

CHAPTER 3

3.0 METHODOLOGY

This chapter is mainly focussed on the methodologies and techniques used in carrying out this research. An explanation on how primary data are analysed as well as the validity and reliability of data collected would be discussed. Moreover, research design, sampling, data collection method, statistical measurement techniques utilised in this research would also be well-illustrated in this chapter.

3.1 Research Design

3.1.1 Type of Research

Zikmund (2000) and Saunders et al, (2003) indicated that the purpose of conducting research is to produce information to 'search again', identify problems and opportunities and decrease ambiguous problems and uncertainties. Generally, there are consisting of three types of research, which are Exploratory Research, Descriptive Research and Causal Research.

Exploratory method is a method of identifying and discovering some problems or issues. Descriptive research which is also known as statistical research is designed to describe and illustrate characteristics of a phenomenon or

estimated the proportion in a population. In descriptive studies, questions such as “who, what, when, where and how” will be included and answered by researchers. Causal research is designed to explore, identify and classify the cause and effect relationship between related variables. Besides that, causal research also can be designed to determine the correlation and relationship between dependent variable and one or more than one independent variables. When conducting causal research, the variation between the presumed cause and the presumed effect must be clearly evaluated and determined.

Basically, this research could be categorised as causal and descriptive research as it aims to describe the roles and contribution of corporate DMT in Malaysia and identify the cause and effect relationships between the factors affecting the accuracy of decision making. Factors discussed in this research are comprised of time pressure, information accessible, behaviour of decision makers and DMT.

3.1.2 Cross- Sectional Study

Saunders et al, (2003) stated that as long as the research is completed within one particular time or phenomena, then it would be categorised as cross-sectional studies. This study can be classified as a cross-sectional study as the data are collected at a single point of time and it is also one-shot study of the usage of DMT and determinants of accuracy in decision making. The respondents who answered the questionnaire were also only approached

once to collect the data needed for this research. According to Olsen and George (2004), correlation and multiple regression are the regular tests which have been used in cross-sectional study. Since this research is to study on factors affecting or the determinants of accuracy in decision making, in one-shot study, bivariate correlation and multiple regression is used in analysing the relationship between dependent and independent variables.

3.1.3 Qualitative versus Quantitative Research Design

Qualitative research is designed to answer the 'why' and not 'how' of the topic (Zikmund, 2000). Generally, subjects such as beliefs, attitudes, interactions and cultures would be categorised as qualitative approach as they are hard to quantify and measure. In order to gain a good understanding and a clear picture of qualitative research, non-numerical data would be collected. Non-numerical data can be presented in any form such as words, pictures, diagrams and drawing. Zikmund (2000) indicated that as long as the data presented is not in figure and number, then it would be classified as non-numerical data.

On the other hand, quantitative research is categorised as systematic scientific investigation by determining the correlation and relationship between variables (Zikmund, 2000). In quantitative research, the objective of the research would be expressed and explained by figures and numbers. Besides, the data collected would be in numerical data. After the data collection, the numerical data will be computed and keyed in the statistical

tools such as SPSS and Microsoft Office Excel for analysis purpose. The relationship between variables or factors would be computed, tested and analysed by using various statistical techniques and the statistical results generated from the tests would be presented in figures.

Obviously, as this study is aimed to determine the roles and contribution of corporate DMT in Malaysia and determinants of accuracy in decision making, therefore quantitative approach is most appropriate. The questionnaire designed in this study is mainly for statistical analysis purpose (Saunders et al, 2003). The measurement used in questionnaire is in Likert scale. The Likert scales used in the questionnaire are between one-point to five-point. The questionnaire collected from respondents would be converted into numbers based on their Likert scale used in each question. Statistical techniques used in this research to measure the relationship and correlation between variables include multiple regression analysis and bivariate correlation. The results attained using these techniques are presented accordingly.

3.1.4 Data Collection

Basically, primary data and secondary data are used in completing this study. Figure 4 below shows the sources of data which have been used in this study.

