ปัจจัยที่มีผลกระทบและผลทางการเงินของการประยุกต์การบริหารเชิงดุลยภาพ: กรณีศึกษาบริษัทจดทะเบียนในประเทศไทย

นางสาววศธร ชุติภิญโญ

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THE DETERMINANTS AND FINANCIAL CONSEQUENCE OF BALANCED SCORECARD IMPLEMENTATION: THE CASE OF LISTED COMPANIES IN THAILAND

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A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy Program in Accountancy
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วศธร ชุติภิญโญ : ปัจจัยที่มีผลกระทบและผลทางการเงินของการประยุกต์การบริหารเชิงดุลยภาพ: กรณีศึกษาบริษัทจดทะเบียนในประเทศไทย. (THE DETERMINANTS AND FINANCIAL CONSEQUENCE OF BALANCED SCORECARD IMPLEMENTATION: THE CASE OF LISTED COMPANIES IN THAILAND) อ.ที่ปรึกษาวิทยานิพนธ์หลัก : รศ. ดร.วรศักดิ์ ทุมมานนท์, 181 หน้า.

งานวิจัยฉบับนี้วัตถุประสงค์ 3 ประการ คือ (1) เพื่อสำรวจระดับการประยุกต์การบริหารเชิงดุลยภาพของบริษัทจดทะเบียนในตลาดหลักทรัพย์แห่งประเทศไทย และตลาดหลักทรัพย์ เอ็ม เอ ไอ โดยใช้กรอบแนวคิดที่พัฒนาขึ้นมาในงานวิจัยฉบับนี้สำหรับการแบ่งระดับการประยุกต์เชิงดุลยภาพ ที่คำนึงถึงลักษณะของการบริหารเชิงดุลยภาพที่ใช้ในระบบการวัดผลการดำเนินงานของบริษัท (2) เพื่อศึกษาปัจจัยที่มีผลกระทบต่อการเคลื่อนไปสู่ระดับการประยุกต์การบริหารเชิงดุลยภาพที่สูงขึ้น และ (3) เพื่อศึกษาผลกระทบทางการเงินของการประยุกต์การบริหารเชิงดุลยภาพ

งานวิจัยฉบับนี้รวบรวมข้อมูลทั้งปฐมภูมิและทุติยภูมิจากแบบสอบถามที่นำส่งให้ประธานเจ้าหน้าที่บริหารฝ่ายบัญชีและการเงินของบริษัทจดทะเบียน และจากระบบข้อมูลตลาดหลักทรัพย์บนอินเทอร์เน็ตตามลำดับ

วิธีการวิเคราะห์ทางสถิติที่ใช้ในการศึกษานี้ ได้แก่ การวิเคราะห์ความถดถอยโลจิสติก (Logistic regression analysis) และการวิเคราะห์ความถดถอย (Regression analysis) โดยใช้ข้อมูลแบบภาคตัดขวาง (Cross-sectional data) การวิเคราะห์ข้อมูลพิจารณาระดับความมีนัยสำคัญที่ 0.10

จากข้อมูลแบบสอบถามตอบกลับจำนวน 73 ราย พบว่า สัดส่วนของบริษัทที่ยอมรับการประยุกต์ และประยุกต์การบริหารเชิงดุลยภาพ คิดเป็นร้อยละ 26 และ 63 ตามลำดับ

ผลการวิจัยด้านปัจจัยที่มีผลกระทบต่อการเคลื่อนไปสู่ระดับการประยุกต์การบริหารเชิงดุลยภาพที่สูงขึ้น พบว่า ปัจจัยภายนอก (อันได้แก่ ความไม่แน่นอนในเรื่องสภาพแวดล้อม) ปัจจัยโครงสร้าง (อันได้แก่ ระดับการมีส่วนร่วมของพนักงาน ระดับความเป็นทางการ ระดับความเชื่อมโยงถึงกันระหว่างพนักงาน และระบบสารสนเทศ) และปัจจัยทัศนคติ (อันได้แก่ ทัศคติที่มีต่อระบบการบริหารเชิงดุลยภาพ) มีความสัมพันธ์ในเชิงบวกต่อการเคลื่อนไปสู่ระดับการประยุกต์การบริหารเชิงดุลยภาพในระดับที่สูงขึ้น

ผลการวิจัย แสดงเพิ่มเติมว่า ปัจจัยโครงสร้าง มีความสัมพันธ์ทางอ้อมต่อการเคลื่อนไปสู่ระดับการประยุกต์การบริหารเชิงดุลยภาพในระดับที่สูงขึ้น โดยผ่านปัจจัยทัศนคติ

นอกจากนี้ ผลการวิจัยพบว่า ปัจจัยการดำเนินงาน (อันได้แก่ การสนับสนุนจากผู้บริหารระดับสูง ความเกี่ยวข้องของประธานเจ้าหน้าที่บริหารฝ่ายบัญชีและการเงิน ทีมงาน และการฝึกอบรม) มีความสัมพันธ์ทางตรงต่อการเคลื่อนไปสู่ระดับการประยุกต์การบริหารเชิงดุลยภาพ และมีความสัมพันธ์ทางอ้อมโดยผ่านปัจจัยทัศนคติ

สำหรับการศึกษาด้านผลกระทบทางการเงินของการประยุกต์การบริหารเชิงดุลยภาพในแง่ของอัตราผลตอบแทนต่อส่วนผู้ถือหุ้นที่เพิ่มขึ้น ผลการวิจัยพบว่าบริษัทที่ประยุกต์การบริหารเชิงดุลยภาพมีผลตอบแทนต่อส่วนผู้ถือหุ้นเพิ่มขึ้นในอัตราที่สูงกว่าบริษัทที่อยู่ในระดับการประยุกต์ที่ต่ำกว่า

ภาควิชา.....การบัญชี..... ลายมือชื่อนิสิต.....

สาขาวิชา....การบัญชี..... ลายมือชื่อ อ.ที่ปรึกษาวิทยานิพนธ์หลัก.....

ปีการศึกษา ...2554.....

5083156326 : MAJOR ACCOUNTANCY
KEYWORDS : BALANCED SCORECARD / ADOPTION / IMPLEMENTATION / DETERMINANT / FINANCIAL CONSEQUENCE

WASATORN SHUTIBHINYO : THE DETERMINANTS AND FINANCIAL CONSEQUENCE OF BALANCED SCORECARD IMPLEMENTATION: THE CASE OF LISTED COMPANIES IN THAILAND. ADVISOR : ASSOC. PROF. VORASAK TOOMMANON, Ph.D.,181 pp.

The objectives of this study are threefold: (1) to explore the BSC application among firms listed on the Stock Exchange of Thailand (SET) and the Market for Alternative Investments (MAI) by employing a developed framework of Balanced Scorecard (BSC) stage classification considering BSC attributes embedded in firms' performance measurement systems, (2) to study the determinants that influence firms' reaching higher stages of BSC application, and (3) to study the financial consequence of BSC implementation.

This study obtains both primary and secondary data from questionnaires sent to CFO's of the listed firms and from SET Market Analysis and Reporting Tool (SETSMART), respectively.

The statistical techniques employed in this study include logistic regression analysis and regression analysis for cross-sectional data. The data analyses are based on 0.10 significance level.

Based on 73 useable surveyed respondents, it is found that the proportions of BSC-adopted and BSC-implemented firms are 26% and 63%, respectively.

The determinant study finds that the external factor (environment uncertainty), the structural factors (participation, formalization, interconnectedness and information system) and the attitudinal factor (attitude toward BSC) are positively associated with the extent to which firms reach higher stages of BSC application.

The structural factors are also found to be indirectly associated with reaching higher stages of BSC application through the attitudinal factor.

Furthermore, it is found that the executional factors (top management support, CFO's involvement, team and training) are directly associated with the extent to which firms reach the implementation stage of BSC application and indirectly through the attitudinal factor.

Regarding the study of the financial consequence of BSC implementation in terms of return on equity (ROE) improvement, the results support the notion that firms with the BSC implementation are likely to have higher ROE improvement than those at the lower levels of BSC application.

Department : Accountancy Student's Signature W. Shutibhinyo

Field of Study : Accountancy Advisor's Signature V. Toommanon

Academic Year : 2011

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I am also grateful to the chief financial officers of firms listed on the Stock Exchange of Thailand and the Market for Investment Alternatives who devoted their time and effort to the completion of this study, to all faculty members at the department of accountancy for their help and advice during the time of study, and to Assistant Professor Dr. Visarut Sribunnak, for his profound insights into the methodology and other related issues with which he has shared to improve the study.

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CHAPTER I

INTRODUCTION

1.1 Motivations

As business environments have become increasingly competitive, dynamic and globalized, the conventional financial performance measures developed during the industrial age alone are no longer an effective decision-making tool. On the contrary, it is generally agreed by many that in the information age of today executives should maintain consistent business strategies and equip themselves with the tools that can provide useful information, both in terms of accounting data and related information regarding strategy and operations, in order to better support their strategic decision (Banker and Johnston: Online; Horngren, 2004). Such a requirement has thus increased the importance attached to the accounting department and management accountants as the provider of relevant information and designer of the strategic performance measurement system as a useful tool for strategic planning and control.

Balanced Scorecard (hereafter BSC), devised by Kaplan and Norton (hereafter KN) in 1992, is one of the most important developments in strategic planning and control (Atkinson et al., 1997). In their early writings, KN (1992) have devised the BSC as an enhanced performance measurement (Kaplan, 2010a: Online) in order to overcome the limitations of the traditional performance measurement system that relies heavily on financial performance measures by providing a balanced framework of non-financial performance measures through three additional perspectives (i.e.,

customer, internal business process, and learning and innovation) and traditional financial measures such as return investment or ROI.

KN (1996a, 1996b) have later emphasized deriving measures from a firm‟s or business unit‟s strategy and entailing the cause-and-effect linkages among objectives and measures across and within perspectives; the linkages among strategic measures show the long-term value creation process (e.g., Sim and Koh, 2001; Bryant, Jone, and Widener, 2004) and promote causal thinking (Horngren, 2004). The change in emphasis transforms BSC from solely a performance measurement system to a strategic performance management system (e.g., McKinsey&Company, Inc. et al., 2000), i.e., a performance measurement system that has measures derived from organization‟s strategy.

Afterward, KN (2001a, 2001b, 2001c) have introduced the Strategy-Focused-Organization (SFO) framework, which is further explained in their subsequent writings (KN 2004, 2005, 2006, 2008a, 2008b). This provides a good conceptual foundation of BSC concept and illustrates that BSC contains four attributes: (1) translating strategy into operational terms (Strategy), (2) aligning the organizational units to the strategy (Alignment), (3) communicating strategy to employees (Communication), and (4) providing feedback and learning (Feedback).

As a revolution in performance measurement technique, BSC is considered to be one of the most significant developments in management accounting (Atkinson et al., 1997; Itter and Larcker, 2001; Horngren, 2004). KN‟s book, *The Balanced Scorecard*, was praised by the American Accounting Association for “the best theoretical contribution in 1997” (Norreklit, 2003).

The book suggests that management team needs more relevant non-financial information, other than financial measures, to efficiently and effectively manage and maintain the competitive advantages and the survival of the organization under today‟s active environment. This need relates directly to one of accountants‟ responsibilities i.e., the improvement in the current performance measurement system to a more advanced one.

Obviously, BSC requires the accounting professionals both to provide management teams and others with the relevant measures and to understand and facilitate the innovation-related activities in an organization. Hence, accounting professionals must clearly understand BSC regarding its key attributes, know how and when to implement such innovation, and recognize how its usage improves the organization‟s performance. It would be difficult to implement BSC without knowledgeable accountants and the influence of accounting department (Huckstein and Duboff, 1999 cited in McPhail, Herington and Guildings, 2008).

Since its introduction and with anecdotal cases of success, BSC has attracted considerable interest worldwide, including Thailand. With respect to practical view, the BSC application rates are increasing in many countries (e.g., McWhorter, 2001; Malmi, 2001; Speckbacher, Bichof and Pfeiffer, 2003; Blundell, Sayers and Shanahan, 2003; Braam and Nijssen, 2004; Hendrick, Menor and Wiedman, 2004; Anand, Sahay and Saha, 2005; Chen, Duh and Lin, 2006; Soderberg, 2006; Yu, Perera and Crowe, 2008; Carenzo and Torolla, 2010; Decharin, 2003; Thinwilai, 2005; Yongvanich and Guthrie, 2009).

Many studies have explored the BSC diffusion, examined factors influencing the adoption and implementation of BSC, and investigated the effects of BSC implementation within a specific firm or industry (e.g., Hoque and James, 2000; Davis and Albright, 2004; Crabtree and DeBusk, 2008). However, prior studies provide mixed results since they have not provided a clear definition of BSC application. For example, most studies found a positive relationship between top management support and BSC application while that of Chen et al. (2006) shows a significant negative relationship between the two.

„Most of these studies were ad hoc collections of nonfinancial and financial variables" (Kaplan 2010a: Online: 30). Few studies have carefully and systematically considered how BSC can be used to facilitate the management processes in the organization. In other words, most have not completely considered all four aforementioned BSC attributes.

Several studies use "Adoption" and "Implementation" interchangeably despite their different meanings. Adapted from Roger (2003), a BSC-adoption firm is one that is at the stage of choosing to follow BSC idea by making use of financial and nonfinancial measures along multiple dimensions. A BSC-implementation firm is one that is at the stage of carrying out a practical means for accomplishing BSC usage by at least using strategic measures that reflect in causal links across multiple dimensions. Thus, BSC stages should consist of non-adoption, adoption, and implementation, rather than non-adoption and adoption or non-implementation and implementation.

Additionally, most studies have trusted firms" self-assessed responses about BSC application. This can bias the research results as firms may differently

understand the BSC concept, leading to dissimilar criteria used to judge to which stages of BSC application they belong (Kaplan, 2010a: Online). Although few studies have considered the BSC attributes to identify the BSC stages (Soderberg, 2006; Soderberg et al., 2011), they have not considered all four BSC attributes. Hence, this raises the importance of the accurate determination of BSC application at the beginning of research projects (Burkert, Davila and Oyon, 2010). To avoid misunderstanding about BSC, the BSC attributes should be taken into account in order to properly identify the stages of BSC application. Doing so enables this study to accurately investigate the extent of BSC usage, the determinants of BSC application and the financial consequence of BSC application.

In Thailand, publicly held companies are listed on either the Stock Exchange of Thailand (SET) or the Market for Alternative Investments (MAI)[1]. Firms listed on the SET have increasingly applied the BSC concept (Decharin, 2003; Thinwilai, 2005; Yongvanich and Guthrie, 2009). To date, only one study (Thinwilai, 2005) has investigated such application among companies listed on the MAI; however, that study relies on firms‟ responses, ignoring all four BSC attributes. This, therefore, offers a great opportunity for this research study to provide large-scale empirical evidence about the current practical application of BSC in terms of the implementation stages of BSC and the applied attributes of BSC among firms listed on the SET and MAI.

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1 The SET provides a market for large companies with more than THB 300 million in paid-up capital after IPO to raise long-term funds. The MAI, on the other hand, is a source of funding for small and medium-sized enterprises, having over THB 200 million in paid-up capital after IPO. However, from the viewpoint of firms applying to the Securities Exchange Commission (SEC) for an IPO, there are no regulatory differences between the two.

Once the BSC attributes and the BSC stages are properly identified, investigating the determinants and the effects of BSC application will provide more valid research results (Ittner and Larcker, 1998b; Chenhall, 2003; Burkert et al., 2010).

Understanding the determinants of BSC application is important as such an understanding presents the factors that help facilitate or impede the progress from one stage to another. The determinants in this study have been drawn from the organizational innovation, the technology acceptance model and the contingency theory.

This study has built on the aforementioned three related theories and prior studies by incorporating key external, structural, attitudinal and executional factors and by presenting the relationships between structural and attitudinal factors and those between executional and attitudinal factors to illustrate how each determinant is important for a firm to reach higher stages of BSC application.

Regarding the implications of BSC, most studies have determined the perceived success and satisfaction in terms of operational and financial performances which are perceptual outcomes (e.g., Hoque and James, 2000; Sim and Koh, 2001; Olson and Slater, 2002; Ittner, Larcker and Randell, 2003; Braam and Nijssen, 2004; DeBusk and Crabtree, 2006; De Geuser, Mooraj and Oyon, 2009). Burkert et al. (2010) call for research that quantitatively assesses the effect of BSC implementation on financial performance since there is still little research in this area. Moreover, most of performance implication research has been conducted in specific industries and taken self-assessed responses as given (Ittner et al., 2003; Hendrick et al., 2004,

Davis and Albright, 2004; Thinwilai, 2005; Crabtree and DeBusk, 2008; Christesen, 2008; Yongvanich and Guthrie, 2009).

This study attempts to overcome such limitations and to extend prior studies by investigating the benefits of BSC implementation in terms of financial performance improvement in all industries as well as by employing BSC attributes as the criteria in specifying BSC stages.

To conclude, this leads to three related important research questions on the determinants and the related financial consequence of BSC application indicated by BSC attributes.

In what follows, the research questions are addressed, the research objectives are described, the definitions are presented, the conceptual model and related hypotheses are developed, the scope and research methodologies of the study are identified, and the contributions and implications are discussed.

1.2 Research questions

This study addresses three important research questions as follows:

1.2.1 What stages of BSC application do Thai listed firms, including those on the SET and MAI, reach?

1.2.2 How are the external, structural, attitudinal, and executional factors associated with reaching higher stages of BSC application?

1.2.3 Do firms that implement BSC have higher financial performance improvement than those that do not?

1.3 Research objectives

The objectives of this study are as follows:

1.3.1 To investigate the BSC application among firms listed on the SET and MAI.

1.3.1.1 To develop a BSC classification framework using BSC attributes.

1.3.1.2 To specify the BSC stages among firms listed on the SET and MAI.

1.3.2 To explore the determinants considered to be important for reaching higher stages of BSC application.

1.3.2.1 To test whether the external, structural, executional and attitudinal factors are directly associated with reaching higher stages of BSC application.

1.3.2.2 To test whether the structural and executional factors are indirectly associated with reaching higher stages of BSC application through the attitudinal factor.

1.3.3 To explore the performance implications of BSC application.

1.3.3.1 To test whether firms that implement BSC have higher financial performance improvement than those that do not.

1.4 Definitions

This section presents the definitions of Balanced Scorecard (BSC) and the stages of its application.

1.4.1 Balanced Scorecard (BSC) is a performance measurement system containing a set of integrated financial and nonfinancial performance measures that are explicitly linked to the firm‟s strategy. The cause-and-effects linkages among these measures can describe an organization‟s value-creating processes. This system is used to align business activities to the vision and strategy of the organization, to improve internal and external communications, and to monitor organizational performance against strategic goals.

