

# Introduction to Research Methodology

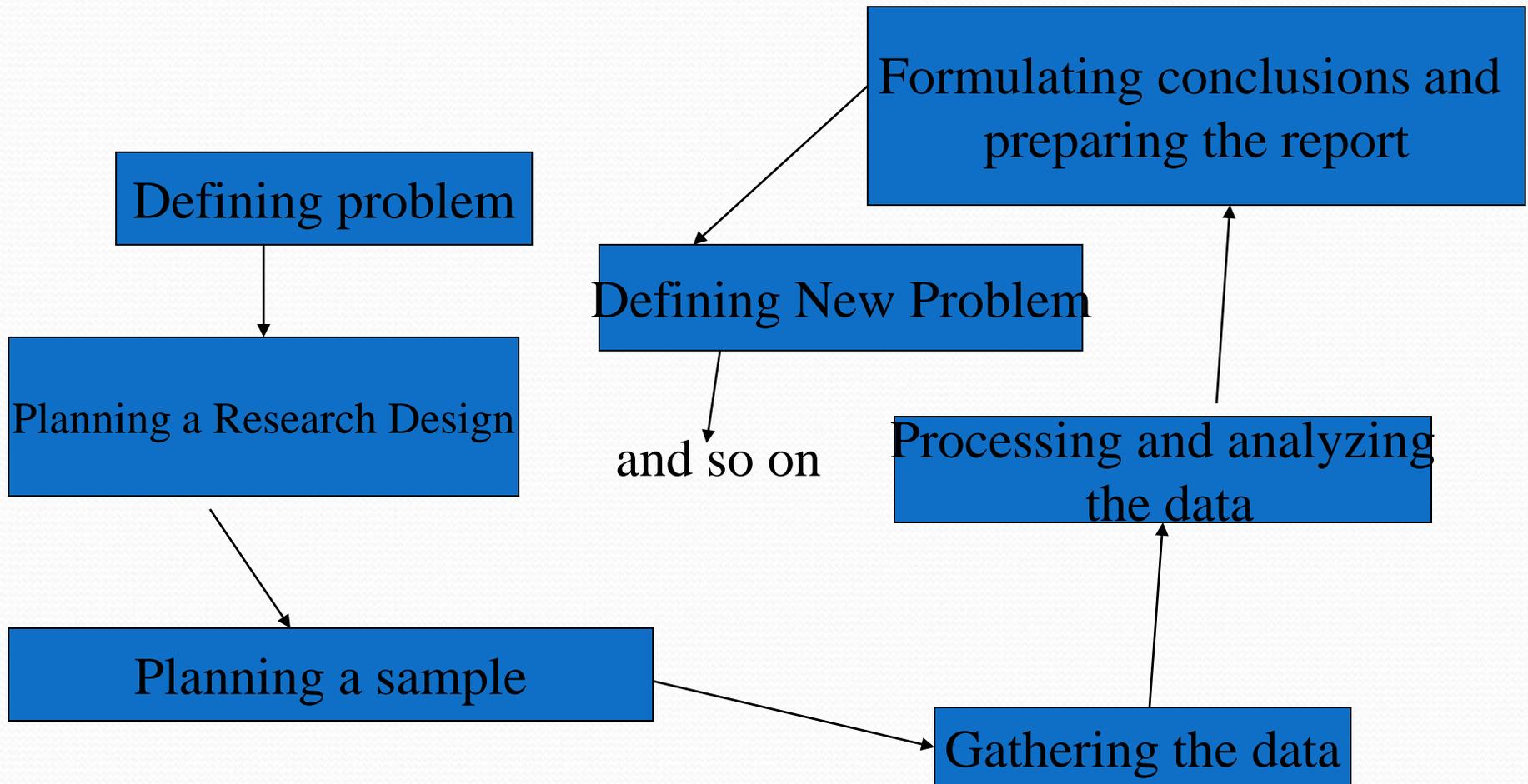
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## How to Start?

- What to research?
- How to find ideas to research?
  - Observation – where does your interest lie?
  - Talking informally to several experienced researchers, attending scholarly conference
  - Library search- literature review
    - Define the problem
    - Gap identification

# Phases of the Research Process



## STEP 1: IDENTIFICATION OF RESEARCH PROBLEM

- Kerlinger and Lee (2000)
  - The identification of the research problem is the “most difficult and important part of the whole research process” p15
  - “Difficulty of stating a research problem satisfactorily at a given time should not cause one to lose sight of the ultimate desirability and necessity of doing so” p24
- Jacob (1997)
  - A clear, precise and well structured problem statement leads to a quality research
- Leedy & Ormrod (2005) p 49
  - To see the problem with unwavering clarity and to state it in precise and unmistakable terms is the first requirement in research process
- Conclusion:

Identification of a problem is a cornerstone of any quality research. Basing research on a well-articulated, well-supported and well-argued problem establishes the potential for producing meaningful results.

