CHAPTER 3:

RESEARCH METHODOLOGY

3.0 Introduction

This chapter shall focus on the methods applied in conducting this research. Remenyi et al. (1998) defines research methodology as the procedural framework within which the research is conducted. In general, research methodology describes the overall shape and design of this study and the entire data collection process. Apart from that, this section also discusses the model replicated and adapted in the study. The source of data and the analysis techniques chosen will be discussed in details. The essence is to justify the method applied in this study with rationale and valid explanations.

The methodology used in this study is quantitative method and uses longitudinal data from some selected Malaysian listed companies, time series pooled cross-section analysis is employed to assess the relationship between international diversification and performance. This technique enables researches to examine variations among the cross-section units over time (Sayrs, 1989; Hsiao, 1995). It assumes that regression parameters do not change over time and do not differ between various cross-sectional units, thus enhances the reliability of the coefficient estimates.

3.1 Research Activities

Research activity can be conducted in different forms based on the appropriateness and the scope of the research. In this paper, the research activity will primarily focus on hypotheses testing in nature as the relationship among the variables has been established by past researchers albeit on foreign multinational corporations. Hypotheses testing in this study will offer an enhanced understanding of these variables in Malaysia context. Hypotheses testing generally could be investigated in two ways, causal or correlational. Causal study is when the researcher wants to delineate the cause of one or more problems, where as Correlational study is when the researcher is interested in delineating the important variables associated with the problem. The former, causal study is used in this paper to determine how the degree of international diversification affects the firm performance statistically. Statistical inference allows one to extend the results obtained from a sample of subjects to a larger population of subjects

3.2 Development of Hypotheses

Pursuant to the literature review discussed in previous chapter, the following hypotheses are developed to meet the research objectives:

1) There will be a negative relationship between Malaysian firms' performance and degree of international diversification at the lower and larger range, and a positive relationship for the middle range, that is, a S-shape relationship

This hypothesis shall be tested by developing mathematical models and confirming the degree of fitness to the models derived. For this, two models shall be tested and determine which would fit better.

Quadratic Model:

$PERF_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 DOI_{it} + \beta_3 I_1 + \beta_4 I_2 + \beta_5 I_3 + \beta_6 I_4 + \beta_7 I_5 + \beta_8 DOI^2_{it} + e_{it}$

Fitting this model would suggest there is 2-stage relationship between the firm performance and degree of internationalization

Cubic Model:

$PERF_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 DOI_{it} + \beta_3 I_1 + \beta_4 I_2 + \beta_5 I_3 + \beta_6 I_4 + \beta_7 I_5 + \beta_6 DOI^2_{it} + \beta_7 DOI^3_{it} + e_{it}$

Fitting this model would suggest there is 3-stage (or S shaped) relationship between the firm performance and degree of internationalization.

Where:

it = the ith firm in the sample of t time

PERF = Firm performance

SIZE = Size of the firm

DOI = Degree of international diversification

I_1 = Dummy variable industry sector for plantation

I_2 = Dummy variable industry sector for finance

I_3 = Dummy variable industry sector for trading and services

I_4 = Dummy variable industry sector for consumer products

I_5 = Dummy variable industry sector for construction and infrastructure

I_6 = Dummy variable industry sector for industrial and manufacturing as the baseline for dummy effect

e = Random error

2) There will be significant difference in firms' performance between domestic based firms and firms with more than 10% degree of international diversification

Where multiple regression analysis with pooled cross-sectional / time series regression technique will be used to in Hypothesis 1 to examine the relationship between degree of international diversification and firm performance. Classical statistical analysis of covariance will be adopted for determining the performance

difference between the domestic firms and firms with more than 10% of international diversification

3.3 Selection of Measures

Previous chapter has summarized the variables adopted by past studies, this paper will use the following variables as the measures for testing the hypotheses:

Dependent Variables

Corporate performance:

4) ROA, return on total assets, for which return refers to profit before interest and income tax. This measure is selected as it is widely adopted among other researchers and should provide adequate comparison with past results obtained.

5) ROS, return on total sales, for which return refers to profit before interest and income tax. This variable is selected because it is another performance indicators widely used in past researches, moreover, it is able to avoid the effect of different assets valuations resulting from timing of investment or depreciation.

To facilitate causal inference, both dependent variables will be lagged by one year with respect to the independent variables, as we expect the effect of international diversification only to be experienced a period later. The selection of one year lag is

consistent with past studies (Gomes and Ramaswamy, 1999; Contractor et al. 2003; Lu and Beamish, 2004)

Independent Variable

The independent variable in this study is DOI, Degree of International Diversification as described in the previous chapter. A brief summary of the measures adopted in the past studies:

    i.   Foreign Sales as the Percentage of Total Sales (FSTS)

    ii.   Foreign Assets as the Percentage of Total Assets (FATA)

    iii.   Foreign Employees as Percentage of Total Employees (FETE)

    iv.   Overseas Subsidiaries as Percentage of Total Subsidiaries (OSTS)

    v.   Research and Development Intensity (RDI)

    vi.   Export Sales as Percentage of Total Sales (ESTS)

    vii.   Foreign Profits as a Percentage of Total Profit (FPTP)

    viii. Top Managers' International Experience (TIMIE)

Majority of the past studies chose FSTS and FATA as the measure for DOI. This paper shall use FSTS as the single dimension construct for measuring the DOI because of the data availability constraint as well as the comparison purpose with other results obtained.

