



# **Research Methodology**

## **Chapter Five: The Research Process – Steps 4 and 5**

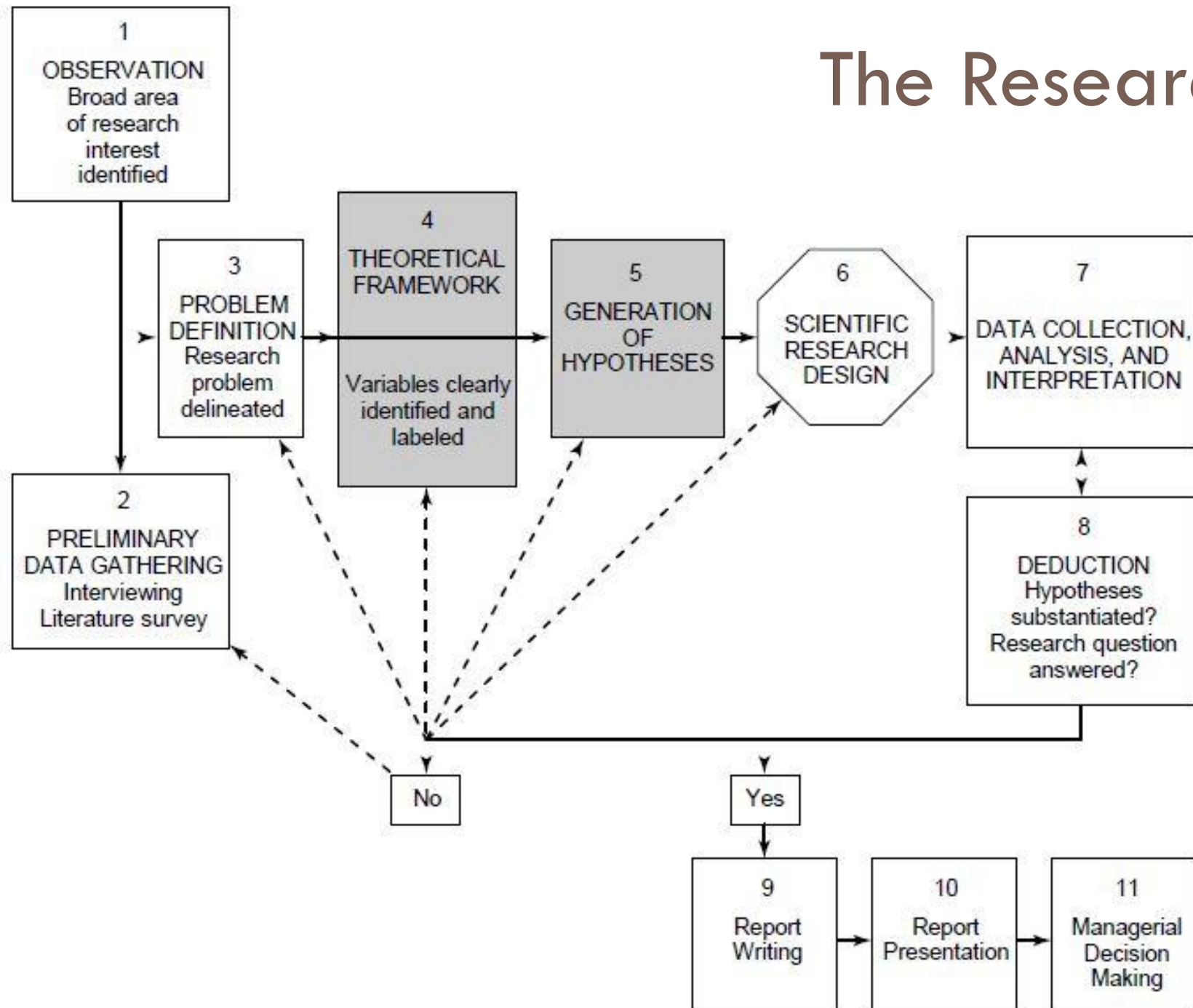
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# The Research Process



# The Need for a Theoretical Framework

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- A theoretical framework is a conceptual model of how one theorizes or makes logical sense of the relationships among the several factors that have been identified as important to the problem.
- The theoretical framework discusses the interrelationships among the variables that are deemed to be integral to the dynamics of the situation being investigated.