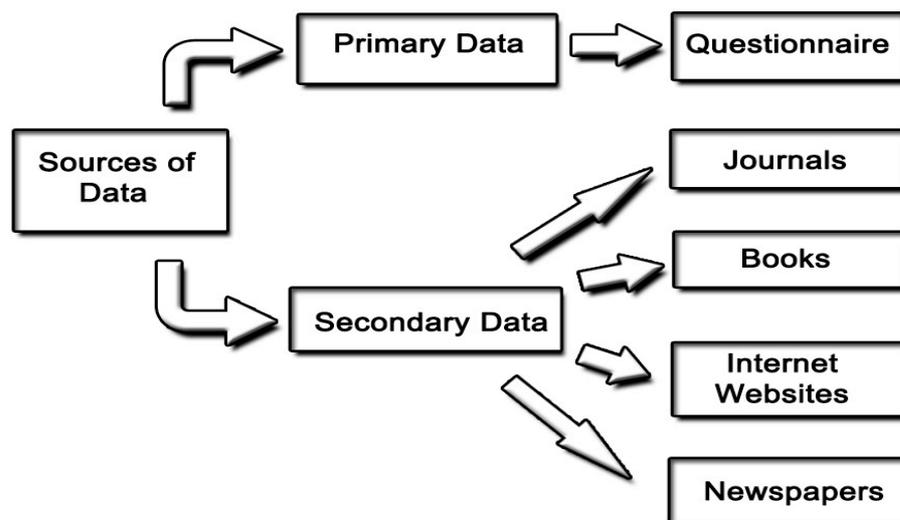


Figure 4: Sources of Primary Data and Secondary Data

3.1.4.1 Primary Data

According to Zikmund (2000) and Saunders et al, (2003), primary data is data gathered from the original source to address a specific research objective (as opposed to secondary data). In this study, survey questionnaire has been used to collect the primary data to provide insights on roles and contribution of corporate DMT in Malaysia and the determinants of accuracy in decision making. Zikmund (2000) stated that one of the advantages of using primary data as compared to the secondary sources is primary data provide latest updated information about the research objectives. Besides that, Saunders et al, (2003) also agreed that since primary data is carried out in the actual environment, the researchers can gain more experience while carrying out the research, even though it can be more costly and time consuming (Haley, 2003) .

3.1.4.2 Secondary Data

Previous study done by Haley (2003) defined secondary data are data that collected by other researchers in their researches. The relevant data and information in literature review is fully depends on secondary data.

3.2 Research Framework

The framework for this research on the determinants of accuracy in decision making is shown in Figure 5 below:-

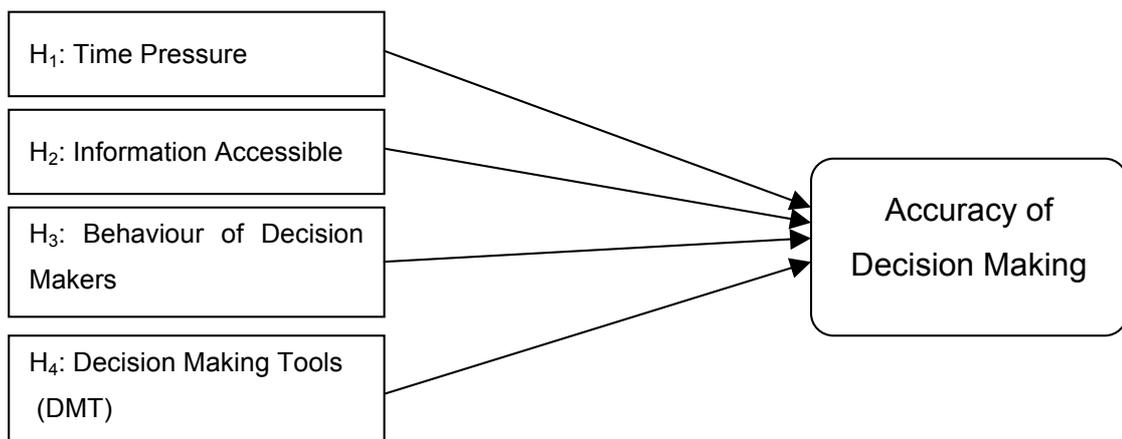


Figure 5: Research Framework on Determinants of Accuracy in Decision Making

3.3 Sampling

In this study, convenience sampling is used but under judgemental criteria. Convenience sampling is classified under non-probability sampling. The respondents were chosen based on own convenience and personal judgement. The results generated by using non-probability method may become bias if there is an element of wrong evaluation and personal judgement in choosing respondents. However, Saunders et al. (2003) indicated that this problem can be eliminated by increasing the sample size. Hence, 200 respondents were chosen from several private and government linked companies. These respondents were mostly working above first-line management level. Almost all the respondents fulfil two basic requirements which are involve in decision making and currently using DMT or at least have used DMT in decision making activities.

