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An empirical study into factors influencing the use of value-based management tools

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**AN EMPIRICAL STUDY INTO FACTORS INFLUENCING
THE USE OF VALUE-BASED MANAGEMENT TOOLS**

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THESIS

Submitted to
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DOCTOR OF BUSINESS ADMINISTRATION

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STATEMENT OF ORIGINAL AUTHORSHIP

I certify that the substance of the research thesis has not been submitted for any degree and is not currently being submitted to any other degree.

I also certify that to the best of my knowledge any help received in preparing this thesis, all sources used have been acknowledged in this thesis.

Signed:

(Benjalux Sakunasingha)

Date: June 9, 2006

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Last, but not least, I would like to dedicate this dissertation to my beloved country, Thailand.

ABSTRACT

For management to perform its functions of planning, organizing, leading and controlling effectively, a control process has to be in place. This control process should incorporate a target or standard measures and compares performance with the standard, evaluates results and takes any necessary corrective action. Hence, the introduction of the control process, including the measurement and evaluation of performance, has been recognized as a significant progression to ensure organizations achieve their objectives and goals.

There are a number of performance measurement tools for management to select but one that stands out as possibly the preferred method is Value-based management (VBM). Value-based management, a relatively new concept, offers management a better way to measure performance in today's business environment. The application of VBM links business strategy, finance, performance measurement and management processes all together to create value. VBM tells how the value of an organization is maximized, while developing corporate value is the best long-term measure to show how good the present management is doing its job. Therefore, VBM indicates the current situation as well as future prospects of an organization. Further, VBM helps managers and employees to obtain a sharper focus of the corporate vision and objectives based on one leading measurement indicator – that is to enhance corporate value. Unlike many performance measurement tools that may focus on many objectives, which may cause the lack of single focus for accountability for shareholder value, VBM provides a clearer objective focusing on the financial objectives across the organization. More importantly, VBM includes the cost of all capital required, while many performance measurement tools still provide incomplete information about cost.

The purpose of this research is to study what organization factors influence the choice of performance measurement tools, such as VBM selected by management. This research also studies the manner in which the selection and the use of VBM might affect the performance of organizations in Thailand.

A number of studies were made in the past dealing with the effectiveness of VBM. These studies analyzed how VBM assisted management in their administration and measurement of organizational activities. These researches add significantly to the body of knowledge and advance the concept of VBM. However, most researchers ignored an important aspect and that is, what factors influence the management to select and utilize VBM tools in their organization. This research attempts to address this knowledge gap, and answer the following questions:

- What are the organization factors that could influence the selection and the use of VBM tools to measure organization performance? Then importantly,
- Do the selection and the use of VBM tools improve organization performance?

To examine and to properly evaluate the above questions, this research study identifies four key objectives. First, factors that influence management in selecting value-based management tools to measure performance and set standards are to be identified. Second, identify the relationship between organization performance, the use of VBM and certain organization factors such as organization size, market share position and product life cycle stages. Third, study the impact of VBM on organization performance in the Thai environment. Fourth, provide information on how VBM is selected and used in the electrical and electronic industry in Thailand.

The following three hypotheses were proposed to study the behavior of variables:

Hypothesis 1: Organization factors are not the determining factors for selecting and using VBM tools for performance measurement.

Hypothesis 2: VBM tool selected and used by an organization do not influence its organization performance.

Hypothesis 3: The relationship between organization factors and organization performance are not mediated by the VBM tools selected and used by an organization to measure organization performance.

To test the hypotheses empirically, a mailed-survey questionnaire was used to collect data. A stratified sampling technique on a population of 462 Head of Finance/Accounting Departments of the Electrical and Electronics Industry of Thailand

was employed. The above hypotheses were tested using several analytical techniques including regression model, correlation coefficient and factor analysis.

The result of this research indicates that none of the chosen organization factors studied directly influences the selection and the use of VBM tools. In addition, the findings indicated a significant relationship between independent variables, which are organization size and market share position. But these two factors do not establish significantly relationship with the VBM or an organization performance. Further, although the product life cycle stage was not a factor that influenced the selection and the use of VBM tools, it showed a significant negative relationship with organization performance. This was regardless of whether or not the organization selected and used VBM tools. This indicates that the selection and the use of VBM tools are less preferable when the product of an organization is at the early stages such as emerging and growth stages. On the other hand, VBM tools are more preferred by an organization when its product reaches maturity. Finally, these research findings demonstrate that the selection and the use of VBM tools are significantly related to an improvement in organization performance. In other words, the performance of an organization improved with the use of the VBM tool.

It is believed that this research is a first attempt to delineate factors that influence management to select and utilize VBM tools in their organizations. One nation, Thailand and one Industry, the electrical and electronic industry were used as the laboratory to test the hypotheses. It is hoped that future research will replicate this study in other industries and countries that would help to confirm the results of this study. Such studies will not only substantiate this research but also offer new insights into understanding the factors influencing the selection and the use of VBM tools. Different organizational factors, different performance measurement tools, and/or different methodologies in conducting the research showed further contribute to knowledge in this area. The research opportunities are considerable, especially in relation to cross-country comparisons based on performance measurements, using VBM tools and it is this type of research that will improve our understanding of the subject and lead to adoption of these measures in organizations.

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ABBREVIATIONS

ABC	=	Activity Based Costing
ABM	=	Activity Based Management
BSC	=	Balanced Scorecard
CAPITAL	=	Capital invested in the operations of and organization
CF	=	Inflation adjusted annual cash flow
CV	=	Corporate Value
CFROI	=	Cash Flows Return on Investment
DCF	=	Discounted Free Cash Flows Valuation Method
EI Directory	=	Electrical and Electronics Institute Directory Year 2003-2004
EIIT	=	Electrical and Electronics Industry Thailand
EPS	=	Earnings Per Share
EVA	=	Economics Value Added
FCF	=	Free Cash Flows
NOPAT	=	Net Operating Profit After Taxes
ROE	=	Return on Equity
ROI	=	Return on Investment
ROIC	=	Return on Invested Capital
SVA	=	Shareholder Value Added
TATO	=	Total Assets Turnover
TV	=	Terminal Value of future cash flows
VBM	=	Value Based Management
WACC	=	Weighted Average Cost of Capital

CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 Background to the research

If the saying '*what gets measured gets managed*' (Eccles 1998 p. 27; Pettit 2000 p. 1) is true, there should be many reasons for organizations to measure their performance. Reasons given could include a desire to increase earnings and improve effectiveness; to encourage new ideas and innovations; to plan for, manage, and even promote change; to better understand best practices; to advance decision making; and to guide strategic planning and design (De Waal 2001; Neely 1998; Pettit 2000).

One of the greatest challenges for most organizations in today's dynamic and competitive business environment is to uncover new ways to measure and manage their own performances. This has to be done to ensure the achievement of strategic objectives and to sustain the creation of value (Lorange & Scott-Morton 1974; Neely 1998; Schermerhorn 1999).

Performance measurement is part of the management control mechanism. According to Hertenstein and Platt (2000) and Sharman (1995), a control mechanism helps to ensure strategies are implemented and objectives are met. It is, therefore, important to have the right performance measurement tools that accurately measure the performance of an organization, so that managers can act upon the results. There are many performance measurement tools and each tool measures a particular aspect of the business operation. Yet the most commonly used methods that have been around for several decades are the traditional financial measurement tools, which rely on traditional accounting report system (Neely 1998). For example, the return on equity (ROE) measures the generated net income that is returned to common shareholders. However, these methods are classified as traditional tools, although they are still being used nowadays. As industries grew and became more complex, organizations found that the outputs of these traditional financial measurement tools alone were unable to provide the answers for several critical issues. Organizations begin to see that many performance measurement tools do not help to link strategies, finance, and performance measurement. Further, by applying too many measurement tools may create confusion in an organization and cause a lack of focus for accountability in value creation (Aggarwal 2001; De Feo 2000; Stern, Shiely & Ross 2001). Therefore, an organization should use an appropriate number of measurements and

select the right measurement tools that could effectively measure its performance and focus more on wealth or value creation (Aguilar 2003; De Waal 2001; Pettit 2000; Stewart III 1995).

The challenge, then, is to find out how significant is the selection and use of the right performance measurement tools in influencing the organization performance; and what factors influence the selection and the use of such performance measurement tools.

Several studies have examined both theoretically and empirically, the relationship between performance measurement tools used and company performance, (Aggarwal 2001; Hoque & James 2000; Merchant 1981 & 1984; Pettit 2000; Ryan & Trahan 1999; Sinclair & Zairi 2000). The driving force behind these studies could be the high degree of interest in issues relating to creating value for the organization. This research is supported by research surveys of Ramirez and Waldman (1991) which found that top management and investors are not aware of the benefits to be derived from managing for value although Chief Financial Officers has shown considerable interest in maximizing shareholder value (Cooper & Petry 1994, Davis 1996). Ryan and Trahan (1999) felt *'there is a room for future research that examines why and when firms adopt VBM systems'*.

1.2 Research problems, objectives, and issues

1.2.1 Research problems and objectives

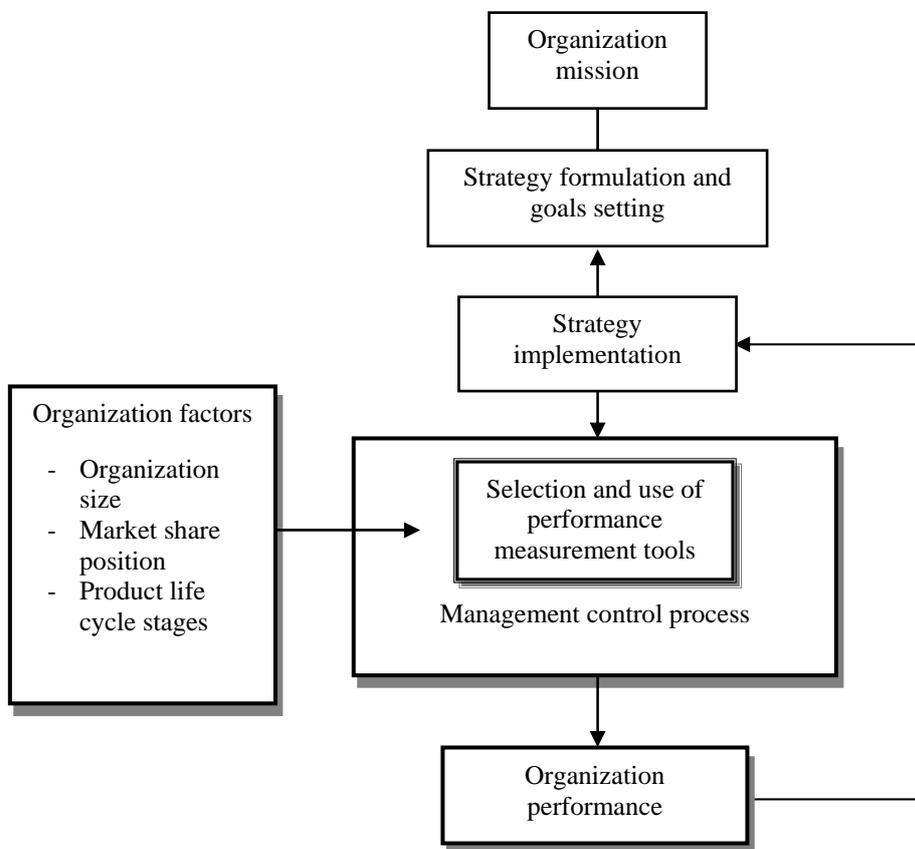
There are many tools used in measuring organization performance, Value-based management (VBM) is one of the performance measurement tools. However, the selection of the right tools depends on a number of organization factors. Some of these factors are organization size, market position in relation to its competitors, and product life cycle stages. This research investigates the following research problem:

1. What are the organization factors that could influence the selection and the use of the performance tools, in particular Value Based Management, to measure organization performance? and
2. Do the selection and the use of Value Based Management improve the organization performance?

The function of management control is to ensure that an organization is implementing strategies to achieve its objectives. In the management control process, performance measurement is a key mechanism used to identify and evaluate performance and help managers to align future activities with the organization's strategies. There are many performance measurement tools that have been identified in management control

mechanisms. Managers need to have the right performance measurement tools to measure whether strategies are implemented effectively and objectives are met (Wheelen & Hunger 2000). Whilst it has been recognized that the right performance measurement tool provides a framework and is the identity of that organization (Black & Porter 2000), the evidence of what organization factors influence the choice of performance measurement tools is very limited (Merchant 1981; Ryan & Trahan 1999). The manner in which the selection and the use of VBM might affect organization performance and the organization as a whole is presented in the Figure 1.1.

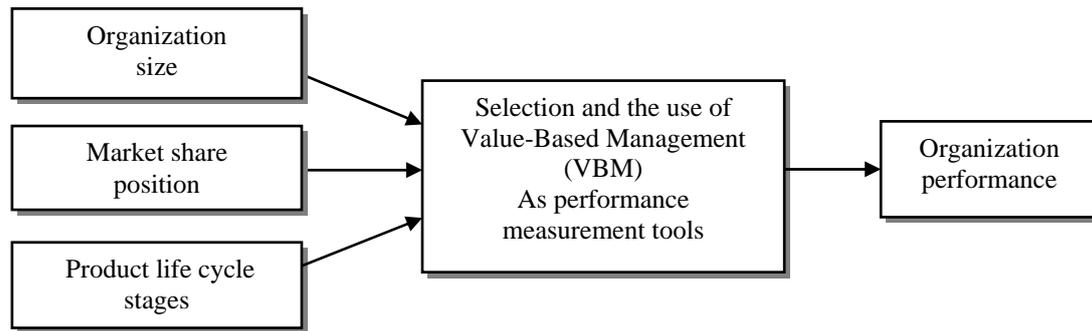
Figure 1.1: **Organization performance measurement**



(Source: Developed for this research)

This research is directed to examine the relationship between the selection of VBM and 1) organization size, 2) market share position in relations to its competitors and 3) product life cycle stages. This research also looks for indirect relationships between organization performance (the outcome variable) and the match between the selection and use of VBM and the three-organization context variables described above. The framework for the research is then narrowed down from Figure 1.1 and is illustrated in Figure 1.2.

Figure 1.2: **Proposed research framework**



(Source: Developed for this research)

In attempting to answer the research problems, this research is directed to the following objectives:

1. To identify and examine factors that influence management in selecting the types of Value-based management (VBM) to measure organization performance or to establishing standards.
2. To identify the relationship between organization performance, through the selection and the use of VBM and the chosen organization factors.
3. To study the impact of VBM on organization performance in the Thai environment setting.
4. To provide information on how VBM is selected and used in the electrical and electronic industry in Thailand.

1.2.2 Research issues and hypotheses

To cope with these objectives, three research questions are generated from the framework model in Figure 1.2. The research questions are:

Research Question I: Do the organization factors such as size, market share position, and product life cycle stages influence the selection of VBM tools to be used to measure its performance?

Research Question II: Do the selection and the use of VBM tools influence the performance of an organization?

Research Question III: Do organization factors such as size, market share position, and product life cycle stages influence an improvement in organization performance through the selection and the use of VBM tools?

Three hypotheses are formulated according to the research questions stated above (also see Chapter 2, Section 2.8, page 71). These three hypotheses will be tested to answer the research questions. These research hypotheses are:

Hypothesis 1 (H1): Organization factors are not the determining factors for selecting and using Value-based management (VBM) tools for performance measurement.

Hypothesis 2 (H2): The Value-based management tool (VBM) selected and used by an organization does not influence its organization performance.

Hypothesis 3 (H3): The relationship between organization factors and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

1.3 Research environment for this study

This research seeks to identify the relationship between organization factors and the selection and the use of VBM in Thai organizations. Thailand has long been well known for its agricultural products, but since 1970's, the emerging of Thailand's manufacturing industry has driven the economy with tremendous growth. Large investments from multinationals have helped Thailand to become an important Southeast Asian production center for many manufacturers (Bank of Thailand 1997). The Thai government also promotes foreign investments to improve business infrastructure and emerging local entrepreneurs. Among the fastest growing Thai manufacturing industries, the Electrical and Electronics Industry is one of the highest on the list (The Office of Industrial Economics Thailand 2003). The products from Thai's electrical and electronic industry brought in, on average, approximately 35 per cent of the total export value per year, even during the economic crisis in Year 1997-1998 (Pongvutitham 2002). Although this indicated the strength of electrical and electronic manufacturing industry in its growth and stability, there is a room for further research to develop a more insights in performance measurement. Contribution to the knowledge in the area of study should improve overall performance of the Thai electrical and electronic industry (Also see Chapter 3, Section 3.3, page 85).

1.4 Justification of the research

The literature review indicates the relationship between organization factors, the selection and use of Value-based management tools and organization performance but are not clearly described such relationship of why and when organizations select and use such tools (Aggarwal 2001; Hoque & James 2000; Merchant 1981 & 1984; Ryan & Trahan 1999; Pettit 2000; Sinclair & Zairi 2000;). This research is an attempt to make a clearer picture of those relationships and can, therefore, be justified for the contribution it makes to the body of knowledge as well as its managerial importance, as explained next.

1.4.1 Need for further research

While works of Value-based management (VBM) tool gurus, such as Ehrbar and Stewart (1999); Rappaport (1981); Stern, Shiely and Ross (2001); Stewart (1995) have added to our knowledge of how VBM can provide managers with an integrative framework to manage organization activities that will create shareholders' wealth, little evidence is available in this area in the developing countries around Southeast Asia region such as Thailand, Indonesia, and Malaysia. However, the biggest challenge to the organization is to find out what are the factors that have to be considered in selecting and using performance measurement tools. The research in this area has been lacking. Therefore, the questions of what are the organization's factors that influence the selection, and how does this selection and the use of performance measurement tools, in particular – the selection and the use of VBM tools, affects the organization's performance, are to be addressed in this research.

Further, the increase in competition in competitive global markets causes organizations to search for ways to better manage shareholder value, and numerous consulting firms have developed models designed to help corporations implement Value-based management systems. Also specific reports and the financial press have dealt with value-based management tools but, so far, in all the literature there has been little, if any, evidence of what actually influences the selection and the use of VBM as internal performance measures (Ryan & Trahan 1999). Moreover, there is little evidence on the awareness, use, and scope of Value-based management in Thai corporations. There is a gap in the academic literature in that no scientific evidence reports how Value-based management is selected and used by Thai companies, and which methods gained the most acceptances. This research will fill the gap in the literature by examining factors that influence the selection and the use of Value-based management in leading electrical and

electronic companies in Thailand. This research also examines the influence of Value-based management on organization performance in Thailand context.

1.4.2 The importance of performance measurement

Performance measurement is one of the four functions in management control mechanism that is used to ensure that activities are performed in such a way that the organization objectives are met (Atkinson 2000; Hertenstein & Platt 2000; Neely 1998). Management needs performance measurement tools that enable them to translate strategies into concrete directions and align the ways people behave in a manner consistent with strategies. This is to say, that research on the roots of performance measurement is needed to identify the way that certain performance metrics are being selected, and once these metrics are implemented, they will effectively measured what they are intended to measure. A framework for selecting and using performance measurement tools to improve organization performance is, therefore, the focus of this research.

1.4.3 Potential managerial implication

This research is based on a sample of the **Electrical and Electronics industry, in Thailand (EEIT)**. Even though this industry has not attracted the interest of many business researchers, it has gained importance in Thailand since electrical and electronic industry has growth potential and is the country's greatest foreign income earner (Pongvuttithum 2002). Therefore, it indicates opportunities for academic research to develop more insights in measuring organization performance. In today's economic development of Thailand, research directed to such enterprises will make a significant contribution to this industry.

1.5 Research methodology

A questionnaire was constructed from the literature by establishing questionnaire items to fit the objectives of this research. This study investigated the population of the electrical and electronics industry in Thailand (EEIT). The main reason for selecting the electrical and electronic industry was due to its recognition in growth and stability since the mid 1980s, as a consequence, organization in electrical and electronic industry can make use of the VBM to increase its strength and to support growth. The 462 medium and large size electrical and electronic companies in Thailand, known as EEIT members were

invited to participate in this study. A stratified sampling technique for collecting data was employed and categorized the companies according to the size of fixed assets as small, medium, and large (Electrical and Electronic Institute Thailand 2002).

It was decided that the Head of Finance/Accounting Department or top managers of these companies should be the respondents. Therefore, a mailed survey questionnaire was sent to these EEIT companies. By the end of the planned data-collecting period, 141 fully returned answered questionnaires to the researcher's mailbox, and was specially prepared for data analysis. A response rate of 30.52 per cent was achieved, and justified as adequate for this research (see Chapter 4, Section 4.2, page 124). Data from the survey were examined; prescreened and analyzed with the SPSS version 10.0 Statistical Package, and Microsoft Excel 2000, for general statistics presentation and applied in this research.

1.6 Definitions of terms

The key words or terms used to explain the constructs generated in this research are defined below.

Organization size: Organization size is one of this research's independent variables. Organization size is commonly measured by total number of employees, total revenues, total assets, and capital employed (Ezzamel 1990; Griffin 1996; Schermerhorn 1999). Following Hoque and James (2000); Ryan and Trahan, (1999), total assets and total revenues are used to represent organization size for this research.

Market share position: Market share position is one of this research's independent variables. It represents the percentage of market share of a particular company in relation to its competitors in Thai electrical and electronic industry. Being able to indicate the positioning of market structures should offer an advantage to organization over its competitors in term of higher returns and minimizing costs and to assess the longer-term potential to increase shareholder value (Porter 1998).

Product life cycle stages: There are four product life cycle stages, namely, emerging, growth, maturity, and decline. The stage in the product life cycle drives the level of competition in the industry (Porter 1998). Grundy (2002) stated that the product life cycle is one of indirect value drivers, and must be managed to outperform competition and, therefore, deliver shareholder value. Further, each stage in the product life cycle requires a different focus on investment, and thus it has some implication in financial performance.

Performance measurement: Performance measurement is a common control mechanism. It is a process that ensures that strategies are implemented and organization objectives are met. Performance measurement provides useful information about the company before decisions or actions could be taken place through certain performance measurement metrics.

Value-based management (VBM): VBM refers to a framework and a set of performance measurement tools for building and maximizing long-term shareholder value. VBM is, in theory, all-encompassing and includes corporate strategy, management compensation issues and detailed internal control and reward systems, all designed to link employee performance to shareholder value. Effective use of VBM should span all levels of the corporation and have an impact on all employees. In this research, the selection and the use of VBM tools represent the intervening variables.

Organization performance: Organization performance is the outcome of how well the business performed. In this research, organization performance is represented by several key financial ratios; these are profit margin, growth in sales, return on assets, total assets turnover, and debt ratio. It is more likely that by applying the VBM, an improvement in key organization performance indicators should be seen.

1.7 Limitations and key assumptions

This research is confined to the electrical and electronic industry in Thailand (EEIT). Therefore, generalizing the results reported in this research to other situations such as cloth and textile industry should only be done cautiously. Due to the large size of the population of 1,760 companies in EEIT, this research applied stratified sampling technique, and surveyed 462 of companies in the EEIT.

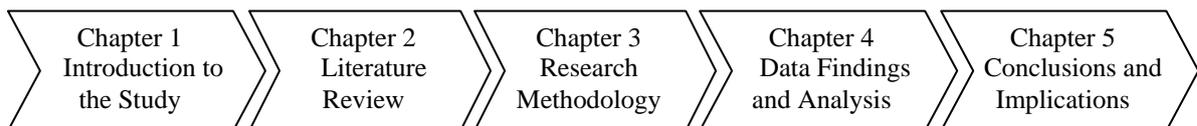
A key assumption of this research is that the response of Head of Finance/Accounting department (CFO) of the EEIT will reflect the industry's underlying of financial performance measurement and control knowledge. This assumption that the CFOs could serve as the organization's representative is based on the findings of Cooper and Petry (1994), Ramirez, Waldman and Lasser (1991) and Ryan and Trahan (1999). These empirical studies found that the CFOs were generally familiar with performance measurement tools; therefore this sample of CFOs of EEIT is justified. Another assumption is that the company's CFOs will be able and willing to provide true information of their businesses and on their companies' performance through a survey instrument.

In regard to the proposed research design, some major limitations are as follows. First, there is a national limitation. No empirical investigation of the topic has been undertaken in Thailand. Hence the findings of the research are limited to Thailand. Second, this study is utilizing a sample of CFOs and the responses are from the EEIT only. Hence the findings may not extend to other manufacturing industry. Third, the sampling frame of only medium and large size companies listed in the Electrical and Electronic Institute Directory Year 2003-2004 may result in bias of the empirical implications.

1.8 Outline of the thesis

Based on Perry's structured approach to presenting PhD theses (Perry 1995), this thesis is structured into five chapters. **Chapter One** describes the background of the research, the research problems, its justification, methodology, terminology and the limitations of the research. **Chapter Two** is used to present the literature reviews carried out for this research and describes the proposed research model and hypotheses. **Chapter Three** deals with the methodology of research employed in this thesis. **Chapter Four** describes the analysis of the data and testing of the hypotheses of the proposed model and the last chapter, **Chapter Five**, presents conclusions and implications of the research. Figure 1.3 provides a conceptual outline of this thesis.

Figure 1.3: **Outline of thesis**



(Source: Developed for this research)

1.9 Summary of the chapter

Chapter One outlined the background to the research, its objectives, framework of the study, definitions of key variables, methodology and outline of the study. Other aspects of the research including literature review, formulation of hypotheses, and detailed methodology will be discussed in the following few chapters.

CHAPTER 2

LITERATURE REVIEW

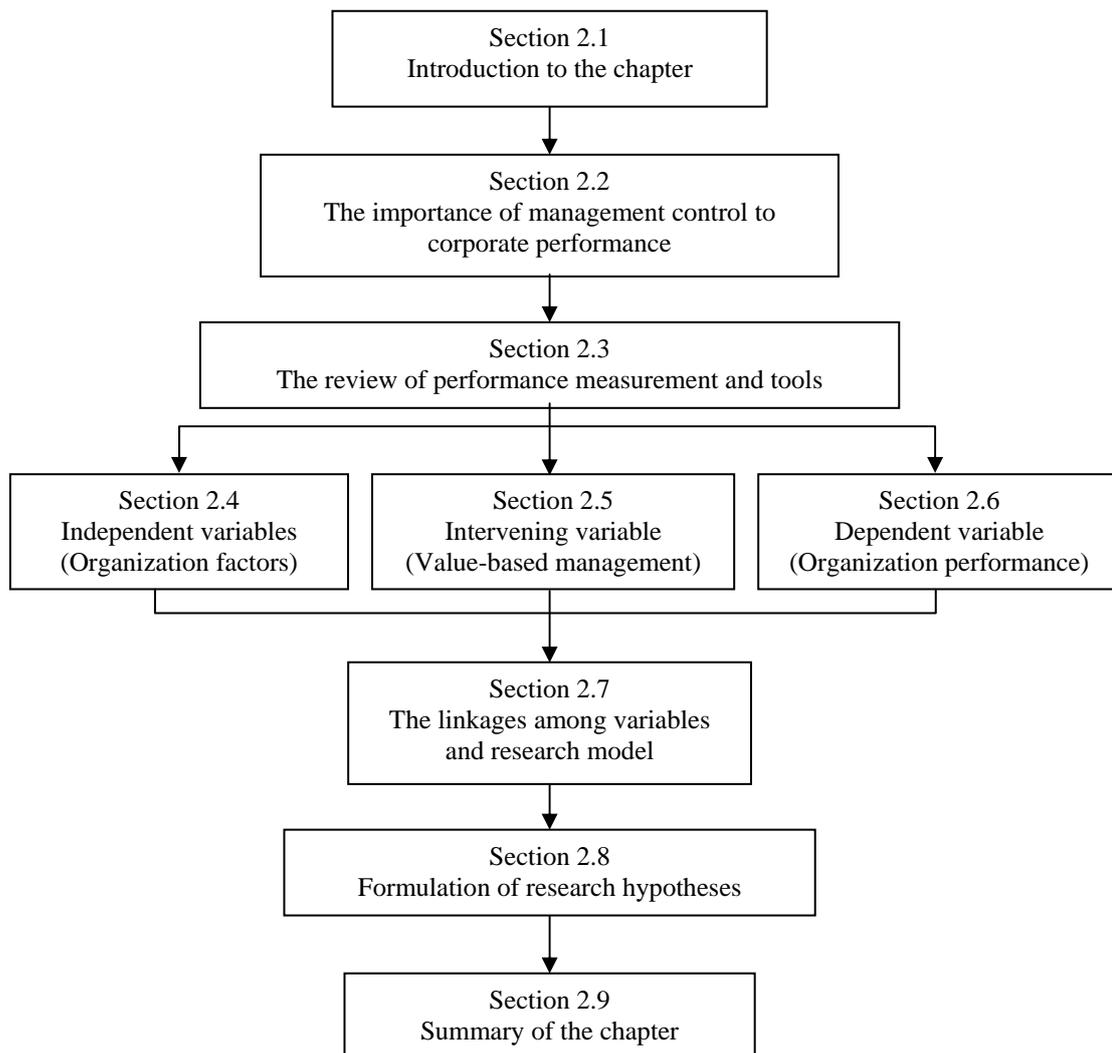
2.1 Introduction to the chapter

In this chapter, the literature on the research topic is reviewed to build the foundation for the formulation of three hypotheses. It will explore a number of avenues of thought in nine sections (see Figure 2.1). An introduction to the structure of this chapter is in Section 2.1. This is followed by Section 2.2, which reviews the parent discipline of this thesis and covers the role played by managerial control in corporate performance. Section 2.3 covers the research's immediate discipline that details the area of performance measurement and the tools used by organizations including traditional tools and techniques such as Earning per Share (EPS), Return on Investment (ROI), and Return on Equity (ROE), and the modern tools such as the Activity-based Costing (ABC), the Balanced Scorecard (BSC), and the Value-based management (VBM). Independent variables such as organization factors, for examples, size, market position, and product life cycle stages that could possibly influence the selection of value-based management tools are covered in Section 2.4. Value-based management, the intervening variable will be detailed in Section 2.5. This is followed by a review of the dependent variable such as organization performance in Section 2.6. Linkages among the variables will be established in Section 2.7 to construct the research model and the formulation of the three research hypotheses in Section 2.8. Section 2.9, summarizes the conceptual context of the literature review and explains how this chapter is linked to Chapter 3, the Methodology.

2.2 The importance of management control to corporate performance

Management of an organization has to recognize the problems, identify the opportunities, make the right decisions and take the appropriate actions to operate a successful business (Anderson 1988; Black & Porter 2000). This is carried out by performing the four basic management functions comprising planning, organizing, leading and controlling effectively (see Figure 2.2).

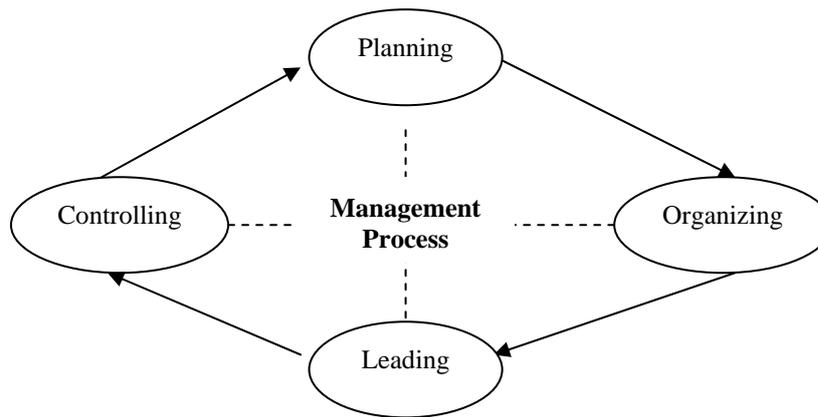
Figure 2.1: **The structure of chapter two**



(Source: Developed for this research)

The emphasis placed on each function of the management process depends on the managerial level (Anderson 1988; Schermerhorn 1999). At the higher managerial level, planning plays an important role and is exercised more often. In comparison, at the lower managerial level, leading and controlling are emphasized (Anderson 1988). However, at whichever level, planning is the process that sets the objectives and determines what should be done to accomplish the objectives. In organizing, tasks are assigned, resources are allocated and activities are arranged to implement plans. Leading is a process of arousing and directing employees to work towards organizational objectives and goals. Last but not least, besides planning, organizing, and leading, one of the critical management processes is controlling.

Figure 2.2: **The four functions of management process**



(Source: Schermerhorn 1999, p. 20).

Anthony and Govindarajan (1995) define management control as a process by which managers influence other members of the organization to implement the organization's strategies. Anderson (1988) supported this definition by stating that besides being responsible for setting goals and making decisions about how these goals are reached; managers also influence employees to focus their attention on achieving the goals. Black and Porter (2000) also stated that managers use control as a process to indicate if the current operation meets organization's objectives. From one perspective, control helps to assure that the current operating systems meet what the organization set out to accomplish (Lorange & Scott-Morton 1974; Wheelen & Hunger 2000). It, therefore, plays a part in the feedback loop that alerts the manager to adjust activities to meet the objectives (Schermerhorn 1999). From another perspective, managerial control process is depicted as deciding what the organization should be doing and comparing actual accomplishments with these plans. Managerial control process, therefore, is an important part in strategic management, which involves a long-range planning and strategy development that affects today's operation, which determines tomorrow's success of an organization. Thus, the management control process involves both planning and controlling (Anderson 1988; Anthony & Govindarajan 1995; Black & Porter 2000; Lorange & Scott-Morton 1974). For example, if profitability is the goal of an organization, management needs to take appropriate measures or to control those measures that could possibly influence future outcome. In doing so, management is able to make adjustments in their plan before it gets out of control (Wheelen & Hunger 2000).

Planning and controlling are closely linked through employees, especially when employees participate in the formulation of the plan from its inception (Anderson 1988). This is one of the advantages of involving the participation of employees since this allows them to get involved in planning; as a result, employees are more likely to keep their own activities in line with the intentions of the plan. For example, a sales force could meet, negotiate and agree on a schedule for turning in their sales report each month. All else being equal, this should lead to a more regular and prompt reporting than a directive from the sales manager.

As mentioned, management control requires both planning and controlling activities. Planning involves setting goals and performance standards, and taking action to implement them. Control measures performance against these goals and standards, then actions are taken to correct any deviations if necessary. The purpose of management control is to ensure that strategies are carried out so that the organization's goals are attained. There are several activities involves in management control. These activities include:

- 1) Planning what the organization should do,
- 2) Coordinating the activities of several parts of organization,
- 3) Communicating information,
- 4) Evaluating information,
- 5) Deciding what action should be taken, and
- 6) Influencing employees to change their behavior (Anthony & Govindarajan 1995).

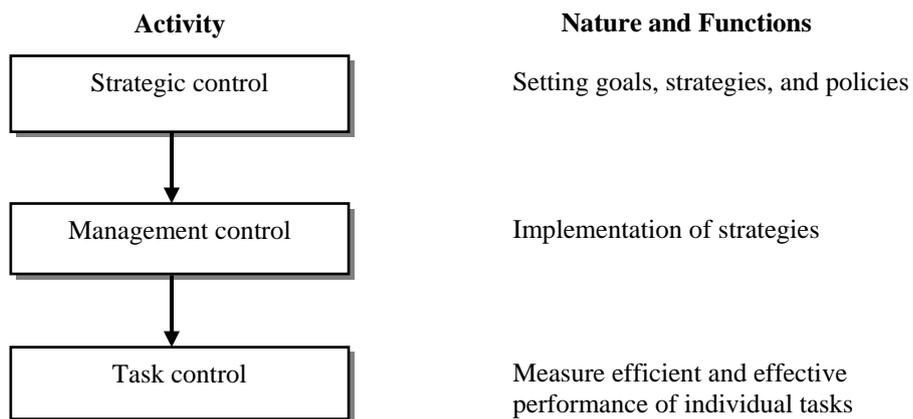
However, the presence of management control does not necessarily mean that results should always correspond to a plan, such as a budget. The stated plans were formulated based on circumstances prevailing at that time. In the meantime, external and internal environments of the organization keep on changing. It is unlikely that management would be able to anticipate all the conditions that are going to happen in the future. Therefore, a manager should not be prohibited from implementing ways not originally planned to achieve the goals.

2.2.1 The scope of management control

There are several types of activities that involve planning and control in an organization (Anthony & Govindarajan 1995). In most organizations, the scope of what is being controlled varies among management levels and functions. Everyone in an organization is affected by control. Most managers exercise control. But the nature of

control is quite different in the three functions, namely, strategic control, management control and task control. For these reasons planning and control should not be considered as separate activities but a subset of each of these three processes (Anthony & Govindarajan 1995). Black and Porter (2000) shared a similar concept of management control to that of Anthony and Govindarajan (1995), but they named these three functions differently as strategic control, tactical control, and operational control. Black and Porter (2000) further explained that, in reality, there are no concrete boundaries to separate these three categories. Each category is used to help managers see where they should focus their attention. This section defines each category, describes relationships and distinguishes management control from strategic control and task control as a means to see its nature and function (see Figure 2.3).

Figure 2.3: **Relationships among three planning and control functions**



(Source: Anthony & Govindarajan 1995, p. 9)

Strategic control

Strategy is a statement of goals and plans for the entire organization. It is a big and important plan which states the direction that executives or senior management wants the organization to be heading. Besides defining the direction of the organization, it is concerned with such issues as organizational strengths and weaknesses, its overall performance, competitor analysis, industry changes and uncontrollable external factors such as economic crisis and war (Anderson 1988; Gray, Salter & Radehaugh 2001; Wheelen & Hunger 2000). Strategic control is the process of deciding on the goals and the

strategies for attaining these goals after taking into consideration the capabilities, resources, structure and system of the organization.

Since the strategic goals of an organization are usually broad and long-term, setting strategic standards and measuring the strategic performance can be challenging (Anthony & Govindarajan, 1995). An organization must select any of innumerable ways of attaining its goals. For example, if the goal of organization is to earn a satisfactory return on investment, the organization may expand into one or more industries, go into other geographical territories, manufacture a new product line and find the niches within the current product lines. A strategy review is usually taken when a gap appears between the goal and the actual results and to reconsider some of the current strategies, perhaps changing them or perhaps adopting new strategies to achieve the goal (Wheelen & Hunger 2000).

Strategic control does not have a predetermined pathway but changes according to the events in the external environment. It has to react to threats or opportunities that may originate from anywhere, at anytime, in an unpredicted manner. These are the behaviors in the external environment discussed earlier. In contrast, the management control process takes place according to a more-or-less fixed timetable and coordinates a series of steps that are intended to accomplish a specified purpose. While strategic control is the process of deciding new strategies for management, management control, is the process of deciding how to ensure the implemented strategies achieve the objectives (Anthony & Govindarajan 1995). Strategic control, in most cases, involves relatively few people; usually those at a higher management level who are, possibly assisted by a consultant and most of the time involves only part of the organization. On the other hand, the management control process involves managers and their subordinates at all levels in the organization.

Management control

Management control aids managers in moving an organization toward its strategic objectives by focusing on strategy implementation and the fundamentals of control arrangements within an organization, which involve day-to-day functions of major departments/units (Anthony & Govindarajan 1995; Black & Porter 2000). The way in which management control is implemented in an organization characterizes an organization and is a critical part of its identity (Black & Porter, 2000). Management control is one of the tools that managers use in implementing the desired strategies such as

organization structure, human resource management and culture (Anderson 1988). Management decisions and actions are best made for particular business units, normally within the framework of organization's strategies and overall organization policies and often within the limit of the resources available.

Broadly speaking, management control can be classified into two types: bureaucratic control and commitment control. Bureaucratic control stresses the rules and regulations, with heavy emphasis on detecting deviation from standards imposed by others rather than by the employees themselves. Commitment control, on the other hand, emphasizes generating shared values and mutual commitment and assistance among employees to the organization objectives. In this approach, the employees' self-control becomes more important especially when the company operates at a changing speed and expands into a wider geographic area, where it relies more on employees' commitment and self-control (Dessler 1998).

To gain acceptance and bring management control into practice, managers and their subordinates should first agree on their objectives and subsequently formulate a plan followed by setting appropriate standards. This whole process constitutes the "planning" stage of management control. The next stage is to measure performance, which is necessary for managers' motivations. The final stage is to evaluate their outputs by comparing them with the plan, any differences are then analyzed and certain corrective actions may be taken (Anderson 1988). To provide an example, an organization's objectives such as strategies and plans are often translated into a budget, then actual results are compared with the standards and/or the strategic plan such as a budget and evaluated, then corrective action may be taken to rectify any deviation.

Taken from this perspective, management control is the core of an organization's total set of control and can be considered as a complete system; that is, the plans are developed and embedded in the management control process (Anderson 1988; Anthony & Govindarajan 1995; Black & Porter 2000). Although a management control system is normally built around a financial core focusing on the monetary "bottom line", often in some financial figure, it does not entirely mean that management control systems encompass only financial objectives. Generally speaking, there are four forms of management control that are widely used in an organization namely, the financial controls, budgets, the supervisory structure, and human resource policies and procedures (Black & Porter 2000).

Financial controls include several quantitative ratios as key financial statistics namely, liquidity ratios, profitability ratios, turnover ratios, leverage ratios and break-even point analysis. Budgetary control is used widely in every organization. It is considered as an essential element of a strategic system and used as a “control” to evaluate how well the financial targets have been met. Supervisory structure may vary from organization to organization, but almost always the core purpose is the same. It focuses on the reporting activities in an organization. On the other hand, human resource policies and procedures are the types of management control that affect everyone working in an organization. It involves selection procedures, training, appraisal and evaluation methods and compensation, in a way that these four procedures are practically used to reinforce the desired behavior that will enhance the overall organization’s value (Black & Porter 2000). In modern day practice, management control systems encompass both financial and non-financial performance measurement tools (Kaplan & Norton 1998). It also includes external factors such as customer satisfaction, product quality, market share, employee morale and so on.

The key function of management control is to ensure that organization strategies are implemented to achieve the objectives (Hertenstein & Platt 2000). Performance measurement is, therefore, a key mechanism in management control used in identifying and evaluating performance and in helping managers to align future activities with the organization’s strategies by improving both financial and non-financial measures and encourages employee behavior that will contribute to the success of an organization (Neely 1998; Waddington, Moreland & Lillie 2001). There are many performance measurement tools that are widely used. Management can select some of these tools to assist them in assessing how well the organization’s strategies have been implemented. One such tool is Value-based management (VBM) that could effectively assess the performance level and is studied in this research. VBM is an effective tool that links strategies, finance, performance measurement and management processes to create value for an organization (Martin & Petty 2000; McTaggart, Kontes & Mankins 1994; Pettit 2000). VBM is more than a concept of financial control function. It ties financial activities with human resource procedures and therefore provides a complete system that allows broad changes by focusing employees’ attention toward value creation (Stewart III 1995).

Task control

Task control is a process that ensures specified tasks are carried out effectively and efficiently. It involves the control of individual tasks and activities, which have cause-and-effect relationships through the transformation of inputs into outputs (Black & Porter 2000). In this process, rules are usually established and used as guidelines to perform tasks. Task control deals with the comprehensiveness of operating the business and operator responsibility by integrating the objectives into all management functions. One well-known tool of task control is the Total Quality Management (TQM), which covers all quality aspects from the selection of the inputs to the transformation to the outputs or products.

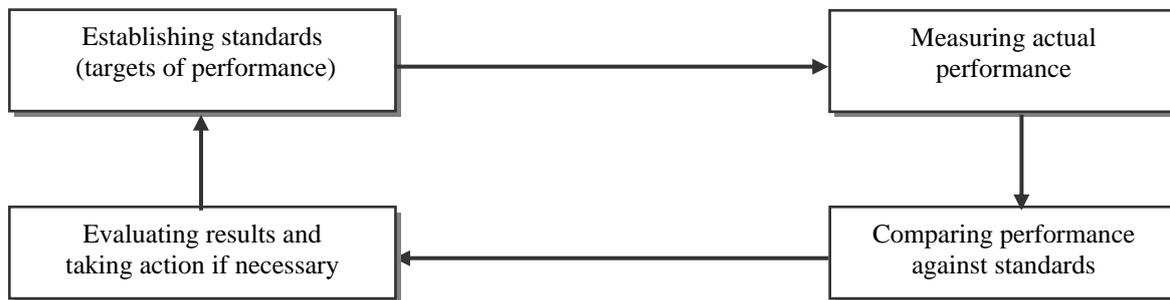
The important distinction between task control and management control is that many task control systems are scientific and possess a cause-and-effect relationship. In contrast, management control involves the judgment and behavior of managers that cannot be expressed by equations. Each type of task performed by a department or unit requires a different task control system. The management control system, on the other hand, is basically similar throughout the organization and relates to broader types of activities.

2.2.2 The basic steps of management control process

In the previous sections, the boundaries or scope of management control were identified, but how management control operates has not been described. In this section, the management control process is segregated into four basic steps, in which each step is described (Black & Porter 2000; Schermerhorn 1999). These steps are establishing standards, measuring performance, comparing performance against standards, evaluating results and taking action if necessary (see Figure 2.4).

This research concentrates on how performance measurement tools, such as VBM tools are selected into an organization and used to measure performance. Performance measurement tools such as VBM are used to measure organization performance, which is part of a management control mechanism (see Figure 2.4). An understanding of the four steps of the management control process is, therefore, necessary since it forms the foundation of this research.

Figure 2.4: **The four basic steps in management control process**



(Source: Black & Porter 2000, p. 478).

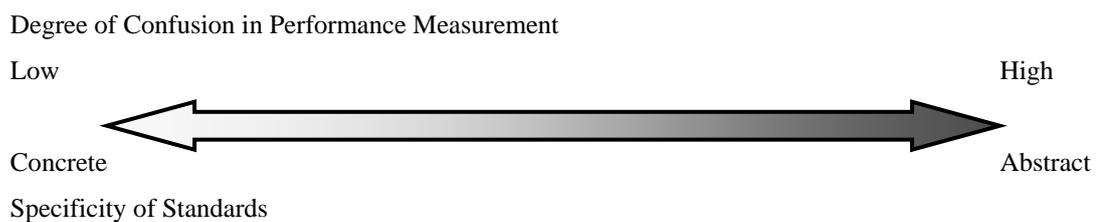
Establishing standards

Most organizations formulate strategic vision. In a smaller organization, this vision is kept in the mind of management and not disclosed to subordinates. However, in larger organizations, managers in various divisions and units are informed of this vision, which becomes the guiding point to establish standards or targets of performance (see Figure 2.4). These standards may be expressed in term of money, time, quantity, quality, or a combination of these components that are likely to be determined through a participative effort of several managers (Schermerhorn 1999). It is also conceivable that these standards will change from year to year to reflect the yearly objectives of the organization. Whatever direction the organization has taken, the normal procedure is to choose specific measures for these standards (Dessler 1998). For example, the number of units to produce, ratio of income to investment, or expense budget limits.

According to Black and Porter (2000), three main issues have to be considered when establishing standards. First, the more concrete, specific or clear the standards, the lower the possibility of confusion in measuring performance and encountering fewer problems in gaining the acceptance of those employees whose performance are being assessed (see Figure 2.5). Second, employees who will be affected by the standards should participate in setting such standards since they are then more likely to be committed to achieve what they have set to accomplish. The participants can exchange information and expertise, which should result in better quality standards. Third, the degree of difficulty of standards themselves should be set in such a way that standards are clearly understood, are challenging, yet realistically attainable and maximize the performance.

Without setting standards, it is difficult to see whether the goals and/or objectives have been met. In other words, targets of performance or standards represent the yardstick to show how well the corporate goals were achieved (Dessler 1998). For example, an organization might set a certain number of engineers that are required to be employed by the firm in order to meet competition. Standards could be such as the type of engineer (electrical, or mechanical) and previous experience. Another example could be the target sales per month that each sale person needs to achieve. The target sales could be represented in term of money or quantity amount of products. However, the yardstick used by each organization would be different. A few organizations would likely use the measures determined from value-based management (VBM) tools. The key objective of this research is to determine what organization factors influence the management to select and use these VBM tools for performance measurement or for establishing standards.