# The Need for a Theoretical Framework cont.

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- From the theoretical framework, testable hypotheses can be developed to examine whether the theory formulated is valid or not.
- The hypothesized relationships can thereafter be tested through appropriate statistical analyses.
- By being able to test and replicate the findings, we will also have stronger conviction in the rigor of our research.
- Thus, the entire research rests on the basis of the theoretical framework.

# Variables

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- A variable is anything that can take on differing or varying values.
- The values can differ at various times for the same object or person, or at the same time for different objects or persons.
- Examples of variables are:
  - ▣ production units
  - ▣ absenteeism
  - ▣ motivation

# Variables cont.

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## **Example:** *Production units:*

- One worker in the manufacturing department may produce one widget per minute, a second might produce two per minute, a third might produce five per minute.
- It is also possible that the same member could produce one widget the first minute, and five the next minute.
- In both cases, the number of widgets produced has taken on different values, and is therefore a variable.

# Variables cont.

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## **Example:** *Absenteeism:*

- Today three members in the sales department may be absent, tomorrow six members may not show up for work; the day after, there may be no one absent.
- The value can thus theoretically range from “zero” to “all” being absent, on the absenteeism variable.



# Variables cont.

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## **Example:** *Motivation:*

- The levels of motivation of members to learn in the class or in a work team might take on varying values ranging from “very low” to “very high.”

# Variables cont.

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## Types of Variables

- Four main types of variables are discussed in this chapter:
  1. The dependent variable (also known as the criterion variable).
  2. The independent variable (also known as the predictor variable).
  3. The moderating variable.
  4. The intervening variable.
- Variables can be discrete (e.g., male/female) or continuous (e.g., the age of an individual).

# Variables cont.

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## **Dependent Variable**

- The dependent variable is the variable of primary interest to the researcher.
- The researcher's goal is to understand and describe the dependent variable, or to explain its variability, or predict it.
- Through the analysis of the dependent variable (i.e., finding what variables influence it), it is possible to find answers or solutions to the problem.

# Variables cont.

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**Example:** A manager is concerned that the sales of a new product introduced after test marketing it do not meet with his expectations.

- Since the sales of the product can vary - can be low, medium, or high - it is a variable.
- Since sales is the main focus of interest to the manager, it is the dependent variable.

# Variables cont.

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## Independent Variable

- An independent variable is one that influences the dependent variable in either a positive or negative way.
- That is, when the independent variable is present, the dependent variable is also present, and with each unit of increase in the independent variable, there is an increase or decrease in the dependent variable also.
- In other words, the variance in the dependent variable is accounted for by the independent variable.

# Variables cont.

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**Example:** Research studies indicate that successful new product development has an influence on the stock market price of the company.

- That is, the more successful the new product turns out to be, the higher will be the stock market price of that firm.
- Therefore, the **success of the new product** is *the independent variable*, and **stock market price** the *dependent variable*.
- The degree of perceived success of the new product developed will explain the variance in the stock market price of the company.

# Variables cont.

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## **Moderating Variable**

- The moderating variable is one that has a strong *contingent* effect on the independent variable–dependent variable relationship.
- That is, the presence of a third variable (the moderating variable) modifies the original relationship between the independent and the dependent variables.

# Variables cont.

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- **Example:** It has been found that there is a relationship between the availability of Reference Manuals that manufacturing employees have access to, and the product rejects.
- That is, when workers follow the procedures laid down in the manual, they are able to manufacture products that are flawless.

