BRM: UNIT 2
RESEARCH DESIGN
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SYLLABUS 2. RESEARCH DESIGN

- **2.1** Concept, Features of a good research design, Use of a good research design
- **2.2** Qualitative research and Quantitative research approaches, Comparison - Pros and Cons of both approaches.
- **2.3** *Exploratory Research Design:* Concept, Types: Qualitative techniques - Projective Techniques, Depth Interview, Experience Survey, Focus Groups, Observation.
- **2.4** *Descriptive Research Designs:* Concept, types and uses. Concept of Cross-sectional and Longitudinal Research
- **2.5** *Experimental Design:* Concept of Cause, Causal relationships, Concept of Independent & Dependent variables, concomitant variable, extraneous variable, Treatment, Control group. (Elementary conceptual treatment expected)
- **2.6** *Hypothesis:* Qualities of a good Hypothesis – Framing Null Hypothesis & Alternative Hypothesis. Concept of Hypothesis Testing - Logic & Importance
2.1 Research Design Concept:

- The research design refers to the overall strategy that researchers choose to incorporate the different components of the study in a consistent and logical way, thereby, ensuring researchers will effectively address the research problem;

- The research design constitutes the blueprint for the collection, measurement, and analysis of data. Research design is the framework that has been created to find answers to research questions.

- A research design is the set of methods and procedures used in collecting and analyzing measures of the variables specified in the research problem research study.
Definition by Kerlinger:

“Research design is a plan, structure and strategy of investigations to obtain answers to the research questions.”
A RESEARCH DESIGN SHOULD DEFINE:

- the study type (descriptive, correlation, semi-experimental, experimental, review)
- sub-type of study (e.g., descriptive-longitudinal case study)
- research problem
- hypotheses
- dependent and independent variables
- experimental design
- data collection methods
- a statistical analysis plan
FEATURES OF A GOOD RESEARCH DESIGN:

Objectivity
- The findings obtained by the research should be objective. It is possible by allowing more than one person to agree between the final scores/conclusion of the research.

Reliability
- If the similar research is carried out time and again in a similar setting it must give similar result. So the researcher must frame the research questions to make it reliable and provide similar outcomes.

Validity
- Any measuring device can be said to be valid if it measures what it is expected to measure and nothing else. To make a research valid the questionnaire framed before research must be framed accordingly.

Generalization
- The information collected from given sample must be utilized for providing a general application to the large group of which the sample is drawn.
USE OF A GOOD RESEARCH DESIGN:

- It cuts down on inaccuracy.
- Allows researcher to get optimum efficiency and reliability.
- Reduce wastage of time.
- Reduce uncertainty, confusion and practical haphazard related to any research problem.
- It is a guide for giving research the right path.
- Provides an idea concerning the type of resources needed in terms of money, effort, time, and manpower.
- Maximizes reliability of results.
- Incorporates by learning from other people’s critical comments & evaluations.
RESEARCH APPROACHES CONCEPT

Research Approaches

Qualitative Approach

Quantitative Approach
The **qualitative approach** to research is focused on understanding a phenomenon from a closer perspective.

The **quantitative approach** tends to approximate phenomena from a larger number of individuals using survey methods.
QUALITATIVE APPROACH

- The qualitative approach focuses on describing a phenomenon in a deep comprehensive manner. This is generally done in interviews, open-ended questions, or focus groups.

- In most cases, a small number of participants participate in this type of research, because to carry out such a research endeavor requires many resources and much time.

- However, such research serves as a spring board for larger studies and deeper understanding that can inform theory, practice, and specific situations.
QUALITATIVE APPROACH (PROS)

- Allows identification of new and untouched problems
- Can provide a deeper understanding of research problem or area
- Gives a one-on-one and subjective information
- Provides verbal information that may sometimes be converted to numerical form
QUALITATIVE APPROACH (CONS)

- Cannot generalize to the general population
- Challenges in applying statistical methods
- Difficulty in assessing relations between characteristics
The quantitative approach focuses on describing a phenomenon across a larger number of participants thereby providing the possibility of summarizing characteristics across groups or relationships.

This approach surveys a large number of individuals and applies statistical techniques to recognize overall patterns in the relations of processes. Importantly, the use of surveys can be done across groups.