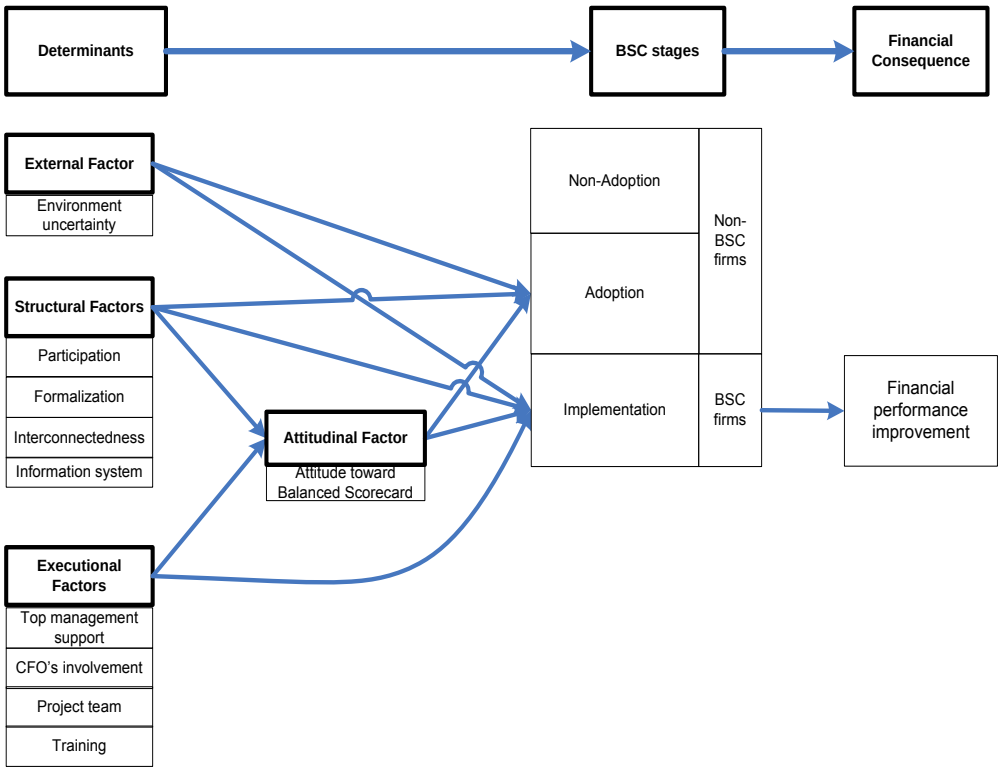
1.4.2 A BSC-adoption firm is one that is at the stage of choosing to follow the BSC idea by making use of financial and nonfinancial measures along multiple dimensions.

1.4.3 A BSC-implementation firm is one that is at the stage of carrying out a practical means for accomplishing BSC usage by at least using strategic measures that reflect in causal links across multiple dimensions.

1.5 Conceptual model and related hypotheses

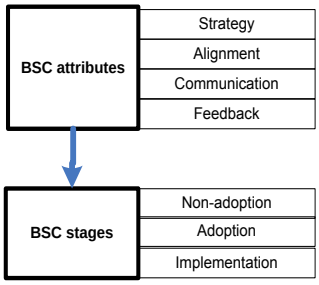
This section briefly presents the conceptual model and related hypotheses developed in this study.

Figure 1-1: The conceptual model



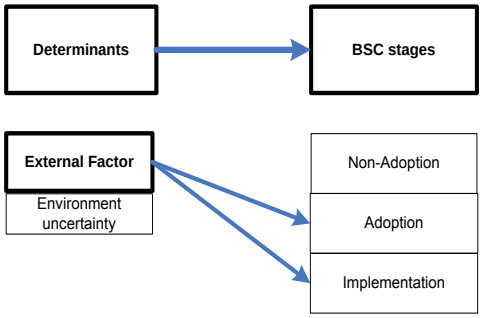
As illustrated in Figure 1-1, the conceptual model that governs the scope of this study can be divided into three parts: Part 1, BSC stage classification, relates to identifying the BSC stages by taking into account the BSC attributes embedded in firms‟ performance measurement system. Part 2, determinant part, explores factors influencing each stage of BSC application; and Part 3, financial consequence part, examines the relationship of BSC implementation to financial performance improvement. These three parts are further sub-divided into eight parts in reference to the research objectives mentioned in Section 1.3 and the hypotheses stated in Chapter 2 (Please see Figures 1-2 to 1-9).

Figure 1-2: The specification of BSC stages considering BSC attributes



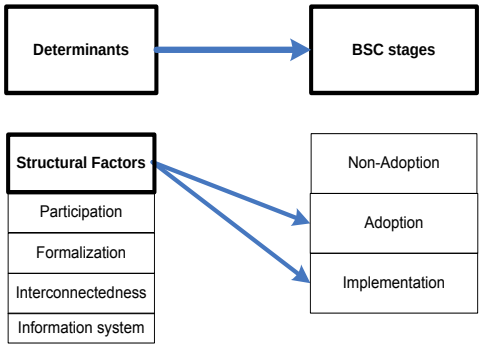
The objective of this part is to investigate the BSC application among firms listed on the SET and MAI to gain insight into BSC stages related to such firms. As this part is simply an exploratory study in nature, no hypothesis is proposed for this research objective.

Figure 1-3: Direct effect of the external factor on reaching higher stages of BSC application



This part tests to see whether the external factor is directly associated with reaching higher stages of BSC application. Specifically, this part hypothesizes that environment uncertainty is positively associated with reaching higher stages of BSC application (H1).

Figure 1-4: Direct effect of each of the structural factors on reaching higher stages of BSC application



The research objective of this part is to test to see whether each of the structural factors is directly associated with reaching higher stages of BSC. The main hypothesis proposed in this part of the study is that the structural factors are positively associated with reaching higher stages of BSC application (H2).

Regarding each of the structural factors, four sub-hypotheses are proposed as follows:

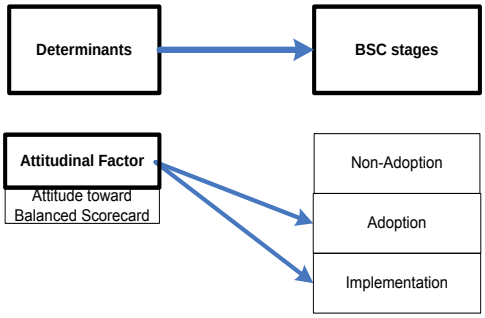
1. Participation is positively associated with reaching higher stages of BSC application. (H2a)

2. Formalization is positively associated with reaching higher stages of BSC application. (H2b)

3. Interconnectedness is positively associated with reaching higher stages of BSC application. (H2c)

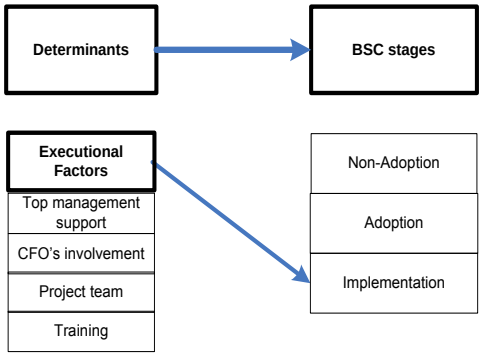
4. Information system is positively associated with reaching higher stages of BSC application. (H2d)

Figure 1-5: Direct effect of the attitudinal factor on reaching higher stages of BSC application



This part explores the role of the attitudinal factor in facilitating BSC implementation process by testing to see whether the attitudinal factor is directly associated with reaching higher stages of BSC application. Specifically, it is hypothesized that the attitude toward BSC is positively associated with reaching higher stages of BSC application (H3).

Figure 1-6: Direct effect of each of the executional factors on reaching the implementation stage of BSC application



The objective of this part is to test to see whether each of the executional factors is directly associated with reaching the implementation stage of BSC application. In particular, this part tests to see if the executional factors are positively associated with reaching the implementation stage of BSC application (H4).

Regarding each of the executional factors, four sub-hypotheses are proposed as follows:

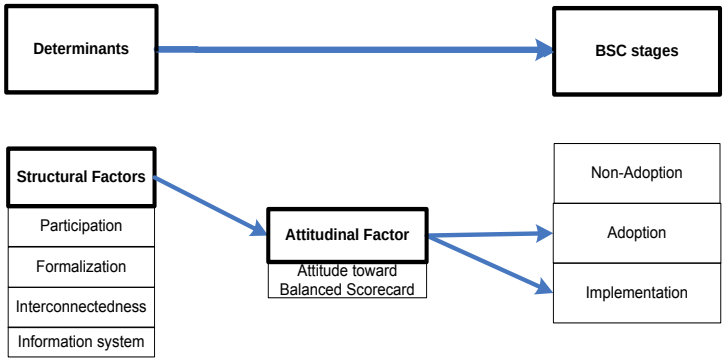
1. Top management support is positively associated with reaching the implementation stage of BSC application. (H4a)

2. CFO"s involvement is positively associated with reaching the implementation stage of BSC application. (H4b)

3. Team is positively associated with reaching the implementation stage of BSC application. (H4c)

4. Training is positively associated with reaching the implementation stage of BSC application. (H4d)

Figure 1-7: Indirect effect of each of the structural factors on reaching higher stages of BSC application through the attitudinal factor



This section tests to see each of the structural factors is indirectly associated with reaching higher stages of BSC application through the attitudinal factor by hypothesizing that the structural factors are positively associated with reaching higher stages of BSC application through the attitudinal factor (H5).

Regarding each of the structural factors, this study proposes the following sub-hypotheses:

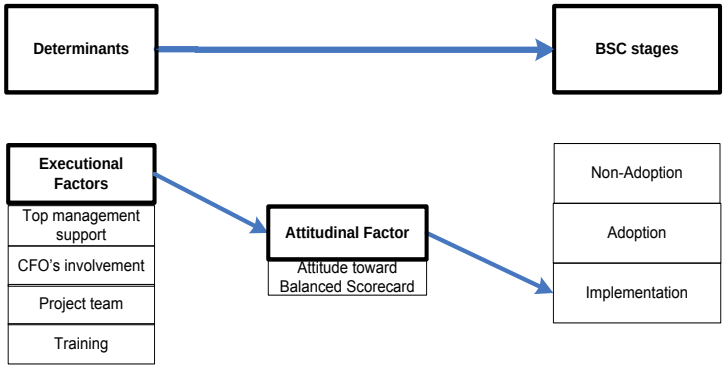
1. Participation is positively associated with reaching higher stages of BSC application through the attitudinal factor. (H5a)

2. Formalization is positively associated with reaching higher stages of BSC application through the attitudinal factor. (H5b)

3. Interconnectedness is positively associated with reaching higher stages of BSC application through the attitudinal factor. (H5c)

4. Information system is positively associated with reaching higher stages of BSC application through the attitudinal factor. (H5d)

Figure 1-8: Indirect effect of each of the executional factors on reaching the implementation stage of BSC application through the attitudinal factor



The objective of this part is to test to see whether each of the executional factors is indirectly associated with reaching the implementation stage of BSC application through the attitudinal factor. Specifically, this section tests to see if the executional factors are positively associated with reaching the implementation stage of BSC application through the attitudinal factor (H6) as a main hypothesis.

Four sub-hypotheses are proposed with respect to each of the executional factors as follows:

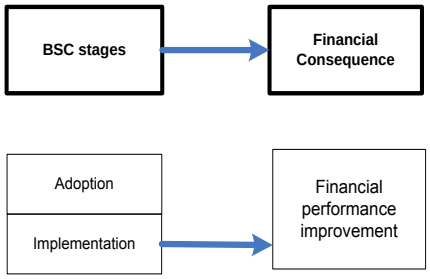
1. Top management support is positively associated with reaching the implementation stage of BSC application through the attitudinal factor. (H6a)

2. CFO"s involvement is positively associated with reaching the implementation stage of BSC application through the attitudinal factor. (H6b)

3. Team is positively associated with reaching the implementation stage of BSC application through the attitudinal factor. (H6c)

4. Training is positively associated with reaching the implementation stage of BSC application through the attitudinal factor. (H6d)

Figure 1-9: Financial consequence of BSC implementation



This final part tests to see whether firms that implement BSC have higher financial performance improvement than those that do not. In particular, it is hypothesized that BSC-implemented firms are likely to have higher financial performance improvement than BSC-adopted firms (H7).

1.6 Scope and research methodology of the study

This study employs both survey and archival research methods to obtain the necessary data for analysis as follows:

1.6.1 Data collection

1.6.1.1 Primary data: With respect to data related to the BSC attributes and the determinants of BSC application, questionnaires were sent to Chief Financial Officers (CFOs) of firms listed on the Stock Exchange of Thailand (SET) and the Market for Alternative Investment (MAI) in Thailand. This enables this study to gain insight into BSC attributes and stages as well as potential determinants of BSC application.

1.6.1.2 Secondary data: Accounting data were retrieved from the SET Market Analysis and Reporting Tool (SETSMART).

1.6.2 Data Analysis

1.6.2.1 The classification of BSC stages: This study relies solely on the BSC framework as developed in this study. The BSC attributes are identified and are consequently employed to specify the BSC stages of sample firms. Two-sample t-tests, one-sample t-tests, and tests for agreement are employed in this part of the study.

1.6.2.2 Determinant part: Ordinal logistic regression analysis, binary logistic regression analysis, and simple regression analysis are employed to test to see whether the determinants of interest are important for a firm in reaching higher stages of BSC application.

1.6.2.3 Consequence part: Multiple regression analysis is employed to test to see whether BSC-implemented firms are likely to have higher financial performance improvement than BSC-adopted firms.

1.7 Contributions and implications

The evidence from this study contributes to accounting and related literature as well as to practical implications as follows:

1.7.1 Contributions to the literature

1.7.1.1 This study provides the conceptionalization and operationalization of a systematic BSC framework for identifying BSC attributes, which in turn can be employed to specify the BSC stages. This could also be applied to future research study examining the application of BSC in different contexts, such as among non-listed companies or among companies in other countries.

In addition, this framework helps address the differences in the interpretation of BSC as earlier mentioned since it helps identify BSC attributes used for specifying BSC stages without the need to take firms‟ self-identified responses into consideration. Hence, this framework should be employed as a starting point for classifying BSC stages of sample firms before conducting any tests in order to reduce or control the diverse stages of BSC application.

Furthermore, the development of framework for indicating the characteristics of BSC instead of relying heavily on firms‟ self-assessed responses provides a research idea for building the structure of other organizational innovations or tools by considering the key characteristics of such innovations or tools.

1.7.1.2 Drawing upon three related theories (i.e., the organizational innovation, the technology acceptance model, and the contingency theory), this study has extended prior literature by going further into details of the determinant-innovation relation.

Specifically, this research study classifies the determinants into four categories: external factor, structural factors, executional factors, and attitudinal factor in order to reveal how these factors influence the stages of BSC application.

In addition, the relationships between the structural and attitudinal factors and those between executional and attitudinal factors are explored in the context of BSC application.

1.7.1.3 The decision to implement BSC is usually based on the expectations of ultimately improved financial results (Crabtree and DeBusk, 2008). This study attempts to provide evidence of financial success once the BSC is implemented. This, as such, sheds some light on the development of management accounting theory devoted to the creation of shareholder value (Malmi and Granlund, 2009).

1.7.2 Implications for practice

1.7.2.1 Based on the surveyed data, this study provides the descriptive analysis of the practical application of BSC concept among Thai listed companies to complement prior studies mostly conducted in the US and Europe.

1.7.2.2 The study benefits companies, which are considering, adopting, or implementing BSC, by

1.7.2.2.1 suggesting the important factors at different stages of BSC implementation. This is very important as the evidence can help organizations identify the factors that ease or inhibit the advancement from one stage to another.

Employing the developed BSC framework allows this study to mitigate the potential reasons of mixed findings by identifying BSC attributes and classifying BSC stages under similar criteria for all responding firms. Hence, this study will provide more valid evidence of key determinants.

Concurrently, this study reveals critical factors influencing BSC implementation process in the context of Thailand to complement with prior studies mostly conducted in other countries.

1.7.2.2.2 presenting the impact of BSC usage on the financial performance improvement to confirm the claimed benefits of BSC usage among sample firms.

1.7.2.3 This study raises the important role of accounting professionals in improving organization"s performance measurement system. One of the primary responsibilities of accounting department is to provide decision makers, especially top management, the relevant information for planning and control. Since BSC is a vital tool for enhancing performance measurement system, accountants must have the knowledge of BSC, its limitations, and its effects; and must understand how to successfully implement it in the organization in order to assist others at different stages of the implementation.

1.8 Structure of dissertation

This study is divided into five chapters. The first chapter is the introduction discussed earlier. The next chapter presents theoretical background, a review of the literature, and the hypotheses to be tested in this study. The third chapter describes the research methodology, covering data collection, a survey instrument, as well as the model specifications and variable measurements. Chapter 4 provides the details of survey responses, the evidence of BSC practices among responding firms listed on the SET and MAI, and the findings of determinant and financial consequence study. The last chapter concludes and provides research implications, as well as limitations of the study and suggestions for future research.

CHAPTER II

THEORETICAL BACKGROUND, LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Theoretical background

Using the related theoretical backgrounds (1) the Balanced Scorecard, (2) the innovation in organization (3) the technology acceptance model and (4) the contingency theory, this study investigates the determinants of BSC adoption and implementation and the consequence of BSC implementation on organization‟s financial performance improvement.

2.1.1 The Balanced Scorecard

Kaplan and Norton have developed the multi-dimensional performance measurement system known as the Balanced Scorecard because there is „no single measure that can provide a clear performance target or focus attention on the critical areas of the business‟ (KN, 1992: 71). They originally devised the Balanced Scorecard as an enhanced performance measurement (Kaplan, 2010a: Online) by providing „a set of measures that gives top managers a fast but comprehensive view of the business‟ (KN, 1992: 71).

Afterward, KN (1996a) have emphasized deriving objectives and measures from a firm‟s or business unit‟s strategy and entailing the cause-and-effect linkages among objectives/measures in the BSC perspectives. They have transformed the original BSC from an ad hoc collection of financial and non-financial measures to the strategic performance measurement system. BSC retains financial measures which

chiefly deals with the past events; and adds operational measures, i.e., customer, internal business processes, and learning and growth, that are the strategic performance drivers of those financial measures. This enables managers to recognize the crucial interrelated perspectives of their business and to see whether improvement in one area may have been achieved at the expense of another.

Later on, they have proposed the strategy-focused organization (SFO) framework (KN, 2001a) that has attached greater importance of BSC usage to firms‟ management processes as described later in this section. All of their subsequent works are based on this SFO framework (Kaplan, 2010a, 2010b: Online).

Five principles are carefully devised to achieve breakthrough performance with the BSC (KN 2001a, 2001b): (1) translate the strategy into operational terms, (2) align the organization to the strategy, (3) motivate to make strategy everyone‟s job, (4) govern to make strategy a continual process, and (5) mobilize change through executive leadership. The first four principles are management processes directly influencing firm‟s performance measurement system, while the fifth one is the important driver that facilitates all four principles. These principles provide this study with a solid foundation to identify the various attributes of BSC usage and subsequently to develop the levels of BSC usage in the organization.

Hence, BSC attributes in this study are: (1) translating strategy into operational terms (Strategy), (2) aligning the organizational units to the strategy (Alignment), (3) communicating strategy to employees (Communication), and (4) providing feedback and learning (Feedback).

2.1.1.1 Translating strategy into operational terms

This attribute is a very crucial since it is the foundation of the other three attributes (i.e., alignment, communication, and feedback). As previously mentioned, the organization‟s strategy is the starting point for deriving the appropriate measures in BSC firms. Without this feature, the organization cannot be claimed to implement BSC. This section briefly discusses three sub-attributes that relate to this key feature of BSC.

2.1.1.1.1 Perspectives of Balanced Scorecard

In the early version of BSC writings, KN (1992) suggest that firms should consider measures along four perspectives or dimensions: (1) learning and growth, (2) internal business process, (3) customer and (4) financial.

Learning and Growth perspective: this perspective identifies the infrastructure needed to create long-term growth and improvement. Three principal sources of organization‟s learning and growth are people, information systems, and organizational procedure. Employee satisfaction and employee retention are examples of typical measures of this perspective.

Internal-Business-Process perspective: in this perspective, managers identify the existing and innovative critical internal processes in which an organization must perform in order to meet financial and customer objectives. Examples of typical measures in this perspective are defective rate, time required to complete the production process, and proportion of sales of new product (KN, 1996a).

Customer perspective: managers identify customer and market segments in which the business unit will compete and the measures of the business units‟ performance in these targeted segments. This perspective typically includes

core measures (e.g., customer satisfaction, customer retention, or customer profitability) and specific measures that are critical for targeted customer (e.g., on-time delivery). This customer perspective indicates the impact of organization‟s actions on customer outcomes and that of customer outcomes on financial measures.

Financial perspective: BSC retains the financial perspectives since financial measures indicate economic consequences of action taken. Financial objectives typically relate to profitability as measured by sales growth, operating income, return-on-capital employed, and so forth.