Availability of  
Reference Manuals

IV



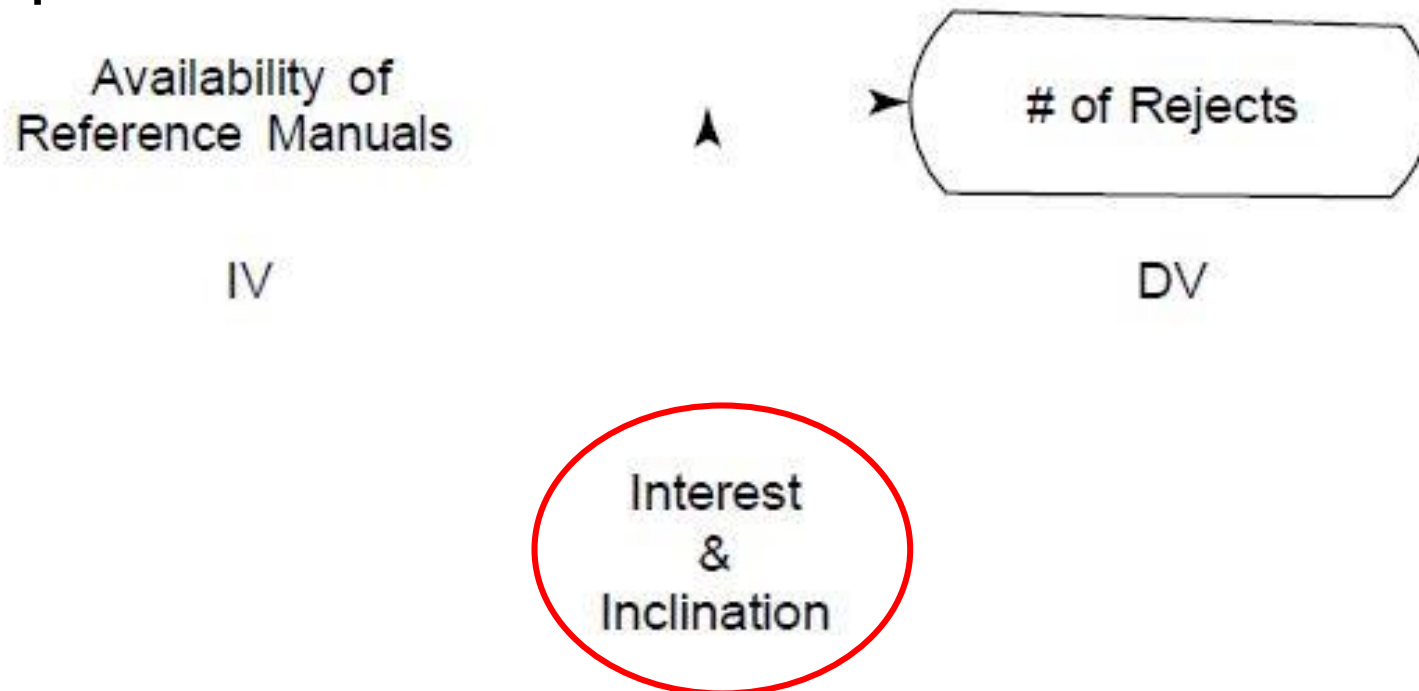
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# Variables cont.

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- **Example:** Although this relationship can be said to hold true generally for all workers, it is nevertheless contingent on the inclination or urge of the employees to look into the Manual every time a new procedure is to be adopted.



# Variables cont.

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## Intervening Variable

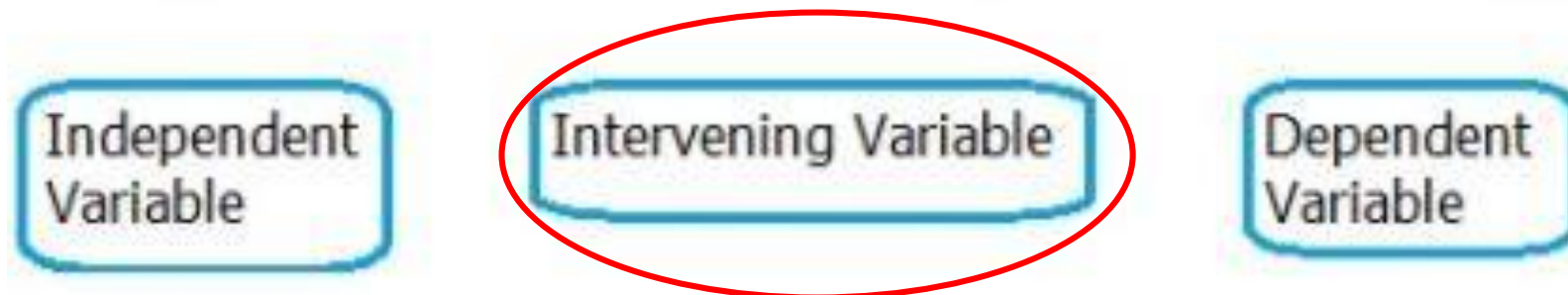
- An intervening variable (sometimes called a mediating variable) is a hypothetical variable used to explain causal links between other variables.
- The intervening variable is “a control variable that follows an **independent variable** but precedes the **dependent variable** in a causal sequence.”
- The intervening variable intervenes or mediates between the two.