3.4 Target Population and Sample Size

According to the Table 3-1, the average sample size from prior studies is 75. Since using non-probability sampling in collecting data may produce bias results, sample size has been increased to 200 in this research in order to minimise possible non-sampling error. In total 200 sets of questionnaire were distributed to seven companies. The name of the companies is not revealed due the private and confidential purpose. The target respondents chosen were personnel from highest management, middle management and first-line management who fulfil the basic two requirements where involve in decision

making and using DMT in decision making. However, only 193 samples were used finally. Seven questionnaires were eliminated because the respondents were totally unaware of DMT and were not involved in decision making process.

Table 3-1
Sample Size Used in Prior Studies

Prior Studies	Location	Sample Size
McGowan and Lombordo, (1986)	US	186
Dror et al, (1999)	UK	32
Williams et al, (2004)	US	64
Kerstholt (1994)	Netherlands	40
Djamasbi,(2006)	US	49
	Mean	75

3.5 Questionnaire Design

The research instrument used in this research is questionnaire survey. The self-administrated questionnaire was designed in response to the four hypotheses that were developed for this study. The questionnaire was divided into three sections which are Section A, Section B and Section C.

In Section A, questions 1 to question 8 were used to obtain feedback on the roles and contribution of DMT. All these questions were developed based on past research conducted by various researchers (Giupponi et al, 2006,

Djamasbi, 2006 & Turban et al, 2007). Questions 1 to 3 were designed to answer the roles of DMT. Questions 4 to 6 were designed to answer hypotheses 4 (H_4) which is “There is a relationship between DMT and accuracy of decision making”. Question 7 was created to ask whether respondent prefers to use DMT or traditional decision making method. Question 8 was designed to ask whether the organisation should continue the usage of DMT in decision making. All variables, scales and measurements for Section A are shown in Appendix 1.

In Section B, questions 1 to question 13 were used to obtain feedback on the determinants of accuracy in decision making. Questions 1 to 4 were designed to answer hypotheses 1 (H_1) which is “There is a relationship between time pressure and accuracy of decision making”. Four questions were designed using the findings on influences of time pressure in accurate decision making (Payne & Bettman, 1996) and Kerstholt (1994). Questions 5 to 8 were designed to prove hypotheses 2 (H_2) which is “There is a relationship between Information accessible and accuracy of decision making”. Four questions were designed using the findings on influences of information accessible in accurate decision making (Marakas, 1999). Questions 9 to 12 were designed to answer hypotheses 3 (H_3) which is “There is a relationship between behaviour of decision makers and accuracy of decision making”. Four questions were developed based past research on influence of behaviour of decision makers on accuracy in decision making (Marakas, 1999; Water, 2008). Question 13 was developed by combining all independent variables to explore if these four factors will determine the accuracy of decision making.

This question is used as the dependent variable in this research. In question 13, one-point to ten-point scale was used to obtain respondents feedback. This scale was reduced to one-point to five-point scale to match the scales of other questions. The variables, scales and measurements for Section B are shown in Appendix 2A and Appendix 2B.

Lastly, in Section C, questions 1 to 7 were used to understand the demographic profile of the respondents. The variables, scales and measurements for this Section C are shown in Appendix 3.

The Figure 6 is the summary on the list of questions which were used to answer and prove the four determinants of accuracy in decision making.