It should be noted that these four perspectives should be considered merely as a template. In a real world, firms can use fewer or more than these four perspectives depending on their strategy and industry circumstances. Moreover, this feature is just an enhanced performance measurement system (Kaplan, 2010a: Online). It cannot be considered as BSC unless the measures are derived from organization‟s strategy and illustrated in causal chains.

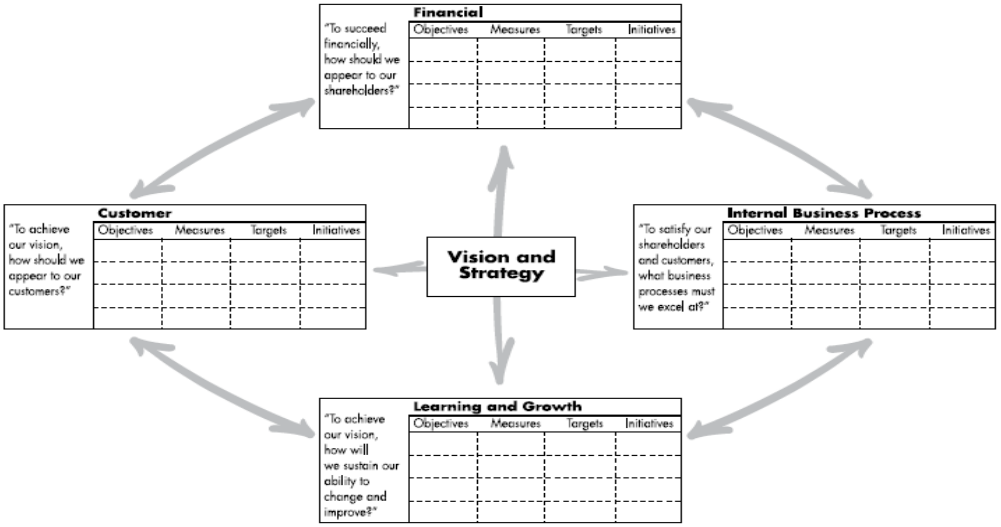
2.1.1.1.2 Measures derived from strategy

KN (1996b: 75) claimed that „we have seen some companies move beyond our early vision for the scorecard to discover its value as the cornerstone of a new strategic management system‟. BSC helps management communicate the company‟s vision and link performance measures to its vision and strategy. Kaplan (2010a: Online: 18) clearly states that „creating a Balanced Scorecard should not start with selecting metrics‟. Therefore, deriving measures from strategy is a key characteristic of BSC. To emphasize, unless the measures are derived from organization‟s strategy, the performance measurement system cannot be called BSC.

In this information age, „strategies for creating value shifted from managing tangible assets to knowledge-based strategies that create and deploy an organization"s intangible assets" (KN, 2001b: 88). That is, BSC is perceived as an improved performance system that describes value-creating strategies that link intangible and tangible assets by relating measures with organizational strategy (KN, 1996b, 2001a) in order to show „how intangible assets get mobilized and combined with intangible and tangible assets to create differentiating customer-value propositions and superior financial outcome" (KN 2001b: 89).

BSC is not merely a collection of financial and nonfinancial measures, but a management tool that translates organization"s vision and strategy into tangible objectives and measures by linking a company"s long-term strategy with its measures and short-term actions as shown in Figure 2-1.

Figure 2-1: The Balanced Scorecard provides a framework to translate a strategy into operational terms (KN, 1996a)



2.1.1.1.3 Cause-and-effect relationships

This attribute pertains to the linkages among strategic objectives and measures within and across perspectives. The means-end relationships for a given organization are of crucial importance for the development of a meaningful BSC (Otley, 1999). A properly constructed BSC should explicitly manifest the business strategy through such a sequence of cause-and-effect relationships among objectives and measures in all various perspectives (KN, 2004, 2008a) in order to describe the value creation process of the particular firm. „Ultimately, causal paths from all the measures on a scorecard should be linked to financial objectives" (KN, 1996a: 151).

In short, BSC is designed to be at the heart of the firm"s planning and control mechanisms for effective strategy deployment by linking operational practices with strategic intent. Taking all three sub-attributes of translating strategy into operational terms, this attribute is a major strength of the BSC (Otley, 1999), helps clarify and gain the consensus about organization"s strategy, while providing a base for the other three attributes (i.e., alignment, communication, and feedback) to be discussed next.

2.1.1.2 Aligning the organizational units to the strategy

Since an organization consists of various sectors, business units, and specialized departments, it is important to translate a high-level strategy into aligned and integrated strategies at lower-level units. This cascading process encourages each operating unit to define its own strategy, which is consistent with the high-level strategy.

Therefore, the business units‟ strategies will reflect objectives and measures that are related to their own strategies and that integrate with the corporate strategy and the strategies of other business units (KN, 2008a).

Apart from aligning the business units, BSC also helps align organizational and cross-departmental units (i.e., support functions and shared service units such as accounting department, human resources, and purchasing). This process will transform support departments from functionally-oriented cost centers into strategic partners of line operating units and the company. Having negotiated the service-level agreements with business units to define the set of services to be provided, these support units should create strategy maps and scorecards based on such agreements.

Linking the company strategy to the strategies of its business units and functional units generates the corporate synergy, which leads to the creation of more value by a collection of business units than if each unit operates autonomously.

2.1.1.3 Communicating strategy to employees

The CEOs and executives realize that they cannot implement the new strategy themselves. When all objectives and measures in BSC are consistent with the overall strategy, communicating and educating ensures that all levels of the organization understand the long-term strategy and scorecard. Once employees understand firm‟s strategy and scorecard, they will conduct their day-to-day business in ways that contribute to the success of such a strategy. That is, their actions would result in the behavior congruent with the organization‟s goals (KN, 1996a). This creates intrinsic motivation since employees‟ personal goals and actions are consistent with business unit objectives and measures (KN, 2001b, 2008a; Kaplan, 2010b:

Online). Employees come to work with more energy, creativity, and initiative (Kaplan, 2010b: Online).

In addition, the explicit causal linkages are important in the sense that they provide mechanisms to link the everyday actions of frontline employees to financial results and to validate the strategy as will be discussed later. It should be noted that this is merely a top-down communication, not top-down directions (KN, 2001b).

Apart from intrinsic motivation, extrinsic motivation is also important. Some companies link their formal compensation system to the scorecard measures, based on predetermined formulas or applied subjectively, in order to align the financial interests of employees with business unit‟s strategic objectives.

Although tying incentive compensation to BSC measures is desirable, it may not be appropriate for firms just starting implementing BSC. This is because the initial scorecard will represent a tentative statement of unit‟s strategy and express hypotheses about the cause-and-effect relationships among measures, which may not be the right ones. The organization should refine the BSC measures before linking them to incentive pay.

2.1.1.4 Providing feedback and learning

Organizations should link strategy to the budgeting process by setting performance targets for the strategic measures and by screening the strategic initiatives for achieving such targets. „[T]arget setting is a crucial feature of well-implemented balanced scroecard‟ (Otley, 1999: 376).

In addition, to keep BSC in tune with external environment, firm needs to consider whether or not its strategy is appropriate. This raises the importance of the feedback and learning process that enables strategic refinements or makes strategy a continual process (Kaplan, 2010a: Online).

The cause-and-effect relationships which tell the organization‟s value-creation strategy should be continually validated and modified by reviewing internal operational data and external data on competition and the business environment (KN 2001a, 2001b, 2001c, 2005, 2008a, 2008b). KN (2005) have proposed a new unit at the corporate level, the office of strategy management (OSM), to oversee all strategy-related activities. Its main responsibilities are strategy formation, strategy execution, and strategy learning.

This close-loop feedback system (i.e., operational review, strategy review, and strategy testing and adapting) is consistent with double-loop learning proposed by Argyris (1977). It is the process of questioning the assumptions held about the organization‟s strategy, the assumed linkages and the selected measures, particularly when the actual results differ from the expected results. This process of BSC helps firms continuously improve strategic execution and results (Askarany, 2006). This also necessitates the readiness of information systems for data collection and data reporting, both of which are required in order to effectively manage and implement the strategy (Kaplan 2010b: Online).

2.1.2 Innovation in organization

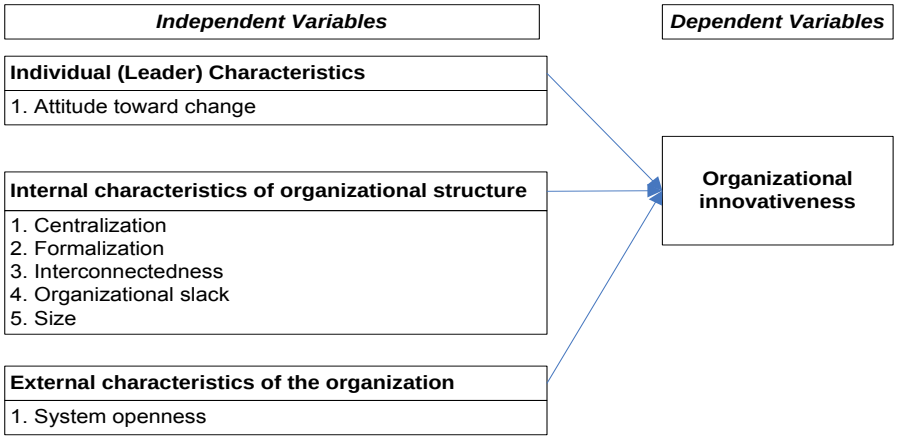
Rogers (2003: 12) defines an innovation as „an idea, practice, or object that is perceived as new by an individual or other unit of adoption". Hence, an organizational innovation is defined as the implementation of an internally generated or a borrowed idea that is new to the organizational at the time of adoption (Damanpour and Evan, 1984; Damanpour, 1991).

There are three types of innovation-decisions: (1) optional innovation-decisions which are choices to adopt or reject an innovation that are made by an individual independent of the decisions by other members of a system, (2) collective innovation-decisions which are choices to adopt or reject an innovation that are made by consensus among the members of a system. Once the decision is reached, each individual must act accordingly, and (3) authority innovation-decisions which are choices to adopt or reject an innovation that are made by a relatively few individuals in a system who possess power, high social status, or technical expertise.

The literature on the organizational innovation has treated the entire organization as a single unit of analysis and has been focusing on the innovation process within an organization. Organizational innovativeness studies have emphasized explaining innovation adoption decisions using adopter and innovation characteristics (Rogers, 2003). Its foundation has been that organizations that adopt an innovation have characteristics that distinguish them from non-adopters.

Rogers (2003) identifies three sets of variables that influence an innovation adoption: (1) individual (leader) characteristics, (2) internal organizational structural characteristics, and (3) external characteristics of the organization as illustrated in Figure 2-2.

Figure 2-2: Independent variables related to organizational innovativeness (adapted from Robbins, 1983; Damanpour, 1991; Rogers, 2003)



Innovation can be viewed as technical or administrative innovation (Kimberly and Evanisko, 1981; Damanpour, 1991; Askarany, 2006). Hence, it is necessary to understand the organization"s adoption behavior and identify the determinants of such innovation since the adoption of administrative and technical innovation does not relate equally to the same predictor variables (Damanpour, 1991). Kimberly and Evanisko (1981) find that the determinant variables are more associated with the adoption of technological innovations than of administrative innovations.

From the perspective of innovation research, the important distinction between technical innovation and administrative innovation is the relation to decision processes (Kimberly and Evanisko, 1981; Damanpour, 1991). Since this kind of research has mainly focused on the technical innovation rather than the administrative one (Gosselin, 1997), future research concerning administrative innovation is needed.

This study follows the definitions of technical and administrative innovation in Damanpour (1991). The technical innovation is an innovation that pertains to products, services, and production process technology. It is directly related to basic work activities and can concern either product or process. The administrative innovation is an innovation that involves organization structure and administrative processes. It is indirectly related to the basic work activities of an organization and is more directly related to its management.

Accounting innovations are usually classified as administrative ones (Chenhall, 2003), so is the BSC as it incorporates the introduction of a new management system, strategic planning process, staff continuing education programs and the incentives or reward systems for the staff. All can be viewed by accountants as management control system and by IT person as new IT system and applications (Nair, 2007: Online).

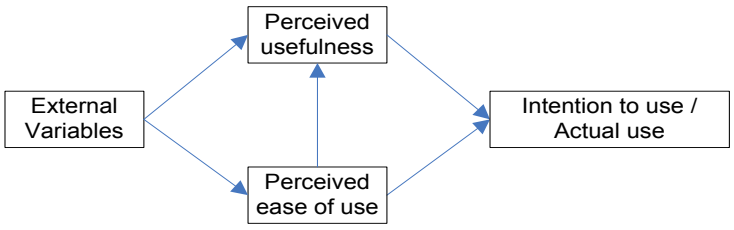
2.1.3 The technology acceptance model

Davis (1989) and Davis, Bagozzi and Warshaw. (1989) have proposed the technology acceptance model (hereafter TAM), which is derived from the theory of reasoned action (TRA hereafter) (Fishbien and Ajzen, 1975 cited in Davis, 1989), in order to specifically explain information technology (IT) or system usage behavior.

TRA is a well-researched intention model that has proven successful in predicting and explaining human behavior; it is appropriate for studying the determinants of IT usage behavior as a special case (Davis et al., 1989). TAM uses TRA as a theoretical basis for specifying the causal links between beliefs (i.e., perceived usefulness and perceived ease of use) and user‟s intention, which consequently is an important determinant of actual usage.

Moreover, TAM provides a theoretical basis for examining the impact of external factors on internal beliefs and intentions. TAM posits that the external variables, e.g., social influences and facilitating conditions, affect both the perceived usefulness and perceived ease of use, which are key determinants that influence system use through the behavior intention as illustrated in Figure 2-3.

Figure 2-3: The technology acceptance model (adapted from Davis, 1989; Davis et al, 1989; Szajna, 1996)



External variables such as management support, participation, training, or educational programs designed to persuade users of the usefulness and to show them how the system is easy to use (Davis et al., 1989; Hongratanawong, 2002; Lee, Kozar and Larson, 2003) have an effect on intention to use a particular system through the perceived ease of use and perceived usefulness.

Following Davis (1989) and Davis et al (1989), perceived usefulness is defined as a degree to which a person believes that using a particular system would enhance his or her job performance within an organizational context. Perceived ease of use is defined as a degree to which a person believes that using a particular system would be free of effort. Due to high correlation between these two variables, they can be constructed as user attitude (Hongratanawong, 2002). In addition, the intention to use is defined as an attitudinal scale that reflects a user‟s intent to use a system (Hongratanawong, 2002).

It should be noted that the relationship between the intention to use and the actual use is observable in longitudinal studies, but not in cross-sectional studies. This is because the intention to use and the actual use can be investigated before and after the system implementation respectively. Specifically, cross-sectional studies have examined at a point of time; that is, either the intention to use or the actual use is investigated depending on the settings and research questions (Davis et al., 1989).

This provides the linkage between the organizational innovation and TAM in the sense that the intention to use, which is an attitudinal scale that reflects user‟s intent to use a system, is consistent with the adoption stage; the actual use is in line with the implementation stage.

2.1.4 The contingency theory

The contingency theory is a classic behavioral theory which states that there is no best way to organize a corporation and that an organizational style that is effective in some situations may be not successful in other situations (e.g., Gordon and Miller, 1976; Hayes, 1977; Waterhouse and Tiessen, 1978; Otley, 1980; Ginzberg, 1980; Ittner and Larcker, 2001). Contingency-based research has its foundations in organizational theory, considering the contextual variables at the organizational level (Chenhall, 2003).

As commonly known, management accounting is not bound by accounting rules stipulated by regulatory bodies or other outside agencies. Rather, it has increasingly become a part of financial accounting over the past decade. Hence, managers are able to design their own management accounting system that provides useful information (Garrison, Noreen and Brewer, 2008).

In the area of management accounting system, contingency-based research contends that „there is no universally applicable system of management accounting and control" (Itter and Larcker, 2001: 352). That is, the appropriate management accounting and control techniques depend on the surrounding circumstances, for example, external environment, firm structures or size with the assumption that „managers act with an intent to adapt their organizations to changes in contingencies in order to attain fit and enhanced performance" (Chenhall, 2003: 160).

2.2 Literature review and hypotheses development

Since its introduction in 1992, BSC has generated much interest and has been applied in various ways in practice. Academically, researchers have conducted action research, experiments and surveys to understand various aspects of BSC.

Although studies have been conducted to examine the determinants or the consequences of BSC application, the results are still inconclusive. There are two major reasons for the inconclusiveness: (1) most studies have placed too much trust on the firm‟s self-assessed responses about the BSC application. This biases the results in the sense that firms may misunderstand the BSC concept and consequently misclassify themselves as either a non-BSC or BSC firm (Ittner et al., 2003; Soderberg et al., 2011; Kaplan, 2010a: Online); and (2) the stages of implementation are mostly ambiguous and the applied attributes of BSC are not fully considered. As mentioned earlier, simply classifying firms as BSC firms or non-BSC firms is nothing more than combining BSC firms from several different stages. As a consequence, testing certain determinant factors distort their significance levels or lead to the rejection of other factors that are only important for certain stages and hence the consequence investigation.

Recently, differences in BSC application have been of important concern. Some researchers have studied such variation by classifying the BSC implementation stages (e.g., Ittner et al., 2003; Speckbacher et al., 2003; Chen et al., 2006; Askarany, 2006; Christesen, 2008; Braam and Nijssen, 2008: Online; Yongvanich and Guthrie, 2009). However, few studies (i.e., Soderberg , 2006; Soderberg et al., 2011) have considered the attributes of BSC as suggested by Kaplan and Norton and none has concurrently scrutinized all four BSC attributes.

This study aims to examine the determinants and the financial consequence of BSC application in connection with the BSC stage. In addition, this study mitigates the different interpretations of BSC by requiring respondents to identify the BSC attributes that they have applied. The firms in this study are then categorized into different stages of BSC application. This allows both the investigation of the different aspects of BSC implementation; for example, some firms might have implemented all four attributes of BSC, „while others did only one or two" (KN, 2001c: 160), and the effective determination of the determinants and of the effects of BSC implementation on the organizational performance.

This section briefly discusses the related studies to provide an overview of prior research and to develop the hypotheses as well as to show how this study differs from such literature. Three areas of research key to this study are presented as follows: (1) the BSC application and the developed BSC classification framework in this study, (2) prior BSC research on factors influencing BSC implementation, and (3) organizational performance implication of BSC implementation.

2.2.1 The BSC application

This section presents prior literature by focusing on (1) studies that considered each BSC attribute without concerning the BSC stages and (2) those that considered the stages of BSC implementation and ends with the developed classification of BSC stages in this study.

2.2.1.1 BSC attributes

This sub-section has emphasized prior studies considering the attributes of BSC without concerning the implementation stages.

There is variation in the content and use of the BSC (e.g., Malmi, 2001; Speckbacher et al., 2003; Bukh and Malmi, 2005: Online; Yongvanich and Guthrie, 2009). Research in BSC area mostly deals with some forms of BSC use in examining the determinants or the consequences of BSC application. As previously mentioned, the conceptual foundation of BSC provides a fine basis for this research study to scrutinize the different forms of BSC application in practice. As discussed earlier, four attributes of BSC are: (1) translating strategy into operational terms (Strategy), (2) aligning the organizational units to the strategy (Alignment), (3) communicating strategy to employees (Communication), and (4) providing feedback and learning (Feedback).

To date, De Geuser et al."s (2009) study is the only empirical research that refers to and separately tests all four BSC attributes. They find that if an organization follows these BSC attributes, it tends to contribute positively to organizational and financial performance. They aim to explore the effects of these four BSC attributes and executive leadership on BSC contributions.

Based on their survey conducted in 2001, the BSC users (selected by the researchers) have been investigated to see whether the four attributes of BSC and top management support are sources of BSC contributions. Four organizational performances are developed in line with Foster and Swenson"s (1997) to capture (1) the management evaluation of the success of BSC, (2) the perceived benefits relative to its costs, (3) the integration of key management process through the BSC representation of the business and organizational model, and (4) the greater autonomy of the business units due to BSC implementation.

