CHAPTER 3

RESEARCH METHODOLOGY

This chapter will illustrate the research methodology that has been deployed in this study. The research design, research instrument, measurement scale, questionnaire design, population of study, development of research hypotheses, unstructured interview undertaken, data collection procedure or sampling method used as well as the data analysis techniques employed in this study.

3.1 Introduction

This study uses quantitative method as its model for this research and hence self-administered structured questionnaire was used as means for data gathering. The survey questionnaires for this study were distributed through non-probability sampling based on convenience sampling and snowball sampling. Though the questionnaire for this study is adopted from the study by Liu and Shen (2004), a pilot study was conducted. This is due to the fact that the original questionnaire was crafted in Chinese and it was translated into English to suit the local environment. The pilot study was conducted to eliminate any errors and ambiguities due to translation.

An unstructured interview was subsequently conducted after the completion of data gathering through survey questionnaire. The unstructured interview was performed to better understand the possible underlying reasons which have guided the engineers involved in this research towards their responses as well as to further comprehend their perceptions of Value Management implementation in the engineering practices.

3.2 Research Design

This research is designed to test hypotheses developed in this chapter using self-administered structured questionnaire. The intended research objectives are investigated by employing the standard regression analysis using the relationships between independent variables and dependent variable identified. This study is conducted stressing on the least interference on the participants of the survey. The target participants identified are registered professional engineers practicing in the Klang Valley. Also, this study is done in cross-sectional manner, where data from respondents were gathered during the one month period to meet the research objectives.

An unstructured interview was subsequently conducted after the questionnaires were distributed to better understand the possible fundamental concerns which have guided the engineers to their responses. Four (4) engineers with wide experiences in their respective fields of engineering and extensive exposure in Value Management implementation in Malaysia were selected to participate in the unstructured interview.

3.3 Research Instrument

The primary research instrument chosen for this study is self-administered structured questionnaire as shown in Appendix F. It offers some degree of advantages such as rapid response, cost and time saving as well as easy to organise. This self-administered structured questionnaire is adopted from the study conducted by Liu and Shen (2004), looking into the relationships between resources, team dynamics, approach strategy and adoption of Value Management as well as the moderating effects of

awareness into the relationships between resources, team dynamics, approach strategy and the adoption of Value Management.

As the original questionnaire was crafted in Chinese, translation of the questionnaire into English was necessary to suit the local environment to enable this study to be conducted. A pilot study was conducted with 10 selected respondents who have vast engineering experiences to eliminate errors and ambiguities of the questionnaire.

An unstructured interview with selected respondents who have vast experiences in both the engineering practice and the implementation of Value Management was subsequently administered after the distribution and collection of the survey questionnaires. Unstructured interview was selected as the mode of information gathering as the implementation of Value Management is a relatively new subject and exploratory in nature. Through unstructured interview, respondents were given opportunity to discuss and opine freely about Value Management and to express their perceptions about how Value Management should be implemented.

3.4 Selection of Measurement Scale

This study intends to study the relationships of resources, team dynamics, approach strategy and adoption of Value Management as well as the moderating effects of awareness on the relationships between resources, team dynamics, approach strategy and, the adoption of Value Management. Respondents of this questionnaire were requested to answer all 52 questions covering the dependent variable of adoption of Value Management, independent variables of resources, team dynamics and approach

strategy as well as moderating variable of awareness. A 7-point Likert-type scale ranging from 1 “Strongly Disagree”, 2 “Disagree”, 3 “Somewhat Disagree”, 4 “Neutral”, 5 “Somewhat Agree”, 6 “Agree” to 7 “Strongly Agree” is used as anchor points in the questionnaire. The total numerical value is subsequently calculated from the responses obtained using the measurement scale proposed on the individual variables (Sekaran, 2003).

3.5 Questionnaire Design

The structured questionnaire was designed to have 2 parts to ensure simplicity to the respondents, namely:-

Part A: Implementation of Value Management (52 questions)

Part B: Demographic Profile of the Respondents (10 questions)

3.6 Part A: Implementation of Value Management

Part A of the questionnaire measures the responses pertaining to the various variables in this study, organised to include the dependent variable of adoption of Value Management, the independent variables of resources, team dynamics, approach strategy and the moderating variable of awareness.