For example, the same survey can be used with a group of mentors that is receiving training (often called the intervention or experimental groups) and a group of mentors who does not receive such a training (a control group).
QUANTITATIVE APPROACH (PROS)

- Enables gathering information from a relatively large number of participants.
- Can conduct in a number of groups, allowing for comparison.
- Allows generalizing to a broader population.
- Provides numerical or rating information.
- Informative for instantiating policy or guidelines.
- Lends to statistical techniques that allow determining relations between variables.
QUANTITATIVE APPROACH (CONS)

- Difficulty in recognizing new and untouched phenomena
- Caution in interpretation without a control group
- Gives severe or strict results
- Expensive and time consuming experiments
**Summary:**

- The qualitative and quantitative approaches to research allow a different perspective of situations or phenomena.

- These two main approaches to research are highly informative, especially if used in combination.

- Each approach has its benefits and detriments, and being aware of the methods used to gather information can help practitioners and policy-makers understand the extent to which research findings can be applied.
<table>
<thead>
<tr>
<th>Qualitative Methods</th>
<th>Quantitative Methods</th>
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<tbody>
<tr>
<td>Primarily inductive process used to formulate theory or hypotheses</td>
<td>Primarily deductive process used to test pre-specified concepts, constructs, and hypotheses that make up a theory</td>
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<tr>
<td>Methods are more subjective: describes a problem or condition from the point of view of those experiencing it</td>
<td>Methods are more objective: provides observed effects (interpreted by researchers) of a program on a problem or condition</td>
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<tr>
<td>Text-based methods</td>
<td>Number-based methods</td>
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<tr>
<td>More in-depth information on a few cases</td>
<td>Less in-depth but more breadth of information across a large number of cases</td>
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<td>Qualitative Methods</td>
<td>Quantitative Methods</td>
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<tr>
<td>Unstructured or semi-structured response options</td>
<td>Fixed response options</td>
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<tr>
<td>No direct statistical tests can be used</td>
<td>Statistical tests are used for analysis</td>
</tr>
<tr>
<td>Can be valid and reliable: largely depends on skill and rigor of the researcher</td>
<td>Can be valid and reliable: largely depends on the measurement device or instrument used</td>
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<tr>
<td>Time expenditure lighter on the planning end and heavier during the analysis phase</td>
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<td>Qualitative Methods</td>
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<tr>
<td>Less generalize format</td>
<td>More generalize format</td>
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<tr>
<td>Methods include focus groups, in-depth interviews, and reviews of documents for types of themes</td>
<td>Surveys, structured interviews &amp; observations, and reviews of records or documents for numeric information</td>
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Exploratory Research Design:

- Exploratory Research is a systematic investigation carried out for a problem that has not been studied more clearly, establishes priorities, develops operational definitions and improve the final research design.

- Exploratory research helps determine the best research design, suitable data collection method and selection of subjects. It should draw definitive conclusions only with extreme caution. Given its fundamental nature, exploratory research often concludes that a perceived problem does not actually exist.

- An exploratory design is conducted about a research problem when there are few or no earlier studies to refer to. The focus is on gaining insights and familiarity for later investigation or undertaken when problems are in a preliminary stage of investigation.
Types: Qualitative Techniques for Exploratory Design

- Projective Techniques
- Observation
- Depth Interview
- Focus Groups
- Experience Survey
PROJECTIVE TECHNIQUES

- Projective Techniques are indirect and unstructured methods of investigation which have been developed by the psychologists and use projection of respondents for inferring about underline motives, urges or intentions which cannot be secure through direct questioning as the respondent either resists to reveal them or is unable to figure out himself.

- These techniques are useful in giving respondents opportunities to express their attitudes without personal embarrassment.

- These techniques help the respondents to project their own attitude and feelings unconsciously on the subject under study.
DEPTH INTERVIEW

- It’s important to start with a good literature search, but at some point it is desirable to talk to persons who are well informed in the area being investigated.
- These people could be professionals or persons outside the organization. Here, we don’t need questionnaire. The approach adopted should be highly unstructured, so that the participant can give divergent views.
- Depth interviews are widely used to tap the knowledge and experience of individuals with information strongly related the situation or opportunity at hand.
EXPERIENCE SURVEY

An experience survey is a set of questions designed to gauge the overall satisfaction of a group of people who have shared a common experience. Businesses commonly distribute these surveys among customers, and educational institutions often distribute surveys among students.