Figure 2.5: **The effect of specificity of standards on performance measurement**



(Source: Black & Porter 2000, p. 479).

Measuring performance

The second step in management control process is to measure actual performance (see Figure 2.4). Management has to go through a series of activities to create the outcome to be measured to determine whether the job has been performed successfully. Performance measurement also has to be taken from many perspectives to prevent misleading results, particularly where corrective action needs to be implemented to improve performance (Kaplan & Norton 1998). As it is common for organizations to reward management based on performance, the method used should be accepted and up-front commitment be obtained from the affected individuals to reduce later complaints about what those measurements show and what they mean to individuals and to the organization (Carney 1999). Another issue that should be considered is that not everything that possibly could be measured should be measured. When the quantifiable criteria do not exist, it becomes important to obtain as much consensus as possible about

the way performance is to be assessed. Measurements also involve costs and the information obtained from the measurements may not justify the costs. Activities and/or performances that are measured should be highly relevant toward the goals of the organization and, if not, then they do not justify the expense to measure them.

Measuring performance is a common control mechanism and is a comprehensive task (Hertenstein & Platt 2000). In order to perform the measuring process, it requires an understanding of the organization's objectives, strategies and operations to identify and evaluate the performance that will result in information that is relevant and reliable for management (Waddington, Moreland & Lillie 2001). However, the real value of performance measurement is not only to derive useful information, but also to ensure that the actions or decisions that follow are important and crucial to the organization's success and survival (Neely 1998). Section 2.3 will describe performance measurement in details, as it is the immediate discipline of this research.

Comparing performance against standards

The third step in the management control process is to compare the actual performance with the expected standard (see Figure 2.4). This comparison requires both subjective and objective estimates and managerial judgment is often necessary. There are different ways to compare the desired and actual performance (Schermerhorn 1999). Historical comparisons can be performed by using past performance as a benchmark for evaluating current performance. Another way is to employ a relative comparison that uses the performance achievements of other persons or work units or organizations as standard. It also can be an engineered comparison that uses engineered or scientific standards as the base. Regardless of the type of comparison being used, managers need to know how to interpret the results of this comparison and then draw appropriate conclusions. Placing too much emphasis on only one positive or one negative comparison may result in a control mistake, since it may outweigh a number of other important analyses.

Evaluating results and taking action

This last step is considered to be the most difficult managerial task in the entire management control process. The results that come from the comparisons of actual performance against the standards may or may not require action to be taken (see Figure 2.4). Managers need to consider if the actual performance is different from the expected performance (Anthony & Govindarajan 1995; Schermerhorn 1999), how much of the

difference is acceptable, how much the difference calls for action and how much action or change is needed. Another important issue is to determine “what” action to take if the actual performance deviates from expected performance and whether this deviation is determined to be significant. Clearly, if major negative differences between the actual performance and standards are discovered, some action is needed to prevent more severe problems in the future. However, positive differences may provide valuable information about the unexpected opportunities that should be pursued. Furthermore, the judgment about whether the standards are appropriate and the performance is the problem, or whether the actual performance is appropriate but the standards are too difficult or too easy could be another important issue. This judgment is involved in determining what action should be taken if significant deviations from standards occur.

In addition, managers should recognize that management control requires coordination among individuals (Anthony & Govindarajan 1995). Individual behavior is an unsystematic aspect of managerial control and managers must ensure that actions are taken in harmony with one another. Since the unsystematic aspects depend on the skills and personalities of the people involved and many other factors, this literature reviews focus primarily on the systematic or formal aspects of the management control function. However, while this research recognizes the importance of unsystematic aspects, it will deal primarily with the way formal control systems affect an organization.

2.2.3 The effectiveness of management control

The effectiveness of the management control process discussed earlier depends largely on the control of managers. Managers should remember that controls should follow strategy. Moreover, there are no rules of thumb for the management control process, yet there are certain key factors to determine the effectiveness of management control that are outlined as followed:

First, the focus of control should closely link to the strategic goals and planning process of the organization in the most effective way (Wheelen & Hunger 2000). Planning should be part of control and control should be part of planning process (Anthony & Govindarajan 1995; Black & Porter 2000). In this manner, priorities will be set to what should be monitored and controlled and will attract the most attention. The focus of management control not only refers to what is to be controlled, but also the location and the groups where control should be exercised. In an organization this is based on what actions and outcomes should receive the highest attention.

Second, the amount of control, which determines the effectiveness of control, involves balancing between over-control and under-control (Black & Porter 2000). The right amount of control for one organization may not be right for another. The amount of control applied should be within set limits and should be adjustable accordingly to each situation.

Third, the effectiveness of control relies on the quality of information and data (Black & Porter 2000; Neely 1998). The four characteristics of quality of information are the usefulness of data, the accuracy of data or numbers, the timeliness and speed of data arrival and the balancing of objective information and thoughtful judgments. Further, control should involve only the minimum amount of information needed to give a reliable picture of events (Wheelen & Hunger 2000). Managers may use the critical success factors to focus on control.

Fourth, control should be presented in understandable terms (Schermerhorn 1999). Simple language, or layman's language may be used to create an understanding and an agreement between management and employees to deliver the activities that achieve corporate objectives (Black & Porter 2000; Lorange & Scott-Morton 1974).

Fifth, speed and flexibility in adjusting to changing conditions is also a key to the effectiveness of management control (Black & Porter 2000; Wheelen & Hunger 2000). When the external environment is fluctuating rapidly, speed and flexibility in responding effectively to the changing environment is needed to reach the corporate objectives, or to take corrective action before it is too late.

Sixth, the cost-benefit ratio should be taken into consideration. The benefits of control must outweigh the direct financial costs and indirect costs, such as inconvenience and awkwardness in implementation (Black & Porter 2000). Complicated control systems may raise the issue of whether they will be worth the expense involved. In some situations, certain activities that are associated with the high level of hazard, such as nuclear power plants and air traffic control agencies need to invest heavily in control systems that ensure an exceedingly high degree of reliability. In such situations, they must provide for costly investment in continual training, expensive equipment for control operations and redundant staffing to minimize the level of accidents. In other situations, the simplest control systems are nearly as effective.

Seventh, management uses different kinds of control systems to motivate employees to cooperate within an organization (Anthony & Govindarajan 1995). Management control may change from bureaucratic control to commitment control, which relies more

on members' monitoring their own or their team's performance rather than a rigid set of rules and regulation to follow (Black & Porter 2000). Acceptability of the control systems by all employees plays an important role in control process. Control systems that are commonly used by management include controlling through management by objectives (MBO) and controlling through performance appraisal (Anderson 1988).

Besides these key factors of effectiveness of management control, managerial success in controlling also greatly depends on good judgment as well as good measurement (Anthony & Govindarajan 1995; Black & Porter 2000; Schermerhorn 1999). Although there are routine ways of comparing certain reports about what is actually happening against some standard of what should be happening, managers themselves must judge whether the difference between actual and standard performance is significant enough to justify action, and, if it is, what action to take. Without good judgment, the control system will remain as theory and will not add value to organization.

2.3 The review of performance measurement and tools

Performance measurement, mentioned in Section 2.2.2 (see Figure 2.4, page 20), is part of a management control mechanism and is a comprehensive task (Hertenstein & Platt 2000). Performance measurement requires an understanding and translation of an organization's vision and strategies into concrete directions that motivates employees to perform in a way that is consistent with strategies and achieves value. Management needs to measure performance because they want to know how well their organization is performing and how its performance might be improved. Performance measurement, therefore, provides information for managers on whether the strategy is being implemented and encourages behaviors consistent with that strategy (Neely 1998).

The previous section, Section 2.2, stated the importance of management control, which is the parent discipline of this research. The importance of performance measurement has been briefly mentioned in the previous section, but has not totally covered the whole area of performance measurement since it is the research immediate discipline. In the following section, the explanation of the performance measurement is needed to justify its importance for this research. This section reviewed performance measurement from its definition, its evolution, its roles and reasons to measure performance. The types of performance measurement tools, such as the traditional performance measurement tools (like earnings per share and return on equity) as well as

modern performance measurement tools such as the Activity-based costing, the Balance-scorecard and the Value-based management are also reviewed in this section.

2.3.1 Performance measurement

Section 2.2.2 outlined the four basic processes of management control comprising establishing standards, measuring performance, comparing performance against standards and evaluating results and taking action if necessary. It is clearly defined that ‘measuring performance’ is one of the management control processes. However, the importance and details of performance measurement have not been justified. This section will review the definitions, the evolution, the roles and reasons that make performance measurement become mandatory for organization.

Definition and the importance of performance measurement

Performance measurement is a common management control mechanism (Hertenstein & Platt 2000). Kagioglou, Cooper and Aouad (2001) defined performance measurement as a process of determining how successful organizations, or individuals, have been in attaining their objectives and strategies. Neely (1998) also defined performance measurement as a process of quantifying the effectiveness and efficiency of past action through the information-processing activities. Effectiveness is the extent in which the requirements are met, while the efficiency refers to a measure of how the organization’s resources are utilized economically when providing a given level of satisfaction. The information or data-processing activities involve the process of acquisition, collation, sorting, analysis, interpretation, and dissemination of appropriate data, which will enable performance measurement decisions to be made and actions to be taken. Waddington, Moreland and Lillie (2001) suggested that performance measurement requires an understanding of the organization’s goals, objectives, strategies and operations. By understanding the organization’s purposes, performance measurement tools can be developed or selected and used to inform management about organization performance. Performance measurement, therefore, should focus on developing, improving and assuring the relevance and reliability of financial and non-financial measures that will contribute to the success of an organization. For example, by measuring customer satisfaction and customer loyalty, such as frequent flier programs for airlines could provide useful information that not only satisfies customers with the airline so that they buy repeatedly

from the same airline, but also become advocates for the business and recommend it to others.

The definition and the importance of performance measurement have been described previously. In practice getting the right answers means having the right performance measurement framework and managers cannot begin to manage performance until they accurately measure it (Pettit 2000). Managers need to have the right performance measurement tools to assess whether the strategies are implemented effectively and objectives are met (Wheelen & Hunger 2000). However, this does not imply that an organization should have many measurement tools. In fact, many organizations may have too many measurement tools leading to a lack of focus and effective measurement (Aguilar 2003). Therefore, the challenge in selecting the right measurement tools include choosing the right leading and lagging measurement, benchmarking against competitors, balancing between financial and non-financial measurement tools and using an appropriate number of measurements.

The Value-based management (VBM) tools, chosen as the intervening variable in this study, are one of the performance measurement tools that managers will need. Once the organization performance is measured, managers then know how the business performs in a way that meets objectives. Managers can identify an organization's strengths and weaknesses and they can make changes or take actions to match the circumstances.

The revolution of performance measurement

The basis of formulating performance indicators has been in operation since the beginning of the 20th century (Wheelen & Hunger 2000). However, those performance indicators traditionally concentrated on cost accounting which, at that time, was useful but tended to measure the past and tended to measure the easily measurable (Kagioglou, Cooper & Aouad 2001). Johnson & Kaplan (1987), in *Relevance Lost*, stated that even though the historical performance measurement began almost a hundred years ago, before the 1950s financial measurement tools were primarily used as means of planning rather than controlling. As industries grew and became more complex, managers were forced to look for practical ways of managing diverse enterprises and settled on financial measurement tools as the best way of doing this. Managers responded by concentrating on financial performance, investing in technology, reducing the head count, utilizing assets and maximizing return on investment. By the 1970s the dynamics of the market place and organizations changed from cost-based phase to a value-based phase and managers began

to see that many performance measurement tools do not link strategies, finance and performance measurement. Atkinson (2000) stated that by the early 1990s managers, academics and consultants proposed that performance measurements should reflect, support and evaluate strategy and recognized the importance of both financial and non-financial measures. This recognition was made to guide managers in delivering value for the organization since concentrating only on traditional financial measurement tools began to show its limitations (Neely 1998).

To summarize, there are four key reasons to explain the revolution in performance measurement:

First, most traditional measurement tools used by organizations were limited in a way that was historical in focus (Neely 1998). Neely (1998) and Wheelen & Hunger (2000) stated that many traditional measures were like rearview mirrors, which told what happened in the past, but provided no indication of what might happen in the future. In this day and age, prediction about future performance does matter since it is what managers are interested in.

Second, many organizations viewed their processes by internally focusing on operational and financial measurement tools. Kaplan (1984) stated that managers require both financial and non-financial indicators of performance, since no measurement system is so well designed to capture all relevant information. Kaplan and Norton (1998) introduced their performance measurement tool in 1992, the Balanced Scorecard, and stated that traditional accounting systems failed to view the process through the eyes of customers (Kaplan & Norton 1998). Customers view the organizations from a different perspective and their view should be valuable for improvements. Customer satisfaction measurements should provide information for managing internal performance, improving the quality of products and/or services and can also be used to benchmark competitors' performance (Sinclair & Zairi 2000).

Third, performance measurement systems should be redesigned so that they enable management to manage future business performance better (Wheelen & Hunger 2000). This reason is supported by the prediction of Robert G. Eccles (1998), in *The Performance Measurement Manifesto*. Eccles (1998) stated that a revolution in performance measurement was necessary and must be recognized. Every company will have to redesign how it measures its business performance so that the company can see its

improvement toward quality strategies. This evolves into customer satisfaction that allows comparison of its performance with its competitors and its own past.

Fourth, the traditional measurement tools used to assess business performance showed a lack of integration between measurement tools and strategies. Neely (1998) stated that performance measurement tools aligned with strategies would provide information on whether the strategy is being implemented and encourage the way people behave in a manner consistent with the strategies. Performance measurement tools will translate vision and strategies into concrete directions and align actions by people throughout the organization (Atkinson 2000). Value-based management (VBM) tools, chosen as the intervening variable in this study, is one of the effective performance measurement tools that provides complete systems that ensure financial activities with human resources procedures are aligned with strategies and evaluating whether strategies have been successfully implemented (Stewart III 1995).

Roles of performance measurement

Performance measurement plays a variety of roles in organizations and the way the business performs is crucial to its success and its survival. Neely (1998) identified the three roles of performance measurement, in respective order as complying, checking and challenging. These roles are different from, and are more in depth, than the traditional view of measurement as a means of control.

- **Complying with non-negotiable parameters:** The non-negotiable parameters are the performance thresholds which are necessary for the survival of organization (Wheelen & Hunger 2000). The non-negotiable parameters include cash flow and recognition from all stakeholders. An organization needs to make sure that it never fails to meet these non-negotiable parameters. Failure to meet these thresholds could hurt the future of the organization.

- **Checking health:** An organization uses several performance frameworks to assess strengths and weaknesses (Kaplan & Norton 1998). These frameworks covers three key areas; financial health, customer satisfaction and employee satisfaction. Financial and non-financial measurement tools have been used and improved to match today's business challenges.

- **Challenging strategies and assumptions:** It is important for an organization to develop the ability to master rapid changes in the external world that require changes in its internal structure. Organizations should regularly check whether its strategies are still

valid in a rapidly changing environment and should identify the organization's strengths and exploit its competencies (Porter 1998).

Reasons for measuring performance

There are many reasons why organizations need to measure performance. However, the real value of measurement comes from the action or decision that follows it. Some managers begin by establishing position. Others want to know how to improve performance and how rapidly it should be improved, how to spot the performance shortfalls, how well the organization is currently performing against its competitors and how to motivate people or encourage them to modify their behavior. Neely (1998) has categorized four major reasons to explain why managers need to measure performance. These four categories are: checking position, communicating position, confirming priorities and compelling progress.

- **Checking position:** The adage 'you can't manage what you can't measure' (Eccles 1998 page 27, Pettit 2000 page 1) holds true and can be simply explained. Without knowing where the organization is, it is difficult to see where the organization is headed. Without the right measurement tools it is impossible to check whether the strategies have been implemented and, therefore, impossible to see whether desirable results have been delivered. Moreover, Matheson (2000) supported this adage by stating that performance measurement tools could help managers to compare, as well as to establish, the position of organization. It could also help in monitoring the performance and progress by tracking the organization's position and taking action to improve its performance or even to benchmark.

- **Communicating position:** Different parties have different interests in organizational performance. Different dimensions of performance are communicated in different ways, often using different media. Organizations choose to communicate their positions to interested external or internal parties (Neely 1998). External communications may be for brand awareness, customer loyalty or exchange of information within the same business industry. Internal communications are often used as a means for administering reward to employees and motivating them to achieve a higher level of performance (Sinclair & Zairi 2000).

- **Confirming priorities:** Performance measurement enables managers to identify how far the organization has to go to meet its goals. It highlights the role of performance information throughout the managerial process to help management monitor

the trends, develop the right initiatives and action plans and evaluate whether the plans have been successfully implemented. Information gathered from measuring performance often identifies valuable business opportunities that could be used for improvement, investments and/or satisfying stakeholders. The information that is tracked must be communicated in such a way that is easily understood and useful for employees (Carney 1999).

- Compelling progress: Measuring performance by itself cannot help to improve business performance but it can be used in compelling progress in several ways. Performance measurement is used to ensure the organization about how well the business is performing by sending signals to employees and highlighting what the organization needs to achieve in performance dimensions (Sinclair & Zairi 2000). Performance measurement does not only link performance and reward as a way to motivate employees to focus on delivering good performance, but also to check whether corrective actions have been taken and whether progress has been made. These actions help employees to live up to performance expectations and requirements. Last, but not least, performance measurement does not only ensure that the evolving actions are aligned with strategies, but also helps the organization to adapt to changes in the competitive environment (Dixon, Nanni & Vollmann 1990).

2.3.2 Traditional performance measurement tools

There are several methods used to evaluate the success or failure of corporate performance. Yet the most commonly used methods are the traditional financial measurement tools that have been around for several decades (Neely 1998). The traditional financial measurement tools include Earnings per Share (EPS), Return on Investment (ROI), and Return on Equity (ROE). These methods are, nowadays, classified as traditional since they have been commonly used for almost one hundred years and are still being used today (Johnson & Kaplan 1987; Rappaport 1981). However, as industries grow and become more complex, organizations find that the outputs of these traditional financial measurement tools are unable to provide answers to several critical issues. This gives rise for the need to create new measures to assess performance (Atkinson 2000; De Waal 2001; Rappaport 1998). Earnings per share and return on investment become less useful methods in measuring organization performance (De Waal 2001; Johnson & Kaplan 1987).

The existence of traditional measurement tools

Traditional performance measurement tools did not fade away. They are continuously used by many organizations. The reasons for their existence can be grouped into two main categories:

First, organizations still prepare financial statements to report the value of their transactions using the traditional accounting system (Boulton, Libert & Samek 2000). For example, the accounting earnings have been the primary measurement tools to reflect corporate performance for a long period. An earnings per share (EPS) is one of the traditional measurement tools, which commonly assume that, if an organization produces satisfactory growth in accounting earnings, the market value of its share will increase and so does the price-earnings (P/E) ratio. Thus, this is evidence of the continual usage of EPS and P/E ratios by the investment community to evaluate the performance of organizations.

Other common traditional measurement tools are the return on investment ratio (ROI) and return on equity (ROE). The ROI is frequently applied as a performance measurement tool for divisional profitability in a single period measurement. ROI shows the linkage between accounting profits of a business unit to the capital employed that assumes that if ROI is greater than the cost of capital, then shareholder value will be created (Chen & Dodd 2001). While ROI is commonly used at the business unit level, return on equity (ROE) is a more popular measurement tool at the corporate level. The focus of ROE is often a measurement tool of primary concern to investors instead of the capital employed (Rappaport 1998). Due to the fact that these tools are common and understandable, ROI and ROE have been continuously applied to measure organization performance. In response, management continues the usage of these traditional measurement tools.

Second, the complication of the new performance measurement tools which involve non-financial issues raises the debate amongst many organization managers whether to keep traditional financial measurement tools and use operational measurement tools only, or whether to use better financial measurement tools (Kaplan & Norton 1998). Many academic authors have pointed out that when organizations attempt to change their performance measurement tools, they are often frustrated if the traditional financial measurement tools remain in place (Sinclair & Zairi 2000). The technical barrier to implement better financial measurement tools, such as Value-based management (VBM), may add a burden to the accountant to produce detailed adjustments to profit and capital employed to move toward economic value. Further, whether these value-driven

measurement tools could be applied as one common performance measurement tool that communicates throughout organization and across all levels and departments is still questionable.

The currently used of traditional earnings and measurement tools

In today's dynamic changing environment, the managers and Board members show increasing interest in ensuring that the organization has adequate strategies that are tested against actual results. Further, the accounting numbers and traditional financial measurement tools will be affected as businesses move from industrial organizations toward knowledge organizations (De Waal 2001; Drucker 1998; Rappaport 1998). This raises the question whether the traditional measurement tools are adequate in the new century.

The traditional earnings and measurement tools that are most commonly and still currently used in the strategic planning process are the five-year projected financial statements (Rappaport 1981). The projected financial statements have long served as the basis for judging the success of the long-term organization plan. However, this accounting-oriented measurement method does not provide completely reliable answers to such questions as:- whether the corporate plan is to create value, whether each business unit is creating value and how each alternative strategic plans could affect shareholder value (Aggarwal 2001; Rappaport 1981).

The earnings per share (EPS) and related traditional measurement tools, such as return on investment (ROI), and return on equity (ROE) have shortcomings as financial standards to evaluate corporate strategy and its performance (Rappaport 1981; Wheelen & Hunger 2000). The growth in EPS may not be related to the increase in shareholder value, due to lower rates of inflation and lower rates of interest which leads to a lower cost of capital. In addition, an increase or decrease in earnings also do not necessary lead to an increase or decrease in market value, because these earnings do not reflect the organization's risk, or working capital and fixed investment that are required to produce growth (Rappaport 1998). Moreover, the use of ROI and ROE concerns the short-term or a single period of measurement and, therefore, neglects the post-planning period residual value of a business unit or a corporate level. The growing interest in including intangibles such as customer satisfaction and research and development, nowadays, will affect the usefulness of ROI and ROE (De Waal 2001; Kaplan 1984; Rappaport 1998). For instance, knowledge-based organizations such as Microsoft that invest directly in intangibles such as

information, training and research, therefore cannot be compared with those organizations investing heavily in fixed assets.

Several limitations relying on accounting earnings as traditional financial standards are grouped as follows:

- 1) The accounting earnings do not equal cash flow, while cash is what managers are concerned with to create wealth or shareholder value (Aggarwal 2001; Drucker 1998; Martin & Petty 2000).
- 2) The projected expenses and revenues do not reflect business risk and financial risk, while the projected accounting earnings do not consider the time value of money (Martin & Petty 2000; Rappaport 1981).
- 3) The accounting numbers do not capture the non-financial indicators of manufacturing performance, which might be relevant for managerial decisions and controls (Kaplan 1984).
- 4) The accounting numbers do not cover all costs of capital employed, including the opportunity costs of equity, thus the reported earnings overstate the value creations of a business's operation (Aggarwal 2001; Martin & Petty 2000; Stewart 1999).
- 5) The accounting practices vary from firm to firm and thus affect the organization's reported earnings and computing costs (Rappaport 1981).
- 6) The use of traditional measurement tools are mostly short-term measurements, these measurement methods do not reflect the risks that vary among different business departments/units and may mislead the decisions arrived at for incentive compensation (Martin & Petty 2000; Rappaport, 1981; Stewart 1999;).

The accounting earnings and traditional measurement tools, even though they may have information content, do not accurately measure the creation of value for shareholders and for the organization, which is the primary goal of a successful corporate strategic plan (Pettit 2000; Rappaport 1981). A better financial performance measurement tools such as Value-based management system (VBM), on the other hand, attempts to overcome the limitations of traditional measurement tools by connecting the business strategies with the creation of shareholder value (Martin & Petty 2000). VBM tools take into consideration all costs of capital used in the business. It operates on the organization's value upon a present value of the discounted free cash flows expected to be received in the future, which is the primary value driver (Rappaport 1981 & 1998). More importantly, VBM motivates

managers to acquire the relevant information and make good decisions by linking between incentives compensation plan and managers' behavior that create value for shareholders (Aggarwal 2001; Pettit 2000).

2.3.3 Modern performance measurement tools

To succeed in the modern world, managers need to use effective performance measurement tools for managing and measuring current business. The traditional performance measurement tools, discussed in Section 2.3.2, may be inadequate in showing the necessary information; such as tracing both direct and indirect costs, determining value creation and the recognition of non-financial issues (Drucker 1998; Holst & Savage 1999; Kaplan & Norton 1998). However, this does not mean that the traditional measurement techniques are totally wrong but, because they may be relied on or may lead to wrong assumptions that no longer fit with what most organizations require in the knowledge-based century (Drucker 1998). The necessary information, such as determining value creating and non-financial issues, become increasingly important to master in the organization in today's competitive market and, therefore, increases the demands for modern performance measurement tools to deliver the predictable contribution to sustained value creation of an organization (De Waal 2002).

Three modern performance measurement tools are introduced in this research, namely; Activity-based Management (ABM), the Balanced scorecard (BSC), and the Value-based management (VBM). This section reviews the modern performance measurement tools, which are considered better tools in evaluating today's organization performance and is the foundation of this research. The ABM, and the BSC are reviewed in this section. The Value-based management (VBM) will be briefly reviewed in this section, but will be justified in more details in Section 2.5, the research intervening variables.

Activity-Based Management

Activity-Based Management (ABM) is a modern cost measurement systems evolved from the Activity-Based Costing (ABC) that provides a cost for each product or service to the customer by analyzing each activity needed to produce such a product or service (Cokins, Stratton & Helbling 1992; Holst & Savage 1999). ABC is used to identify all activities performed by the organization, traces direct and indirect costs and uses cost drivers to trace costs and allocate the costs associated with these activities more precisely

(Shinder & McDowell 1999). It is simply used to answer the question “What do things cost?” ABC allocates indirect costs and fixed costs to individual products or product lines based on the value-added activities going into that product. Thus, management can easily discover how much it costs to produce products and they can use this information to assess the profitability and/or make decisions regarding growth or retrenchment (Wheelen & Hunger 2000).

Even though traditional cost systems have worked well for many decades and continue today to be useful for financial reporting functions, by themselves, they are inadequate for managers in today’s competitive environment (Cooper & Kaplan 1999; Drucker 1998). ABC is considered a better tool to measure cost than the traditional cost accounting systems due to its response to recent changes in the business environment and providing relevant information for management operating decisions (Cokins, Stratton & Helbling 1992; Cooper & Kaplan 1999; Drucker 1998; Kennedy & Affleck-Graves 2001; Ness & Cucuzza 1998; Shinder & McDowell 1999).

A new competitive environment requires that managers have timely and accurate information to make processes more efficient, but the complexity associated with traditional cost accounting systems takes several days or weeks following closing of the books and the reports, therefore it is too late for managers and operators to take corrective actions. ABC is considered more efficient in a way that it could respond to the need of managers in providing relevant information so that managers could track and control the cost in a more appropriate manner. For example, in a production line in a pen factory where black pens are made in high volume and red pens in low volume. Assuming that the cost of reprogramming the machinery to shift production from one kind to another takes five hours; if a company produces ten times as many black pens as red pens, ten times the cost of reprogramming expenses will be allocated to the black pens as to the red pens under traditional cost accounting method. This approach underestimates the true cost of making red pens. In contrast, when ABC is applied, the company could break down pen manufacturing into activities, then calculate the average cost of setting up the machinery and charge it against each batch of pens required for reprogramming, regardless the size of the run. Management is now able to discover that red pens cost more than black pens and they can use this information to make changes in operations or marketing to improve the company’s profits significantly.

In contrast, traditional cost systems require that employees at operating levels check their performance by comparing actual results with predetermined standards that were set long ago and performance evaluated on whether or not employees followed prescribed procedures. In this day and age, performance that just meets historical standards is no longer adequate and employees must make continuous improvements to improve quality, reduce defects and eliminate waste (Cooper & Kaplan, 1999).

Nowadays, ABC has evolved into Activity-Based Management (ABM), a wider concept that also supports total quality management (TQM). ABM provides a discipline focusing on managing activities as the route to achieve continuous improvement by including managing costs as well as more proper costs assigned to processes and procedure (Cokins, Stratton & Helbling 1992; Kennedy & Affleck-Graves 2001; Sinclair & Zairi 2000). In other words, ABM employs a process view and is concerned with what factors cause costs to occur (Holst & Savage 1999). ABM uses ABC data and focuses on how to redirect and improve efficiency in using resources. Although powerful tools that assist the organization in continuously rethinking and improving a business are difficult to implement, the implementation normally requires a dramatic organizational-change effort that involves a tremendous amount of work where the most difficult task is to overcome the internal resistance (Ness & Cucuzza 1998).

Top management in many companies delegate the implementation of the ABC or ABM to accountants. This is not a wise decision since top managements' direct and long-term commitment is essential for successful implementation (Ness & Cucuzza 1998). On the other hand, although Value-based management (VBM) requires full executives support to provide top-down directives, it also mainly involves the commitment of employees at all levels to create long-term business value (Aggarwal 2001; Martin & Petty 2000). The integration of activity-based costing means that as soon as the ABC system has been introduced, it should become the only source of financial-reporting system. It requires new information support systems to update the ABC numbers and to create an automatic link between its general ledger and the ABC system to ensure that the numbers reconciled in both systems are up-to-date (Ness & Cucuzza 1998). This gives rise to two problems: The first is that management decisions will be limited to the accounting data which may not report the complete picture of performance. For instance, it does not include financial and other non-financial performance indicators which could be important. ABC systems capture costs stated on the profit and loss statement alone, which is not sufficient to provide a complete picture of corporate profit. ABC only provides the accounting profits,

rather than the economic profit, which does not reflect the additional costs of both debt and equity capital employed in operating the business (Aggarwal 2001; Shinder & McDowell 1999). Secondly, ABC systems, even though they have been improved to include the cost of all capital required, still only provide incomplete information about how costs interact with other performance indicators before they can improve the performance of their business (Kaplan & Norton 2001; Shinder & McDowell 1999). Lastly, implementing ABC is time-consuming in collecting data, especially in the beginning. The company may end-up with an enormous amount of detailed information which overwhelms both employees and the computer systems in which much of the requested information may not be important for determining costs (Ness & Cucuzza 1998).

The Balanced Scorecard

Kaplan and Norton (1998) proposed the Balanced Scorecard (BSC) to assist managers so that they do not have to choose between financial and non-financial measurement tools. The balanced scorecard believes that financial and accounting numbers do not provide the only basis for managerial decisions and control. Non-financial information is equally important, and therefore should not be ignored (Kaplan 1984). BSC also helps managers balance their focus between current and future performance (Kaplan & Norton 2001). It provides managers and executives with a broader view of the organization from several perspectives simultaneously, and not limited to the accounting data (Kaplan & Norton 2001). The scorecard is a collection of data that helps a manager understand performance. It includes financial measurement that tell the results of actions already taken, with operational measurement, which are the drivers of future financial performance such as customer satisfaction, internal processes and innovation and learning activities (Atkinson 2000; Kaplan & Norton 1998; Sinclair & Zairi 2000). Each goal in each area is assigned one or more measures, as well as a target and an initiative. These measures can be thought of as key performance measures – measures that are essential for achieving a desired strategic option. For example, a company could include cash flow and ROE as measures for success in the financial area. It can include market share (competitive position goal) and percentage growth under customer perspectives.

Several companies that adopted the balanced scorecard found that the scorecard brings together, in a single management report, the different elements of a company's competitive agenda such as becoming customer oriented, shortening response time, improving quality and emphasizing teamwork. Additionally, the balanced scorecard

shows senior managers whether or not improvement in one area may have been achieved at the expense of another.

Traditional performance measurement systems specify the particular actions management wants employees to take and then measure to see whether the employees have in fact taken those actions. In this way, the performance measurement systems try to control behavior. The balanced scorecard (BSC), on the other hand, puts strategy and vision, not control, at the center (Kaplan & Norton 1998). The measurement tools under BSC are designed to motivate employees towards the overall vision. At the same time, it also helps managers to note the functional barriers and ultimately lead to improved decision making and problem solving.

The balanced scorecard, if properly implemented, is an excellent performance measurement tool. BSC stresses that managers and executives should use the balanced measurement tools to translate vision and strategy into objectives that can be measured and provide concrete directions of action that motivate employees' behavior throughout the organization (Atkinson 2000; Kaplan & Norton 2001). The measurement tools under BSC are designed to pull employees toward the overall vision and employees will adopt whatever behaviors and take whatever actions are necessary to arrive at those goals. Therefore, BSC should help managers to track factors that influence performance (Shinder & McDowell 1999).

As stated earlier, BSC weighed the importance of both financial and non-financial information equally. BSC categorizes performance into four broad categories, namely, 1) financial performance, 2) customer satisfaction, 3) internal processes and 4) innovation and learning. However, each of the four broad categories of BSC has two to five measurement tools/indicators. Thus too many measurement tools are included into their scorecard causing the lack of single focus for accountability for shareholder value (Aggarwal 2001; Stern, Shiely & Ross 2001). Since there are various types of measurement matrix used in each of the four categories, therefore within one scorecard, there is different terminology used in an organization, which may cause employees to speak different languages. This could create considerable confusion during data collection and analysis. It may lead to unreliable performance results (De Feo 2000). Further, employees may not clearly understand how the new set of measurement tools in the balanced scorecard support and align with the company's strategies; therefore, employees may not feel comfortable using these tools (De Feo 2000).

The Value-Based Management

Value-based management tools (VBM) such as Economic Profit or Economic Value Added (EVA), on the other hand, provide a clearer objective focusing on financial objectives using one common language across organization that serves to minimize confusion (Aggarwal, 2001; Shinder & McDowell 1999). VBM helps employees to obtain a sharper focus of the corporate vision and objectives based on one leading indicator that is to enhance corporate value. In addition, tools under VBM will indicate to employees not only where improvement is needed and whether their work has been successful in achieving the objectives, but also that they should be rewarded. This is in contrast to the Balanced Scorecard, which only motivates employees to deliver on corporate vision without telling them if their accomplishment has been successful and rewarded (Shinder & McDowell 1999). Kaplan and Norton (1998, 2001) were also aware of this issue and recommended that a company adopting BSC should also apply one of the value-based management tools, such as Economic Value Added (EVA) as the financial measurement tool in the Balanced Scorecard and tie incentives to improving this measure, so that the management will not lose sight of shareholder interest.

Value-based management (VBM) is a set of management tools used to facilitate business decisions to achieve the objective of maximizing wealth of shareholders (Martin & Petty 2000; McTaggart, Kontes, & Mankins 1994; Morin & Jarrell 2001).

VBM brings about broad changes within an organization, from financial changes to employee behavioral changes, to achieve the central objective of maximizing shareholders' wealth. Managers must generate, evaluate and select business strategies that will increase the value of the company; as a consequence, the application of VBM links business strategy, finance, performance measurement and management processes all together to create value (Martin & Petty 2000; Pettit 2000). When implementing VBM, managers as well as employees, will focus on working to enhance corporate value where the contribution of all employees toward the creation of shareholder value is measured and the compensation system is structured accordingly (Borowsky & Spero 1998; Ehrbar & Stewart 1999; Tully 1993).

The advantages in using the VBM are that it connects the business strategies with the creation of shareholders value and it goes one step further from the traditional accounting measurement methods in determining the activities that create value and measure the value being created (Martin & Petty 2000; Stewart 1999;). VBM also provides relevant information for managers for making good decisions and motivates the desired employees'

behavior to create value for shareholders (Aggarwal 2001; Pettit 2000). In addition, adopting VBM into an organization provides a clearer objective for employees at all levels. Once the objective is clearly communicated by sharing a common “language”, employees can understand what they should do to improve their performance and to achieve corporate value (Aggarwal 2001; Borowsky & Spero 1998; Shinder & McDowell 1999). Section 2.5 described the VBM in more details, since it is the research intervening variables.

2.4 Organization factors – the independent variables

Management needs frequent and accurate information to inform them how well their organization strategies are implemented. Performance measurement helps them to ensure that activities are implemented in a way that it fits the overall strategic objectives. To effectively implement organization objectives, management must know if the goals are being achieved, on time, with allocated resources.

There are many performance measurement tools used in measuring organization performance. These are the traditional performance measurement tools such as return on investment (ROI), and return on equity (ROE) as discussed in Section 2.3.2, and modern performance measurement tools such as activity-based costing (ABC), the balanced scorecard (BSC) and the value-based management (VBM) as discussed in Section 2.3.3. The right tools should highlight to managers whether the goals are met or corrective action needed to increase the value of shareholders. The difficult decision for managers is, therefore, to select and use the right performance measurement tools (Aguilar 2003). The selection process can be influenced by certain organizational factors.

Thereby, this research questions whether organization factors influence the selection and the use of the right performance measurement tools such as value-based management (VBM). To answer the question, this research will empirically study chosen organization factors that influence the selection and the use of the VBM tools as a performance measurement indicator in Thai organizations. If it is evidenced, this research will determine factors that organization should consider in selecting and implementing VBM. It is true that there are other organization factors that have not been considered in this research that could be important in explaining what factors determine the selection and the use of the right tools such as VBM that could improve organization performance. Some of these other factors could be used for future research.

There are several factors that management may consider when selecting and using the right measurement tools for an organization such as the degree of centralization and/or decentralization, diversity, organization size, market position of the organization in relation to its competitors and product life cycle stages. The latter three factors that influence the selection and the use of the value-based management (VBM) were considered for the reasons mentioned below. These three organization factors represent research independent variables and the relevant literature is reviewed in this section.

2.4.1 Organization size

Organization size is commonly measured by the total number of full-time or full-time-equivalent employees (Griffin 1996). However, other items such as number of branches, total sales or total revenues, total assets, capital employed and turnover could be used to determine the size of organization (Ezzamel 1990; Hoque & James 2000; Ryan & Trahan 1999; Schermerhorn 1999;).

Burns and Stalker (1961); Lawrence and Lorsch (1969); Woodward (1965) suggested in *Contingency Theories of Organization Development* that size might affect the way organizations design and the way organizations use management systems. The larger organizations tend to be more specialized, more standardized, more formalized and more difficult to adapt to changing environments, compared with smaller organizations while larger organizations are more (Ezzamel 1990; Schermerhorn 2002). In this research, total assets and total revenue are used to represent organization size. The study by Merchant (1981, 1984) suggested that growth of an organization increases communication and control problems and the need to stimulate effective communication becomes greater in larger organizations. This indicates that a growing organization could have more transactions and, therefore, needs more communication to coordinate its activities.

It is also observed by Ezzamel (1990); Libby and Waterhouse (1996) that as an organization increases in size, the accounting and control processes tend to be more complicated and it needs performance measurement tools that are more sophisticated to measure the performance. The reason could be that, as organization becomes larger, the numbers of potentially profitable investment opportunities increases, giving rise to the need of implement more control (Robbins 2001). Consequently, staffing levels and computing power must also grow to support them as they expand.

Hoque and James (2000) studied 66 Australian manufacturing firms and found that the larger firms make more use of the Balanced Scorecard. In their study, Hoque and James (2000) used sales turnover, total assets, and number of employees as a proxy for organization size. A similar study was carried out by Cooper and Petry (1994) who surveyed 1,000 US firms in the *1990 Business Week*. The comparison of five years of financial performance data established a positive correlation between sizes of organization (using market value of equity and total assets) and financial sophistication. Their view was confirmed by research completed by Ryan and Trahan (1999) that used total sales of the US industrial corporations to measure firm size. Their findings revealed that the larger the organization, the more likely that the financial performance gets more complicated and the organization would have to implement more sophisticated performance measurement tools to determine shareholder wealth. Both studies of Cooper and Petry (1994), and Ryan and Trahan (1999) stated positive relationship between the size of the organization and the need for more sophisticated performance measurement tools used to collect information for decision making.

Base on this a priori reasoning, it is proposed that more resources are needed as an organization grows to support the increase in sales volume which, in turn, leads to an increase in the number of staff. Further, the larger organizations are likely to place greater reliance on more sophisticated performance measurement tools, such as VBM, than smaller organizations. Therefore, this research sets out to determine if organization size has been selected by management as one of the factors influencing the selection and the use of VBM and its related evaluation techniques.

2.4.2 Market share position

Anderson (1988) stated that the efficiency of organization performance depends on resources, **market position** and overall productivity. *The Financial Times: Handbook of Management* defined market position as ‘...the relative position that a product has in a market or the process of trying to attain a certain position’ (Crainer 1995, page 1131). According to Robbins (1994) market position is represented by market share, which is identified by the percentage share of the total industry sales that is controlled by organization.

There seems to be linkages between market positions and the value of an organization. McTaggart, Kontes and Mankins (1994) found that the value of an organization depends either on the positioning in market structures which offer more

favorable returns, or having the advantage over its competitors by receiving higher returns or minimizing costs. Their argument is concurrent with that of Porter (1998) in *Competitive Advantage*. Grundy (2002) supported this view by reasoning that for organizations to maintain or to improve their position in the market, it is necessary to track the market and financial position of competitors to assess the longer-term potential of increasing shareholder value. The better the position held by one organization in comparison to its competitors, the more significant advantages that organization has over the competitors by being more effective in creating value (Anderson, 1988).

Scott (2000) claimed that even though market share does not necessarily correlate with profit, it can provide useful indicators in term of the degree of consolidation and fragmentation of the market and how it is evolving over time. This gives an understanding of the basis of competition and, therefore, could help to prepare our organizations to consider what skills are necessary to create shareholder value. Merchant (1984) suggested that for the organization in the stronger market position has greater demand for internal communication and emphasizes more on the usage of internal control such as budgets. This greater demand for internal communication and control could mean that a more sophisticated management system is needed (Atkinson 2000; Kaplan & Norton 1998).

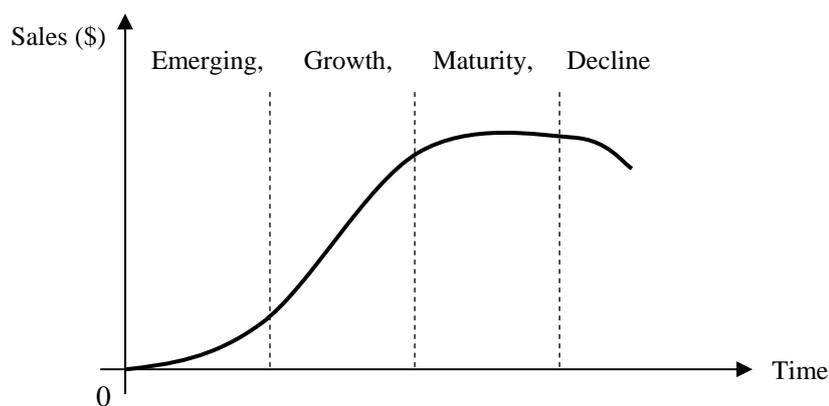
Hoque and James (2000) used market share as a proxy for market position to observe the association between the market position and the greater use of the Balance Scorecard. However, in the final analysis Hoque and James (2000) did not find any positive association between them. This left a gap for future research to use different organization factors, or different performance measurement tools such as VBM, to determine whether an association exists. This research was further encouraged by the finding of Ryan and Trahan (1999) that concentrated on the potential factors, such as industry level of fixed assets and operating assets rather than the market share. Thus, they left a gap for future research. This research, therefore, sets out to discover whether or not the market share of an organization is associated with the selection of the VBM tools.

2.4.3 Product life-cycle stages

A product or service, like a human being, has a finite life that is usually categorized by an early period of high growth, a period of development, followed by a period of middle age, then a period of retirement and death (Scott 2000). In similar fashion, the organizational strategy literature classifies “product life cycle” into four stages such as the emerging, growing, maturing and declining stages of a product’s life (Drury 1996; Nellis

& Parker 2002; Thorelli & Burnett 1981). At the emerging stage, the product is launched where sales are usually low with high prices. At the growth stage, sales begin to rise rapidly because of introductory promotions and growing customer awareness. At the mature stage, sales have peaked while prices remain low; there is no further sales growth as the potential for new customers is exhausted. At declining stage, sales reduce as the product is gradually replaced with either innovations or an enhanced version (see Figure 2.6).

Figure 2.6: **The product life cycle stages**



(Source: Developed from Nellis & Parker 2002, p. 249)

The stage in the product life cycle drives the level of competition in the industry or the market place and every industry passes through cycles, that may vary in shape, but will usually obey the same pattern, although over different time periods (Porter 1998). At each point in the life cycle, the industry is likely to witness different demands on the firms competing in it. By identifying the position on the life cycle curve, on which account for the bulk of the industry's products or services fall, the manager can make predictions about the demands of the products, which is a fundamental driver of the level and the nature of competition (Scott 2000). Grundy (2002) noted that product life cycle, is one of the indirect value drivers, and must be managed to outperform competition and, therefore, deliver shareholder value.

Each stage in the product life cycle demands a different competitive strategy and a different focus on investment (Grundy 2002). As a consequence, the product life cycle is linked to a company's financial performance in terms of funding requirements and the company's financing mix. During the emerging stage, a company may be unable to obtain significant borrowings. Even if the company can obtain the required loans, this funding

may require a high return because of the high business risk and to cover the cost of capital which invariably may be high. At the growth stage, the cost of capital may be substantially lower, since the business has become established and investors perceive it to be an attractive venture to invest in. At the maturity and decline stages, investment requirements decline. Dividends, however, rise as a proportion of earnings. Thus, this reduces the capital base and helps to improve return on capital.

Ward (1993) traced the linkages at each stage of the product life cycle. He relates the market life cycle with how risky the firm's projects are perceived to be, by stating that by lowering the cost of capital could be one vehicle to increase returns for shareholders. However, Ward's study did not identify performance measurement tools that could possibly create shareholder value, which left a gap for future research.

Merchant (1984) suggested that organizations with products in the early product life-cycle stages (that is emerging and growth stages) tend to make less use of traditional financial measurement tools such as budgeting, compared to organizations with products in the latter stages (that is maturing and declining stages). Conversely, Merchant's (1984) found that the stage in product life cycle seemed to have little or no effect on using budgeting as a tool. However, this negative result may be an exception and further research under different settings or different measurement on these questions may be needed to confirm this observation. Hoque and James (2000) replicated the research of Merchant (1984), but used the Balanced Scorecard instead of budgeting as their performance measurement tool. They found a positive relationship between the early product life cycle stage and greater use of the Balanced Scorecard and is associated with an increase in organization performance. Hoque and James (2000) also observed that further studies might add new findings to the body of knowledge by extending the instruments or apply to different approaches, different situations, or different measurements.

Drawing from the conclusions made by Grundy (2002); Hoque and James (2000); Merchant (1984) there is a potential relationship between product life cycle stages and performance measurement tools, such as VBM, which could be evidently examined in Thai organizations. This is supported by the observation that financial outcomes are less certain at early stages of the product life cycle (that is emerging and growth stages), therefore, organizations should depend more on sophisticated financial control measurement tools, such as the VBM.

2.5 Value-based management (VBM) – the intervening variable

Certain organization factors could influence managers in selecting and using VBM as performance measurement tools. Selecting and using such tools could probably improve organization performance. This research chose Value-based management (VBM) as an intervening variable to find out whether VBM tools are mediated between organization factors and improvement in performance of organization.

During the past decades, academics, business leaders and investors recognized the growing interest about creating value and how to measure and manage the created value (Frykman & Tolleryd 2003). Realization of economic value becomes more pronounced than ever before as the world is transforming into the 'New Economy'. This new economy has been built on a revolution of globalization, new technologies and the increased importance of intangible assets. These developments have made it necessary for organizations to understand and revise their performance measurement tools to include creating value to an organization (Armour & Mankins 2001; Frykman & Tolleryd 2003; Neely 1998). The increase in competition in global capital markets and more active Boards of Directors have increased pressure on organizations to focus on maximizing shareholder value. In response, organizations are searching for ways to better manage shareholder value (Bloxham 2002; Ryan & Trahan 1999). To manage in a changing and competitive business environment, the traditional approaches to management and measurement are not adequate, since changes come too fast and from too many directions. The traditional accounting systems, the old methods of managing and measuring business performance and the old models of information for decision-making, are becoming obsolete and do not precisely determine a business' success (Boulton, Libert & Samek 2000). An analysis of the corporate value cannot rely solely on analyzing the present and historical information, but the company also needs to forecast its future to enhance the shareholder value (Frykman & Tolleryd 2003).