3.6.1 Adoption of Value Management

Adoption of Value Management is the dependent variable in this study and is evaluated based on the Liu and Shen’s (2004) and Fong & Shen’s (2000) recommendations. A 7-point Likert-type scale ranging from 1 “Strongly Disagree” to 7

"Strongly Agree" is used to measure the responses. The adoption of Value Management variable is based on the literature as described in Table 3-1 below.

Type Of Variable	Reference Sources
Dependent Variable (DV) – Adoption of Value Management	• Fong, 1998 • Jaapar & Torrance, n.d. • Fang & Rogerson, 1999 • Ting & Cheah, 2004 • Gupta, 2009 • Chen, Chang & Huang, 2010 • Fong & Shen, 2000 • Liu & Shen, 2004 • Bowen, Jay, Cattell & Edwards, 2010 • Hamilton, 2002

Table 3-1: Summary of Dependent Variable and Reference Sources

3.6.2 Resources

Resources are the independent variable in this study and are evaluated based on the Liu and Shen's (2004), Fong & Shen's (2000) and Ting and Cheah's (2004) recommendations. Resources are further divided and measured in terms of 3 dimensions of resources, namely cost, time and experiences. A 7-point Likert-type scale ranging from 1 "Strongly Disagree" to 7 "Strongly Agree" is used to measure the responses. The resources variable is based on the literature as described in Table 3-2 below.

Type Of Variable	Reference Sources
Independent Variable (IV) - Resources	• Fong, 1998

	• Jaapar & Torrance, n.d. • Chan, Wong & Scott, 1999 • Chen, Chang & Huang, 2010 • Fong & Shen, 2000 • Liu & Shen, 2004 • Moyer, 2003 • Davis, 2004 • Shen & Chung, 2002 • Luo, Shen, Fan & Xue, 2010

Table 3-2: Summary of Independent Variable (Resources) and Reference Sources

3.6.3 Team Dynamics

Team dynamics is the independent variable in this study and is evaluated based on the Liu and Shen's (2004) recommendations. Team dynamics is further divided and measured in terms of 5 dimensions of owner's participation, teamwork, communication, training and knowledge of team members. A 7-point Likert-type scale ranging from 1 "Strongly Disagree" to 7 "Strongly Agree" is used to measure the responses. The team dynamics variable is based on the literature as described in Table 3-3 below.

Type Of Variable	**Reference Sources**
Independent Variable (IV) – Team Dynamics	• Fong, 1998 • Jaapar & Torrance, n.d. • Ting & Cheah, 2004 • Nazirah & Pasquire, 2001 • Chen, Chang & Huang, 2010 • Fong & Shen, 2000

	• Liu & Shen, 2004 • Davis, 2004 • Shen & Chung, 2002 • Luo, Shen, Fan & Xue, 2010 • Crawford & Pollock, 2004

Table 3-3: Summary of Independent Variable (Team Dynamics) and Reference Sources

3.6.4 Approach Strategy

Approach strategy is the independent variable in this study and is evaluated based on the Liu and Shen's (2004) and Ting and Cheah's (2004) recommendations. Approach strategy is further divided and measured in terms of 4 dimensions of objectives, culture, perceived benefits and methodology. A 7-point Likert-type scale ranging from 1 "Strongly Disagree" to 7 "Strongly Agree" is used to measure the responses. The approach strategy variable is based on the literature as described in Table 3-4.

Type Of Variable	**Reference Sources**
Independent Variable (IV) – Approach Strategy	• Hill & Zeller, 2008 • Chan, Wong & Scott, 1999 • Ting & Cheah, 2004 • Bowen, Jay, Cattell & Edwards, 2010 • Chen, Chang & Huang, 2010 • Fong & Shen, 2000 • Liu & Shen, 2004 • Nazirah & Pasquire, 2007

	• McDuff, 2001

Table 3-4: Summary of Independent Variable (Approach Strategy) and Reference Sources

3.6.5 Awareness

Awareness is the moderating variable in this study and is evaluated based on the Liu and Shen's (2004) recommendations. A 7-point Likert-type scale ranging from 1 "Strongly Disagree" to 7 "Strongly Agree" is used to measure the responses. The awareness variable is based on the literature as described in Table 3-5 as follow.