Experience surveys are usually composed of two types of questions.

The first are multiple-choice questions that allow participants taking the survey to rate their experiences on a scale or indicate their satisfaction levels by choosing from a list of responses.

Many experience surveys also include open-ended questions in which individuals write short responses or expand on their answers in the multiple-choice section.
FOCUS GROUPS

- A focus group is a small, but demographically diverse group of people whose reactions are studied especially in market research or political analysis in guided or open discussions about a new product or something else to determine the reactions that can be expected from a larger population.

- It is a form of qualitative research consisting of interviews in which a group of people are asked about their perceptions, opinions, beliefs, and attitudes towards a product, service, concept, advertisement, idea, or packaging. Questions are asked in an interactive group setting where participants are free to talk with other group members.

- During this process, the researcher either takes notes or records the vital points he or she is getting from the group. Researchers should select members of the focus group carefully for effective and authoritative responses.
OBSERVATION

- Observation is a systematic data collection approach. Researchers use all of their senses to examine people in natural settings or naturally occurring situations.

- Observational research (or field research) is a type of correlation (i.e., non-experimental) research in which a researcher observes ongoing behavior. ... It is a social research technique that involves the direct observation of phenomena in their natural setting.

- Observation can provide the foundation for theory and hypothesis development.
Descriptive research can be explained as a statement of affairs as they are at present with the researcher having no control over variable.

“Descriptive research may be characterized as simply the attempt to determine, describe or identify what is, while analytical research attempts to establish why it is that way or how it came to be”.

In its essence, descriptive studies are used to describe various aspects of the phenomenon. In its popular format, descriptive research is used to describe characteristics and/or behavior of sample population.

Three main purposes of descriptive studies can be explained as describing, explaining and validating research findings.
DESCRIPTIVE RESEARCH DESIGNS (PROS)

- Effective to analyze non-quantified topics and issues
- The possibility to observe the phenomenon in a completely natural and unchanged natural environment
- The opportunity to integrate the qualitative and quantitative methods of data collection
DESCRIPTIVE RESEARCH DESIGNS (CONS)

- Descriptive studies cannot test or verify the research problem statistically
- Research results may reflect certain level of bias due to the absence of statistical tests
- The majority of descriptive studies are not ‘repeatable’ due to their observational nature.
USES OF DESCRIPTIVE RESEARCH DESIGNS

1. What are the most effective ‘employee motivation’ tools in IT sector in the 21st century?
2. What is the impact of online marketing on consumer behavior in consumer amongst students in Pune City?
3. What are the main distinctive traits of organizational culture of Amazon India?
4. What is the impact of GST in financial industrial growth?
Types of Descriptive Research Designs

Descriptive Research Types

Cross-Sectional
- Single Cross sectional
- Multiple Cross sectional

Longitudinal
- Panel Study
- Cohort Study
- Retrospective Study
CONCEPT OF CROSS-SECTIONAL RESEARCH

A cross-sectional study involves looking at people who differ on one key characteristic (such as age) at one specific point in time. The data is collected at the same time from people who are similar on other characteristics but different on a key factor of interest such as age, income levels and geographic locations. Participants are usually separated into groups known as cohorts.

For example, researchers might create cohorts of participants who are in their 20s, 30s, and 40s.
CROSS-SECTIONAL RESEARCH

This type of study uses different groups of people who differ in the variable of interest but who share other characteristics such as socioeconomic status & educational background.

For example, researchers studying developmental psychology might select groups of people who are remarkably similar in most areas but differ only in age. By doing this, any differences between groups can presumably be attributed to age differences rather than to other variables.
Cross-sectional studies are observational in nature and are known as descriptive research not causal or relational. Researchers record the information that is present in a population, but they do not manipulate variables.

