

Introduction to Data Analysis

The Research Process



Data Analysis - Issues

What is data analysis? Types of techniques



Identifying the right technique Using computers to analyse data



Reporting the analysis



In most cases, the process is not sequential and linear, but more iterative where you may need to go back to some steps to explore further

Data Analysis - Types

Purpose of Study Exploratory; Test of Differences; Establishing Relationships

Number of Variables *Univariate; Bivariate; Multivariate*

Level of Measurements Nominal, Ordinal, Interval & Ratio

Purpose of Study -Exploratory

Basically to address the issue of "What is the current situation – vis-à-vis the phenomenon of interest?"

Example:

- 1. What is the current level of innovation of Malaysian Companies?
- 2. What is the preferences of Malaysian consumers of organic food?
- 3. What percentage of the Malaysian consumers will use internet banking?

Etc.....

Purpose of Study – Test of Differences

To address the question of "Is there a difference between Type A and Type B in terms the phenomenon of interest, Y?"

- 1. Are companies in the electronics sector more innovative than companies in the food sector?
- 2. Are consumers in the professional line more likely to use internet banking compared to those in other occupation?
- 3. Is the preference for organic food higher for urban consumers compared to consumers living in the rural areas?

Purpose of Study – Establishing Relationships

To address the question of "Is there a relationship between phenomenon X with phenomenon, Y?"

- 1. The *larger* the company, the more *innovative* it is?
- 2. The *more business* a company undertakes the more *likely* is the company *to use internet banking*?
- 3. The more the consumer *believe* that organic food is *good for the health*, the more likely he/she is to *consume* organic food.
- 4. The *more secure* is internet banking, the more *user-friendly* is the system, and the *easier to access* the system, the more likely a company is to *use* internet banking.

Number of Variables -Univariate

- Analysis involves only one variable
- Exploratory studies typically involve univariate analysis

- What is the current *level of innovation* of Malaysian Companies?
- What is the *preferences* of Malaysian consumers of organic food?
- What percentage of the Malaysian consumers will *use internet banking*?

Number of Variables -Bivariate

Analysis involves two variablesTest of differences involves two variablesEstablishing relationships may involve bivariate

analysis (correlation)

- Are companies in the electronics sector more innovative than companies in the food sector? *sector & level of innovation*
- 2. The more business a company undertakes the more likely is the company to use internet banking? *size (in terms of business transactions)* & *likelihood of using internet banking*

Number of Variables -Multivariate

Analysis involves three or more variables Analysis typical when trying to establish relationships

Example:

1. The more secure is internet banking, the more userfriendly is the system, and the easier to access the system, the more likely a company is to use internet banking. – *security, user-friendliness, ease of access, and likelihood of using internet banking*

Data Types – Levels of Measurement **Purpose of Study** *Exploratory; Test of Differences; Establishing Relationships*

Number of Variables *Univariate; Bivariate; Multivariate*

Level of Measurements Nominal, Ordinal, Interval & Ratio

Data Types - Levels of Measurements

| Empirical Scale | Basic Operations | Measures of Typical use | Averages |
|--------------------|--|--|-------------------|
| Nominal | Determination of equality | Classification Male-Female Occupations | Mode |
| Ordinal | Determination of greater or less | Ranking Preference Attitude | Median |
| Interval | Determination of equality of intervals | Index numbers Temperature | Mean |
| Ratio | Determination of equality of ratios | Sales Unit produced No. of customers | Mean Geometric |

The Right Technique? Research Question Concern for Central Tendency; Comparing groups; Relationships



Number of Variables Univariate; Bivariate; Multivariate



Level of Measurements Parametric and Non-parametric

Introduction to Data Analysis



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Descriptive Analysis Purpose:

To describe the distribution of the variables of interest

Answers the question of "What is ...?"

Techniques

Frequencies Distribution - if 1 ordinal or nominal variable,

Cross-tabulation - if 2 ordinal or nominal variables Means - if 1 interval or ratio level variable Means of subgroups - if 1 interval or ratio level variable by subgroups

Test of Differences

Purpose:

To evaluate the differences between 2 or more groups with respect to a variable of interest

Techniques depends on Levels of Measurement of the Variable Number of Groups Independence of the Groups





Relationship

Purpose: To establish relationship between

variables

Techniques depends on Whether or not there exist dependent variable(s) Number of dependent and independent variables Levels of Measurement of the Variable

Dependence Relationships