# Variables cont.

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- **Example:** there is an association between being poor and having a shorter life span. Just because someone is poor doesn't mean that will lead to an early death, so other hypothetical variables are used to explain the phenomenon.
- These intervening variables could include: lack of access to healthcare or poor nutrition.

Poverty --> Lack of Access to Healthcare --> Shorter Longevity



# The Components of the Theoretical Framework

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There are five basic features that should be incorporated in any theoretical framework. These features are:

1. The variables considered relevant to the study should be clearly identified and labeled in the discussions.
2. The discussions should state how two or more variables are related to one another.
3. If the nature and direction of the relationships can be theorized on the basis of the findings of previous research, then there should be an indication in the discussions as to whether the relationships would be positive or negative.

# The Components of the Theoretical Framework cont.

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4. There should be a clear explanation of why we would expect these relationships to exist. The arguments could be drawn from the previous research findings.
5. A schematic diagram of the theoretical framework should be given so that the reader can see and easily comprehend the theorized relationships.

# Hypotheses Development

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- A hypothesis can be defined as a logically conjectured relationship between two or more variables expressed in the form of a testable statement.
- Relationships are conjectured on the basis of the network of associations established in the theoretical framework formulated for the research study.
- By testing the hypotheses and confirming the conjectured relationships, it is expected that solutions can be found to correct the problem encountered.

# Hypotheses Development cont.

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## Statement of Hypotheses: Formats

### □ *If–Then Statements*

- To examine whether or not the conjectured relationships or differences exist, these hypotheses can be set either as propositions or in the form of **if–then statements**.
- **Example:** *Employees who are more healthy will take sick leave less frequently.*
- **Example:** **If** employees are more healthy, **then** they will take sick leave less frequently.

# Hypotheses Development cont.

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- *Directional and Nondirectional Hypotheses*
  - ▣ If, in stating the relationship between two variables or comparing two groups, terms such as *positive*, *negative*, *more than*, *less than*, and the like are used, then these hypotheses are **directional** because the direction of the relationship between the variables (positive/negative) is indicated.
  - ▣ **Example:** The greater the stress experienced in the job, the lower the job satisfaction of employees.
  - ▣ **Example:** Women are more motivated than men.



# Hypotheses Development cont.

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- *Directional and Nondirectional Hypotheses*
  - ▣ On the other hand, **nondirectional** hypotheses are those that do assume a relationship or difference, but offer no indication of the direction of these relationships or differences.
  - ▣ **Example:** *There is a relationship between age and job satisfaction*
  - ▣ **Example:** *There is a difference between the work ethic values of American and Asian employees.*

# Hypotheses Development cont.

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## ***Null and Alternate Hypotheses***

- The null hypothesis is a proposition that states a definitive, exact relationship between two variables.
- That is, it states that the correlation between two variables is equal to zero or that the difference in the means of two groups is equal to zero (or some *definite* number).
- In general, the null statement is expressed as no (*significant*) relationship between two variables or no (*significant*) difference between two groups.

# Hypotheses Development cont.

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## ***Null and Alternate Hypotheses***

- The alternate hypothesis, which is the opposite of the null, is a statement expressing a relationship between two variables or indicating differences between groups.

# Hypotheses Development cont.

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□ **Example:** *Women are more motivated than men.*

▣ The **null** hypothesis would be:  $H_0: \mu_M = \mu_W$

or

$$H_0: \mu_M - \mu_W = 0$$

▣ The **alternate** hypothesis would statistically be set as follows:

$$H_A: \mu_M < \mu_W$$

or

$$H_A: \mu_W > \mu_M$$

where  $H_0$  represents the null hypothesis,  $H_A$  represents the alternate hypothesis,  $\mu_M$  is the mean motivational level of the men, and  $\mu_W$  is the mean motivational level of the women.

# Hypotheses Development cont.

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□ **Example:** *There is a difference between the work ethic values of American and Asian employees.*

▣ The **null** hypothesis would be:  $H_0: \mu_{AM} = \mu_{AS}$

or 
$$H_0: \mu_{AM} - \mu_{AS} = 0$$

▣ The **alternate** hypothesis would be:

$$H_A: \mu_{AM} \neq \mu_{AS}$$

where  $H_0$  represents the null hypothesis,  $H_A$  represents the alternate hypothesis,  $\mu_{AM}$  is the mean work ethic value of Americans and  $\mu_{AS}$  is the mean work ethic value of Asians.