

Chapter One

The Nature and Scope of Research

Contents

- Definition of research
- Objective, motivation, and significance of research.
- Types of research
- Research and theory
- Stages of the research process

What is research? (1)

- Different definitions by different scholars in different discipline.
 - The systematic investigation and study of materials and resources in order to **establish** and **reach** at new conclusions.
 - Scientific research is **systematic, controlled, empirical**, and **critical** investigation of **natural phenomena** guided by theory and hypotheses about the presumed relations among such phenomena

What is research? (2)

- Seeking through methodical processes to add to one's own body of knowledge and to that of others, by discovery of non trivial facts and insights
- A scientific and systematic search for pertinent / **relevant**/ information on a specific topic
 - A systematic **effort** to gain new knowledge
- Research is an **organized** and **systematic** way of **finding answers to questions**

What is research? (3)

- **Systematic:** Because there is a **definite set of procedures** and **steps** which you will follow
- **Organized:** It is a planned procedure, not a spontaneous one. It is focused and limited to a **specific scope**
- **Finding answers**
 - It is the end of all questions
 - Whether it is the answer to the hypothesis or even a simple question, research is successful when we find answers. Some times the answer may be no, but Still this is the answer.

What is research? (4)

- **Questions:** Are central to a research
 - If there is no question, then the answer is of no use
 - Research is focused on relevant, useful and important questions
 - Without a question, research has no focus, drive or purpose

What is research? (5)

- Research is an academic activity
 - Search for knowledge
 - An art of scientific investigation
- Research **includes**
 - Defining and redefining problems
 - Formulating hypothesis
 - Collecting, organizing and evaluating data
 - Making deductions and reaching conclusions
 - Carefully testing the conclusions to determine whether they fit the formulated hypothesis or not.

Objectives of Research (1)

- To discover **answers to questions** through the application of scientific procedures
- To **find out the truth** which is hidden/has not been discovered as yet
- To gain familiarity with the phenomenon or to **achieve new insights** in to it

Objectives of Research (2)

- To portray accurately the characteristics of a particular individual, situation or a group
- To determine the frequency with which something occurs or with which it is associated with something else
- To test the hypothesis of casual relationships between variables

Significance of Research (1)

- Increased amount of **research** make progress possible
- Promote scientific thinking & development of logical habits of thinking & organization.
- There is more **information** and **knowledge** to understand the world than before
- Necessary in allocation of resources or for optimum resource allocation

Significance of Research (2)

- A means of livelihood
- An outlet for new ideas & insights
- The development of new styles & creative work
- The generalizations of new theories
- Fountain of knowledge
- Important source of providing guidelines for solving different problems

Motivations in Research

What makes people to **undertake** research

- Desire to get **research degree** along with its consequential benefits
- Desire to solve a **challenge** in solving the unsolved problems
- Desire to design appropriate policies
- Desire to contribute to the existing stock of knowledge
- Desire to get intellectual joy of doing some creative work
- Desire to be of service to the society
- Directives of government
- **Curiosity /Interested/** about new things

Types of Research

Research can be classified in terms of the following

- **Goal of research:** Applied vs. Basic
- **Specific objective of research:** Descriptive, Explanatory, and Exploratory
- **Approaches of research:** Quantitative vs. Qualitative
- **Design:** Experimental vs. Non Experimental
- **The type of data used in the research:** Primary vs. Secondary
- **Field of study:** Natural , social, educational, behavioral, health science etc.

Applied research Vs. Basic research (1)

- **Applied Research**

- Designed to solve problems of the **modern world** rather than to acquire knowledge for **knowledge sake**
- Applied research is about testing theories generated by pure/basic research and applying them to real situation for answers to **specific** questions
- Aims at finding a solution for an **immediate** problem facing a society or any **industrial/business** organization

Applied research Vs. Basic research (2)

- **Fundamental/basic/pure research**

- Its primary objective is the **advancement of knowledge** and theoretical understanding of relations among variables
- It is the formulation of theory
- It mainly concerned with **generalizations** and with the **formulation of a theory**
 - **Examples:-** research relating to pure mathematics like Driving Formulas. And research carried out to make generalization about human behavior.
- The driving force in basic research is researcher's curiosity or interest in a scientific question
- The motivation behind is to expand human knowledge, not to create or invent something that has practical significance

Types of Research: Descriptive research

- The goal of descriptive research is to describe some aspects of a phenomenon, i. e the status of given phenomenon
- It can help understand a topic and lead to causal analysis
- Used to identify and classify the elements or characteristics of the subject
- Involves a variety of research methods to achieve its goal
 - Surveys, Correlation studies, Observation studies, Case studies

Research Type: Explanatory research

- When we encounter an issue that is already known and have a description of it, we might begin to wonder **why things are the way they are**
- The desire to know “why” to explain is the purpose of explanatory research
- Finding the Reasons why? Focuses on why question
- Usually referred as **hypothesis-testing**

Research Type: Explanatory research

- It is a continuation of descriptive research and builds on exploratory and descriptive research and goes on to identify the reasons for something that occurs.
- Analytical research often extends the descriptive approach to suggest or explain **why** or **how** something is happening, e.g. underlying causes of industrial action.
 - An important feature of this type of research is in locating and identifying the different factors (or variables) involved.