To understand Value-based management (VBM), one must understand the importance of value creation in an organization since VBM is a management process that focuses on creating shareholder value. In the value creation process, future financial performance is the primary interest (Martin & Petty 2000; Rappaport 1998). Past and present information such as profits, balance sheet and income statements are used as a guideline in forecasting the future, but this does not provide a complete picture of the ability of an organization to bring in future profits or positive cash flow. To gain insight into a company's future financial performance, internal resources such as intellectual

capital and its environment must also be analyzed since they share part of value creation (Frykman & Tolleryd 2003).

2.5.1 The review of value-based management

Since the beginning of the 1990s, maximizing company value and shareholder wealth is increasingly the most important task facing present-day managers. The implication for companies is that it is no longer enough to satisfy the customer, a company must also prove itself in the capital markets and management must show it is capable of maximizing company value. The management style then has changed with more focus on creating shareholder value, called value-based management (VBM) (Frykman & Tolleryd 2003). Unlike other performance measurement tools mentioned in Section 2.3.2 and Section 2.3.3, VBM is a better financial performance tool that connects the business strategies with the creation of shareholder value and considers all costs of capital used in the business (Martin & Petty 2000). VBM also links managerial behaviors with the rewards and measurement tools to create value (Aggarwal 2001; Pettit 2000;). This section reviews the VBM from its definitions and the comparison between VBM and other performance measurement tools.

Value-based management (VBM) is defined as a formal or systematic approach to managing companies to achieve the objective of maximizing wealth creation and shareholder value over time (McTaggart, Kontes, & Mankins 1994). VBM is a single framework composed of a set of management tools used to facilitate business decisions that consistently enhance shareholder value – both intermediate and long-term (Frykman & Tolleryd 2003; Martin & Petty 2000; Morin & Jarrell 2001). VBM also refers to management adopting a corporate strategy of maximizing shareholder value. In theory, VBM includes corporate strategy, management compensation and reward issues and detailed internal control; all designed to link employee performance to shareholder value (Borowsky & Spero 1998). To maximize the wealth of owners or shareholders, management must generate, evaluate, and select business strategies that will increase the value of the company. However, corporate value cannot be increased, unless management knows what it is and how to measure it. Morin and Jarrell (2001) identified three key primary elements that management can use to increase corporate value as spread, scale and sustainability.

- Spread: Value is created only when the return on capital exceeds the cost of capital. The difference between return and cost of capital is called “spread”. It is the economic profit, the greater the spread, the greater the economic profit, regardless of the rates of growth; value is created only when the spread is positive.

- Scale (size): A positive spread on large capital base is adding value. The larger the capital is used for the potential increase in business opportunity, the greater the potential for increasing value.

- Sustainability: The period of time over the returns and growth can add to the value of the business. It also refers to the period of time the company enjoys its competitive advantage (Porter 1998). The longer the time the company can enjoy the positive spread on its investments, the greater the value being created.

The application of VBM is the effective linkage between strategy, finance, performance measurement and management processes to create value (Frykman & Tolleryd 2003; Martin & Petty 2000; Pettit 2000). It attempts to solve the agency problem which arises where the ownership and management control are different. The value-based management process proposes that the contributions of individuals and groups toward the creation of shareholder value be measured and, using their performance measurement tools, rewards be structured accordingly.

From the VBM definition stated above, one should not misunderstand that VBM only brings about financial change; indeed, VBM is concerned about the transforming the organization culture rather than financial change (Ehrbar & Stewart 1999; Haspeslagh, Noda & Boulos 2001; McTaggart, Kontes & Mankins 1994; Stewart 1995). More often, VBM’s failure was cultural resistance to change rather than complication in accounting and financial process. Haspeslagh, Noda and Boulos (2001) stated that in achieving the desired cultural transformation, VBM requires five elements:

First, a clear commitment to shareholder value, which can serve as a communicating channel to the public that the organization is about to change its culture and to motivate its employees to change behavior.

Second, providing intensive training programs, so that everyone is convinced and acknowledges that managing for value is the right thing to do (Wenner & LeBer 1989). This could begin with the executives, or corporate level and then go down to operation level (Stewart 1995). Training should cover all the basics and start before implementing VBM, so that employees have adequate knowledge and accept VBM (Frykman & Tolleryd 2003).

Third, pay-for-performance, which is a new practice for incentive or compensation systems that are closely tied to VBM performance to provide employees throughout the firm a sense of ownership in both the company and the program. It is important to understand that VBM is not only about the financial figures, but it is also about people (Ehrbar & Stewart 1999). Motivating employees to create corporate value involves changing their behavior, which is part of the process for organizational change. To make it happen, compensation systems that affect human behavior play a critical role in motivating employees to create value for an organization (Borowsky & Spero 1998). For instance, the incentive pay of executives will directly link to improving shareholder value, while incentives for other employees may link to other value indicators that lead to shareholder value achievement (Rappaport 1999; Frykman & Tolleryd 2003).

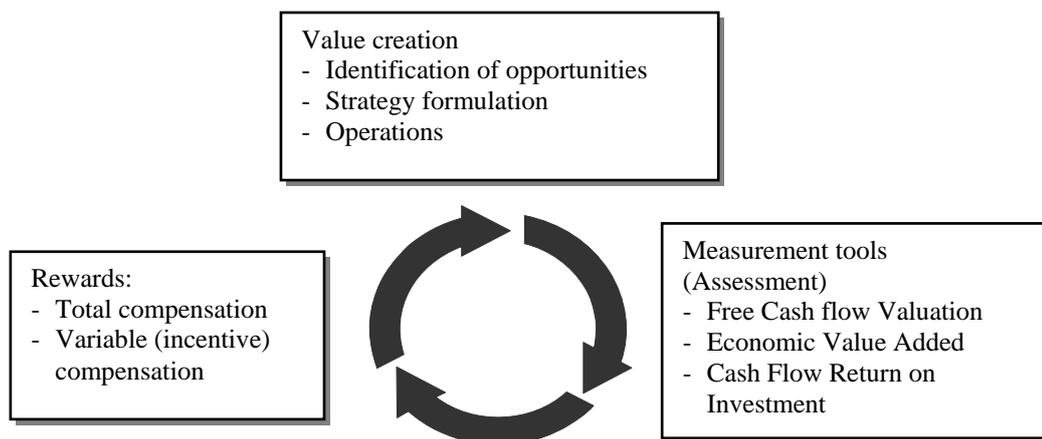
Fourth, willingness to make major changes in an organization that allow all employees to make value-creating decisions. This allows each department/unit to become more independent, while turning employees into strategic planners (Frykman & Tolleryd 2003). With this practice, VBM enhances managers to develop more detail and more meaningful value-creating strategic options. Therefore, management at each business unit would spend more time on business issues rather than controlling budgets.

Fifth, allowing broad changes rather than a narrow-focus on financial reports and compensation (Stewart 1995). VBM requires each business unit to identify the operational factors, or value drivers that have the greatest influence on creating economic profit, so that this focuses employees' activities toward value creation.

Martin and Petty (2000) argued that the heart of value-based management (VBM) is not only to create value, measure and then offer rewards to individuals or groups who contribute to enhance the wealth of shareholders, but also to maintain the sustainable cycle of value creation as a whole (see Figure 2.7). VBM triggers a series of value-creating processes in changing the organization culture by convincing that managing for value is the right thing to do and to encourage employees be part of value creation through training programs (Haspeslagh, Noda & Boulos 2001). Value drivers are identified and applied to derive a set of strongly shared beliefs about what creates success in each business unit and across all levels. Managerial performance, as well as other employees' performance must be measured and rewarded using objectives that can be directly linked to creating shareholder value (Frykman & Tolleryd 2003). In doing so, it provides the sustainable cycle of value creation.

Martin and Petty (2000) further stated that there are four primary elements that make VBM successful. First, VBM must have the full and complete support of the top executives before transforming into the operating culture of the firm. Although the decision in selecting and using VBM system may come from a corporate level, planning group, financial officer or someone else in the firm's hierarchy, it is essential that the VBM gain the support from the executives (Frykman & Tolleryd 2003; Wenner & LeBer 1989). Second, for VBM to affect individual managers' behavior, there must be some link between behavior and compensation (Ehrbar & Stewart 1999). Third, skillful employees, who are able to spot problems, understand and be able to interpret the results when implementing the VBM, play significant roles in greasing the wheel of VBM implementation (Wenner & LeBer 1989). Fourth, employees at all levels must understand the VBM system if it is to be effective in transforming behavior. In implementing VBM, it should be simplified as much as possible so that employees understand the VBM. Further, employees need to understand what they are being asked to do, why it is important and how their own personal well-being will be affected (Haspeslagh, Noda & Boulos 2001). Therefore, education and training are absolutely essential to the success of any VBM program. These four elements share similarity to the five VBM requirements of elements explained by Haspeslagh, Noda and Boulos (2001).

Figure 2.7: **Sustainable cycle of value creation**



(Source: Martin & Petty 2000, p. 6)

Comparison of VBM with traditional performance measurement tools

VBM attempts to overcome the limitations of accounting measures by connecting business strategies with the creation of shareholder value (Martin & Petty 2000). While the accounting information addresses only past and present information, VBM goes one step further in determining activities that will create value and also measure the value being created (Martin & Petty 2000; Stewart 1999). VBM determines the cash generated over the life of the business and the risk of the cash receipts (Stewart 1999). It incurs all costs of capital used in business and realizes that discounting free cash flows expected to be received in the future will create the organization's value (Rappaport 1981 & 1998). In addition, VBM motivates managers to procure relevant information and make good decisions by using incentive plans that motivate the desired behavior to create value for shareholders (Aggarwal 2001; Pettit 2000).

Comparison of VBM with modern performance measurements tools

Among the modern performance measurement tools, VBM is considered a better framework than the Activity-based management (ABM) and the Balanced Scorecard (BSC) in three broad perspectives. First, VBM provides a clearer objective with one common measure used across the organization. This helps employees to obtain a better focus of corporate vision and objectives, using one simple 'language' to communicate throughout the organization (Borowsky & Spero 1998). Second, VBM has behavioral effect on employees in term of achievement (Aggarwal 2001; Shinder & McDowell 1999). VBM does not only motivate employees to achieve corporate objectives, but also indicates if their accomplishment has been successful (Shinder & McDowell 1999). Third, VBM captures the economic profit which includes the cost of all capital required in operating a business and it shows a complete picture of how costs interact and how to improve the performance of business (Kaplan & Norton 2001; Shinder & McDowell 1999).

From the comparisons described previously, this does not mean that within organizations there must be only one value-oriented performance measurement tool (Frykman & Tolleryd 2003; Stern, Shiely & Ross 2001). In fact, an organization can select one leading performance measurement tool under VBM or simply adopt the VBM foundation, then select other related measurement tools as 'key value drivers' in support the leading tool (Rappaport 1999). Key value drivers or the components of the leading measurement could include key financial ratios, Du Pont Equation and cash conversion efficiency ratios (Young & O'Byrne 2001). With this application, management's

responsibilities and performance may link directly to the leading performance measurement tool, while the performance of employees at lower levels may directly link to the relative key value drivers (Frykman & Tollyrd 2003; Hubbard 2000), which are the components or drivers of leading tools.

Further, there is no conflict between the application of the modern performance measurement tools such as the Activity-based Management (ABM), the Balanced Scorecard (BSC) and the selection of Value-based management (VBM). Ward and Patel (1990) suggested that ABM provides a sound foundation for future cash flow projections, which leads to investment in value-added activities that support products, services, customers and market segments, thereby increasing shareholder value. The research by Kennedy and Affleck-Graves (2001) found that the use of activity-based costing/management has significant impact on firm value through better-cost controls and asset utilization and with a greater use of financial leverage. Moreover, there is no conflict between the use of VBM and increase in awareness of non-financial measurement tools such those applied under the BSC metrics. In fact, Kaplan and Norton (1998, 2001) recently recommended that a company adopting BSC should also apply one of the VBM tools such as Economic Value Added (EVA) as the financial measurement tool in the scorecard and tie incentives to the improvement of the EVA. The only problem with the BSC, as viewed by the VBM is that BSC tends to take management's eye off the key drivers of shareholder value to a number of other critical issues that all firms face such as relations with suppliers and customers and so on (Stern, Shiely & Ross 2001). The reward systems for achievement are primarily focusing on operating objectives rather than financial objectives, shareholder interests may suffer.

2.5.2 Measurement tools under value-based management

Several popularized performance measurement tools under VBM framework are:

- 1) Shareholder value approach (SVA) by LEK/Alcar Consulting Group and later developed into a popular tool used by McKinsey & Co.
- 2) Economic value added (EVA Registered Trademark) by Stern Stewart & Co.,
- 3) Cash flow return on investment (CFROI) by Boston Consulting Group.
- 4) Another tool to mention in this research is the rate of return on invested capital (ROIC). ROIC is widely used in many organizations as key financial value drivers that must be identified before one of the three VBM tools could apply.

These four popularized VBM tools are widely used in practice by consulting firms, and rely on the principle theory that underlies the use of cost of capital and free cash flow valuation methods (DCF method) for evaluating new investment opportunities (Copeland, Koller, & Murrin 2000; Martin & Petty 2000; Rappaport 1981). Some organizations may employ consulting firms that popularized these VBM tools, many may use one of these tools without employing the consulting firms, or they may use their own variation of the tool relying on the foundation of VBM such the free cash flows valuation method (Ryan & Trahan 1999). Since there is no perfect performance measurement tool, the debate over which VBM tool to use depends on the different aspects of performance and the purposes in fitting the tool with organization strategies. Even though tools under VBM are not completely identical, they help managers to make value-creating decisions (Copeland, Koller, & Murrin 2000), and provide consistent answers as to whether the organization has created or destroyed value (Rappaport 1998). The competition among these VBM tools and the debate over which tools works best is illustrated in articles by Copeland, Koller, and Murrin (2000); Myers and Welch (1997). In addition, the selection and the use of which VBM measurement alternative depend on how well the particular VBM tool fits with organization requirements. Regardless of which tool under VBM is being applied, they are used to assess the success or failure of ongoing operations. In general, VBM tool provides management with a method for evaluating the performance of a firm's existing assets using the same standard that is used to evaluate the anticipated contribution to organization value, which in turn, measures value being created for shareholder value. Further, VBM provides a structure for connecting performance with compensation that motivates managers to act in the shareholders' interest (Tully 1993). Four popularized VBM alternatives are summarized as follows:

2.5.2.1 Shareholder Value Added (SVA):

McKinsey & Co. and LEK/Alcar proposed a measurement called SVA. SVA is an initial tool, which measures the amount of value created, based on a forecast scenario. It addresses the 'change' in shareholder value over the forecast period (Rappaport 1998). It estimates the value creation of an investment at rates in excess of the cost of capital rate required by the capital market. The increase in net operating profit after taxes (NOPAT) is capitalized each year and discounted back to the present, at the discount rate (K). SVA is obtained by subtracting the present value of incremental investment from the present value of the capitalized NOPAT increase. The calculation would be assessed as:

$$\text{SVA} = \frac{\text{Change in NOPAT}}{K(1+K)^{t-1}} - \text{Present value of incremental investment}$$

The approach developed for SVA depicted the essential link between the corporate objective of creating shareholder value and three basic value drivers – first, operating decision such as pricing, promotion, customer service level are primarily drive sales growth rate, and operating profit margin. Second, investment decisions such as increasing inventory levels and capacity to expand the business could drive working capital and fixed capital investment. Third, financing decisions, which involve the cost of capital also questions not only the business risk the company is about to participate but also the proper proportion of debt and equity to fund the business. Shareholder value added approach is a foundation for providing shareholder returns from dividends and capital gain. Therefore, SVA is a disciplined process to evaluate organizational activity. It is not only a financial numbers exercise. In fact, SVA is only as good as the strategic thinking behind the numbers, but it does not guarantee that the strategy with greatest SVA number will be effectively and efficiently implemented.

2.5.2.2 Economic Value Added (EVA Registered Trademark):

Stern Stewart & Co. developed the EVA approach. EVA is based on the concept of ‘residual income’ or economic profits, something we have known for a long time (Drucker 1998). The residual income or economic profits differ from accounting profits which could be explained as:

$$\begin{aligned} \text{Accounting profits} &= \text{sales} - \text{cost of goods sold} - \text{operating expenses} \\ &\quad - \text{interest expenses} - \text{taxes} \\ \text{Economic profits or} &= \text{sales} - \text{cost of goods sold} - \text{operating expenses} \\ \text{Residual income} &\quad - \text{interest expenses} - \text{taxes} - \text{charge for all capital used} \\ &= \text{net operating profits after taxes} - \text{charge for all capital used} \end{aligned}$$

The residual income or economic profits concepts is intended to measure how well a company has performed in term of generating profits in a particular period, given the amount of capital employed to generate that profits. In other words, the residual income or economic profits is recognized only if it exceeds all costs of capital charges including the

cost of debt and the cost associated with the use of equity capital (Brigham & Houston 2001; Stewart 1999). Economic Value Added (EVA) looks much like the economic profits measure. It is computed as follows:

$$\begin{aligned} \text{EVA} &= \text{Net operating profits after taxes} - (\text{Cost of capital} \times \text{beginning CAPITAL}) \\ &= \text{NOPAT} - (\text{WACC} \times \text{CAPITAL}) \end{aligned}$$

where; NOPAT is Firm operating profits after taxes but before financing costs and noncash bookkeeping entries except depreciation.

WACC is Firm's weighted average cost of capital

CAPITAL is Capital stock in the firm at the beginning of the year such as accounts payable, accrual wages and taxes

Alternatively, EVA is expressed as:

$$\text{EVA} = (\text{ROIC} - \text{WACC}) \times \text{CAPITAL}$$

$$\text{where; ROIC} = \frac{\text{NOPAT}}{\text{CAPITAL}}$$

ROIC is the return on invested capital for year one. ROIC is a key financial value driver which will be described next.

The result of EVA calculations states whether the company has a positive or a negative EVA, in other words, whether the company is creating or destroying value. In accordance with EVA, a company can only create value in the following ways:

1. Increase ROIC and hold WACC and invested capital constant.
2. Decrease WACC and hold ROIC and invested capital constant.
3. Increase the invested capital in projects/activities yielding a ROIC greater than WACC.
4. Withdraw capital from projects/activities that yield a ROIC lower than WACC.
5. Create longer periods where the company is expected to earn a ROIC greater than WACC.

2.5.2.3 Rate of Return on Invested Capital (ROIC):

ROIC is the key financial value driver. ROIC is the ratio of net operating profits less adjusted taxes (NOPAT) to its invested capital (Copeland, Koller, & Murrin 2000). It is expressed as:

$$\text{ROIC} = \frac{\text{NOPAT}}{\text{CAPITAL}}$$

NOPAT is the earnings before interest and taxes less cash taxes, while CAPITAL is the amount invested in the operations of an organization. ROIC considers the components that drive value in EVA model; in fact, it reorganizes and breaks down accounting statements into components to gain greater analytical insights before calculation. Further, the value of the company cannot be created if the ROIC does not exceed the cost of capital over time (Frykman & Tolleryd 2003). As a consequence, the return on invested capital drives value of the company, in which investing in a projects/activities that yield a ROIC greater than WACC could potentially create value for a company.

2.5.2.4 Cash Flow Return On Investment (CFROI):

CFROI was originally designed by the Boston Consulting Group. CFROI represents a cash-based measure, meaning that it converts all accounting profits into cash flows. While EVA relies on earnings, CFROI method relies completely on cash flows and recognizes the life over which assets will produce cash flows (Frykman & Tolleryd 2003). CFROI represents the sustainable cash flow a business generates in a given period as a percentage of the rate of return on cash invested in the firm's assets where inflation is a significant factor (Martin & Petty 2000; (Frykman & Tolleryd 2003). Usually it is expressed as:

$$\text{CFROI} = \frac{\text{CF}_1}{(1+\text{CFROI})} + \frac{\text{CF}_2}{(1+\text{CFROI})^2} + \dots + \frac{\text{CF}_n}{(1+\text{CFROI})^n} + \frac{\text{TV}}{(1+\text{CFROI})^n}$$

where; CF is the inflation-adjusted annual cash flow

TV is the inflation-adjusted terminal value of all future cash flows from year n
to infinity

n is the average economic life of the firm's assets

CFROI is one of a value-based measurement tools that measures the company's performance which reflects the average underlying rates of return on all existing investment projects. CFROI of a firm can be thought of as a weighted average internal

rate of return (IRR) of all projects making up the business as a whole as it is expressed in the CFROI model. The Boston Consulting Group believes that measuring value creation in terms of rates of return is much better than measuring it with any form such as SVA or EVA since these two measures are based on a period-to-period basis. In fact, CFROI is a cash-based measure by converting accounting data into cash-based measures, which reflect the economic profit reality.

2.5.3 Foundation of value-based management – discounted free cash flow valuation (DCF)

The four VBM tools discussed previously share a common theoretical root without any exception; that is the concept of free cash flow valuation (Copeland, Koller, & Murrin 2000; Martin & Petty 2000; Rappaport 1998). Most published articles and research have identified and explored how VBM is implemented in an organization, leaving gaps to identify 1) whether an organization already has the root of VBM which is mandatory before selecting and using any VBM system and its tools and 2) what organization factors influence the decision in selecting and using VBM. This research will identify organization factors that impact on the decision in selecting VBM, observes how each factor affect the selection and the use of VBM and observes the extent in which organization performance is affected by the use of VBM through selected organization factors.

All the methods of VBM share a common root of free cash flow valuation. Since the beginning of the 1980s, the free cash flow is viewed by many investors as a new benchmark of value creation, while traditional accounting measurement tools, such as earnings per share or return on net assets, no longer fit the changing environment (Martin & Petty 2000). Free cash flow represents cash that is actually free and available for distribution to investors and represents the core determinant of firm value, since the investor's perception of that firm's ability to generate cash over a period of time (Brigham & Houston 2001; Martin & Petty 2000). In other words, the company's value is the present value of the future cash flow stream for the entity as a whole, discounted at the investor's required rate of return. The concept of free cash flow valuation, therefore, serves as the foundation for value-based management. No matter which VBM approach is pursued by an organization, the use of free cash flow valuation is widely understood and plays the role of value driver in management's efforts to maximize shareholder value.

Discounted free cash flow valuation (DCF method) consists of two major components. The two components of free cash flow valuation are free cash flow (FCF) and cost of capital (COSTCAP), in which free cash flow is discounted at cost of capital:

2.5.3.1 Free cash flow (FCF):

Cash flow from operations represents the difference between operating cash inflows and outflows (Brigham & Houston 2001). These cash flows are relevant for estimating the firm's value since it represents cash available to compensate all investors, which are both debtholders and shareholders. These available cash flows are called "free cash flow" (Brigham & Houston 2001; Copeland, Koller & Murrin 2000; Martin & Petty 2000; Rappaport 1998). Regardless of how this cash flow is being viewed, the firm's free cash flows are always the same as the cash flows received by the investors (Martin & Petty 2000).

Free cash flow can be divided into two parts; 1) the present value of cash flows from operations during the forecast period and 2) the present value of cash flows to be received beyond the forecast period (Martin & Petty 2000; Rappaport 1998;). First, the present value of cash flows from operations during the forecast period, which is identified by the length of the forecast period and the factors that determine free cash flow, in turn, affect the corporate value. The length of the forecast period should be the time that an organization is enjoying a competitive advantage in growth over its competitors. The longer the period, the more an organization enjoys its competitive advantage (Porter 1998), the higher the cash flows. Further, the key factors that drive the determination of free cash flows are sales, sales growth, expected operating profit margins, cash taxes and assets-to-sales ratios; such as fixed assets to sales, net working capital to sales and other long-term assets to sales (Martin & Petty 2000).

Second one considers the "residual value or terminal value" is the present value of cash flows to be received beyond the forecast period. By definition, residual value is the value of all financial flows after the forecast period to infinity (Frykman & Tolleryd 2003). Residual value is significant and it is often the largest component of corporate value. There is no unique formula for calculating residual value since its value depends on the assessment of the competitive position of an organization at the end of the forecast period (Rappaport 1998) and the size of residual value also depends directly on the assumptions made for the forecast period. The calculation to assess the residual value therefore applies the perpetuity method which assumes that, after the forecast period the organization will

receive, on average, the cost of capital on new investment. In other words, the organization will invest, after the forecast period, where the investments' net present value is equal to zero. Therefore, the calculation of present value for residual cash flows treats cash flows that come after the forecast period as an infinite stream of identical cash flows, at which the rate of return on those investments is equal to the cost of capital, thereby, the net present value is zero (Martin & Petty 2000; Rappaport 1998).

2.5.3.2 Cost of Capital:

The cost of capital is an economic concept, where the cost is based on the opportunity cost of the invested capital. The appropriate rate for discounting the cash flow stream is the weighted average of the cost of debt and equity capital (Martin & Petty 2000; Rappaport 1998). The cost of capital is essential as it is required that investments should yield returns that are greater than the cost of capital to create shareholder value. Such costs are based on the proportions of debt and equity that an organization targets for its capital structure. This is different from an accounting concept of cost, where the cost of equity is not considered when computing the corporate net income. The cost of capital is expressed as:

$$\text{Cost of Capital} = W_D K_{D(A-T)} + W_P K_P + W_C K_S$$

Where; W_D is the weight of debt in capital structure

W_P is the weight of preferred stock in capital structure

W_C is the weight of common equity in capital structure

$K_{D(A-T)}$ is the cost of debt after taxes

K_P is the cost of preferred stock

K_S is the cost of common equity

Cost of debt is measured relatively straightforward, since historical costs have little correspondence to prospective investments, therefore it is appropriate to measure the cost of new debt, not the cost of previously outstanding debt. Further the interest on debt is tax deductible; therefore the rate of return on debt financing is the after-tax cost of debt (Brigham & Houston 2001). In addition, the relevant rate for cost of debt is the long-term rate or yield to maturity, since it is incurred on the expected cost of short-term debt and reflects the rate demanded by debtholders (Rappaport 1998).

The cost of equity is more complicated to measure. Since there is no agreement to pay a specific rate of return to common shareholders, the cost of equity should be the

implicit rate of return that will induce investors to buy and hold the company's shares (Brigham & Houston 2001; Martin & Petty 2000; Rappaport 1998). It assumes that there will be a demand for a risk-free rate of return on government securities plus the equity risk premium. Equity risk premium is measured by the expectation of additional compensation if holding the company's stocks rather than risk-free government bonds also or called the market risk premium of equity and the individual security's systematic risk, or beta coefficient (Brigham & Houston 2001). Therefore, the cost of equity is measured by using the Capital Asset Pricing Model (CAPM), which holds that:

$$\begin{aligned} \text{Cost of equity} &= \text{Risk-free rate} + \text{Equity risk premium} \\ &= \text{Risk-free rate} + \text{Beta} (\text{Expected rate of return on market} - \text{risk-free rate}) \end{aligned}$$

Consequently, cost of equity can also be calculated by:

$$\text{Cost of equity} = (D_1 / P_0) + \text{growth rate}$$

Where; D_1 is the expected dividend on common equity

P_0 is the market price of common stock per share

2.5.3.2 Discounted Free Cash Flow Valuation (DCF) and corporate value:

The company value is calculated as all the future free cash flow streams discounted back to today using the appropriate cost of capital. In other words, **discounted free cash flows valuation (DCF)** is not completed without being discounted back to find present value at the cost of capital or the rate of return required by investors. An organization is creating value only if it earns a rate of return on invested capital that exceeds the weighted average cost of capital (Brigham & Houston 2001; Copeland, Koller & Murrin 2000; Martin & Petty 2000). The formula for the DCF model is:

$$CV = \frac{FCF_1}{(1+WACC)} + \frac{FCF_2}{(1+WACC)^2} + \dots + \frac{FCF_n}{(1+WACC)^n} + \frac{TV}{(1+WACC)^n}$$

$$\text{where } TV = \frac{FCF_{n+1}}{(WACC - g)}$$

CV is the corporate value

TV is the terminal value

FCF is future free cash flows

WACC is constant weighted average cost of capital

g is growth rate of the free cash flow

n is number of years in the explicit period

Most VBM tools will yield similar results, given that input data are consistent. For instance, one can prove, under certain assumptions, that the SVA, EVA, ROIC, CFROI, and DCF presented in this section are all-important equal aspects (Martin & Petty 2000). However, the most common valuation approach is the DCF model (Frykman & Tolleryd 2003). The advantage of the DCF model is that it requires a good understanding of the underlying business, the value-creation opportunities and the key value drivers of the business. The disadvantage of DCF model is that it is time consuming and very sensitive to small errors in key input variables (Frykman & Tolleryd 2003). That is why most consulting firms combine the DCF valuation model with the use of other ratios such as sales, return on equity, price/earnings, growth in earnings or in sales.

2.5.4 Why should organizations select value-based management

Organization performance is determined by using selected performance measurement tools. Whether an organization selects traditional or modern performance measurement tools matters to a certain degree on the effectiveness and efficiency of the management team. Since management will use these tools in achieving the organization's objectives and enhancing organization value in the competitive global market.

Management in the knowledge-based era has an obligation to commit to strategies that will create value, or wealth, for their organization and investors. Enhancing corporate value involves reducing costs, utilizing assets more efficiently, reducing investment in assets as well as motivating managers to focus on underutilized assets; as a result, increasing cash flows and improving financial performance. Organizations that select and use VBM as their performance measurement tools will find it helpful to carry out the previously mentioned activities to create value. (Bloxham 2002; Haspeslagh, Noda & Boulos 2001; Martin & Petty 2000).

Beside the VBM tools used by management, VBM tools also provide a signal to investors and shareholders concerning business health. Investors are no longer only concerned with the returns an organization made over the years, but they also aim at maximizing the value. Since the management and shareholders of an organization have one common goal in maximizing the value of the shares, then it is important that all parties agree how value is to be measured and how to maximize it (Frykman & Tolleryd 2003). VBM can indicate the current situation as well as future prospects of an organization. VBM tools can tell how the value of an organization is maximized, while developing

corporate value is the best long-term measure about how good the present management is doing its job.

Moreover, VBM implementation requires changes in managerial and employee behavior in a way that they focus on and contribute to enhancing corporate value. The selection and the use of VBM also plays a role in linking managerial attention to shareholder value by linking compensation and reward to how much corporate value has been created. Employees can clearly see that their inputs are valued and corporate goals are achieved (Ehrbar & Stewart 1999; Tully 1993). Education and training about VBM also creates an understanding and commitment of employees. Together, reward systems and education will encourage employees to think and act like owners and will promote a continuous cycle of value creation (Martin & Petty 2000) that drives the wheel of a sustainable and knowledge-based organization.

This research supports the claim that VBM is the right performance measurement tool in determining the value of organization. The selection and utilization of VBM tools in an organization should improve organization performance. As a consequence, the selection and the use of VBM tools is chosen as this research's intervening variables. This research studied six VBM tools; free cash flows (FCF), cost of capital (COSTCAP), return on invested capital (ROIC), economic value added (EVA), shareholder value added (SVA) and cash flow return on investment (CFROI). This research believes that many organizations may have had the discounted free cash flows valuation (DCF), the foundation of VBM that incurred FCF, COSTCAP, but may not be aware or are reluctant to take the advantage of what they already have. Further, how much the firm should focus on the value-based management methods and how often the firm uses these VBM tools depends on how mature the company is. A less mature company will focus more on the value driver, and revenues, while the more mature the firm, the more focus the firm should be put on the discounted free cash flow valuation and the well-known or VBM by consulting firms (Frykman & Tolleryd 2003). This research, therefore, will observe if the organization selects and uses VBM tools and, if it does, to what extent these tools have been used.

2.6 Organization performance – the dependent variable

Performance is the end result of activity. Performance measurement tools selected and used to assess performance depends on the organizational unit to be appraised and the objectives to be achieved (Wheelen & Hunger 2000). This research questions whether

using the right performance measurement tools such as VBM lead to better organization performance (see Figure 2.9 and Figure 2.10). Thus, organization performance is chosen as the research's dependent variable.

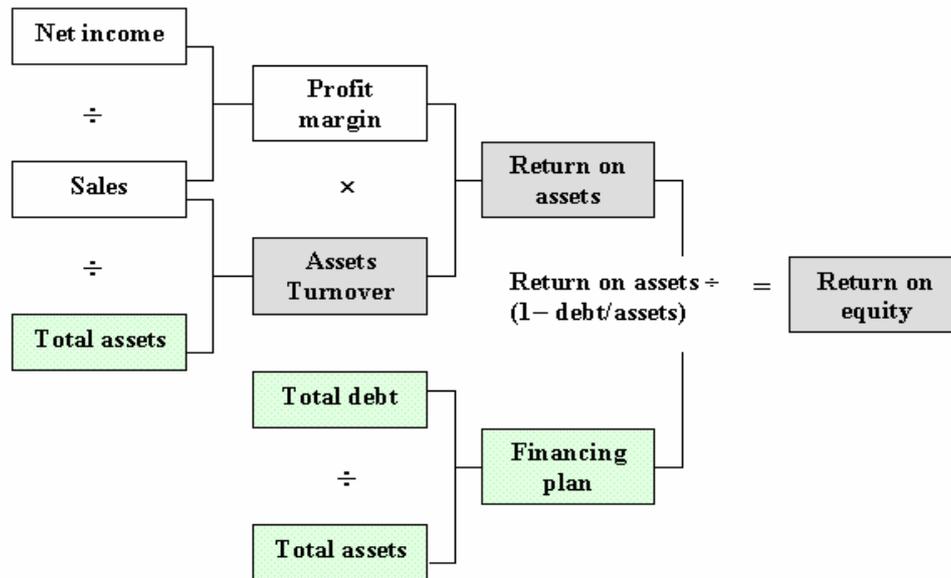
From the review of literature on Value-based management (VBM) tools in Section 2.5, it was clear that the implications of VBM are related to the overall business strategy (Ryan & Trahan 1999). Further, the performance that results from selecting and using VBM is correlated more to business strategy and decision-making than accounting-based measurement tools. This is because VBM directly links managers' attention to that of the market by increasing the awareness of managers that their task is to create shareholder value (Lehn & Makhija 1996). Broadly speaking, when an organization selects and uses a VBM tool, the organization performance should not focus just on the standards and number figures and not limited to financial data.

From a management perspective, performance of an organization influences the market valuation of the company. By improving or strengthening its performance, an organization becomes more accountable at the same time raising shareholders confidence (Newell & Wilson 2002). Strengths and/or weaknesses in organization performance reflect the responsiveness of Board of Directors and governance; thus, the way the organization is governed interests the market. Investors are no longer satisfied only with simple selling of their shares when dissatisfied with returns but, instead, argue for altered company strategies aimed at maximizing the value of their shares (Frykman & Tolleryd 2003). Newell and Wilson (2002) research in six selected countries in 2001, found that there was a linkage between market valuation and corporate governance practices and concluded that most investors look for strength in financial performance and high standards of good governance. They stated that investors are willing to pay a premium for shares in such companies that meet their demands.

Performance of an organization can be measured by looking at the revenues or the profit made at the end of the year, or using key financial ratios such as profit margin, earning per share, return on equity, return on assets, debt-to-equity, or equity multiplier (total assets to equity), total assets turnover, or percentage growth. The research by Ryan and Trahan (1999) used three key dimensions of performance, or the Du Pont equation, in measuring the effectiveness in utilizing assets to generate profits. For Du Pont Equation, their key dimensions are profit margin, total assets turnover and equity multiplier. The key points in the Du Pont equation are presented in Figure 2.8. Alternatively, Du Pont Equation could be written as:

$$\begin{aligned}
\text{Return on equity} &= \text{profit margin} \times \text{total assets turnover} \times \text{equity multiplier} \\
&= (\text{net income/sales}) \times (\text{sales/total assets}) \times (\text{total assets/ equity}) \\
&= \underbrace{(\text{net income/sales}) \times (\text{sales/total assets})}_{\text{return on assets}} \times \text{equity multiplier}
\end{aligned}$$

Figure 2.8: **Du Pont equation**



(Source: Block & Hirt 2005, p. 57)

It is more likely that the profit margin, total assets turnover and equity multiplier indicate the effectiveness in utilizing financial resources within the firm while the selection and the use of VBM should lead to a better result in these key indicators, hence a better overall organization performance. Abernethy and Lillis (1995); Merchant (1984); Hoque and James (2000) used a similar technique in asking managers to indicate by self-rating their organizations performance. Merchant (1984) showed that using self-ratings of performance were higher in larger organizations, which used more administrative approaches to budgeting. Hoque and James (2000) measured organization performance using five dimensions of performance based on the Balance Scorecard theory.

This research resembles other researchers in using these key points in Du Pont equation, or five key financial ratios were used to measure organization performance. Thus this research will measure three key performance areas, which are:

- a. The ability to generate revenues by looking at growth in sales, and profit margin ratio

- b. The effectiveness in utilizing assets to generate profit, by looking at the total assets turnover (TATO) and return on assets (ROA) ratios, and
- c. The ability to pay its costs by looking at debt ratio.

These five financial ratios are described in this section.

2.6.1 Growth in sales

Growth rate in sales is a very useful number. If sales are to grow continuously in which the firm assumes to maintain constant debt ratio and does not sell its new common stock, the firm must increase profit margin, increase total asset turnover, and increasing financial leverage (see Figure 2.8).

2.6.2 Profit margin

Profit margin is one of the best known and most widely used of all financial ratios beside return on equity (ROE), and return on assets (ROA). Profit margin could indicate an operating efficiency of a company. Profit margin is part of the Du Pont equation that indicates the efficiency in cost controlling of organization (see Figure 2.8). Since the profit margin is an income statement ratio, a high profit margin could indicate good cost control.

2.6.3 Total assets turnover

Total assets turnover consider a big picture ratio of how well a company uses its assets to generate sales in a year. Figure 2.8 showed that total assets turnover, together with profit margin forms the return on assets. Weakness in either operating or asset use efficiency or both could show up in a diminished return on assets, which will translate into a lower return on equity.

2.6.4 Return on assets

Return on assets (ROA) is a measure of profit per dollar of assets. It is calculated as net income divided by total assets. Return on assets could be described through the two components of profit margin and total assets turnover in Du Pont equation (see Figure 2.8). For Du Pont equation, a satisfactory return on assets may be achieved through high profit margin or rapid turnover of assets, or a combination of both.

2.6.5 Debt ratio

Total debt ratio takes into account all debts of all maturities to all creditors. It addresses an organization's ability to meet its obligation, or its financial leverage. Debt ratio can be defined as total debt divided by total assets (see Figure 2.8), which indicates the percentage of assets financed with debt.

Another useful variation on total debt ratio is equity multiplier. Equity multiplier could indicate how much assets is financed with debt using equity in calculation. Equity multiplier can be defined as total assets divided total equity or $1 + \text{debt-to-equity ratio}$.

2.7 Linkages among variables in the research model

This research explores the relationships or linkages among variables discussed above. In this section, the linkages among research variables are established and the research model is developed (see Figure 2.9 and Figure 2.10). Three hypotheses are formulated according to these linkages and are presented in Section 2.8.

2.7.1 Linkage among organization factors and the VBM tools

From the review of the literature in Section 2.4, organization factors influence management decisions to select and use the VBM tools for measuring organization performance. This research chooses three organization factors, organization size, market position of the organization and stages in a product life cycle. These three factors are the independent variables and are used to assess whether or not they influence the selection and the use of VBM tools.

Past research found that organization size affects the way organizations select/use management systems (Cooper & Petry 1994; Hoque & James 2000; Libby & Waterhouse 1996; Merchant 1984; Ryan & Trahan 1999). As organizations increase in size the number of investment opportunities increase and planning control of these activities become more complicated, so are the financial performance measurement tools. It, therefore, forces organizations to implement more sophisticated performance measurement tools to determine value for shareholders. Based on past research that used different performance measurement tools and/or the studies carried out under different settings, this research hypothesizes whether or not organization size influences the selection and the use of VBM tools in Thai organizations. Total assets and total annual revenue are used to represent organization size in this study.

The market share position of an organization is used as one of the research independent variables and is represented by the market share in relation to its competitors in a particular market. Several researches found that there seems to be linkages between market positions and the value of an organization (McTaggart, Kontes and Mankins 1994; Merchant 1984). As an organization gains stronger market position, it also makes a greater demand for internal communication and control and this could mean that more sophisticated management systems is needed. Further, organizations with satisfactory market positions should have better financial performance than weaker ones and they are more likely to use VBM tools to maintain its current positions. On the other hand, organizations with average or weaker market positions may be less likely to use VBM tools to maintain position, but they may want to use VBM to benchmark or to improve their market position. This research will study if the market share position of an organization compared to its competitors, as viewed by management, is associated with the selection of VBM tools.

Product life cycle stages is one of the indirect value drivers and must be managed to outperform competition and possibly deliver value to shareholders (Grundy 2002). The study by Ward and Patel (1990) found that linkages of product life cycle stages and the lowering of the cost of capital could raise the shareholders' value. The research by Hoque and James (2000), Merchant (1984) also studied the relationship between product life cycle stages and management systems, although their studies resulted in different solutions, which may due to different settings or different management systems. Drawing on past research, this study questions whether or not different stages in the product life cycle may depend on more sophisticated tools. Therefore, this research also observes the association between product life cycle stages and the selection of VBM tools.

2.7.2 Linkages among the VBM tools and organization performance

Organization performance is determined by the utilization of selected performance measurement tools and may indicate the effectiveness and efficiency of the management team in enhancing the value for the organization. Value-based management (VBM) described in Section 2.5, is one of the management systems composed of several measurement tools that link finance, performance measurement and management processes to create value (Frykman & Tolleryd 2003). Regardless of the VBM tools implemented in an organization, VBM demands that three areas of improvement should be monitored, that are; reducing costs, utilizing assets more efficiently and reducing

investment in assets. As a result, these three areas should increase cash flows and improve financial performance (Haspeslagh Noda & Boulos 2001; Martin & Petty 2000). A study by Ryan and Trahan (1999) conducted in a US industrial corporation indicated that there was improvement in utilizing assets when VBM is implemented. Other studies also indicate effects on performance when different performance measurement tools are implemented (Abernethy & Lillis 1995; Hoque & James, 2000; Merchant, 1984). In replicating previous researches; this research will answer the question if organizations that institutes VBM can perform better than those organizations that do not by studying the relationship between the selection and the use of VBM tools and organization performance. This research studies four popular VBM tools that are commonly used by many consultant companies (EVA, SVA, CFROI, and ROIC), plus another two foundation VBM tools (FCF, and COSTCAP) which are the components of free cash flow valuation that companies may select and use internally, without employing the popular ones.

2.7.3 VBM as an intervening variable

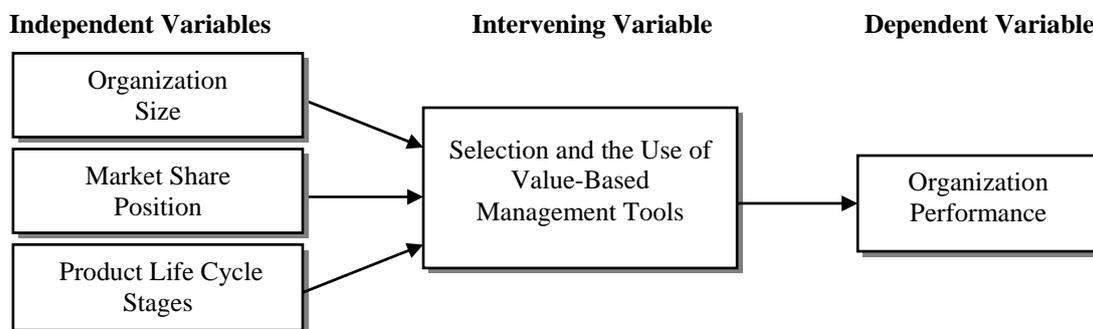
Few studies have examined empirically the relationship between organization factors and organization performance, using performance measurement systems as an intervening variable. The research by Merchant (1981, 1984) used budgeting controls as intervening variables found that performance was higher in larger organization in which a more administrative approach to budgeting was applied. Hoque and James (2000) used the balance scorecard (BSC) as an intervening variable and found that larger companies gain more benefits from the use of BSC.

The literature reviewed in Section 2.7.1 and Section 2.7.2, described the linkage among variables. Section 2.7.1 studied the linkages between certain organization factors and the selection and the use of VBM, while Section 2.7.2 studied the linkage between the selection and the use of VBM and organization performance. This section bridges both Section 2.7.1 and Section 2.7.2 and questions whether the association between organization factors and organization performance exist and possibly relates to selecting VBM tools. Therefore, VBM tools serve as a research intervening variable. The linkages among variables are then drawn and demonstrated in the next section (see Figure 2.9 and Figure 2.10).

2.7.4 Developing the research model

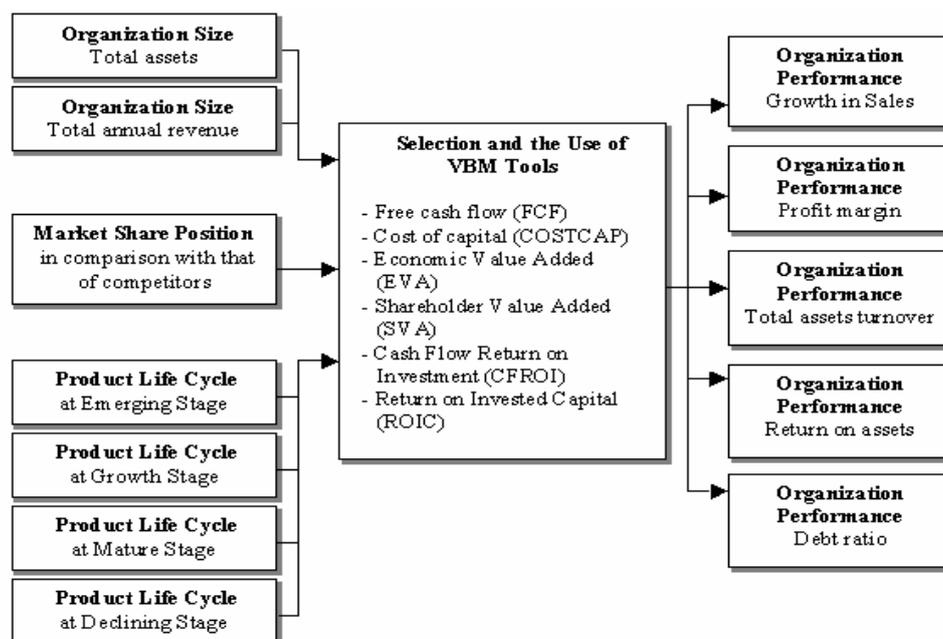
From the linkages described previously, the research model is drawn accordingly and is demonstrated in Figure 2.9 and Figure 2.10. Figure 2.9 demonstrates the research model at a macro-level, in which it depicts the interrelationship among the research variables described in Section 2.4, Section 2.5, and Section 2.6 and provides the theoretical framework of this research. While the micro-level research model shows more details of each variable to be tested in this research to predict the relationship among variables (see Figure 2.9 and Figure 2.10).

Figure 2.9: **Diagram for the research model at a macro-level**



(Source: Developed for this research)

Figure 2.10: **Diagram for the research model at a micro-level**



(Source: Developed for this research)

2.8 Formulation of research hypotheses

The task for this research is to study which organization factors influence the selection and the use of the Value-based management (VBM) tools and whether or not these selected tools influence performance in Thai organizations. For the purpose of testing this research, three main hypotheses are formulated according to the research models proposed in the previous section. These hypotheses depict the interrelationship among the variables to be tested using the quantitative methods to be described in Chapter 3 (Methodology).

Based on the research problem, three research questions determined and were stated in Chapter One. In this Section, three hypotheses are drawn in keeping with the research questions; the linkages and the research model (see Figure 2.9). To seek the answers for the first research question, one hypothesis with three sub-hypotheses were formed. Each of these hypotheses examines the relationship between each organization factor and its influence in selecting and using VBM tools. One hypothesis was formulated to answer the second research question. This hypothesis is formulated to establish the relationship between the selection and the use of VBM tools and organization performance. The last research question results in one hypothesis with three sub-hypotheses being formulated. Each examines whether or not the indicated organization factors, through the selection and the use of VBM, affect in organization performance.