# Research Problem

- The presence of the research problem is almost always established through the literature review
- A viable research problem is usually noted at the introduction of the research manuscript to identify why the study is important (Creswell, 2005)

# Statement of the problem vs problem statement

- Statement of the problem
  - is one or two sentences that outline the problem the study addresses
  - Should address the question: What is the problem that the researcher will address
- Problem statement
  - The statement of the problem and the argument for its viability
  - The problem statement should address all six questions: what, how where, when, why and who
  - Should be stated in the introductory sections of the research manuscripts and provide the rationale for its importance by 'developing justifications for studying it'.

# Problem Statement

- **What:** What is the problem that the research will address. Outline the negative points of the current situation and explain why this matters. It also serves as a great communication tool, helping to get buy-in and support from others
- **Why:** Identify the conceptual basis for the problem ie what does the literature outline as the cause of the problem? Define the problem being addressed in a way that's clear and precise.
- **How, Where, and When:** Describe the impact of the problem. How are researchers' understanding negatively impacted by the problem? When and where is the problem evident?

# Problem Statement

- For each point, write in no more than 2 sentences. List a few current, peer-reviewed references that support them and briefly describe the nature of that support
- It is helpful to have a couple of people who are involved in the process
- Refine the problem statement as you start to further investigate root cause
- Finally review your new problem statement against the following criteria:
  - It should focus on only one problem
  - It should not suggest a solution

# Good Research Problem

A good research problem should have the following characteristics

- It should address a gap in knowledge
- It should be significant enough to the existing body of research
- It should lead to further research
- The problem should render itself to investigation through collection of data
- It should be of interest to the researcher and suit his/her skills, time, and resources
- The approach towards solving the problem should be ethical

Source: [ediage.com/insights/...](http://ediage.com/insights/)

# Female Age at First Marriage

- **Aryal, T. R. (2007)**

Female age at first marriage is becoming an important demographic variable due to its influence on fertility and population growth, especially in developing countries where contraceptive use rate is very low (Aryal, 2005a). Late age of marriage leads to lower fertility and lengthens the interval between generations, causing plummeting population growth and ultimately a small proportion of grandmothers in the population (United Nations, 1997; Aryal 2005b). A delayed marriage may affect fertility indirectly due to some contributing factors linked with higher age at marriage, such as women's education, which may relate to family size preference and use of contraception, etc (Adhakha, 1991). In populations where almost all births occur in marriage, the age of first marriage of women would have a strong influence on number of years available for reproduction and the level of fertility (Aryal, 2007; Mat & Omar, 2002). An increase in age at marriage reduces the number of years available for reproduction which may, in turn, reduce the ultimate number of births. A number of studies have been done on differentials and determinants of age at marriage and its relationships with fertility.

The apparent decline in first marriage rates and the increase in the age at first marriage has been described a sign of the great social changes of our time. Numerous studies show that marriage levels influence fertility because married fertility is still higher than unmarried fertility (Goldstein 2002), although with increasing non-marital childbearing in many Western European countries (Kiernan 2001). Hence, the mean age of marriage affects the average number of children, the timing and spacing of births (Heckman et al, 1985), and thus the mean interval between successive generations (Lutz et al, 2003).

Other studies show a negative relation between the individual marriage age and the risk of divorce, negatively contributing to the increase in divorce rates (Engelhardt 2002). Moreover, in many industrialized countries the first marriage rate is a social indicator affecting the welfare of adults and children since married persons and their children are on average wealthier than unmarried individuals and children with single parents (Waite 1995, McLanahan and Sandefur 1984). In addition, from a sociological perspective, first marriages are of interest as an indicator of the degree of individualisation of a society, in which unmarried individuals as well as cohabiting couples live with less connexion to traditional norms of their society.

Age at marriage has achieved considerable prominence in discussion of the English demographic revolution but surprisingly little is known about variations in it, either over time or among regions and social groups at points in time.