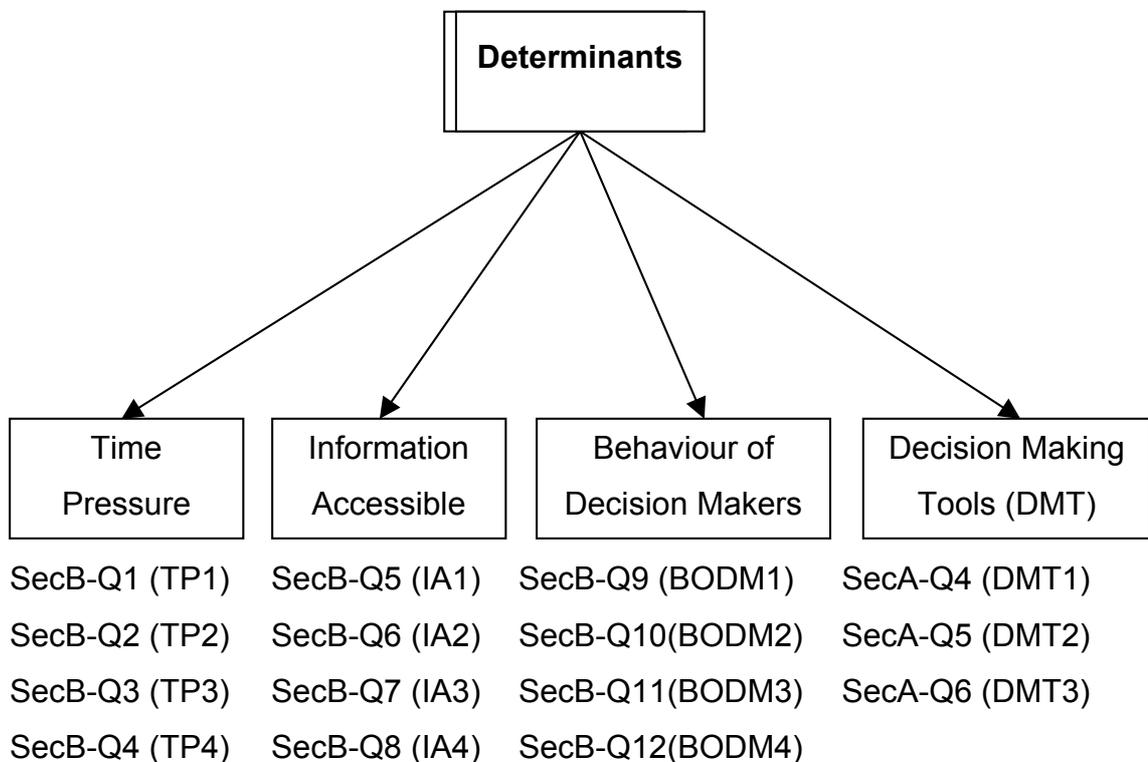


Figure 6: Summarise the List of Questions from the Questionnaire (which set according to the independent variables)

3.6 Pilot study

The pre-testing procedure is a preliminary analysis which is important in the questionnaire design in order to have a better quality result. The non-verbal communication in the questionnaire design is important to ensure that the language utilised in all questions is easily understandable.

In order to ensure the main constructs were operationalised properly, a draft questionnaire has been distributed to 30 respondents to check their reliability and sent to five subject matter experts to answer and review the initial questionnaire. These experts consist of University of Malaya's Lecturers with minimum PHD qualification and external professionals who have extensive experiences in decision making activities at high level management, with minimum Master Degree qualification. Cronbach's Alpha was used to test the reliability level. The test is considered reliable when the overall Cronbach's Alpha value is higher than 0.7 (Coakes & Steed, 2000 & Raduan et al, 2006).

These five subject experts have amended the critical words used in the questionnaire and the overall Cronbach's Alpha value for the first draft questionnaire was lower than 0.7 due to the critical words and jargon terms have been used in initial questionnaire. After the amendments, the improved questionnaire has been resent to another 20 respondents for pre-testing. At this period, the reliability level for questionnaire was reliable as the overall Cronbach's Alpha value is higher than 0.7 which has been shown in Table 3-2 below.

Table 3-2

Cronbach's Alpha Values for Pilot Test

Constructs	Number of Items	Cronbach's Alpha
Time Pressure	TP1, TP2, TP3, TP4	0.735
Information Accessible	IA1, IA2, IA3, IA4	0.746
Behaviour of Decision Makers	BODM1, BODM2, BODM3, BODM4	0.845
Decision Making Tools (DMT)	DMT1, DMT2, DMT3	0.812

3.7 Reliability and Validity

The usage of reliability and validity are commonly used in quantitative research and it has been reconsidered in qualitative research paradigm. Reliability is the consistency of one's measurement, or even though it is the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects. Hence, it is the repeatability of measurement where the measurement is considered reliable if the person's score on the same test given twice similarly. Reliability is not measured but estimated. As of validity, it is the strength of our conclusions, propositions or inferences. Even though we often thought that reliability and validity as separate ideas but in actual fact they are inter related to each other.