They find that the key sources of overall performance improvement are attributes 1 (strategy) and 4 (feedback). Attributes 2 (alignment) and 3 (communication) show marginal impact on BSC contributions. However, top management support does not influence any perceived organizational performance; this implies that top management support may drive the organizational performance through the BSC attributes.

Other prior related studies that have explored only certain attributes of BSC are discussed below.

The importance of nonfinancial or forward-looking performance measures has been on the rise due mainly to the fact that traditional performance measures are insufficient guides for decision making (Ittner and Larcker, 1998b; De Waal, 2005; Luft, 2009). Non-financial measures are believed to be the useful leading indicators of a firm‟s future performance; therefore, a growing body of research has investigated empirical links between nonfinancial and financial measures in a variety of firms and industries (e.g., Srinivasan, 1997; Ittner and Larcker, 1998a; Banker, Potter and Srinivasan, 2000, 2005; Aaker and Jacobson, 2001; Said, HassabElnaby and Wier, 2003; Sedatole, 2003; Van der Stede, Chow and Lin, 2006; Dekolli and Sedatole, 2007).

Based on this belief, the original BSC has also been developed as a performance measurement system that combines both nonfinancial and financial measures. Therefore, some prior studies have been conducted by arguing that firms that use nonfinancial measures are BSC firms[2] as follows:

Based on a survey of 66 Australian manufacturing firms, Hoque and James (2000) have examined the links between organization size, product life cycle stage, market position, BSC usage, and organizational performance. They define BSC usage as the performance measure diversity and clearly state that „BSC measure might not pick up the strategic linkages of a real BSC usage (p.8).“ According to their results, size and proportion of new products are factors making more use of measures; greater BSC usage (or more performance measure diversity) is associated with perceived performance improvement relative to competitors.

Gosselin (2005) examines the measures that Canadian manufacturing firms use and the relationship between such measures and some contextual factors. In a similar vein, Jusoh, Ibrahim and Zainuddin (2007) and Jusoh (2008) explore the extent of performance measures used by Malaysian manufacturing firms. Gosselin (2005) reveals that traditional, or financial, measures are still widely used in Canada, while Jusoh et al. (2007) and Jusoh (2008) show that measures regarding financial, customer, and internal business process (except for the innovation and learning) are extensively used in Malaysia.

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2 Kaplan (2010a: Online: 25) states that „Many academics … continue to think erroneously of the scorecard as a performance measurement only. Their knowledge and acquaintance with the scorecard is probably based only on reading the original 1992 HBR article or the first half of the initial Balanced Scorecard book.“

Simply having nonfinancial measures in a performance measurement system is no longer a sufficient condition to be a BSC firm. Therefore, firms with a collection of financial and nonfinancial measures that are not strategically linked should be regarded as firms in BSC adoption stage, not implementation stage. More studies have considered the strategy link as an important attributes of BSC application as follows:

McWhorton (2001) investigates the effects of BSC characteristics on managers‟ job satisfaction and superiors‟ recent judgments about managers‟ actions. Three BSC features are: (1) perspective framework which deals with categorizing financial and nonfinancial performance measures into four perspectives, (2) strategy link which is concerned with deriving measures from strategy, and (3) long-term/short-term tradeoff which deals with complementing short-term performance measures with future-oriented performance indicators. To exclude non-BSC users, she developed four decision rules to help identify BSC users: (1) financial plus nonfinancial rule, i.e. retaining firms using both financial and nonfinancial measures, (2) strategy link rule, i.e. containing firms deriving measures form strategy, (3) strategy link plus rule, i.e. gathering firms both using financial and nonfinancial measures and deriving measures form strategy, and (4) naïve rule, i.e. consisting of firms claiming the BSC use. Although these data sets somehow moderate the results, her key findings are that the strategy link characteristics positively and directly affect both managers‟ job satisfaction and superiors‟ judgments, and indirectly affect job satisfaction through role conflict, while the other two BSC features show weaker results.

Lipe and Salterio‟s (2000), the classic experiment research paper, explores the judgmental effects when using BSC in performance evaluation. Supervisors have to evaluate two divisional managers responsible for business units that have different strategies; two scorecards are presented. These two scorecards contain measures that are common to both units (i.e., common measures) and measures that are unique to each unit depending on unit‟s strategy (i.e., unique measure). While both units have similar overall performance, one unit has better performance regarding common measures while the other outperforms regarding unique measures.

Their results show that supervisors give a higher rating to the divisional manager with better common measures than one with better unique measures. That is, the common measure bias has existed and can undermine the usefulness of BSC. Although many researchers have attempted to mitigate this bias with various mechanisms (Libby, Salterio and Webb, 2004; Robert, Albright and Hibbets, 2004; Dilla and Steinbart, 2005; Wong-on-wing et al., 2007; Sawatyanont, 2009), the common measure bias still exists.

This is because some of the measures in scorecards are linked to business units‟ strategies; some are not (Banker et al., 2004a). In addition, only narrative statements of business units‟ strategies do not ensure that participants will completely recognize that all performance measures are linked to strategy. Banker, Chang, and Pizzini (2004) and Humphreys and Trotman (2010: Online) concern this point and notice the benefits of a causal model since a strategy map clearly shows that all performance measures are strategically linked.

Banker et al. (2004) find the reduction of common measure bias when the participant is provided with detailed strategy information (both narrative statement and a strategy map). However, the experiment is intentionally designed so that half of scorecard measures are strategically linked and the other half are not. This is probably the reason for the existence of common measure bias.

Elaborating on Banker et al.‟s (2004), Humphreys and Trotman (2010: Online) explicitly inform experimental participants about business units‟ strategies using only narrative statement or, in other treatments, using both narrative statements and strategy map. They reveal that once participants are given detailed strategy information describing that all measures are strategically linked, regardless of a strategy map presentation, the common measures bias is eliminated. These two studies have built on attribute 1 (strategy) and have confirmed the importance of deriving measures from strategy and the cause-and-effect relationships.

Since more studies on attribute 1 (strategy) are called for (Atkinson, 2006), many investigations, especially in the area of the cause-and-effect relationships, have been increasingly performed.

Norreklit (2000, 2003) have criticized BSC, especially the claim of causality, since few empirical studies have explored the cause-and-effect relationships of all perspectives while time dimension is less concerned. Bukh and Malmi (2005: Online) have nevertheless voiced disagreement with some of Norreklit‟s views. They have explained that the cause-and-effect relationships should not be perceived as generic, but specific to the organization, situation, and the relevant time dimension. The relationships are unnecessarily firmly established, but based on beliefs and

assumptions. That is, it is management‟s responsibility to state the hypothesized causal relationship and to validate it when data are available.

Using interviews as a common source of mental data, Abernethy et al. (2005) propose and illustrate the methods to qualitatively build the causal performance maps: a computerized analysis, an ethnographic analysis, and interactive mapping. All methods draw on the knowledge of experts who control core-operating tasks. The triangulation of these qualitative methods enhances the validity of such maps. However, these are qualitative approaches that identify a plausible and coherent causal performance map. This is the initial step in establishing an effective performance measurement system and is consistent with attribute 1 (strategy). The researchers suggest that the next step is to verify and refine the cause-and-effect relationship by employing existing data sources and statistical package to be more in line with attribute 4 (feedback).

A number of research studies have been conducted in various settings to quantitatively develop the existing cause-and-effect relationships among the financial and non-financial measures by employing either simple or advanced statistical analyses. Those are, for example, Watkins (2003), Bryant et al. (2004), Smith and Wright (2004), Kim and Kim (2005), Kasperskaya (2006), Moeller (2009), Chu, Wang and Dai (2009), Saghaei and Ghasemi (2009). It should be noted that BSC merely translates firm‟s strategy into operational measures but does not guarantee a successful strategy. When the operational performance has improved but the financial one has not, managers should carefully investigate both strategy execution and the suitability of chosen strategy.

Hence, several studies have given attentions to the feedback and learning role of BSC since the cause-and-effect relationships allow for feedback through hypothesis testing and revising. Verifying and refining strategy is obviously consistent with attribute 4 (feedback).

Malina"s (2001) is among the first research papers that empirically examine the causal relationships in the context of BSC. The structural equation model is employed to test the assumed causal relationships among the chosen BSC measures at a large, international manufacturing firm in the US. The results provide partial support in the sense that only nonfinancial performance measure is a significant leading indicator of performance.

Through a case-study approach, Nielsen and Nielsen (2008) have demonstrated how to use the system dynamics modeling approach (SDM) to verify the assumed causal relationships with the time-lag consideration. Their results provide the firm with a comprehensive set of cause-and-effect relationships across and within perspectives.

Campbell et al. (2002: Online) have illustrated how firms use BSC, specifically causal links, to evaluate and learn about problems with a strategy and subsequently to devise plans to mitigate such problems.

Their research site, Store 24, decided to change its strategy from the traditional strategy (operational efficiency) to the new one (differentiation). After testing the relationship between each strategy and financial outcomes, they find that the differentiation strategy has no significant impact on financial performance, but the operational efficiency strategy has. Therefore, Store 24 returned to its traditional strategy. The findings highlight the importance of timely feedback and learning role

of BSC and the need for considering alternative strategy. With data on the alternative strategy, firms can analyze and compare the results from executed strategy and from plan-B strategy. The feedback and learning system allows BSC users to assess the degree of the validity of the cause-and-effect relationships, which can be used as an effective management-control device.

Malina, Norreklit and Selto (2007) have shown quite interesting results. After firm‟s strategy map is qualitatively derived by using a method reported in Abernethy et al. (2005) and validated by firm‟s managers. They have quantitatively tested and found no support for the perceived cause-and-effect relationships; few hypothesized leading measures explain lagging measures. Surprisingly, the case-study firm continues to rely on its assumed models and to use the BSC measures for compensation plan. Hence, the authors cautiously conclude that statistically significant cause-and-effect relationships may be not necessary for effective management control but that a causal model developed and validated by experts in firm is practically adequate.

With data from a large financial services firm that implements a BSC incentive plan, Burney, Henle and Widener (2009) have found that the presence of strategic causal model and the degree of validity of such causal links are positively associated with employees‟ perceptions of procedural and distributive justice. The perceived procedural justice subsequently affects employees‟ performance. That is, the presence of strategic causal model and the degree of validity also positively relate to employees‟ performance through their effect on procedural justice.

Wong-On-Wing et al. (2007) have proposed and examined the mechanism expected to reduce the conflict between top management and divisional managers. When BSC is used in evaluating performance of divisional managers (ratees), top management (raters) may fail to consider the effectiveness (or the quality) of their chosen strategy, but not for the ratees. This can lead to disagreement in performance ratings between raters and ratees. To mitigate this conflict, raters are required to assess the impact of strategy quality on divisional performance prior to the evaluation of divisional managers. According to their results, this proposed procedure reduces the difference in performance ratings between top management and divisional managers. Hence, the strategy assessment which is in line with attribute 4 (feedback) can help raters realize that the strategy effectiveness is one of the reasons for poor divisional performance and thereby fairly evaluate divisional managers‟ performance.

Tayler (2010) has designed an experiment to examine the impact of the manager involvement in selecting BSC measures and in presenting causal relationships on the subsequent evaluation of the strategy. His results show that framing BSC as a causal relationship, together with managers‟ involvement in the selection of scorecard measures, can mitigate the optimistic assessments of strategies. This highlights the importance of the presence of causal linkages in a strategy-evaluation task.

In a similar vein, Vera-Munoz, Shackell and Buehner (2007) underscore the usefulness of casual models in enhancing decision performance. Regardless of the degree of its validity, the presence of cause-and-effect relationships helps covariation detection by reducing the cognitive demands on the individual. Their findings show that accountants who receive the causal-model information are

more able to interpret and explore the relationships implied in the provided data, and allocate more resources to the investment that offers higher future benefits, despite the validity of such a causal model.

Concerning other features of BSC, Malina and Selto (2001) investigate the communication and management-control attributes. In one corporate setting, they find that if BSC is perceived to be effective communication device[3] and management control device[4], managers respond positively to BSC measures by reorganizing their resources and activities, which can lead to the improvement in business efficiency and profitability. In contrast, ineffective BSC negatively affects the perceptions of BSC and causes significant conflict and tension among the company and business units.

Apart from revealing the complex value-creation process, Bryant et al. (2004) find that such cause-and-effect relationships among the generic leading and lagging measures are stronger once executive compensation contracts include both financial and nonfinancial measures. This moderating effect can be viewed as one of the reasons why some studies observe the causal relationships, but some do not. Hence, tying BSC measures to incentive plan appears to be important.

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3 An effective organization communication device should have the following attributes: (1) understandable and reliable messages, (2) support of existing (and changing) organizational culture, and (3) creation and exchange of knowledge.

4 An effective organization control device should have the following attributes: (1) a comprehensive set of effective (accurate, objective, verifiable) measures that are linked with strategy, (2) causal linkages, (3) appropriate benchmarks, and (4) measures tied to reward system.

The abovementioned studies are in agreement with the various combinations of four attributes of BSC: (1) translating strategy into operational terms, (2) aligning the organizational units to the strategy, (3) communicating strategy to employees, and (4) providing feedback and learning. Nevertheless, more emphasis is given by most research studies to attributes 1, 3 and 4 than to attribute 2. The likely reasons are that attribute 1 is the fundamental attribute of BSC application and is the basis for the other three attributes, and that relative to attributes 3 and 4, it is far more difficult to investigate the application of attribute 2 in a large-scale research study.

In summary, this subsection briefly reveals the attributes of BSC investigated in prior studies. This study has extended prior studies by examining all four BSC attributes and classifying the different stages of BSC application. In other words, this allows proper identification of the BSC attributes embedded in firms‟ performance measurement system and subsequent classification of firms into different levels of BSC application. This offers an opportunity to more precisely examine the determinants and the financial consequence of BSC application.

2.2.1.2 The BSC implementation stages

This sub-section concentrates on prior studies that have proposed and examined the stages of BSC application.

2.2.1.2.1 The BSC implementation stages identified by firms' self assessed responses

Most of prior studies take firms‟ self assessed responses as given, several of which do not concern the BSC attributes; only few do so.

2.2.1.2.1.1 The classification of BSC stages without considering BSC attributes

Ittner et al. (2003) examine the relationship between the use of measurement alignment techniques (i.e., BSC, economic value measurement, and causal business model) and their implications (i.e., measurement satisfaction and economic performance) in 140 US financial service firms. This study perceives BSC as a measurement alignment technique since it is believed to improve organization performance by translating strategy into specific objectives and by incorporating measures that are linked in a causal chain of leading and lagging indicators[5]. This study has considered only the first attribute of BSC (Strategy).

Following Krumweide (1998), Ittner et al. (2003) have classified the stages of BSC implementation into six stages and have then assigned firms as non-BSC or BSC firms according to the stages as follows:

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5 This usually has been known as strategy maps, establishing the cause-and-effect relationship to reflect the organization‟s strategy. This research study uses “cause-and-effect relationships”, “causal links”, “causal models”, “strategy map”, and “business model” interchangeably.

Table 2-1: Ittner et al's (2003) classification framework

Stages	Classification
(1) Not considered (2) Implemented and abandoned (3) Considering (4) Implementing now	Non-BSC firms
(5) Used (6) Used extensively	BSC firms

Thinwilai (2005) has surveyed Thai listed firms to examine the determinants (size, industry, and market position) and financial consequence (financial performance improvement) of BSC firms. Her classification framework only relies on Yes/No responses. No different level of application is considered.

Assiri, Zairi and Eid (2006) have globally surveyed 103 organizations that have already implemented BSC or are in the process of implementing BSC in 25 countries. Unfortunately, Thailand is not included in their samples. They have classified BSC implementation into six stages and have proposed 27 critical success factors that are expected to influence BSC implementation.

Six BSC implementation stages are comprised of (1) planning stage, (2) design stage, (3) implementation stage, (4) sustainability stage, (5) learning and innovation stage, and (6) benefits and realization stage.

According to their proposed critical success factors, 6 out of 27 factors are discussed later in the determinant literature[6]. One factor (namely, Initial plan) is consistent with the BSC adoption stage since it reflects the approval for BSC development and implementation. The other 20 factors should be considered as key attributes of BSC as shown below.

Seven following factors are consistent with attribute 1 (strategy): (1) identification of BSC perspectives, (2) mission, value, vision, strategy, (3) setting objectives and measures, (4) KPIs, (5) corporate alignment, (6) cause and effect linkages, (7) finalizing BSC plan.

Two factors: (1) cascading BSC and (2) simultaneous culture, are compatible with attribute 2 (alignment).

Three factors are in agreement with attribute 3 (communication): (1) rolling out implementation plan, (2) communicating BSC and (3) linking measures with rewards.

The other remaining eight factors are in agreement with attribute 4 (feedback): (1) updating BSC measures, (2) regular reporting, (3) learning and innovation, (4) measure assessment, (5) benchmarking, (6) problem solving and action planning, (7) self-assessment, and (8) fine tuning and refining.

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6 These are (1) executives" and senior managers" commitment which is considered as top management support factor in this study, (2) BSC team in line with project team factor in this study, (3) training consistent with training factor in this study, (4) automating BSC, (5) information system design, and (6) integration, which is in agreement with information system in this study.

Drawing on the organizational innovation (Damanpour, 1991; Rogers, 2003) and the technology acceptance model (Davis, 1989), Chen et al. (2006) have investigated various determinants of BSC implementation in Taiwan. They have divided the implementation process into 25 separate stages, which are subsequently grouped as follows:

Table 2-2: Chen et al's (2006) classification framework

Stages	**Classification**	
(1) Not considered (BSC has not been seriously considered) (2) Considering (BSC is being considered; implementation is possible, but implementation has not been approved) (3) Considered then rejected (BSC is being considered (not implemented) but was later rejected)	Non-adopter	
(4) Approved for implementation (4.1) Develop objectives for BSC (4.2) Determine the appropriate organizational unit (4.3) Gain executive sponsorship (4.4) Build BSC team (4.5) Formulate your project plan (4.6) Develop a communication plan (4.7) Gather and distribute background (4.8) Develop or confirm mission, values, vision, and strategies (4.9) Conduct executive interviews (4.10) Develop objectives and measures (4.11) Develop cause-and-effect linkages (4.12) Establish targets for your measures (4.13) Develop the ongoing BSC implementation plan (4.14) Complete the BSC implementation plan (4.16) Communicate with employees and start employee training (4.17) Build consensus around strategies & objectives at the employee level (4.18) Cascade BSC at all levels of the company (4.19) Assist the development of personal BSC to align with company"s strategies	Adopter	Non-routine adopter
(4.20) Link BSC to budgets (4.21) Link BSC to performance measurement system (4.22) Continually update BSC	Adopter	Routine adopter
(4.15) Implement then abandon BSC	Adopter	Implemented then abandoned

The results based on 157 usable responses reveal that 21.7% of Taiwanese listed firms have adopted and implemented BSC. About 56% have not seriously considered BSC; 14% considered to adopt it, while 8% considered but later rejected it.

Non-routine adopter is in harmony with attribute 1 (strategy). Routine adopter is compatible with a combination of attributes 2 (alignment), 3 (communication) and 4 (feedback). However, this study does not consider each attribute separately.

From a sample of 120 Malaysian manufacturing firms, Jusoh (2007) has classified firms as BSC adopters or non-adopters as follows:

Table 2-3: Jusoh's (2007) classification framework

BSC Adoption	Classification
Yes, partially Yes, wholly	BSC adopters
No, but intend to use it in the future No, and do not intend to use it in the future Do not know	Non-adopters

Only 35 firms adopt the BSC either wholly or partly. The results reveal that the use of financial, customer, and internal process measures is significantly different between BSC adopters and non-adopters, while that of innovation and learning measures is not. Although the aim of this study is consistent with attribute 1 (strategy), only types of measures are concerned. The study does not reflect the strategic links of those measures.

