

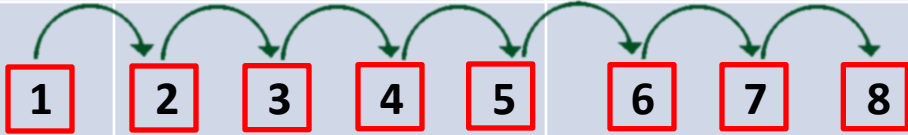
Ph.D. Course Work  
Research Methodology: ECON6001

# Research Process

Shreedhar Satyakam  
Department of Economics  
Mahatma Gandhi Central University

# THE RESEARCH PROCESS\*

## An Eight Step Model

Phase	Phase I	Phase II	Phase III					
Main Task	DECIDING ↓	PLANNING ↓	UNDERTAKING ↓					
	WHAT (research questions to answer)	HOW (to gather evidence to answer the research questions)	COLLECTING (the required information)					
Operational Steps / Research Journey								

\*Source: Kumar, R. (2011). Research Methodology, SAGE, New Delhi.

Step 1: Formulating a Research Problem

- **Required theoretical knowledge:**
  - \* Considerations and steps in formulating a research problem
  - \* Identifying variables
  - \* Constructing hypotheses
- **Required intermediary knowledge:**
  - \* Reviewing the literature

- First and most important step
- Identification of destination – what you intend to research
- It is like the ‘input’ upon which the quality of the ‘output’ entirely depends
- Main objective and sub-objectives must be specific and free from ambiguity
- Developing operational definitions for the concepts that you propose to study is extremely important

# Formulating a Research Problem

## Sources of Research Problem

Most research revolves around **four Ps** :

**1- People, 2- Problems, 3- Programmes, 4- Phenomenon**

Aspects of a Study	About	Study of	
<b>Study Population</b>	<b>People</b>	Individuals, groups, organizations, communities	Source of information
<b>Subject Area</b>	<b>Problem</b>	Issues, situations, needs, population, compositions, etc.	Information that you need to collect to find answers to your research questions
	<b>Programme</b>	Contents, structures, outcomes, consumers, providers, etc.	
	<b>Phenomenon</b>	Cause and effect, relationships, study of a phenomenon itself etc.	

# Formulating a Research Problem

## Considerations in selecting a research problem

When selecting a research problem /topic there are a number of considerations to keep in mind which will help to ensure that your study will be **manageable** and that you remain **motivated** –

- ✓ Interest
- ✓ Magnitude
- ✓ Measurement of concepts
- ✓ Level of expertise
- ✓ Relevance
- ✓ Availability of data
- ✓ Ethical issues

# Formulating a Research Problem

## Steps in formulating a research problem

- ✓ **Step-1 – Identity a broad field or subject area of interest to you.**
- ✓ **Step-2 – Dissect the broad area into subareas**
- ✓ **Step-3 – Select what is of most interest to you**
- ✓ **Step-4 – Raise research questions**
- ✓ **Step-5 – Formulate objectives**
- ✓ **Step-6 – Assess your objectives**
- ✓ **Step-7 – Double-check**

Suppose you want to study the relationship between fertility and mortality. Follow these steps:

### **Step 1. Identity**

- \* fertility and mortality

### **Step 2. Dissect**

- \* trends in fertility and mortality
- \* determinants of fertility behaviour
- \* relationship between fertility and mortality
- \* impact of health services on mortality
- \* impact of contraceptives on fertility behaviour, etc.



### Step 3. Select

- \* relationship between fertility and mortality

### Step 4. Raise Questions

- \* what happens to fertility when mortality declines?
- \* what is the time lag between the start of decline in mortality and start of decline in fertility?
- \* what are the factors that contribute to the decline in fertility? etc.

