CHAPTER THREE: RESEARCH METHODOLOGY

3.1 INTRODUCTION

The main purpose of this research is to examine the level of firm's existing supply chain capabilities and its relationship to performance in Malaysian firms. This chapter contains the following sections relating to methodology: (i) research design, (ii) instrumentation, (iii) reliability testing (iv) analysis of data, and v) chapter summary.

3.2 RESEARCH DESIGN

A cross-sectional survey was conducted on Malaysian manufacturing and service firms which are based in Kuala Lumpur. The data collection was done from the third week of September 2009 to October 2009.

3.2.1 Population, Sampling and Data Collection Procedure

The target population includes Malaysian manufacturing and service firms which implement web based supply chain in their operations. The sample frame of this study was a database of the listed companies in Kuala Lumpur Stock Exchange. Survey questionnaire was structured to get respond from the targeted firms. The supply chain managers/executives or head of supply chain department were approached to participate in this survey-based study. There are 800 companies listed in KLSE, however a random sampling method was adopted and according to Sekaran (2000), a random sample of 120 firms needed to participate in this study to generalize the findings of the study (p. 291). A total of 250 firms were selected randomly from the list.

These firms were then contacted by telephone to obtain particulars of the senior personnel undertaking responsibilities for logistics and supply chain operations of the company. Only the firms that have already adopted in e-supply chain management were included in this study. After one week of data collection, only 78 (31%) out of selected 250 firms were found to meet the criteria and therefore included in this survey. Questionnaires with a cover letter were self-administrated to the executive from the 78 selected firms.

3.2.2 Questionnaire Design

The survey questionnaire was stuctured in English. An introductory letter was attached with the questionnaire (see Appendix"A"). The letter introduced the researcher and the purpose of research and also ensures the anonymity of the respondent's personal information would be treated as private and confidential.

The survey questionnaire composed of three sections (see Appendix "B). Section one was structured to collect and capture the firm's web based supply chain capabilities, while section two to measure the firm performance. On the other hand, section three was structured to collect the demographic information of the firms and the respondents.

3.3 INSTRUMENTATION

This study involves two important variables. Web based supply chain capabilities and firm performance were pertained as independent and dependent variable respectively. Measurements of each variable were as follows:

3.3.1 Web based Supply chain capability

Web based supply chain capability in this study is defined as the extent to which a firm accomplishes business process electronically including transactions and information exchange. To measure web based-Supply chain capability, the original instrument developed by Ngai et al., (2004) was used.

Five facets of web based supply chain capability were asked. The facets were communication (7 items), top management commitment (8 items), training and education (5 items), data security (5 items), and reliability of hardware and software (3 items). These items were rated using a five–point Likert type scales ranging from '1' "not at all" to '5' "to the great extent." In order to analyze the data, the items of respective factors of web based supply chain capability were computed as average summated score. (See Appendix A for survey items)

3.3.2 Firm Performance

The measurement of organizational performance was based on the evaluation and judgment by respondents with regard to market share, sale growth and profit margin of the company (compared to the previous year). The item scales used were five-point

Likert scales with 1 = significant decrease, 2 = decrease, 3=same as before, 4=increase, 5=significant increase. (See Appendix "B" for items)

3.3.3 Demographic Information

In addition to the above questions, respondents were also asked to provide their personal information such as age, gender, education profile, ethnicity, marital status, monthly income and length of working experience. These items were generally measured on a categorical scale. In addition to the respondents' profile questionnaire, participative organization's profile were also obtained from questions such as adoption of internet/intranet based supply chain management systems, type of firm, number of employee, and level of operations.

Table 3.1 summary of the instruments used for the present study

Instruments of Variables

Variables	Items
Web-based Supply chain capabilities	
- Communication	1. Accurate and timely communication in supply chains 2. Transparency in WSCMS 3. Easy communication between the customers and supply chains. 4. Sharing information and insights

	5. High level of collaboration in the supply chain 6. Stable availability of information in the supply chain 7. Trusting relationship with partners in the supply chain
- Commitment from top management	1. Knowledge and good understanding of top management of WSCMS. 2. Commitment of top management to the implementation of a WSCMS 3. Involvement of top management in the WSCMS 4. Commitment of top management to the WSCMS throughout the supply chain 5. Persuasion of employees by top management to participate in the development of a WSCMS. 6. Establishment of a complete performance measurement system in WSCMS by top management 7. The delegation of authority by top management in the implementation of the WSCMS. 8. Managing the transition to the new WSCMS by top management
- Data Security	1. Availability of the use of information in the WSCMS across the supply chain. 2. A cost-effective security system in the WSCMS.