# Precondition

- An exhaustive understanding of the body of knowledge related to the field or topic of study
- A solid conceptual foundation for the research (Hart, 1998)
- A 'yes' to one of the following questions (Creswell, 2005):
  - Will a known gap in the body of knowledge be filled?
  - Will previous research be replicated and expanded by looking at a different category of participants, environment, and/or constructs/variables
  - Will previous research be expanded by more thoroughly examining some identifiable aspects?
  - Are there specific, identifiable, and documented problems with the currently available solutions?

# Research-Worthy Problems

- should not be based
  - solely on personal observations and/or experiences
  - on a comparison of two sets of data for the sake of comparison
    - Identifying the research worthy problem behind such a comparison is warranted
  - on a correlation of two sets of data
    - Tell nothing about *why* the relationship exists
  - On investigation that yields a 'yes' and 'no' answer

(Ellis and Levy, 2008)

# Research Goals, Questions and Objectives

- Research Goal
  - “is the major intent or objective of the study used to address the problem” (Creswell, 2005, p. 62)
  - Detail what the research study intends to do in order to address the problem. Answer the question: “What will this study do?”
  - Operationalized by one or more research questions
  - May include the type of study being conducted – experimental, developmental, descriptive etc
- Research Questions
  - “narrow the purpose [goal] into specific questions that the researcher would like answered or addressed in the study” (Creswell , 2005, p.62)
  - Formulated in a question format and are narrowed enough to identify the variables or construct under study
- Research Objectives
  - Should be specific and reflect the question that we are asking. Different research questions and objectives may require different methodology
- Not all three should be included in a thesis/paper. And the order can be exchangeable

# Example

- Research question:

What is the antibiotic prescribing rate for upper respiratory tract infection (URTI) in Malaysian general practice?

- Research objectives:
  - To determine the antibiotic prescribing rate for URTI in Malaysian general practice
  - To examine factors influencing antibiotic prescribing for URTI in these practices

Khoo (2005)

# Introduction (Chapter 1)

- Background of the study
- Problem statement
  - Justification for the study
    - Why the study is important
    - Why the research questions need to be addresses
    - Why the variables are included in the study
  - Purpose of the study
    - Goal of the study
  - Research Questions
  - Research Objectives

# Step 2: Research Design

- A research design is a framework or blueprint for conducting the research project.
- It details the procedures necessary for obtaining the information needed to structure or solve the research problems
- Types of research design
  - Exploratory
  - Descriptive
  - Causal

# Research Design: Exploratory Studies

- Conducted to clarify ambiguous problem. Management may have discovered general problems but research is needed to gain better understanding of the dimensions of the problems
- Information needed is defined loosely.
- Research process is flexible and unstructured.
- Sample is small and non-representative
- Analysis of primary data is qualitative
- Findings/results are tentative
- Usually conducted with the expectation that subsequent research will be required to provide conclusive evidence

# Conclusive Research Design

- Two types: Descriptive and Causal
- Information needed is clearly defined
- Research process is formal and structured
- Sample is large and representative
- Data analysis is quantitative

# Descriptive vs Causal

- Descriptive
  - To describe characteristics of a population or phenomenon
  - Seeks to determine the answers to who, what, when, when and how questions
  - Often helps to segment and target markets.
- Causal
  - Main goal is to identify cause-and effect relationships among variables.
  - Exploratory and descriptive research normally precede cause-and-effect studies
  - Manipulation of one or more independent variables
  - Control of other mediating variables
  - It is typical to have an expectation of the relationship to be explained, such as a prediction about the influence of price, packaging, advertising and the like on sales.