## Step 5. Formulate Objectives

**Main objective:** to explore the relationship between fertility and mortality.

**Specific objectives:**

- \* to find out the extent of the decline in fertility in relation to the decline in mortality
- \* to ascertain the time lag between the decline in mortality and the decline in fertility
- \* to identify the factors that affect the changes in fertility
- \* to explore the relationship between socioeconomic and demographic characteristics of the population and the extent of changes in fertility and mortality

## Step 6. Assess Objectives

Assess these objectives in the light of:

- \* the work involved
- \* the time available to you
- \* the financial resources at your disposal
- \* your (and your research supervisor's) technical expertise in the area

## Step 7. Double-check

- \* that you are really interested in the study
- \* that you agree with the objectives
- \* that you have adequate resources
- \* that you have the technical expertise to undertake the study

**(If your answer to one of the above is 'NO', reassess your objectives.)**

# Formulating a Research Problem

## Identifying Variables and Constructing Hypotheses

In the process of formulating a research problem, in the case of quantitative research, there are two important considerations:

1. The use of concepts and variables.
2. Construction of hypotheses.

# Formulating a Research Problem

## Identifying Variables

### Concept:

Concepts are mental images or perceptions and therefore their meanings vary from individual to individual. In defining a research problem or the study population you may use certain words that as such are difficult to measure and/ or the understanding of which may vary from person to person. These words are called concepts. In order to measure them they need to be converted into indicators (not always) and then variables. Words like satisfaction, rich, happy are concepts as their understanding very from person to person.

# Formulating a Research Problem

## Identifying Variables

### Indicators:

An image, perception or concept is sometimes incapable of direct measurement. In such situations a concept is 'measured' through other means which are logically 'reflective' of the concept. These logical reflectors are called indicators. For example 'income' and/ or 'assets' are indicators reflecting the concept of 'rich'.

# Formulating a Research Problem

## Identifying Variables

### Variable:

An image, perception or concept that is capable of measurement – hence capable of taking on different values – is called a variable. In other words, a concept that can be measured is called a variable. A variable is a property that takes on different values. It is a rational unit of measurement that can assume any one of a number of designated set of values.

**Measurability is the main difference between a concept and a variable.**

# Formulating a Research Problem

## Identifying Variables

### Converting Concepts into Variables:

Concept	Indicators	Variables	Decision Level (working definitions)
Rich	<ol style="list-style-type: none"><li>Income</li><li>Assets</li></ol>	<ol style="list-style-type: none"><li>Income per year</li><li>Total value of assets</li></ol>	<ol style="list-style-type: none"><li>if &gt; Rs. 10 lakh</li><li>If &gt; Rs. 25 lakh</li></ol>



# Formulating a Research Problem

## Constructing Hypotheses

A hypothesis is a hunch, assumption, suspicion, assertion or an idea about a phenomenon, relationship or situation, the reality or truth of which you do not know and you set up your study to find this truth.

A hypothesis is a tentative statement about something, the validity of which is usually unknown. A hypothesis is written in such a way that it can be proven or disproven by valid and reliable data.

A hypothesis has certain characteristics:

1. It is a tentative proposition.
2. Its validity is unknown.
3. In most cases, it specifies a relationship between two or more variables.

# Formulating a Research Problem

## Constructing Hypotheses

### Considerations for constructing a hypothesis:

- A hypothesis should be simple, specific, and conceptually clear. It should be unidimensional – that is, it should test only one relationship or hunch at a time.
- A hypothesis should be capable of varification.
- A hypothesis should be related to the existing body of knowledge, and that it adds to it.
- A hypothesis should be operationalisable – that is, it can be expressed in terms that it can be measured. If it can not be measured, it can not be tested and, hence, no conclusions can be drawn.

# Formulating a Research Problem

## Constructing Hypotheses

Hypotheses bring clarity, specificity and focus to a research problem, but are not essential for a study. You can conduct a valid investigation without constructing a single formal hypothesis. On the other hand, within the context of a research study, you can construct as many hypotheses as you consider to be appropriate.