This type of research can be used to describe characteristics that exist in a community, but not to determine cause-and-effect relationships between different variables.
ADVANTAGES OF CROSS-SECTIONAL STUDIES

- Cross-sectional studies are usually relatively inexpensive and allow researchers to collect a great deal of information quite quickly.
- Data is often obtained using self-report surveys and researchers are often able to accumulate large amounts of information from a large pool of participants.
- Researchers can collect data on some different variables to see how differences in sex, age, educational status, income etc and might correlate with the critical variable of interest.
- While cross-sectional studies cannot be used to determine causal relationships that can provide a useful launch pad to further research.
Single cross sectional research: Information is obtained only once from only one sample of responders.

Multiple cross sectional research: Information is obtained only once but from two or more samples of responders.
CONCEPT OF LONGITUDINAL RESEARCH

- Longitudinal research is a type of correlation research that involves looking at variables over an extended period of time. This type of study can take place over a period of weeks, months, or even years.

- Longitudinal research is used to discover relationships between variables that are not related to various background variables.

- This observational research technique involves studying the same group of individuals over an extended period.

- Data is first collected at the outset of the study, and may then be repeatedly gathered throughout the length of the study.

- For example, imagine that a group of researchers is interested in studying how exercise during middle age might impact cognitive health as people age. The researchers hypothesize that people who are more physically fit in their 40s and 50s will be less likely to experience cognitive declines in their 70s and 80s.
THE ADVANTAGES OF LONGITUDINAL RESEARCH

- Longitudinal studies provide unique insight that might not be possible with other forms of research.
- It allows researchers to look at changes over time.
- Since the participants share these similar characteristics, it is assumed that any differences are due to environmental factors. Researchers can then look at what the participants have in common versus where they differ to see which characteristics are more strongly influenced by either genetics or experience.
The Drawbacks of Longitudinal Research

- Longitudinal Studies Can Be Expensive
- Participants Tend to Drop Out Over Time
TYPES OF LONGITUDINAL RESEARCH

- **Panel Study:** Involves sampling a cross-section of individuals.
- **Cohort Study:** Involves selecting a group based on a specific event such as birth, geographic location or historical experience.
- **Retrospective Study:** Involves looking to the past by looking at historical information such as medical records.
EXPERIMENTAL DESIGN: CONCEPT OF CAUSE, CAUSAL RELATIONSHIPS

○ Causal Research:
Causal research also called explanatory research. It is the investigation of cause and effect relationships. To determine causality, it is important to observe variation in the variable assumed to cause the change in the other variable(s), and then measure the changes in the other variable(s).

○ Cause and Effect:
Causality (cause and effect) is the agency or efficacy that connects one process (the cause) with another process or state (the effect), where the first is understood to be partly responsible for the second, and the second is dependent on the first. In general, a process has many causes, which are said to be causal factors for it, and all lie in its past. An effect can in turn be a cause of many other effects.
There are two methods for exploring the cause-and-effect relationship between variables:
- Experimental and Statistical Research
Experimental Research

Experimental research is an attempt by the researcher to maintain control over all factors that may affect the result of an experiment. In doing this, the researcher attempts to determine or predict what may occur.

Experimental Design:

Experimental Design is a blueprint of the procedure that enables the researcher to test his hypothesis by reaching valid conclusions about relationships between independent and dependent variables. It refers to the conceptual framework within which the experiment is conducted.
STATISTICAL RESEARCH

- It is a branch of mathematics dealing with the collection, analysis, interpretation, presentation, and organization of data. In applying statistics to,

- e.g., a scientific, industrial, or social problem, it is conventional to begin with a statistical population or a statistical model process to be studied. Statistics deals with all aspects of data including the planning of data collection in terms of the design of surveys and experiments.
Concept of Types of Variables

Variable

- A variable is any entity that can take on different values.
- Variables can be defined as any aspect of a theory that can vary or change as part of the interaction within the theory.
- In other words, variables are anything can effect or change the results of a study.
- Every study has variables as these are needed in order to understand differences.
DEPENDENT VARIABLE

- The Dependent variables are those that depend on other factors that are measured. These variables are expected to change as a result of an experimental manipulation of the independent variable or variables.
- It is the presumed effect.
- Value of dependent variable may change due to change in independent variable.
- In research, effect of independent variable on dependent variable is studied.
INDEPENDENT VARIABLE

- The variable that is stable and unaffected by the other variables you are trying to measure. It refers to the condition of an experiment that is systematically manipulated by the investigator.
- It is the presumed cause.
- There may be one or many independent variables. By changing theses variables, effect on dependent variables is considered.
MODERATING VARIABLE

