RESEARCH METHODOLOGY
CHAPTER 2
SCIENTIFIC INVESTIGATION

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Definition of Scientific Research

- focusing on solving problems and
- pursues a step-by-step logical, organized and rigorous method to identify the problems, gather data, analyze them and draw valid conclusions there from.

Why Scientific Research?

- not based on hunches, experience and intuition.
- purposive and rigorous.
- Enables all those who are interested in researching and knowing about the same or similar issues to come up with comparable findings when data are analyzed.
- Findings are accurate and confident.
- Apply solutions to similar problems.

The Hallmarks of Scientific Research

The hallmarks (main distinguishing characteristics) of scientific research may be listed as follows:

1. Purposiveness
2. Rigor
3. Testability
4. Replicability
5. Precision and Confidence
6. Objectivity
7. Generalizability
8. Parsimony
Purposiveness

It has to start with a definite aim or purpose. It should have a purposive focus.
- Eg: The focus is on increasing employee commitment.
- Increase employee commitment will translate into:
  - less turnover,
  - less absenteeism and
  - increased performance levels.

Bad Examples
- Studying Commitment of Employees
- Consumer preferences about food packing
- What is our market share?

Good Examples
- Studying factors that contribute to normative commitment of managers
- How do consumers respond to color of food packages
- What is our market share regarding type A and Type B product in different regions

Rigor

- A good theoretical base and methodological design
- Rigor adds carefulness, scrupulousness and the degree of exactitude in research.

Example:
A manager asks 10-12 employees how to increase the level of commitment. This research would lack rigor for the following reasons:
1. Based on few employees
2. Bias and incorrectness
3. There might be other influences on commitment which are ignored and important for a researcher to know

Following factors enable the researcher to collect the right kind of information:
- from an appropriate sample
- with the minimum degree of bias and
- facilitate suitable analysis of the data gathered.
Testability

After random selection manager and researcher develops certain hypothesis on how manager employee commitment can be enhanced, then these can be tested by applying certain statistical tests to the data collected for the purpose.

- The researcher might hypothesize that
  - those employees who perceive greater opportunities for participation in decision making would have a higher level of commitment.

Replicability

- It means that it can be used again if similar circumstances prevails.
- Hypotheses have not been supported merely by chance

Precision and Confidence

- Precision refers to the closeness of the findings to “reality” based on a sample.
- It reflects the degree of accuracy and exactitude of the results of the sample.
- Confidence refers to the probability that our estimations are correct.

Example: Confidence interval...

95% confidence level – which implies that there is only a 5% probability that the findings may not be correct

Objectivity

- The conclusions drawn through
  - the interpretation of the results of data analysis should be objective;
  - they should be based on the facts of the findings derived from actual data,
  - and not on our subjective or emotional values.
**Generalizability**
- It refers to the scope of applicability of the research findings in one organization setting to other settings.
- For wider generalizability, the research sampling design has to be logically developed.

**8. Parsimony**
- Parsimony → a good understanding of the problem and the important factors that influence it.
- “For instance, if 2-3 specific variables in the work situation are identified, which when changed would raise the organizational commitment of the employees by 45%, that would be more useful be more useful and valuable to the manager than if it were recommended that he should change 10 different variables to increase organizational commitment by 48%.”

**The Building Blocks of Science in Research**

**Deduction and Inductions**
Answers to issues can be found either by the process of induction or the process of deduction, or by a combination of the two.

**Deduction**
- Deduction is the process by which we arrive at a reasoned conclusion by logical generalization of a known fact.
**Induction**

- Induction is a process where we observe certain phenomena and on this basis arrive at conclusions.

**CONCEPT – What is MINNETTI?**

**EXAMPLE**

**NON-EXAMPLE**

**EXAMPLE**

**NON-EXAMPLE**
What is minnetti?

- Minetti is
- a five-sided figure enclosing two dots.

The Hypothetico-Deductive Method

Observation

- Observation is the first stage, in which one senses that certain changes are occurring or that some new behaviors, attitudes and feelings are surfacing in one’s environment (i.e., the workplace).
- How does one observe phenomena and changes in the environment?
Preliminary Information Gathering:

- It involves the seeking of information in depth, of what is observed.
- Unstructured interviews
- Structured interviews.
- Doing library research or obtaining information through other sources, the investigator would identify how such issues have been tackled in other situations.

Theory Formulation

- It is an attempt to integrate all the information in a logical manners, so that the factors responsible for the problem can be on conceptualized and tested.
- The theoretical framework formulated is often guided by experience and intuition.
- In this step the critical variables are identified and examined as to their contribution or influence in explaining why the problem occurs and how it can be solved.

Hypothesizing

- It is the next logical step after theory formulation.
- From the theorized network of associations among the variables, certain testable hypotheses or educated conjectures can be generated.

- Hypothesis testing is called deductive research. Sometimes, hypotheses that were not originally formulated do get generated through the process of induction.

Further Specific Data Collection

- After the development of the hypotheses, data with respect to each variable in the hypotheses need to be obtained.
- Further data are collected to test the hypotheses that are generated in the study.
Data Analysis

- Data gathered are statistically analyzed to see if the hypotheses that were generated have been supported.
- Co relational method will be used to analyze and determine the relation ship of two or more factors in the hypotheses for example: stock availability and customer satisfaction.

Deduction

- Deduction is the process of arriving at conclusions by interpreting the meaning of results of the data analysis.