2.8.1 Hypothesis one

From the review of the literature, the research derived the first research question.

Research question I: Do the organization factors such as size, market share position, and product life cycle stages influence the selection of VBM tools to be used to measure its performance?

The linkages between each organization factor, which represent the research independent variable and the selection of VBM tools, described in Section 2.7.1, are formulated into Hypothesis One. Since management needs to have a clear and true picture of overall corporate performance, to measure how objectives and goals are met and to achieve corporate value, it is important for management to select and use the right measurement tools to assess the performance of the organization. The research hypothesizes that the management decision in selecting and using VBM tools over other measurement tools may be influenced by organization factors. This research chooses three organization factors, namely, organization size, market share position of the organization

and product life cycle stages to assess whether these are determining organization factors for selecting and using VBM tools. One hypothesis was proposed relating to the first research question shown in Figure 2.11. The first hypothesis was then sub-divided into 3 sub-hypotheses, each of which represents an organization factor studied in this research.

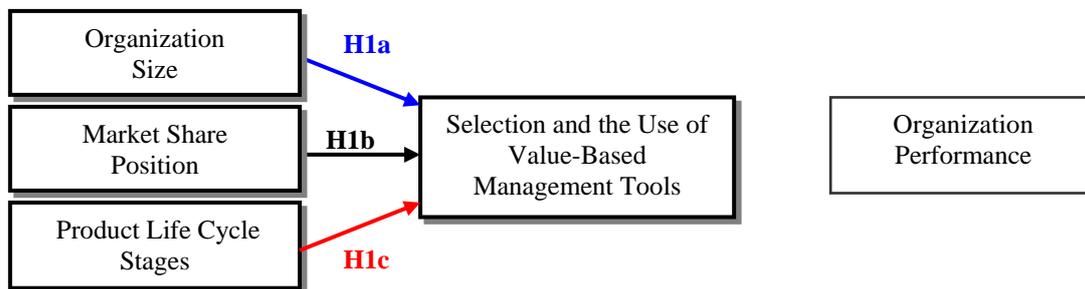
Hypothesis 1 (H1): Organization factors are not the determining factors for selecting and using Value-based management (VBM) tools for performance measurement.

H1a: Organization size is not the determining for selecting and using Value-based management (VBM) tools for performance measurement.

H1b: Market position of organization in relation to its competitors is not the determining for selecting and using Value-based management (VBM) tools for performance measurement.

H1c: Product life cycle stages are not the determining for selecting and using Value-based management (VBM) tools for performance measurement.

Figure 2.11: **Proposed model for hypothesis one**



(Source: Developed for this research)

2.8.2 Hypothesis two

The research questions were restated to formulate hypotheses as follow:

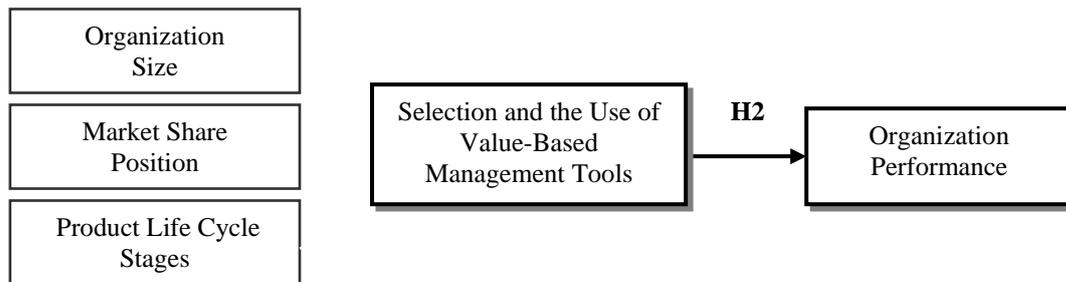
Research question II: Does the selection and the use of VBM tools influence the performance of an organization?

Hypothesis Two was proposed (see Figure 2.12), based on the linkage between the VBM tools and organization performance stated in Section 2.7.2. The performance measurement tools help managers to determine organization success while operating in a highly complex environment. Performance measurement tools used in organizations, therefore, must be reliable so that the outcome reflects the true performance. The selection and the use of reliable performance measurement tools such as VBM tools should enable

managers to assess overall organization performance, which reflects its success and ability to survive. All these should improve overall performance of an organization.

Hypothesis 2 (H2): *The Value-based management tool (VBM) selected and used by an organization does not influence its organization performance.*

Figure 2.12: **Proposed model for hypothesis two**



(Source: Developed for this research)

2.8.3 Hypothesis three

The research questions were restated to formulate hypotheses as follow:

Research question III: Do organization factors such as size, market share position, and product life cycle stages influence an improvement in organization performance through the selection and the use of VBM tools?

Section 2.7.3 described the linkages among all variables. This research hypothesizes the association between organization factors such as organization size, market position and product life cycle stages and improvement in organization performance that may depend on the selection and the use of VBM tools. Organization factors were treated independently to identify influences through the selection and the use of the right performance measurement tools such as VBM, which should result in a better organization performance.

One hypothesis, with three sub-hypotheses is drawn for the third research question, mainly to search for a relationship between organization performance and organization factors through selecting Value-based management tools (see Figure 2.13).

Hypothesis 3 (H3): *The relationship between organization factors and organization performance are not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.*

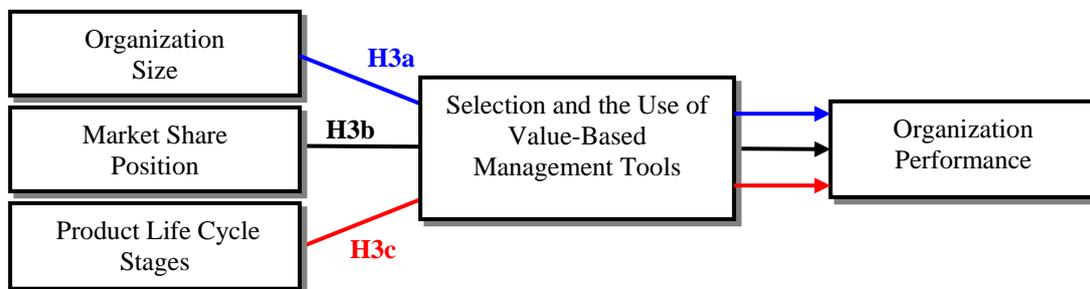
Hypothesis 3 is subdivided into 3 sub-hypotheses, each of which represents an organization factor studied in this research.

H3a: The relationship between organization size and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

H3b: The relationship between market position and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

H3c: The relationship between product life cycle stages and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

Figure 2.13: **Proposed model for hypothesis three**



(Source: Developed for this research)

2.9 Summary of the chapter

This Chapter emphasizes the area of the management control process, which is the research parent discipline. Management control helps managers to ensure that current operations are meeting the organization objectives. It involves setting standards and planning what the organization should do in achieving its goals, measuring performance, evaluating results based on accurate information and whether performance results are acceptable in terms of what was planned and then taking action, if necessary, to correct the situation. Performance measurement is key to the management control process and is studied as the research's immediate discipline. Performance measurement helps managers identify and evaluate overall performance that will provide useful information that could affect current and future activities of organization. Several performance measurements tools that are commonly used in most organizations are reviewed in this Chapter.

This research questions that if VBM tools are successful performance measurement tools, should Thai organizations start implementing it. This research will study factors that influence an organization in selecting and using VBM tools in Thai organizations. The

findings from this research should broaden knowledge in the area of performance management and motivate Thai organizations in selecting and using VBM tools.

The research variables are reviewed in this Chapter. Three organization factors are chosen and are studied in this research as independent variables. These are organization size, organization market position compared to its competitors and product life cycle stages. VBM tools are the research intervening variable while organization performance is the dependent variable. The linkages among research variables were established, the research model drawn and three hypotheses formulated accordingly, ready to be tested using the quantitative methods to be described in the next Chapter.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction to the chapter

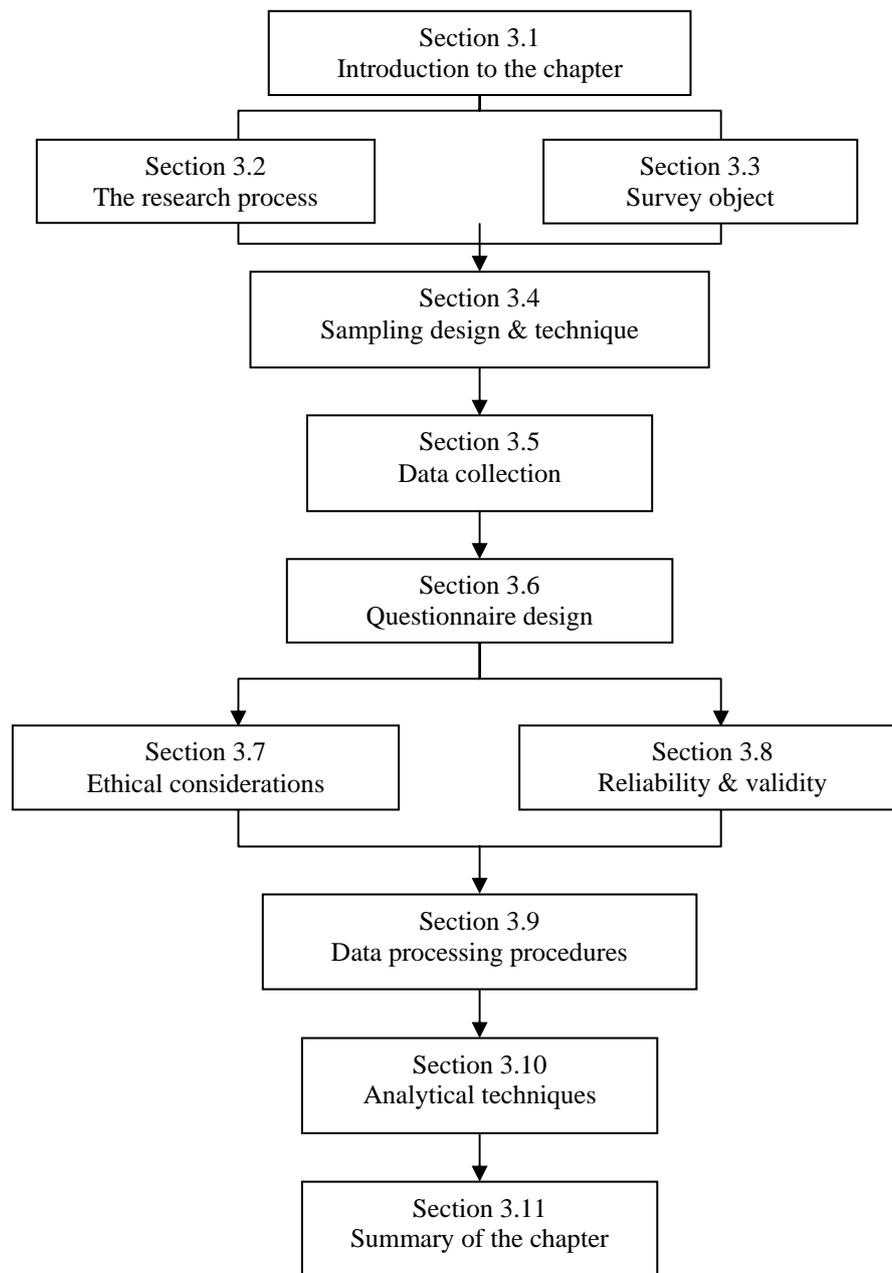
The previous Chapter reviewed the relevant literature related to performance measurement and its tools, in particular, the value-based management tools that lead to the construction of a research model and formulation of three hypotheses. To test these hypotheses, an appropriate research methodology including a detailed description of the survey population, research ethics, and reliability and validity issues, was developed and is detailed in this Chapter.

This Chapter has eleven sections and begins with an introduction and outlines the structure in section 3.1 (see Figure 3.1). This is followed by Section 3.2 which addresses the research design and types of research. Section 3.3 reviews the survey object, and provides an overview of Thailand and the surveyed industry. Section 3.4 states the sampling design and technique. Section 3.5 deals with the data collection and the survey administration. Section 3.6 describes the questionnaire design and the operational function of the questionnaire. Ethical considerations will be addressed in Section 3.7 with a discussion on the reliability and validity of this research in Section 3.8. Section 3.9 describes the data processing procedures while and section 3.10 describes the analytical techniques. The last section, Section 3.11 summarizes the conceptual context of the Chapter and explains how this Chapter links to the next Chapter, the Data Findings and Analysis.

3.2 The research process

In its simplest form, research can be seen as a process of discovery of new information or relationships amongst the variables considered to expand existing knowledge for some specified purpose or to solve problems which may be theoretical or practical in nature (Bennet 1991; Ticehurst & Veal 2000). Research can also be seen as a process to explore, describe, understand, explain, predict, change, evaluate and assess aspects of certain phenomena (Blaikie 2003). It starts with a research problem, an intellectual puzzle or a practical problem which is about answering three types of questions: 'what', 'why', and 'how'.

Figure 3.1: **The structure of chapter three**



(Sources: Developed for this research).

The discovery of new information and relationships for a particular purpose covers a number of investigation activities. The methods and purpose of research as defined above distinguish it from the other forms of professional inquiry. Two major field of research are scientific research and social research (Ticehurst & Veal 2000). Scientific research is conducted within the rules and conventions of science. This means that it based on logic, reason and the systematic examination of evidence. Ideally, scientific research should be

possible for replication by the same or different researchers and derived for similar conclusions. It applies mostly in the physical or natural sciences, such as physics, chemistry or biology. Social research differs from scientific research because it deals with people as social beings and people are much less predictable than non-human phenomena. In social research, the social world is constantly changing, so it is rarely possible to replicate research at different times or in different places and obtain similar results. This includes research from fields such as education, economics, business and management, psychology, political science and sociology (Blaikie 2003).

Research is an essential management tool (Ticehurst & Veal 2000). All organizations that engage in managing human and material resources to achieve their goals will consider the role of research in the management process. Business research is undertaken by a wide variety of individuals and organizations. Managers conduct business research in their companies to reduce uncertainty through the collection of information about organizational and environmental conditions (Zikmund 2000). Further, business research is also used to identify problems and/or opportunities, to diagnose causal factors, to evaluate current programs and courses of action, to explain what went wrong in the past, to forecast future conditions and to suggest some possible alternatives (Ticehurst & Veal 2000; Zikmund 2000). The information necessary to conduct business research needs to be clearly stated and define its objectives and provide essential information upon which to base decisions, in which it may play an important role by reducing managerial uncertainty, however research is never a substitute for managerial thought and judgment.

3.2.1 Types of business research

Since this research is in the field of business studies and management; then it fits under social research. Social research can be generally categorized into basic or applied research. Basic research attempts to advance fundamental knowledge by developing and testing theories and usually has no immediate application (Blaikie 2003; Salkind 2000; Zikmund 2000). Basic research, therefore, expands the boundaries of knowledge, and is conducted to verify the acceptability of a given theory or to know more about a certain concept. Applied research is concerned with practical outcomes, trying to solve some practical problem, with the development and implementation of policy, results of applied research are often required immediately (Blaikie 2003; Zikmund 2000).

So far, most studies (Carney 1999; Cooper and Petry 1994; Hoque and James 2000; Ryan and Trahan 1999; Sinclair and Zairi 2000) in the area of performance measurement were conducted to broaden the knowledge base and did not directly provide a solution to a particular pragmatic problem. However, the information gained from basic research studies could prove to be the critical finding that can be applied in the future (Salkind 2000). The research hypotheses stated in Chapter Two are more likely to be associated with social or practical problems, identify whether the desired outcomes were achieved and to establish an understanding or explanation. Further, this research is operated under a limited time frame and only in the Thai organization context by trying to answer the problem statement identified in Chapter One. Thus, this research falls into the applied research category.

Besides classifying a research into basic or applied research, a research can also be distinguished into three types, which correspond to its functions, directions and situations (Ticehurst & Veal 2000; Zikmund 2000). The three types of business research are exploratory research, descriptive research and explanatory or as often called causal research. Table 3.1 summarized the features of each type of business research, and Figure 3.2 summarized the features of this research.

Table 3.1: Types of business research

	Exploratory Research	Descriptive Research	Explanatory Research (Causal research)
Functions	- Discovering evidence and clarifying problems	- Finding out, describing what it is	- Explaining how or why things are as they are
Directions	- Gaining a better understanding of the general problem from various dimensions - Crystallizing problems that lead to identifying information needed for future research.	- Describing the characteristics of phenomenon or population - Providing accurate description of the problem but does not provide explanation for the cause of problem.	- Identifying cause-and effect relationship between variables when the research has been narrowly defined.
Situations	- Conduct during the early stage of decision making when the decision is ambiguous or uncertain about the nature of the problem.	- Conduct when there is an awareness of the problem but not completely knowledgeable about the situation.	- Conduct to sharply define problems, even though uncertainty about future outcomes exists.

(Source: Developed from Zikmund 2000, p. 53)

Exploratory, descriptive and explanatory researches are applied in this study for the following reasons:

Exploratory Research was conducted at the early stage of this research study:

- a. To gain background information about the research problem
- b. To gain a better understanding of the problems from many dimensions
- c. To clarify the problems into the researchable issues, and to generate propositions and hypotheses (Zikmund 2000).

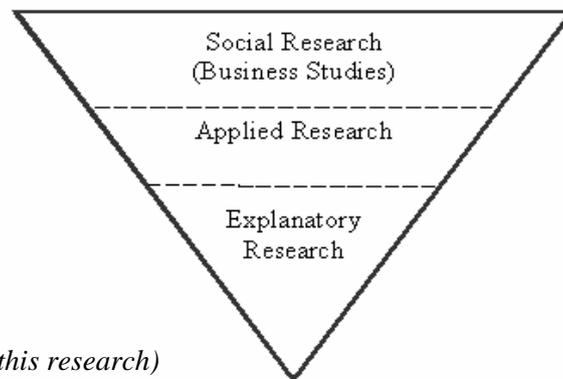
The objective of exploratory research is to find out more in an area where the numbers of research conducted is small. Therefore, it is common to use focus groups, expert knowledge and case study. In this research, exploratory studies was undertaken by analyzing existing studies and secondary data on the core subject in the area of performance measurement, discussion with practitioners whose responsibility and experiences are in the area of organization performance and measurement, discussion with professors, lecturers, and fellow doctoral candidates in order to gain a clearer idea of the research problems.

Descriptive research is used to find out and describe the characteristics of an existing phenomenon or population of interest to allow a better understanding of the topic with clearer specification of the characteristics being investigated, but gives no explanation for the cause of findings. (Salkind 2000; Zikmund 2000). The descriptive study was appropriate in describing information about organization factors, the performance measurement tools, and organization performance. In this research, the descriptive study is used to gain an in-depth knowledge about the performance measurement and its tools; the researcher gets a clearer picture and a sharper focus of the research area.

Explanatory or causal research moves beyond description to seek to explain patterns and trends observed. Explanatory research identifies cause-and-effect relationships or linkages among variables. It requires a process of data collection, analysis, and interpretation. It also generally requires some sort of theoretical framework to relate the phenomenon under study to be able to understand and predict the relationships (Ticehurst & Veal 2000; Zikmund 2000). In this research, explanatory research was undertaken to measure the causal relationship between organization factors and the selection of VBM in organizations in Thailand. It will identify cause-and-effect relationships among variables where the research problem has already been narrowly defined. In this study, explanatory research is used to observe whether the chosen organization factors could change or cause companies to adopt the VBM as their performance measurement tool, and whether the

application of the VBM relates organization performance. To understand relationships, the researcher needs explanatory or causal research to identify such relationships.

Figure 3.2: **Features of this research**



(Source: Developed for this research)

3.2.2 Selecting design techniques

Blaikie (2003); Perry (1995); Zikmund (2000) stated that explanatory or causal research takes a quantitative approach; that is, gathering numerical data to ensure objective and accurate results. However, qualitative approach, or data in words, is potentially useful to obtain more information. Many researchers believe that the two approaches complement one another and suggest that quantitative research should be based on initial qualitative work (Salkind 2000; Ticehurst & Veal 2000). Therefore, the understanding of the two approaches is important. Perry (1995) stated that in some Doctor of Philosophy (PhD) researches, there might be a mix of qualitative research and quantitative research. For example, a research normally begins with problem discovery and identifying problems to obtain more qualitative information. A researcher may not have a clear-cut statement of the problem at an earlier stage. At this point, a researcher may notice the problems that are apparent to begin with, but may not know exactly the nature of the problem. It is at a later stage, that the problem statement is developed based on the symptoms. This is followed by the formulation of research questions to find out how, why, and what; which translate the research problem into questions and indicate the issues to be resolved. A hypothesis is then formulated to identify the important variables in a situation and establish the relationships among them through logical reasoning in the theoretical framework, which can be empirically tested through appropriate statistical analysis for quantitative research, or through a case study analysis in qualitative research (Sekaran 2003). As a

result, a researcher will obtain reliable information on what kinds of relationships exist among the variables operating in the problem situation.

A qualitative approach does not focus significantly on statistical analysis in comparison to a quantitative approach. Qualitative approach involves gathering a great deal of information about a small number of people or organizations and the information collected is generally not presented in numerical form (Zikmund 2000). The research usually begins with gathering qualitative information such as observation, informal and in-depth interviewing and participant observation. This research study was conducted through a review of the literature to gain in-depth knowledge of the study area, and informal interviewed with academics and professionals. It follows by identifying some research gaps, developing research questions and formulating hypotheses. Therefore in this study, a qualitative approach through informal interviewing is used as an initial input for a subsequent quantitative approach.

Quantitative research data primarily involves statistical analysis (Zikmund 2000). It relies on numerical evidence to ensure objective and accurate results to draw conclusions or to test hypotheses. To be sure of the reliability of the results, it is often necessary to study a number of people or organizations and to use computers to analyze the data (Ticehurst & Veal 2000). For example, a survey by Hoque and James (2000) studied 188 samples of Australian Manufacturing firms, while the survey by Ryan and Trahan (1999) studied 977 publicly-owned US industrial and non-financial service companies. The quantitative data can be derived from primary data sources such as an interview, survey questionnaire, from observation or from secondary data sources. These data are transformed into numbers and are subjected to different level of statistical manipulation which are then reported (Blaikie 2003).

For this study, the researcher took an initial step before conducting this research in gathering information by talking to middle-level and top-level managers to explore possible reasons on the lack of use of VBM in organizations. The search indicated that many companies were not familiar with VBM tools. Based on this qualitative information and the review of the literature, a quantitative approach was then taken by questioning the relationships of factors that influence the selection and the use of VBM tools.

3.2.3 Justification of research approach for this research

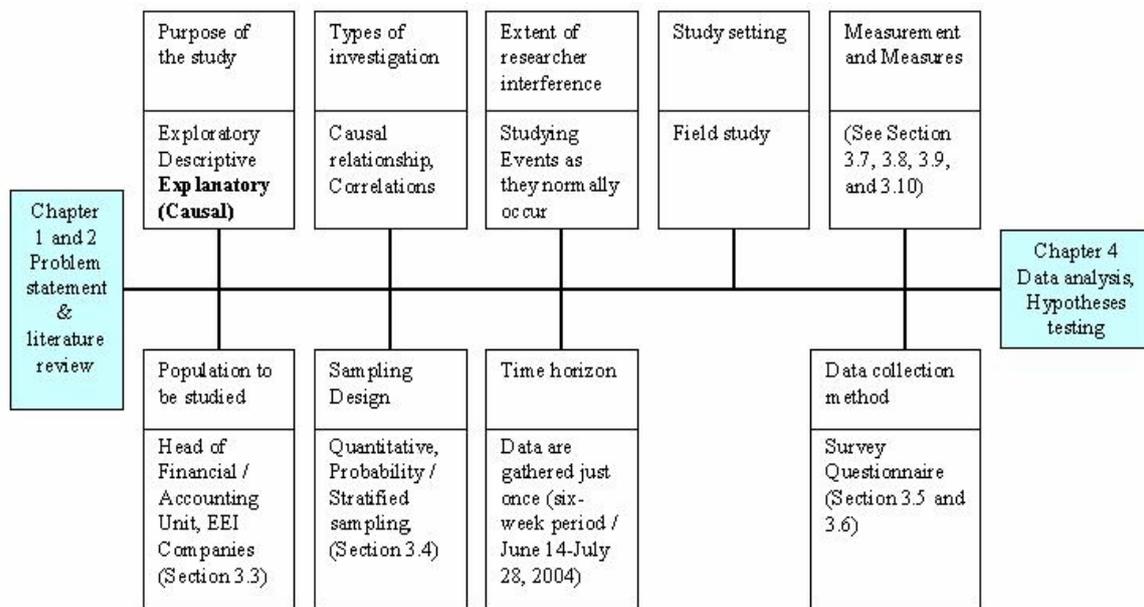
This research is to be conducted as a systematic and objective process of gathering, recording and analyzing data to understand the way an organization selects performance measurement tools to achieve performance. The design of this research is summarized in Figure 3.3. Exploratory research was undertaken at an initial stage to crystallize problems that lead to identifying the information needed for this research. In this research, the researcher discussed with the academic colleagues and middle-level and top-level managers of some companies to explore issues. It then conducted a quantitative approach by collecting and analyzing the data. This research seeks to identify relationships between organization factors and the selection and the use of VBM in organization in Thailand. To test the hypotheses, this research chooses a sample from a population of Electrical and Electronic companies listed in 'Electrical and Electronic Institute Directory Year 2003-2004' also known as EEI Directory of the Thai organizations. A mail survey was used as a means to collect data that was interpreted into information for analysis. Statistical measures of the associations, causalities, correlations and covariance and regressions between variables were analyzed in the next Chapter (Chapter Four) to verify that the proposed cause-and-effect relationships were possible.

Based on the above description, the exploratory research, using a qualitative approach, was undertaken at the primary stage to crystallize the factors that could influence the selection of performance measurement tools. Discussions with managers and academic colleague were carried out to gather information on the problem area for this research. From the information gathered, the research area was clarified to be ready to conduct the research. Thus, the qualitative approach was applied at the beginning stage of this research to crystallize the area of study.

The early stage of this research was devoted to an intensive literature review to identify some research gaps/problems and then a research model was proposed. The descriptive and explanatory (causal) approaches were carried out at this stage to describe the characteristics of the population in a framework of the problems and conceptual model. The causal approach reviewed the relationships between the variables that have been identified and measured. Causal research is conducted to identify cause-and-effect relationships among variables where the research problem has already been narrowly defined (Zikmund, 2003). The quantitative research approach played a major role in this research since it was used to answer questions that required numbers as data to solve the problem. In quantitative studies, the data are transformed from words into numbers, are

subjected to different statistical manipulation, and are reported in both numbers and words. This research uses regression analysis of the survey data to unearth the testable hypotheses, proposed in Chapter Two, to examine the cause-and-effect relationships among variables in the research model. The quantitative approach using statistical measures was applied to verify that the proposed causal relationship were possible (see Figure 3.3).

Figure 3.3: The research design



(Source: Adapted from Sekaran, 2003 p. 118, and developed for this research)

3.3 Survey object

3.3.1 An overview of Thailand

The roots of Thailand's economy are firmly planted in its natural resources and agricultural advantages. The Kingdom is famous for rice and products native to tropical climates including rubber, tropical fruit, and seafood. The production and export of these products have produced sizable earnings for the country. In the 1970's, Thailand's agricultural resources, combined with the emerging of manufacturing industry has driven the modernization of the economy with tremendous growth in manufacturing, technology, and foreign investment. From the 1980's onwards, Thailand's economy has become a unique and diverse compared to its neighbors in Southeast Asia. The Kingdom has the most promising growth at the average rate of thirteen per cent in Year 1988, and eleven per cent in Year 1989 (Thai Portal Company 2004). This high growth continued in the early to

mid 1990's. It looked like Thailand would join the group of Asian Tiger economies, composed of South Korea, Singapore, Hong Kong and Taiwan. However, by the mid 1990's Thailand's economic situation began to encounter some problems. A swelling negative current account balance, reduced consumer spending, stagnant exports and high inflation indicated trouble ahead for Thailand's economy.

The explosive growth in the late 1980's and early 1990's collapsed suddenly in 1997. Thailand was forced to float the Thai Baht in July 1997, leading to a rapid devaluation and virtually shutting down the economy (Bank of Thailand 1997). Due to this factor companies overextended with debt payable in U.S. dollars found they are unable to repay principal or interest and quickly went into default. Banks and finance companies were left with collateral largely held in a collapsing property market and weak bankruptcy laws protecting the assets of debtors. Exporters keen to capitalize on the sudden demand for Thai products were unable to obtain financing from local banks while exporters and manufacturers dependant on imported components suffered from prices that jumped dramatically. This crisis quickly spread around Southeast Asia and also affected Northern Asian and Russia.

With the offer of a 17.2 Billion U.S. Dollar package by the International Monetary Fund (IMF) granted on condition of major restructuring of the economy, financial institutions and regulatory framework in Thailand (Bank of Thailand 1997). With the help of the IMF, Thailand's economy is growing again and consumer and investor confidence has returned. Since the crisis in 1997, the economy shrank leading to large increases in unemployment and non-performing loans. Starting in mid 1999, growth in GDP returned, with improved domestic consumption and exports and an improving external debt situation. The Baht has stabilized and both interest rate and inflation dropped to very low levels. During 2001-2002 the economic recovery showed signs of improvement. However, pressures from global uncertainties including the weakening of the world economy, the threat of war by the United States and its allies on Iraq, the controversy between the US Pacific Maritime Association and the International Longshore and Warehouse Union, the bombing in Bali, escalating oil prices and exchange rates affected Thailand's economy and carried on to year 2003. These external factors put particular pressure on export demand from the US market, which represents as much as twenty per cent of total Thai exports (Srisukkasem 2002). Despite the uncontrollable external factors, the Thai government tried to boost domestic consumption and investment, reduced the import of luxury products and targeted the export of Thai products to China and India

(Pongvutitham 2002). Later in 2003, although the SARS (Severe Acute Respiratory Syndrome) and Avian Flu had some influence over the economy and export value, Thailand was able to repay its loan to the IMF and its economic future is resuming its health (Bank of Thailand 2003; The Office of Industrial Economics Thailand 2003). The country has established itself as an emerging base for high technology in the region at the same time remaining to capitalize its wealth of natural resources and agricultural advantages.

3.3.2 Manufacturing industry outlook

While Thailand has long been famous as an exporter of agriculture products, high technology exports have become the largest and fastest growing part of the economy. From Year 2000 Bank of Thailand (2000; 2003) reported the expansion of manufacturing production due to the progress in debt restructuring and high world trade volume, particularly in **electronics, electrical appliances**, iron and steel products, vehicles and parts and construction materials. Large investments from multinationals have helped Thailand to become an important Southeast Asian production center for many manufacturers of computers, electronic integrated circuits, automobiles, auto parts and air conditioners. In Year 2003, the Office of Industrial Economics reported foreign investment in the top three industries are, ranked in order, Drugs & Chemical Products, Metal and Steel and Electrical and Electronic industries. Further, the Thai government's initiatives to promote foreign investments improve business infrastructures and emerging local entrepreneurs.

According to the Thai Ministry of Industry (1996), registered companies in the manufacturing industry can be classified by size either by the number of full-time employees or fixed assets (see Table 3.2). *The Analytical Review and Report of the Structure of Manufacturing Industry* (Department of National Statistics Thailand 2002) stated that, manufacturing companies are differentiated from services companies by the use of their fixed assets and employees. Manufacturing companies are generally classified using the size of fixed assets since they are highly automated and use large amounts of capital to invest in machines and equipment for manufacturing, while the services companies are classified by the number of employees (Department of National Statistics Thailand 2002).

Table 3.2: Classification of manufacturing companies by Thai Ministry of Industry

Classification of Manufacturing Companies	Number of Full-time Employees	Fixed Assets (Local Currency: Thai Baht)	Approx. Proportion of Manufacturing companies
SMALL	10-50	Less than 50 million	68.0%
MEDIUM	51-200	50 million – 200 million	21.0%
LARGE	More than 200	more than 200 million	11.0%

(Source: developed from Department of Industrial Promotion, Ministry of Industry Thailand 1996).

Further, the Industrial Census Survey which is conducted regularly on a ten-year-term, reported in the *Report of the Year 1997: Industrial Census* by Department of National Statistics Thailand (2002), that 23,677 manufacturing companies operated in Year 1997, these companies were classified by their products into fifteen categories in the *National Industry Development Plan from Year 1996-2001* (Ministry of Industry Thailand 1996). Table 3.3 indicated the electrical and electronics industry hold 1,431 companies in Year 1997, or approximately 6 per cent of the total manufacturing industry in Thailand.

Table 3.3: Manufacturing industry sector categorized by types of products

Manufacturing Industry Sector Categorized by Types of Products	Number of Companies in Year 1997	Percentage of Companies
1. Food	3,786	15.99%
2. Clothing and textile	3,416	14.43%
3. Leather, Leather products and footwear	832	3.51%
4. Wood, Wood products and furniture	1,933	8.16%
5. Drugs and chemical products	917	3.87%
6. Rubber, rubber products	672	2.84%
7. Plastic products	1,272	5.37%
8. Ceramics and glasses	1,233	5.21%
⇒ 9. Electrical & electronics parts & products ⇒	1,431	⇒ 6.04%
10. Vehicles and parts	1,311	5.54%
11. Gems, Jewelry and ornaments	380	1.60%
12. Metal, Steel, and products	3,458	14.60%
13. Petroleum, Petrochemical products	43	0.18%
14. Construction materials	1,519	6.42%
15. Paper and paper products	1,474	6.23%
Total 15 Manufacturing Sectors	Total 23,677 companies	Total 100 %

(Source: Developed from Department of National Statistics Thailand 2002).

3.3.3 The Electrical and Electronics Industry, Thailand (EEIT)

Since the 1980s, the demand for electrical appliances continued to grow not only from the demand within the country but also from overseas. The Manufacturing Production Index (MPI) Year 2003 stated that the three major players in the manufacturing industry that caused the increase in the MPI 2003 were, respectively, Automobile and

parts, Electrical and Electronics and appliances, and Construction Materials (The Office of Industrial Economics Thailand 2003). Among these three players, the main export markets for Electrical and Electronic products are Singapore, the United States and Japan. The export value of electrical and electronic and appliances remained unchanged during years 2002 and 2003 and was approximately 17,000 million US Dollars (approximately thirty-five per cent of the total export value), and is the country's greatest foreign income earner (Pongvutitham 2002). The Board of Investment stated that in year 2004, the electronics and computer sectors had not rebounded and the export value remained unchanged, due to the slowdown of orders in electronic goods from the U.S. and price competition with Chinese products. The Thai government will need to attract more foreign direct investment, especially in this industry sector, working with Japanese partners, to establish more plants in Thailand (Srisukkasem 2002).

Products made under Thai Electrical and Electronics Industry (EEIT) include air conditioning, cable, compressor, electric wire, fax machine, refrigerator, radio, television, transistor and electronic components such as electrical and integrated circuits, ballast, starter, ferrite core, floppy disk and drive, computer and microchips used in computer components. These EEIT products continue to improve in term of quality and quantity through the using of the latest technology as well as improving the level of education, with support from government export policy and foreign investment (The Federal of Thai Industries 2003).

Amongst the EEIT profiles, some of the well-known companies are, Cannon Hi-Tech (Thailand) Ltd., JVC Components (Thailand) Ltd., Korat Denki Co., Ltd., LG Mitr Electronics Co., Ltd., Olympia Thai, Co., Ltd., Matsushita Electric Works (Thailand), Co., Ltd., Siam Mould & Part Co., Ltd., Seagate Technology (Thailand) Co., Ltd., SONY Thai Co., Ltd., SVOA Public Co., Ltd., and World Electric (Thailand) Co., Ltd.

This research study chooses to explore Thailand's Electrical and Electronics Industry (EEIT) for two reasons:

First, the EEIT has grown steadily from the mid 1980's, the EEIT sector was particularly identified as having the greatest potential to grow both in volume and importance (The Federal of Thai Industries 2003). Despite the weakening of the world economy and other external factors which causes the growth of EEIT to slow down during mid 2002 to 2004, the EEIT shows, at its best, potential in growth as well as maintaining strength in exporting products. As a consequence, the EEIT company's cash flow should be recognized to be able to support growth and stability. Therefore, it is highly likely that

companies in the EEIT can make use of the VBM tools. As a result, the EEIT is chosen as the population for this research.

Second, among the major three industries, which yielded the highest MPI 2003 in the manufacturing industry sector, little research has been carried out in the Electrical and Electronic Industry in Thailand. Further, the export of electrical and electronic appliances showed the greatest earnings in Year 2003; therefore, it is significant to show how electrical and electronic companies manage their growth and cash flows. As a result, this research will fill the gap where, currently, only little research has been conducted and, by exploring the EEIT, this research will provide needed information, as well as add new knowledge to the industry.

In this research the EEIT represented the universe or population to be studied. To test the research hypotheses, the research must use a small number of items or parts of the whole population to make conclusions regarding the entire population (Zikmund 2000). The process of sample selection must be aimed at minimizing bias in the sample. This research uses the Electrical and Electronics Institute Directory Year 2003-2004, known as '*EEI Directory*', as the basis for the survey sample. The EEI Directory is a directory that provides the list of all companies, addresses and products of EEIT (Electrical and Electronics Institute 2002). The use of the EEI Directory is justified in Section 3.3.4. In addition to the EEI Directory, there are two publications that provide reliable information as a directory for companies in the Electric and Electronics Industry. The Directory of members of the Federation of Thai Industries Electrical and Electronics Products has 181 members. Another publication is the Directory of members of the Thai Chamber of Commerce, Electrical and Electronics Products, which has 176 members. However, the size of these two directories is too small and may not represent the whole industry; therefore, they were not selected as the basis for the survey sample for this research.

3.3.4 Justification of the survey object for this research

The '*EEI Directory*', published by the Electrical and Electronics Institute, is used as a source to provide the survey sample for this research. The Electrical and Electronics Institute, established by Thai Ministry of Industry in July 1998, is an autonomous institute that helps strengthen the competitiveness of Thailand's electrical and electronics industry. The major activities of this institute are to support local companies to achieve operational and international standards such as the International Organization for Standardization (ISO), and International Electro-technical Commission (IEC); to encourage and support

companies in using local raw materials and parts and components, at the same time, to increase the electrical and electronics export volume; and to serve as a center for research and development, collection and analysis of electrical and electronics data related to production, market, international trade agreement and recognition (Electrical and Electronics Institute 2002).

Since the Electrical and Electronics Institute served as a center, for electrical and electronics companies in Thailand, which provides services to the electrical and electronic industry, the institute also has current information of companies in the electric and electronic industry, and therefore, any publication and announcement from the institute reflects reality and is up-to-date about what is currently happening in the industry and, therefore, is reliable. As a consequence, the EEI Directory published by this institute is considered as a reliable source of data for the survey sample.

This research uses the Electrical and Electronics Institute Directory Year 2003-2004, known as *EEI Directory*. The EEI Directory showed that, in Year 2003, 1,760 companies were under the EEIT and classified according to the size of fixed assets (see Table 3.4). In addition, it provides a source of information or reference indexes on products classification and suppliers of particular products, as well as contact names and addresses (Electrical and Electronics Institute 2002).

Table 3.4: *EEIT companies classified by the size of fixed assets*

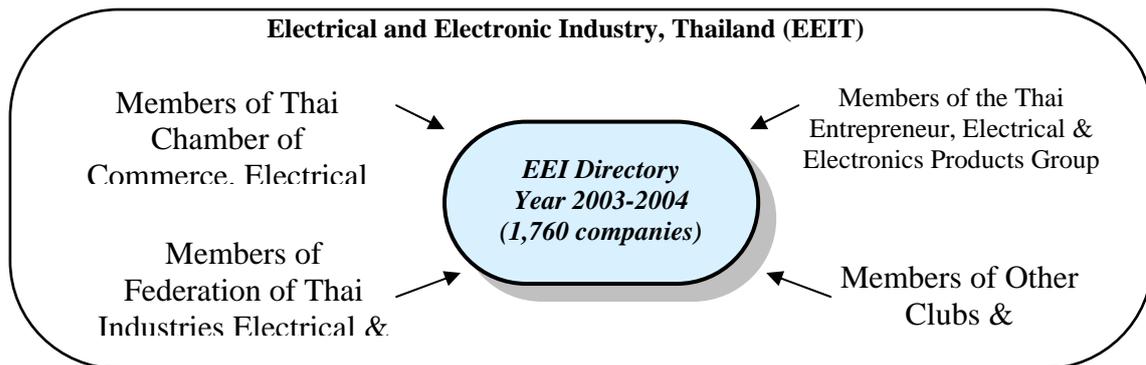
SIZES: Classified by the size of fixed assets in Thai Baht (THB)	No. EEIT Companies Year 2003
SMALL = Less than 50 Million THB	1,268 (72.04%)
MEDIUM = 50 Million – 200 Million THB	283 (16.08%)
LARGE = More than 200 Million THB	209 (11.88%)
TOTAL	1,760 companies (100.00%)

(Source: Adapted from Electrical & Electronics Institute 2002)

Besides being listed in the EEI Directory, the electrical and electronic companies in Thailand can apply to become active members of one or more Clubs or Associations under which they can exchange information, as well as express their concern among members. The Clubs or Associations for EEIT were not chosen in this research because information about members of some Clubs or Associations is not accessible to outsiders who are not members; some companies participate in more than one Club or Association that may cause redundancy in conducting research, while some information, such as the name and address of contact persons, is incomplete and outdated and the numbers of members of the

Clubs or Associations are too small to represent the whole industry. However, most electrical and electronic companies have their name listed in the EEI Directory, since they register for support and services from the Electric and Electronics Institute. This research, therefore, was conducted through the use of listed companies in the EEI Directory Year 2003-2004 (see Figure 3.4).

Figure 3.4: **The selection of the sample survey**



(Source: Developed for this research)

3.4 Sampling design and technique

In business research, a universe or a population represents a group of potential participants relevant to the research project and a sampling frame or a working population is the list of population elements that can be worked with operationally. (Ticehurst & Veal 2000). A sample is a subset or some part of a larger population. The process of sampling, therefore, involves any procedure using a small number of items or parts of the whole population to make conclusions regarding the entire population (Zikmund 2000). The process of sample selection must be aimed at minimizing bias in the sample.

In this research, the companies in the Electrical and Electronic Industry of Thailand (EEIT) represent the research population. In total, there are 1,760 companies listed in the EEI Directory Year 2003-2004. These companies manufacture electrical products, electronic and computer, and electronic parts and components. This research used a stratified sampling technique in which a sample from the EEIT companies was first divided into mutually exclusive subgroups that are relevant and meaningful in the context of study (Sekaran 2003; Zikmund 2000). The EEI Directory had already categorized 1,760 listed companies into small, medium and large size companies according to the size of fixed assets. This research chose the medium and large size companies as the sample survey. This research focuses on the area of performance measurement in studying

medium and large size companies (Cooper & Petry 1994; Hoque & James 2000; Ryan & Trahan 1999). Moreover, medium and large size companies are more likely to select complicated tools such as VBM tools where implementing such tools involves high costs. Further, the reason for selecting a sample as opposed to the whole population is due to time constraints and cost effectiveness. Further, it is practically impossible to collect data from, or examine every element; therefore, the use of sample rather than the entire population reduces error and fatigue, which may result in collecting data especially when a large number of elements are involved. Therefore, sampling was considered appropriate as it provides much quicker and/or lower cost results than a survey of the entire population (Zikmund 2000). This section discusses how the samples are drawn to represent the population dealing with the two issues the sampling design and determining sample size.

In selecting a valid sample for the study, this research takes into consideration how well the sample represented the characteristics of the population under study. This research followed previous researches in the same area of interest in selecting the size of sample to study. It also considered the representativeness of the source of data and carefully considered the sampling design in which the samples being selected should represent the industry. Further, when the characteristics of the population are to be estimated from those represented in a sample, the sample has to be chosen so that the distribution of characteristics of interest, follow the same pattern of normal distribution in the sample as it does in the population (Sekaran 2003). The two issues that indicate the representativeness of samples are the sampling design and the sample size. Thus, if the sampling design and sample size are right, the researcher can ensure that the sample subjects are not chosen from the extremes, but are truly representative of the characteristics of the population (Punch 2003). The sampling design and sample size are discussed in the next two sections.

3.4.1 Sampling design

In selecting a valid and efficient sample for this study, a sampling procedure as outlined in seven stages by Zikmund (2000) was modified and used (see Table 3.5). Sampling design decisions are an important issue of research design and include both the sampling plan to be used and the sample size that will be needed. The sample size is described in details in the next section.

Table 3.5: Stages in selection of a sample

Stages in Selection of a Sample	Selection of a Sample for This Research
Stage 1: Define Target Population	Electrical and Electronic Industry, Thailand (EEIT)
Stage 2: Select a Population Frame	1,760 Companies listed in “EEI Directory Year 2003-2004”
Stage 3: Determine Sampling Design	Probability Sampling / Stratified Sampling Method
Stage 4: Plan for Select Sampling Units	Plan for sample size, accuracy, time, resources, analysis
Stage 5: Determine Sample Size	462 large & medium size firms (classified by EEI Directory)
Stage 6: Select Sampling Units	Surveyed 462 companies (Large 202; Medium 260)
Stage 7: Conduct Fieldwork	Mail survey questionnaire to survey subjects

(Source: Adapted from Zikmund 2000 p. 342, and developed for this research)

Stage 1: The sampling process begins with the identification of the population that the researcher wishes to investigate (Sekaran 2003). The target population is the specific, complete group relevant to the research project. There is a need to correctly identify and carefully define the target population since it is the source from where the researcher is to collect data (Zikmund 2000). Incorrect identification and definition of target population may lead to invalid data and limit generalization of the research results. Section 3.3.3 identified that the population for this research was defined as the Electric and Electronic Industry in Thailand (EEIT). EEIT has grown steadily from the mid 1980’s both in volume and its importance (The Federal of Thai Industries 2003). Despite the weakening of the world economy and other external factors which causes the growth of EEIT to slow down during the mid of year 2002 to year 2004, the EEIT still showed its strength in exporting its products. As a consequence, EEIT is recognized for its growth and stability. Therefore, it is more likely that the organization under the EEIT can make use of the VBM to increase its strength and to support growth. As a result, the EEIT was chosen as the population for this research.

Stage 2: After identification of the target population, a population frame is created. A population frame according to Sekaran (2003) is the list of elements in the population from which a sample of study may be drawn, it is also known as working population. Choosing a correct population frame is important if the research results are to be generalized. Although the population frame is useful in provide a listing of each element in the population, it may not always be a current, updated document and may not always be entirely correct or complete (Sekaran 2003). In this research, the working population or

sample frame of the EEI Directory of Year 2003-2004 was chosen, since it is the most recently updated information published in December 2002. Even though the “EEI Directory” provides the current addresses and names of the current members, the researcher was aware that it may not be able to guarantee that the most recently applied for, or withdrawal of membership, would be included in the current directory. Hence, there is no firm guarantee that the addresses of the companies on the list are current.

Stage 3: Determining the sampling design or sampling method is the next stage after selection of the sampling frame. Sampling design is the approach used to select the units of analysis for study. There are two basic sampling designs used: Non-probability sampling and probability sampling (Sekaran 2003; Zikmund 2000).

Non-probability Sampling: Non-probability sampling method is a process in which the selection of sampling units is based on personal judgment. Sample units are selected on the basis of availability/convenience or desire of a researcher (Zikmund 2000). In this case, the potential members of the sample do not have an equal and independent chance of being selected.

Probability Sampling: Probability sampling method is a sample-selected process in such a way that all members in the population have an equal chance of being selected. According to Zikmund (2000), probability sampling is a sampling technique in which every member of the population will have a known, nonzero probability of selection. Probability samples are preferable because they are more likely to produce representative samples and also enable estimates of the sample’s accuracy to be made. Zikmund (2000) categorized probability sampling techniques into five categories, simple random, systematic, **stratified**, cluster and multistage.