# TYPES OF RESEARCH

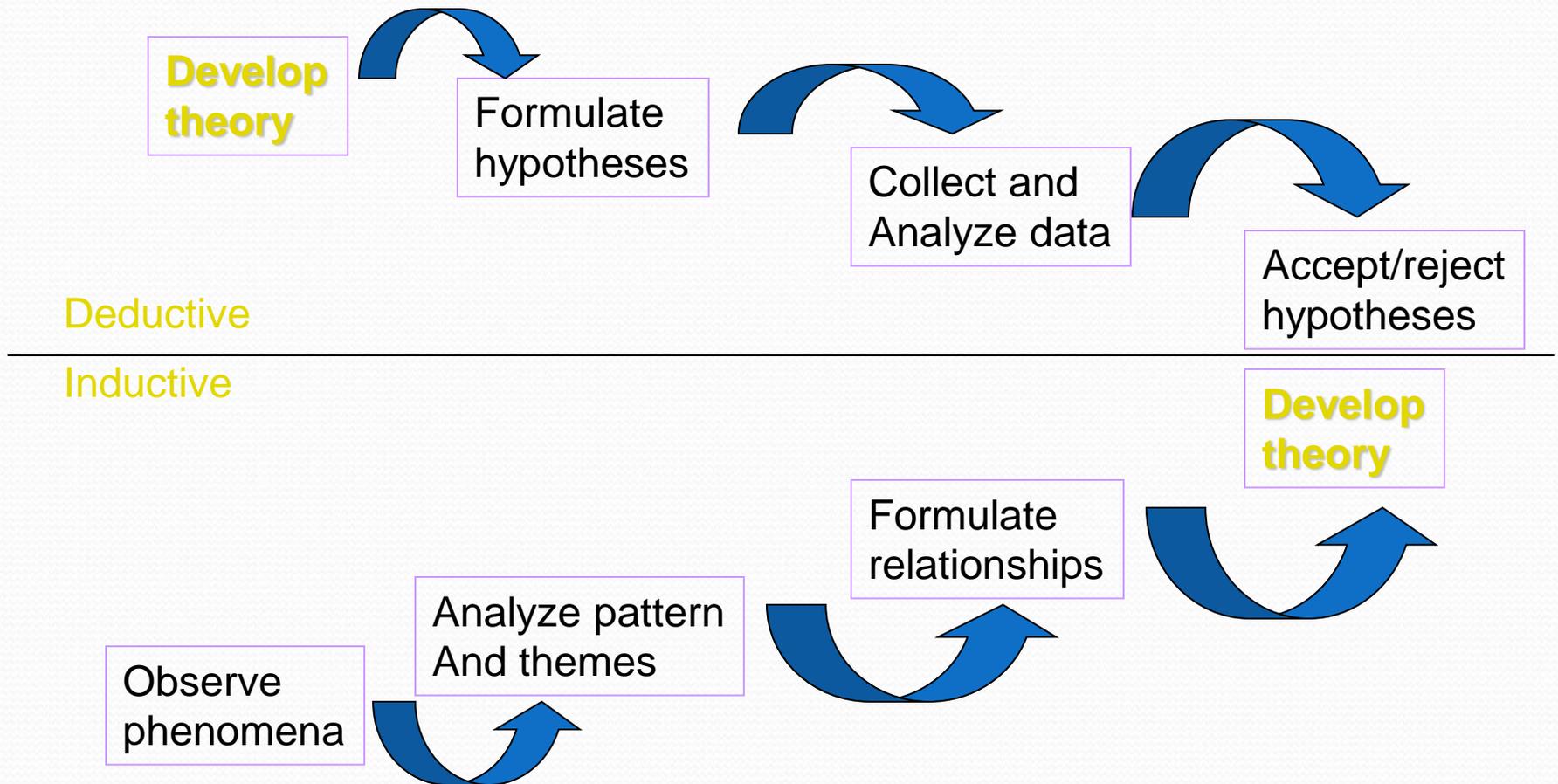
## QUANTITATIVE

1. Objective research
2. Precise measurement
3. Statistical analysis
  
4. Hypotheses are tested
5. Deductive
6. Using questionnaire
7. Many cases

## QUALITATIVE

1. Subjective research
2. Non-precise measurement
3. Extracting themes or generalizations from evidence
4. Answer research questions
5. Inductive
6. Based on Interviews
7. Few cases