3.7.1 Validity

Joppe (2000) determined that validity is whether the research could truly measure what it intended to measure or how truthful would the research results could be. Researchers normally determine validity by asking a series of questions and often will look for the answers in the research of others. Also, Wainer and Braun (1998) described the validity in quantitative research as “construct validity”. Construct is the initial concept, notion, question or hypotheses that could determine which data to be gathered and the way to gather it. The research instrument (questionnaire) used in the research is valid as it could measure what is intended to be measured and measure the same construct. Moreover, the analysis techniques that have been carried out are the evidence of constructs validity since the analysis techniques used have been carried out by other researchers and also supported by empirical evidence.

According to Norusis (2000), convergent validity (factor loading) can be used to measure construct validity. When the factor loading values for each construct are more than 0.5, it means the factor (construct) has achieved construct validity (Norusis, 2000). In this research, the four constructs (time pressure, information accessible, behaviour of decision makers and DMT) determine accuracy of decision making have achieved construct validity as all their factor loading values exceed 0.5 (between 0.637 and 0.973) as shown on Table 3-3 below. Besides that, based on the factor loading below, we could see that the entire constructs could be factorised into four factors which are

“Time Pressure”, “Information Accessible”, “Behaviour of Decision Makers” and “Decision Making Tools (DMT)”.

Table 3-3

Factor Loading Values

Constructs	Items	Factor Loading
Time Pressure	TP1	0.804
	TP2	0.817
	TP3	0.870
	TP4	0.973
Information Accessible	IA1	0.637
	IA2	0.648
	IA3	0.754
	IA4	0.789
Behaviour of Decision Makers	BODM1	0.716
	BODM2	0.802
	BODM3	0.751
	BODM4	0.948
Decision Making Tools (DMT)	DMT1	0.708
	DMT2	0.669
	DMT3	0.790

3.7.2 Reliability

Reliability is the extent to which results could be consistent over time and an accurate representation of the total population under study is referred to as reliability. Also if the results of the study can be reproduced with the similar methodology then the research instrument is considered to be reliable (Joppe, 2000). Three types of reliability are used to refer in quantitative research

which are the degree to which a measurement given repeatedly would remain the same, the stability of the measurement over time and lastly the similarity of the measurement in the given time period (Kirk & Miller, 1986). The reliability analysis used to estimate the reliability of the measurement and data set for this research is Cronbach's Alpha. As stated earlier, the test is considered reliable when the overall Cronbach's Alpha value is higher than 0.7 (Coakes & Steed, 2000 & Raduan et al, 2006). This research is considered showing moderately weaker reliability as the overall Cronbach's Alpha value for four constructs are slightly lower than 0.7 (between 0.525 and 0.666) which has been summarised in Table 3-4 below.

Table 3-4

Cronbach's Alpha Values

Constructs	Number of Items	Cronbach's Alpha
Time Pressure	TP1, TP2, TP3, TP4	0.648
Information Accessible	IA1, IA2, IA3, IA4	0.666
Behaviour of Decision Makers	BODM1, BODM2, BODM3, BODM4	0.525
Decision Making Tools (DMT)	DMT1, DMT2, DMT3	0.540

3.8 Data Analysis

The data collected was analysed by SPSS software and Microsoft Office Excel. In this study, the bivariate correlations and multiple regression analysis used to see the relationship between independent variables and dependent variables. Other analysis used were frequency analysis and descriptive analysis. The descriptive and frequency analysis was used to show the number, average and mean of each question. It also enables to enhance the understanding regarding the numerical data collected.

3.8.1 Multiple Regression Analysis

According to Brant (2004) multiple regression is a statistical analysis or generalisation of simple regression model which extensively uses to measure the degree of relationship or association between a dependent variable and more than one independent variables. The selection of dependent and independent variables is based on conceptual logic or information from a literature research and it must be ensured that independent variables influence on dependent variable, and not vice versa (Norusis, 2000). The function for multiple regression equation is shown in Appendix 4.

3.8.2 Bivariate Correlation

Bivariate Correlation is a statistical tool used to measure the linear association (strength and direction) between two related quantitative variables, x and y (Norusis, 2000). The correlation coefficient (represented by the letter r) is

used to describe the strength of relationship between two related variables and always takes a value ranges from -1 to +1; where zero (0) correlation indicates no linear relationship, positive correlation (+1) indicates positive relationship and negative correlation (-1) indicates negative relationship (Saunders et al, 2003). Parametric test which is Pearson Correlation would be used for this study as the scale measurement used in the questionnaire is interval (Saunders et al, 2003). The functions for the correlation and correlation coefficient have shown in Appendix 5.