In this research, a **stratified sampling** method is chosen. The EEI Directory categorized the listed companies into small, medium and large size according to the size of their fixed assets. Stratified sampling is a procedure in which the population is first divided into mutually exclusive subgroups or strata that are relevant, appropriate, and meaningful in the context of the study (Sekaran 2003; Zikmund 2000). The subjects are then drawn from each group or stratum, which can be either proportionate or disproportionate to the number of elements in the stratum. If the members from each stratum are drawn proportionately, then it is called a proportionate stratified random sampling. If the members from each stratum are not proportionately drawn, due to the reason that some stratum or strata are too small, too large, or when there is more variability

suspected within a particular stratum, then the redistribution of the numbers in the strata would be considered more appropriate and representative for the study than the proportionate sampling design; this stratified sampling design is called disproportionate stratified random sampling. Further, the disproportionate sampling is also sometimes employed when it is easier, simpler and less expensive to collect data from one or more strata than from others (Sekaran 2003).

In comparison to the simple random method, stratified sampling is more efficient because, for the same sample size, each important segment of the population is better represented and more valuable since differentiated information is obtained with respect to each group (Sekaran, 2003; Zikmund, 2000). This research selects a stratified sampling technique and surveys the entire companies' population in medium and large size categories. These two categories were selected for the following reasons:

- a. Medium and large size companies are more likely to use the complicated tools such as VBM, where the benefit of implementing such tools is higher than the implementation costs.
- b. Medium and large size companies, compared to small size companies, have been in the industry for sometimes and their financial status is quite stable and shows some strength; therefore medium and large size firms have higher potential to share their financial information and participate in this research.
- c. Most of the research conducted in the area of performance measurement is more likely to study medium and large size companies. For example, the research by, Cooper and Petry (1994) studied companies listed in the *1990 Business Week*, Hoque and James (2000) studied manufacturing companies listed in the *Business Who's Who of Australia (Dun & Bradstreet 1997)*, Libby and Waterhouse (1996) studied manufacturers with over 100 employees from *1993 Dunn & Bradstreet Guide to Canadian Business*, and Ryan and Trahan (1999) studied the 1,000 largest publicly-owned US companies. This research studied the medium-to-large size companies, which is relevant to other research in the same area.

Stage 4: After determining the sampling method, procedures for selecting sampling units are planned. The sampling plan specifies the operational procedures and methods to obtain the desired sample (Zikmund 2000) and guides the researcher in determining the sample size and the level of accuracy, time, and resources and as a result minimizes potential errors in the sampling process (Sekaran 2003).

In this research, the EEIT was defined as the target population, the EEI Directory Year 2003-2004, was selected as the population frame and a stratified sampling method was determined. The sampling plan was outlined to determine the procedures in selecting sample size, the method in collecting data from the samples were studied in terms of timing, and accuracy. This research used a questionnaire survey in collecting data, within a six-week collection period. The data received were checked and adjusted to make ready for coding and transfer to data storage. The purpose of checking and adjusting data is to ensure the completeness, accuracy and reliability of data before analysis.

Stage 5: When the sampling plan is in place, the sample size is determined. Sample size is the selected number of people or objects to be chosen to represent the population (Zikmund 2000). The sample size should be large enough to answer the research question; too large a sample does not increase the precision of testing research question beyond the costs and trouble incurred in getting that size sample, however, too small a sample is not representative of the population (Salkind 2000). The total numbers of sample size for this research are 462 EEIT companies that were listed in the EEI Directory Year 2003-2004, or approximately 26.25 per cent of the sampling frame, which is composed of companies in the medium and large size EEIT companies as explained earlier in Stage 3. The sample size of 462 companies is manageable in size, cost and time. Section 3.4.2 explained how this research determines its sample size.

Stage 6: Apart from the sample size, a researcher will select the sampling units, which are the working units that the researcher will select to study before proceeding to conduct the fieldwork (Zikmund 2000). Since this research applies a stratified sampling technique and census survey is used for both medium and large size categories, meaning that every subject classified under medium size and large size was selected. In conducting the census survey for medium and large size categories, the names and addresses of the survey objects were obtained from the EEI Directory, of which 202 large size companies and 260 medium size companies were selected and represent the sample units of this research (see Table 3.4).

Stage 7: Once the six stages were determined, the researcher was ready to proceed with data collection and to conduct the fieldwork.

3.4.2 Issues of precision, confidence and sample size

The two key issues in determining the right sample that represented the population are the sampling design, which was described previously and the sample size, which is described in this section. There are two criteria in determining sample size, precision and confidence.

By studying the reliable and valid sample, the researcher is able to draw conclusions that would be generalizable to the population of interest. A reliable and valid sample depends on two key issues. One is precision and the other is confidence of the sample. The sample statistics should be reliable estimates and reflect the population parameters as closely as possible within a narrow margin of error (Sekaran 2003).

Precision allows the researcher to know how close the estimate is to the true population characteristics. It is a function of the range of variability in the sampling distribution of the sample mean. That is, the closer the researcher wanted the sample results to reflect the population characteristics, the greater the precision required, the larger the sample size needed (Punch 2003; Sekaran 2003). For Example, research by Ezzamel (1990) in which he selected 186 companies from the *Times 1000*, some 81 companies (44%) sent complete responses. Another example is research by Cooper and Petry (1994) surveyed 450 firms listed of the *1990 Business Week 1,000* firms, of these 151 companies (34%) completed the survey. Ryan and Trahan (1999) also surveyed 977 sample firms listed in the *1994 Stern Stewart Performance 1000*, of these, 204 responses (21 per cent) completed the questionnaire.

Whereas precision denotes how closely the estimate of the population parameter is based on the sample statistic, confidence denotes how certain that the results based on the sample statistics will also hold true and reflect the true population characteristics. In most business research, a 95 per cent confidence level is the conventionally accepted requirement.

Precision and confidence are important issues in determining the sample size. Since the sample data are used to draw inferences about the population, the researcher needs to ensure that the sample size and data is a relatively accurate estimation of the population characteristics. As a consequence, if the researcher wants more precision, more confidence, or both, the sample size needs to be increased. However, in research, the theoretical framework has several variables of interest and determining the sample size, by taking all variables into account, is complicated. Roscoe (1975) proposed a rule of thumb for determining an appropriate sample size that the sample sizes should be larger than 30

and less than 500. Sekaran (2003) simplified size decision by providing a generalized scientific table as a guideline to ensure a good decision model for sample size.

This research takes into account Roscoe's rule of thumb and Sekaran's table discussed earlier (Sekaran 2003). From 1760 EEIT companies, according to Roscoe's rules of thumb (1975) and Sekaran's table (2003), the reasonable sample size should be between 313-317 companies. However, the decision was made to survey all the medium and large EEIT companies, totaled 462 companies, rather than a sample for the following reasons:

- Medium to large size companies have greater potential in gaining benefit of implementing VBM tools more than its costs. As a result, the companies could apply or make use of the knowledge gained from this research study more than the small size companies.
- The whole population classified under medium and large size categories of 462 companies within manageable proportion for this kind of research.
- Since the entire population of medium and large size companies is being used in the survey, the estimates should reflect the population parameter, as a consequence an appropriate level of precision and confidence is achieved.
- The researcher's time and resources allowed an approach to be made to the entire medium and large size EEIT companies.

3.5 Data collection

For business research, several methods are used to collect data. The selection of the methods depends on the type of the research design being conducted. Data collection could be by experiment, observation and survey or from secondary sources. The choice of data collection methods depends on the facilities available, the degree of accuracy required, availability of time and resources and expertise of researchers (Sekaran 2003). This section will discuss the selected methods that were used to collect data for this research.

3.5.1 Sources of data

Data can be obtained from primary, secondary, or tertiary sources. Primary data refer to information obtained first-hand by the researcher on the variables of interest for the specific purpose of the study. This new or primary data are used to answer specific research questions. Individuals, focus groups and panels in which respondents are asked to

answer specific research questions and from whom opinions may be sought on specific issues from time to time are the sources of primary data (Blaikie 2003).

Secondary data refer to information gathered from sources already existing such as annual reports of companies, government publications of economic indicators, industry studies and syndicated information services as well as traditional books and journals found in libraries (Zikmund 2000). The advantage of secondary data sources is saving in time and cost of acquiring information; however, it is quite often that secondary data is obsolete and may be inconsistent with the aims the researcher wished to pursue (Sekaran 2003).

Tertiary data are the information that has been analyzed by either the researcher who generated them or an analyst of secondary data, in which the raw data may not be available, only the results of the analysis (Blaikie 2003). Sources of tertiary data are such as the report of analysis on census by government agencies where access to the original data set may not be possible and officially collected statistics such as tables of data that have summarized, categorized, or have been involved in manipulation of raw data. With tertiary data, the researcher should be more selective when using it. The further the researcher is removed from the original primary data, the greater possibility the risk of unintentional or deliberate distortion.

To conduct this research, primary data gathered from individuals through a mail survey, was suitable to answer the research questions. The Head of finance/accounting departments of EEIT were the primary sources of data for this research. However, even if this research aims to gain new information, the existing information of the EEI Directory Year 2003-2004 was served as the source of secondary data for this research. The main purpose of the EEI Directory was to provide names and contact addresses of the companies to create a business link within the industry. This information was previously gathered and recorded for purposes other than the one for this research, but can be used in this research. Tertiary data sources are such as government reports of economics, industrial census and statistics data were used to support the explanation about the survey objective described in Section 3.3 page 84.

3.5.2 Data collection methods

Data can be collected in variety of ways, in different settings – field or laboratory – and from different sources (Salkind 2000). Data collection methods can be categorized in three main categories, namely, observation, experimental, and survey methods.

Observation methods: Observation methods are unobtrusive and involve gathering information about people's behavior without their knowledge, as a result it provides rich data and insights into the nature of the phenomena observed (Ticehurst & Veal 2000). The main advantage of observation methods is that it records behavior without relying on reports from respondents. Therefore it is more reliable and free from respondent bias (Sekaran 2003). However, the observation method has a limitation in that it cannot be used to observe cognitive phenomena such as attitudes, intentions, and expectations (Zikmund 2000).

Experimental method: Experimental method is a study in which the researcher might conduct the study in natural settings, or create an artificial setting. The researcher controls some variables and manipulates the independent variable to establish cause-and-effect relationships (Sekaran 2003). Manipulation provides a basis for isolating causal factors, so that extraneous variables cannot come into play (Zikmund 2000). An experimental method operates where there are dependent and independent variables and the dependent variable has to be controlled, while the independent variable is not controlled.

Survey method: Survey method is one of the most common tools used to collect primary data from a representative sample of individuals (Punch 2003; Sekaran 2003; Zikmund 2000). Zikmund (2000) defined survey method as a method in which information is gathered from a sample of people by use of a questionnaire. Questionnaire survey or interviews survey are commonly used to collect data by telephone interview, face-to-face, mail survey and through other communication media. The term sample survey is often used since the survey is expected to obtain a representative sample of the target population (Salkind 2000; Zikmund, 2000).

Although survey methods provide quick, inexpensive, flexible, efficient and accurate means of assessing information about the population, it may contain some errors (Zikmund 2000). Response error could arise from some imperfect aspect of the research design or from a mistake during the execution of the research such as during random sampling (Zikmund 2000). When conducting surveys, the researcher should be aware of various forms of errors as a result of sampling and should try to minimize errors to maximize the information content and provide generalized results. The relative advantages and disadvantages of the four commonly used survey methods are summarized and reviewed (see Table 3.6).

For this research study, a mail survey questionnaire method was chosen because of the following benefits and advantages:

- i. Mail survey is cost effective, especially when it involves a large sample size (Ticehurst & Veal 2000).
- ii. Mail survey allows highly confidential questions to be conducted
- iii. It allows the researcher to gather new data that is suitable to answer the research questions
- iv. It allows contact with normally inaccessible executives such as the Head of Financial and Accounting Department
- v. It allow respondents time to think about their replies which minimize the possibility of researcher bias and is appropriate for reaching a geographical dispersed population (Ticehurst & Veal 2000; Zikmund 2000), as in this study where the respondents are spread throughout Thailand.

In contrast with a mail survey, personal and telephone interviews are costly and do not match a large size sample survey. Moreover, they are not flexible in a dispersed geographical area and some other limitations summarized in Table 3.6. An e-mail survey, even though it has become more popular recently, the follow-up process is more complicated than a mail survey and if the respondents can be identified, they may not feel comfortable in responding to the questionnaire, thus causing a lower response rate.

The researcher is aware that a mail survey has some limitations or disadvantages, such as slow speed in collecting data and lower response rates compared to other survey methods. Further, there is no assurance that the “right” respondents will fill out the questionnaire or all questions in the questionnaire will be answered (Zikmund 2000). Ticehurst and Veal (2000); Sekaran (2003) stated that the 30 per cent response rates are considered acceptable, but questions must be raised as to their validity when 70 per cent of the target sample is not represented.

To overcome the limitations or disadvantages of using mail survey, the researcher undertook the following:

- i. Respondents were able to choose to participate and had the right not to complete the questionnaire or to withdraw at any time.
- ii. To achieve a high response rate, an introduction letter from the research supervisor and a covering letter from the researcher were used to state the purpose of study and to induce the respondents to complete and return questionnaire

- iii. Covering letter states that the data received from the companies would be kept anonymous and confidential this is to assure that the respondents' identities and company's information will be not be explicitly reported.
- iv. A prepaid postage stamp and self-addressed returned envelope were used to increase the response rate.
- v. Interesting and carefully designed questions assist to simplify responses, arranging the questions in a structured and a good-looking survey questionnaire can also maximize the cooperation of the respondents.
- vi. A follow-up strategy such as sending a reminder message via a reminding letter to companies also increase the response rate (Zikmund 2000).

Table 3.6: Summary of advantages and disadvantages of survey methods

Factors	Personal Interview	Telephone Interview	Mail Survey	E-mail Survey
Cost	Medium to expensive	Medium	Cheapest	Cheap
Speed of collecting data	Moderate to fast	Fast	Slow; Researcher has no control over the return of questionnaire	Instantaneous
Geographic flexibility	Limited to moderate	High	High	Worldwide
Sample size coverage	Small	Small to medium	Large	Large
Length of Questionnaire	Medium to long	Medium	Varies depend on incentive	Modest
Respondent cooperation (percentage of return)	Excellent	Good	Moderate; Poorly designed questionnaire will have low response rate	Varies
Possibility for respondent misunderstanding	Lowest	Average	High	High
Item non-response	Low	Medium	High	None; can use software to assure all items are response
Anonymity of respondent	Low	Moderate	High	Respondent can be anonymous or known
Ease of Follow-up	Difficult	Easy	Easy; but takes time	Difficult
Degree of researcher influences on answers	High	Moderate	None; Researcher is absent	None

(Source: adapted from Zikmund 2000, p. 212)

3.5.3 The survey administration

This research survey was administered as:

- The number of EEIT companies in Thailand, according to the record of the Electrical and Electronics Institute, is 1,760 companies (Electrical and Electronics Institute 2002). That represents the EEIT population as a universe. This research conducted a mailed survey of 462 both medium and large size EEIT companies listed in the *EEI Directory Year 2003-2004*. Small size companies were not chosen in this research because these companies were unlikely to use the VBM, due to the high cost of implementation and the benefit gained from the VBM is too low, as a result the return on investment in applying such performance measurement tools is not effective and too costly.
- In total, there are 492 medium and large size EEIT companies (Electrical and Electronics Institute 2002). However, only 462 medium and large size EEIT companies participated. The reasons that 30 companies did not participate in the survey are as follows: 1) Nine companies already participated and in the pre-test of this research, therefore were not available for the survey. 2) The researcher checked and updated the information of the EEI Directory with the Electrical and Electronics Institute, Thailand on April 23, 2004 to provide an accurate number of companies and their addresses for mailing, and found the following information regarding the EEIT companies: Seven companies closed down, five companies had merged and new addresses were not yet updated in the EEI Directory, five companies closed down their plants and moved to other countries, and four companies' addresses were unknown after they moved to new plants/office within the country.
- The Head of finance/accounting departments of these 462 EEIT companies were the research respondents. These 462 EEIT companies comprises of 260 medium size companies, and 202 large companies. These 462 companies could represent the enterprises of EEIT, and represent about 26.25 per cent of the total EEIT industry. Since these medium and large size companies are more likely to apply the more sophisticated performance measurement tools such as VBM tools, therefore, they are chosen as the survey object for this study.
- The survey of 462 companies is manageable in size, cost and time. The survey took total of six weeks (from June 14, 2004 to July 28, 2004) for the data collection period.

- The questionnaire was submitted to the Southern Cross University Human Research Ethics Committee (HREC) for approval according to the University's code of research ethics. The research questionnaire was approved on May 5, 2004. HREC approval number ECN-04-48 (see Appendix A).
- The questionnaires were photocopied at a copy center in Bangkok, total of 463 copies were made. Four hundred sixty-two copies of questionnaires were delivered to target respondents in labeled address envelope and sent out on June 14, 2004. The target respondents were the Head of finance/accounting departments of medium and large size companies listed in EEI Directory Year 2003-2004.
- The first response came in June 25, 2004. On June 28, 2004, the reminding letter to respondents was sent to increase the response rate (see Appendix E). On July 31, 2004, the data collection stage was concluded, a total of 141 questionnaires were returned with no incomplete answer.
- Data coding and tabulation / SPSS-data entry was carried out in Bangkok and finished on August 15, 2004, stored in a 256 MB thumb-drive ready for further analysis. The data file was checked for accuracy by SPSS to examine Univariate descriptive statistics for each variable and to verify there were no out-of-range values for variables.

3.6 Questionnaire design

A questionnaire which is a communication medium for data collection consists of a set of written questions for the respondents to answer (Baumgartner & Strong 1998). Questionnaire is commonly used as an instrument to collect data from respondents. The design of the questionnaire is, therefore, one of the critical stages in the survey research process (Zikmund 2000).

3.6.1 Questionnaire construction

Sound questionnaire design principles should focus on three areas (Sekaran 2003). First, the language and wording should be simple. Second, the question sequence and the layout or appearance should be designed to interest respondents and keep them involved. Third, the formulation of question should be carefully phrased, so that the respondent can respond to the questions and the responses made easier to code, tabulate, and interpret. Each of these three areas is explained as follows:

First, language and wording used in asking questions. It is essential to word the questions in a way that can be understood by the respondent. Questions asked should not be too long, as respondents tend to get tired or lose interest in answering long questions. The questions should not lead or be loaded to suggest answers to the respondents. The language, the choice of words, the usage of terms and idioms in different cultures is also important in achieving validity of the survey information collected (Sekaran 2003). Examples of simple short questions used in this research questionnaire are:

- 1) What is the structure of your business?
- 2) At the end of year 2003, how long has your company been in business?
- 3) How many full-time employees does your company have at the end of year 2003?

The language used in this research questionnaire was kept simple and provided in English. An introduction letter from the research supervisor and a covering letter were also sent to introduce the researcher, the purpose of the research survey and the importance of the results from the survey while assuring the respondent confidentiality (see Appendices B, C, and D). Only the covering letter from a researcher was translated into Thai so that the respondents could clearly understand the research purposes before they answered the questionnaire.

The original covering letter was prepared in English by the researcher, but was translated into Thai by a Thai senior marketing research analyst, who has been fluently using English and Thai in her career. Although English is the analyst's second language, her professional knowledge of English and Thai business term is most appropriate. It is important since the translator needed to understand the meaning of the English version of covering letter. Further, an American-English lecturer, someone different from the original translator, undertook back-translation (from Thai to English). The purpose of translation was to assure that the respondents clearly understand the research purposes stated in the covering letter and to feel assured that the questions being asked in the questionnaire were used only for the research purposes.

Second, the question sequence and the appearance of the questionnaire can affect the response rate (Zikmund, 2000). The opening questions should be interesting and simple to comprehend to warm up respondents toward the questionnaire. Demographic questions were asked at the end of the questionnaire, so that the respondents did not feel threatened or embarrassed (Baumgartner & Strong 1998). The layout of the questionnaire should be

designed to appear as brief, neat, clean and easy to follow, so that respondents can easily understand what they are required to do so that, in turn, the rate of return can be increased (Zikmund 2000).

This research questionnaire was designed to appear as a brief three pages, a total of 15 questions and was separated into two sections. The question sequence in this questionnaire begins with easy-to-answer questions to involve respondents' cooperation. Words and instruction used were kept simple and understandable to respondents to assist respondents to complete all questions (see Appendix D). The first section, Section One, dealt with questions about the company and the organization factors that influence the adoption of VBM in organization. The purpose of questions in this section was to test linkages between the organization factors and the introduction of VBM tools. In the latter section, Section Two, demographic questions were asked so that the respondents would not feel threatened at the beginning of the questionnaire.

Third, the construction of the type of questions and measurement scales used in the questionnaire are crucial in determining how the researcher wants each question to be answered. The type of questions refers to whether the question will be open or close-ended (Sekaran 2003). Open-ended questions allow respondents to answer them in any way they choose. Closed-ended questions, in contrast, ask respondents to make choices among a set of alternatives provided by the researcher (Zikmund 2000). The questions asked in this research all consisted of closed-ended questions, a total of 15 questions, in which the respondents were asked to choose the one closest to his/her own viewpoint. This research chose closed-ended questions to ensure that the alternatives are mutually exclusive and to code the information easily for subsequent analysis (see Appendix D). An example of the closed-ended question used in this research questionnaire is:

To answer each question, simple put a “✓” in the box that is closest to your opinion.

3) How many full-time employees does your company have at the end of year 2003?

- | | |
|--|--|
| <input type="checkbox"/> a) Less than 50 | <input type="checkbox"/> d) 150 to less than 200 |
| <input type="checkbox"/> b) 50 to less than 100 | <input type="checkbox"/> e) 200 to less than 250 |
| <input type="checkbox"/> c) 100 to less than 150 | <input type="checkbox"/> f) 250 and above |

In addition, the researcher must determine the best way to measure what is to be investigated by determining the measurement scale used in quantifying the value. The type of measurement scale used in business research determines the form of statistical analysis to be used after receipt of the responses (Sekaran 2003; Zikmund, 2000). Generally, there are three types of measurement scales used namely; categorical, ordinal,

and interval scales (Zikmund 2000). A categorical scale, sometimes called a nominal scale, is the simplest type but has no intrinsic ordering. An ordinal scale is similar to a nominal scale, but the difference between the two is that there is a clear ordering of scales. Even though the order can be classified, however, it is hard to determine whether the space between each level is equal. An interval scale is similar to an ordinal scale, except that the intervals between each level are equally spaced and is the scale mainly used in this research. An example of the interval scale used in this research questionnaire is:

- 4) What are the total assets such as current assets and fixed assets (in Million Thai Baht, THB) of your company at the end of year 2003?
- | | |
|--|--|
| <input type="checkbox"/> a) Less than 1,000 | <input type="checkbox"/> d) 9,000 to less than 13,000 |
| <input type="checkbox"/> b) 1,000 to less than 5,000 | <input type="checkbox"/> e) 13,000 to less than 17,000 |
| <input type="checkbox"/> c) 5,000 to less than 9,000 | <input type="checkbox"/> f) 17,000 and above |

Besides these three types of scales, an attitude measurement, like a Likert scale and graphical scale, is also important in business research since it has a number of choices dealing with attitude scales (Zikmund 2000). The researcher should consider several questions and consider the advantages and disadvantages of each attitude scale by comparing it with the research problem definition. An example of the Likert scale used in this research questionnaire is:

- 9) Based on the following indicators, how did your **organization perform** in year 2003 in comparison to that of year 2002?

Organization Performance	Very Much Worse [1]	Worse [2]	No Different [3]	Better [4]	Very Much Better [5]
Indicators					
i. Growth in Sales or in Revenues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii. Profit Margin = net income / sales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Questions in the questionnaire need to be linked to the research problem and research question that relates to the field of study. The linking of research questions, hypotheses and the appropriate questionnaire questions, are indicated in Table 3.7. Demographic factors, even though not include as part of the variables in this research theoretical framework, were also gathered since they can be used to describe the sample characteristics in the report written following the data analysis (Sekaran 2003). The research problems were stated in Chapter One, but are restated as follows:

1. What are the organization factors that could influence the selection and the use of the performance tools, in particular Value Based Management, to measure organization performance? And
2. Do the selection and the use of Value Based Management improve the organization performance?

From the research problem, three research questions (RQ) were identified and the research model was proposed in Chapter Two (see Figure 2.8 page 65). These research questions are used to develop hypotheses to find out which factors influence the selection and the use of the tools such as VBM tools and whether the VBM is a better tool to assess organization performance (see Table 3.7).

3.6.2 Justification of questions in the questionnaire

Chapter Two reviewed the related literature and other relevant research about the variables that were used to build the research model (see Section 2.7 page 67). Table 3.7 indicated the linkage between the hypotheses and the questions that appeared in the questionnaire (see Appendix D). In this next Section, the justification for each research variable represented in the questionnaire is discussed as follows:

3.6.2.1 Independent variables (IV)

In quantitative research, the central interest is the relationship between variables, rather than in just describing the variable (Punch 2003). The most common conceptual framework for quantitative research is to look for the causal relationships among variables, where one is the 'cause' and the other is the 'effect'. The independent variable is the cause that influences the dependent variable, or the effect, in either a positive or negative way (Sekaran 2003).

This research selects three independent variables, where all three represented organization factors and were described in Section 2.4 page 41. The objective of this research is to find out whether these factors caused the selection and the use of VBM tools that influence organization performance. These three independent variables are, in order, organization size, market share position in comparing with its competitors and product life cycle stages. These variables are then represented in the questionnaire as follows:

Table 3.7: **Linking the research questions, hypotheses, and survey questions**

Research Questions (RQ)	Hypotheses (H)	Question No.		
		IV	ITV	DV
RQ 1. Do the organization factors such as size, market share position, and product life cycle stages influence the selection of VBM tools to be used to measure its performance?	H1. <u>Organization factors</u> are not the determining factors for selecting and using Value-based management (VBM) tools for performance measurement.	See below	See below	
	<ul style="list-style-type: none"> ▪ H1a. <u>Organization size</u> is not the determining for selecting and using Value-based management (VBM) tools for performance measurement. 	4-5	8	
	<ul style="list-style-type: none"> ▪ H1b. <u>Market position</u> of organization in relation to its competitors is not the determining for selecting and using Value-based management (VBM) tools for performance measurement. 	6	8	
	<ul style="list-style-type: none"> ▪ H1c. <u>Product life cycle stages</u> are not the determining for selecting and using Value-based management (VBM) tools for performance measurement. 	7	8	
RQ 2. Does the selection and the use of VBM tools influence the performance of an organization?	H2. The Value-based management tool (VBM) selected and used by an organization does not influence its organization performance.	-	8	9
RQ 3. Do organization factors such as size, market share position, and product life cycle stages influence an improvement in organization performance through the selection and the use of VBM tools?	H3. The relationship between <u>organization factors</u> and organization performance are not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.	See below	See below	See below
	<ul style="list-style-type: none"> ▪ H3a. The relationship between <u>organization size</u> and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance. 	4-5	8	9
	<ul style="list-style-type: none"> ▪ H3b. The relationship between <u>market position</u> and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance. 	6	8	9
	<ul style="list-style-type: none"> ▪ H3c. The relationship between <u>product life cycle stages</u> and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance. 	7	8	9
<i>Notes: IV = Independent Variables, ITV = Intervening Variable, DV = Dependent Variable</i>				

(Sources: Developed for this research)

Organization size: Total sales (or total revenue), total assets, or number of employees, or a combination of all three are used as measures of organization size. In the

research questionnaire, respondents are asked to indicate the level of their total assets and total annual revenue to represent organization size in the questionnaire. The number of employees was not chosen, since this research is to observe the electrical and electronic industry, which is classified as manufacturing industry. Thus, fixed assets rather than number of employees are used to classify the size of the industry. Further, the utilization of assets, and ability to generate earnings could be interpreted into financial indicators that are more relevant for this research such as turnover, return on assets, profit margin and percentage growth in sales when measuring organization performance.

Market share position: The market position of organizations is used as one of the research independent variables. This research questionnaire asked the respondents to indicate how they perceived the market share of the company in relation to its competitors in EEIT. By observing the percentage of the market share that they think they share, the position of organization can then be categorized as in a strong, average, or weak financial position, compared to its competitors.

Product life cycle stages: the stages in product life cycle could be a determining factor in selecting VBM tools and could be one factor that influences the performance. In the questionnaire, respondents are asked to indicate the stage of the product life cycle of the top product in term of highest revenue collected for their organization.

3.6.2.2 Intervening variable (ITV)

An intervening variable, by definition, is the variable that intervenes between the independent and dependent variables, which helps in explaining the influence of the independent variable on the dependent variable (Baumgartner & Strong 1998; Sekaran 2003).

In this research, 'the selection and the use of the Value-based management (VBM) tools' is the intervening variable. From Section 2.5 page 47, six VBM tools were studied and were asked in the questionnaire to observe whether an organization selects these tools and if it does, to what degree have such tools been used in the organization. These six VBM tools are: Free cash flows (FCF), cost of capital (COSTCAP), return on invested capital (ROIC), economic value added (EVA), shareholder value added (SVA) and cash flow return on investment (CFROI). Respondents are asked to indicate the extent in which each VBM tool was selected or used in their organization. It is true that some of these tools are less sophisticated than others and not all VBM tools are selected and used in an organization. The purpose of this study, therefore, is not to find out which VBM tool is

more favorable than others, but the important fact is to find whether an organization is moving toward the Value-based management by selecting and using VBM tools.

3.6.2.3 Dependent variable (DV)

The dependent variable, or outcome variable, is the variable that is influenced or predicted by one or more independent variables. The dependent variable is the variable of primary interest to the study and is to be explained (Blaikie 2003; Sekaran 2003).

From Section 2.6 page 63, organization performance is proposed as the dependent variable for this research. Respondents are asked to indicate by self-rating their organization performance in the questionnaire. Five key performance indicators were used to indicate financial performance of the organization; these are percentage growth in sales, profit margin, total assets turnover, return on assets and debt ratio. These combined indicators, how the improvement performance of organization. The use of organization performance indicators was conceptually consistent with the research by Ryan and Trahan (1999).

3.6.3 Pre-testing the questionnaire design

Zikmund (2000) defined pre-testing or pilot testing, as the administration of a questionnaire to a small group of respondents, which allows researchers to detect ambiguity or bias in the questions. Pre-testing serves as a trial run of the questionnaire to see if it is in further need of revision. The objectives of a pre-testing are:

- a. To ensure that the respondents understand the questions
- b. To determine whether the questions provided appropriate and/or needed data
- c. To familiarize the researcher with questionnaire administration procedures
- d. To rectify any inadequacies, in time, before the actual questionnaire was being administered, thus reducing bias
- e. To obtain a set of data for trying out the proposed data treatment techniques, and
- f. To first determine the reliability and the validity of the questionnaire (Baumgartner & Strong 1998; Sekaran 2003).

The pre-testing sample should be a group of respondents selected on a convenience basis and similar in makeup to the one that ultimately will be sampled (Zikmund 2000). The pre-testing respondents should not be too divergent from the actual respondents, so that the results of the pre-test will help the researcher to see whether the questionnaire meet the objectives of the research.

In this research, a pre-testing sample of 12 was chosen and the questionnaires administered. The pre-test was carried out by personal interview to observe the person filling out the questionnaire and to ask for the respondent's comments. Several changes were made to the questionnaire as a result. The pre-test was first undertaken during March 12-16, 2004, on three academicians who provided information that was used to rephrase some questions to make it clearer, but not to be specific, also to assess the length of time taken in answering the questionnaire and check for face validity. The reviewed questionnaire was then presented to a pre-test sample of nine Heads of Finance/Accounting Departments of EEIT companies who provided insights, which were used to adjust the questionnaire during May 7-20, 2004. These nine EEIT companies, after participating in the pre-test, did not participate in the final survey sampling.

3.7 Ethical considerations

Ethical considerations are important in academic and business research, as in any other field of human activity (Ticehurst & Veal 2000). Research ethics play an important part in the planning, design and conduct of research projects and in reporting results. The principles underlying research ethics deal with such topics as plagiarism and honesty, but additional issues such as respect of the rights of individuals arise when the research involves human subjects (Zikmund 2000). Ethical concerns in business research involve protecting the rights and obligations of the respondents or subjects. The respondent's rights include privacy and being informed about all aspects of the research and to provide honest answers and cooperation and the right to the safeguarded (Zikmund 2000).

Ethical considerations were addressed in this research by adhering to the Southern Cross University's code of research ethics. An application that included the questionnaire used in this research was made to the Southern Cross University Human Research Ethics Committee for approval according to the University's code of research ethics and the application was approved on May 5, 2004, approval number ECN-04-48 (see Appendix A).

The researcher's ethical obligations for this research study are the following:

- Adhering to the purpose of the research.
- Maintaining high standards to ensure the accuracy of data via objectivity and scientific investigation.
- Not misrepresenting the statistical accuracy of data, nor overstating the significance of the results by altering the findings. The researcher has an

obligation to analyze the data honestly and to report correctly the actual data collection methods.

- Protecting the right to confidentiality of the respondents.
- Avoiding shading the research conclusions that is not in line with the obligations to report accurate findings.

3.8 Reliability and validity

Reliability and validity are two essential characteristics of a good measurement tool (Zikmund 2000). The assessment tools that will be used to test the hypothesis must be reliable and valid; otherwise the researcher may act incorrectly in accepting or rejecting the research hypothesis (Salkind 2000). The relationship between reliability and validity is straightforward. A test can be reliable but not valid, but a test cannot be valid without first being reliable. In other word, reliability is a necessary, but not sufficient condition of validity (Salkind 2000). Therefore, the criteria of reliability and validity were considered carefully in this research since reliability is a necessary condition for validity and only a reliable and valid instrument will yield accurate results. The reliability and validity are now described in this Section.

3.8.1 Reliability

Zikmund (2000) refers to reliability as a measure when similar results are obtained over time and across situations. Reliability tests the consistency and stability of a measurement instrument or a test (Punch 2003). It is the degree to which measures are free from error and therefore yield consistent results across time and across the various items (Sekaran, 2003; Zikmund 2000). Two dimensions that underlie the concept of reliability are repeatability and internal consistency with which the instrument measures the concept and helps to assess the goodness of a measure (Salkind 2000; Zikmund 2000). In assessing repeatability, the test-retest method and parallel-form method are used (Sekaran, 2003). In measuring internal consistency, a split-half method and Cronbach alpha method are used.

This research used Cronbach alpha to measure reliability. The Cronbach alpha is a commonly used method to examine the reliability coefficient, within a particular set of items, by correlating performance on each of the items in a test or a scale with overall performance on the test or scale across participants (Salkind 2000; Sekaran 2003; Zikmund 2000). Cronbach alpha is computed in terms of the average intercorrelations among the

items measuring the concept (Sekaran 2003). The closer Cronbach's alpha is to 1, the higher the internal consistency reliability (Baumgartner & Strong 1998; Zikmund 2000).

Reliability estimates for the measures of variables were computed using the software package SPSS version 10. The results are presented in Chapter Four before subjecting the data from a specific scale to further analysis; this is to ensure that the data being analyzed were reliable.

3.8.2 Validity

Zikmund (2000) refers to validity as an ability of the measuring instrument to measure what it is intended to be measured. Ticehurst and Veal (2000) refer to validity as the extent to which information collected in a research study truly reflects the phenomenon being studied. If the measuring instrument does not measure what is designed to measure there will be problems. Validity is an issue of research concern, since validity determines the confidence researchers have in the results/outcomes of the study. The way that the questionnaire was examined for validity is to examine whether the questions focus on the results of the study and whether the results are understood within the context of the research's purpose (Punch 2003; Salkind 2000). A validity test is usually undertaken to check if what has been measured is what was intended. There are several types of validity tests:

Content / Face Validity: Content validity is a measure of how well the items represent or tap the concept (Sekaran 2003). Zikmund (2000) refers to content validity as the professional agreement that a scale logically appears to reflect accurately what it intended to be measured. To establish the content/face validity for this research, previous studies were reviewed to identify possible items to be included in the scale, experts in the research fields were consulted to obtain their comments on the measurement instrument, then the measurement instrument were pre-tested on a group of respondents similar to the population being studied, to see whether revision is needed before modifying the measurement based on the feedback from the pre-test (Salkind 2000).

Criterion Validity: Criterion validity is the ability of a measure to correlate with other measures of the same construct (Zikmund 2000). Criterion validity measure how well the scores on a test are related to the scores on another that has already established the test to the administered at the present time or in the future Salkind (2000). It is used as a confirmatory measure to evaluate the validity of ability test such as skills and aptitude tests.

Construct Validity: Salkind (2000) refers the construct validity as an extent to which the results of a test are related to an underlying construct. Construct validity examines whether the empirical evidence or a test score relates to some underlying theory or set of related variables. Zikmund (2000) defines construct validity as the ability of a measure to confirm a network of a related hypothesis generated from a theory based on concepts. Construct validity occurs during the statistical analysis of the data.

Content/face validity was undertaken in this research study to ensure that the questionnaire designed would collect the required information to answer and solve the research questions and problem. To establish the content validity, the researcher reviewed previous studies and identified possible items used by other researchers to be included in the scales used. Expert opinions were sought from other researchers with an interest in the same field of this research study. The scales were then developed and tested on a group of respondents similar to the sample of study. With opinions and feedback from previous studies, the research experts, and the pre-test respondents, the measurements were modified. With the modification, a reasonable degree of confidence of the content validity was achieved.

3.9 Data processing procedures

The objective of applied business research is to solve some social or practical problem, and to identify whether the desired outcomes were achieved and to establish an understanding or explanation (Sekaran 2003). The research design specified the methods that were transferred into action in collecting the data. Such raw data cannot be used to reach conclusions or make decisions until they are converted into information in a format suitable for decision-making (Zikmund 2000). The procedures in converting raw data into information include editing, coding, data entry and data analysis. These procedures are discussed in the next Section.

3.9.1 Editing

Editing involves a process of checking and adjusting the data and making it ready for coding and transfer to data storage. The purpose of editing is to ensure the completeness, consistency and reliability of data (Zikmund 2000). Editing can be of two types: field editing and in-house editing. Field editing is conducted with the interviewing methods, while the in-house editing investigates the results of data collected in the mail questionnaires.

In this research, upon receiving mail questionnaires from the field, in-house editing was carried out to check for errors and omissions in the questionnaires, then adjustments were made to make the data more complete, readable and consistent before coding.

3.9.2 Coding

Coding is the process of identifying the data from the mail questionnaires using numerical scores or other character symbols, then transcribing these scores or symbols onto the computer (Sekaran 2003; Zikmund, 2000). There are two procedures in coding pre-coded questions and open-ended questions. The code of pre-coded questions is numbered against the answer. Where the answer is already a number, there is no need to code the answer, because the computer can handle the numerical answer. Generally, only one answer is possible, therefore only one code is recorded for an answer to the question. In the case of open-ended questions, a small sample of a total number of replies to a particular question may be tallied to construct categories for coding (Ticehurst & Veal 2000). The decisions about how many categories are acceptable depend on the purpose of the study and the limitations of the computer program and plan for data entry (Zikmund 2000).

In this research pre-coded questions were used. A numerical score was assigned to each answer. Since the questions are closed-ended question, therefore, for each question, the respondent is asked to select only one answer that is closest to his/her opinion, where the code was assigned. After completing the editing procedures, the code for each answer was then transferred to data storage as presented in Table 3.8.

3.9.3 Data entry

Zikmund (2000) defined data entry as a process of transferring data from a research project to computers. Transferred data include answers from the mail survey questionnaire. There are several alternative means of entering data, such as an optical scanning system, direct entering data into computers at the moment they are collected and manually keyboarding into computer (Sekaran 2003). When using a keyboarding process to transfer data, the researcher must be aware that errors can occur. To ensure accuracy in transferring data, the process of verifying data should be applied by a second keyboard operator, who is different from the original keyboard operator, to check the accuracy of data entered (Zikmund 2000).

In this research, the first keyboard operator (the researcher) manually keyed data into the computer, while a second keyboard operator verified the data entered to ensure accuracy before the data are ready for analysis. This research used Statistical Package for Social Sciences (SPSS) for Windows version 10.0-computer package for data entry before further analysis.

Table 3.8: Identification of questions and variable codes

Questions as Listed in the Questionnaire	Codes
1) What is the structure of your business?	STRUCBUS
2) At the end of year 2003, how long has your company been in business?	YROPERAT
3) How many full-time employees does your company have at the end of year 2003?	FEMPLOY
4) What are the total assets such as current assets and fixed assets (in million Thai Baht) of your company at the end of year 2003?	TOASSET
5) What is the total annual revenue (in million Thai Baht) of your company for year 2003?	TRVENUE
6) What is your company's market share in the electric and electronic industry?	MKTSHR
7) Given below are the four stages of a product life cycle, please indicate at which of the 4 stages are the top product (in term of the highest revenue collected) of your company.	PRDLIFCY
8) To what extent does your company use the following tools to measure its financial performance in year 2003? <ul style="list-style-type: none"> - free cash flow - cost of capital - economic value added - shareholder value added - return on invested capital - cash flow return on investment 	FCF COSTCAP EVA SVA ROIC CFROI
9) Based on the following indicators, how does your organization performed in year 2003 in comparison to that of year 2002? <ul style="list-style-type: none"> - growth in sales or in revenues - profit margin - total assets turnover - return on assets - debt ratio 	GRWSALE PROFITM TATO ROA DEBT
10) What is your gender?	GENDER
11) What is your marital status?	MARITAL
12) What is your age?	AGE
13) What educational level have you obtained?	EDUCAT
14) How long have you been working with this company?	YRWORK
15) How long have you been working in this current position?	YRPOSITN

(Source: developed for this research)

3.9.4 Data analysis

Once the data was edited, coded and entered into the computer, data analysis was undertaken. Analysis is the application of reasoning to understand and interpret the data

that have been collected about the subject (Zikmund 2000). Sekaran (2003) determined the three basic objectives in data analysis as:

- 1) To check the preliminary ideas of frequencies, central tendency and dispersion,
- 2) To test the goodness of data in term of reliability and validity, and
- 3) To test whether the hypotheses are substantiated.

In this research the SPSS version 10.0 was used to analyze the data. The common analytical tools used to analyze the collected data in this research are descriptive statistics and inferential statistics. Descriptive and inferential statistics are quite different from one another, but work hand in hand. Descriptive statistics are used to describe or summarize information about the characteristics of the sample (Salkind 2000; Zikmund 2000). In order to summarize such information, tabulation is used to show how one variable relates to another by arranging the information in a table or other summary format (Zikmund 2000). Descriptive statistics included the calculation of median, mode, mean, standard deviation, range, quartile, bar graphs and pie charts.

After the descriptive analysis stage, a researcher generally applies inferential statistics. Inferential statistics are used to make inferences or judgments about a population on the basis of a sample (Zikmund 2000). Inferential statistics also help to establish relationships among variables, in which the conclusions are drawn and decide whether the collected data relates to the original hypotheses (Salkind 2000). The techniques used to analyze the data and to draw the conclusions in this research is described in the next Section.

3.10 Analytical techniques

After the data have been collected through questionnaires, edited, coded, entered, they need to be analyzed and to test the research hypotheses. Data analysis techniques and how these techniques used in this research are explained as follows:

3.10.1 Factor analysis

Factor analysis is a tool that is part of the multivariate statistical technique to extract information from large databases and identify the interrelated data (Hair et.al. 1998). Factor analysis points to the interesting relationships that might not have been seen from examination of the raw data alone or even a correlation matrix. The two primary uses for factor analysis are to summarize the data and data reduction (Blaikie 2003; Hair et.al. 1998). In summarizing the data, factor analysis describes the data in a smaller number of

concepts than the original individual variables. It summarizes the characteristics of variables with a clearer picture of which variables may act together and how many variables might be expected to have impacts in the analysis. For data reduction, factor analysis assists in calculating the scores for each underlying dimension and substituting them for the original variables. It provides an empirical basis for assessing the structure of the variables and the potential to create new composite variables as replacements for the original variables, or selecting a subset of representative variables for further analysis. In either case, the researcher must know how the variables are interrelated to better interpret the results.

In this research, factor analysis was primarily applied before other statistical analyses. This is to **reduce or extract the data** from total original variance into a smaller number of factors or derive a new composite factor for further analysis and hypothesis testing, using the principal components analysis method (PCA) provided with the SPSS Version 10.0 for Windows. The two groups of variables applicable for factor analysis were the VBM tools, which are the research intervening variables and the organization performance indicators, which are the research dependent variables.

In conducting factor analysis, this research observes the correlation matrix to ensure there are sufficient correlations to justify the application of factor analysis. The Bartlett test of sphericity was used to determine the appropriateness of factor analysis; the measure of sampling adequacy (MSA) was also used to identify whether the intercorrelations among variables are appropriate. The MSA should range from 0 to 1, reaching 1 when the variable is perfectly predicted without error. For example, the MSA for VBM tools tested in this research were at 0.789 which indicated that it is greater than the critical value of 0.6, meaning that it is appropriate to proceed with factor analysis (see Table 4.11, page 145). The eigenvalue and scree test were applied to assist in selecting the number of factors retained for interpretation. Only factors that have an eigenvalue greater than 1 are considered significant. For instance, the result in Chapter Four indicated the eigenvalue of VBM tools was 3.084, and the eigenvalue of organization performance was 3.541, both are greater than 1, thus they are significant (see Table 4.13 page 146 and Table 4.18 page 149). The scree test is used to identify the optimum number of factors that can be extracted before the amount of unique variance begins to dominate the others. The results were listed in a factor matrix and communality table, in which the factor solution extracted the factors in the order of their importance, with factor 1 accounting for the most variance. The factor was then checked for validity to ensure that the results generalize across the

population before a decision is made between selecting the variable with the highest factor loading as a surrogate variable and creating a composite measure or summated scale which is more commonly the average score of the variables. Once the factor analysis is completed, research continues for further analysis and hypotheses testing.

An example to illustrate the use of factor analysis is presented in Section 4.4.1, page 145. This research used factor analysis for six VBM tools and extracted the factors in order of their importance, where factor 1 accounts for the strongest factor loadings. From factor analysis for VBM tools, the result appeared that there was a heavy loading on one factor (CFROI). Further, the factor analysis for organization performance indicated that there was a heavy loading on one factor (TATO). This indicated that this one factor could be used as a representative variable of, in respective order, all VBM tools and for organization performance, for further analysis and hypotheses testing.

3.10.2 Pearson's correlation coefficient

Pearson's correlation coefficient is used in this research to observe the relationship between two research variables (Coakes & Steed 2003; Sekaran 2003). The relationship between two variables can take different forms. When a high score on one variable is associated with a high score on the other variable and vice versa, a positive relationship exists. Alternatively, when a high score of one variable is associated with a low score on the other variable and vice versa, then a negative relationship exists. Sometimes there may be no relationship that means that a score on one variable is not associated with a score on the other variable. Further, the confidence level, or degree of confidence, is measured using a significant 2-tailed test to test whether the relationship is statistically significant. The significance level of 0.05 is set to indicate that there is 95 per cent confident about the population estimated. For example, Table 4.20 page 155 showed the significant relationship between CFROI and TATO of 0.197 with the significant of less than 0.05. This means that there is about 95 per cent confident in this relationship. For this research, **Pearson's correlation matrix** is used to observe a bivariate correlation (or zero-order correlation), to show the relationship between two variables (see Table 4.20 page 155) and is the common measure of linear relationship (Coakes & Steed 2003). Pearson's correlation was also used statistically to describe the association between the selection of VBM tools and the organization performance stated in Hypothesis 2.