# Formulating a Research Problem

## Function of Hypothesis

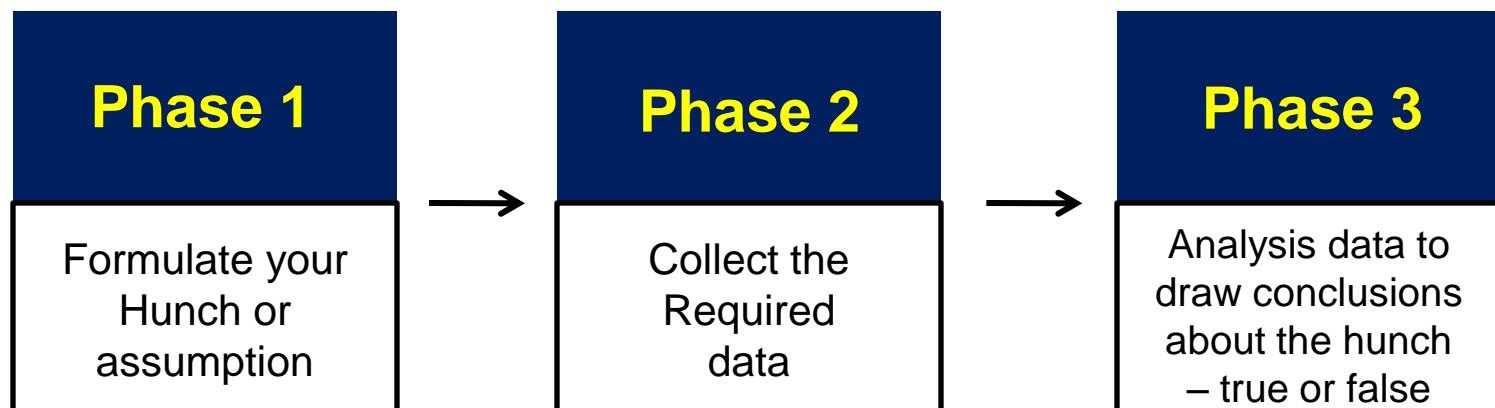
- The formulation of hypothesis provides a study with focus. It tells you what specific aspects of a research problem to investigate.
- A hypothesis tells you what data to collect and what not to collect, thereby providing focus to the study.
- As it provides a focus, the construction of a hypothesis enhances objectivity in a study.
- A hypothesis may enable you to add to the formulation of theory. It enables you to conclude specifically what is true or what is false.

# Formulating a Research Problem

## Testing of a Hypothesis

The testing of a hypothesis comprises three phases

- 1- Constructing hypothesis
- 2- Gathering appropriate evidence
- 3- Analysing evidence to draw conclusions as to its validity



Step 2 : Conceptualising a research designResearch Design

The research design is a plan, structure and strategy of investigation so conceived as to obtain answers to research questions or problem.

A research design is a complete procedural plan that is adopted by the researcher to answers questions validly, objectively, accurately and economically.

The main function of a research design is to explain **HOW** you will find answer to your research questions.

- A **Research Design** provides framework for the collective analysis of data. Choice of Research Design reflects decision about priorities given to the dimensions of the research process.
- A **Research Method** is simply a technique for collection of data. Choice of research method reflects decisions about the type of instruments or techniques to be used.

# Research Design

A detailed outline of how an investigation will take place.

The way in which researcher develops Research Design is fundamentally effected in whether the research question is descriptive or explanatory.

Social researcher ask two fundamental types of research questions –

- What is going on (descriptive research) ?
- Why is it going on (explanatory research) ?



# Descriptive Research

Descriptive Research is not merely description. Good design is fundamental to the research and it has added immeasurably to our knowledge of the shape and nature of our society.

*Example –*

- How much poverty is there in this community?
- Is the level of inequality increasing or declining?
- What is accurate description of level of unemployment?
- Good design provokes the "Why" question of explanatory research, i.e. why is this happening?