Type Of Variable	Reference Sources
Moderating Variable (MV)	• Liu & Shen, 2004 • Fong & Shen, 2000 • Kartam, Al-Daihani & Al-Bahar, 2000 • Shehu & Akintoye, 2009 • Perrera, Hayles & Kerlin, 2011

Table 3-5: Summary of Moderating Variable and Reference Sources

3.7 Part B: Demographic Profile of the Respondents

Part B of this questionnaire seeks to examine the background information of the respondents. Respondents were required to answer questions about their nationality, gender, age, ethnicity, monthly income, education level, current job position, current engineering sector, current engineering field and years of service with the current company. This was intended to determine the distribution of the respondents participated in this study.

3.8 Population of the Study

The targeted respondents of this study are engineers practicing in the Klang Valley region regardless of their engineering discipline. As at 2012, there is a total of 71,768 engineers registered with the Board of Engineers, Malaysia. The majority of the population is practicing in Klang Valley region. The respondents were required to answer the questionnaire based on their knowledge and experiences on the subject and subsequently were required to express their views in terms of agreement and disagreement based on the 7-point Likert-type scale devised.

3.9 Development of the Research Hypotheses

As have been outlined in Chapter 1, there are six (6) research objectives in this study. Cause-and-effect relationship between two and more variables is used in this study to determine the relationship between resources, team dynamics, approach strategy and the adoption of Value Management. This study further examines the moderating effects of awareness on the relationship of resources, team dynamics, approach strategy and adoption of the Value Management (Zikmund, Babin, Carr, & Griffin, 2010). Based on the objectives devised, the hypotheses were devised as below:

Objective 1: To determine the relationship between resources and adoption of Value Management among engineering professionals in the Klang Valley.

Hypothesis 1: H_0: There is no significant relationship between resources and adoption of Value Management among engineering professionals in the Klang Valley.

H1: There is significant relationship between resources and adoption of Value Management among engineering professionals in the Klang Valley.

Objective 2: To determine the relationship between team dynamics and adoption of Value Management among engineering professionals in the Klang Valley.

Hypothesis 2: H_0: There is no significant relationship between team dynamics and adoption of Value Management among engineering professionals in the Klang Valley.

H2: There is significant relationship between team dynamics and adoption of Value Management among engineering professionals in the Klang Valley.

Objective 3: To determine the relationship between approach strategy and adoption of Value Management among engineering professionals in the Klang Valley.

Hypothesis 3: H_0: There is no significant relationship between approach strategy and adoption of Value Management among engineering professionals in the Klang Valley.

H3: There is significant relationship between approach strategy and adoption of Value Management among engineering professionals in the Klang Valley.

Objective 4: To determine how different levels of awareness moderates the relationship between resources and adoption of Value Management in the Klang Valley.

Hypothesis 4: H_0: There is no significant relationship between resources and adoption of Value Management, moderated by awareness among engineering professionals in the Klang Valley.

H4: There is significant relationship between resources and adoption of Value Management, moderated by awareness among engineering professionals in the Klang Valley.

Objective 5: To determine how different levels of awareness moderates the relationship between team dynamics and adoption of Value Management in the Klang Valley.

Hypothesis 5: H_0: There is no significant relationship between team dynamics and adoption of Value Management, moderated by awareness among engineering professionals in the Klang Valley.

H5: There is significant relationship between team dynamics and adoption of Value Management, moderated by awareness among engineering professionals in the Klang Valley.

Objective 6: To determine how different levels of awareness moderates the relationship between approach strategy and adoption of Value Management in the Klang Valley.

Hypothesis 6: H_0: There is no significant relationship between approach strategy and adoption of Value Management, moderated by awareness among engineering professionals in the Klang Valley.

H6: There is significant relationship between approach strategy and adoption of Value Management, moderated by awareness among engineering professionals in the Klang Valley.