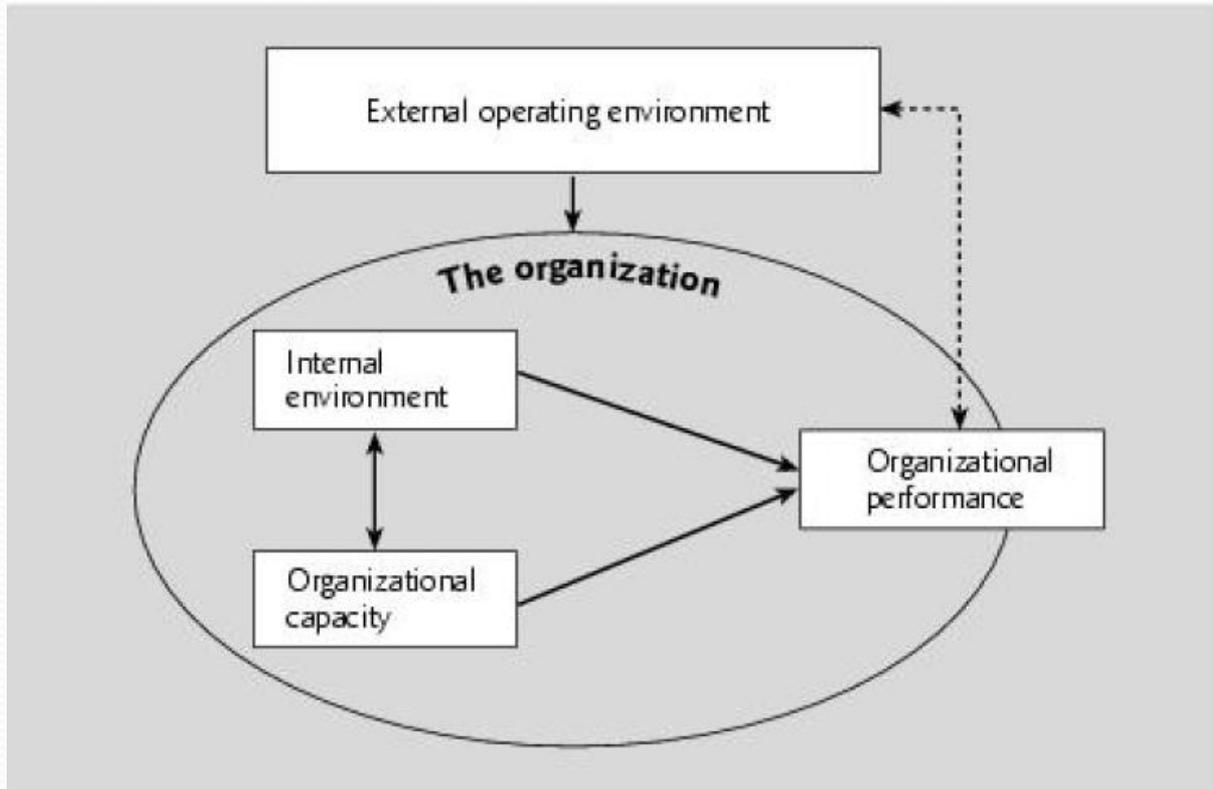
# INDUCTIVE VS. DEDUCTIVE



# Research Framework

- Warmbrod (1986) stated that “theoretical/conceptual framework can be defined as a systematic ordering of ideas about the phenomena being investigated or as a systematic account of the relations among a set of variables”
- Though there are similarities between the two, there are differences in approach and style that confuse many
- Theoretical Framework
  - A structure that can hold or support a theory of a research work. It presents the theory which explains why the problem under study exists.
  - Is based upon theories that have already been tested.
  - It resulted from research conducted earlier.
  - It is broader in scope and dimension
  - It however involves broad generalizations that reflect relationship between things in a phenomenon
- Conceptual Framework
  - A conceptual framework is a structure of what has been learned to best explain the natural progression of a phenomenon that is being studied
  - It provides the direction that is missing in theoretical framework
  - Makes things easier by delineating the input as well as output of the research project
  - One gets to know the variables that need to be tested
- While the theoretical framework is the theory on which the study is based, the conceptual framework is the operationalization of the theory
- Both are based on previous studies, conceptual analyses, and theories that exist in the literature