3.10.3 Partial correlation analysis

Partial correlation provides a single measure of a linear association between two variables while adjusting for the effects of one or more additional variables (Blaikie 2003; Coakes & Steed 2003). A partial correlation analysis is used to detect a spurious correlation between two variables. A spurious correlation is one in which the correlation between two variables results solely from the fact that one of the variable is correlated with a third variable that is the rule predictor (Norusis 1993). This research conducted a partial correlation analysis to test Hypothesis 3 by examining the possible effect of the intervening variable, the selection of VBM, on the association between organization factors (independent variable) and organization performance (dependent variable). For example, the result showed in Table 4.26 page 167 that by controlling the VBM, it caused some changes in the relationship between product life cycle and organization performance.

3.10.4 Multiple regression

A review of the correlations between the independent and intervening variables, the independent and dependent variables and the intervening and dependent variables alone may not reveal the relationship between them. Regression analysis is used as an extension of a bivariate correlation. Multiple regression is a method for analyzing the relationship between a single, metric outcome variable and two or more independent variables (Blaikie 2003; Coakes & Steed 2003). For this research, the expression of **regression model** was showed as an equation to test Hypothesis 1, whether the selection of VBM resulted from the independent variables such as organization size, market share positions and product life cycle stages (Table 4.21, page 157). The regression model was:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where; Y = Dependent Variable (the Selection of VBM tools)
X₁ = Independent Variable #1 (Organization Size)
X₂ = Independent Variable #2 (Market Share Position)
X₃ = Independent Variable #3 (Product Life Cycle Stages)
β₁, β₂, β₃ = Regression coefficient for each independent variable
ε = Random error

3.11 Summary of the chapter

This Chapter addressed the research methodology adopted for this study. The research design and appropriate data collection methods were described together with the sample selection procedure and the measurement process.

The Electrical and Electronic Industry of Thailand (EEIT) will be the survey objective where stratified sampling is applied to collect data through a mail survey questionnaire. Once the data is gathered, it will be edited and input into the computer. Several analytical tools are explored:- factor analysis, Pearson's correlation coefficient, partial correlation and regression analysis from statistical software package, SPSS Version 10.0 for Windows, will be used analyze the data.

In the next Chapter, Chapter Four, the collected data will be analyzed and interpreted according to the protocol established in this Chapter.

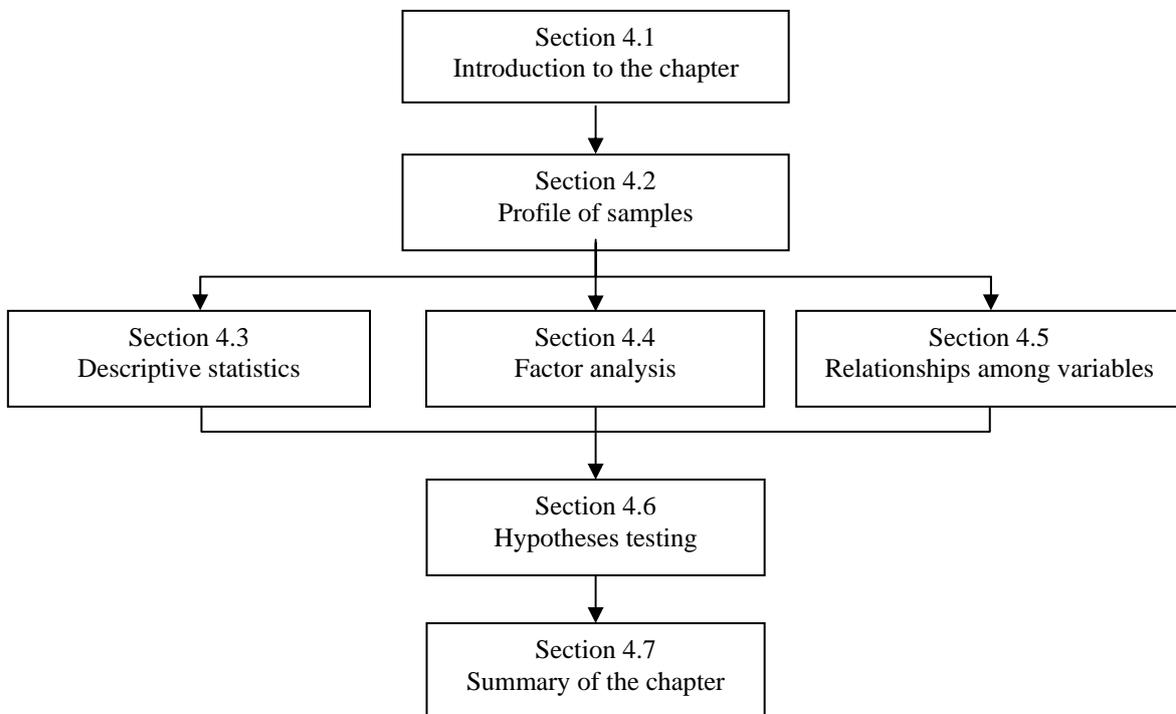
CHAPTER 4

DATA FINDINGS AND ANALYSIS

4.1 Introduction to the chapter

The previous chapter provides a detailed discussion on the research methodology applied in this study. This Chapter presents the data collected from the mail survey in tables and graphs, and provides a detailed analysis of the data collected using statistical tools identified in Chapter Three to test the three hypotheses formulated in Chapter Two. This is done in six sections. Section 4.1 introduces the structure and details of this Chapter (see Figure 4.1). Section 4.2 provides a profile of the samples and the profile for collected data. Section 4.3 provides descriptive statistics of research findings. Section 4.4 analyzes variables using factor analysis. Section 4.5 examines and determines relationship among variables, therefore, states the inferential statistics. Section 4.6 presents the hypotheses testing. Last, Section 4.7 is a summary of the chapter.

Figure 4.1: The structure of chapter four



(Source: Developed for this research)

4.2 Profile of samples

4.2.1 Data profile

In this research, a mail-surveyed questionnaire with a cover letter and postage paid, self-addressed envelope was mailed to the head of finance/accounting department of 462 Thai Electrical and Electronic companies. One hundred and thirteen questionnaires were returned within the first four weeks. A follow-up letter was sent to remind the respondents, and an additional twenty-eight questionnaires were received. In total, 141 of 462 questionnaires were returned during the six-week collection period (see Table 4.1). This represents 30.52 per cent of the medium and large size companies. All 141 returned questionnaires have no missing or incomplete answer. Consequently, the usable response rate is 30.52 per cent. A sample of 15 of non-respondents was contacted by telephone to investigate reasons for nonresponse. Two primary reasons given for nonresponse were contravening company policy and staffing constraints.

4.2.2 Accuracy of data file

The data file was checked for accuracy using SPSS to examine Univariate descriptive statistics for each variable; that is, verifying there were no out-of-range values. SPSS frequencies operation had been carried out to check the accuracy of data files and all related measures such as the means, standard deviation, median, and interquartile range were found plausible. No missing data were found in this data set.

Table 4.1: **Number of survey objects and returned survey questionnaire**

SIZES: Classified by the size of fixed assets in Thai Baht (THB)	No. of Companies in EEIT	No. of Company Surveyed	No. of Returned Survey
SMALL : Less than 50 Million THB	1,268	--	--
MEDIUM : 50 Million – 200 Million THB	283	260	80
LARGE : More than 200 Million THB	209	202	61
TOTAL	1,760	462	141

(Source: Analysis of survey data collected for this research)

4.2.3 Characteristics of samples

The profile of respondents to the survey was summarized and shown in Table 4.2. All 141 respondents are the heads of finance/accounting departments. Thirty-six of the respondents are male and the remaining 105 are females. About 60 per cent of the respondents are married. Twenty-seven per cent are below 35 years of age. The average

age of respondents are between the age group of 35 to less than 40 years old that comprise about 28 per cent of the respondents. About 45 per cent are 40 years of age and above. These latter two groups denoted a mature workforce. Sixty per cent of respondents hold bachelor degrees with 37 per cent holding master degrees. The remaining three per cent hold either doctoral degrees or are certified public accountants. About 28 per cent of respondents work in the company for at least 10 years with 23 per cent of respondents work in current position for two to four years. Only 15 per cent are working in the current position as the Head of finance/account department for less than two years. About 62 per cent are Heads of finance/account department for more than four years, which denote that they have sufficient experience that could be beneficial as an input for this research.

From the survey all are limited companies. Of these, 14 per cent are public limited companies. About 40 per cent of these companies have operated their business for at least 15 years; which indicated the stability of the business in EEIT. Forty-nine per cent of the surveyed companies have at least 250 full-time employees; about 16 per cent have 200 to less than 250 full-time employees, which indicated a large size company. About 33 per cent of the companies hired workers ranged between 50 to 200 full-time employees, indicated medium size company, and only three per cent employed less than 50 full-time employees.

Table 4.2: **Profile of survey samples**

Characteristics	Samples	Survey %
Gender:		
Male	36	25.50
Female	<u>105</u>	<u>74.50</u>
	<u>141</u>	<u>100.00</u>
Age:		
Less than 25 years old	2	1.40
25 years old to less than 30 years old	7	5.00
30 years old to less than 35 years old	29	20.60
35 years old to less than 40 years old	40	28.40
40 years old to less than 45 years old	33	23.40
45 years old and above	<u>30</u>	<u>21.30</u>
	<u>141</u>	<u>100.00</u>
Education:		
Bachelor degree	85	60.30
Master degree	52	36.90
Others (doctorate degree, and CPA)	<u>4</u>	<u>2.80</u>
	<u>141</u>	<u>100.00</u>
Years working in this company:		
Less than 2 years	12	8.50
2 years to less than 4 years	21	14.90
4 years to less than 6 years	19	13.50
6 years to less than 8 years	22	15.60
8 years to less than 10 years	28	19.90
10 year and above	<u>39</u>	<u>27.70</u>
	<u>141</u>	<u>100.00</u>
Years working as Head of Finance/Accounting Dept.:		
Less than 2 years	21	14.90
2 years to less than 4 years	33	23.40
4 years to less than 6 years	29	20.60
6 years to less than 8 years	17	12.10
8 years to less than 10 years	21	14.90
10 year and above	<u>20</u>	<u>14.20</u>
	<u>141</u>	<u>100.00</u>
Business structure:		
Company Limited	121	85.80
Public Company Limited	<u>20</u>	<u>14.20</u>
	<u>141</u>	<u>100.00</u>
Years of operating business:		
Less than 3 years	2	1.40
3 years to less than 6 years	11	7.80
6 years to less than 9 years	25	17.70
9 years to less than 12 years	20	14.20
12 years to less than 15 years	26	18.40
15 years and above	<u>57</u>	<u>40.40</u>
	<u>141</u>	<u>100.00</u>
Number of full-time employees:		
Less than 50	4	2.80
50 to less than 100	11	7.80
100 to less than 150	9	6.40
150 to less than 200	26	18.40
200 to less than 250	22	15.60
250 and above	<u>69</u>	<u>48.90</u>
	<u>141</u>	<u>100.00</u>

(Source: Analysis of survey data collected for this research)

4.3 Descriptive statistics

This section provides statistics and graphical displays that are useful for describing variables according to the sections in the questionnaire (See Appendix D). The summary of descriptive statistics is set out in Table 4.3.

In Part I of the survey questionnaire, questions were classified into three groups. The first group from questions #1 to #3 was introduced to obtain information to identify the business structure, the number of years in operation and number of full-time employees. These questions were used as opening questions to “warm up” the respondents toward remaining parts of the questionnaire. These findings were summarized in section 4.2.2. A second group covers questions #4 to #7. These four questions obtain information to determine which factors influence the selection and the use of the VBM tools. The third and final group comprises questions #8 and #9, which obtain information to uncover the intervening variables and dependent variables for hypothesis testing. Each testing variable is grouped according to the independent variables, intervening variables and dependent variables stated for this research. A reliability check for the measure in this research produced a Cronbach Alpha of 0.7840 with 15 variables (see Appendix F).

In Part II of the survey questionnaire, the questions asked the demographic factors of respondents that are already described in section 4.2.2 (see Table 4.2).

4.3.1 Descriptive statistics of organization factors

Organization size

Organization size was measured using total assets and total annual revenues. The two variables were significant and highly correlated (*Pearson's* $r = 0.8311$ and $p < 0.001$) (see Table 4.20 page 155) with each other.

The results of total assets reflect that size of the companies is a reliable representative of the research population. The medium and large size companies will certainly need more resources to grow and to support increasing sales volumes. As a consequence, the results came out as expected that total assets of most respondents, which are medium-to-large size companies, vary between THB 1,000 Million to THB 9,000 Million.

Table 4.3: Summary of descriptive statistics of company (15 variable codes, 141 respondents)

Variable Codes	RANGE	MIN	MAX	MODE	MEDIAN	Percentiles		MEAN	STD. DEV.	Skewness		Kurtosis	
						Q1	Q3			Statistic	Std Error	Statistic	Std Error
<i>TOASSET</i>	5.00	1.00	6.00	1.00	2.00	1.00	3.00	2.26	1.624	1.129	0.204	-0.026	0.406
	5.00	1.00	6.00	1.00	1.00	1.00	3.00	2.05	1.451	1.350	0.204	0.849	0.406
TRVENUE	5.00	1.00	6.00	3.00 ^a	3.00	2.00	4.00	3.17	1.469	0.181	0.204	-0.841	0.406
MKTSHR	3.00	1.00	4.00	2.00	2.00	2.00	3.00	2.42	0.729	0.063	0.204	-0.235	0.406
PRDLIFCY													
FCF													
COSTCAP	5.00	1.00	6.00	5.00	4.00	2.00	5.00	3.60	1.665	-0.278	0.204	-1.174	0.406
EVA	5.00	1.00	6.00	1.00	3.00	2.00	4.00	3.06	1.541	0.129	0.204	-1.071	0.406
SVA	5.00	1.00	6.00	1.00	2.00	1.00	4.00	2.54	1.466	0.494	0.204	-0.876	0.406
ROIC	5.00	1.00	6.00	1.00	2.00	1.00	3.00	2.17	1.409	0.983	0.204	-0.047	0.406
	5.00	1.00	6.00	4.00	4.00	2.00	4.00	3.33	1.570	-0.196	0.204	-1.108	0.406
<i>CFROI</i>	5.00	1.00	6.00	1.00	3.00	1.00	4.00	2.99	1.563	0.058	0.204	-1.242	0.406
GRWSALE	4.00	1.00	5.00	4.00	4.00	3.00	4.00	3.60	1.068	-0.718	0.204	-0.298	0.406
PROFITM	4.00	1.00	5.00	4.00	4.00	2.00	4.00	3.21	1.151	-0.170	0.204	-1.166	0.406
TATO	4.00	1.00	5.00	4.00	4.00	3.00	4.00	3.39	0.947	-0.804	0.204	0.015	0.406
ROA	4.00	1.00	5.00	4.00	4.00	2.00	4.00	3.25	1.022	-0.475	0.204	-0.676	0.406
DEBT	4.00	1.00	5.00	4.00	4.00	3.00	4.00	3.42	0.935	-0.664	0.204	0.055	0.406
VBM_AVG ^b	5.00	1.00	6.00	4.00	3.00	2.08	3.78	2.97	1.130	0.061	0.204	-0.421	0.406
ORG_AVG ^c	4.00	1.00	5.00	4.00	3.40	2.80	4.00	3.37	0.859	-0.595	0.204	0.129	0.406

1. Multiple modes exist. The smallest value is shown
2. The average of VBM variables
3. The average of organization performance variables

(Source: Analysis of survey data collected for this research)

The result also shows that about 78 per cent of the respondents indicated that their total assets are below THB 9,000 Million (see Table 4.4). Forty-eight per cent of respondents stated that their Total Assets are less than THB 1,000 Million (mode = 1.00 on a 6-point interval scale). The average for total assets is THB 1,000 Million to less than 5,000 Million (mean = 2.26), and standard deviation = 1.624. The median for total assets is THB 1,000 Million to less than 5,000 Million (median = 2.00). The measure of dispersion for the median, the interquartile range; the first quartile position is less than THB 1,000 Million (Q1 = 1.00), and the third quartile position is THB 5,000 Million to less than THB 9,000 Million (Q3 = 3.00), as shown in Table 4.3.

Table 4.4: Frequency table for total assets (TOASSET)

Level of Total Assets (in Thai Baht-THB)	Frequency	Valid Percentage	Cumulative Percentage
1) Less than 1,000 Million	68	48.20	48.20
2) 1,000 Million to less than 5,000 Million	30	21.30	69.50
3) 5,000 Million to less than 9,000 Million	12	8.50	78.00
4) 9,000 Million to less than 13,000 Million	10	7.10	85.10
5) 13,000 Million to less than 17,000 Million	11	7.80	92.90
6) 17,000 Million and above	10	7.10	100.00
TOTAL	141	100.00	

(Source: Analysis of survey data collected for this research)

From the total annual revenue perspective, seventy-three per cent of respondents generated total revenue of less than THB 5,000 million per year (see Table 4.5). Most respondents indicated that their Total Annual Revenue is less than THB 2,000 Million (mode = 1.00 on a 6-point interval scale). The average for total annual revenue is THB 2,000 Million to less than THB 5,000 Million (mean = 2.05), and standard deviation = 1.451. The median for total annual revenue is less than THB 2,000 Million (median = 1.00). The measure of dispersion for the median, the interquartile range; the first quartile position is less than THB 2,000 Million (Q1 = 1.00), and the third quartile position is THB 5,000 Million to less than THB 8,000 Million (Q3 = 3.00), as shown in Table 4.3.

The survey results from medium and large size companies in EEIT industry showed that these results represented the population being studied. About eighty-two per cent of respondents indicated their total annual revenues to be less than THB 5,000 Million. Fifty-three per cent of the respondents have total revenue of less than THB 2,000 Million.

Table 4.5: Frequency table for total annual revenue (TRVENUE)

Level of Annual Revenue (in Thai Baht-THB)	Frequency	Valid Percentage	Cumulative Percentage
1) Less than 2,000 Million	75	53.20	53.20
2) 2,000 Million to less than 5,000 Million	28	19.90	73.00
3) 5,000 Million to less than 8,000 Million	12	8.50	81.60
4) 8,000 Million to less than 11,000 Million	15	10.60	92.20
5) 11,000 Million to less than 14,000 Million	4	2.80	95.00
6) 14,000 Million and above	7	5.00	100.00
TOTAL	141	100.00	

(Source: Analysis of survey data collected for this research)

Market share position

The respondent's perception of the market share position, in relation to its competitors, is identified by the percentage share of the total industry sales and is used as an indicator of market share position. Based on a 6-scale measurement, the findings of respondent's perceptions on market position were described in Table 4.6. The most frequent answers given by respondents indicated that their Market Share Position is between 9 per cent to less than 13 per cent (mode = 3.00). The average of market share position is also between 9 per cent to less than 13 per cent (mean = 3.17), and standard deviation = 1.469. The median for market share position is also between 9 per cent to less than 13 per cent (median = 3.00). The interquartile range; the first quartile position is from 5 per cent to less than 9 per cent (Q1 = 2.00) and the third quartile position is from 13 per cent to less than 17 per cent (Q3 = 4.00), as shown in Table 4.3.

Table 4.6: Frequency table for market share position (MKTSHR)

Market share position (in percentage)	Frequency	Valid Percentage	Cumulative Percentage
1) Below 5%	22	15.60	15.60
2) 5% to less than 9%	28	19.90	35.50
3) 9% to less than 13%	32	22.70	58.20
4) 13% to less than 17%	32	22.70	80.90
5) 17% to less than 20%	17	12.10	92.90
6) 20% and above	10	7.10	100.00
TOTAL	141	100.00	

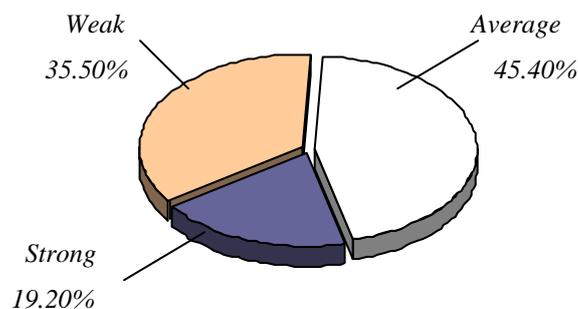
(Source: Analysis of survey data collected for this research)

The measure of market share position was re-scaled to represent the level of market share as 1-2: Weak (lower than 9 per cent); 3-4: Average (9 per cent to less than 17 per cent); and 5-6: Strong (17 per cent and above), to provide a better picture of the market share position.

Figure 4.2 indicated that 45.40 per cent of respondents perceived that they are in the ‘average market share’ position of the company, in relation to competitors. In other words, they hold about 9 per cent to less than 17 per cent market share. Around 19 per cent of respondents perceived that their companies are in a ‘strong market share’ position, or from 17 per cent market share and above. And 35.50 per cent perceived that their companies are in a ‘weak market share’ position, or they hold less than 9 per cent market share.

The results of market share position represented the EEIT population in a way that identified the percentage share of the total industry sales that is controlled by medium and large size companies. Companies with better market share positions may result from receiving higher returns or minimizing their expenses.

Figure 4.2: **Market share position**



(Source: Analysis of survey data collected for this research)

Product life-cycle stages

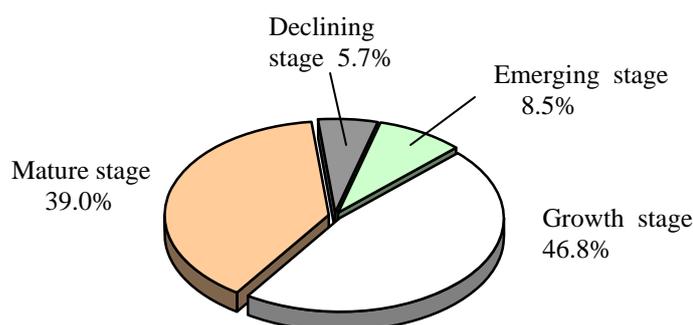
The survey instrument asked respondents to indicate the product life cycle stages of the top product that brings the highest revenue to the company. It was found that 46.80 per cent of the survey samples gain their highest revenue when their product reaches the growth stage, followed by 39.0 per cent at the mature stage, 8.50 per cent at an emerging stage, and 5.70 per cent at a declining stage (see Table 4.7, and Figure 4.3). On average, most respondents (about 47 per cent) stated that they are at growth stage (mean = 2.42, mode = 2.00), with a standard deviation of 0.729. The median of product life cycle stages is also at growth stage (median = 2.00) with the first quartile position at the growth stage (Q1 = 2.00), and the third quartile position is at the mature stage of product life cycle (Q3 = 3.00), as shown in Table 4.3.

Table 4.7: Frequency table for product life cycle stages (PRDLIFCY)

Product Life Cycle Stages	Frequency	Valid Percentage	Cumulative Percentage
Emerging stage	12	8.50	8.50
Growth stage	66	46.80	55.30
Mature stage	56	39.00	94.30
Declining stage	8	5.70	100.00
TOTAL	141	100.00	

(Source: Analysis of survey data collected for this research)

Figure 4.3: Product life-cycle stages



(Source: Analysis of survey data collected for this research)

4.3.2 Descriptive statistics of value-based management tool

The survey instrument asked respondents to indicate whether they selected and used or ‘not select’ each VBM tool such as free cash flow (FCF), cost of capital (COSTCAP), economic value added (EVA), shareholder value added (SVA), return on invested capital (ROIC) and cash flow return on investment (CFROI). This research did not observe how frequent was the selection and the use of such tools during the year, since it may depends on other factors such as the number of projects that may vary in each organization. However, this research could observe that if where VBM tools were selected and used, to what extent that the tool was selected and used to assess their organization’s performance.

When respondents indicated that they select VBM tools in a ‘much’ and ‘very much’ extent, this could imply that they usually pick one particular tool more often than others. While the ‘average’ extent could mean that the respondents may consider other tools, along with the particular VBM tool during the year. And when respondents selected ‘very little’ and ‘little’ extent, it could mean that other tools may be selected and used more often or have a higher priority in selection than a particular VBM tool. Each VBM tool was measured on five-scale measurement ranging from 1 (Not Select) to 6 (Very much). A reliability check for the measure in this research produced a Chronbach alpha of 0.8024,

indicating satisfactory internal reliability of the scale (Appendix G). The following show the results of the extent to which each VBM tool was selected and used and the overall VBM tool was outlined (see Table 4.8).

Table 4.8: Frequency table for degrees in selecting and using VBM tools

VBM Tools		Extent in selecting/using VBM tools						Total
		Not Select (1)	Very Little (2)	Little (3)	Average (4)	Much (5)	Very Much (6)	
FCF	Frequency	25	17	16	32	34	17	141
	Valid Percentage	17.70	12.10	11.30	22.70	24.10	12.10	100.00
	Cumulative %	17.70	29.80	41.10	63.80	87.90	100.00	.
COST CAP	Frequency	32	22	28	31	20	8	141
	Valid Percentage	22.70	15.60	19.90	22.00	14.20	5.70	100.00
	Cumulative %	22.70	38.30	58.20	80.10	94.30	100.00	.
EVA	Frequency	51	23	25	28	10	4	141
	Valid Percentage	36.20	16.30	17.70	19.90	7.10	2.80	100.00
	Cumulative %	36.20	52.50	70.20	90.10	97.20	100.00	.
SVA	Frequency	68	24	20	19	6	4	141
	Valid Percentage	48.20	17.00	14.20	13.50	4.30	2.80	100.00
	Cumulative %	48.20	65.20	79.40	92.90	97.20	100.00	.
ROIC	Frequency	30	14	21	41	26	9	141
	Valid Percentage	21.30	9.90	14.90	29.10	18.40	6.40	100.00
	Cumulative %	21.30	31.20	46.10	75.20	93.60	100.00	.
CFROI	Frequency	40	14	28	31	23	5	141
	Valid Percentage	28.40	9.90	19.90	22.00	16.30	3.50	100.00
	Cumulative %	28.40	38.30	58.20	80.10	96.50	100.00	.
VBM AVG	Frequency	246	114	138	182	119	47	846
	Valid Percentage	29.08	13.48	16.31	21.51	14.07	5.56	100.00
	Cumulative %	29.08	42.56	58.87	80.38	94.45	100.00	.

(Source: Analysis of survey data collected for this research)

Free Cash Flow (FCF)

In the survey, 17.70 per cent of respondents ‘did not select and use’ FCF to measure performance. About 24 per cent of respondents indicated that they select and used FCF in a ‘much’ extent (mode = 5.00) while the indication at the ‘average’ extent was 22.70 per cent (see Table 4.8). On average, respondents selected and used FCF to a ‘little’ extent (mean = 3.60), and standard deviation = 1.665. The median of the selection and the use of FCF is at a ‘average’ extent (median = 4.00), while the first quartile position indicated the selection and the use of FCF at ‘very little’ extent (Q1 = 2.00) and the third quartile position stated the selection and the use of FCF at ‘much’ extent (Q3 = 5.00) as shown in Table 4.3.

While approximately of 56 per cent of respondents selected and used free cash flow in a ‘much’ and an ‘average’ extent, only about 18 per cent of respondents ‘do not select and

use' free cash flow. The reason that respondents do not select and use could result from the complication in calculation of free cash flow in finding residual value to be received beyond the forecast period to infinity. Since the calculation of residual value has no unique formula (Rappaport 1998), this may cause some complication to the company of which residual value formula should be used.

Cost of Capital (COSTCAP)

About 23 per cent of respondents indicated that they 'did not select and use' the cost of capital as their financial performance measurement tool. Twenty-two per cent stated that they used the cost of capital at the 'average' extent (see Table 4.8) which could possibly mean that they selected and used the cost of capital and, at the same time, also considered other tools. The mode for the COSTCAP = 1.00, meaning that most respondents 'did not select and use' this method. On average, respondents selected and used COSTCAP at 'little' extent (mean = 3.06) with a standard deviation = 1.541. The median for selection and the use of COSTCAP is also at 'little' extent (median = 3.00) while the first quartile position yield the selection and the use of COSTCAP to a 'very little' extent (Q1 = 2.00) and the third quartile position yield the selection and the use of COSTCAP on 'average' extent (Q3 = 4.00), shown in Table 4.3.

Cost of capital is an economic concept where the cost is based on an opportunity cost of the invested capital, both debt and equity. The concept of cost of capital is different from traditional accounting concept of cost, where only the cost of debt is calculated and the cost of equity is not considered when calculating the corporate net income (Aggarwal 2001; Martin & Petty 2000). One reason to explain why respondents did not select and use cost of capital is that privately-own companies may find difficulty in determining the cost of equity since these companies are not listed in the stock market (Brigham & Houston 2001). From the survey, about 86 per cent of respondents were privately-own companies and therefore were not listed in the stock market. Therefore, respondents may find difficulty in determining cost of equity to fulfill the cost of capital formula. In addition, another reason follows that since the calculation of cost of capital is different from traditional accounting method, this may cause some confusion, at the same time, may add some burden to respondents to produce detailed adjustments toward cost of capital and other value-based management tools (Sinclair & Zairi 2000). As a result, respondents are reluctant to use the cost of capital.

Economic Value Added (EVA)

In the survey, 36.20 per cent of respondents 'did not select and use' EVA as their financial performance measurement tool. Among those who selected and used EVA, about 20 per cent used the EVA at the 'average' extent, which could mean that they also considered other tools while considering EVA. In other word, the EVA may not have higher priority over other tools. About 17.70 per cent indicated that they used the EVA tool to a 'little' extent, and 16.30 per cent indicated that the EVA tools were used in a 'very little' extent (see Table 4.8). The mode for Economic Value Added = 1.00, which indicated that most respondents 'did not select and use' EVA. The average selection and use of EVA is 'very little' in extent (mean = 2.54), with a standard deviation = 1.466. The median for selection and the use of EVA indicated that the respondents selected and used EVA to a 'very little' extent (median = 2.00). The first quartile position for selection and the use of EVA is 1.00, indicated that the respondents ranges from 'not select and use' the EVA. The third quartile position indicated that respondents selected and used EVA at an 'average' extent (Q3 = 4.00), shown in Table 4.3.

The reasons that EVA is not commonly selected and used could be:

First, EVA is based on the concept of residual income or economic profits, which is recognized only if it exceeds all cost of capital charges (Stewart 1999). This concept may sound simple, but it could be complex when implementing it. EVA requires some adjusting of the accounting items before it derives economic profits. It also brings about broad changes from financial changes to employee behavioral changes in order to maximize shareholders' value (Ehrbar & Stewart 1999). Further, in order to bring about changes in an organization, EVA requires the full support from the company's chief executive (Stern, Shiely & Ross 2001).

Second, the concept of EVA is new to Thai organizations. Stern Stewart & Co., which holds the EVA Registered Trademark, opened their corporate office in Thailand in Year 2002. In contrast ROIC, and CFROI have been implemented in the country for quite some time as reflected by the higher usage in the findings.

Shareholder Value Added (SVA)

In the survey, 48.20 per cent of respondents indicated that they 'did not select and use' shareholder value added as their financial performance measurement tool. 17 per cent of respondents indicated they used this tool to a 'very little' extent and 14.20 per cent used

SVA to a 'little' extent (see Table 4.8). The mode for Shareholder Value Added is 1.00, meaning that most respondents 'did not select and use' SVA. On average, respondents selected and used SVA to a 'very little' extent (mean = 2.17 with standard deviation = 1.409). The median of selection of SVA showed that respondents selected and used SVA to a 'very little' extent (median = 2.00). The interquartile range; the first quartile position stated that SVA was 'not selected and used (Q1 = 1.00) and the third quartile position stated that the SVA was selected and used to a 'little' extent (Q3 = 3.00), shown in Table 4.3. When comparing the SVA with other VBM tools, SVA were the least common in term of selection and use by respondents, that is, SVA gained the highest score in the 'not select and use' item. Since SVA is an indicator that addresses the change in value over forecasted period, it estimates the value creation of an investment by discounting the future cash flows at the rate of the cost of capital required by capital markets (Rappaport 1998). This could be the reason why most respondents did not favor SVA because the company should be listed on the stock market to receive the full benefit of implementing SVA. Therefore, SVA was ranked at the lowest extent of selection and use among all VBM tools.

Return on Invested Capital (ROIC)

In the survey, about 29 per cent of respondents indicated that they selected and used ROIC at the 'average' extent, 18.40 per cent indicated that they used ROIC in a 'much' extent, while 21.30 per cent did not select and use ROIC as their financial performance measurement tool (see Table 4.8). Most respondents indicated that they selected and used ROIC at 'average' extent (mode = 4.00). The average selection and use of ROIC is 'little' in extent (mean = 3.30 with a standard deviation = 1.570). The median in selecting and using ROIC is at an 'average' extent (median = 4.00). The interquartile range; the first quartile position showed the selection and the use of ROIC to a 'very little' extent (Q1 = 2.00), while the third quartile position showed the selection and the use of ROIC at 'average' extent (Q3 = 4.00), stated in Table 4.3.

From the survey, most respondents selected and used ROIC at an 'average' extent. However, about 21 per cent of respondents did not select and use ROIC. The reason that ROIC was not selected and used by some respondents could be that they may consider traditional accounting ratios such as return on assets, return on equity, and return on investment which has been popularized by most companies for several decades.

Cash Flow Return on Investment (CFROI)

About 28 per cent of respondents 'did not select and use' CFROI as a tool to measure financial performance. 22 per cent of those who selected and used CFROI were using this tool at the 'average' extent and about 20 per cent selected and used CFROI to a 'little' extent (see Table 4.8). Most respondents indicated that they did not select and use CFROI (mode = 1.00). By the mean, those respondents selected and used CFROI at 'very little' extent (mean = 2.99, and standard deviation = 1.563). The median of selection and use of CFROI showed 'little' extent (median = 3.00). The interquartile; the first quartile position showed that respondents 'did not select and use' CFROI (Q1 = 1.00) and the third quartile position showed that respondents selected and used CFROI to an 'average' extent (Q3 = 4.00), stated in Table 4.3.

Boston Consulting Group (BCG-HOLT), who designed CFROI method, was the first value-oriented consulting firm in Thailand and has been in the country over 10 years. As a consequence, the company has been established and known by many Thai companies. This could be one reason why CFROI was more popularized and was selected and used by many Thai organizations when compare with other tools that belongs to consulting firms such as EVA, and SVA. Main reason that some organization may not consult with Boston Consulting, and therefore, did not select and use CFROI could result from high consulting expenses, difficulty in converting accounting data into cash-based measures and other company specific reasons.

Overall VBM tools (VBM AVG)

About 29 per cent of respondents 'do not select and use' VBM tools in measuring organization performances, as shown in Table 4.8. Among the 70.9 per cent that selected and used VBM tools, SVA ranks at the bottom. Free cash flow (FCF), return on invested capital (ROIC), and cost of capital (COSTCAP) marked the top three VBM tools commonly selected as performance measurement tools in organizations.

The reasons that FCF, ROIC, and COSTCAP are more commonly used among respondents could be explained for several reasons that are consistent with the review of the literature in Chapter Two:

First, many investors view FCF and COSTCAP as a new benchmark for shareholder value creation since the 1980s (Martin & Petty 2000). While the earnings per share or

return on net assets no longer fit with new environment, such as the concept of intangible assets like research and development, customer satisfaction, and brand names (Rappaport 1998). Therefore, the movement from industrial companies to knowledge companies affects the traditional financial ratios, while the shareholder value calculations do not.

Second, FCF and COSTCAP represented cash that is actually available for distribution to investors and the core determinant of business value in which the future cash flow stream is discounted at the investor's required rate of return. An organization is creating value only where it earns a rate of return on invested capital that exceeds the weighted average cost of capital (Brigham & Houston 2001; Copeland, Koller & Murrin 2000; Martin & Petty 2000). While the accounting-oriented measurement tool does not provide a complete answer to the questions whether implementing the corporate plans is creating value to shareholders (Aggarwal 2001; Rappaport 1981).

Third, ROIC is one of the key financial ratios that drive value. Its implication stated that a business must not only break even but also make a profit large enough to justify the cost of the capital it is using (Frykman & Tolleryd 2003). As a consequence, the ROIC and the proportion of its profits that the organization invested for growth drive free cash flow.

Fourth, FCF and COSTCAP provide the foundation of all VBM tools in which are used to calculate the discounted free cash flow valuation. While the ROIC is the key value driver of FCF, as stated in Chapter Two. Company may develop their own internal VBM which based on these foundation and key value driver rather than selecting and using the popularize ones.

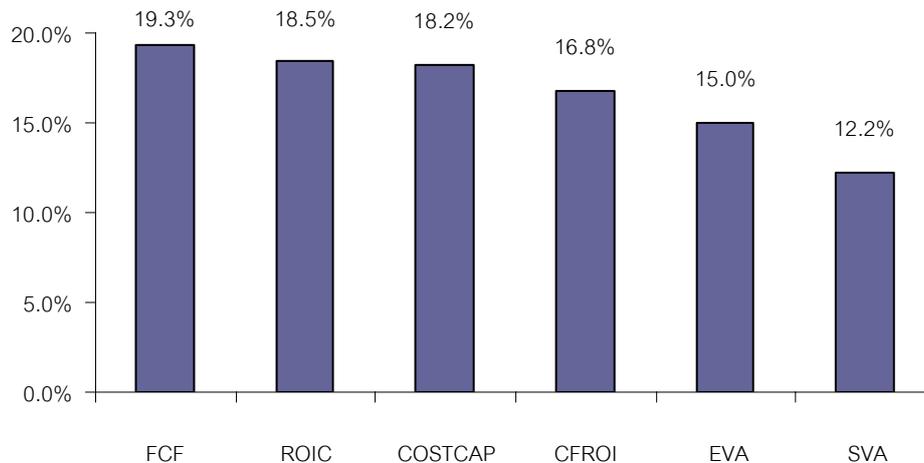
Among 70.9 respondents who selected and used VBM tools to measure their organization performance, about 13.50 per cent used VBM tools to a 'very little' extent and 16.31 per cent used VBM tools to a 'little' extent. About 21.50 per cent used VBM tools at the 'average' extent and 14 per cent of respondents indicated that they used VBM tools at 'much' extent while only 5.56 per cent stated that they selected and used VBM tools at the 'very much' extent. Most respondents answered that they selected and used VBM tools at an 'average' extent (mode = 4.00). On average, respondents selected and used VBM tools at the 'very little' extent, (mean = 2.97 and standard deviation of 1.130). The median stated 'little' extent in selection and use of VBM tools (median = 3.00). The interquartile range; the first quartile position stated that VBM tools were selected and used at 'very little' extent

(Q1 = 2.08), and the third quartile position stated that VBM tools were selected and used at 'little' extent (Q3 = 3.78), indicated in Table 4.3.

Figure 4.4 indicates the degree of selection and use of VBM tools. It shows the respondents who selected and used these VBM tools (about 70.9% of total respondents, and n = 141), FCF was used the most by responding companies, followed by ROIC and COSTCAP. This indicates that FCF, ROIC, and COSTCAP provided the foundation of the VBM tools. Thus, this could indicate that most respondents apply the foundation of VBM tools and may develop internal VBM tools from using these foundation tools rather than applying the complicated or the licensing tools such as EVA.

The research finding is relevant with what Martin & Petty (2000), and Ryan & Trahan (1999) stated that many firms learn from consultants but then adapt the methods to fit their own situation. In fact, most firms develop their own VBM systems rather than hiring a consulting firm. For instance, many of the firms that use EVA do not rely on Stern Stewart & Co. for designing or operating the system. CFROI by Boston Consulting Group were used at a lower extent than FCF, ROIC, and COSTCAP. EVA did not gain popularity compared to other tools, except SVA. The reason could possibly be that EVA is a registered trademark of Stern Stewart Company and is new to Thai organizations. Stern Stewart Company just opened its office in Bangkok in the third quarter of year 2002, while this research was conducted about the same period. Last, SVA by McKinsey & Company was not used by most responding companies, which could due to the reason that the company must be listed on the stock market to apply SVA, therefore, SVA was ranked at the lowest level of selection among all VBM tools.

Figure 4.4: **The percentage selection and the use of each VBM tool**



(Source: Analysis of survey data collected for this research)

4.3.3 Descriptive statistics of organization performance

The survey questionnaire asked the respondents to compare organization performance between years 2003 and 2002 (see Table 4.9). Organization performance, as described in Chapter Two, was measured by the Du Pont Analysis that uses financial performance indicators such as growth in sales, profit margin, total assets turnover, return on assets and debt ratio. The use of these indicators as dependent variables was conceptually consistent with the research performed by Ryan and Trahan (1999). In this research, respondents were asked to indicate their organization performance compared to its performance in previous years along the 5-scale measurement from 1 (very much worse) to 5 (very much better). The reliability test, Chronbach alpha, of organization performance variables is 0.8928 and is acceptable (see Appendix H), since it is higher than the lower limit of acceptability of 0.6 to 0.7 (Hair, et.al., 1998). Each organization performance measurement is outlined and the overall organization performance is described.

Growth in sales (GRWSALE)

From Table 4.9, about 50 per cent of respondents indicated that sales growth in year 2003 was 'better' than that of last year (mode = 4.00), and 17 per cent indicated that their growth in sales was 'very much better' than that of year 2002. The respondents indicated that there was between 'no different' and 'better' in improvement in sales growth from year 2002 to year 2003 (mean = 3.60 and standard deviation of 1.068). The median of growth in

sales was 'better' (median = 4.00), the first quartile position showed that the respondents perceived 'no different' in growth in sales (Q1 = 3.00) and the third quartile position showed that the respondents perceived 'better' growth in sales (Q3 = 4.00), also see Table 4.3.

Table 4.9: Frequency for organization performance indicators

Financial Performance Indicators		Organization Performance Comparing Year 2003 and that of Year 2002					Total
		Very much worse (1)	Worse (2)	No different (3)	Better (4)	Very much better (5)	
Growth in Sales	Frequency	5	24	17	71	24	141
	Valid Percentage	3.50	17.00	12.10	50.40	17.00	100.00
	Cumulative %	3.50	20.60	32.60	83.00	100.00	.
Profit Margin	Frequency	7	44	18	56	16	141
	Valid Percentage	5.00	31.20	12.80	39.70	11.30	100.00
	Cumulative %	5.00	36.20	48.90	88.70	100.00	.
Total Assets Turnover	Frequency	6	21	33	74	7	141
	Valid Percentage	4.30	14.90	23.40	52.50	5.00	100.00
	Cumulative %	4.30	19.10	42.60	95.00	100.00	.
Return on Assets	Frequency	7	31	31	64	8	141
	Valid Percentage	5.00	22.00	22.00	45.40	5.70	100.00
	Cumulative %	5.00	27.00	48.90	94.30	100.00	.
Debt Ratio	Frequency	5	19	39	68	10	141
	Valid Percentage	3.50	13.50	27.70	48.20	7.10	100.00
	Cumulative %	3.50	17.00	44.70	92.90	100.00	.
ORG AVG	Frequency	30	139	138	333	65	705
	Valid Percentage	4.26	19.72	19.57	47.23	9.22	100.00
	Cumulative %	4.26	23.98	43.55	90.78	100.00	.

(Source: Analysis of survey data collected for this research)

Profit margin (PROFITM)

From the survey, 39.70 per cent of respondents indicated a 'better' profit margin in year 2003 compared to 2002 and 31.20 per cent indicated that the profit margin of year 2003 got 'worse' than that of year 2002 (see Table 4.9). The mode for profit margin is 4.00, indicating that the profit margin for year 2003 was 'better' than that of year 2002. The respondents saw there was 'no different comparing the profit margin of year 2003 and that of year 2002 (mean = 3.21 and standard deviation = 1.151). The median for profit margin indicated that profit margin of year 2003 was 'better' than that of year 2002 (median = 4.00). The interquartile range; the first quartile position showed that the profit margin of year 2003 was 'worse' than that of year 2002 (Q1 = 2.00), and the third quartile position

showed that profit margin of year 2003 was 'better' than that of year 2002 (Q3 = 4.00), as shown in Table 4.3.

Total assets turnover (TATO)

From the survey, 52.50 per cent of respondents stated that their total asset turnover in year 2003 was 'better than that of year 2002 and 23.40 per cent indicated that there was no improvement or 'no different' to their total assets turnover between year 2003 and year 2002 (see Table 4.9). Since the mode for TATO is 4.00, which indicated that the majority of respondents stated that their TATO of year 2003 was 'better' than that of year 2002. The respondents stated that there was 'no different' in TATO from year 202 and that of year 2003 (mean = 3.39, standard deviation = 0.947). The median for TATO 4.00 indicates that the mid-range of respondents stated 'better' or showed an improvement in TATO from year 2002 to year 2003. The interquartile range; the first quartile position showed 'no different' in TATO over year 2002 to year 2003 (Q1 = 3.00) and the third quartile position showed that TATO improved or was 'better' in year 2003 when compared to that of year 2002 (Q3 = 4.00), also see Table 4.3.

Return on assets (ROA)

About 45 per cent of respondents reported that their return on assets performance for year 2003 was 'better' than that for year 2002. Twenty-two per cent indicated that there was 'no different' in return on assets, and 22 per cent stated that their performance for return on assets in year 2003 was 'worse' than in year 2002 (see Table 4.9). The mode for ROA is 4.00, which indicated that respondents stated that their ROA was 'better' in year 2003 than that for year 2002. The mean of ROA is 3.25, perceived by the respondents, showed that there were 'no different' between the ROA of year 2003 and that for year 2002 (mean = 3.25, standard deviation = 1.022). The median for ROA indicated a 'better', resulted when compared the ROA of year 2003 and that for year 2002 (median = 4.00). The interquartile range; the first quartile position showed the performance in ROA for year 2003 and that for year 2002 was 'worse' (Q1 = 2.00), while the third quartile position showed the performance in ROA for year 2003 and that of year 2002 was 'better' (Q3 = 4.00), also showed in Table 4.3.

Debt ratio (DEBT)

From Table 4.9, forty-eight per cent of respondents stated that their debt ratio in year 2003 performed 'better' than that for year 2002, while 27.70 per cent indicated that there was 'no different' in their debt ratio. Mode for debt ratio is 4.00, meaning that respondents stated that the debt ratio of year 2003 was 'better' than that for year 2002. The mean of debt ratio is 3.42, which indicated that the debt ratio of respondents showed 'no different' from year 2002 to year 2003 (mean = 3.42, standard deviation = 0.935). The median showed that debt ratio of year 2003 was 'better' than that for year 2002 (median = 4.00). The interquartile range; the first quartile position showed the performance of debt ratio with 'no different' between year 2002 and year 2003 (Q1 = 3.00), and the third quartile position showed that the performance of debt ratio was 'better' in year 2003 compare to that for year 2002. (Q3 = 4.00), also showed in Table 4.3.

Overall organization performance (ORG AVG)

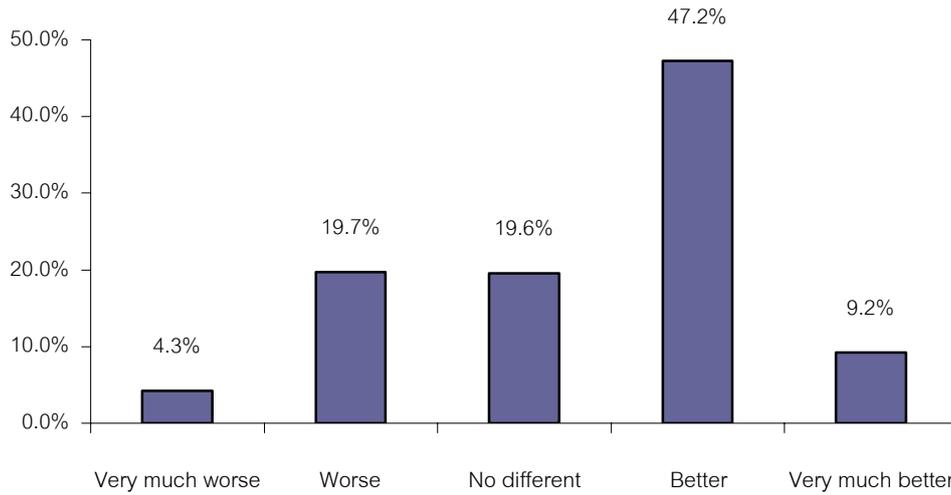
The overall organization performance is identified to make a comparison between financial year 2002 and that for year 2003. From Table 4.9 and Figure 4.5, 9.22 per cent indicated that their overall performance was 'very much better' and 47.23 per cent indicated that their overall organization performance in year 2003 was 'better' than that for year 2002. Also 19.57 per cent indicated that their performance in year 2003 stated 'no difference' from that for year 2002. About 20 per cent stated that their performance in year 2003 was 'worse' than that for year 2002 and only about four per cent stated that in year 2003 their performance was 'very much worse' compare to that for year 2002.

