

## Module 3

### Research design

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# Agenda

- Matching research questions and design
- Measurement instrument
- Sampling
- Data collection



# Matching research questions and design

<b>Methodology</b>	the process of a study from a philosophical/paradigm perspective.
<b>Method</b>	means by which data can be collected and/or analysed.
<b>Research Design</b>	the master plan specifying processes and actions from a practical perspective.



# Matching research questions and design

Methodology refers to the overall approach to the research process, from the theoretical underpinning to the collection and analysis of the data. “Like theories, methodologies cannot be true or false, only more or less useful” (Silverman, 1994, p.2).

Methods, on the other hand, refer only to the various means by which data can be collected and/or analyzed" (Collis and Hussey 2003, p.55).

"A research design is a framework or blueprint for conducting the marketing research project. It details the procedures necessary for obtaining the information needed to structure and/or solve marketing research problem" (Maholtra 2004, p.74).

"The research design serves as a master plan of the methods and procedures that should be used to collect and analyze the data needed by the decision maker" (Hair, Bush and Ortinau 2003, p.40)



# Matching research questions and design

from good theory . . . to . . . good data



# Matching research questions and design

## A comparison of basic research designs

	Exploratory	Descriptive	Causal
Objective:	Discovery of ideas and insights.	Describe market characteristics or functions.	Determine cause and effect relationships.
Characteristics:	Flexible, versatile.  Often the front end of total research design.	Marked by the prior formulation of specific hypotheses. Preplanned and structured design.	Manipulation of one or more independent variables. Control of other mediating variables.
Methods:	Expert surveys Pilot surveys Secondary data Qualitative research	Secondary data Surveys Panels Observational and other data	Experiments

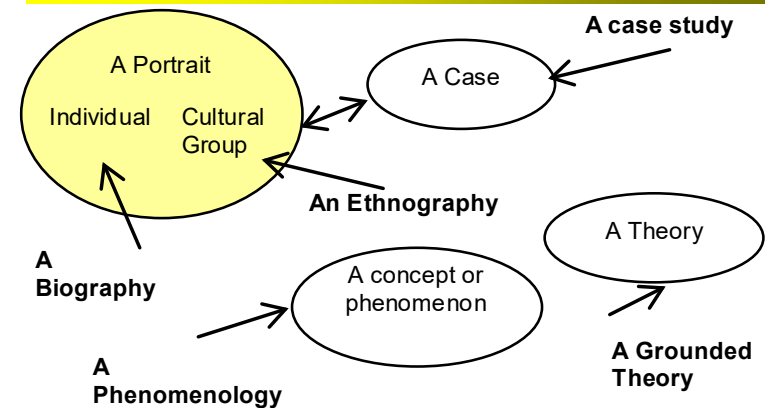


# Matching research questions and design

## Characteristics of Qualitative Research

Research Objectives	→	Discovery and identification of new ideas, thoughts, feelings; preliminary insights on understanding of ideas and objects
Type of Research	→	Normally exploratory designs
Type of Questions	→	Open-ended, semistructured, unstructured, deep probing.
Time of Execution	→	Relative short time frames
Representativeness	→	Small samples, limited to the sampled respondents.
Type of analysis	→	Debriefing, subjective, content, interpretive, semiotic analysis.
Researcher skills	→	Interpersonal communications, observations, interpretive skills.
Generalizability of Results	→	Very limited; only on preliminary insights and understanding.

## Qualitative Research Methods



Source: Adapted from Creswell (1994:37)



# Matching research questions and design

## Qualitative Research Design: Data Collection

Authors	Data gathering techniques
Punch (1999:176-178)	<ol style="list-style-type: none"><li>1. Interview<ul style="list-style-type: none"><li>▪ structured interviews</li><li>▪ focus groups</li><li>▪ unstructured interviews (non-standardized, open-ended, in-depth or ethnographic)</li></ul></li><li>2. Observation</li><li>3. Participant observation</li><li>4. Documentary data</li></ol>
Creswell (1998:121)	<ol style="list-style-type: none"><li>1. Observation (ranging from nonparticipant to participant),</li><li>2. Interviews (ranging from semistructured to open-ended),</li><li>3. Documents (ranging from private to public), and</li><li>4. Audio-visual materials (including materials such as photographs, compact disks, and videotapes)</li></ol>
Padgett (1998:55)	<ol style="list-style-type: none"><li>1. Observation (of the respondent, the setting, and oneself)</li><li>2. Interviewing</li><li>3. Review of documents or archival materials</li></ol>
Flick (1998)	<ol style="list-style-type: none"><li>1. Verbal data<ul style="list-style-type: none"><li>▪ Semi-structured interviews (focused, semi-standardized, problem-centered, expert, ethnographic)</li><li>▪ Narratives as data (narrative interview, episodic interview)</li><li>▪ Group procedures (group discussions, focus groups, joint narratives)</li></ul></li><li>2. Visual data<ul style="list-style-type: none"><li>▪ Observation</li><li>▪ Participant observation</li><li>▪ Ethnography</li><li>▪ Use of photos</li><li>▪ Film analysis</li></ul></li></ol>