Bedford et al. (2008) have surveyed Australian business units to determine whether different choices in BSC design have an impact on perceived success outcome by indicating initially the level of BSC consideration or adoption as follows:

Table 2-4: Bedford et al's (2008) classification framework

Level of consideration/adoption	Classification
(1) Not considered (2) Implemented then abandoned	Non-users
(3) Gaining acceptance (4) Used extensively	BSC users

The usable response rate is about 18% (426 of 2,400 firms); 92 firms (22%) are classified as BSC users. Three BSC attributes applied by those BSC firms are then explored and tested for their impact on 11 related benefits and 3 overall success outcomes. The attributes are the use of cause-and-effect relationship between measures (attribute 1, strategy), the extent to which BSC has been implemented throughout the organizational hierarchy (attribute 2, alignment), and the tie of non-financial measures to compensation (attribute 3, communication).

Christesen (2008) has investigated the impact of BSC usage on the performance of 61 companies in three industries: financial services, telecommunications, and energy. Of those 61 firms, 32 companies are BSC users and 29 are not. He obtained a proprietary and confidential annual survey conducted by the Hackett Group between 2001 and 2006 for the purpose of creating best practice information for their customers. The survey has explored the BSC implementation, which is classified into four stages and then grouped as follows:

Table 2-5: Christesen's (2008) classification framework

Stages	Classification
(1) No development (2) Being developed	Non-BSC firms
(3) Reports are generated and distributed, but still tuning (4) Mature user of BSC	BSC firms

This study cannot scrutinize any BSC attributes that BSC firms have employed since the data are retrieved from the survey conducted by a third party.

A survey of medium and large Australian manufacturing firms conducted by Yu et al. (2008) has identified firms adopting BSC as shown in the following table:

Table 2-6: Yu et al's (2008) classification framework

Degree of adoption	Classification
(1) Not considered (2) Implemented then abandoned	Non-adopters
(3) Gaining acceptance (4) Used to some extent (5) Used extensively	BSC adopters

The adjusted usable response rate is about 26% (75 of 280 organizations). Of the 75 respondents, 44 firms (58.67%) are classified as BSC adopters. The perceived strategy link and the perceived causal link from adopters are measured.

While both perceived strategy link and perceived causal link are in agreement with attribute 1 (strategy), the measurement of the perceived strategy link also captures the extent of attributes 2 (alignment), 3 (communication) and 4 (feedback). This makes strategy link variable the invalid construct.

2.2.1.2.1.2 The classification of BSC stages considering BSC attributes

Speckbacher et al. (2003) have surveyed publicly traded firms in Germany, Austria and Switzerland of their BSC usage and have preliminarily shown the characteristics of firms (i.e., size and industry) and the expected benefits of BSC users. They have developed and identified seven stages of BSC implementation and have thus assigned firms as non-BSC or BSC firms according to the stages.

In addition, they have derived three main types of BSC based on the BSC attributes, which range from the BSC origin as the multidimensional framework for strategic performance measurement combining strategic financial and non-financial measures to the advanced usage as the integrated strategic management system employing cause-and-effect logic and linking to the reward system. That is, BSC firms have been classified as (1) Type 1, i.e. minimum standard BSC firm, (2) Type 2, i.e. Type 1 firm with cause-and-effect relationship and (3) Type 3, i.e. a fully-developed BSC firm using the mentioned criteria.

Table 2-7: Speckbacher et al's (2003) classification framework

Stages	Classification	BSC Type	Criteria
(1) No contact with BSC thus far (2) Know BSC (3) Studied BSC, but no concrete steps taken (4) First steps already taken (5) BSC project has existed	Non-BSC firms		
(6) BSC implemented in individual business units (7) BSC implemented for entire company	BSC firms	Type 1	(1) Identify strategic measures or objectives (2) Group strategic measures or objectives into perspectives
		Type 2	Type 1 with the following criterion: (1) Employ cause-and-effect chains
		Type 3	Type 2 with some or all of the following criteria: (1) Contain action plans/target (2) Link Measures to incentives

Speckbacher et al. (2003) find that 42 firms (24% of the all respondents) have implemented the BSC either in individual parts or for the entire company. Half of such companies are of Type 1 BSC. Only 21% and 29% are of Types 2 and 3 BSC, respectively. Types 1 and 2 are consistent with attribute 1

(strategy). Type 3 combines attributes 3 (communication) and 4 (feedback). This study has not mentioned attribute 2 (alignment).

Recently, along the lines of Speckbacher et al. (2003), Yongvanich and Guthrie (2009) have proposed framework for classifying BSC into three different usage types, which are then used to survey companies listed on the SET on their BSC usage, satisfaction, and the effects on financial performance. To raise the importance of the feedback systems, this study has modified Speckbacher et al."s (2003) classification as follows:

Table 2-8: Yongvanich and Guthrie's (2009) classification framework

Stages	**Classification**	**BSC Type**	**Criteria**
(1) Decided not to implement (2) Considering but no concrete steps taken (3) Implemented and abandoned (4) Implementing now	Non-BSC firms		
(5) Implemented in individual business units or implemented extensively for entire company	BSC firms	Type 1	(1) Financial and/or non-financial measures (2) Grouped into perspectives
		Type 2	Type 1 with cause-and-effect relationships and some or all of the following criteria: (1) Strategic objectives or measures (2) Targets and action plans (3) Linkage between measures and organization"s reward system (4) Linkage between strategy and the budgeting process and the scorecard used as a basis for evaluating potential investments and initiatives
		Type 3	Type 2 with some or all of the following: (1) There is an analytical and information system designed to support strategy review. (2) There is a process for learning and adapting the strategy in which managers validate (determine if new strategic opportunities have emerged) and refine strategy.

The adjusted usable response rate is about 34% (123 of the 362 questionnaires). Of the 123 respondents, 49 firms (40%) are classified as BSC firms. Of the 49 companies, 16 (33%), 5 (10%), and 28 (57%) are classified as Types 1, 2 and 3, respectively.

Regarding the conceptual foundation of BSC, Type 1 is in agreement with the simple performance measurement system, which is not the key feature of BSC; therefore, firms classified in this type will be considered as firms at adoption stage in this current study. Type 2 combines attributes 1 (strategy), 3 (communication) and 4 (feedback), while Type 3 is in line with attribute 4 (feedback). This study has separately concerned attribute 2 (alignment) by examining the dissemination throughout the organization.

As discussed earlier, most empirical studies have simply classified firms as BSC firms and non-BSC firms by placing trust on the responses from the organization, or the unit of analysis, resulting in mixed results regarding the determinants or consequences of BSC application.

2.2.1.2.2 The BSC implementation stages identified by firms' characteristics of performance measurement systems

A Canadian study, Soderberg et al."s (2011) has elaborated on Soderberg"s (2006) thesis to develop five-level BSC taxonomy based on the attributes of KN"s BSC. The developed taxonomy is used to explore the extent of BSC implementation by surveying firms with more than 51 employees. Moreover, it aims to only report the differences between organizations with different levels of BSC

adoption rather than to examine the determinants and consequences of such differences.

By asking the structure and the use of current performance measurement system (PMS hereafter), Soderberg et al. (2011) are able to categorize firms into different levels of BSC implementation, ranging from non-BSC firms to Level 5 BSC organizations. The criteria used for the classification are shown below.

Table 2-9: Soderberg et al's (2011) classification framework

Classification	BSC Level	Attribute	Criteria
Non-BSC firms			No criterion is met.
BSC firms	1	Derived from strategy	(1) Business unit strategy is well defined. (2) Performance measures are derived from such strategy.
	2a	Strategy+ Balance	BSC level 1 with all of the following criteria (1) PMS contained financial and nonfinancial measures. (2) PMS contained driver (leading) and outcome (lagging) measures.
	2b	Strategy+ Causal links	BSC level 1 with all of the following criteria (1) PMS has measures that are linked through driver-outcome relationships. (2) Business units understand the potential driver-outcome relationship among individual measures.
	3	Strategy+ Balance+ Causal links	Level 2a with Causal links, or Level 2b with Balance
	4a	Double Loop Learning	Level 3 with Deviation from expected or planned results causes the business unit"s management to question the unit"s business strategy.
	4b	Compen-sation	Level 3 with Business unit uses the PMS to compensate/reward some or all of unit"s employees.
	5		Level 4a with Compensation, or Level 4b with Double Loop Learning

Of the 149 respondents, 75% are classified as BSC firms. 11%, 9%, 14%, 1%, 3%, 13% and 24% are classified as firms in Levels 1, 2a, 2b, 3, 4a, 4b and 5, respectively.

BSC levels 1, 2a, 2b, and 3 are consistent with attribute 1 (strategy). BSC levels 4a and 4b are consistent with attributes 4 (feedback) and 3 (communication), respectively. This study has not considered attribute 2 (alignment).

This study also considers one of the key determinants of BSC by showing that senior management involvement differs across the BSC levels.

This subsection briefly reveals the BSC implementation stages that are proposed and employed in prior studies. Obviously, most prior studies usually take firms‟ self-assessed responses as given in identifying BSC stages. Only a few consider the BSC attributes embedded in firms‟ performance measurement systems. Recently, Soderberg et al. (2011) have classified firms into different levels of BSC application by considering BSC attributes. This can mitigate the misunderstanding about the BSC concept and provide more accurate classification of BSC stages.

Hence, the conceptual foundation of BSC (e.g., Kaplan, 2010a: Online) and the literature review provide a useful basis for developing the BSC framework discussed in the next sub-section.

2.2.1.3 The developed classification of BSC stages in this study

In this study, the BSC attributes are used to specify the stages of BSC application. Based on the conceptual foundation of BSC, this study has developed the BSC framework for identifying BSC attributes, which are consequently employed to specify three stages of BSC application as follows:

Table 2-10: The BSC attributes and the stages of BSC application

BSC Stages	Criteria	
Non-Adoption	No criterion is met.	
Adoption	Adoption firm = Firm with all of the following criteria: (1) Financial and non-financial measures; and (2) Grouped into perspectives	
Imple-mentation[7]	Implementation firm = Adoption firm with the following sub-attributes to satisfy *Attribute 1: Translating strategy into operational terms* (1) Strategic objectives or measures with the well-defined strategy; and (2) Cause-and-effect relationship Firms at this stage are classified as BSC firms, which can be re-classified as partially- or fully-implemented BSC firms:	
	Partial[8]	BSC firms that have applied some of the following attributes: *Attribute 2: Aligning the organizational units to the strategy* (1) Aligning business units‟ or support functions‟ strategies to firm‟s strategy; and (2) Disseminating objectives or measures throughout the company *Attribute 3: Communicating strategy to employees* (1) Communicating vision, mission, and strategy throughout the company; and (2) Understanding firm‟s strategy; and (3) Linking measures to reward system *Attribute 4: Providing feedback and learning* (1) Linking strategy to operating plan and budgeting systems; and (2) Information system for strategy review; and (3) Process for formulating, learning, and reviewing strategy; and (4) Process for questioning and refining strategy
	Full	BSC firms that have applied all of above.

7 This stage is consistent with the Speckbacher et al.‟s (2003) Type 2 BSC, Yongvanich and Guthrie‟s (2009) Type 2 BSC and the Soderberg et al.‟s (2011) Level 3 BSC.

8 This stage covers the Speckbacher et al.‟s (2003) Type 3 BSC, Yongvanich and Guthrie‟s (2009) Types 2 and 3 BSC and the Soderberg et al.‟s (2011) Levels 4 and 5 BSC.

Firms at non-adoption stage have not adopted or implemented BSC since none of any criteria has been met.

Firms at "the adoption stage" are firms that have used the financial and nonfinancial measures that are grouped into multidimensional perspectives. As mentioned earlier, BSC is not just a collection of financial and non-financial measures. Unless the measures are derived from strategy and can reflect the business model, such a measurement system is only the performance measurement system, not the BSC-strategic measurement system. Hence, firms of his type have not implemented the BSC; however, they are considered as firms that have adopted BSC to make full use of it in the near future.

The last two stages are viewed as "the implementation stage" since firms in this stage have implemented BSC concept, but in various combinations of the applied attributes. It should be noted that firms in the implementation stage are considered as BSC-users because at least they have attribute 1 (Strategy: translating strategy into operating terms), which is the basis of BSC implementation. If firms have implemented all BSC attributes, they are considered as fully-implemented firms. Otherwise, they are partially-implemented firms.

Although this study is similar to prior studies in terms of classifying the different stages of BSC implementation, it has extended prior studies by considering BSC attributes that firms have applied in firm"s performance measurement system. This allows the reclassification of firms into three stages of BSC application, i.e., non-adoption, adoption and implementation. In addition, this allows the study of the extent to which the applied attributes of BSC are used among those BSC firms.

This study also differs from previous studies in the way that this study considers broader BSC attributes and examines the BSC usage among firms listed on the SET and MAI[9] in anticipation that results derived from this study should complement those of prior studies mainly conducted among large firms in specific industries in the US and Europe.

All in all, even though the rates of BSC application are increasing worldwide and a growing body of research has been conducted, it is still to some extent unclear as to how to classify a performance measurement system as a BSC and how BSC is actually used (Bukh and Malmi, 2005: Online). Attempting to advance the understanding of these issues is very important and needed. This study aims to fill this gap and explores the determinants and a financial consequence of such BSC application.

9 Chenhall (2003) calls for exploring the BSC application in small and medium sized firms. Investigating listed firms in the Market for Alternative Investments (MAI), which are smaller than those in the Stock Exchange of Thailand (SET) in terms of paid-up capital, can address this concern.

2.2.2 Prior BSC research on the factors influencing BSC implementation

To sustain and enhance competitive advantage, firms should adjust themselves to their environment and, when needed, consider new ideas (or innovations) that can facilitate such adaptation. This research study has focused on BSC, the innovation in management accounting that transforms the simple performance measurement system to the strategic performance measurement system, which helps in providing timely relevant information, creating synergy among business units and departments, and motivating employees at all levels to contribute to organization‟s long-term goal of value creation.

As the firm‟s necessity and capability certainly influence the implementation of new innovation, various factors should be considered in order to successfully implement such innovation.

Drawing on the organizational innovation literature, the technology acceptance model and the contingency theory, prior studies have suggested various factors relating to the BSC application (e.g., Hoque and James, 2000; Malmi, 2001; Hongratanawong, 2002; De Waal, 2003; Ranor and Lovell, 2003; Hendrick et al., 2004; Gosselin, 2005; Thinwilai, 2005; Islam and Kellermanns, 2006; Chen et al., 2006; Assiri et al., 2006; Braam and Nijssen, 2008: Online). While several studies have examined the determinants of BSC application, the determinant study as proposed in this study is still warranted since the results are inconclusive. As aforementioned, possible reasons for mixed findings are (1) the reliance on firms‟ self-assessed responses, (2) the ambiguous classification of BSC attributes and BSC stages, and (3) the different sample firms.

Most studies have taken firms‟ self assessed responses about BSC application as given. Dissimilar understanding of BSC causes the sample firms to misclassify themselves and subsequently bias the results. In addition, BSC attributes and BSC stages are not clearly defined. Testing certain determinant factors distorts their significant levels as the firms from several different stages are simply classified as BSC or non-BSC firms. Finally, various samples of prior studies are taken from different countries; culture differences possibly lead to mixed results.

This study strives to mitigate the first two reasons of mixed findings by developing a BSC framework that identifies BSC attributes and classifies BSC stages under similar criteria for all responding firms. This study simultaneously seeks to provide evidence of key determinants in the context of Thailand to complement prior studies conducted in other countries.

As a result of past literature review, the determinants as proposed in this study are categorized into four groups: (1) external factor, (2) structural factors, (3) executional factors, and (4) attitudinal factor.

2.2.2.1 External factor

The external environment is a powerful variable that is „at the foundation of contingency-based research‟ (Chenhall 2003: 137), and organizational innovation literature (Rogers, 2003). The most important aspect of the environment is uncertainty.

2.2.2.1.1 Environment uncertainty

Uncertainty has been associated with a need for performance measurement system that provides nonfinancial and future-oriented information (Gordon and Narayanan, 1984; Chenhall, 2003).

BSC offers a performance measurement system that assists managers in strategically planning and controlling organization in the highly competitive environment. Previous studies have revealed that firms in uncertain environment tend to use both financial and non-financial measures (Gosselin, 2005; Jusoh, 2008; Braam and Nijssen, 2008: Online) and BSC application (Hendrick et al., 2004). These results support the efficient choice perspective (Malmi, 1999). As BSC is a managerial accounting tool that provides useful strategic financial and nonfinancial measures as well as related necessary information for decision makers, it is expected that uncertain environment should positively encourage firms to adopt and implement BSC. The hypothesis is proposed in alternate form as follows:

H1: Environment uncertainty is positively associated with reaching higher stages of BSC application.

2.2.2.2 Structural factors

Structural factors are those reflecting firm characteristics (Anderson and Young, 1999). These organizational structures are about „the formal specification of different roles of organizational members, or tasks for groups, to ensure that the activities of the organization are carried out" (Chenhall, 2003: 144). Several organizational variables affect innovation application (Kimberly and Evanisko, 1981; Damanpour, 1991; Chenhall, 2003; Rogers, 2003).

Specifically, according to prior studies, the structural factors influence both the organization‟s decision to adopt an innovation (adoption stage) and the process of implementation (implementation stage) (e.g., Gosselin, 1997; Krumweide, 1998; Anderson and Young, 1999; Chen et al., 2006), leading to the hypothesis stated in alternate form as follows:

H2: Structural factors are positively associated with reaching higher stages of BSC application.

2.2.2.2.1 Participation

This refers to the degree of participation by organizational members in decision-making (Aiken and Hage, 1968; Damanpour, 1991; Rogers, 2003). Participative work environment facilitates innovation by increasing employees‟ awareness, involvement, and commitment (Damanpour, 1991). Prior studies find that higher degree of participation is a significant predictor of innovation adoption (e.g., Damanpour, 1991; Rogers, 2003), including the implementation of accounting innovation (Chenhall, 2003; Abernethy and Bouwens, 2005).

Although Braam and Nijssen (2008: Online) have found an insignifanct relationships between decentralization and BSC application, Gosselin‟s (2005) study finds that decentralized firms tend to use both financial and non-financial measures, which is a characteristic of BSC adoption stage.

Despite the mixed results, this study takes prior studies that align with the organizational innovation and the contingency theory to hypothesize that the degree of members‟ participation in decision making is likely to encourage the BSC application, leading to the sub-hypothesis, as stated in alternate form:

H2a: Participation is positively associated with reaching higher stages of BSC application.

2.2.2.2.2 Formalization

Formalization represents the degree an organization controls employees to handle the same input in exactly the same way, resulting in a consistent and uniform output (Roger, 2003; Robbins and Judge, 2009). This is an inverse of flexibility, representing the degree an organization allows organizational members to exercise discretion in their works (Robbins, 1983; Rogers, 2003; Damanpour, 1991; Robbins and Judge, 2009).

Formalization has been argued to have an ambiguous effect on innovation; Damanpour‟s (1991) meta analysis has reported an insignificant negative relationship between formalization and innovation with the explanation that well-established and clearly specified work rules are needed for the successful introduction of innovations in organization.

Prior BSC studies also provide mixed results. Henri (2006) finds that flexibility facilitates more use of performance measures (i.e., BSC adoption in this study); the more flexibility, the more input the employee has into how his or her work to be performed. This encourages the need for an employee to consider alternatives and the possibility of an employee to act in such alternative ways. Braam

and Nijssen (2008: Online) find an insignificant negative impact of formalization on the use of performance measures, but a significant one on strategic management system, demonstrating that formalization is likely to inhibit the BSC application. However, Wiersma (2009) finds that when more action control is used, managers use the BSC more often for making decisions and rationalizing these decisions for themselves and toward others, supporting the notion that formalization encourages the BSC usage. In addition, Assiri et al. (2006) have proposed that the written guidelines or procedures facilitate the BSC application in the organization.

Given the mixed results stated earlier and within the context of Thailand, this study follows takes Wiersma"s (2009) and Assiri et al."s (2006) works. In Thailand, the power of distance or society's level of inequality between leaders and followers is high. Managers rely on formal rules; subordinates are influenced by formal authority (Hofstede, 2001). Therefore, formalization seems to be an important factor facilitating the BSC adoption and implementation. The sub-hypothesis for formalization stated in alternate form is as follows:

H2b: Formalization is positively associated with reaching higher stages of BSC application.