# Explanatory Research

- Explanatory Research focuses on "Why" question for example, it is one thing to describe the poverty rate in a country, to examine trends over time or to compare rates in different countries.
- It is quite a different thing to develop explanations about why poverty is as high as it is, why some types of poverty are increasing or why the rate is higher in some countries than in others.
- Answering the why question involves developing causal explanation. Causal explanations argue that phenomenon Y (e.g. income level is affected by factor X e.g. gender)

- **A Plan** – Specifies the sources and types of information relevant to the research problem.
- **A Strategy** – Which approach will be used for gathering and analyzing the data.
- **The time & cost budget** – Most studies are done under these two conditions.

## Research Design must, at least, contain –

- a clear statement of the **research problem**,
- **procedures and techniques** to be used for gathering information,
- the **population** to be studied,
- **methods** to be used in processing & analyzing data,

# Designing Decisions

- What is the study about?
- Why is the study being made?
- Where will the study be carried out?
- What type of data is required?
- Where can the required data be found?
- What periods of time will the study include?
- What will be the sample design?
- What techniques of data collection will be used?
- How will the data be analyzed?
- In what style will the report be prepared?

## Split the overall Research Design into the following parts

- **Sample design** – the method of selecting items to be observed
- **Observations design** – the conditions under which the observations are to be made
- **Statistical design** – the question of how many items are to be observed & how the information and data gathered are to be analysed.
- **Operational design** – the techniques by which the procedures specified in the sampling, observational and statistical designs can be carried out.

## The Various Concepts Relating to Designs

1. Dependent and independent variables
2. Extraneous variable
3. Control
4. Confounded relationship
5. Research Hypothesis
6. Experimental and control groups

# Dependent and Independent Variables

- A concept which can take on different quantitative values (a variable)
- Qualitative phenomena (or the attributes) are also quantified
- If one variable depends upon or is a consequence of the other variable – a dependent variable
- The variable that is antecedent to the dependent variable – an independent variable



# Extraneous Variable

Independent variables that are **not related** to the purpose of the study, but may affect the dependent variable.

- The researcher wants to test the hypothesis - a relationship between level of women's income and their education level.
  - education is an independent variable, & level of income is a dependent variable.
  - family background may as well affect the level of income, but since it is not related to the purpose of the study undertaken by the researcher, it will be turned as an extraneous variable.
- Whatever effect is noticed on dependent variable as a result of extraneous variable (s) is technically described as an '**experimental error**'.

# Control

One important characteristic of a good research design is to minimize the influence or effect of extraneous variable(s).

# Confounded Relationship

- When the dependent variable is not free from the influence of extraneous variable(s).
- the relationship between the dependent and independent variables is said to be confounded/confused by an extraneous variable(s).

# Research Hypothesis

- When a prediction or a hypothesized relationship is to be tested by scientific methods, it is termed as research hypothesis.
- The research hypothesis is **predictive statement** that relates an independent variable to a dependent variable.

## Experimental Group & Control Group

In an experimental hypothesis-testing research when a group is exposed to usual condition, it is termed a '**Control Group**', but when the group is exposed to some novel or special condition, it is termed as '**experimental group**'.

## Conceptualizing a research design

- **Required theoretical knowledge:**
  - \* The research designs: functions
  - \* Selecting a study design
- **Required intermediary knowledge:**
  - \* Reviewing the literature

# Conceptualizing a research design

## **The functions of Research Design :**

A research design has two main functions –

1. The identification and development of procedures required to undertake and complete the study.
2. To insure that these procedure are adequate to obtain valid, objective and accurate answers to research question.

# Conceptualizing a research design

One of the most important requirements of a research design is to specify everything clearly so a reader will understand what procedures to follow and how to follow them. A research design, therefore, should do the following.

- Name the study design per – this is, ‘cross-sectional’, ‘before-and-after’, ‘longitudinal’.
- Provide detailed information about the following aspects of the study.
  - Who will constitute the study population?
  - How will the study population be identified?
  - Will a sample or the whole population be selected?
  - If a sample is selected, how will it be contacted?
  - How will consent be sought?
  - What method or data collection will be used and why?
  - In the case of a questionnaire, where will the responses be returned?
  - How should respondents contact you if they have queries?
  - In the case of interviews, where will they be conducted?
  - How will ethical issues be taken care of?