# Matching research questions and design

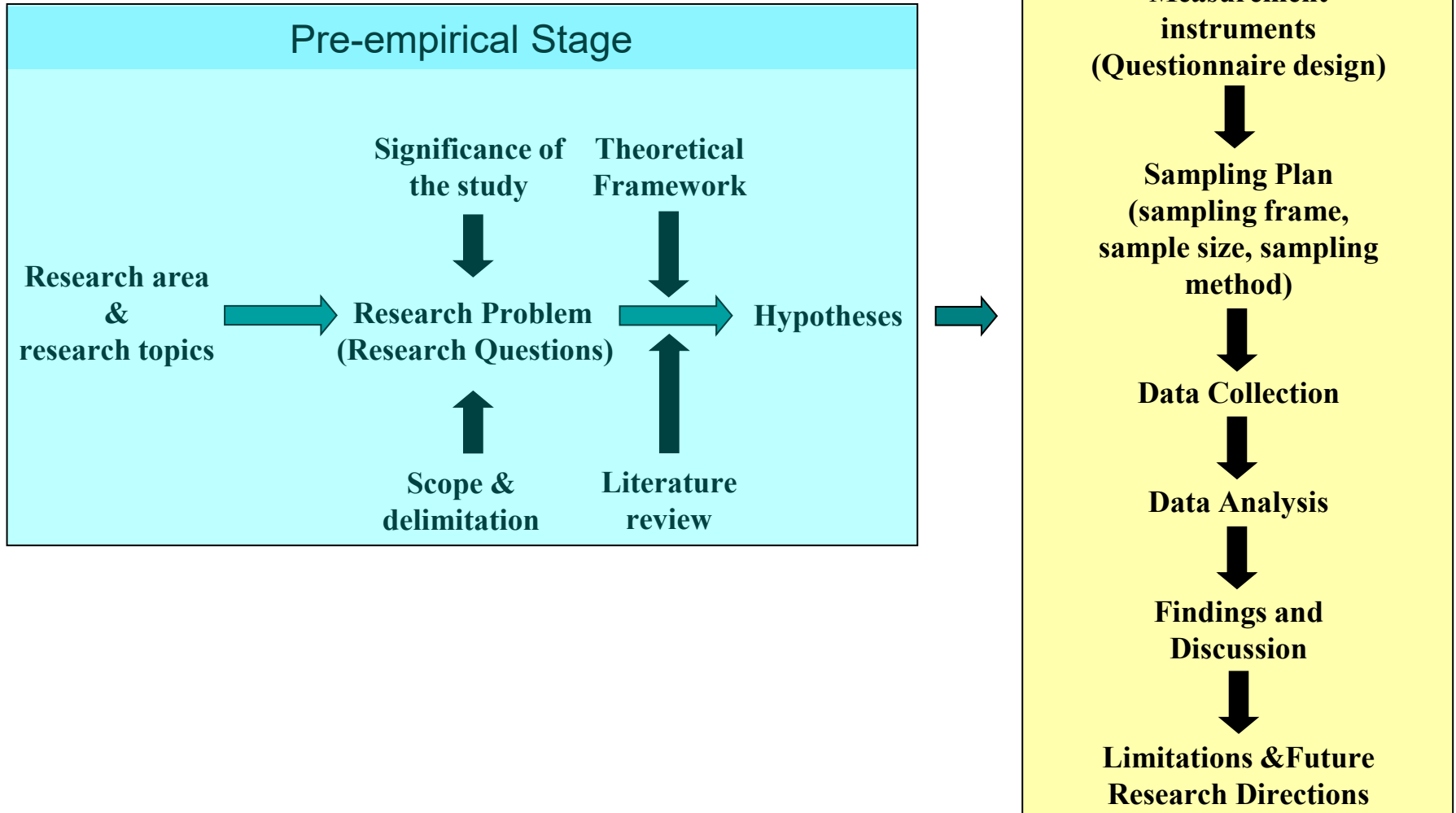
## Characteristics of Quantitative Research

Research Objectives	→	Validation of facts, estimates, relationships, predictions.
Type of Research	→	Descriptive and causal designs
Type of Questions	→	Mostly structured
Time of Execution	→	Usually significantly longer time frames
Representativeness	→	Large samples, normally good representation of target populations
Type of analysis	→	Statistical, descriptive, causal predictions, and relationships.
Researcher skills	→	Scientific, statistical procedure and translation skills; and some subjective interpretive skills.
Generalizability of Results	→	Usually very good; inferences about facts, estimates of relationships.



# Matching research questions and design

## A Simplified Research Model with Hypotheses





# Matching research questions and design

Carefully matching research questions and design

- What data
  - cross-sectional, longitudinal, panel, experiment
- Internal validity
- External validity
- Samples and procedures
  - executives versus students



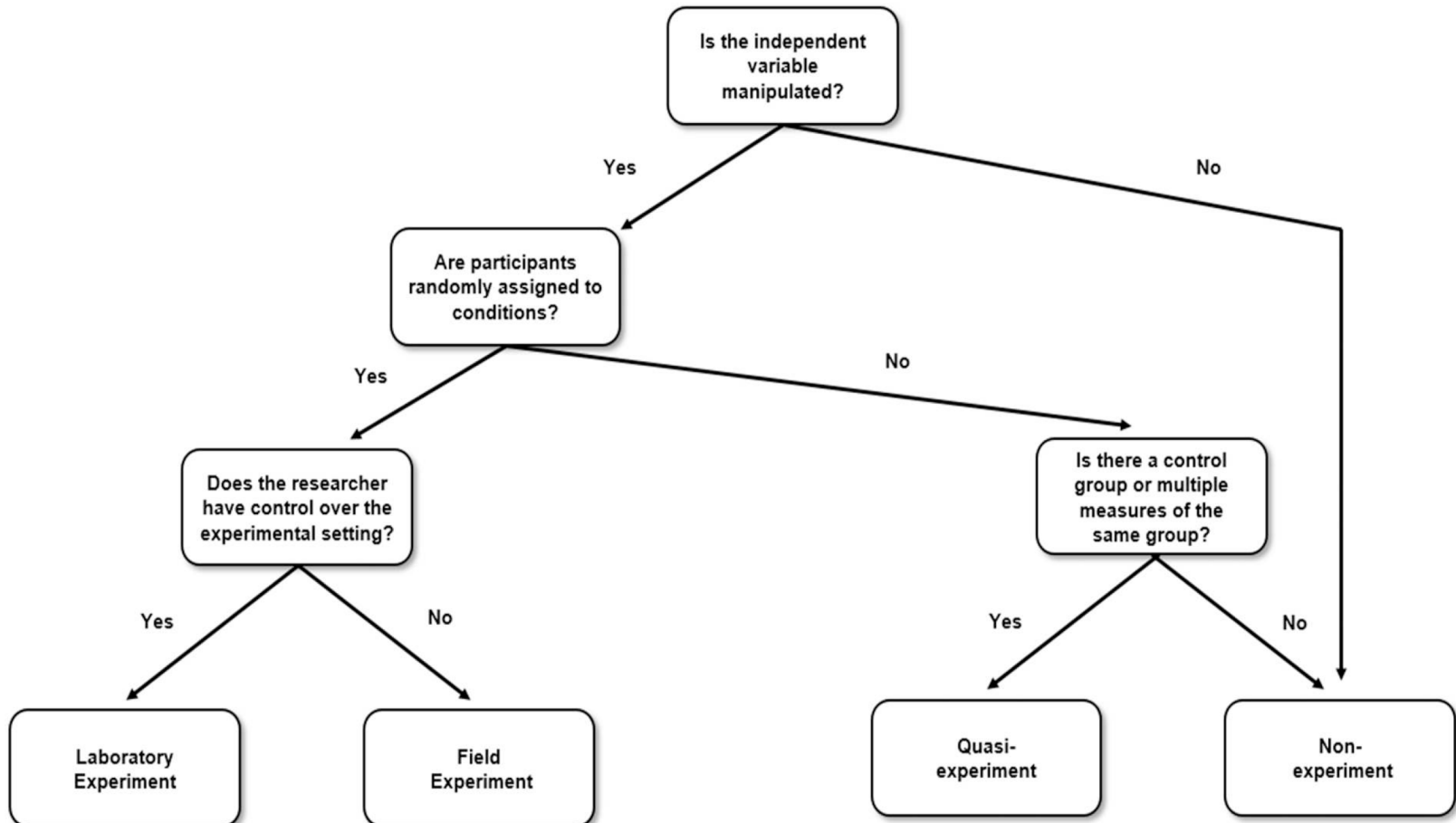
# Matching research questions and design

## Causality

- Correlation does not establish causality.
- Causality occurs under three conditions:
  - the cause (X) and the effect (Y) must be associated
  - evidence of clear temporal ordering of the cause and the effect
  - no plausible alternative explanations for the hypothesized causal effect.
- Robustness checks:
  - to reject reverse causality
  - to demonstrate the elimination of omitted variable bias
  - to ensure that the correlations are robust to different specifications and samples.