- It is the third variable that affects strength of relationship between dependent and independent variables.
- There is at least one independent and dependent variable in each relationship, other variables are not considered in relationship.
INTERVENING VARIABLE

- It is the hypothetical internal scale that is used to explain the relationship between observed variables.
- Such are the variables arising between the starting time and till independent variables influence remains on dependent variables. Intervening variables are not observable and measurable directly.
**EXTRANEOUS VARIABLE**

- These are undesirable variables that influence the relationship between variables under study.
- These are the independent or moderating but external variables which are not connected to objective of research study but affect dependent variables. The effect is called as experimental error.
CONCOMITANT VARIABLE

- These types of variables are observed in study but not measured.
- Concomitant means accompanying. There is relationship between variables. In research such relationship it observed and hypothesis is formed
- e.g. fruit juices in attractive packing are sold more. On this basis hypothesis is that all fruit juices in attracting packing will have more sales than others. So, variables associated are identified and many variables influencing one another are found.
HYPOTHESIS

- A hypothesis (plural hypotheses) is a proposed explanation for a phenomenon. For a hypothesis to be a scientific hypothesis, the scientific method requires that one can test it.
- A hypothesis is a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation.
QUALITIES OF A GOOD HYPOTHESIS

- It should be empirical statements i.e., susceptible to observation. The hypotheses should not be normative.
- It should explain a general phenomenon, rather than a single occurrence.
- It should be plausible - it shouldn't challenge logic.
- It should be specific, meaning that the concepts are carefully defined.
- It must be testable
- It should rely on sound reasoning
- It should be neatly affirms the relationship between variables
- It should offers a valid explanation for some outcome
- It should be under test in a valid period of time
- It should have an if–then statement.
Null hypothesis ($H_0$)

- The null hypothesis states that a population parameter is equal to a value. The null hypothesis is often an initial claim that researchers specify using previous research or knowledge.

Alternative Hypothesis ($H_1$)

- The alternative hypothesis states that the population parameter is different than the value of the population parameter in the null hypothesis. The alternative hypothesis is what you might believe to be true or hope to prove true.
**Concept of Hypothesis Testing**

- The theory, methods, and practice of testing a hypothesis are done by comparing it with the null hypothesis.
- The null hypothesis is only rejected if its probability falls below a predetermined significance level, in which case the hypothesis being tested is said to have that level of significance.
- A hypothesis test is a statistical test that is used to determine whether there is enough evidence in a sample of data to infer that a certain condition is true for the entire population.
- A hypothesis test examines two opposing hypotheses about a population: the null hypothesis and the alternative hypothesis. The null hypothesis is the statement being tested.
- Usually the null hypothesis is a statement of "no effect" or "no difference".
- The alternative hypothesis is the statement you want to be able to conclude is true.
FOUR STEPS OF HYPOTHESIS TESTING

All hypotheses are tested using a four-step process.

1) The first step is for the analyst to state the two hypotheses so that only one can be right.
2) The second step is to formulate an analysis plan, which outlines how the data will be evaluated.
3) The third step is to carry out the plan and physically analyze the sample data.
4) The fourth and final step is to analyze the results and either accept or reject the null.
EXAMPLE:

Purpose two hypotheses for following: (December 2013, SPPU)

Q1) Level of worker output and closeness of worker supervision
ANSWER 1

- **Dependent variable:** Level of worker output

- **Independent variable:** Closeness of worker supervision
HYPOTHESIS STATEMENTS

Null hypothesis \((H_0)\)
- There is no significant difference between level of worker output and closeness of worker supervision.

Alternative Hypothesis \((H_1)\)
- There is a significant difference between level of worker output and closeness of worker supervision.
Q 2) Attendance in class and students’ performance in examination
**Answer 2**

- **Dependent variable:**
  Students’ performance in examination

- **Independent variable:**
  Attendance in class
HYPOTHESIS STATEMENTS

Null hypothesis \((H_0)\)
- There is no significant difference between attendance in class and students’ performance in examination.

Alternative Hypothesis \((H_1)\)
- There is a significant difference between attendance in class and students’ performance in examination.
Thank You