	3. I received with the security my job provides me. 4. Availability of secure modes in the WSCMS for transmitting information. 5. The greater effectiveness of WSCMS in handling sensitive information. 6. Security of transactions across over the WSCMS
- Training and Education	1. Training on WSCMS implementation. 2. Personnel qualified to execute the WSCMS through training. 3. Developing own in-house training on WSCMS. 4. All personnel understand the benefits of the WSCMS 5. Training on use of the WSCMS.
- Reliability of hardware and software	1. Reliable hardware and software in WSCMS. 2. Technical team supports the software and hardware of WSCMS. 3. The performance of the Internet and response time of the server.
Performance	1. Market share. 2. sales growth 3. Profit Margin on sales

Respondent's background	1. Have you adopted Internet/intranet supply chain management systems in the organization/or would likely to adopt in the future. 2. What is your sex? 3. What is your ethnic origin 4. What is your marital status? 5. How old are you? 6. What is the highest level of your education? 7. How long have you been working in the firm? 8. What is your job title? 9. How many full time employees work in the firm?

3.4 RELIABILITY TESTING

Reliability of measure is an indication of the stability and consistency with which the instrument measures the concept and helps to assess the "goodness" of a measure (Sekaran, 2005). Furthermore, the reliability of measure indicate the extent to which it is without bias (error free) and hence ensures consistent measurement across time and across the various items in the instrument. To measure the reliability of the instruments used in this study, Cronbach's alpha was employed. According to Sekaran (2005), if the value of Cronbach's alpha is less than 0.6, it means that the instrument used has a low reliability (and thus opens for some errors). If the alpha value is within 0.7, the instrument is acceptable for further analysis.

3.5 DATA ANALYSIS

Descriptive analyses include frequencies, mean, and standard deviations, which are computed for all variables to obtain a general profile of the responses' distribution. In particular, frequencies, mean, and standard deviations are calculated to identify the characteristics of the sample for the study. By calculating mean and standard deviation of each facet of the capabilities of web based supply chain management and firm's performance, objective 1 (one) of this study would be achieved.

3.5.1 Correlation Analysis

For this study, Pearson correlation analysis was used to inspect whether web based supply chain management and firm performance have significant relationship to each other. The scale suggested by Hair *et al.,* (2003) was used to describe the intensity

of relationships between the dependent and the independent variables of the study as shown in Table 3.2. This analysis was used to test the relationship between facets of WBSCM and firm performance. Testing H1a to H1e using correlation analysis would help to achieve the second objective of this study.

Table 3.2: *Pearson's r Indices of Correlation*

Pearson's r	Indication
Between ± 0.80 to ± 1.00	High correlation
Between ± 0.60 to ± 0.79	Moderately high correlation
Between ± 0.40 to ± 0.59	Moderate correlation
Between ± 0.20 to ± 0.39	Low correlation
Between ± 0.01 to ± 0.19	Negligible correlation

Correlation coefficient was computed to investigate the strength of association among the variables. The level of significance was set at 0.05 or less.

3.5.2 Multiple Regression Analysis

Regression analysis was used to describe the relationship between dependent variable (performance) and the five factors of independent variables (WBSCM capabilities). The multiple regression models estimate the relationship between the multiple predictor variables and the dependent variable. Since all the constructs/variables were measured in metric scale, regression analysis was suitable to be applied, where five

factors of web based supply chain management capabilities are regressed on single dependent variable firm' performance to investigate the relationship and effects between the two or more variables. This analysis was used to test the hypothesis two to achieve the third objective of this study.

3.6 SUMMARY

In this chapter research methodology and the research design have been discussed. Different statistical tests, such as, descriptive (mean and standard deviations), Pearson correlation, and multiple regression analysis were used to examine the hypothesized relationship.