# Constructing an instrument for data collection

## Step 3 : Constructing an instrument for data collection

- **Required theoretical knowledge:**
  - \* Methods and tools of data collection
  - \* Selecting a method of data collection
  - \* Collecting data using attitudinal scales
  - \* Establishing the validity and reliability of a research instrument
- **Required intermediary knowledge:**
  - \* Field test of the research tool
  - \* Reviewing the literature

# Selecting a Sample

## Step 4 : Selecting a sample

The accuracy of your findings largely depends upon the way you select your sample. The basic objective of any sampling design is to minimise the gap between the values obtained from your sample and those prevalent in the study population

- **Required theoretical knowledge:**
  - \* Sampling theory and designs
  - \* There are three categories of sampling design :  
Random/probability sampling designs,  
Non- Random/Non-probability sampling designs,  
**Mixed sample designs**
- **Required intermediary knowledge:**
  - \* Reviewing of literature

# Writing a Research Proposal

## Step 5 : Writing a Research Proposal

Having done all the preparatory work, the next step is to put everything together in a way that provides adequate information about your research study.

A research proposal must tell you, your research supervisor and a reviewer the following information about your study –

- What you are proposing to do,
- How you plan to proceed,
- Why you selected the proposed strategy.

# Writing a Research Proposal

A research proposal should contain the following information about your study.

- A statement of the objectives of the study,
- A list of hypotheses, if you are testing any,
- The study design you are proposing to use,
- The setting for your study,
- The research instrument(s) you are planning to use,
- Information on sample size and sampling design,
- Information on data processing procedures,
- An outline of the proposed chapters for the report,
- The study's problems and limitations; and
- The proposed time-frame.

## PHASE III : COLLECTING / CONDUCTING A RESEARCH STUDY

### Step 6 : Collecting Data

**Having formulated a research problem, developed a study design, constructed a research instrument and selected a sample, you then collect the data from which you will draw inferences and conclusions for your study.**

**As a part of research design, you decided upon the procedure you wanted to adopt to collect your data.**

**In this phase you actually collect the data.**

- **Required theoretical knowledge:**
  - \* Considering ethical issues in data collection
- **Required intermediary knowledge:**
  - \* Editing of the data
  - \* Field test of the research tool

# Processing and Displaying Data

## Step 7 : Processing and Displaying Data

**The way you analyse the information you collected largely depends upon two things : the type of information (descriptive, quantitative, qualitative or attitudinal); and the way you want to communicate your findings to your readers.**

- **Required theoretical knowledge:**
  - \* Methods of data processing
  - \* Use of computers and Statistics
  - \* Displaying data
- **Required intermediary knowledge:**
  - \* Editing the data
  - \* Developing a code book
  - \* Coding

# Writing a Research Report

## Step 8 : Writing a Research Report

**Writing the report is the last and, for many, the most difficult step of the research process. This report informs the world what you have done, what have discovered and what conclusions you have drawn from your findings.**

There are two broad categories of reports : quantitative and qualitative. The distinction is more academic than real as in moist studies you need to combine quantitative and qualitative skills. Nevertheless, there are some solely quantitative and some solely qualitative studies.

- **Required theoretical knowledge:**
  - \* Principles of scientific writing
- **Required intermediary knowledge:**
  - \* Reviewing the literature

# The Eight Steps: The Total Spectrum of Research Endeavour

The steps are operational in nature, following a logical sequence, and detailing the various methods and procedures in a simple step-by-step manner.