3.10 Unstructured Interview

The four (4) respondents for this interview were selected as they have vast experiences in the engineering practices in Malaysia and have substantial exposure to the implementation of Value Management in Malaysia. As this was an unstructured interview, there were no prescribed manners to which the respondents were guided to express their responses. Respondents were allowed to express their opinions and thoughts freely about the implementation of Value Management in Malaysia. Their responses were recorded systematically for analysis later. The respondents are as listed below:

1. Respondent A is a registered Professional Engineer who has 44 years of experience in the government sector and engineering consultancy practices. Respondent A is the managing director of a consultancy firm and has been exposed to Value Management practices since it was introduced in Malaysia.

2. Respondent B is a registered Professional Engineer who has 34 years of experience in engineering practices. Respondent B has served in the government sector and private sector as well as participated in numerous Value Management implemented for projects undertaken.

3. Respondent C is a registered Professional Engineer who has 34 years of experience in engineering practices. Respondent C has served in the government sector and private sector. Respondent C is at present participating in Value Management for the projects undertaken due to the requirements imposed by the government.

4. Respondent D is a registered Professional Engineer who has 21 years of experience in engineering practices particularly in the project management and consultancy. Respondent D is currently participating in Value Management for the projects undertaken due to the requirements imposed by the government.

3.11 Data Collection Procedure / Sampling Method

There were two means to which this questionnaire was distributed to the targeted respondents, through printed handouts and emails. Non-probability sampling method was adopted for the study with convenience sampling method and snowball sampling method were used to distribute the questionnaire to selected engineers registered in the directory of engineers provided by the Board of Engineers, Malaysia and Association of Consulting Engineers, Malaysia. Though it has been argued that this method of sampling could induce un-specifiable biasness or influence, this method is necessary due to the time constraint and the inaccessibility to the targeted respondents (Robson, 2002). A total of 350 sets of questionnaire were distributed. Only 117 copies of the questionnaire were returned (33.4% response rate). Out of the 117 copies of the questionnaires returned, only 105 copies were usable in this study.

3.12 Data Analysis Techniques

Collected and completed data for this study are analysed using SPSS version 17. Data must be first screened to reduce potential errors due to data entry. Data transformation is necessary to reverse the scale of 3 sub-variables and 1 variable due to the negatively worded statements of those variables. Data analysis techniques used in this study consisted of normality test (Hair, Black, Babin, Anderson, & Tatham, 2006), reliability test (Nunnaly & Bernstein, 1994) and multiple regression analysis (Coakes, Steed, & Ong, 2010; Saunders, Lewis, & Thornhill, 2007). At the meanwhile, frequency analysis is used to examine the profiles of the respondents participated in this study.

Normality test is used to test the distribution of the data conformance to the normal distribution through the kurtosis and skewness analysis. A set of data is considered as normally distributed if both the kurtosis and skewness fall between the figure of -2 and 2 (Sekaran, 2003). If these criteria of kurtosis and skewness are not met, data transformation is required to transform the data to the desired normal distribution.

Reliability test is conducted to determine the consistency of a set of measurements obtained through the interpretation of Cronbach's Alpha coefficient. Higher scores indicated that the set of measurements obtained is highly reliable and vice-versa. Generally, a score of 0.7 and above is preferred to indicate that the set of measurements is consistent and reliable (Nunnaly & Bernstein, 1994).

Multiple regression analysis is conducted to test the relationship between the independent variables and the dependent variable. A variation of multiple regression analysis, hierarchical multiple analyses are used to test moderator's effects on the

relationship between independent variables and dependent variable. A significant factor of 0.05 is adopted for this study (Coakes, Steed, & Ong, 2010; Saunders, Lewis, & Thornhill, 2007).

The respondents' profiles are analysed using frequency analysis as described by Saunders, Lewis and Thornhill (2007). The trend of the respondents' profiles will be then reported based of the frequency of occurrence.

3.13 Summary

This chapter discussed the research design, research instrument, selection of measurement scale, questionnaire design, population of the study, development of hypotheses, data collection procedure and data analysis techniques.