# Matching research questions and design





# Matching research questions and design

What make a good data?

- Few errors
- Accurate measures
- Clear inferences of cause and effect
- Simple statistical analyses



# Matching research questions and design

The problem of common method bias

- Use multiple informants per observational unit.
- The Harman's (19967) single-factor test is weak.
- Note that all techniques have problems associated with them.
- You should start at the research design stage.



# Matching research questions and design

## The problem of endogeneity

- The variance of  $X$  is endogenous to the model → biased and inconsistent estimates
- Sources of endogeneity: reverse causality, simultaneous causality, and omitted variable

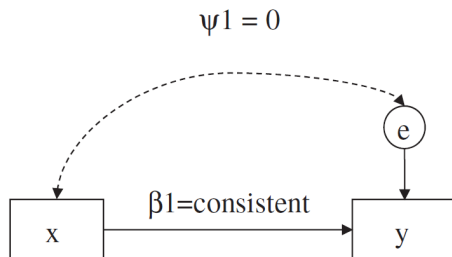




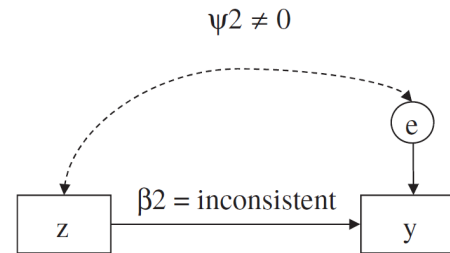
# Matching research questions and design

## The problem of endogeneity

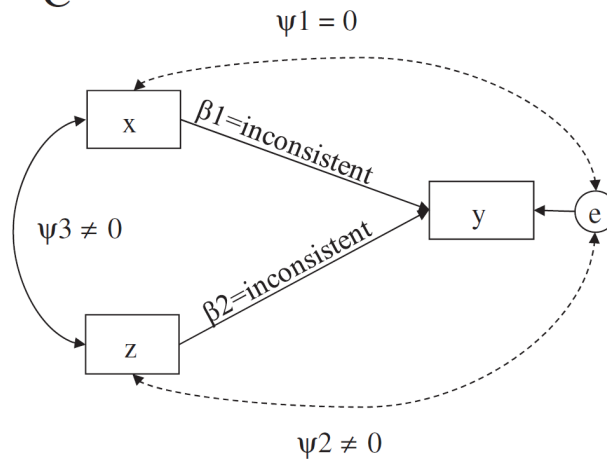
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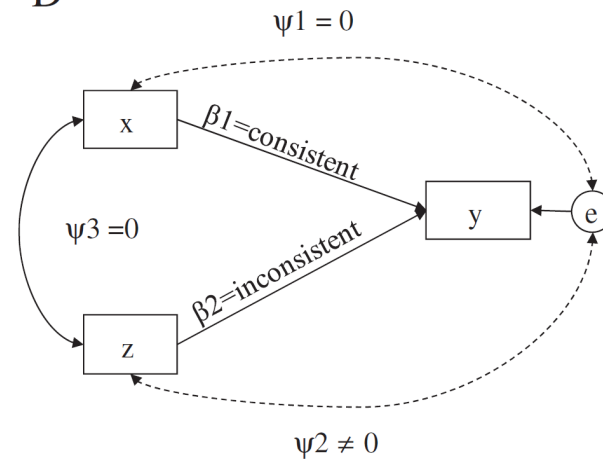
B



C



D





# Matching research questions and design

The problem of endogeneity

$$y_i = \beta_0 + \beta_1 x_i + \beta_2 z_i + e_i$$

$$y_i = \varphi_0 + \varphi_1 x_i + v_i$$

$$z_i = \gamma_1 x_i + u_i$$

$$y_i = \beta_0 + \beta_1 x_i + \beta_2 (\gamma_1 x_i + u_i) + e_i$$

$$y_i = \beta_0 + \beta_1 x_i + \underbrace{(\beta_2 \gamma_1 x_i + \beta_2 u_i + e_i)}_{v_i}$$

$$y_i = \beta_0 + (\beta_1 + \beta_2 \gamma_1) x_i + (\beta_2 u_i + e_i)$$



# Matching research questions and design

Why do we need to cover all aspects of a research process?

**For want of a nail, the shoe was lost.**

**For want of the shoe, the horse was lost.**

**For want of the horse, the rider was lost.**

**For want of the rider, the battle was lost.**

**For want of the battle, the kingdom was lost.**

**And all for the want of a nail.**

**Nursery Rhyme**



# Measurement instrument

## What to write

- Conceptualization and operationalization of focal constructs (new measures and existing measures)
  - constructs and indicators/measures
  - questionnaire design
  - construct reliability and validity (e.g. content validity, face validity, convergent validity, discriminant validity)
- Pretest

## Examples

MO was measured using nine items adapted from Jaworski and Kohli (1993) and Matsuno and Mentzer (2000). The respondents indicated the extent to which they agreed or disagreed with nine statements about being market oriented, with one indicating “*strongly disagree*” and seven indicating “*strongly agree*.” IC was measured using five items developed from the work of Aragón-Correa, García-Morales, and Córdón-Pozo (2009), Chiesa, Coughlan, and Voss (1996), and Weerawardena and O’Cass (2004) using 7-point scales with “*much worse than competitors*” and “*much better than competitors*” anchors. MC was measured using six items adapted from Atuahene-Gima (1993) and Vorhies and Morgan (2005) using 7-point scales with anchors of “*much worse than competitors*” and “*much better than competitors*.”