## Phase I: Deciding What to Research

- Step 1: Formulating a Research Problem

## Phase II: Planning a research Study

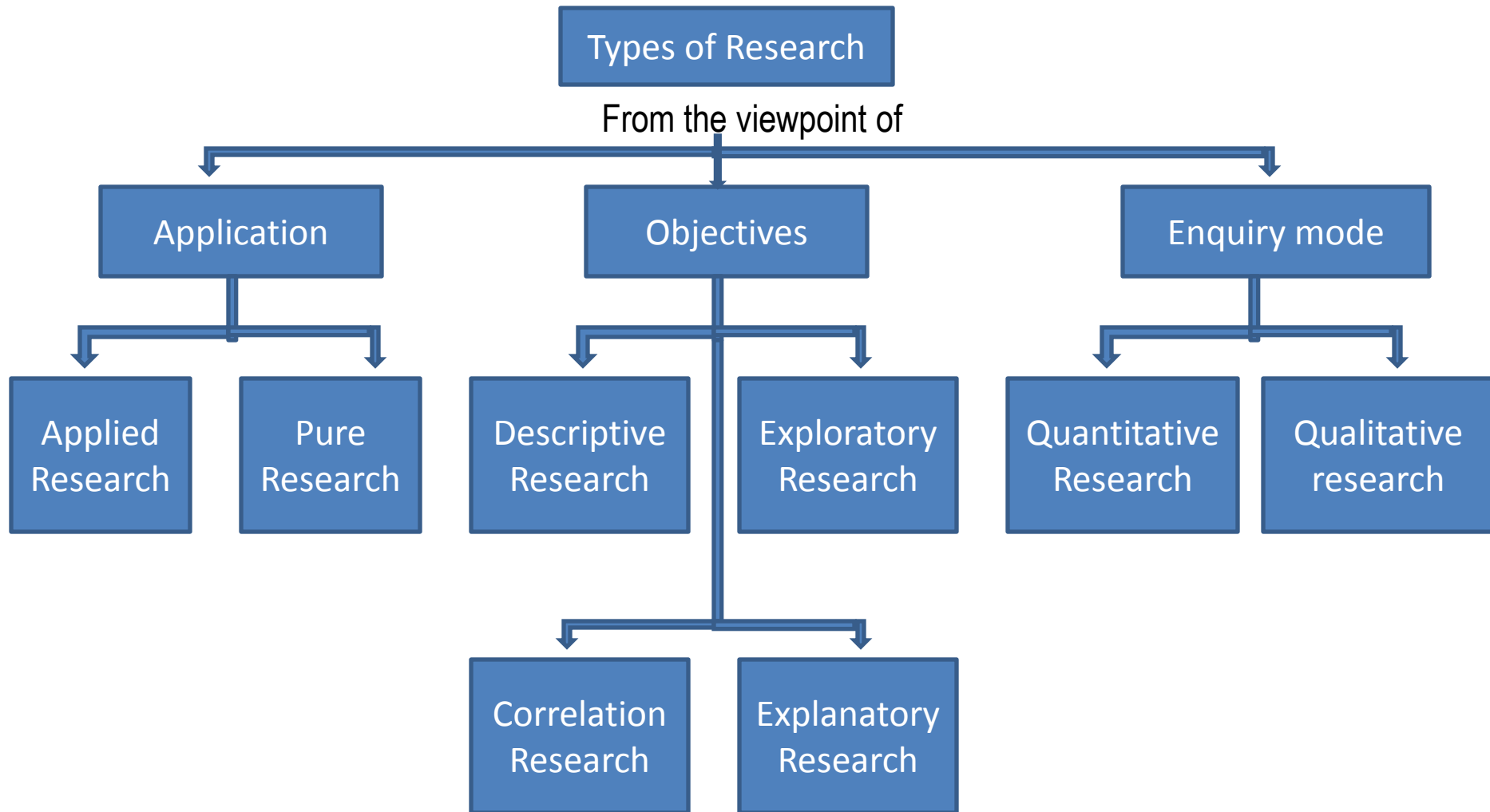
- Step 2: Conceptualising a research design
- Step 3: Constructing an instrument for data collection
- Step 4: Selecting a sample
- Step 5: Writing a Research Proposal

## Phase III: Conducting a Research Study

- Step 6: Collecting Data
- Step 7: Processing and Displaying Data
- Step 8: Writing a Research Report