Respondents stated that their overall organization performance was 'better' in year 2003 than that for year 2002 (mode = 4.00). The average of the overall organization performance viewed by respondents stated 'no difference' between the performances for year 2003 and that for year 2002 (mean 3.37, standard deviation = 0.859). The median of overall organization performance also indicated 'no difference' between the performances for year 2003 to that for year 2002 (median = 3.40). The first quartile position of overall organization performance was 'worse' (Q1 = 2.8), while the third quartile position of overall organization performance was 'better' (Q3 = 4.0), as shown in Table 4.3.

Among the five performance indicators used for measuring organization performance; growth in sales, total assets turnover and debt ratios were viewed 'better', and 'very much better' in year 2003 compare to that of year 2002 (Table 4.9) These findings were consistent

with the research by Ryan & Trahan (1999) in that there was an improvement in utilizing assets (total assets turnover and return on assets). Growth in sales and profit margin indicated a satisfactorily improvement in generating revenue, while debt ratio indicates improvement in paying the costs of financing.

Figure 4.5: **The overall organization performance**



(Source: Analysis of survey data collected for this research)

4.4 Factor analysis

Following the descriptive analysis and the reliability test, a factor analysis was applied before observing the relationship among variables and testing the hypotheses. It is used in this research to reduce the data into a smaller number of variables.

To apply factor analysis, two groups of variables were formed. The first group of variables are the intervening variables representing VBM tools, composed of six VBM tools (FCF, COSTCAP, EVA, SVA, ROIC, and CFROI); the second group of variables are the dependent variables representing organization performance indicators (GRWSALE, PROFITM, TATO, ROA and DEBT). Factor analysis was used to test these two groups individually to reduce the large number of variables into a smaller set of underlying factors that could represent the entire set of related variables.

4.4.1 Factor analysis for value-based management tools

For the first group representing the VBM tools, the outputs of VBM tools (FCF, COSTCAP, EVA, SVA, ROIC and CFROI) were shown in a correlation matrix table (see Table 4.10) which showed that all VBM tools are significantly related. Bartlett's test of overall significance showed it to be significant (sig. = 0.000) and the Kaiser-Meyer-Olkin measure of sampling adequacy is 0.789, which is greater than the required critical level of 0.6. This indicated it was appropriate to proceed with factor analysis (see Table 4.11). Measures of sampling adequacy (MSA) are printed on the diagonal on Anti-image matrices table (see Table 4.12), which determines the appropriateness of variables. The MSA for VBM tools are above 0.7, showing it to be acceptable. Inspection of the Anti-image matrices correlation matrix reveals that all the measures of sampling adequacy are well above the acceptable level of 0.5; which indicated the appropriateness of applying the factor analysis.

Table 4.10: Correlation matrix for VBM tools

		FCF	COSTCAP	EVA	SVA	ROIC	CFROI
Correlation	FCF	1.000					
	COSTCAP	.2898**	1.000				
	EVA	.385**	.399**	1.000			
	SVA	.316**	.130**	.512**	1.000		
	ROIC	.289**	.319**	.503**	.462**	1.000	
	CFROI	.467**	.324**	.533**	.481**	.680**	1.000

(Source: Analysis of survey data collected for this research)

Table 4.11: KMO and Bartlett's test for VBM tools

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.789
Bartlett's Test of Sphericity	Approx. Chi-Square
	268.721
	df
	15
	Sig.
	.000

(Source: Analysis of survey data collected for this research)

Table 4.12: **Anti-image matrices for VBM tools**

		FCF	COSTCAP	EVA	SVA	ROIC	CFROI
Anti-image Correlation	FCF	.810 ^a					
	COSTCAP	-.142	.769 ^a				
	EVA	-.120	-.272	.825 ^a			
	SVA	-9.537E-02	.168	-.325	.812 ^a		
	ROIC	.115	-.121	-.140	-.168	.764 ^a	
	CFROI	-.303	-4.954E-02	-.144	-.140	-.518	.764 ^a

a Measures of Sampling Adequacy(MSA)

(Source: Analysis of survey data collected for this research)

Since the objective of applying factor analysis in this research is to reduce the original variance to a minimal number of factors for prediction purposes, the Principles Component Analysis (PCA) was used to extract the factors. Examination of the initial statistics revealed that from a total of six variables, only one factor was extracted and ranked accordingly to its eigenvalue. The final statistics outlined those factors with eigenvalues greater than 1 considered to be significant. For the intervening variables, the final statistics showed that this one factor accounted for 51.4 per cent of the variance (See Table 4.13). It appeared that factor 1 was dominant with an eigenvalue of 3.084. The scree test (see Figure 4.6) also indicated that a one-factor solution was the most appropriate (must be greater than 1), this yielded a similar result to the eigenvalue extracted.

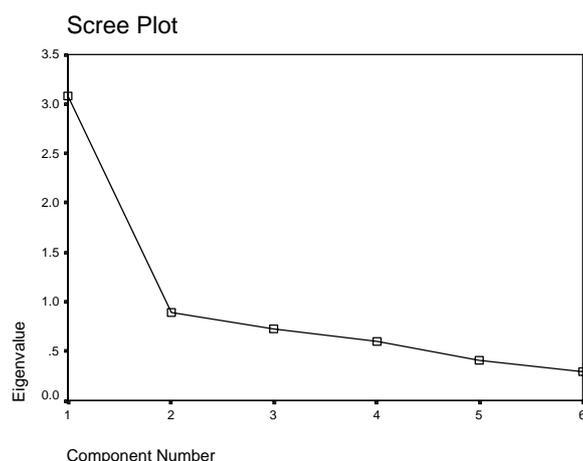
Table 4.13: **Total variance explained for VBM tools**

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.084	51.398	51.398	3.084	51.398	51.398
2	.895	14.921	66.319			
3	.727	12.120	78.439			
4	.596	9.939	88.378			
5	.410	6.839	95.217			
6	.287	4.783	100.000			

Extraction Method: Principal Component Analysis.

(Source: Analysis of survey data collected for this research)

Figure 4.6: **Scree plot graph for VBM tools**



(Source: Analysis of survey data collected for this research)

The factor analysis solution extracted factors in order of importance, with factor 1 accounting for most variance as shown in the factor matrix. The factor matrix for the research intervening variables showed that factor 1 contains all 6 VBM tools as factors loadings (see Table 4.14). Since only one factor is extracted, and is accounted for the most variance, the solution cannot be rotated. The unrotated factor solution means that all six variables loaded significantly on the first factor. Factor 1 comprised all VBM tools (research intervening variables), ranked in order of the strongest factor loadings; CFROI, EVA, ROIC, SVA, FCF and COSTCAP (see Table 4.14). Since there was a heavy loading on one factor, it may be better to use a surrogate variable to represent the research intervening variables. The highest factor loading, **CFROI, could be used as a surrogate variable** for the research intervening variables (see Table 4.14).

Table 4.14: **Factor matrix ^a and communalities for VBM tools**

	Factor ^a	Communalities	
	1	Initial	Extraction
CFROI	.839	1.000	.704
EVA	.790	1.000	.624
ROIC	.785	1.000	.616
SVA	.689	1.000	.475
FCF	.621	1.000	.385
COSTCAP	.530	1.000	.281

Extraction Method: Principal Component Analysis. One factor extracted.

Rotated Factor Matrix ^a

^a Only one factor was extracted. The solution cannot be rotated.

(Source: Analysis of survey data collected for this research)

4.4.2 Factor analysis for organization performance

For the second group representing the organization performance indicators, the output of organization performance (GRWSALE, PROFITM, TATO, ROA and DEBT) is shown in the correlation matrix table for organization performance (see Table 4.15). The matrix indicated the significant correlation of all organization performance variables. Barlett's Test of sphericity is significant (sig. = 0.000) and the Kaiser-Meyer-Olkin measure of sampling adequacy is 0.793, which is greater than 0.6. This indicated it is appropriate to proceed with factor analysis (see Table 4.16). Measures of sampling adequacy (MSA) are printed on the diagonal on the Anti-image matrices table (see Table 4.17). Inspection of the Anti-image matrices correlation matrix reveals that all the measures of sampling adequacy are well above the acceptable level of 0.5, therefore, there is a further evidence of the factorability of the items.

Table 4.15: **Correlation matrix for organization performance**

		GRWSALE	PROFITM	TATO	ROA	DEBT
Correlation	GRWSALE	1.000				
	PROFITM	.563**	1.000			
	TATO	.592**	.709**	1.000		
	ROA	.483**	.798**	.836**	1.000	
	DEBT	.447**	.640**	.621**	.601**	1.000

(Source: Analysis of survey data collected for this research)

Table 4.16: **KMO and Bartlett's test for organization performance**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.793
Bartlett's Test of Sphericity	Approx. Chi-Square
	df
	Sig.
	467.029
	10
	.000

(Source: Analysis of survey data collected for this research)

Table 4.17: **Anti-image matrices for organization performance**

		GRWSALE	PROFITM	TATO	ROA	DEBT
Anti-image Correlation	GRWSALE	.815 ^a				
	PROFITM	-.289	.805 ^a			
	TATO	-.356	6.718E-02	.769 ^a		
	ROA	.195	-.530	-.635	.728 ^a	
	DEBT	-3.780E-02	-.289	-.215	-4.011E-03	.912 ^a

^a Measures of Sampling Adequacy(MSA)

(Source: Analysis of survey data collected for this research)

Examination of the initial statistics revealed that from five variables, only one factor was extracted by its eigenvalue. The final statistics showed this one factor accounted for 70.8 per cent of the variance (see Table 4.18). It appeared that factor 1 was dominant with an eigenvalue of 3.54 considered to be significant because its eigenvalue is greater than 1. The scree test also indicated a one-factor solution to be most appropriate, which is similar to the eigenvalue extracted (see Figure 4.7).

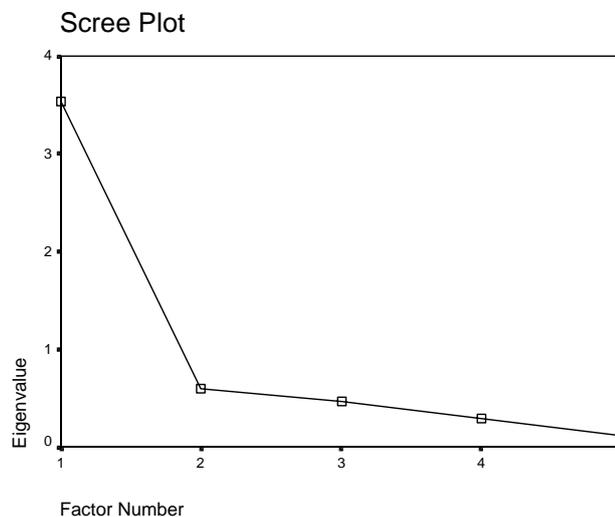
Table 4.18: Total variance explained for organization performance

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.541	70.814	70.814	3.541	70.814	70.814
2	.590	11.793	82.607			
3	.459	9.183	91.790			
4	.290	5.802	97.591			
5	.120	2.409	100.000			

Extraction Method: Principal Component Analysis.

(Source: Analysis of survey data collected for this research)

Figure 4.7: Scree plot graph for organization performance



(Source: Analysis of survey data collected for this research)

The factor analysis solution has extracted one factor to account for the variance which appears in the factor matrix indicating that factor 1 contains all five-organization performance indicators as factor loadings. Since only one factor was extracted which accounted for the most variance, the solution cannot be rotated. The unrotated factor

solution means that all five variables loaded significantly on the first factor. Factor 1 comprised of all organization performance indicators (research dependent variables), ranked in order of the strongest factor loadings; TATO, ROA, PROFITM, DEBT and GRWSALE (see Table 4.19). Since there was a heavy loading on one factor, this factor could be used as a surrogate variable. The heavy factor loading for dependent variables was TATO. This was confirmed by the eigenvalue that dominated other variables and the factor matrix. Therefore, **TATO could represent the surrogate variable** for the research dependent variables (see Table 4.19).

Table 4.19: **Factor matrix ^a and communalities for organization performance**

	Factor ^a	Communalities	
	1	Initial	Extraction
TATO	.892	1.000	.815
ROA	.890	1.000	.807
PROFITM	.868	1.000	.793
DEBT	.705	1.000	.614
GRWSALE	.621	1.000	.513

Extraction Method: Principal Component Analysis. One factor extracted.
Rotated Factor Matrix ^a

^a Only one factor was extracted. The solution cannot be rotated.

(Source: Analysis of survey data collected for this research)

4.5 Relationships among variables

This section explores the relationships among the variables. Their strengths are measured, but the results do not state whether and how they might influence each other. Pearson's correlation coefficient is used to establish the relationship between the two research variables. The confidence level, or degree of confidence, is measured using the significant 2-tailed to test whether the relationship is statistically significant. In this research, significance levels of 0.05 and 0.01 indicated the degree of confidence about the population estimated. Pearson's correlation coefficient (Pearson's r) was carried out using SPSS version 10.0. A list of correlation of 15 variables is shown in Table 4.20 page 155.

From Pearson's correlation coefficient matrix (see Table 4.20), the associations or correlations among variables is described as follows:

4.5.1 Relationships between independent variables

- Total assets and total annual revenue were used to represent organization size, which is one of the research independent variables. The relationship between total assets (TOASSET) and total annual revenue (TRVENUE) were highly significant and highly positively correlated (Pearson's $r = 0.831$, $p < 0.001$). Since each represents organization size and are highly correlated, therefore, one could represent the other.
- The relationship between total assets (TOASSET) and market share position (MKTSHR), which is another research independent variable, was highly significant and positively correlated (Pearson's $r = 0.335$, $p < 0.001$).
- The relationship between total annual revenue (TRVENUE) and market share position (MKTSHR), which is another research independent variable, was highly significant and positively correlated (Pearson's $r = 0.382$, $p < 0.001$).
- For product life cycle (PRDLIFCY), which is one of the research independent variables; the research found no significant relationship between organization size and product life cycle (Pearson's $r = 0.033$, $p > 0.05$), nor any relationship between market share position and product life cycle (Pearson's $r = 0.022$, $p > 0.05$).

4.5.2 Relationships among intervening variables

- The six VBM tools (FCF, COSTCAP, EVA, SVA, ROIC and CFROI) were highly correlated. These relationships were statistically significant ($p \leq 0.001$). See Table 4.20.
- Since each represents the VBM tools, and are highly correlated, one could represent the others. Further, from the factor analysis result, this research used CFROI as a surrogate variable to represent VBM tools. The eigenvalue of CFROI dominated other VBM tools and from the factor matrix there was a heavy loading on CFROI to the point that it could represent the VBM tools.

4.5.3 Relationships among dependent variables

- The five organization performance indicators (GRWSALE, PROFITM, TATO, ROA and DEBT) were highly correlated and statistically significant ($p < 0.001$).

These five organization performance indicators represented research dependent variables. See Table 4.20.

- Since each of them represents organization performance indicators that are highly correlated, one could represent the others. From the factor analysis result this research used TATO to represent organization performance, since the eigenvalue of TATO dominated other organization performance indicators and from factor matrix there was a heavy loading on TATO.

4.5.4 Relationships between independent variables and intervening variables

- The relationship between total assets (TOASSET) and free cash flow (FCF) was correlated and significant (Pearson's $r = 0.201$, $p < 0.05$). The relationship between TOASSET and cost of capital (COSTCAP) was correlated and significant (Pearson's $r = 0.302$, $p < 0.05$). But the result yielded no significant association between TOASSET and CFROI, which is used as surrogate variable to represent VBM tools, where Pearson's $r = 0.120$, $p > 0.05$.
- The relationship between total annual revenue (TRVENUE) and free cash flow (FCF) was correlated and significant (Pearson's $r = 0.177$, $p < 0.05$). The relationship between TRVENUE and cost of capital (COSTCAP) was correlated and significant (Pearson's $r = 0.331$, $p < 0.05$). The result yielded no significant association between TRVENUE and CFROI in which Pearson's $r = 0.104$, $p > 0.05$.
- There was no significant relationship between market share position (MKTSHR) and CFROI (Pearson's $r = 0.030$, $p > 0.05$).
- The relationship between product life cycle (PRDLIFCY) and CFROI was negatively related, but there was no significant relationship between the two variables (Pearson's $r = -0.101$, $p > 0.05$).

4.5.5 Relationships between independent variables and dependent variables

- There was no significant relationship between total assets (TOASSET) and TATO which represent the dependent variables (Pearson's $r = 0.017$, $p > 0.05$).
- The relationship between total annual revenue (TRVENUE) and the percentage growth in sales (GRWSALE) was correlated and significant (Pearson's $r = 0.170$,

$p < 0.05$). However, there was no significant relationship between total assets (TRVENUE) and TATO (Pearson's $r = 0.038$, $p > 0.05$).

- The relationship between market share position (MKTSHR) and debt ratio (DEBT) was correlated and significant (Pearson's $r = 0.176$, $p < 0.05$). However, there was no significant relationship between total assets (MKTSHR) and TATO (Pearson's $r = 0.038$, $p > 0.05$).
- The relationship between product life cycle stages (PRDLIFCY) and growth in sales (GRWSALE) was negatively correlated and highly significant (Pearson's $r = -0.281$, $p = 0.001$). The relationship between PRDLIFCY and profit margin (PROFITM) was negatively correlated and statistically significant (Pearson's $r = -0.209$, $p < 0.05$). The relationship between PRDLIFCY and return on assets (ROA) was negatively correlated and significant (Pearson's $r = -0.188$, $p < 0.05$). There was no significant relationship between PRDLIFCY and debt ratio (DEBT), although it showed a negative association between the two variables (Pearson's $r = -0.154$, $p > 0.05$).
- The relationship between PRDLIFCY and total assets turnover (TATO) that represent the dependent variables was negatively correlated and significant (Pearson's $r = -0.197$, $p < 0.05$). Since TATO was used as a surrogate variable to represent dependent variables this surmised that, as the product life cycle moves toward the maturity and declining stages, the overall organization performance declines.

4.5.6 Relationships between intervening variables and dependent variables

- The relationship between free cash flow (FCF) and percentage growth in sales (GRWSALE) was highly significant and correlated (Pearson's $r = 0.267$, $p = 0.001$). The relationship between FCF and total assets turnover (TATO) was significant and correlated (Pearson's $r = 0.182$, $p < 0.05$). The relationship between FCF and debt ratio (DEBT) was also significant and correlated (Pearson's $r = 0.183$, $p < 0.05$).
- The relationship between economic value added (EVA) and return on assets (ROA) was significant and correlated (Pearson's $r = 0.186$, $p < 0.05$).
- The relationship between shareholder value added (SVA) and debt ratio (DEBT) was significant and correlated (Pearson's $r = 0.173$, $p < 0.05$).

- The relationship between return on invested capital (ROIC) and the percentage growth in sales (GRWSALE) was significant and correlated (Pearson's $r = 0.197$, $p < 0.05$). The relationship between ROIC and total assets turnover (TATO) was significant and correlated (Pearson's $r = 0.183$, $p < 0.05$). The relationship between ROIC and debt ratio (DEBT) was also significant and correlated (Pearson's $r = 0.169$, $p < 0.05$).
- The relationship between cash flow return on investment (CFROI) and the percentage growth in sales (GRWSALE) was significant and correlated (Pearson's $r = 0.206$, $p < 0.05$). The relationship between CFROI and total assets turnover (TATO) was significant and correlated (Pearson's $r = 0.197$, $p < 0.05$). The relationship between CFROI and debt ratio (DEBT) was also significant and correlated (Pearson's $r = 0.190$, $p < 0.05$).
- There was no significant relationship between cost of capital (COSTCAP) and the dependent variables.
- The CFROI, which was the surrogate variable for VBM tools was significant and positively correlated to TATO, which was the surrogate variable for organization performance with Pearson's $r = 0.197$, $p < 0.05$).

Table 4.20: **Pearson's correlation coefficient (total 15 variables, n = 141)**

Variables	TO ASSET	TR VENUE	MKT SHR	PRD LIFCY	FCF	COST CAP	EVA	SVA	ROIC	CFROI ^a	GRW SALE	PRO FITM	TATO ^b	ROA	DEBT
TOASSET	1.000														
TRVENUE	0.831**	1.000													
MKTSHR	0.335**	0.382**	1.000												
PRDLIFCY	0.033	0.007	0.022	1.000											
FCF	0.201*	0.177*	0.105	-0.060	1.000										
COSTCAP	0.302*	0.331*	0.144	0.014	0.289**	1.000									
EVA	0.081	0.108	0.097	0.021	0.385**	0.399**	1.000								
SVA	0.037	-0.011	-0.029	-0.063	0.316**	0.130**	0.512**	1.000							
ROIC	0.115	0.071	0.022	-0.020	0.289**	0.319**	0.503**	0.462**	1.000						
CFROI ^a	0.120	0.104	0.030	-0.101	0.467**	0.324**	0.533**	0.481**	0.680**	1.000					
GRWSALE	0.151	0.170*	0.137	-0.281**	0.267**	-0.037	0.106	0.012	0.197*	0.206*	1.000				
PROFITM	0.073	0.130	0.085	-0.209*	0.150	0.012	0.088	0.066	-0.011	0.145	0.563**	1.000			
TATO ^b	0.017	0.038	0.135	-0.197*	0.182*	-0.002	0.161	0.100	0.183*	0.197*	0.592**	0.709**	1.000		
ROA	-0.005	0.035	0.123	-0.188*	0.143	-0.037	0.186*	0.149	0.020	0.150	0.483**	0.798**	0.836**	1.000	
DEBT	0.144	0.122	0.176*	-0.154	0.183*	-0.046	0.058	0.173*	0.169*	0.190*	0.447**	0.640**	0.621**	0.601**	1.000

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

a. The surrogate variable for VBM variables

b. The surrogate variable for organization performance variables

(Source: Analysis of survey data collected for this research)

4.6 Hypotheses testing

Statistical analyses were conducted through the use of the software package, SPSS version 10.0 for Windows. Regression analysis was used to test hypothesis 1, Pearson's correlation for hypotheses 2 and partial correlation analysis for hypothesis 3. The results of these tests and their interpretation are discussed below.

4.6.1 Test of hypothesis one

Hypothesis 1: Use of Regression Analysis

Hypothesis 1 (H1): Organization factors are not the determining factors for selecting and using Value-based management (VBM) tools for performance measurement.

H1a: Organization size is not the determining for selecting and using Value-based management (VBM) tools for performance measurement.

H1b: Market share position of organization in relation to its competitors is not the determining for selecting and using Value-based management (VBM) tools for performance measurement.

H1c: Product life cycle stages are not the determining for selecting and using Value-based management (VBM) tools for performance measurement.

Pearson's Correlation Matrix (Table 4.20) showed no significant relationship amongst organization size (TOASSET, TRVENUE), market share position (MKTSHR), product-life cycle stages (PRDLIFCY) and the cash flows return on investment (CFROI), which represents VBM tools. A regression analysis was applied to test whether the selection and the use of CFROI was resulted from the independent variables such as organization size, market share position, and product life cycle stages.

Before the relationship between each chosen organization factors and CFROI was tested using regression analysis, the correlation among independent variables was observed using Pearson's correlation matrix (see Table 4.20). According to the regression assumption for multicollinearity, the research should pick the one with the highest correlation value. The research found that organization size is highly and significantly correlated with market share position ($r = 0.382$, $p < 0.01$), as a consequence only organization size (representing **by total annual revenue**), and **product life cycle stages** were applied to the regression model and it tested hypothesis 1a and hypothesis 1c (see

Table 4.21). From the regression model, the result showed the normal distribution of CFROI, which is the surrogate variable representing selection and the use of VBM tools, showed in histogram (Figure 4.8). The test for normality also confirmed and showed in Normal Probability Plots of Regression (see Figure 4.9).

The following regression model was applied to test the relationship between the organization factors and the selection VBM tools, as stated in hypothesis 1 (see Table 4.21):

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$$

Where; Y = The Selection of VBM tools (CFROI)
 X_1 = Organization size (TRVENUE)
 X_2 = Market share position (MKTSHR)
 X_3 = Product life cycle stages (PRDLIFCY)
 $\beta_1, \beta_2, \beta_3$ = Regression coefficient for each independent variable
 ε = Random error

Dependent Variable: Cash flow return on investment (CFROI).

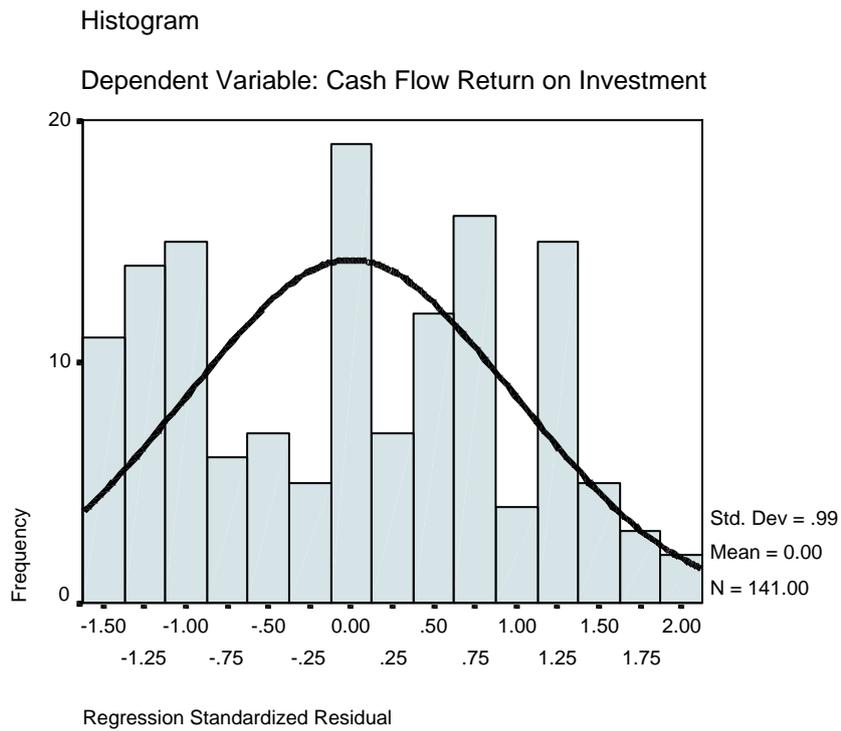
Independent Variables: Organization size (TRVENUE), product life cycle stages (PRDLIFCY).

Table 4.21: **Multiple regression results for Hypothesis 1a, and Hypothesis 1c**

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	0.146 ^a	0.021	0.007	1.56		
a Predictors: (Constant), Product Life Cycle Stages, Total Annual Revenue						
ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.286	2	3.643	1.502	0.226 ^a
	Residual	334.685	138	2.425		
	Total	341.972	140			
a. Predictors: (Constant), Product Life Cycle Stages, Total Annual Revenue						
b. Dependent Variable: CFROI						
Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.284	0.491		6.682	0.000
	Total Annual Revenue	0.113	0.091	0.105	1.247	0.215
	Product Life Cycle Stages	-0.219	0.181	-0.102	-1.213	0.227
a Dependent Variable: CFROI						

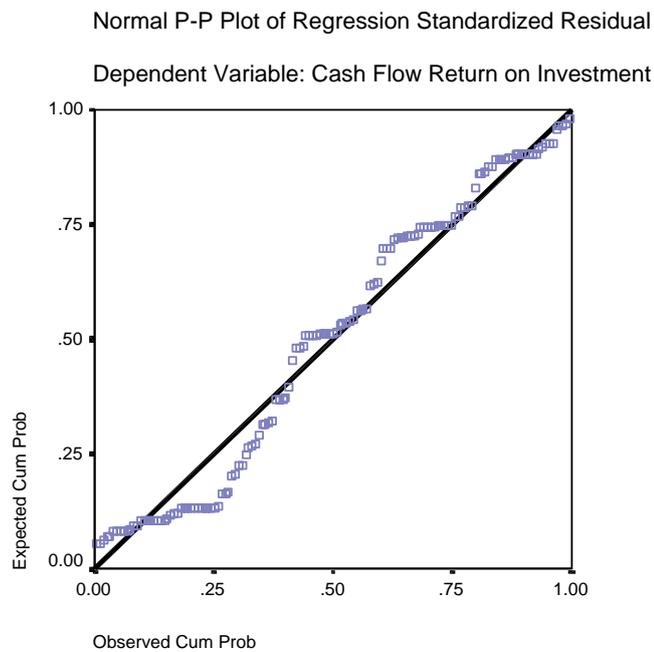
(Source: Analysis of survey data collected for this research)

Figure 4.8: **Histogram for surrogate variable for VBM tools (CFROI)**



(Source: Analysis of survey data collected for this research)

Figure 4.9: **Normal probability plots for surrogate variable for VBM tools (CFROI)**



(Source: Analysis of survey data collected for this research)

There is no statistically significant relationship between organization size (TRVENUE) and cash flow return on investment (CFROI) based on Pearson's correlation as shown in Table 4.20 (Pearson's $r = 0.104$, $p > 0.05$). Table 4.21 reports the results of multiple regression analysis. The overall regression model explained 0.7 per cent (adjusted R^2) of the variance in the dependent variable ($F = 1.502$, $p = 0.226$ two-tailed). The data indicated that an unstandardized coefficient beta for organization size (TRVENUE) is positive ($\beta_1 = 0.113$) but is not significant since $p = 0.215$ (two-tailed). This implies that there is no significant association between the size of organization and CFROI which representing the selection and the use of VBM tools. From the analysis, although the result was contrary with the expectation, but **Hypothesis 1a (H1a) was accepted. That is organization size is not a determining factor for the selection and the use of VBM tools.**

The finding from this research shows that organization size is not one of the factors that influence managers in the selection and the use of the VBM tools, at least in the Thai context. This result contradicts the findings of Cooper and Petry (1994); Hoque and James (2000); Merchant (1984); Ryan and Trahan (1999), in which they found the positive and significant relationship between organization size and the selection of the performance measurement tools. As stated in Section 2.4.1 page 42 that larger organizations are more likely to rely on more sophisticated performance measurement tools such as VBM. However, this research found that in the Thai organization context, the size of the organization is not the factor that influences managers to select VBM tools. It should be noted that this unexpected result in this regard could have been affected by the instrument used in this research or by other factors such as the use of the limited control variables, or the spread of other performance measurement tools in Thailand that are less complicated and are more affordable. Therefore, this research finding has added new knowledge to the area of performance measurement.

The results of Pearson's correlation matrix showed in Table 4.20 did not indicate any significant association between market share position and CFROI (Pearson's $r = 0.030$, $p > 0.05$ two-tailed). However, multicollinearity existed between market share position and total annual revenue (Pearson's $r = 0.362$, $p = 0.000$ two-tailed). When two independent variables are highly associated, it is not appropriate to use multiple regressions for analysis. The high association between market share position and total annual revenue could be

explained as respondents view these two independent variables to be the same. Therefore the results showed that these two independent variables are highly correlated.

Simple linear regression was then used to find out the relationship of market share position and the CFROI (see Table 4.22). The regression model explained 0.06 per cent (adjust R^2) of the variance in the dependent variable ($F = 0.121$, $p = 0.728$ two-tailed). The data indicated that an unstandardized coefficient beta for market share position is positive ($\beta_2 = 6.381e-02$) but is not significant since $p = 0.728$ (two-tailed). Thus, **Hypothesis 1b (H1b) was accepted, that is, there is no association between market share position and the selection of VBM tools.**

This result evidently confirms other findings with respect to the effect of market share position and the use of performance measurement tools. Hoque and James (2000) did not find any positive association between market share and the use of the balanced scorecard. Ryan and Trahan (1999) used the potential factors to represent market share, such as operating assets, and fixed assets and found no association between the potential factors and the VBM tools. Thus, this research found no support for the significant association between market share position and the selection and the use of VBM tools.

Table 4.22: **Linear simple regression results for Hypothesis 1b**

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	0.030 ^a	0.008	0.006	1.57		
a Predictors: (Constant), Market Share Position						
ANOVA^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.298	1	0.298	0.121	0.728 ^a
	Residual	341.673	139	2.458		
	Total	341.972	140			
a Predictors: (Constant), Market Share Position						
b Dependent Variable: CFROI						
Coefficients						
Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
	(Constant)	2.869	0.361		7.936	0.000
	Market Share Position	6.381E-02	0.183	0.030	0.348	0.728
a Dependent Variable: CFROI						

(Source: Analysis of survey data collected for this research)

Also from table 4.21, the data indicated an unstandardized coefficient beta for product life cycle stages to be negative ($\beta_3 = -0.219$) but is not significant since $p = 0.227$ (two-tailed). Further, Pearson's correlation matrix (Table 4.20) showed a negative correlation but this correlation was not significant with Pearson's $r = -0.101$, and $p > 0.05$. This implies that there is no significant association between the product life cycle stages and CFROI, representing the selection of VBM tools. **Hypothesis 1c (H1c) was accepted; therefore, product life cycle stages are not a determining factor for the selection and the use of VBM tools.**

The research finding is concurrent with the findings of Merchant (1984), however it is contrary to the findings of Hoque and James (2000). The reason why this research finding is concurrent with Merchant's (1984) could possibly be that budgeting control, which was used by Merchant, focused more on financial management. Budgeting control, although considered as a traditional performance measurement tool is related to VBM tools in a way that both tools focus more on financial performance measurement. While the balanced scorecard, used by Hoque and James (2000), focuses not only on financial performance but also customer satisfaction, internal process, innovation and learning.

The findings of Merchant (1984) showed that the stages in the product life cycle had no effect on the usage of budgeting as a performance control tool. Hoque and James (2000) replicated the research done by Merchant (1984), but they used balanced scorecard instead of budgeting. They found a positive relationship between the early product life cycle stages and a greater use of the balanced scorecard. Hoque and James' (2000) finding is confirmed by Grundy (2002), who stated that different stages of product life cycle demand different competitive strategy. These competitive strategies, in turn, lead to a different investment strategy and different financial performance. As a consequence, the product life cycle stages are indirect value drivers that could deliver shareholder value. This research found a negative association, although not significant, between product life cycle stages and the selection and the use of VBM tools in the Thai organization context, which is different from the research by Hoque and James (2000).

Conclusion for hypothesis 1

The result shows that **Hypothesis 1 is accepted, that is organization factors such as organization size, market share position, and product life cycle stages, are not the determining factors for the selection and the use of Value-based management (VBM) tools to measure the organization performance.** The results do not suggest that other

organization factors such as management style, organization culture, the trade-off in implementing VBM and the concern of public image as up-to-date management when implementing VBM, could affect the selection and the use of VBM tools. These factors could be used for further study.

4.6.2 Test of hypothesis two

Hypothesis 2: Use of Pearson's Correlation Matrix

Hypothesis 2 (H2): The Value-based management tool (VBM) selected and used by an organization does not influence its organization performance.

The results from the Pearson's correlation matrix in Table 4.20 page 155 showed there is a statistically significant relationship between the surrogate variable of the selection and the use of VBM tools (CFROI) and the surrogate variable of organization performance (TATO) with a positive correlation at 0.197 with $p < 0.05$, two-tailed. This could mean that the selection of VBM tools influences organization performance. Therefore, **Hypothesis 2 was rejected, that is, there is a significant association between the selection and the use of VBM tools and the organization performance. Thus, the selection and the use of VBM tools influences organization performance.** This research studied six VBM tools. Pearson's correlation table (Table 4.20 page 155) shows that there are some significant correlations between each VBM tool with organization performance indicators. Table 4.23, summarized the significant correlation between VBM tools and organization performance indicators from Pearson's correlation coefficient. It is noted that the cost of capital (COSTCAP) was the only tool among the selected six VBM tools being studied, that showed no significant correlation with any organization performance indicator.

Conclusion for hypothesis 2

The finding for the second hypothesis shows **there is significant relationship between the selection and the use of VBM tools and organization performance** and is supported by the study of Ryan and Trahan (1999). Ryan and Trahan (1999) found an improvement in utilizing assets (TATO, and ROA) when VBM is implemented. Further, the result of this study supported the explanation stated in Section 2.7.2 page 68 that the implementation of VBM should be linked to efficiency in utilizing assets, reducing costs and reducing investment assets, where these should improve cash flows and financial performance Frykman and Tolleryd (2003); Martin and Petty (2000); Haspeslagh, Noda and

Boulos (2001), and. Therefore, this research finding confirmed the statement that organizations, which select VBM tools perform better than those that do not.

Table 4.23: **Significant relationship between VBM tools & organization performance indicators**

VBM tools	Pearson's correlation	Organization Performance Indicators
FCF	0.267**	GRWSALE
FCF	0.182*	TATO
FCF	0.183*	DEBT
EVA	0.186*	ROA
SVA	0.173*	DEBT
ROIC	0.197*	GRWSALE
ROIC	0.183*	TATO
ROIC	0.169*	DEBT
CFROI	0.206*	GRWSALE
→ CFROI	0.197*	TATO ←
CFROI	0.190*	DEBT

Note: Arrows indicated the surrogate variables
 ** correlation is significant at 0.01 (2-tailed)
 * correlation is significant at 0.05 (2-tailed)

(Source: Analysis of survey data collected for this research)

4.6.3 Test of hypothesis three

Hypothesis 3: Use of Partial Correlation Coefficient

Hypothesis 3 (H3): The relationship between organization factors and organization performance are not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

H3a: The relationship between organization size and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

H3b: The relationship between market share position and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

H3c: The relationship between product life cycle stages and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

The possible effect of the selection and the use of VBM on the association between organization factors and organization performance is explored by computing a partial correlation coefficient. Partial correlation coefficient, therefore, is used to remove the association that the selection and the use of VBM has with both organization factors and organization performance.

The associations were grouped by each organization factor used in this research before analyzing the data using Partial correlation coefficient. CFROI is a surrogate variable representing the VBM tools, the research intervening variables. TATO is a surrogate variable represented the organization performance indicators, the research dependent variables

4.6.3.1 Partial correlation of organization size – CFROI – TATO

In this research, total assets and total annual revenue represent organization size. Since there is a strong correlation between the two (Pearson's $r = 0.831$) and also the correlation is highly significant ($p = 0.000$), therefore, one can represent the other. This research used total annual revenue (TRVENUE) to represent organization size.

Table 4.24 showed that CFROI is positively and significantly correlated with TATO, at Pearson's $r = 0.197$, $p = 0.019$ as it was tested from Hypotheses 2. Total annual revenue (TRVENUE) is positively but not significantly correlated with the cash flow return on investment (CFROI) at Pearson's $r = 0.104$, $p = 0.219$.

Further, there is no significant correlation between TRVENUE and TATO, although the Pearson's $r = 0.038$, but $p = 0.656$. When the relationship between TRVENUE and TATO is controlled for the linear effects of the CFROI, it showed a partial correlation coefficient between TRVENUE and TATO to be $r = 0.018$, $p = 0.835$, when CFROI is controlled and held constant (see Table 4.24). Although there is a drastic change in correlation value between TRVENUE and TATO when CFROI is controlled, but the correlation was not significant ($p > 0.05$). Therefore, this indicated that CFROI is not an intervening variable between organization size, and organization performance. Therefore, **H3a is accepted, that is, the relationship between organization size and organization performance is not mediated by the selection and the use of Value-based management (VBM) tools to measure organization performance.**

Contrary to expectations, the finding is different from the findings of Ezzamel (1990); Hoque and James (2000); Merchant (1984). In this research, the results did not show a significant relationship between organization size and organization performance, even when

the VBM tools were selected and used. An implication of this result is that when managers are to measure organization performance, the decisions to select and use VBM tools, may not rely on the information regarding the size of organization.

Table 4.24: **Partial correlation for TRVENUE – CFROI – TATO**

Control Variables			TRVENUE	TATO	CFROI
-None ^a -	TRVENUE	Correlation Sig. (2-tailed) df	1.000 .0 0		
	TATO	Correlation Sig. (2-tailed) df	0.378 0.656 139	1.000 .0 0	
	CFROI	Correlation Sig. (2-tailed) df	0.104 0.219 139	0.197 0.019 139	1.000 .0 0
CFROI	TRVENUE	Correlation Sig. (2-tailed) df	1.000 .0 0		
	TATO	Correlation Sig. (2-tailed) df	0.018 0.835 138	1.000 .0 0	
a. Cells contain zero-order (Pearson) correlations.					

(Source: Analysis of survey data collected for this research)

4.6.3.2 Partial correlation of market share position – CFROI – TATO

The CFROI is positively and significantly correlated with TATO at Pearson's $r = 0.197$, $p = 0.019$, and is supported by the result from testing Hypothesis 2. Table 4.25 showed that market share position (MKTSHR) is positively but not significantly correlated with the CFROI (Pearson's $r = 0.030$, $p = 0.728$).

The association between MKTSHR and TATO is positive but not significantly correlated with Pearson's $r = 0.135$, and $p = 0.110$. When the relationship between MKTSHR and TATO is controlled for the linear effects of the CFROI, it showed a partial correlation coefficient between MKTSHR and TATO at 0.132, this also yielded no significant relationship since $p = 0.120$ (see Table 4.25). Further, when controlling CFROI, the strength of association of MKTSHR and TATO did not drastically change, therefore, **Hypothesis 3b (H3b) was accepted, that is, the selection and the use of VBM tools is not an intervening variable between market share position and organization performance.**

This finding confirms the finding of Hoque and James (2000) as it provides no support for the positive association between market share position and organization performance, even when the selection and the use VBM tools is controlled. This result could imply that

market share position has no influence in a management decision to select and use VBM tools to measure organization performance. It should be noted that this unexpected result in this regard could have been affected by the limited use of independent variables or instruments used. More research, using different settings, or different measurement, is needed to confirm the result.

Table 4.25: **Partial correlation for MKTSHR – CFROI – TATO**

Control Variables			MKTSHR	TATO	CFROI
-None ^a -	MKTSHR	Correlation	1.000		
		Sig. (2-tailed)	.		
		df	0		
TATO	TATO	Correlation	0.135	1.000	
		Sig. (2-tailed)	0.110	.	
		df	139	0	
CFROI	CFROI	Correlation	0.030	0.197	1.000
		Sig. (2-tailed)	0.728	0.019	.
		df	139	139	0
CFROI	MKTSHR	Correlation	1.000		
		Sig. (2-tailed)	.		
		df	0		
TATO	TATO	Correlation	0.132	1.000	
		Sig. (2-tailed)	0.120	.	
		df	138	0	
a. Cells contain zero-order (Pearson) correlations.					

(Source: Analysis of survey data collected for this research)

4.6.3.3 Partial correlation of product life cycle stages – CFROI – TATO

CFROI is positively and significantly correlated with TATO at Pearson's $r = 0.197$, $p = 0.019$, which is considered to be a strong and significant relationship, as tested in Hypotheses 2. Table 4.26 showed that product life cycle stages (PRDLIFCY) is negatively, but not significantly, correlated with cash flows return on investment (CFROI) since Pearson's correlation is -0.101 , and is not significant since $p = 0.232$. This indicated that the association between PRDLIFCY and CFROI is weak and not significant.

PRDLIFCY is negatively and significantly correlated with total assets turnover (TATO) at Pearson's $r = -0.197$. This negative relationship between PRDLIFCY and TATO is considered strong and significant since $p = 0.019$. When the relationship between PRDLIFCY and TATO is controlled for the linear effects of CFROI, it showed a reduction in the strength of association between the PRDLIFCY and TATO (see Table 4.26), however this relationship continued to be negative and also shows it to be significant (Pearson's $r = -0.181$, $p = 0.032$). This could summarize that controlling CFROI caused some change in the relationship between PRDLIFCY and TATO. Therefore, **Hypothesis 3c (H3c) was**

rejected, that is the selection and the use of VBM tools is an intervening variable between product life cycle stages and organization performance.

As expected, the result of H3c suggested that the greater selection and use of VBM tools is associated with an increase in organization performance, but this significant relationship depends on the product life cycle stages. The result showed that product life cycle stages and organization performance was negatively associated with and without the selection and the use of VBM tools. This result is contrary to the finding of Hoque and James (2000), in which they found a positive relationship. In this research, the result is also contrary to expectations but is concurrent to the finding of Merchant (1984). The result of H3c, therefore, suggested that at the early product life cycle stages, the selection and the use of VBM tools to measure organization performance should be less beneficial for organization than with products at the latter stages of the product life cycle.

Table 4.26: Partial correlation for PRDLIFCY – CFROI – TATO

Control Variables			PRDLIFCY	CFROI	TATO
-None ^a	PRDLIFCY	Correlation	1.000		
		Sig. (2-tailed)	.		
	df	0			
TATO	PRDLIFCY	Correlation	-0.197	1.000	
		Sig. (2-tailed)	.019	.	
CFROI	TATO	df	139	0	
		Correlation	-0.101	0.197	1.000
CFROI	CFROI	Sig. (2-tailed)	0.232	0.019	.
		df	139	139	0
CFROI	PRDLIFCY	Correlation	1.000		
		Sig. (2-tailed)	.		
	df	0			
TATO	PRDLIFCY	Correlation	-0.181	1.000	
		Sig. (2-tailed)	0.032	.	
	df	138	0		

a. Cells contain zero-order (Pearson) correlations.

(Source: Analysis of survey data collected for this research)

Conclusion for hypothesis 3

The findings for Hypothesis 3 are different to the research performed by Hoque and James (2000); Merchant (1984) in that their research used the balanced scorecard and budgeting control as intervening variables. This research used VBM tools as intervening variables, which are different from that of Hoque and James (2000); Merchant (1984). Further, this research was carried out within Thailand organization context, in which the

management culture could possibly be different from western culture and may cause differences in research results.

This research found no significant relationship between the sizes of organization and organization performance, and found no significant relationship between market share position and organization performance through the selection and the use of VBM tools. However, this research found that there is a negatively and significant relationship between product life cycle stages and improving organization performance through the selection of VBM tools.

The result after testing hypothesis 3a, hypothesis 3b and hypothesis 3c, is that only hypothesis 3c is rejected. Therefore, this can be concluded that **only the relationship between product life cycle stages and organization performance is intervened by the selection and the use of Value-based management (VBM) tools to measure organization performance.**

4.6.4 Hypotheses testing – summary

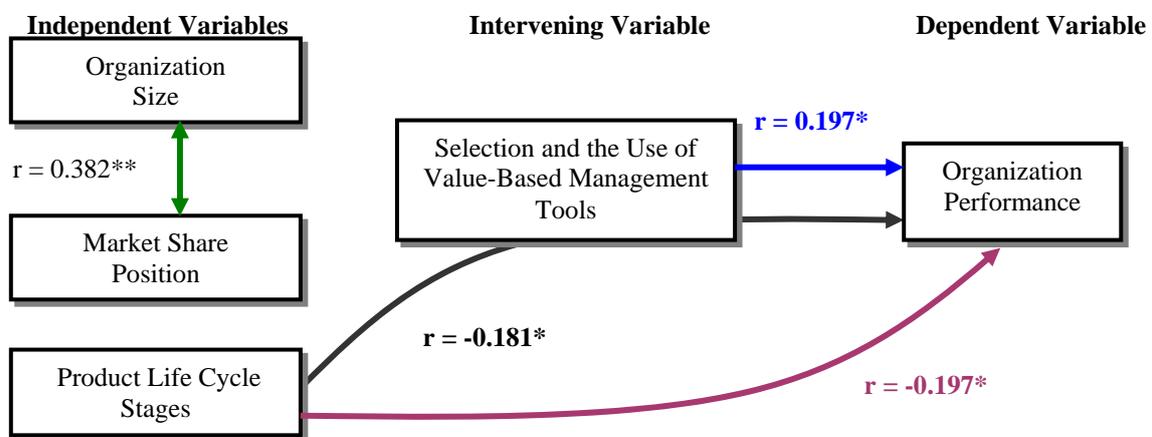
From the result of testing three hypotheses; **only H2, and H3c were rejected** (see Figure 4.10). The research findings are somewhat different from the research model proposed in Chapter Two (see Figure 2.9 page 70), which suggested that organization factors are the influential factors in determining the selection and the use of Value-based management (VBM) tools. From the results of the regression analysis, it is clear that none of the three organization factors; organization size, market share position, nor product life cycle stages, are the influential factors in determining the selection and the use of VBM tools.