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IRP was measured using four items adapted from Cooper and Kleinschmidt (2000), Gatignon and Xuereb (1997), and Ramaswami, Srivastava, and Bhagarva (2009). The respondents rated their firms’ IRP in the areas

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2008). Therefore, CRP was measured using four items adapted from Jayachandran et al. (2005), Ramani and



# Measurement instrument

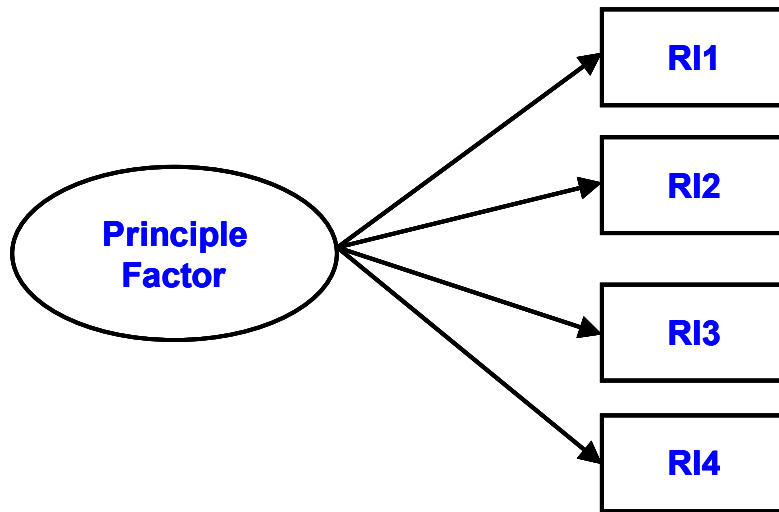
- Hypothetical constructs are unobservable and cannot be measured directly (Peter and Churchill 1986).
- Constructs (latent variables) are not directly measured but by their respective indicators.
- Indicators are observed variables or manifest variables such as items in a survey instrument (e.g. questionnaire).



# Measurement instrument

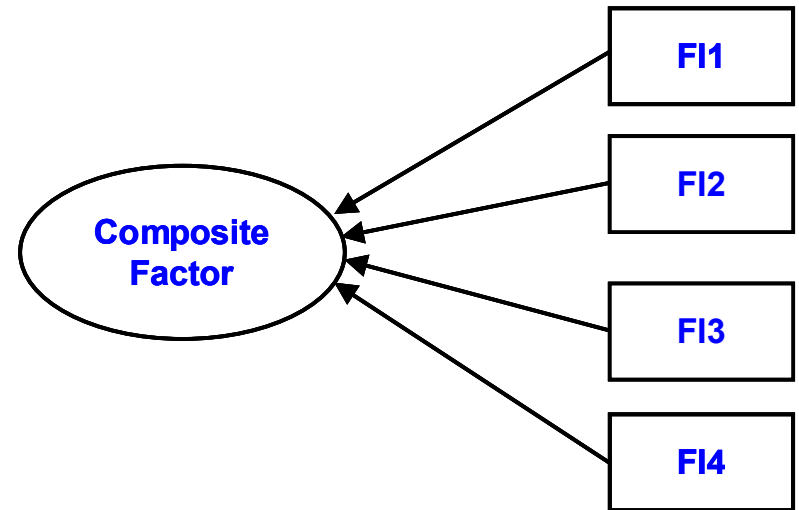
## Constructs and Indicators

### Reflective versus Formative Indicators



**Principle Factor: existing factor**

**RI1, RI2, RI3, RI4: reflective indicators**



**Formative Factor: emerging factor**

**FI1, FI2, FI3, FI4: formative indicators**

*Source: Adapted from Jarvis, MacKenzie and Podsakoff (2003)*



# Measurement instrument

## Questionnaire Design: Item Writing

### *Basic Principles of Item Writing:*

- The theoretical-rational or deductive method of scale development.
- The language should be simple, straightforward, and appropriate for the reading level of the scale's target population. For instance, scales intended for use in general clinical samples need to be readily understandable by respondents with only a modest education.
- Avoid using trendy expressions that quickly may become dated, as well as colloquialisms and other language for which the familiarity (and thus utility) will vary widely with age, ethnicity, region, gender, and so forth.
- Avoid writing items that virtually everyone or no one will endorse, unless they are intended to assess invalid responding.
- Avoid writing complex or double-barreled items that actually assess more than one characteristic.



# Measurement instrument

## Questionnaire Design: Measurement and Scaling

### Measurement

- Assigning numbers (symbols) to certain characteristics of objects according to certain pre-specified rules
- Necessary to conduct analysis

### Scaling

- Creating a continuum upon which measured objects are located – very satisfied to very dissatisfied





# Measurement instrument

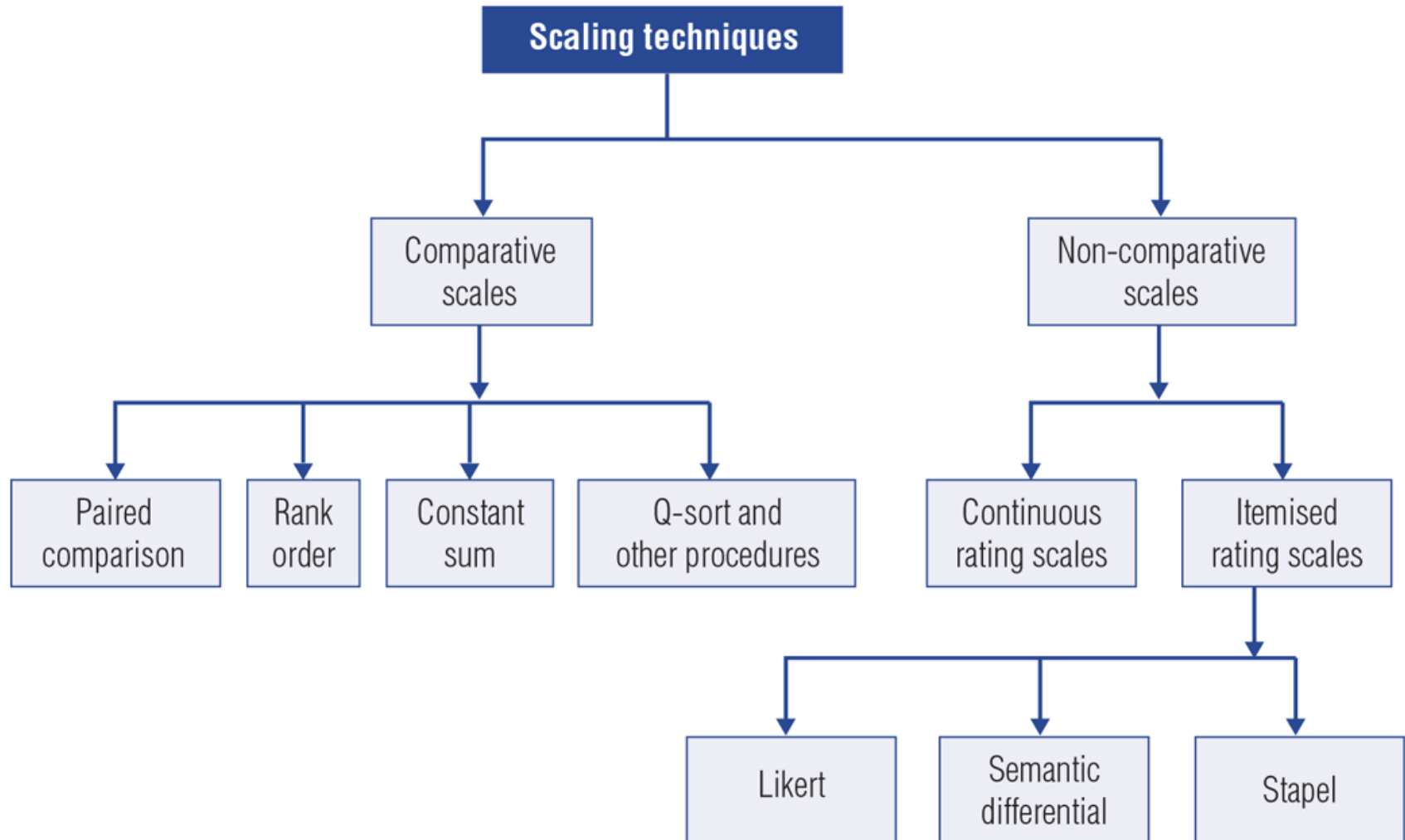
## Questionnaire Design: Measurement and Scaling