Research Type: Exploratory research (1)

- Exploratory research is undertaken when few or no previous studies exist
 - Undertaken with the aim of clarifying ambiguous problems
- The aim is to look for patterns, hypotheses or ideas that can be tested and will form the basis for further research.

Research Type: Exploratory research (2)

- General problems usually known but not sufficiently understood
- The purpose is to get more information, not to uncover specific courses of action (subsequent research).
- Typical research techniques would include:
 - Case studies,
 - Observation and
 - Reviews of previous related studies and data.

- Qualitative research vs. Quantitative research
- Quantitative Research
 - Based on the measurement or amount -
 - Applicable to phenomenon that can be expressed in terms of quantity
 - It is objective type of research
 - The emphasis is on collecting and analyzing *numerical* data;
 - It concentrates on **measuring** the scale, range, frequency etc. of phenomena.
 - Although harder to design initially, is usually highly detailed and structured and results can be easily collated and *presented statistically*.

Qualitative Research

- Concerned with qualitative phenomenon/related to quality or kind
- It is **subjective** type of research
- Concerned with subjective assessment of attitudes, opinions, and behaviors
- More subjective in nature than quantitative and involves examining and reflecting on the less tangible aspects of a research subject, e.g. values, attitudes, perceptions
 - Although this type of research can be easier to start, it can be often difficult to interpret and present the findings; the findings can also be challenged more easily

Empirical vs Non Experimental Research

- Relies on **experience** or **observation**
- It is **data based** research, coming up with conclusions which are capable of being verified
- Tried to prove a given hypothesis with new data
- From the point of view of **TIME**, we may have
 - **Cross Sectional Research**:- where the research is confined to a single time period. Also called one time research
 - **Longitudinal Research**:- where the research is carried out several time periods

Research and Theory (1)

- A statement or set of statements explaining one or more laws, usually including one indirect concept needed to explain the relationships between variables.
 - The statements concern only a single relationship between variables=***a law***.
 - However a number of laws are tied together in a more general set of statements, which is called ***theory***.
- Theoretical concepts are not observed directly, they can be observed only indirectly by reference those events that are directly observed.
- A theoretical concept is an invention of the scientist to account laws of behavior. E.g. In physics, no one has ever seen an electron. It is a theoretical concept invented to account for particular law of physics.

Research and Theory (2)

- Theory is based upon a hypothesis and backed by evidence
- A theory presents a concept or idea that is testable
 - In science, a theory is not merely a guess
- A theory is a fact-based framework for describing a phenomenon
- In psychology, theories are used to provide a model for understanding human thoughts, emotions and behaviors

The Scientific Approach

- The **Scientific Method** involves a series of steps that are used to investigate a natural occurrence.

Steps of a Scientific method

1. Problem description /Question
2. Observation/Research
3. Formulate a Hypothesis
4. Experiment
5. Collect and Analyze Results
6. Conclusion
7. Communicate the Results

Steps of a Scientific method (2)

1. **Problem/Question:** Develop a question or problem that can be solved through experimentation
2. **Observation/Research:** Make observations and research your topic of interest.
3. **Formulate a Hypothesis:** Predict a possible answer to the problem or question.
 - Example: If **soil temperatures** rise, then **plant growth** will increase

Steps of a Scientific method (3)

4. **Experiment:** Develop and follow a procedure

- Include a detailed materials list
- The outcome must be measurable (quantifiable)

5. **Collect and Analyze Results**

- Modify the procedure if needed
- Confirm the results by retesting
- Include tables, graphs, and photographs

Steps of a Scientific method

6. Conclusion: Include a statement that accepts or rejects the hypothesis.

- Make recommendations for further study and possible improvements to the procedure.

7. Communicate the Results: Be prepared to present the project to an audience

- Expect questions from the audience

Research Process



Stages of the Research Process

- Problem identification and its justification
 - State of the Art/ Literature Review, Context definition, Questions/Hypothesis
- Planning the Research Design/ Methodology
- Data Collection
- Data Analysis
- Hypothesis Testing
- Report Writing

THANK YOU