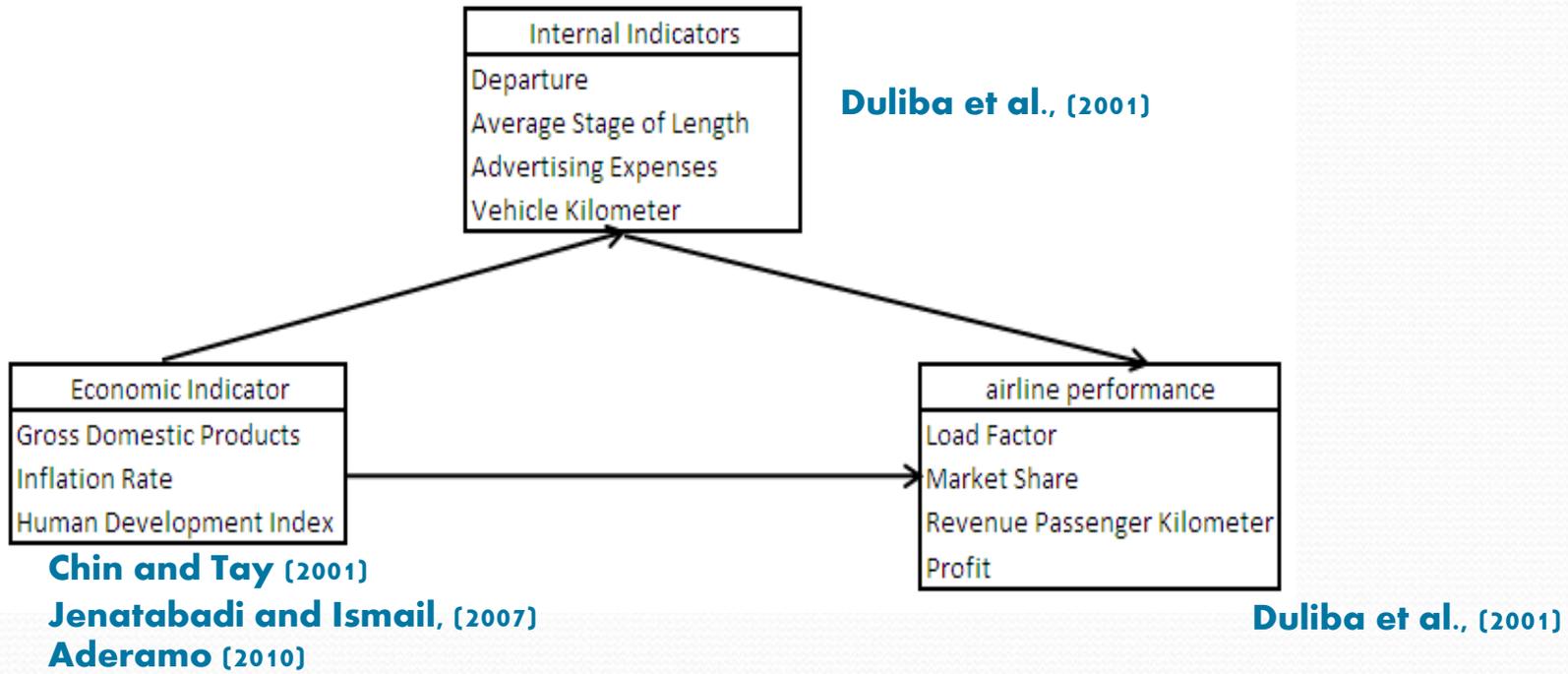
## Example: Theoretical framework



organizational assessment ([Lusthaus, 2002](#))