Nominal	Numbers identify and classify objects	Brand numbers, store types, gender classification	Percentage, mode	Chi-square, binominal test
Ordinal	Numbers indicate relative position not magnitude	Preference rankings, market position, social class	Percentile, median	Rank order correlation, Friedman ANOVA
Interval	Differences between objects can be compared	Attitudes, opinions, index numbers	Range, mean, standard deviation	Correlations, t-tests, ANOVA, regression, factor analysis
Ratio	Zero point is fixed; ratios of scale values can be computed	Age, income, costs, sales, market share	Geometric mean, harmonic mean	Coefficient of variation



# Measurement instrument

## Questionnaire Design: Measurement and Scaling





# Measurement instrument

## Questionnaire Design: Measurement and Scaling

- The selection of a scaling technique depends upon a study's information requirements, respondent characteristics and the proposed means of administration (Tull and Hawkins, 1990).
- Rating scales (e.g. Likert scale, Semantic differential).
- Likert scale is one of the most widely used formats in measuring attitudes or components of attitudes (Albaum 1997). The scale purports to measure direction and intensity of attitude.
- Likert scale are used with a number of different response formats; among the most popular are the frequency (never to always), degree or extent (not at all to very much), similarity (like me to not like me), and agreement (strong agree to strongly disagree) (Clark and Watson 1995, p. 313)
- Likert scale is adopted because it is easy to construct and administer. In addition, respondents readily understand how to use the scale, making it suitable for mail, telephone, or personal interviews (Maholtra 2004)



# Measurement instrument

## Questionnaire Design: Measurement and Scaling

- A seven point Likert scale has been considered as the most appropriate to effectively capture the direction and intensity of response (Ryan and Garland 1999). This scale has also widely used in marketing research (e.g. Kohli and Jaworski 1993; Matsuno and Mentzer 2000).
- The use of scales that are labeled at all points, rather than only at end points increases reliability of the instrument (Churchill and Peter 1985).

MARKETING CAPABILITY						
Not at all	Not very much	Slightly	Moderately	Quite a lot	Very much so	Extensively
1	2	3	4	5	6	7
Not at all effective	Somewhat effective	Quite effective	Moderately effective	Generally effective	Highly effective	Extremely effective
1	2	3	4	5	6	7
Strongly disagree	Moderately disagree	Slightly disagree	Neither agree/disagree	Slightly agree	Moderately agree	Strongly agree
1	2	3	4	5	6	7



# Measurement instrument

**Table 1 – A Summary of Key Components of Construct Validity**

Component	“Working” definition	Relevant techniques analytical framework	Illustrative references
Content validity	Extent to which empirical measurement reflects a specific domain of content	Review by “experts” and analyses of the extent of consistency among them	Hambrick (1981) Hambrick (1983) Nunnally (1978)
Internal consistency			
1. Unidimensionality	Extent to which the items reflect one underlying construct.	Exploratory factor analysis Confirmatory factor analysis.	Dess & Beard (1984) Dess & Davis (1984) Hunter & Gerbing (1982) Joreskog & Sorbum (1978) Nunnally (1978)
2. Reliability	Absence of measurement error in cluster score.	Cronbach alpha; Reliability coefficient of structural equation models.	Bagozzi (1980) Cronbach (1951) Nunnally (1978) Peter (1979)
Convergent validity	Degree to which multiple attempts to measure the same concept with different methods are in agreement.	Correlation analysis; MTMM matrix; Structural equation methodology – confirmatory factor analysis.	Bagozzi (1980, 1981) Campbell & Fiske (1959) Farh, Hoffman & Hegarty (1984)
Discriminant validity	Extent to which a concept differs from other concepts	Correlation analysis; MTMM matrix; Structural equation methodology.	Bagozzi (1980, 1981) Campbell & Fiske (1959)
Nomological (predictive) validity	Degree to which predictions from a theoretical network are confirmed.	Correlations; Regressions; Causal modeling.	Bagozzi (1980, 1981) Campbell (1960)

*Source: Venkatraman and Grant (1986)*



# Measurement instrument

- Content validity: the degree to which a measure's items represent a proper sample of the theoretical content domain of a construct (e.g. conceptualization of marketing capability)
- Expert judges are given the conceptual definitions of the constructs and then asked to rate each item as either 'not representative', 'somewhat representative', or 'very representative' to the construct definition (e.g. Zaichkowsky 1995).
- Decision Rules:
  - Sumscore rule (e.g. Lichtenstein et al. 1990; Sharma et al. 1990): at least 80% of expert judges to rate an item as complete or somewhat.
  - Complete rule (e.g. Obermiller and Spangenberg 1998; Saxe and Weitz 1982): at least 50% of expert judges to rate an item as complete.
  - Not representative rule (cf. Bearden et al. 1989; Netemeyer et al. 1995, 1996). Items will be deleted when evaluated by any judge as being not representative.