2.2.2.2.3 Interconnectedness

This factor is the degree to which the units in an organization are linked by networks. This facilitates a flow of new ideas and thus the implementation process of innovation (Rogers, 2003). Meta analysis conducted by Damanpour (1991) reveals the positive effects of this factor on innovation. Chenhall (2003) has also reported that the higher the levels of interdependence among

departments, the greater the usefulness of aggregated and integrated management control system.

In the context of BSC, Assiri et al. (2006) have proposed that information sharing among departments is an important factor of BSC implementation process. Braam and Nijssen (2008: Online) have found the positive impact of departmental interconnectedness on BSC adoption. This is only one research study, to date, that empirically examines this particular factor in the context of BSC application. This study takes this evidence together with prior studies of the organizational innovation to hypothesize that interconnectedness is a key determinant for reaching higher stages of BSC application, thereby giving rise to the following sub-hypothesis stated in alternate form:

H2c: Interconnentedness is positively associated with reaching higher stages of BSC application.

2.2.2.2.4 Information system

An information system facilitates data collection, data sharing, data processing and reporting. Three main characteristics of information system are: (1) information architecture which provides data that identify and measure the company‟s competencies and skills, (2) technical architecture which allows transparent, open and flexible networks for people to connect to one another, and (3) application architecture which emphasizes problem solving and presentation, rather than results and transactions (Manville and Foote, 1996 cited in Olve et al., 1999).

An information system is expected to facilitate the adoption and implementation of BSC (e.g., Assiri et al., 2006; Kaplan, 2010b: Online) as it collects relevant information and communicates such information to users. Olve et al. (1999: 255) clearly state that „systems and IT development can prove decisive for success." Hence, information system capability is believed to facilitate BSC application, leading to the following sub-hypothesis for information system, stated in alternate form:

H2d: Information system is positively associated with reaching higher stages of BSC application.

2.2.2.3 Attitudinal factors

According to the technology acceptance model (TAM), it is widely accepted that the perceived ease of use (a process expectancy) and the perceived usefulness (an outcome expectancy) are two key determinants for intention to use and actual use of a new system. The perceived ease of use and the perceived usefulness are highly correlated in a sense that the easier the system to use, the more useful it can be (e.g., Davis, 1989; Davis et al., 1989; Szajna, 1996; Venkatesh, 2000; Venkatesh and Davis, 2000; King and He, 2006; Islam and Kellermanns, 2006; Turner et al., 2010; Wu et al., 2010: Online). Therefore, this study considers both variables concurrently as an attitudinal factor, namely attitude toward BSC, which is consistent with prior research (Hongratanawong, 2002).

Top executives‟ attitude toward innovation is likely to facilitate the implementation process as decision-makers with a more favorable attitude toward innovation are more likely to adopt and implement the innovative ideas that depart from existing practices by creating internal atmosphere conductive to the innovation (Damanpour, 1991; Damanpour and Schneider, 2006; Frambach and Schneider, 2006).

Regarding prior BSC literature, some studies have preliminarily suggested that the perceived ease of use and the perceived usefulness of BSC affect individual‟s intent to use BSC (Hongratanawong, 2002; Islam and Kellermanns, 2006). Speckbacher et al. (2003) have also provided the evidence that the expected benefits of BSC are likely to affect the BSC usage. However, Chen et al.‟s (2006) study has not supported the impact of the perception of BSC ease of use and that of BSC usefulness on BSC adoption and implementation stages. Despite the inconclusive results, this study takes the works of the former group for granted as their works align with the technology acceptance model and the organizational innovation. Specifically, the favorable attitude toward BSC is likely to affect the implementation process of BSC. The hypothesis expressed in alternate form is as follows:

H3: Attitude toward BSC is positively associated with reaching higher stages of BSC application.

2.2.2.4 Executional factors

Executional factors are those reflecting mechanisms that support or drive the implementation process (Anderson and Young, 1999).

That is, firms that have decided to adopt BSC must cope with these executional factors in order to successfully implement BSC, leading to the following hypothesis stated in alternate form.

H4: Executional factors are positively associated with reaching the implementation stage of BSC application.

2.2.2.4.1 Top management support

This is one of the most important variables in implementing any innovations (Damanpour, 1991; Rogers, 2003; Chenhall, 2003) as top management has a dominant position in the organization. Kaplan and Norton have raised the importance of this factor as it drives the four attributes of BSC. That is, top management involvement helps generate organizational support for BSC in terms of both time and resources, positively affecting its application.

While Chen et al. (2006) find a significant negative impact of top management support on BSC application, Assiri et al. (2006) have proposed that top management support is a dominant factor in BSC implementation. Many studies have confirmed the significance of this driver (e.g., Radnor and Lovell, 2003; Islam and Kellermanns, 2006; Braam and Nijssen, 2008: Online). This study takes the latter stance, leading to the following sub-hypothesis for top management support stated in alternate form:

H4a: Top management support is positively associated with reaching the implementation stage of BSC application.

2.2.2.4.2 CFO's involvement

In addition to top management, chief financial officer (CFO) is expected to be an innovation champion[10] who can affect the BSC implementation (Huckstein and Duboff, 1999 cited in McPhail, Herington and Guilding, 2008).

Accountants have specific knowledge on and responsibility for accounting-based management control and financial reporting; therefore, they have realized how the organization benefits from implementing the advanced performance measurement system like BSC (Kimberly and Evanisko, 1981; Krumwiede, 1998; Rogers, 2003). They should be the key persons in implementing the system. In addition, although very few empirical studies have investigated this variable, the significant role of CFO in implementing BSC has been confirmed (Chen et al., 2006; Braam and Nijssen, 2008: Online).

Thus, CFO"s involvement is expected to affect BSC implementation as stated in alternate form in the following sub-hypothesis:

H4b: CFO's involvement is positively associated with reaching the implementation stage of BSC application.

2.2.2.4.3 Project team

It is usually a good idea to put a project-management team in overall charge of the process (Damanpour, 1991; Olve et al., 1999; Frigo and Krumweide, 2000; Assiri et al., 2006; KN, 2008).

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10 A champion is an individual who throws his or her weight behind an innovation. This can be either a powerful individual with a high position in an organization or a lower-level administrative position who possesses the ability to coordinate the actions of others (Rogers, 2003).

This team should be seen as representative of the entire company as managers from different business units and departments can share their tacit knowledge and put their efforts to successfully implement BSC (e.g., Radnor and Lovell, 2003; De Waal, 2003; Abernethy et al., 2005). This can be recognized as the office of strategy management (OSM), a new unit at the corporate level proposed by KN. Its main responsibility is to oversee all strategy related activities: strategy formation, strategy execution, and strategy learning.

Most prior studies provide preliminary evidence and arguments to support this important factor in the context of BSC implementation (e.g., Frigo and Krumweide, 2000; Radnor and Lovell, 2003; De Waal, 2003; Abernethy et al., 2005; Assiri et al., 2006), while one does not (Chen et al., 2006). The project team keeps BSC process moving and allows employees to contribute their ideas and knowledge in terms of clarifying and obtaining consensus about strategy, deriving measures from strategy, aligning corporate-level strategy to business unit‟s and department‟s strategies and personal goals, communicating strategy throughout the organization, linking strategic objectives to long-term targets and annual budgets, tying to employees‟ reward system, enabling periodic/systematic reviews, and providing (double loop) feedback to assist strategy learning or development.

Therefore, it should encourage the implementation of BSC as hypothesized in alternate form below:

H4c: Team is positively associated with reaching the implementation stage of BSC application.

2.2.2.4.4 Training

During the implementation process, training or education support is needed for employees (Olve et al., 1999; Radnor and Lovell, 2003; De Waal, 2003; Assiri et al., 2006) in order to enhance their understanding of long term strategy and scorecard. This is expected to keep the BSC implementation process moving by motivating employees to accept and regularly use BSC information and thus conduct their work in the ways that contribute to the organization. In addition, employees can provide feedback regarding the appropriateness of strategy or initiate a better one.

Most studies that raise the importance of training are case-based study, except for Assiri et al."s (2006) which has proposed but not empirically examined it. Along the similar vein, the studies relating the implementation of activity-based costing and management show the positive impact of training on implementation process (Krumwiede, 1998). Thus, training is presumably expected to affect the implementation stage of BSC application as stated in the sub-hypothesis:

H4d: Training is positively associated with reaching the implementation stage of BSC application.

2.2.2.5 The relationships between the attitudinal factor and other factors

The technology acceptance model provides framework to investigate the effects of structural and executional factors focused in this study on the attitude toward BSC[11]. This allows this study to test to see whether or not the structural and executional factors are indirectly associated with reaching higher stages of BSC application through the attitudinal factor.

Organization structures and organizational facilitators are the key determinants of individual attitudes and behavior. Specifically, facilitating conditions and the social influences from both peer and superior are likely to have a positive effect on attitude toward using the system (e.g., James and Jones, 1976; Venkatesh and Davis, 2000; Frambach and Schillewaert, 2002; Lee et al., 2003; Kim, Mannino and Nieschwietz, 2009). This study takes this position, leading to the following hypotheses stated in alternate forms:

H5: Structural factors are positively associated with reaching higher stages of BSC application through the attitudinal factor.

H6: Executional factors are positively associated with reaching the implementation stage of BSC application through the attitudinal factor.

The following subsection provides in brief prior literature about the relationships between the attitudinal factor and the structural and executional factors.

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11 Other variables are individual factors such as computer playfulness, computer attitude, computer anxiety and perceived enjoyment. Those variables mainly reflect the individual abilities and attitude toward using technology and are beyond the scope of this study.

2.2.2.5.1 The relationships between the structural factors and the attitudinal factor

Participation allows the information exchange between superiors and subordinates. It is one of the social influences affecting attitude because a superior can suggest the ease of use or the usefulness of information system so that subordinates may come to believe that it actually is easy to use and useful, or vice versa (e.g., Taylor and Todd, 1995; Karahanna and Limayem, 2000; Frambach and Schillewaert, 2002). Participation can also be perceived as the facilitating condition that offers an opportunity to understand the usefulness and ease of use of a particular system (Venkatesh, 2000). The same should hold true for the case of BSC, leading to the following sub-hypothesis:

H5a: Participation is positively associated with reaching higher stages of BSC application through the attitudinal factor.

Organizational control should be done by the design of the accounting information system. Formalization can be viewed as the facilitating condition and social norm that are likely to affect the perceived ease of use and usefulness (e.g., Taylor and Todd, 1995; Venkatesh, 2000; Frambach and Schillewaert, 2002). This is because a more formalized organization tends to be associated with tight control where rules and control procedures are embedded within the organizational routines. There is also an increased need for monitoring organizational actions on an ongoing basis. Nicolaou (2000) finds that formalization has a positive significant effect on the user information satisfaction, which is qualitatively similar to the attitude toward performance measurement system

constructed in this study. Furthermore, formalization helps reduce role ambiguity (James and Jones, 1976). The important tasks are focused and raise the significance of strategic performance measurement system, leading to positive attitude toward BSC. Hence, formalization tends to positively relate to the attitudinal factor as stated in the following sub-hypothesis in alternate form:

H5b: Formalization is positively associated with reaching higher stages of BSC application through the attitudinal factor.

Interconnectedness lets the information flow among people in the organization such as among departments or business units; hence, it is a social influence that allows one to share with others his attitude toward information system so that others understand how easy to use and how useful it is (Taylor and Todd, 1995; Frambach and Schillewaert, 2002). Interconnectedness also seems to be one of the structural conditions facilitating such understanding (Venkatesh, 2000). Many prior studies find a significant effect of this social presence on attitude toward system (e.g., Venkatesh, 2000; Karahanna and Limayem, 2000). Nicolaou (2000) finds that information sharing that takes place among different organizational functions in carrying out their tasks has a positive significant effect on the user information satisfaction, which is a measure similar to the attitude toward performance measurement system constructed in this study. Hence, interconnectedness tends to positively relate to the attitudinal factor as stated in the following sub-hypothesis in alternate form:

H5c: Interconnectedness is positively associated with reaching higher stages of BSC application through the attitudinal factor.

An information system involves the ability to retrieve the desired information from the system. It is a technological organizational facilitator that affects both perceived ease of use and perceived usefulness as the information system facilitates the fulfillment of the relevant tasks and enhances work efficiency (Taylor and Todd, 1995; Venkatesh, 2000; Frambach and Schillewaert, 2002; Venkatesh and Davis, 2000; McFarland and Hamilton, 2006; Venkatesh and Davis, 2000; Karahanna and Limayem, 2000; Thong, Hong and Tam, 2002; Nan, Xua-hua and Guo-qing, 2007; Yen et al., 2010).

In the BSC context, the maintenance and updating information system to maintain the availability of relevant information and update the information tend to positively affect the attitude toward information system as stated in alternate form in the following sub-hypothesis:

H5d: Information system is positively associated with reaching higher stages of BSC application through the attitudinal factor.

2.2.2.5.2 The relationships between the executional factors and the attitudinal factor

„[I]f a superior or co-worker suggests that a particular system might be useful, a person may come to believe that it actually is useful" (Venkatesh and Davis, 2000: 189). Hence, top management support is an important factor that influences the attitude toward using information system since management support can ensure an adequate allocation of resources and time and act as a change agent who encourages other people in the organization (Taylor and Todd, 1995; Igbaria et

al., 1997; Venkatesh, 2000; Venkatesh and Davis, 2000; Frambach and Schillewaert, 2002; McFarland and Hamilton, 2006; Kim et al., 2009).

Although Hongratanawong (2002) does not find support for the attitude toward BSC, Islam and Kellermanns (2006) do. This study takes the latter stance, leading to the following sub-hypothesis for top management support stated in alternate form:

H6a: Top management support is positively associated with reaching the implementation stage of BSC application through the attitudinal factor.

The extent to which the target system is applicable to one‟s job increases the perceived usefulness of such a system and the perceived ease of use (Venkatesh and Davis, 2000; Thong et al., 2002; Nan et al, 2007; Kim et al., 2009). Management accountants who have worked closely with managers in the organization are likely to perceive that BSC is useful. Hongratanawong (2002) finds that user involvement in BSC development project enhances the attitude toward BSC. Hence, having involved in improving a performance measurement system, CFOs with involvement are likely to have a positive attitude toward BSC and encourage the BSC implementation process as the following sub-hypothesis:

H6b: CFO's involvement is positively associated with reaching the implementation stage of BSC application through the attitudinal factor.

The availability of support staff is one of the facilitating conditions affecting the perceived ease of use (Venkatesh, 2000; Frambach and Schillewaert, 2002). The extent to which BSC team consists of managers from different business units and departments allows information sharing among organizational units. Such information sharing affects individual attitudes by highlighting the necessity of BSC implementation in order to run the business with a clear direction. Team members are likely to share their tacit knowledge and combine their efforts to successfully implement BSC. Hence, the existence of project team makes the BSC implementation process easier and more useful, leading to the sub-hypothesis stated in the alternate form as follows:

H6c: Team is positively associated with reaching the implementation stage of BSC application through the attitudinal factor.

Training is considered as one of the facilitating conditions affecting the attitude toward using the system as it encourages the realization of the usefulness and ease of use (Igbaria et al., 1997; Venkatesh, 2000; Frambach and Schillewaert, 2002; Nan et al, 2007; Kim et al, 2009). In the BSC context, training enhances the knowledge and ability, resulting in a positive attitude toward BSC (Hongratanawong, 2002) as hypothesized below:

H6d: Training is positively associated with reaching the implementation stage of BSC application through the attitudinal factor.

2.2.3 Prior BSC research on the impact of BSC on organizational performances

„Dave Norton and I developed the Balanced Scorecard since we believed that companies‟ multi-period maximization of shareholder value could not be based on financial metrics alone. … The metrics, derived from and linked to strategy, improved communication, resource allocation, management, and feedback so that intangible assets could be aligned for shareholder value creation.‟ (Kaplan, 2006: 133)

Based on their action research studies, Kaplan and Norton have claimed a variety of benefits of BSC. Specifically, Kaplan (2006: 128-129) has clearly stated that „[t]he management accounting innovations of … the Balance Scorecard … have demonstrated its ability to create value far in excess of its costs through the creation and communication of valid information that guides decision made by thousands of employees and dozens of business units about products, processes, customers, and transactions.‟

Prior BSC studies have explored various implications of BSC among the BSC users, while some studies have compared between BSC users and non-BSC users to examine the claimed benefits of BSC implementations.

Previous research studies on implication of BSC have mostly revealed significant consequences of BSC application in terms of perceptual outcomes. Those are employees‟ satisfaction (Ittner et al., 2003; McWhorton, 2001), perceived organization‟s performance compared to competitors (Hoque and James, 2000; Braam and Nijssen, 2004; Soderberg, 2006; Iselin et al., 2008), perceived performance improvement (Sim and Koh, 2001; Malmi, 2001; Olson and Slater, 2002; Anand et al., 2005; Bedford et al., 2006; DeBusk and Crabtree, 2006; Abernethy, Bell and

Schulz, 2008: Online; De Geuser et al., 2009), the integration of management processes, and perceived benefits of BSC relative to its costs (De Geuser et al., 2009).

Although the positive ex post attitudes toward using BSC have been revealed in most studies, they reflect the subjective organization performances, not the objective ones. These perceptual outcomes do not necessarily imply the improved economic performance (Ittner, 2008). For example, Ittner et al. (2003) find that BSC users report higher satisfaction with their performance measurement systems; however, stock returns of BSC firms are not statistically different from those of non-BSC firms. Surprisingly, return on assets (ROA) of BSC users is statistically lower than those of non-BSC users. This leads to suspicion of perceptual outcome measures (Ittner, 2008).

Therefore, the empirical studies on financial performance implications of BSC are still warranted (Burkert et al., 2010) and are the important research projects in order to find out whether BSC implementation produces such claimed economic results.

This section concisely reviews prior literature related to the financial consequences of BSC implementation and the argument for employing return on equity as a financial performance measure for the consequence test in this study.

2.2.3.1 Prior BSC research on the financial consequences of BSC implementation

Regarding economic performance, Kaplan and Norton (2001b: 89) argue that BSC „create[s] differentiating customer-value propositions and superior financial outcome" by translating strategy into specific objectives and measures that are linked in a causal chain of leading and lagging indicators in all scorecard perspectives. Kaplan and Norton (2001a: viii) „observed that a high proportion of the early Balanced Scorecard adopters effectively implemented new strategies and realized positive returns within twelve to twenty-four months."

Due to the existing BSC case study evidence, previous empirical research studies have expected the significant positive impact of BSC implementation on financial performances as well as shareholder returns. However, they provide conflicted evidence. This may be due to at least four possible reasons: (1) relying on self-assessed responses about BSC application, (2) different financial performance measures, (3) different samples and time of the studies, and (4) a concern of the specific year of implementation.

As aforementioned, firms may misclassify themselves as to whether they are BSC users. Taking self-identified responses about BSC application as given probably biases the research results. Therefore, this study overcomes this limitation by developing a BSC framework in order to properly specify the BSC attributes and BSC stages of responding firms.

Secondly, several financial performance measures, such as sales growth, return on assets, return on equity, a composite index of financial performances, are investigated. Since strategic financial measures in the cause-and-effect relationships in firms‟ BSC scorecard are unique for each firm, observing the impact of BSC implementation on the specific financial measures unable to encompass the whole activities occurring in the firms may lead to different conclusions. Hence, this study selects the financial measure that presumably captures all significant actions in the organization as discussed later.

Additionally, various samples from different industries or countries and time of studies may be the reasons of mixed results.

Some previous studies concern only the current state of BSC application, leading to the examination of current financial performances by, for example, comparing the financial performances for certain years or periods between BSC and non-BSC firms. While some research studies have concerned the specific year of implementation, resulting in the investigation of financial performances during the post-implementation period. However, it is worth mentioning that this depends on the specific research question of each study.