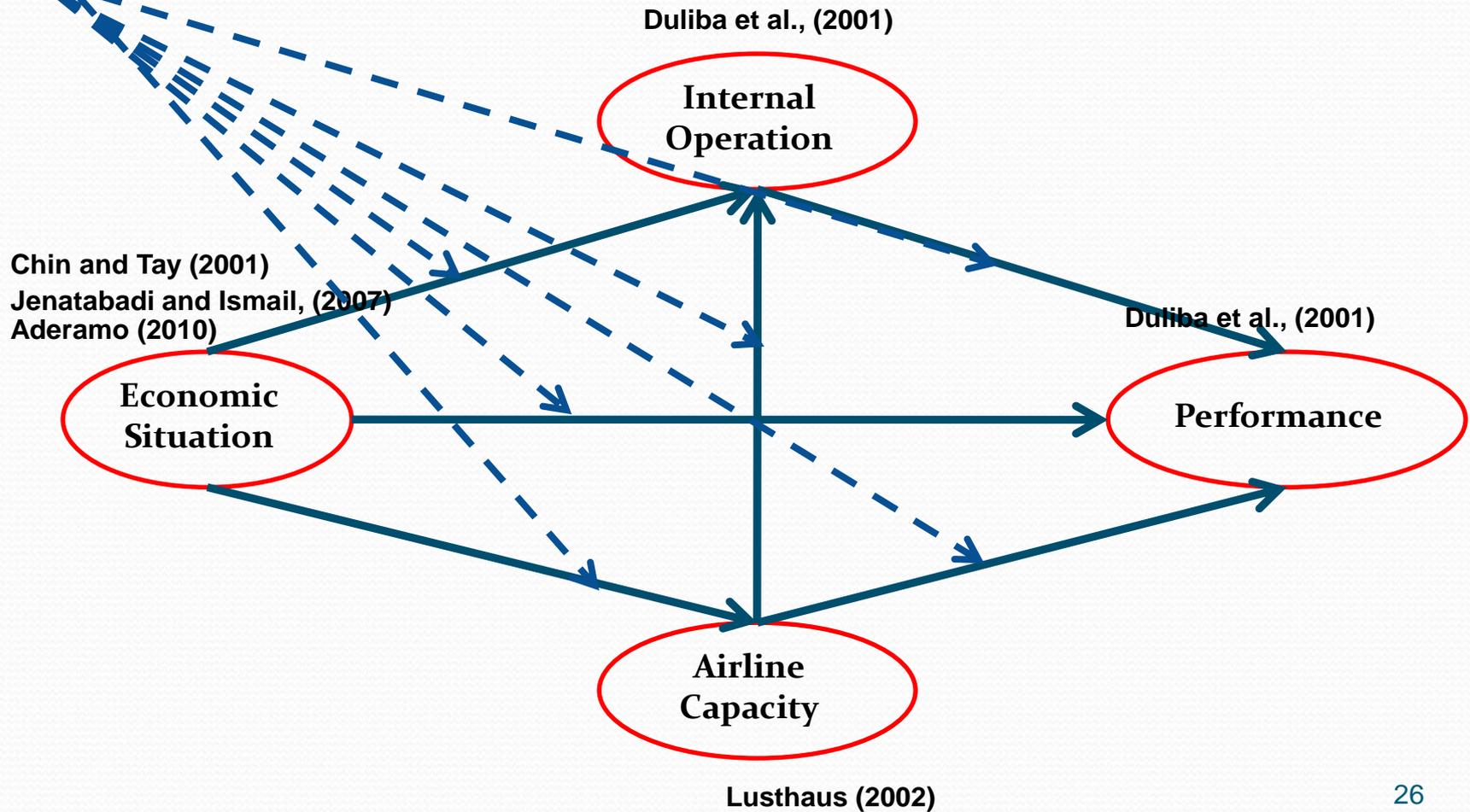
An organization's performance is influenced by its capacity, by its internal environment, and by the external environment in which it operates.

# Example 1: Conceptual Framework



## Example 2: Conceptual framework

**Firm Age**

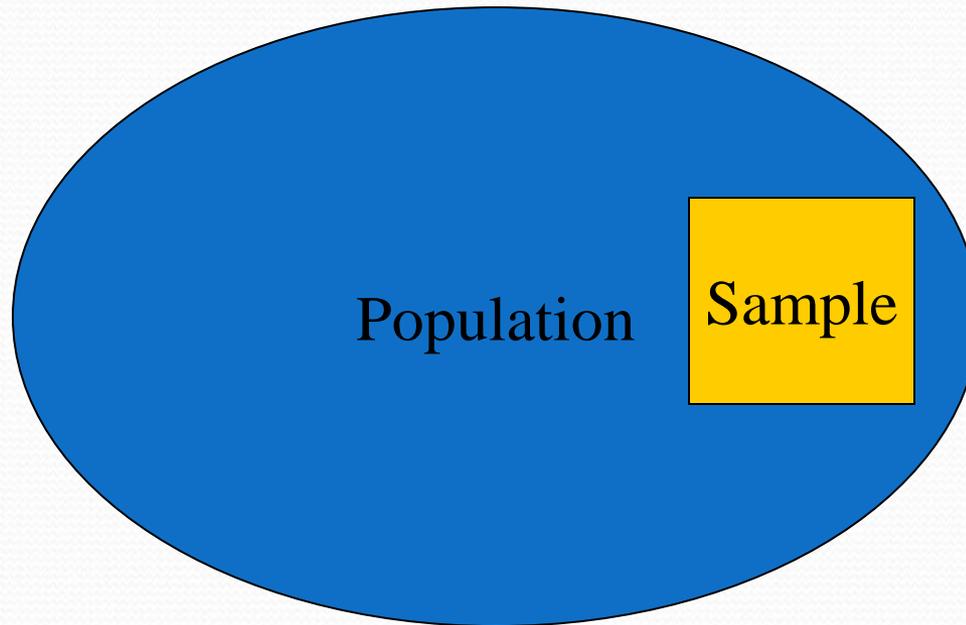


# Step 3: Planning a Sample

## Population vs Sample

- Population – The entire set of individuals or objects of interest or the measurements obtained from all individuals or objects of interest
- Sample – A portion, or part, of the population of interest

# Population vs. Sample



# Examples

- Population - Responses of ALL currently enrolled underage college students as to whether they have consumed alcohol in the last 24 hours
- Sample - Responses of 538 currently enrolled underage college students as to whether they have consumed alcohol in the last 24 hours

# Why sample?

- The cost of studying all the items in a population is often expensive
- The adequacy of sample results
- Time consuming to interview/contact the whole population
- The destructive nature of certain tests.
- The physical impossibility of checking all items in the population
  - Eg. The populations of fish, birds, snakes, mosquitoes and the like – constantly moving, being born, and dying.