# Typology of Research



# Types of Research

- ✓ **Applied Research** – Most of the research in the social sciences is applied. In other words, the research techniques, procedures and methods that form the body of research methodology are applied to the collection of information about various aspects of a situation, issue, problem or phenomenon so that the information gathered can be used in other ways – such as for policy formulation, administration and the enhancement of understanding of a phenomenon.
- ✓ **Pure Research** – Pure research is concerned with the development, examination, verification and refinement of research methods, procedures, techniques and tools that form the body of research methodology. The knowledge produced through pure research is sought in order to add the existing body of knowledge of research. (for example, developing a sample technique that can be applied to a particular situation, developing an instrument, say, to measure the stress level of banks etc.)

# Types of Research

- ✓ **Descriptive Research** – A study in which the main focus is on description , rather than examining relationship or associations. A descriptive study attempts systematically to describe a situation, problem, phenomenon, service or programme, or provides information about, say, the living conditions of a community, or describes attitudes towards an issue, for example, the attitudes of employees towards management.
- ✓ **Correlation Research** – These studies are primarily designed to investigate whether or not there is a relationship between two or more variables. The main emphasis in a correlation study is to discover or establish the existence of a relationship between two or more aspect of the situation, for example, the relationship between fertility and mortality.

# Types of Research

- ✓ **Exploratory Research** – This is when a study is undertaken with the objective either to explore an area where little is known or to investigate the possibilities of undertaking a particular research study. When a study is carried out to determine its feasibility it is also called a feasibility study or a pilot study. It is usually carried out when a researcher want to explore areas about which he has little or know knowledge.
- ✓ **Explanatory Research** – It attempts to clarify why and how there is a relationship between two aspects of a situation of phenomenon. This type of research attempts to explain, for example, why a decline in mortality is followed by a fertility decline, or how the changes in income effect environment.

# Types of Research

- ✓ **Qualitative Research** – It based upon the philosophy of empiricism, follows an unstructured, flexible and open approach to enquiry, aims to describe than measure, believes in in-depth understanding and small samples, and explores perceptions and feelings than facts and figures. The main objective of a qualitative study is to describe the variation and diversity in a phenomenon, situation or attitude with a very flexible approach so as to identify as much variation and diversity as possible.
- ✓ **Quantitative Research** – This approach is rooted in rationalism, follows a structured, rigid, predetermined methodology, believes in having a narrow focus, emphasises greater sample size, aims to quantify the variation in a phenomenon, and tries to make generalisations to the total population. Quantitative research helps to quantify the variation and diversity.

# Differences between Quantitative and Qualitative Research

Difference with respect to	Quantitative Research	Qualitative Research
Underpinning Philosophy	Rationalism: 'That human beings achieve knowledge because of their capacity to reason'.	Empiricism: 'The only knowledge that human beings acquire is from sensory experiences'.
Approach to enquiry	Structured/ rigid/ predetermined methodology	Unstructured/ flexible/ open methodology
Main Purpose of investigation	To quantify extent of variation in a phenomenon, situation, issue, etc.	To describe variation in phenomenon, situation, issue, etc.
Sample size	Emphasis on greater sample size	Fewer cases
Focus of enquiry	Narrow focus in terms of extent of enquiring, but assembles required information from a greater number of respondents	Covers multiple issues but assembles required information from fewer respondents

# Differences between Quantitative and Qualitative Research

Difference with respect to	Quantitative Research	Qualitative Research
Dominant research value	Reliability and Objectivity (value-free)	Authenticity but does not claim to be value-free
Dominant research topic	Explains prevalence, incidence, extent, nature of issues, opinions and attitude; discovers regulations and formulates theories	Explores experiences, meanings, perceptions and feelings
Analysis of Data	Subjects variables to frequency distributions, cross-tabulations or other statistical procedures	Subjects responses, narratives or observational data to identification of themes and describes these
Communication of findings	Organisation more analytical in nature, drawing inferences and conclusions, and testing magnitude and strength of a relationship	Organisation more descriptive and narrative in nature