Prior studies related to the financial consequences of BSC implementation will be briefly presented as follows:

2.2.3.1.1 The impact of BSC on financial performances over a specific year or period without concern for implementation year.

Using a sample of US financial services firms, Ittner et al. (2003) have directly examined the effect of BSC use on financial results, including the one-year measures (for fiscal year 1999) and the three-year measures (for the time period covering fiscal years 1997-1999). They found that BSC users did not exhibit higher one-year stock return, three-year stock return and three-year sales growth than non-users. Conversely, use of BSC is negatively associated with return on assets (ROA). When they restrict their samples to firms that do not change their performance measurement systems in the past two years, the results are qualitatively the same. BSC firms do not have significantly higher economic performance than non-BSC firms.

Braam and Nijssen (2004) reveal empirical evidence from 41 Dutch firms regarding the effects of BSC usage on change in return on investment (ROI or the ratio of net income to invested capital) over the three-year period, 1999-2001. They find that the usage of measurement-focused BSC results in statistically lower change in ROI while that of strategy-focused BSC insignificantly increases change in ROI.

With respect to 61 firms from financial services, telecommunications and energy sectors, Christensen (2008) has investigated the impact of BSC usage on three financial performance measures: revenue, net income, and return on assets. Using the 2006 and 2003 financial results as dependent variables and covariates, respectively, the analysis of covariance (ANCOVA) finds return on assets, not revenue or net income, to be statistically significant. Hence, the study concludes that „balanced scorecard does have a statistically significant effect on return on assets measure of the firms that were part of this sample." (Christensen, 2008: 76).

In the context of Thailand, Thinwilai (2005) has examined the relationship between the application of BSC and the change in financial performance among firms listed on the SET and MAI. The BSC application is statistically and positively associated with change in return on assets (ROA) over a two-year period, 2002-2004, after controlling for industry size, market position, and market to book ratio.

Recently, Yongvanich and Guthrie (2009) have provided a descriptive analysis of BSC usage among companies listed on the SET and have investigated the BSC implications on performance in terms of overall satisfaction, annualized sales growth over a three-year period (for period covering 2004-2006), return on asset and net profit margin (for year 2006). Out of 123 responding firms, 49 are classified as BSC users since their self-identified responses report that they have implemented BSC extensively for the entire companies. They have then been classified into three different usage types, i.e. Types I, II and III as mentioned in earlier section. According to their results, there are no significant associations between the BSC usage and the outcomes (i.e., satisfaction and all financial performance variables). Examining 27 firms that have used the BSC for at least four years yields similar results, except for the fact that sales growth over the three-year period of Type II users (firms at implementation stage in this current study) is significantly lower than that of Type I users (firms at adoption stage in this current study). Overall, their results do not support the hypothesis that the use of BSC improves the financial performance. It is likely that superior performance is not a quick result of BSC implementation and may be from various factors.

2.2.3.1.2 The impact of BSC on financial performances with concern for implementation year.

Kallas and Sauaia (2004) have employed business game for the experiment aiming to explore the effect of BSC implementation on financial performances reflected by the game total score calculated from seven corporate financial performances. In their experiments, there are seven runs of the total game application. Firms in the treatment group have started implementing BSC from the third year on and have acquired the strategy map reflecting the relationships among the strategic indicators, while firms in control group have not. In the first two rounds, the average score of control group is higher than that of experimental group. However, the average score of experimental group becomes steadily higher in year four and increases consistently until year seven, while that of control group shows consistent scores throughout those periods. Therefore, their results reveal that the experimental group (BSC-users) has outperformed control group (non-BSC users) in terms of the game total score calculated from seven corporate financial performances. However, it should be noted that BSC application has produced positive impact on the total score, but not on all financial performances.

Davis and Albright (2004) have conducted the quasi-experiment study in nine branches of one bank to investigate the effectiveness of BSC in improving financial performance (i.e., a composite measure of nine key financial performance measures). Four experimental branches implementing BSC have developed causal links among strategic measures with some of financial measures in the composite score as ultimate financial goals. Subsequently, employees are educated about branch strategic goals and their contribution to achieving such goals.

The control branches run their business as usual. The composite measure is used for bonus rewards for both experimental and control groups, while the BSC measures, only for experimental group, are additionally used in determining an annual raise and in considering promotion decision. When comparing performance for a month before implementing BSC and that for a month after implementing BSC for two years, Wilcoxon rank test results indicate that the experimental group has experienced a significant increase in financial performance but the control group has not. Their results also show that the experimental divisions have realized greater improvement in financial performance than the control ones. Overall, this study shows that the implementation of BSC leads to improved financial performance. It is worth noting that although generalization is limited, their quasi-experimental designs allow researchers to draw valid conclusions about the impact of the treatment, i.e. the implementation of BSC. The availability of pre-/post-treatment observations and the presence of a control group of branches from the same bank as well as same general geographical regions can control for confounding events and alternative explanations by the nature of experimental design.

Crabtree and DeBusk (2008) observe the relationship between BSC implementation and stock returns with the assumption that the BSC implementation produces the improved results at the business units. When BSC is implemented for the organization as a whole, the sum of improved operating unit results will significantly increase overall financial performances, subsequently leading to excess stock market returns. Using a matched pair design, their results have showed that BSC firms outperform non-BSC firms in terms of shareholder returns over a three-year period beginning with the year of implementation.

Their robustness tests also provide some supports for the similar conclusions for accounting profitability measures. Specifically, for the sample matched on market value of equity, BSC firms perform better than match-pair firms on operating margin and return on equity, but no statistical difference on return on assets. However, for the sample matched on book-to-market and net assets, BSC firms produced a higher return on assets than the control firms, but no significant difference on operating margin and return on equity.

In summary, based on KN‟s claim and prior study results, organizations using BSC can focus on achieving their strategic objectives and measures, cascading the corporate strategy into aligned and integrated strategies at lower-level units, communicating the strategy to ensure that everyone works toward common goals, and adjusting strategy when needed. This, consequently, should result in significant improvement in performance results (KN, 2008a). This highlights how management accounting makes organization better off by explaining how forms and uses of management accounting, specifically BSC, can ultimately lead to financial gains (Cummings and Worley, 2005; Malmi and Granlund, 2009).

However, there are still few empirical research studies that directly investigate the financial implication of BSC implementation using actual financial performance measures. The possible reasons of few studies are (1) the actual performance data were not readily available from public sources, (2) difficulty in specifying when the BSC is actually implemented and (3) the implementations of numerous other management or accounting techniques other than BSC, resulting in

the complication in separating the impact of only BSC implementation on financial performance.

Furthermore, prior studies provide inconclusive results due to some possible reasons mentioned earlier. This leaves the financial consequence of BSC implementation to be an important research topic for this study.

2.2.3.2 The importance of return on equity (ROE)

Regarding the financial performance, prior studies do not explain nor do they justify why specific accounting ratios (e.g., ROA, profit margin, sales growth) reflecting organizational financial performance are selected for their studies. This study selects the return on equity (hereafter ROE) as a common financial performance measure because of the following reasons.

Firstly, although organizational performance should be measured by the goals that the organization set for itself (Etzioni, 1964 cited in Murphy, Trailer and Hill, 1996), organizations have varied goals, thereby making cross-firm comparison difficult. This current study aims to examine the financial performance improvement among listed firms across various industries. Hence, using generic performance measure from the view of capital market makes possible the comparison of the financial performance improvement among these listed firms. In addition, all listed firms in this study are required to submit Form 56-1, including a section on the firm‟s financial ratios. ROE is found to be the most common financial performance measure across industries. Therefore, ROE should be a more suitable measure to be used in this study than any other measures.

Secondly, creating shareholder value depends on properly managing three basic areas common to all organizations, i.e. the investment of resources, the operation of the business using such resources, and the proper mix of financing that funds such resources. Therefore, owners or investors need a ratio to determine the return they are receiving from their investments in a company or to measure the return on their investments. ROE, by no means, serves this purpose (Helfert, 2003; Bragg, 2007; Palepu, Healy and Peek, 2010).

ROE can also be used to compare with the opportunity cost of equity to determine whether firm creates value for shareholders (Brealey et al., 2009; Palepu et al., 2010). A firm which earns more (less) than the cost of equity makes its shareholders better (worse) off[12]. Such comparison is useful for analyzing the value of the firm (Palepu et al., 2010). Therefore, using ROE for primary analysis in this study sheds some light on the firm‟s value creation.

Thirdly, ROE is a comprehensive indicator of a firm‟s performance and can be expanded to express various components. This allows investors to look for the key drivers that management used to raise the return on owner‟s equity (Helfert, 2003; Brealey et al., 2009; Palepu et al., 2010). This ratio is useful in tracing through the ultimate effects from changes in any of basic drivers that are brought about by management decisions. That is, the different organizational performance measures that organization sets as its goals to pursue can be reflected in ROE since the ROE formula can be expanded as illustrated:

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12 Brealey et al. (2009) show how to calculate a specific type of simple EVA. That is, EVA = Net income – (cost of equity x equity) = ROE – Cost of equity. Hence, in their textbook, ROE is considered as a part of EVA. It should be noted that adjusted return on capital employed, rather than ROE, should be used to calculate EVA. However, the adjustments of net income in line with the suggestions of Stern Stewart & Co. to obtain the adjusted ROCE are beyond the scope of this study.

$$ROE = \frac{NetIncome}{Equity} \quad (1)$$

$$ROE = \frac{NetIncome}{Assets} \times \left(1 + \frac{Debts}{Equity}\right) \quad (2)$$

$$ROE = \frac{NetIncome}{Sales} \times \frac{Sales}{Assets} \times \left(1 + \frac{Debts}{Equity}\right) \quad (3)$$

ROE can be broken down into various components. In equation (2), ROE is a product of ROA and financial leverage ratio. With the extended version of the Du Pont formula, ROE in equation (3) is broken down into three parts: profit margin, assets turnover, and financial leverage ratio.

Therefore, ROE seems to be the most appropriate financial measure for this research study since whatever financial performance measures that organization sets for itself are finally reflected in ROE. For example, an increased level of inventories will reduce working capital turnover, which in turn lowers the return on assets, and in the end, the return on equity.

This study has extended prior studies that examine actual financial consequence of BSC implementation over the year of implementation. In particular, this study aims to empirically investigate the financial consequence of BSC implementation with some major differences from prior studies as follows:

Firstly, this study is not the experimental research as are Davis and Albright"s (2004) and Kallas and Sauaia"s (2004). Similar to Crabtree and DeBusk"s (2008), sample firms in this study are from various industries to enhance the generalization. In addition, sample firms are listed on the SET and MAI in Thailand to complement prior studies conducted in the US.

Secondly, this study focuses on financial performance improvement, not on the static financial performance in a certain year or period as do, for example, Ittner et al. (2003) and Yongvanich and Guthrie‟s (2009). The percentage change in ROE over a two-year period is employed as a proxy for financial performance improvement.

Thirdly, firms are likely to integrate financial and nonfinancial measures along multiple dimensions in their performance measurement systems, following „the original 1992 article or the first half of the initial Balanced Scorecard book‟ (Kaplan, 2010a: Online: 25). Based on the BSC framework developed in this study, these firms are BSC-adopted firms.

As previously mentioned, the measures should be derived from strategy (strategy-link sub-attribute) and be illustrated as cause-and-effect relationships (causal-link sub-attribute). Several firms attempt to do so; hence, it is possible that certain BSC-adopted firms have either of those two sub-attributes as an approach to reach the implementation stage of BSC. As these firms are in between the adoption and implementation stages (BSC-adopted+ firm hereafter), this offers a great opportunity to test to see if BSC-implemented firms have higher financial performance improvement than such BSC-adopted+ firms.

This is the first study that extends prior studies by revealing another aspect of BSC‟s financial consequence. Specifically, the evidence will explicitly show whether BSC-implemented firms (firms with all three sub-attributes of Strategy attribute) produce higher change in ROE than BSC-adopted+ firms (firms with at least two out of three sub-attributes of Strategy attribute).

This will provide the implication for BSC-adopted firms as to whether or not they should attempt to become BSC-implemented firms.

Fourthly, the survey participants under this study are required to identify the years in which firms have Strategy-link sub-attribute and Causal-link sub-attribute. This allows this study to determine the year of BSC implementation (adoption+) for each BSC-implemented (BSC-adopted+) firms[13].

Finally, due to the inability to identify the exact months of the sub-attribute implementations, this study employs the implementation year specified by survey respondents as the base year[14]. Therefore, the base year for computing changes in ROE for a two-year period is the latest year of sub-attribute implementation. For example, if the year in which firms implemented the strategy-link and causal-link sub-attributes is 1999 and 2000, the base year is 2000. The measure of changes in ROE is calculated as (ROE in 2002 – ROE in 2000)/ROE in 2000.

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13 Unfortunately, this study is unable to specify the exact year of BSC adoption since this study does not have the information about the year in which firms start using both financial and nonfinancial (or operating) measures and the year in which measures are grouped into multiple perspectives. Hence, this study cannot compare the improved financial results between firms at implementation stage and those at adoption stage.

14 This study assumes that the implementation year identified by survey participant includes the period of implementation and non-implementation. Hence, the beginning of the implementation should be assumed as it is as at the end the year specified by the respondents in order that the financial performances for two years following the implementation year will thoroughly reflect the financial results within twelve to twenty-four months after the implementation.

Overall, this study attempts to investigate the financial consequence of BSC implementation in different views. Regarding KN‟s claim and prior literature, after implementing BSC, organizations are able to focus on (1) achieving their strategic objectives and measures, (2) cascading the corporate strategy into aligned and integrated strategies at lower-level units in the organization, (3) communicating the strategy to ensure that everyone works toward common goals, and (4) adjusting the strategy when necessary in order to maintain the competitive advantage. This strategic orientation ultimately improves their financial performances, leading to the hypothesis stated in alternate form as follows:

H7: BSC-implemented firms are likely to have higher financial performance improvements than BSC-adopted firms.

It is worth noting that there are several reasons for which, among sample firms, BSC-implemented firms are less likely to exhibit higher improvement in return on equity than BSC-adopted+ firms.

Firstly, this study focuses on overall financial performance improvement. In reality, the financial performances of the strategic business units in an organization tend to offset one another. That is, some business units may exhibit improved performance, while others within the same organization may exhibit no change or, even worse, a decrease in performance.

In addition, although BSC has focused on promoting value creation (Kaplan and Norton, 1992; Ittner and Larcker, 2001), in a real world firms have implemented BSC merely for organizational success or, at the very least, survival (Otley, 1999), or for other purposes such as communication purpose. These purposes

could lead to insignificant improvement in financial performance for certain sample firms.

Moreover, ROE may be not explicitly included in the financial perspective of the sample firms‟ Balanced Scorecards; hence, inconsistency could result between the financial measure (i.e., ROE) mostly considered by the market and the internally used measures upon which top management has focused. The strategy reflected in the cause-and-effect relationships may not be the profitable strategy for sample firms at the time of study. The weights for financial measures are unknown. Given all these reasons, bias against expected results is likely to occur.

Additionally, Folk, Garrison and Noreen (2002: 10) stated that „management accounting system will not by itself guarantee success, but a poor management accounting system can stymie the best efforts of people in an organization‟. This could prove true with BSC.

Last but not least, BSC-adopted firms probably exhibit relatively high financial performance improvement after implementing additional sub-attribute(s) of a strategy attribute. This complicates the determination of the significant difference between the financial result improvement of BSC-implemented firms and that of BSC-adopted firms.

CHAPTER III

RESEARCH METHODOLOGY

This chapter provides an overview of the research methodology. Discussed in this chapter are the sections on (1) data collection, (2) survey instrument and (3) model specifications and variable measurements

3.1 Data collection

Samples in this cross-sectional survey research are firms listed on the Stock Exchange of Thailand (SET) and the Market for Alternative Investments (MAI). The initial sample consists of 519 firms. Excluding 11 pre-tested firms from the samples results in the final sample of 508 companies. Details for responses are discussed in Chapter 4.

The research objectives are (1) to explore the stage of BSC application by considering BSC attributes embedded in organizations‟ performance measurement systems, (2) to examine the key determinants for BSC stages, and (3) to investigate the financial consequence of BSC implementation. Thus, this study employs the survey method to serve the first two research objectives and archival data retrieved from financial statements in the SET Market Analysis and Reporting Tool (SETSMART) to achieve the third objective.

3.2 Survey instrument

3.2.1 Questionnaire design

Mail surveys are employed to obtain information on the applied BSC attributes and the determinants. Chief Financial Officers are the target population since they are presumably considered to be the most knowledgeable about their organizations‟ performance measurement systems.

The questionnaire (see Appendix C for details) contains questions on BSC attributes and determinants following previous surveys. The questionnaire of this study consists of nine parts.

The first and the second parts enquire the respondents about their organization‟s profile as well as their profiles.

Relating to BSC attributes, the third and the fourth parts consist of 15 Yes/No questions and 25 percentage-scale questions, respectively. These parts of the questionnaire were developed based on the BSC framework proposed in this study (refer to section 2.2.1.3 in Chapter 2). Specific survey questions were employed to align the questionnaire with the BSC attributes embedded in firms‟ performance measurement systems. The answers consequently allow this study to specify the stages of BSC application. Classifying firms into each stage of BSC using Yes/No questions is consistent with prior studies (Speckbacher et al., 2003; Yongvanich and Guthrie, 2009). This study has also developed a questionnaire that reflects the degree of usage for each BSC attribute. The respondents are required to specify the degree (in percentage scale: 0-100) for the features of performance measurement system and management process in the organization.

Parts five to eight contain questions relating to organizational factors, attitude toward BSC, participation and environment uncertainty, respectively. Finally, respondents are also required to provide their self-assessed responses about the application of BSC in part nine.

3.2.2 Questionnaire administration

Once the questionnaire was revised based on pre-test results and suggestions from a group of CFOs and academics, a questionnaire package was sent to CFOs during May 2011. The questionnaire package contains a cover letter, a questionnaire, and a postage-paid return envelope with a code. The code was used later to identify respondents who had returned the survey.

The follow-up procedure is employed. Specifically, the first follow-up (a reminder letter) was sent two weeks after sending the questionnaire. The second follow-up with questionnaire replacement was sent in the next four weeks after sending the reminder letter in the first follow-up procedure. The respondents are informed that the identity of the respondent companies and of the respondents would remain undisclosed and only aggregate generalizations would be published.

3.3 Model specifications and variable measurements

3.3.1 Determinant part

3.3.1.1 Model specifications

3.3.1.1.1 Test for direct effects

To test whether each of the external, structural, and attitudinal factors is associated with reaching higher stages of BSC application (H1-H3), the following ordinal regressions[15] are employed:

External factor

M1

$$\frac{\left\langle P(Stage > m \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > m \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_{0m} + \beta_1 ENV_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_{0m} + \beta_1 ENV_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

Structural factors

M2a

$$\frac{\left\langle P(Stage > m \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > m \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_{0m} + \beta_1 PART_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_{0m} + \beta_1 PART_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

M2b

$$\frac{\left\langle P(Stage > m \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > m \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_{0m} + \beta_1 FORM_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_{0m} + \beta_1 FORM_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

M2c

$$\frac{\left\langle P(Stage > m \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > m \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_{0m} + \beta_1 INT_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_{0m} + \beta_1 INT_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

M2d

$$\frac{\left\langle P(Stage > m \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > m \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_{0m} + \beta_1 IS_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_{0m} + \beta_1 IS_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

15 Ordinal logistic regression is more appropriate for ordinal (ordered) dependent variables with three or more levels. If ordinal dependent variable has *m* stage, there are *m-1* logit models. Each logit has its own intercept but the same coefficients of independent variables. Hence, the underlying ordinal logistic regression is the parallel regression assumption. The effects of the independent variables are the same for different logit functions. In other words, the coefficients that describe the relationships between, for example, the lowest versus all higher categories of the dependent variable are the same as those that describe the relationships between the next lowest category and all higher categories, and so on.