# Sampling frame

- The list of elements from which the sample may be drawn
- May be different from the target population that has been defined
- Example:

Target group – your university's students

Sampling frame

- students listed in student telephone directory
- exclude student who registered late, students without phones etc
- is also called the *working population*

# Sampling

- Probability sampling
  - A sample selected in such a way that each item in the population being studied has a known (nonzero) likelihood of being included in the sample.
  - Each item in the population has a chance of being chosen.
  - Require sampling frame
- Non-probability sampling
  - Not all items have a chance of being included in the sample.
  - Results will be biased, ie the sample results may not be representative of the population.

# Sampling Techniques

- Probability sampling
  - Simple random sampling
  - Systematic random sampling
  - Stratified random sampling
  - Cluster sampling
- Non-probability sampling
  - Convenience sampling
  - Judgement (purposive) sampling
  - Quota sampling
  - Snowball sampling

# Step 4: Gathering the Data

## Means of Data Collection

- Personal/Face to Face interviews
- Telephone interviews
- Mail questionnaires

# Questionnaire Design

- What should be asked?
- How should each question be phrased?
- In what sequence should the question be arranged?
- What questionnaire layout will best serve the research objectives?
- How should the questionnaire be pretested? Does the questionnaire need to be revised?

# Phrasing Questions

- Open-Ended response vs Fixed-Alternative Questions
- Open-ended – A question that poses some problem and asks the respondent to answer in his or her own words
- Fixed-alternative question – A question in which the respondent is given specific limited-alternative responses and asked to choose the one closest to his or her own view

# Types of fixed-alternative question

- Simple-dichotomy question – choose one of two alternatives

Example:

Status of your health

healthy  not healthy

- Determinant-choice question – choose one response from among several possible alternatives

Example:

In which section of aircraft did you sit?

First class  Business class  Economy class

# Fixed-alternative question

- Frequency-determination question – asks for an answer about general frequency of occurrence

Example:

How frequently do you watch HBO channel?

Everyday

5 – 6 times a week

2 – 4 times a week

Once a week

Less than once a week

Never

# Art of Asking question

- Use simple, conversational language
- Avoid leading and loaded questions
  - Leading question – A question that suggests or implies certain answers
  - Loaded question – suggest a socially desirable answer or are emotionally charged
- Avoid ambiguity
- Avoid double-barreled items
  - Indicate if you agree or disagree with the following statement: I have called in sick or left work to golf.

# Step 5: Processing and Analyzing Data

## Problem definition

- Determine the relevant variables
  - A variable is defined as anything that varies or changes in values
  - It may assume different numerical or categorical values
  - Types
    - Dependent – to be predicted or explained
    - Independent – expected to influence the dependent

# Qualitative (Categorical) Data

The raw (unsummarized) data are merely labels or categories

# Quantitative (Numerical/Measurement) Data

The raw (unsummarized) data are numerical

# Quantitative Data

- Discrete Data
  - Number of times a woman has given birth
  - Number of new cases of tuberculosis
  - Number of beds available in a particular hospital
- Continuous Data
  - Cholesterol level
  - Height
  - Temperature

# Who Cares?



**The type(s) of data collected in a study determine the type of statistical analysis used.**

# Statistical Analysis

- Univariate Analysis
- Multivariate Analysis – Why?
  - Theoretical reasons:
    - Real-world is multidimensional and multicausal
    - ie multiple IVs (predictors) and DVs (outcomes)
  - Statistical reasons
    - Examine large data sets in a single analysis

# Two Types of Multivariate Techniques

- Analysis of dependence
  - Where one (or more) variables are dependent variables, to be explained or predicted by others  
E.g. Multiple regression
- Analysis of interdependence
  - No variables thought of as “dependent”
  - Look at the relationships among variables, objects or cases
  - Variables are interrelated  
E.g. cluster analysis, factor analysis

# Step 6: Writing Report

## Thesis

- Introduction
- Literature review
- Methodology
- Results
- Discussion and conclusion

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