This research found that market share position does not significantly correlate with the selection and the use of VBM tools or organization performance, but it is significantly correlated with organization size, which is one of the organization factors. Therefore, the strength of its market position compared to its competitors is not a determining factor in the selection and the use of VBM tools and has no influence on organization performance.

By looking at the macro-level, it is clear from the result of Pearson's correlation matrix (see Table 4.20) that the selection and the use of VBM tools is positively and significantly correlated with organization performance indicators, where Pearson's r is 0.197 (see Figure 4.10). Hence, if an organization selects and uses the VBM tools as its performance measurement tools, it should improve performance to a certain level and, therefore, hypothesis 2 is rejected.

Further, it is also clear that product life cycle stages are negatively and significantly associated with organization performance. That is, the selection and the use of VBM tools to measure organization performance is less preferable when the product is at the early stages of product life cycle, but is more preferable when the product reaches maturity or where the organization can prolong the maturity stage. In other words, at the latter stages of product life cycle, organization performance is at its peak and the organization could perform better and enjoy longer-term benefit when the VBM tools are selected and used at these stages (see Figure 4.10). Therefore, hypothesis 3c is rejected.

Figure 4.10: **Research findings with Pearson’s correlation coefficient**



** correlation is significant at 0.01 (2-tailed)

* correlation is significant at 0.05 (2-tailed)

(Source: Analysis of survey data collected for this research)

4.7 Summary of the chapter

This Chapter analyzed the data collected from the mail survey of the Thai electrical and electronics industry. Of 462 questionnaires sent to the Head of Finance/Accounting departments, 141 were returned with complete answers. The profiles of respondents and responding companies were outlined.

The mean, median, mode, range, standard deviation, and percentile quartiles were used to portray the central tendency and dispersion of the research variables. Cronbach’s alpha was applied to check the reliability of the measures. Frequency distributions of the variables were obtained and generated as tables, graphs, and pie charts. Factor analysis was used to reduce the data into surrogate variables to represent the variable groups before identifying the relationships among variables and testing hypotheses. To identify relationship among the research variables, Pearson’s correlation matrix was applied. After

preparing the data for analysis, statistical analysis and tests such as regression analysis and partial correlation coefficients were used to examine research hypotheses to answer the research question.

Based on the interpretation of the results, this research found that the VBM tools, selected and used during the growth stage of product life cycle, to measure organization performance would no doubt strengthen organization performance. But the fact remains that only three independent variables were considered in this study. In other words, there are other additional determination factors that have not been considered in this study that could be important in explaining what factors determine the selection and the use of the right tools, such as VBM tools, to improve the organization performance. More research might be necessary to explain more of the variance. The next chapter, Chapter Five, will summarize this research, its limitations and provide recommendations for future research.

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

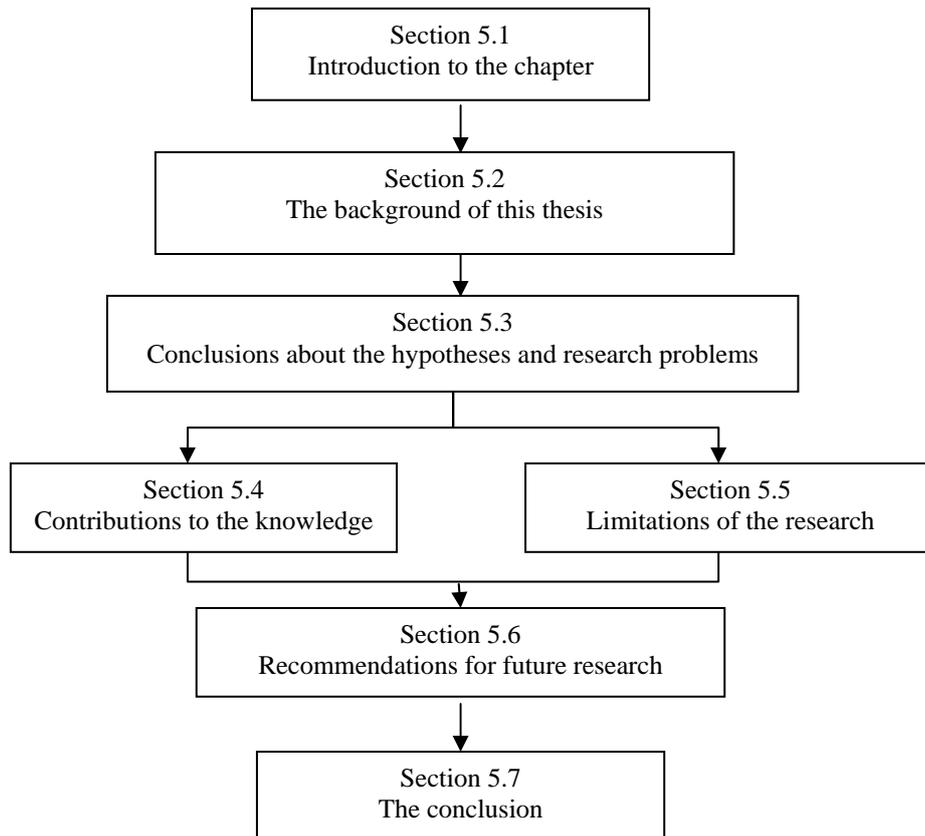
5.1 Introduction to the chapter

Chapter Five states the background of the thesis that identified the links between chapters of the thesis before drawing conclusions and implications of the research findings. This chapter also outlined major limitations and recommendation for further research.

This chapter is organized into seven sections as shown in Figure 5.1. The introduction of this Chapter is presented in Section 5.1. The background of this thesis identified the links between chapters of this thesis, and is presented in Section 5.2. This is followed by a review of the hypotheses and the findings to resolve the research problems in Section 5.3.

The research findings covering contributions to the knowledge are described in Section 5.4. It is followed by limitations of this research are described in Section 5.5. Section 5.6 presents recommendations for future research. The last section, Section 5.7 states the conclusion of the research.

Figure 5.1: **The structure of chapter five**



(Source: Developed for this research)

5.2 The background of this thesis

As presented in Chapter One, most organizations recognize the importance of measuring and managing their performance to ensure the achievement of strategic objectives and to sustain value creation. Management uses certain performance measurement tools to measure whether organization performance reaches the desired goals and meets the objectives. (Aggarwal 2001; Eccles 1998; Hertenstein & Platt 2000; Neely 1998; Sharman 1995; Stern, Shiely & Ross 2001). Several studies evidently showed the relationship between performance measurement tools and organization performance (Aggarwal 2001; Hoque & James 2000; Merchant 1981 & 1984; Pettit 2000; Ryan & Trahan 1999; Sinclair & Zairi 2000).

Even though value-based management (VBM) is recognized as one of performance measurement tools managers' use in today's businesses, little evidence examined what

causes organizations to select and use VBM systems (Ryan & Trahan 1999). This study proposes to fill this research gap, and therefore the questions of what are the factors that cause the company to select and use VBM and how do the selection and the use of VBM tools affect performance in the Thai organization context was addressed.

In attempting to empirically explain the selection and the use of VBM in the organization, the following research problems were addressed:

1. What are the organization factors that could influence the selection and the use of the performance tools, in particular Value Based Management, to measure organization performance? And
2. Does the selection and the use of Value Based Management improve the organization performance?

To investigate the proposed research problems, a literature review was completed in Chapter Two. Four management functions were addressed, namely; planning, organizing, leading and controlling. This research looked into management control, in which it helps managers to assure that the current operations are still meeting the organization objectives. Management control mechanisms involve setting targets or standards, measuring performance, evaluating the results and taking actions. Performance measurement is the key element in management control process and is studied as the research immediate discipline. Performance measurement requires an understanding and translation of organization's strategies into directions that motivate employees to focus their energies to achieve an organization's objectives. Performance measurement helps managers to identify and to evaluate the performance and derive to useful information before decisions and/or actions are taken. Chapter Two reviewed several performance measurement tools; the traditional tools such as earnings per share and return on equity; and modern tools such as activity-based management (ABM), the Balanced Scorecard (BSC) and, in particular, Value-based management (VBM).

A review of the literature shows that most organizations select and use certain performance measurement tools to measure their performance. But what influences such selection of the performance measurement tools and the criteria of how organization performance is achieved through the selection and the use of such tools are questionable and were addressed as the research problems. To answer the research problems, four objectives were stated and the research questions were generated, which lead to the formulation of research hypotheses.

This research chose three organization factors as independent variables, to examine of what factors influence the selection and the use of VBM tools. The independent variables being studied are organization size, market share position in relation to its competitors and product life cycle stages. On the strength of the literature review, three hypotheses were postulated as:

Hypothesis 1 (H1): Organization factors are not the determining factors for selecting and using Value-based management (VBM) tools for performance measurement.

Hypothesis 2 (H2): The Value-based management tool (VBM) selected and used by an organization does not influence its organization performance.

Hypothesis 3 (H3): The relationship between organization factors and organization performance are not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

To test the proposed hypotheses in Chapter Two (see Figure 2.9, page 70) empirically, Chapter Three presented the research method for this research. The research instrument for data collecting was a mailed-survey questionnaire. A stratified sampling technique on a population of 462 Heads of Finance/Accounting Departments, of the Electric and Electronic Industry of Thailand was employed and a response rate of 30.52 per cent was achieved. Several analytical techniques were reviewed as they are used to test the hypotheses. These techniques are such as regression model, correlation coefficient, and factor analysis.

Data Finding and Analysis was presented in Chapter Four. Descriptive characteristics of the sample surveyed were concluded as follows:

About 86 per cent respondent companies are private companies; only about 14 per cent are public companies. Some 40.40 per cent respondent companies have been in existence for fifteen or more years, which indicated the stability of the companies in operating businesses. According to the classification of manufacturing companies by the Ministry of Industry, Thailand, if categorized by calculating the size of the company by the number of full-time employees; approximately 64.50 per cent of the respondents had 200 full-time employees and above, which indicated large size organizations while 32.60 per cent of respondents yield medium size organizations that employed 50 to less than 200 employees.

The characteristics of the research independent variables can be summarized as follows:

Organization size, which measured by total assets and total annual revenue found that these two variables were significantly and highly correlated (Pearson's $r = 0.8311$, $p < 0.001$), therefore one can represent the other. Most of the respondents showed that about 48 per cent of them hold less than THB 1,000 Million in total assets and about 53 per cent respondents hold less than THB 2,000 Million of total annual revenue.

Market share position, which is measured from the perception of respondent firms when they compare themselves with others in the same industry. The result showed that around 45.40 per cent of respondents perceived that their market share position is about average compared to competitors. About 35.50 per cent stated that they are in a weak market share position compared to competitors, while 19 per cent indicated that they have strong market share position.

Product life cycle stages, which is measured for the four life cycle stages. Some 46.80 per cent of respondents stated that their companies gained the highest revenue when their product reached the growth stage, followed by 39 per cent of respondents, which stated that mature stage brought the highest revenue to the companies. Only 8.50 per cent respondents stated that product life at an emerging stage brought the highest revenue and 5.70 per cent stated that product life at a declining stage brought the highest revenue to the companies.

The selection and the use of VBM tools have been chosen as the research intervening variable. Regardless of which VBM tools are selected and used, all are designed to help corporations improve performance. Six VBM tools were listed in the questionnaire and respondents were asked to indicate the extent in which they select and use these VBM tools in their organizations; these VBM tools indicated in the questionnaire are free cash flow (FCF), cost of capital (COSTCAP), economic value added (EVA), shareholder value added (SVA), return on invested capital (ROIC) and cash flows return on investment (CFROI). Among six VBM tools used in this research; FCF, ROIC, and COSTCAP marked the highest familiarity for the respondents. The reason that these three tools were the most familiar to the Heads of Finance/Accounting Departments is that these tools provided the fundamental of VBM, which is not only simple and involved the basic knowledge of discounted cash flow method, but also can be applied to a wide range of sizes and does not demand a large investment such as using consultant firms. Factor analysis technique was applied to reduce the data, and CFROI was selected as a surrogate variable according to the result of factor analysis to represent the six VBM tools before the hypotheses were tested.

For the descriptive characteristics of organization performance variables, five financial indicators were used to represent organization performance; these are percentage growth in sales (GRWSALE), profit margin (PROFITM), total assets turnover (TATO), return on assets (ROA) and debt ratio (DEBT). Respondents were asked to compare their performance of Year 2002 and Year 2003, using these indicators. About 47 per cent of the respondents believed their performance improved in all these five ratio indicators, comparing to those of the previous year. About 19.57 per cent stated that their performance was about the same as the previous year, and 19.72 per cent stated that their performance was worse than that of previous year. Factor analysis was used to reduce data, and TATO was selected as a surrogate variable to represent all five-performance indicators before testing hypotheses.

To test the hypotheses, Pearson's correlation matrix, regression analysis and partial correlation coefficient were applied. Then, an evaluation and assumption was conducted indicating that not all the research independent variables related to the VBM and/or to organization performance. The next section, Section 5.3, will conclude the hypothesis testing and answer the research problems.

5.3 Conclusion about the proposed hypotheses and research problems

5.3.1 Conclusion for hypothesis one

Hypothesis 1 (H1): Organization factors are not the determining factors for selecting and using Value-based management (VBM) tools for performance measurement.

H1a: Organization size is not the determining for selecting and using Value-based management (VBM) tools for performance measurement.

H1b: Market share position of organization in relation to its competitors is not the determining for selecting and using Value-based management (VBM) tools for performance measurement.

H1c: Product life cycle stages are not the determining for selecting and using Value-based management (VBM) tools for performance measurement.

Hypothesis 1 (H1) was accepted that is organization factors; such as organization size, market share position and product life cycle stages, are not the determining factors for the selection and the use of Value-based management (VBM) tools to measure the organization performance. The results from testing this hypothesis do not suggest that other organization factors such as management style, organization culture, the trade-off in implementing VBM, and the concern of public image as up-to-date management when implementing VBM, could affect the selection of VBM tools. These factors could be used for further study.

Organization size (H1a): The finding indicates that organization size has no significant association to the way organization select and use VBM tools, at least in the Thai context. This result is different from the findings of other researchers, which they found the relationship between organization size and the selection and the use of performance measurement tools (Cooper & Petry 1994; Hoque & James 2000; Ryan & Trahan 1999; Merchant 1984). However, this unexpected result could have been affected by the instrument used in this research or by other factors such as the use of the limited control variables or the spread of other performance measurement tools in Thailand that are less complicated and are more affordable. Therefore, the result of H1a is a new finding in the area of performance measurement.

Market share position (H1b): From this study, multicollinearity existed between the market share position and total annual revenue which represent organization size, therefore it was not appropriate to use a multiple regression model with organization size and product life cycle stages. The high association between market share position and total annual revenue as respondents view these two independent variables to be the same. A simple linear simple regression was used. The result of the regression showed no significant association between market share position and the selection and the use of VBM tools. The result was concurrent with other researchers who found no relationship between market share position and the selection and the use of performance measurement tools (Hoque and James 2000; Ryan and Trahan 1999). More research, in different settings, using a different sample or different measurement, is needed to confirm the results.

Product life cycle stages (H1c): The result indicates a negative association between product life cycle stages and the selection and the use of VBM tools but this association is not significant. The result of this study was different from that of Hoque and James (2000). Hoque and James (2000) used the balanced scorecard instead of VBM tools, and the result yielded a positive association, but the relationship was found to be not significant. However, the result of H1c agreed with that of Merchant (1984). Merchant (1984) conducted research and used budgeting controls instead of VBM tools. The reason explained that the result of H1c agreed with Merchant's could possibly be that budgeting control and VBM tools both concentrate on how well organization is performed financially. Budgeting control, although considered as a traditional performance measurement tools, relates to VBM tools in a way that both tools concentrate more on financial performance measurement. On the other hand, the balanced scorecard does not concentrate its performance measurement on one area. The balanced scorecard positions its attention among the four performance areas; namely, customer satisfaction, internal process, innovation and learning activities, and financial performance (Kaplan & Norton 1998).

5.3.2 Conclusion for hypothesis two

Hypothesis 2 (H2): The Value-based management tool (VBM) selected and used by an organization does not influence its organization performance.

This research found a significant relationship between the selection and use of VBM tools and organization performance to reject **hypothesis 2 (H2)**. That is, this research confirmed that the selection and use of the right performance measurement tools, in

particular – the VBM, influence an improvement in organization performance in the Thai organization context. The test of Pearson’s correlation coefficient shows there was a positive and significant association in that the selection and the use of VBM could possibly lead to better organization performance.

Performance measurement tools help managers to determine organization success when operating in a highly complex environment (Dixon, Nanni & Vollmann 1990). It was found that performance measurement tools must be reliable so that the outcome reflects the true performance. The selection and the use of VBM should enable managers to assess overall organization performance that reflects its success and ability to survive. All these factors should improve the overall performance of an organization, which in turn, increases the value of the business. Although this research was completed under different settings, its finding is relevant to the research by Ryan and Trahan (1999) that stated that firms with good performance might be more likely to utilize the VBM because the firms are committed to continuing strong performance. It was concluded that the selection and the use of VBM as performance measurement tools has the capability to improve performance of organization.

This research went further into the micro-level to study whether the use of VBM tools is associated with organization performance, and found that almost all VBM tools being tested in this research significantly and positively related to organization performance indicators. This indicated that organization that any selected and used VBM tools performs better than those that do not.

5.3.3 Conclusion for hypothesis three

Hypothesis 3 (H3): The relationship between organization factors and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

H3a: The relationship between organization size and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

H3b: The relationship between market share position and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

H3c: The relationship between product life cycle stages and organization performance is not mediated by the Value-based management (VBM) tools selected and used by an organization to measure organization performance.

Not all sub-hypotheses in hypothesis 3 (H3) were rejected. Each sub-hypothesis (H3a, H3b, and H3c) was examined using a partial correlation coefficient to remove the association that the selection and the use of VBM has with both organization factors and organization performance. The hypothesis testing yields that **only H3c was rejected**. The results were shown according to each independent variable to conclude as follows:

Organization size (H3a): The result shows no significant association between organization size and organization performance even when the VBM tools were selected and used. As a consequence, the sub-hypothesis H3a is accepted. This study concluded that when Thai managers selected and used VBM tools to measure organization performance, organization size was not a factor influencing managers in making such decisions. Reasons to the conclusion of H3a could be the research instrument used in this research, or other factors may be more significant than size of organization. These factors could be cost-to-benefit in hiring consulting firms to implement VBM tools and whether VBM tools are more preferable by shareholders. In addition, the result of this finding was different from other researchers (Ezzamel 1990; Hoque and James 2000; Merchant 1984). This may due to the different in national context, different performance measurement tools and different settings, which may influences managers to think differently.

Market share position (H3b): From the findings, the result also indicated no significant association between market share position and organization performance, regardless the selection and the use of VBM tools existed. As a consequence H3b is accepted. This result was concurrent with that of Hoque and James (2000) in which the finding provided no support of significant association between market share position and organization performance, even when the selection and the use VBM tools is controlled. This could mean that under the Thai organization context, the market share position has no influence in management decision to select and use VBM tools to measure organization performance. More research, using different settings, or different measurement, is needed to confirm the result.

Product life cycle (H3c): The result shows that product life cycle stages and organization performance was negatively and significantly associated, regardless of the presence in selection and the use of VBM tools. Therefore, **H3c was rejected**. The result

indicated that at the early product life cycle stages, such as emerging stage, the selection and the use of VBM tools to measure organization performance should be less beneficial for organizations than with products at the latter stages of product life cycle. The result of this finding was concurrent with what Frykman and Tolleryd (2003) stated in *Corporate Valuation* that the more mature the company, the more focus should be put on the discounted cash flow valuation model, and vice versa. That is, at emerging stage, organizations may depend more on some simple performance measurement tools, and may have multiple-focus such as management, and expansion of the market. As a consequence, at earlier stage, organizations may use some simple performance measurement tools or other tools such as the balanced scorecard where they focus into four areas rather than in one area as VBM tools. When organizations become more mature, that is their growth becomes more stable, they may focus more on sophisticated tools such as VBM, which concentrate on financial performance and creating value.

5.3.4 Conclusion about the research problems

This research was conducted as an attempt to test empirically the association between the selection of VBM and 1) organization size, 2) market share position in relations to its competitors, and 3) product life cycle stages. It also looks for relationship between organization performance and the match between the selection and the use of VBM and the three organization factors variables. These research problems are:

What are the organization factors that could influence the selection and the use of the performance tools, in particular Value Based Management, to measure organization performance?

Amongst the organization factors, organization size and market share position have no influence over the selection and the use of VBM, but they positively associated with each other. A product life cycle stages also has no influence over the selection and use of VBM, but it associates negatively and significantly with organization performance. Moreover, this negative association is also significant although the selection and use of VBM tools is controlled.

Do the selection and the use of Value Based Management improve the organization performance?

From the research findings, it is confirmed that the selection and the use of VBM tools significantly associates with improvement in organization performance. Organizations that select and use VBM tools should see an improvement in organization performance.

5.4 Contributions to the knowledge

The conclusions reached by this research resulted in several significant research contributions being made to the field of performance measurement and financial management in a number of ways. The findings of this research that contribute to the area of performance measurement are grouped as follows:

First, this research addressed the significance in taking an initial step by selecting and using VBM tools into organizations. Since VBM tools could indicate current situation as well as future prospects of an organization, selecting and using such tools should help managers and employees to obtain a sharper focus of the corporate vision and objectives to enhance corporate value. Finance managers in electrical and electronics industry, as well as in the manufacturing industry in Thailand, therefore, should consider selecting and using VBM tools to measure overall organization performance since it helps to improve organization performance and enhance corporate value. This is not to say that an organization should select and use the popularized VBM tools from consulting firms, where the cost of implementing and consulting such tools may be too high. However, an organization should consider selecting and using a VBM tool that could fit their needs so that financial performance improves over times.

Second, organizations should, at least, apply the foundations of VBM tools, which are free cash flow and cost of capital to enhance performance. Since the combination of free cash flow and cost of capital provides a background about how financial performance of an organization can be improved and less expensive than implementing a popularized VBM that may involve hiring consulting firms and a large investment. Organizations should consider applying or implementing the foundations of VBM tools.

Third, the size of organization and market share position are not the key factors that influence the selection and the use of VBM to achieve a desired performance, at least in the Thai electrical and electronics industry.

Fourth, stages in product life cycle are significant factors when considering applying performance measurement tools, such as VBM. The more mature stage the organization, the more organization should select sophisticated tools that could measure wealth or value being created, such as VBM.

5.5 Limitations of the research

Certain limitations appear as follows:

- The main limitation of this study is that this research is confined to only one industry, namely Electrical and Electronic Industry Thailand (EEIT), where the results of one industry study might not be replicated or represent other manufacturing industrial sectors.
- This research is conducted only in Thailand; the results of the research may not be applicable to other countries. The cultural and contextual differences may cause differences in the results. There will be a need to replicate the study in other national context.
- This research studied only three organization factors as independent variables, future research to investigate other organization factors could determine that the selection and use of the VBM might explain more of the variance.
- This research used a mail-survey questionnaire to gather information. The decision to use a mail survey over other approaches was due to its cost effective and geographic flexibility. Alternative approaches such as an interview survey or case-study research, may allow the researcher to broaden and gain an in-depth knowledge in the area of VBM tools from a managerial perspective.

5.6 Recommendations for future research

Recommendations for future research might take place as follows:

- Future research that replicates this study in other manufacturing industrial sectors, for example, in the textile or steel industries. Research in other industrial sectors could further improve understanding of the selection and use of VBM, and provide a more complete picture to this puzzle. Future research could also be carried out studying over and across all sectors in manufacturing and service industries.
- The replication of this study in other national contexts could further improve an understanding of the selection and the use of VBM as well as enhancing company performance. One might possibly conduct cross-national research, which would add more value to the area of study.
- Future study with different organization factors such as management style, organization culture, the level of innovation, cost control strategies, capital

structure, macroeconomic context and style of leadership could also improve an understanding of the selection and use of VBM tools.

- One might also attempt to investigate more in-depth of why and how companies implement VBM, pitfalls in implementing it, and its success in achieving intended goals.
- One might also attempt to select and investigate a specific VBM tool, and/or conduct a comparison study between the particular VBM tool with other performance measurement tools.

5.7 Conclusion

Measuring organization performance is one of four-management control functions to ensure an organization implements strategies and meets objectives. To measure organization performance, management must use certain performance measurement tools. There are several performance measurement tools that are applicable for organizations, Value-based management (VBM) tools is one of them and that is studied in this research.

Many researches provided knowledge how VBM tools could assist managers in managing organization activities to achieve corporate objectives. However, little evidence showed what factors cause managers to select and implement VBM in their organization, thus it is the gap for more research. This research questioned what organization factors cause an organization to select and use VBM rather than other performance measurement tools. This research also explored whether the selection and the use of VBM significantly improve organization performance. This research, therefore, touched the roots of performance measurement, that is, to identify organization factors that influence the selection and the use of that VBM tools and once these tools are used, whether or not they effectively improve organization performance and enhance corporate value. This research chose to study three organization factors as independent variables; organization size, market share position and product life cycle stages. The research used the selection and the use of VBM tools as intervening variables, and organization performance as the dependent variable.

The research investigated the population of the Electrical and Electronics Industry in Thailand (EEIT). The EEIT is recognized as one of the fastest growing and stable Thai manufacturing industries since the mid 1980s (The Office of Industrial Economics Thailand, 2003). A stratified sampling technique for collecting data was employed and categorized the EEIT companies according to the size of fixed assets as small, medium, and

large (Electrical & Electronics Institute Thailand 2002). In total, 462 medium and large size companies were invited to and participated in this research. A mail survey questionnaire was developed and sent to the Head of Finance/Accounting Departments or top managers of these companies. The data collection period was conducted during June 14 – July 28, 2004 or about 6 weeks. By the end of data collection period, 141 questionnaires were returned; approximately a 30.52 per cent response rate was achieved. Data were examined, prescreened and analyzed with SPSS version 10.0 for statistical presentation in this research.

From the research findings, none of the chosen organization factors is the influential factor in determining the selection and the use of VBM tools. In addition, the research found that market share position was significantly associated with organization size but not with the VBM tools or an organization performance. From the findings, it was clear that the selection and the use of VBM tools was significantly correlated with an improvement in organization performance. Further, it was clear that product life cycle stages are negatively but significantly associated with organization performance regardless when it went through the selection and the use of VBM tools. The finding also evidently showed that the selection and the use of VBM tools to measure organization performance is less preferred when the product is at the early stages of product life cycle, but VBM tools were more preferred when the product reaches maturity or where the organization can prolong the maturity stage and enjoy longer-term benefit.

Since the limitation of this research was framed to accommodate only one nation and one industry, one should be interested to explore different countries and different industries to confirm the results. Further, future researchers could use different organization factors, different performance measurement tools and/or different research methods in conducting their research to add more knowledge in the area of performance measurement. A study of a more in-depth such as why and how organizations implement VBM and the success and pitfalls in implementing it should be valuable in furthering the body of knowledge about VBM.

* * * * *

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APPENDIX A: Letter of ethic approval from HREC

SOUTHERN CROSS UNIVERSITY

~ MEMORANDUM ~

To: C. S. Teo/B. Sakunasingha
GCM
csteo@hemsdale.edu.sg
bsakunas@samart.co.th

From: Secretary, Human Research Ethics Committee

Date: 4.May 2004

Project: An empirical study into factors influencing the selection of value-based management tools for measuring financial performance.

Status: **Approved subject to standard conditions.**
Approval Number **ECN-04-48**

HUMAN RESEARCH ETHICS COMMITTEE (HREC)

Thank you for your responses to the Committee's queries regarding the above project. Your responses are satisfactory and as the Committee delegated the authority to approve this proposal to the Chair, it is now approved.

The approval is subject to the standard conditions of approval and ratification by the full Committee at the HREC meeting on the 17 May 2004.

Best wishes with your research.

Standard Conditions (in accordance with *National Health and Medical Research Council Act 1992* and the National Statement on Ethical Conduct in Research Involving Humans):

1. That the person responsible (usually the Supervisor) **provide a report every 12 months** during the conduct of the research project specifically including:
 - (a) The security of the records
 - (b) Compliance with the approved consents procedures and documentation
 - (c) Compliance with other special conditions.
2. That the person responsible and/or associates report and present to the Committee for approval any **change in protocol** or when the **project has been completed**.

3. That the person responsible and/or associates report immediately anything that might affect ethical acceptance of the research protocol.
4. That the person responsible and/or associates report immediately any adverse effects on participants.
5. That the person responsible and/or associates report immediately any unforeseen events that might affect continued ethical acceptability of the project.
6. That subjects be advised in writing that:

“Any complaints or queries regarding this project that cannot be answered by the person responsible for this research project should be forwarded to:

Mr John Russell, Ethics Complaints Officer

Graduate Research College, Southern Cross University

PO Box 157, Lismore, 2480

Ph: (02) 6620 3705 Fax: (02) 6626 9145 Email: jrussell@scu.edu.au”

Suzanne Kelly
Secretary, HREC
Ph: (02) 6626 9139
skelly1@scu.edu.au

Dr Robert Weatherby
Chair, HREC
Ph: (02) 6620 3671
rweather@scu.edu.au

APPENDIX B: Letter of introduction

TO WHOM IT MAY CONCERN

Re: Letter of Introduction – Ms Benjalux Sakunasingha

We are pleased to introduce Ms Benjalux Sakunasingha who is pursuing the Doctor of Business Administration (DBA) in the Graduate College of Management at the Southern Cross University. She completed her Bachelor of Science (Biology) degree with International College - Mahidol University Thailand in 1993 and Master of Business Administration (Finance) with California State University in 1995. Presently, she is the lecturer at the College of Management, Mahidol University Thailand.

For the DBA program, Ms Sakunasingha is conducting an empirical study into the factors influencing the selection of value-based management tools for measuring financial performance.

In the circumstances, we would sincerely request your cooperation by providing Ms Sakunasingha with information about your firm through the questionnaire. The duration of the filling the questionnaire will be approximately 15 to 20 minutes. You can be assured that information collected will be kept strictly confidential and will not be disclosed to any third party.

Ms Sakunasingha will contact you (or mail to you) within the next few days to arrange an appointment for an interview (or the questionnaire). Alternatively, you may wish to contact her either by telephone on 0-2573-1374 or 0-9809-8065 (mobile phone) or by email bsakunas@samart.co.th. If you have any doubts, please feel free to contact me at telephone number 65-63393889 or fax number 65-63371183.

Thank you.

Sincerely,

Dr. Teo Cheng Swee
Adjunct Professor

APPENDIX C: Cover letter (English)

Benjalux Sakunasingha
Doctor Candidate
Graduate College of Management
Southern Cross University, Australia

Date: MMM, DD, 2004

<< SAMPLE for HREC >>

The Head of Financial Department

«Company»
«Address1»
«Address2»
«City» «PostalCode»

Dear Sir/Madame:

My name is Benjalux Sakunasingha. I am a lecturer at the College of Management, Mahidol University Thailand, and a Doctor of Business Administration Candidate for Southern Cross University Australia.

I am presently conducting a research for my doctoral thesis on corporate financial performance measurement to determine the factors that influence Thai companies to adopt the Value-based management measurement as financial performance measurement tools. To explore this issue, I am conducting a mail survey using the attached questionnaire.

I believe your managerial experience could provide me with very useful insights. Your name and your company name were obtained from the journal "Top 1000 Thai Companies Year 2002," published by The Nation Newspaper Group. All data that you provide will be kept strictly confidential. Your name or your company name will not be identified in any way in my thesis. You also have the prerogative not to participate in this survey and stop at any point of the questionnaire. It will take you between 15-20 minutes to complete the questionnaire. Please use the stamped self-addressed envelope to return the completed questionnaire to me.

If you need any clarification or information, please feel free to call me at 0-2573-1374, 0-9809-8065 or at bsakunas@samart.co.th. Alternatively, you may wish to contact my supervisor, Professor Teo Cheng Swee in Singapore at (65) 6339-3889 or at csteo@hemsdale.edu.sg

Your assistance will be important and valuable in the successful completion of my research. Thank you very much for your kind consideration of my request.

Yours sincerely,

Benjalux Sakunasingha
P.O. Box 159, Laksi Office
Bangkok 10210, Thailand

APPENDIX C: Cover letter (Thai)

Benjalux Sakunasingha

Doctor Candidate, Graduate College of Management
Southern Cross University, Australia
(เอกสารฉบับแปลเป็นภาษาไทย)

วันที่ xxxx 2547

เรื่อง ขอความอนุเคราะห์ตอบแบบสอบถามในการทำวิทยานิพนธ์ปริญญาเอก

เรียน ผู้จัดการฝ่ายการเงิน/บัญชีของบริษัทฯ

ดิฉัน น.ส. เบญจลักษณ์ ศกุนะสิงห์ เป็นอาจารย์สอนที่วิทยาลัยการจัดการ มหาวิทยาลัยมหิดล กรุงเทพฯ และกำลังศึกษาปริญญาเอกด้านบริหารธุรกิจ สาขาการจัดการการเงิน ที่มหาวิทยาลัย Southern Cross University, New South Wales ประเทศออสเตรเลีย

ในขณะนี้ ดิฉันกำลังทำการวิจัยสำหรับวิทยานิพนธ์ในหัวข้อเรื่อง “ปัจจัยที่มีผลต่อการเลือกวิธีการจัดการแบบเน้นมูลค่าเพื่อใช้ในการวัดผลการดำเนินงานทางการเงิน” หรือ An Empirical Study into Factors Influencing the Selection of Value-Based Management Tools for Measuring Financial Performance ทั้งนี้ เพื่อหาปัจจัยที่มีอิทธิพลต่อบริษัทในประเทศไทยในการที่จะนำเอา “วิธีการจัดการแบบเน้นมูลค่า” หรือ Value-Based Management Measurement ไปใช้เป็นเครื่องมือวัดผลการดำเนินงานด้านการเงินของบริษัทฯ และเพื่อช่วยในการหาปัจจัยดังกล่าว ดิฉันจึงทำการวิจัยโดยใช้แบบสอบถามในการเก็บรวบรวมข้อมูล

ดิฉันมีความมั่นใจว่า ประสบการณ์ทางด้านการบริหารงานของท่านจะให้ข้อมูลอันเป็นประโยชน์อย่างยิ่งแก่ ดิฉัน ขอให้ท่านเชื่อใจได้ว่าข้อมูลต่างๆของท่านจะถูกเก็บเป็นความลับ รวมถึงข้อมูลของบริษัทและข้อมูลของท่านจะไม่ถูกนำไปเปิดเผยแต่อย่างใดแม้ในวิทยานิพนธ์ของดิฉัน อนึ่ง ท่านมีสิทธิที่จะปฏิเสธการร่วมในการวิจัยครั้งนี้ หรือท่านสามารถหยุดตอบ ณ ช่วงใดช่วงหนึ่งในระหว่างการตอบแบบสอบถามก็ได้ ในกรณีที่ท่านยินดีให้ความร่วมมือในการวิจัยครั้งนี้ โปรดเลือกตอบแบบสอบถามที่ได้แนบมานี้ ซึ่งท่านจะใช้เวลาประมาณ 15-20 นาที และขอความกรุณาส่งแบบสอบถามดังกล่าวกลับมา โดยใช้ซองจดหมายตอบกลับที่แนบมาในเอกสารนี้แล้ว

กรณีที่ท่านต้องการข้อมูลเพิ่มเติม สามารถติดต่อดิฉันได้ที่ โทร. 0-9809-8065 หรือที่อีเมลล์ bsakunas@samart.co.th หรือท่านสามารถติดต่ออาจารย์ที่ปรึกษาของดิฉัน Professor TEO Cheng Swee ได้ที่หมายเลขโทรศัพท์ (65) 6339-3889 หรือที่อีเมลล์ csteo@hemsdale.edu.sg ประเทศสิงคโปร์

ดิฉันหวังเป็นอย่างยิ่งว่า คงได้รับความอนุเคราะห์จากท่านในการตอบแบบสอบถาม และส่งกลับโดยใช้ซองจดหมายตอบกลับที่แนบมาในเอกสารนี้ หรือส่งมาที่ ตู้ ป.ณ.159 ปณจ. หลักสี่ กรุงเทพฯ 10210 ความช่วยเหลือของท่านสำคัญมากและเป็นสิ่งมีค่ายิ่งต่อความสำเร็จของการวิจัยครั้งนี้ ขอขอบพระคุณล่วงหน้ามา ณ โอกาสนี้ด้วย

ขอแสดงความนับถือ

(เบญจลักษณ์ ศกุนะสิงห์)

9. Based on the following indicators, how does your **organization performed** in year 2003 in comparison to that of year 2002?

Organization Performance	Very Much Worse [1]	Worse [2]	No Different [3]	Better [4]	Very Much Better [5]
ii. Growth in Sales or in Revenues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii. Profit Margin = net income / sales	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv. Total Assets Turnover = sales / total assets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v. Return on Assets (ROA) = net income / total assets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vi. Debt ratio = total debt / total assets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 2: PARTICULARS OF THE RESPONDENT

10. What is your gender?

Male

Female

11. What is your marital status?

Single

Married

Divorce / Separated

Widow / Widower

12. What is your age?

a) Less than 25

d) 35 to less than 40

b) 25 to less than 30

e) 40 to less than 45

c) 30 to less than 35

f) 45 and above

13. What educational level have you obtained?

a) Certificate of Vocational School

d) Master Degree

b) Higher Certificate of Vocational School

e) Doctorate Degree

c) Bachelor Degree

f) Other, please name

14. How long have you been working with this company?

a) Less than 2 years

d) 6 to less than 8 years

b) 2 to less than 4 years

e) 8 to less than 10 years

c) 4 to less than 6 years

f) 10 years and above

15. How long have you been working in this current position?

a) Less than 2 years

d) 6 to less than 8 years

b) 2 to less than 4 years

e) 8 to less than 10 years

c) 4 to less than 6 years

f) 10 years and above



☞ Thank you for your time and cooperation ☜

Please return this questionnaire in the stamped self-addressed envelope
Or mail to P.O. Box 159, Laksi Post Office, Bangkok 10210

APPENDIX E: REMINDING LETTER TO RESPONDENTS

MM, DD, 2004

To: Head of Finance/Accounting Department

Re: Please Complete and Return The Questionnaire For Doctorate Thesis

Dear Sir/Madame:

My name is Benjalux Sakunasingha. I am a lecturer at the College of Management, Mahidol University Thailand, and a Doctor of Business Administration Candidate for Southern Cross University Australia.

I am presently conducting a research for my doctoral thesis on corporate financial performance measurement to determine the factors that influence Thai companies to adopt the Value-based management measurement as financial performance measurement tools. To explore this issue, I conducted a mail survey by sending the questionnaire to your company on June 14, 2004.

I would greatly appreciate if you could participate in this survey by filling in the questionnaire that has been sent to you few weeks ago. You can choose to complete either in English or Thai versions. Please return the completed questionnaire to me by fax at 02-573-1374 or by using the stamped self-addressed envelope enclosed with the questionnaire, and mail to P.O. Box 159, Laksi Office, Bangkok 10210.

Your kind assistance is important and valuable in the successful completion of my doctorate research. If you need further information concerning this survey, please feel free to contact me at 09-809-8065 or at bsakunas@samart.co.th.

Thank you very much for your kind consideration and assistance.

Yours sincerely,

Benjalux Sakunasingha

Fax: 02-573-1374

Mail: P.O. Box 159, Laksi Office

Bangkok 10210, Thailand

(เอกสารฉบับแปลเป็นภาษาไทย)

วันที่ xxxx 2547

เรื่อง ขอบความอนุเคราะห์ตอบแบบสอบถามในการทำวิทยานิพนธ์ปริญญาเอก

เรียน ผู้จัดการฝ่ายการเงิน/บัญชีของบริษัทฯ

ดิฉัน น.ส. เบญจลักษณ์ ศกุนะสิงห์ เป็นอาจารย์สอนที่วิทยาลัยการจัดการ มหาวิทยาลัยมหิดล กรุงเทพฯ และกำลังศึกษาปริญญาเอกด้านบริหารธุรกิจ สาขาการจัดการการเงิน ที่มหาวิทยาลัย Southern Cross University, New South Wales ประเทศออสเตรเลีย

ในขณะนี้ ดิฉันกำลังทำการวิจัยสำหรับวิทยานิพนธ์ในหัวข้อเรื่อง “ปัจจัยที่มีผลต่อการเลือกวิธีการจัดการแบบเน้นมูลค่าเพื่อใช้ในการวัดผลการดำเนินงานทางการเงิน” หรือ An Empirical Study into Factors Influencing the Selection of Value-Based Management Tools for Measuring Financial Performance ทั้งนี้ เพื่อหาปัจจัยที่มีอิทธิพลต่อบริษัทในประเทศไทย ในการที่จะนำเอา “วิธีการจัดการแบบเน้นมูลค่า” หรือ Value-Based Management Measurement ไปใช้เป็นเครื่องมือวัดผลการดำเนินการด้านการเงินของบริษัทฯ และเพื่อหาปัจจัยดังกล่าว ดิฉันจึงทำการวิจัยโดยใช้แบบสอบถามเพื่อเก็บรวบรวมข้อมูล โดยได้ส่งแบบสอบถามมายังท่านเพื่อขอความอนุเคราะห์ในการตอบแบบสอบถามดังกล่าว เมื่อวันที่ 14 มิถุนายน 2547

ดิฉันจักขอบคุณยิ่งหากท่านจะกรุณาสละเวลาและให้ความร่วมมือในงานวิจัยครั้งนี้ โดยการตอบแบบสอบถามที่ได้ส่งมายังท่านเมื่อ 2-3 สัปดาห์ที่แล้ว ทั้งนี้ ท่านสามารถเลือกตอบแบบสอบถามชุดภาษาไทยหรือชุดภาษาอังกฤษ ชุดใดชุดหนึ่งก็ได้ และขอความกรุณาส่งแบบสอบถามดังกล่าวกลับมา โดยใช้ซองจดหมายตอบกลับที่แนบมาพร้อมแบบสอบถาม หรือกรุณาส่งมาที่ ตู้ ป.ณ.159 ปณจ. หลักสี่ กรุงเทพฯ 10210 หรือ แฟกซ์ได้ที่ 0-2573-1374

กรณีที่ท่านต้องการข้อมูล/เอกสารเพิ่มเติม สามารถติดต่อดิฉันได้ที่ โทร. 0-9809-8065 หรือที่อีเมลล์ bsakunas@samart.co.th ดิฉันหวังเป็นอย่างยิ่งว่าจะได้รับความอนุเคราะห์จากท่านในการตอบแบบสอบถามและส่งกลับความช่วยเหลือของท่านเป็นสิ่งที่มีความสำคัญต่อความสำเร็จของการวิจัยครั้งนี้ และดิฉันขอขอบพระคุณล่วงหน้ามา ณ โอกาสนี้ด้วย

ขอแสดงความนับถือ

(เบญจลักษณ์ ศกุนะสิงห์)

แฟกซ์ : 0-2573-1374

ไปรษณีย์ : ตู้ ป.ณ.159 ปณจ. หลักสี่

กรุงเทพฯ 10210

APPENDIX F: Cronbach Alpha for Reliability Test for All Variables

***** Method 1 (space saver) will be used for this analysis *****

RELIABILITY ANALYSIS - SCALE (ALPHA)

1.	TOASSET	Total Assets
2.	TRVENUE	Total Annual Revenue
3.	MKTSHR	Market Share Position
4.	PRDLIFCY	Product Life Cycle Stages
5.	FCF	Free Cash Flow
6.	COSTCAP	Cost of Capital
7.	EVA	Economic Value Added
8.	SVA	Shareholder Value Added
9.	ROIC	Return on Invested Capital
10.	CFROI	Cash Flow Return on Investment
11.	GRWSALE	Growth in Sales
12.	PROFITM	Profit Margin
13.	TATO	Total Assets Turnover
14.	ROA	ROA ratio
15.	DEBT	Debt ratio

Statistic for	Mean	Variance	Std Dev	N of Variables
SCALE	43.1206	94.1782	9.7045	15

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
TOASSET	40.8582	81.1512	.3550	.7766
TRVENUE	41.0709	82.3378	.3698	.7740
MKTSHR	41.2837	90.2904	.2448	.7818
PRDLIFCY	40.7021	95.5535	-.1338	.7981
FCF	39.5248	77.4226	.4774	.7640
COSTCAP	40.0567	81.3396	.3765	.7738
EVA	40.5816	78.5737	.5175	.7601
SVA	40.9504	82.5332	.3773	.7731
ROIC	39.7943	78.3217	.4820	.7634
CFROI	40.1348	76.1031	.5733	.7539
GRWSALE	39.5177	84.8943	.4137	.7709
PROFITM	39.9078	84.5557	.3918	.7720
TATO	39.7305	85.3411	.4538	.7694
ROA	39.8723	85.5407	.4015	.7720
DEBT	39.7021	85.6249	.4440	.7701

Reliability Coefficients

N of Cases =	141.0	N of Items =	15
Alpha =	.7840	Standardized items alpha =	.7770

APPENDIX G: Cronbach Alpha for Reliability Test for VBM Tools

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

- | | | |
|----|---------|--------------------------------|
| 1. | FCF | Free Cash Flow |
| 2. | COSTCAP | Cost of Capital |
| 3. | EVA | Economic Value Added |
| 4. | SVA | Shareholder Value Added |
| 5. | ROIC | Return on Invested Capital |
| 6. | CFROI | Cash Flow Return on Investment |

***** Method 2 (covariance matrix) will be used for this analysis *****

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Correlation Matrix

	FCF	COSTCAP	EVA	SVA	ROIC	CFROI
FCF	1.0000					
COSTCAP	.2886	1.0000				
EVA	.3854	.3988	1.0000			
SVA	.3158	.1299	.5119	1.0000		
ROIC	.2886	.3191	.5033	.4624	1.0000	
CFROI	.4673	.3237	.5332	.4812	.6803	1.0000

N of Cases = 141.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
FCF	14.0851	31.2641	.4718	.2694	.7935
COSTCAP	14.6170	33.4951	.3896	.2183	.8091
EVA	15.1418	30.1083	.6562	.4483	.7502
SVA	15.5106	32.5088	.5182	.3590	.7808
ROIC	14.3546	29.6019	.6295	.5133	.7549
CFROI	14.6950	28.4849	.7128	.5726	.7346

Reliability Coefficients 6 items

Alpha = .8024 Standardized item alpha = .8039

APPENDIX H: Cronbach Alpha for Reliability Test for Organization Performance

***** Method 2 (covariance matrix) will be used for this analysis *****

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

- | | | |
|----|---------|-----------------------|
| 1. | GRWSALE | Growth in Sales |
| 2. | PROFITM | Profit Margin |
| 3. | TATO | Total Assets Turnover |
| 4. | ROA | ROA ratio |
| 5. | DEBT | Debt ratio |

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Correlation Matrix

	GRWSALE	PROFITM	TATO	ROA	DEBT
GRWSALE	1.0000				
PROFITM	.5628	1.0000			
TATO	.5920	.7094	1.0000		
ROA	.4834	.7983	.8363	1.0000	
DEBT	.4466	.6401	.6213	.6007	1.0000

N of Cases = 141.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
GRWSALE	13.2695	12.8126	.5923	.4155	.9024
PROFITM	13.6596	10.9690	.8114	.7050	.8524
TATO	13.4823	12.1229	.8286	.7572	.8510
ROA	13.6241	11.7363	.8141	.7922	.8519
DEBT	13.4539	13.0925	.6679	.4667	.8843

Reliability Coefficients 5 items

Alpha = .8928 Standardized item alpha = .8945