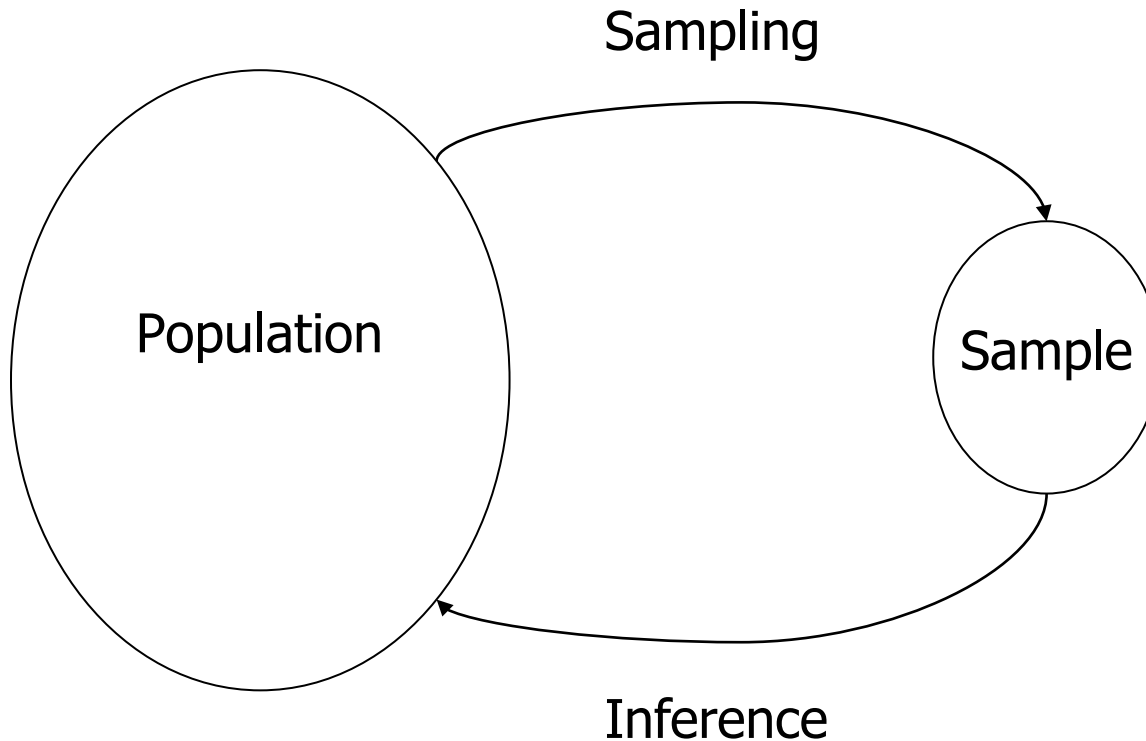
# Measurement instrument

## Questionnaire Design: Pretest

- Quantitative (e.g. Churchill 1979; DeVellis 1991; Spector 1992) or Qualitative (e.g. Converse and Presser 1986; Czaja 1998; Presser et al. 2004)
- Qualitative interview is adopted because:
  - Budget limitation.
  - Triangulation: qualitative methods help “aiding scale construction” (Punch 2005, p. 242)
  - Being widely used in business research (e.g. Kohli, Jaworski and Kumar 1993)



# Sampling



## **Descriptive Statistics**

- Measures of Location
- Measures of Variability
- Measures of Shape

## **Inferential Statistics**

- Univariate Techniques
- Multivariate Techniques
- Structural Equation Modeling





# Sampling

## What to write

- Sampling frame
  - Unit of analysis
- Sample size
- Sampling methods
  - non-probability sampling
  - probability sampling