Control Variables

Consistence with the common variables employed in the past studies as described in Chapter 2, firm size and sector effect are selected in this paper as the control variables. Firm size is determined by the natural logarithm of net sales as the log transformation is found to be effective and easy to interpret as the change of firm size is closed to normal distribution. As for controlling industry sector effects, this paper uses 6 industry dummy variables, representing the 6 industries: I_1 = Plantation; I_2 = Finance; I_3 = Industrial and Manufacturing; I_4 = Trading and Services; I_5 = Consumer Products; I_6 = Construction and Infrastructure. The construction and infrastructure industry is the residual dummy variable in which when all the I's = 0.

3.4 Sampling Design

The sample selected consists of different industries to extend the generalizability of the result obtain to various industries in general. This cross-sectional study will have to take into account the variation across industries by statistical technique elaborated in the following section, as such minimizing some of the sector confounding variance. The data was drawn from the top 100 listed companies by market capitalization in Bursa Malaysia in 2008 published by The Star – Starbiz section. The criteria for companies in the first hypothesis: finding the relationship between degree of international diversification and firm performance; is minimum of 10% sales originating from overseas operation, this is consistent with past studies (Stopford and Wells, 1972; Siddharthan and Lall, 1982; Daniels et al., 1984; Geringer, Beamish and Da Costa, 1989; Gomes and Ramaswamy, 1999).

Out of the 100 companies selected, there are 42 companies with foreign sales more than 10% of the total sales, and 50 companies which are identified as domestic orientated companies with foreign sales less than 10%. The rest of 8 companies are discarded from our analysis due to incomplete relevant information. Table 2 summarizes the sample data available for this study:

Table 3.1: Sample from Top 100 Listed Companies in Bursa Malaysia

		Number of Companies in Top 100 List	Number of companies involved in Hypothesis 1 (foreign sales > 10% of total sales)	Number of companies with less than 10% of sales originating from overseas operation
1	Plantation	15	8	6
2	Finance	12	5	7
3	Industrial and Manufacturing	18	9	7
4	Trading and Services	23	7	13
5	Consumer Products	11	5	6
6	Construction and Infrastructure	19	8	11
7	Others	2	0	0
	Total	100	42	50

3.5 Data Collection Procedure

Archived data used in this empirical analysis were collected mainly from public information sources: Bursa Malaysia, annual reports and the companies' website. Each company's data were collected from year 2003 to 2008. Bursa Malaysia requires the listed companies with more than 10% of foreign sales to provide segmental information such as the breakdown information of foreign sales and assets data according to the geographical dispersion. For that, each annual report is analyzed in detail to identify the relevant data to be used in this paper.

3.6 Data Analysis Techniques

As mentioned in previous section that cross-sectional data across 5 years period were collected in this analysis to allow generalization of the findings over time. As such, Time Series Cross-Sectional (TSCS) method is used to take care of the variation across industries and over time. This method also increases the degrees of freedom for the estimation (Dielman, 1983). However, TSCS method is not without problems, even assuming that explanatory variables are non-stochastic, a problem with heteroskedasticity may exist when combining several sets of data, with non-constant variance arising from between-subject differences (Neter et al., 1990). Further more, Nerlove (1971) pointed out that autocorrelated errors are frequently encountered when dealing with time series analysis, because of the correlations among variables over time.

Autoregressive-heteroskedastic model will be used to minimize autocorrelation and heteroskedasticity problems (Kmenta, 1986), this model employs non-restrictive assumption by allowing both variances and autocorrelation parameters to vary among the cross-sectional units. This will relax the homogeneity assumption required for regression. With this model, in the first stage, the model will make correction for autocorrelation, autoregressive parameters for each firm will be generated. Then these parameters will be used to generate a final transformed equation in the second stage, where the effects of heteroskedasticity are minimized. This model is necessary for this study as the homogeneity is hard to be assumed among the data due to

differences among firms, both within and across the industries. For that, Eviews statistical software is used to perform the time series cross-sectional analysis by employing time series panel data technique.

For hypothesis 2 which states that there will be difference in performance statistically between international diversified companies and those non-international diversified companies. Consistent with the variables used in hypothesis 1, financial performance ROA and ROS are identified as the dependent variables to be tested for these two groups. To determine the difference in performance among these two groups of companies, T-test is applied. The test is expected to illustrate a clear comparison between these groups. Wherever necessary, eta squared will be used to assess the effect size. SPSS software, independent-sample T-test will be used for this analysis in particular. Before T-test is be conducted, one of the assumptions for the test which is the normality of dependent variable will be assessed to ensure the normality criteria is met, the criteria will base on the Skewness and Kurtusis values of the sample collected.

3.7 Summary

In summary, this chapter describes the methods to be adopted in conducting this research. From development of hypotheses through various literatures support to the design of hypotheses testing by adapting the previous studies and the data analysis manner, the mechanism of the study is proven reliable and effective in answering the research questions. In the next chapter, the result of the empirical testing will be evaluated in detail.