## Examples

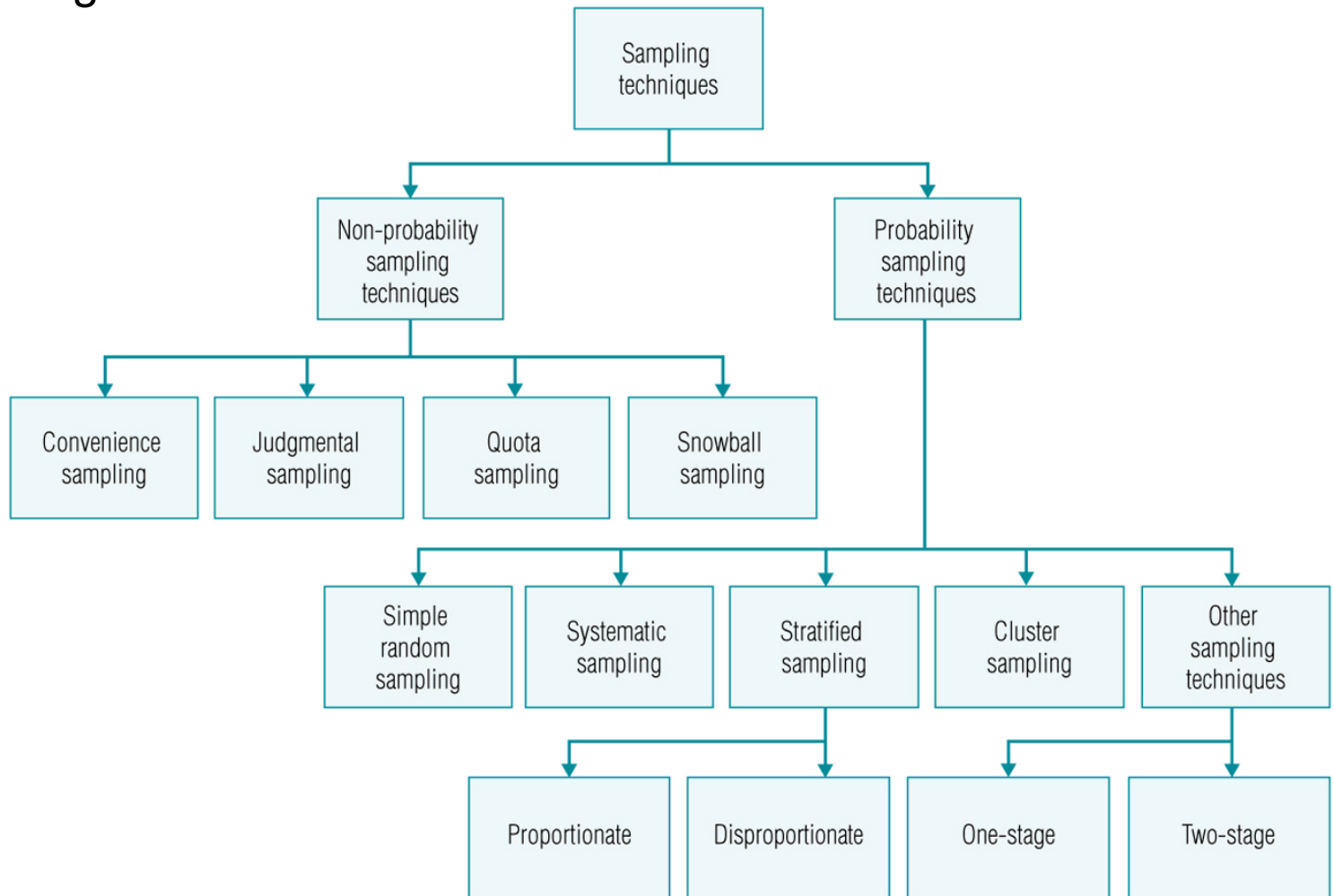
### *Sampling and Data Collection*

This study used survey data to test the hypotheses. A sample of 1000 firms was randomly obtained from a commercial listing of manufacturing and services firms. An online self-administered questionnaire was used as the primary means for data collection.<sup>1</sup> The focus of the study was on manufacturing and services firms operating in 20 different two-digit Standard Industrial Classification code industries (20, 30, and 40) not only to maintain relevance across industries but also to be broad enough for the results to be generalizable. A commercial mailing list of 1000 senior managers in single-business firms with more than 20 employees operating in these industries (Hult et al., 2005) was purchased. In collecting the data, the study followed Huber and Power's (1985) guidelines for obtaining high-quality data from key informants. A key informant design is common in studies of marketing organization (e.g., Moorman and Rust, 1999; Olson, Slater, and Hult, 2005) and of market-oriented behavior (e.g., Gatignon and Xuereb, 1997).



# Sampling

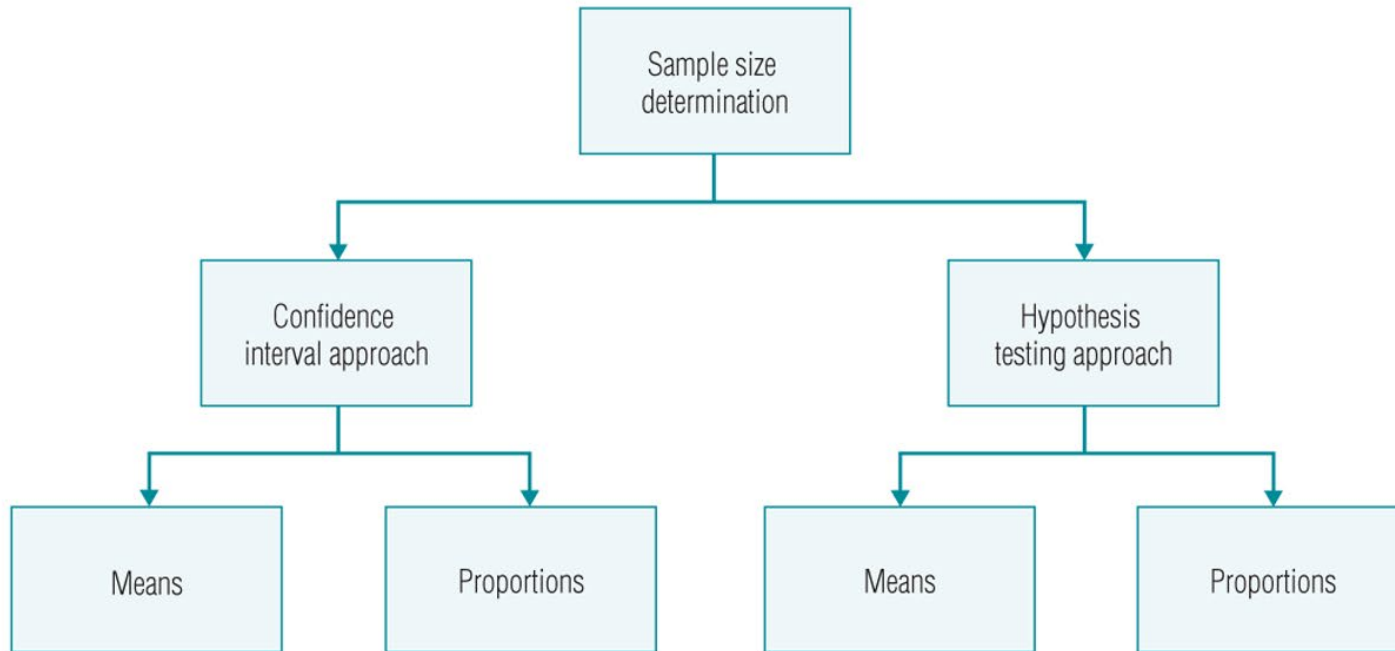
## Sampling Design





# Sampling

## Sampling Design





# Data collection

## What to write

- How the participants are contacted
- How the data is obtained
- What kinds of encouragement for participants are used
- Who report the information for different constructs in the model
- Common method variance
  - non-statistical remedies
  - statistical remedies

## Examples

An online self-administered questionnaire was used as the primary means for data collection.<sup>1</sup> The focus of the

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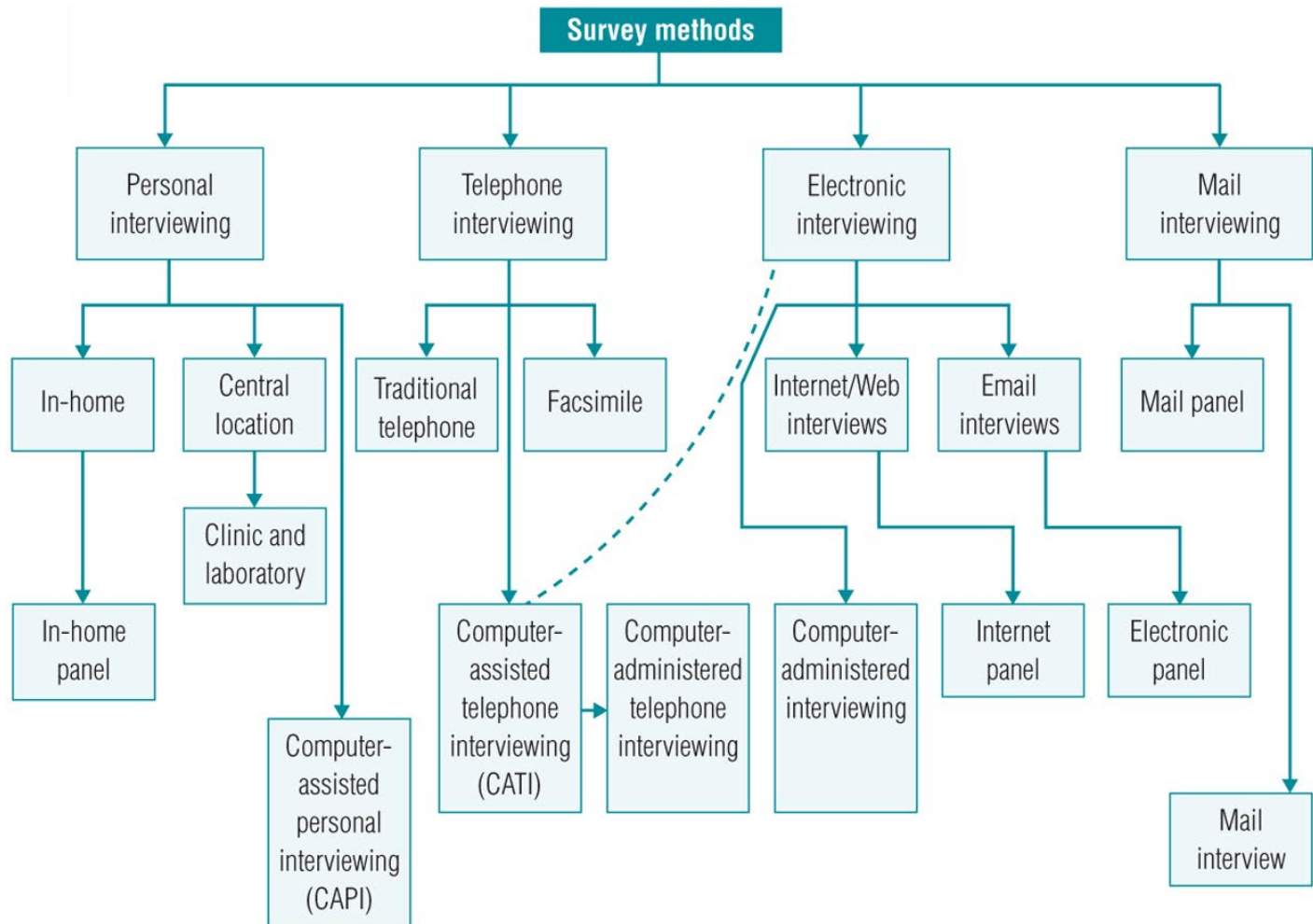
This sampling frame enabled the collection of information about different variables from respondents who work in relevant positions (i.e., the most knowledgeable informants) and thereby reduce systematic measurement error. For example, information on key variables from the manager most closely associated with marketing activities in each organization was obtained. Senior marketing executives (single informant) served as the respondents because they are the most knowledgeable informants about MO, marketing organization structure, strategic marketing behavior, and marketplace performance metrics (Olson et al., 2005; Zhou et al., 2008).

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In total, 163 useable surveys were received, producing a response rate of 16.3%. The sample consisted of 45% of firms operating within the services sector and 55% in the manufacturing sector. With respect to firm size, the sample contained 42% medium-sized firms (the number of full-time employees >20 and <200) and 48% large-sized firms (the number of employees >200).

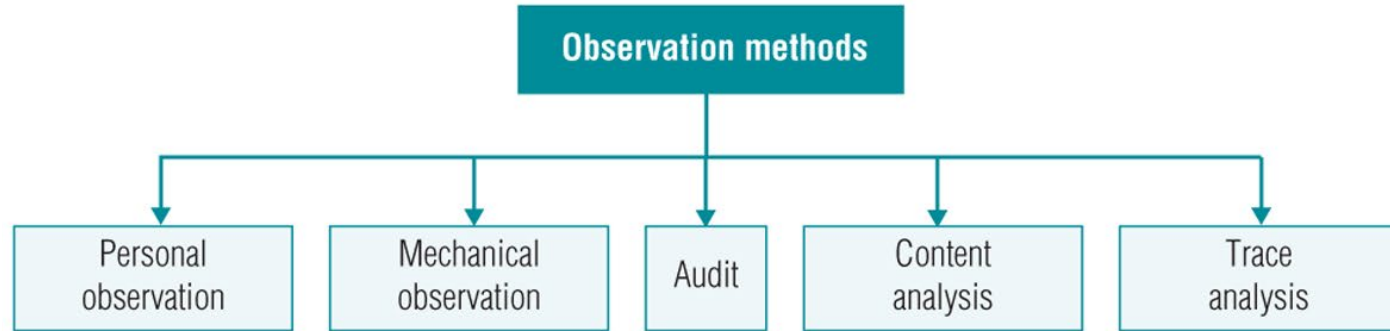


# Data collection



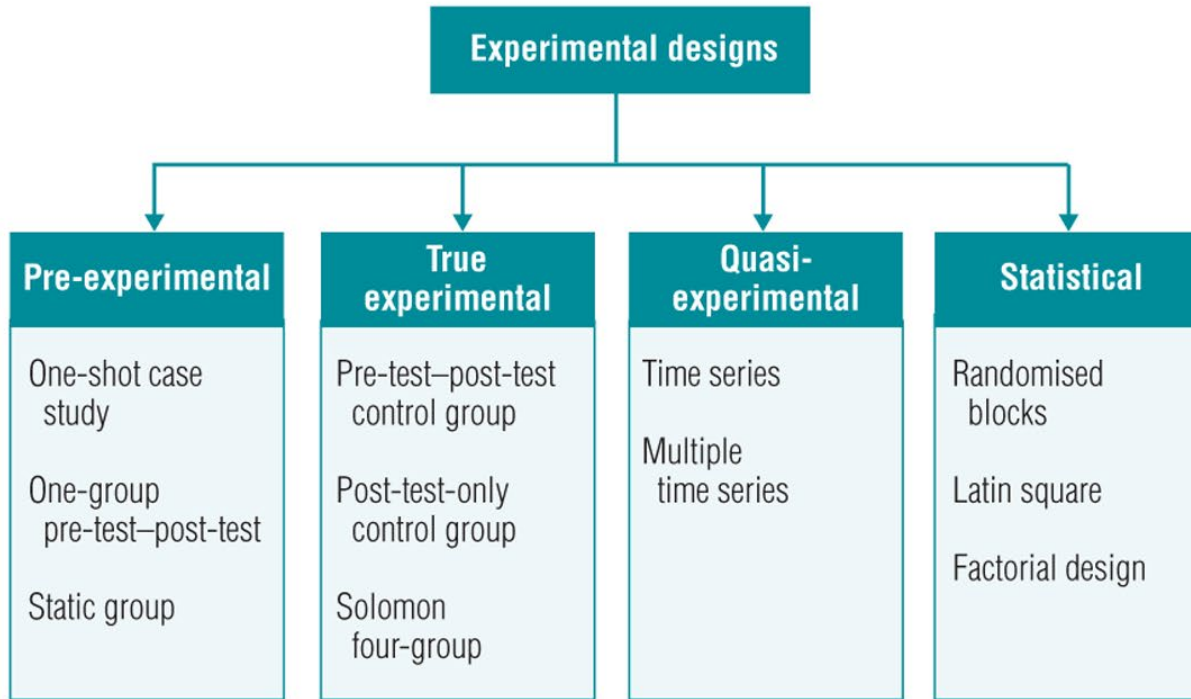


# Data collection





# Data collection





# Data collection

## Data Preparation