Attitudinal factor

M3

$$\frac{\left\langle P(Stage > m \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > m \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_{0m} + \beta_1 ATT_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_{0m} + \beta_1 ATT_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

Remarks: 1. Three stages of BSC application are (1) non-adoption, (2) adoption and (3) implementation. Two logit models are analyzed for each hypothesis. Hence, m equals 1 or 2 to express the relationships between the lowest category (non-adoption) versus all higher categories (adoption and implementation) and those between two lowest categories (non-adoption and adoption) and the highest category (implementation).

2. Dependent and independent variables are defined in section 3.3.1.2

To test whether each of the executional factors is associated with reaching the BSC implementation stage (H4), the binary logistic regression analysis is employed as it is suitable when the categorical outcome variable has two levels.

Executional factors

M4a

$$\frac{\left\langle P(Stage > 2 \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > 2 \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_0 + \beta_1 TOP_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_0 + \beta_1 TOP_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

M4b

$$\frac{\left\langle P(Stage > 2 \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > 2 \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_0 + \beta_1 CFO_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_0 + \beta_1 CFO_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

M4c

$$\frac{\left\langle P(Stage > 2 \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > 2 \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_0 + \beta_1 TEAM_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_0 + \beta_1 TEAM_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

M4d

$$\frac{\left\langle P(Stage > 2 \mid X_1,...X_p \right\rangle}{1-\left\langle P(Stage > 2 \mid X_1,...X_p \right\rangle} = \frac{\exp\{\beta_0 + \beta_1 TRAIN_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1+[\exp\{\beta_0 + \beta_1 TRAIN_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$$

Remarks: 1. Three stages of BSC application are (1) non-adoption, (2) adoption and (3) implementation. In order to express the relationships between two lowest categories (non-adoption and adoption) and the highest category (implementation), m equals 2.

2. Dependent and independent variables are defined in section 3.3.1.2

3.3.1.1.2 Test for indirect effects

To test whether each of the structural and executional factors is associated with reaching higher stage of BSC application through the attitude toward BSC (H5 and H6), the following models are employed.

Structural factors	
M5a	$ATT_i = \alpha_0 + \alpha_1 PART_i + \varepsilon_i$
M5b	$ATT_i = \alpha_0 + \alpha_1 FORM_i + \varepsilon_i$
M5c	$ATT_i = \alpha_0 + \alpha_1 INT_i + \varepsilon_i$
M5d	$ATT_i = \alpha_0 + \alpha_1 IS_i + \varepsilon_i$
Executional factors	
M6a	$ATT_i = \alpha_0 + \alpha_1 TOP_i + \varepsilon_i$
M6b	$ATT_i = \alpha_0 + \alpha_1 CFO_i + \varepsilon_i$
M6c	$ATT_i = \alpha_0 + \alpha_1 TEAM_i + \varepsilon_i$
M6d	$ATT_i = \alpha_0 + \alpha_1 TRAIN_i + \varepsilon_i$

Remark: Dependent and independent variables are defined in section 3.3.1.2

The structural or executional factors are considered to be indirectly and positively associated with reaching higher stages of BSC application through the attitudinal factor if (1) each determinant in models 5a-5d and 6a-6d significantly and positively relates to the attitudinal factor, and (2) the attitudinal factor in model 3 is significantly and positively associated with reaching higher stages of BSC application. The indirect effects of each structural and executional factor can be computed as the product of the standardized coefficient of each determinant in models 5a-d and 6a-d and that of the attitudinal factor in model 3.

3.3.1.2 Variable measurements

3.3.1.2.1 BSC stages

As discussed earlier, BSC application is separated into three stages. The BSC application ranges from one to three (as an ordinal scale) corresponding to the stage assigned. Specifically, firms at non-adoption, adoption, and implementation stages are assigned as one, two and three, respectively.

3.3.1.2.2 Determinant variables

The measurements of each determinant adapted from prior literature are shown in Questionnaire (the sections are specified) as follows:

Determinant variables		***Section***	***Adapted from***
External factor			
Environment uncertainty	ENV	8	Gosselin (2005)
Structural factors			
Participation	PART	7	Pasewark and Welker (1990), Pholnaruksa (2007)
Formalization	FORM	5	Robbins (1983), Braam and Nijssen (2008: Online)
Interconnectedness	INT	5	Rogers (2003), Braam and Nijssen (2008: Online)
Information system	IS	5	Krumweide (1998), Assiri et al. (2006)
Attitudinal factor			
Attitude toward BSC	ATT	6	Davis (1989), Hongratanawong (2002)
Executional factors			
Top management support	TOP	5	Assiri et al. (2005), Chen et al. (2006)
CFO‟s involvement	CFO	5	Chen et al. (2006), Braam and Nijssen (2008: Online)
Project team	TEAM	5	Assiri et al. (2005), Chen et al. (2006)
Training	TRAIN	5	Krumweide (1998), Hongratanawong (2002), Assiri et al. (2005)

All items in each determinant, with the exception of Participation, are measured as a percentage scale (0-100%). The mean of all items in each determinant serves as the score for such determinant. The reliability of each measure is assessed using Cronbach‟s alpha (Nunnally and Bernstein, 1994).

Regarding Participation, the following scores are assigned to each level of participation:

Level of participation	Score
AI: You have made decisions yourself, using information available to you at the time.	0
AII: You have obtained the necessary information from your subordinates, and then have made decisions yourself. You may or may not describe your decisions to them when asking for the information. The role played by the subordinates is clearly one of providing necessary information to you, rather than generating or evaluating the decision making.	1
CI: You have shared your decisions with the relevant subordinates individually, getting their ideas and suggestions without bringing them together as a group. Then you have made decisions, which may or may not reflect your subordinates‟ influence.	5
CII: You have shared your decisions with the relevant subordinates as a group, obtaining their collective ideas and suggestions. Then you have made decisions, which may or may not reflect your subordinates‟ influence.	8
GII: You have shared your decisions with the relevant subordinates as a group. Together you have discussed and evaluated various alternatives and have attempted to reach agreement (consensus) on a solution. Your role is much like that of a chairman. You do not try to influence the group into adopting “your” decision, and you are willing to accept and implement any decision which has the support of the entire group.	10

3.3.1.2.3 Control variables

Larger organizations are likely to implement the organizational innovation (Rogers, 2003) as they have more resources to do so. Most studies have found that size is positively associated with diversity of performance measure used (Hoque and James, 2000), BSC adoption (Speckbacher et al., 2003; Hendrick et al., 2004; Islam and Kellermanns, 2006; Jusoh, 2007) and BSC implementation (Thinwilai, 2005; Chen et al., 2006). Moreover, Speckbacher et al. (2003) and Hendrick et al. (2004) consider industry as one of potential factor affecting the BSC adoption. In addition, several survey studies usually examine BSC application among finance firms and manufacturing firms.

Hence, three variables are considered to be control variables in this part of the study. The measurements of control variables are adapted from prior literature.

Control variables		Section	Measurements
Firm size	SIZE	1	Total revenue (thousand million baht) in Year 2010
Industry -Finance or insurance	FIN	1	Finance or insurance = 1; otherwise = 0
Industry -Manufacturing	MANU	1	Manufacturing = 1; otherwise = 0

3.3.2 Consequence part

3.3.2.1 Model specifications

To test whether BSC-implemented firms outperform BSC-adopted firms (H7), the following models are employed.

M7a $$\Delta ROE_i = \gamma_0 + \gamma_1 IMPLE_i + \gamma_2 FIN_i + \gamma_3 MANU_i + \gamma_4 SIZE_i + \gamma_5 MB_i + \gamma_6 MA_i + \varepsilon_i$$

M7b $$\Delta ROE_i = \gamma_0 + \gamma_1 PRE\_IMPLE_i + \gamma_2 FIN_i + \gamma_3 MANU_i + \gamma_4 SIZE_i + \gamma_5 MB_i + \gamma_6 MA_i + \varepsilon_i$$

Remark: Dependent and independent variables are defined in section 3.3.2.2

3.3.2.2 Variable measurements

3.3.2.2.1 Dependent variable: Financial performance improvement

As BSC is an improved strategic performance measurement system that describes value-creation process by relating measures with organizational strategy, aligns the organization, communicates strategy throughout the organization, adjusts the strategy to the proper one, and ultimately leads to „superior financial outcome" (KN 2001b: 89).

Therefore, the measurement for firm"s financial performance should reflect value-creation process. This study selects the return on equity as the financial performance measure as discussed in Chapter 2.

As KN observed the financial improvement within two years after implementing BSC (KN, 2001a), the measurement of financial performance improvement used in this study is defined as a percentage change in return on equity from one period to another (ΔROE_i), using a two-year lag period as defined below:

$$\text{Percentage change in ROE } (\Delta ROE_i) = \begin{cases} \left| \dfrac{ROE_{i,t+2} - ROE_{i,t}}{ROE_{i,t}} \right|; & ROE_{i,t+2} - ROE_{i,t} > 0 \\ -\left| \dfrac{ROE_{i,t+2} - ROE_{i,t}}{ROE_{i,t}} \right|; & ROE_{i,t+2} - ROE_{i,t} < 0 \end{cases}$$

where ROE = Net income / Beginning shareholder"s equity

t = year that organization has started implementing BSC

3.3.2.2.2 Independent variables: BSC implementation

The measurements of BSC implementation are as follows:

BSC implementation		**Measurement**
BSC implementation	IMPLE	Dummy variable IMPLE = 1 when firm is classified as a BSC-implemented firm; 0 otherwise (or when firm is classified as a BSC-adopted firm with additional sub-attribute of Strategy attribute)
Predicted probability of BSC implementation	PRE_ IMPLE	Predicted probability of the extent to which firms reach the stage of BSC implementation from the following logistic model: $\dfrac{\langle P(Stage > 2 \mid X_1, \ldots X_p \rangle}{1 - \langle P(Stage > 2 \mid X_1, \ldots X_p \rangle} = \dfrac{\exp\{\beta_0 + \beta_1 DETER_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}}{1 + [\exp\{\beta_0 + \beta_1 DETER_i + \beta_2 SIZE_i + \beta_3 FIN_i + \beta_4 MANU_i\}]}$ where DETER = Factor scores of all determinants; other variables are defined in section 3.3.1.2.3.

3.3.2.2.3 Control variables

The control variables in this study are consistent with prior studies (Ittner et al., 2003; Thinwilai, 2005; Yongvanich and Guthrie, 2009; King et al., 2004). The measurements are as follows:

Control variables		**Measurements**
Industry -Finance or insurance	FIN	Finance or insurance = 1; otherwise = 0
Industry -Manufacturing	MANU	Manufacturing = 1; otherwise = 0
Firm size	SIZE	Total revenue (thousand million baht) for the year that firm has started implementing BSC.
Growth opportunity	MB	The ratio of market value of equity to book value of equity at year-end of the year that organization has started implementing BSC.
Mergers and acquisitions	MA	Mergers and acquisitions within two years after implementing BSC = 1; otherwise = 0

CHAPTER IV

MAIN RESULTS

This chapter presents (1) survey responses, (2) the BSC application among the respondent firms, (3) the results of determinant study and (4) the results of financial consequence study.

Since the study is an exploratory research in nature, the 0.10 significance level is employed throughout this study.

4.1 Survey responses

Table 4-1 reports details of survey responses. Panel A of Table 4-1 shows that the initial sample consists of 519 firms. After excluding 11 pre-tested firms, a total of 508 questionnaires were sent to CFO. However, three questionnaires were returned due to no recipients while the other five questionnaires later returned by the recipients fall into 'decline to respond', three of which have a note 'decline to respond' attached and the other two left blank. Therefore, final possible responses are 500 firms. Out of the 500 firms, merely 81 questionnaires were returned, 8 of which unfortunately contain missing data. Hence, the remaining 73 observations result in 15% usable response rate. Such a response rate is comparable to 34% response rate of Yongvanich and Guthrie (2009), 5% of Pholnaruksa (2007) and 32% of Thinwilai (2005). This low response rate is probably due to the fact that the questionnaire is lengthy and detailed. However, it is important to identify BSC attributes embedded in firms' performance measurement systems to classify the BSC stages without taking firms' self-assessed responses as given.

Table 4-1: Details of respondent firms

Panel A	Targeted firms		Responding firms	
	No. of firms	Proportion	No. of firms	Proportion
Initial samples	519			
Less Pre-tested samples	(11)			
Questionnaire mailed	508			
Less Address expired samples	(3)			
Decline to respond	(5)			
Net possible responses	500	100%		
Returned questionnaires			81	16%
Less Missing data			8	1%
Usable questionnaires			73	15%

Panel B	Targeted firms		Respondent firms	
	No. of firms	Proportion	No. of firms	Proportion
SET				
Financials	57	11%	11	15%
Agribusiness & Food	41	8%	5	7%
Consumer Products	40	8%	5	7%
Resources	25	5%	4	5%
Services	81	16%	11	15%
Technology	38	8%	5	7%
Industrials	76	15%	11	15%
Property & Construction	79	16%	14	19%
MAI	63	13%	7	10%
Total	500	100%	73	100%

Panel B of Table 4-1 summarizes the industries of targeted firms and respondent firms. The responding firms are spread over the SET and MAI; the proportion of respondent firms ranges from the lowest of 5% to the highest of 19%. The proportions of survey respondents are quite similar to those of targeted firms over all industries. The responding firms seem to be good representatives of targeted firms.

The statistical test was also performed to test the difference in industries between 73 respondent firms and 508 non-respondent (and 500 non-respondent) firms in order to statistically investigate whether there is no significant non-response bias. Fortunately, a Goodman and Kruskal tau test results show no industry differences between these two groups at 0.10 significance level, providing support for the absence

of a non-response bias. Hence, sample firms employed in this study are appropriate representatives of targeted firms.

4.2 The BSC application among Thai listed firms

Based on the BSC framework developed in this study, the stages of BSC application of 73 usable observations can be classified as follows:

Table 4-2: The BSC application among Thai listed firms

BSC Stages	Total	Proportion
Non-Adoption	8	11%
Adoption	19	26%
Implementation		
Partial	12	16%
Full	34	47%
Total	73	100%

Remark: BSC attributes of 70 and 3 firms are identified by YES/NO responses and 70-percent cutoff point respectively (Please refer to Appendix A).

Table 4-2 reveals the BSC application among Thai firms listed on the SET and MAI. The proportions of firms at non-adoption, adoption, partial-implementation, and full-implementation stages are 11%, 26%, 16% and 47%, respectively. The high proportions of firms at the adoption and implementation stages suggest that listed firms in Thailand have followed the western management accounting concepts. Particularly, 19 firms have selected to follow BSC idea and 46 firms have implemented the Balanced Scorecard.

4.2.1 BSC-Adoption firm

An organization with a collection of financial and nonfinancial measures that are grouped into perspectives, such as learning and growth, internal processes, customer and financial, is considered to be a BSC-adoption firm since two conditions (i.e., financial and non-financial measures and grouped into perspectives) are met.

It is can be inferred that such a firm is at least at the stage of choosing to follow BSC idea. A firm not meeting both conditions is classified as non-adoption one.

Of the usable observations, 65 are found to meet the requirement for adopting BSC. Hence, at least these firms could be classified as BSC-adoption firms. However, the performance measurement systems of some firms contain other sub-attributes of Strategy attribute. This means that some firms could be classified as BSC-implementation firms; some could not. Note that the rest (8 firms) are classified as non-adoption firms.

4.2.2 BSC-Implementation firm

With respect to BSC-implemented firms, the performance measurement systems of 46 adopted-firms meet the strategy attribute requirement, i.e. the strategy is well-defined as well as the measures are derived from strategy and can be shown as a causal chain to illustrate the value-creation process. These sub-attributes are considered as key important features of BSC in translating strategy into operational terms. The remaining 19 firms are still at the BSC-adoption stage since some conditions are not met.

Other attributes of BSC for BSC-implemented firms are then examined. Thirty-four firms are considered as fully-implemented BSC firms since all conditions for alignment, communication and feedback are met. The rest (12 firms) are classified as partially-implemented BSC firms as they have only certain attributes of BSC.

4.3 The determinants of BSC application

Regarding determinant study, there are 72 usable observations due to the exclusion of one outlier[16].

Table 4-3 summarizes the dependent variables, independent variables (i.e., the external, structural, attitudinal, and executional factors) and control variables used in the determinant study and their descriptive statistics.

Table 4-3: Descriptive statistics of variables in the determinant study (n=72)

Variables		Average	Standard Deviation	Median	Min	Max	Cronbach's alpha
Dependent variables							
Adoption	ADOPT	0.903	N.A.	1.000	0.000	1.000	N.A.
Implementation	IMPLE	0.639	N.A.	1.000	0.000	1.000	N.A.
Independent variables							
External:							
Environment uncertainty	ENV	63.807	19.095	66.667	6.667	100.000	0.846
Structural :							
Participation	PART	7.278	2.805	8.000	0.000	10.0000	NA
Formalization	FORM	75.167	17.016	80.000	10.000	100.000	0.894
Interconnectedness	INT	74.236	14.577	75.000	25.000	100.000	0.826
Information system	IS	74.629	15.859	75.625	35.000	100.000	0.906
Attitudinal :							
Attitude toward BSC	ATT	69.260	18.083	70.625	3.333	100.000	0.786
Executional :							
Top management support	TOP	76.444	16.452	81.500	14.000	100.000	0.905
CFO's involvement	CFO	77.806	15.052	80.000	30.000	100.000	0.880
Project Team	TEAM	72.028	19.566	78.750	0.000	100.000	0.913
Training	TRAIN	71.315	18.338	74.167	0.000	100.000	0.948
Control variables							
Firm's size (thousand million baht)	SIZE	14.249	30.568	4.159	0.178	147.572	N.A.
Industry - Finance/Insurance	FIN	0.153	N.A.	0.000	0.000	1.000	N.A.
Industry - Manufacturing	MANU	0.417	N.A.	0.000	0.000	1.000	N.A.

Remark: Variable measurements are defined in section 3.3.1.2

16 The outlier is identified by Cook's distance, which is a measure of global influences of particular observations on all predicted values.

To test non-response bias, the responses from the first 30 returned questionnaires and those from the last 42 were systematically compared. Specifically, a Goodman and Kruskal tau test was conducted to examine the differences between two groups in terms of the BSC stages and industries. A Mann-Whitney U test and a Kolmogorov-Smirnov Z test were also performed to test the response differences between the external, structural, attitudinal, and executional factors and firm size. The results show no differences between these two groups at 0.10 significance level, providing support for the absence of the non-response bias.

4.3.1 Direct effects of determinants

Table 4-4 provides the results of determinant study. Panel A[17] reports the results of the ordinal logistic regressions of the external, the structural and the attitudinal factors. Panel B[18] shows the results of the binary logistic regressions of the executional factors.

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17 P-values from the Likelihood Ratio Chi-square test are less than the level of significance; α equals 0.10. This leads us to conclude that at least one of the regression coefficients in the model is not equal to zero. Regarding the test of parallel lines, the parallelism assumption appears to be held since the significance of Chi-Square statistics are greater than 0.10 level This provides evidence that the slope coefficients across response categories are the same. In other words, the effects of the independent variables are the same for two logit functions describing the relationships between the lowest category (non-adoption) versus all higher categories (adoption and implementation) and those between two lowest categories (non-adoption and adoption) and the highest category (implementation).

18 P-values from the Likelihood Ratio Chi-square test are less than 0.10 significance level; therefore, at least one of the regression coefficients in the models is not equal to zero. Hosmer-Lemeshow test results for each model suggest that the null (the model is fit) cannot be rejected at 0.10 significance level. That is, the models are good fit for the data.

Table 4-4: The results of direct effects in the determinant study (n = 72)

Panel A:	**Non-adoption vs. Adoption vs. Implementation**												
Independent variable		**ENV**		**PART**		**FORM**		**INT**		**IS**		**ATT**	
Expected sign +	Coeff	**0.028**	**	**0.300**	***	**0.047**	***	**0.051**	***	**0.026**	*	**0.021**	*
	StdCoeff	0.299		0.464		0.440		0.406		0.223		0.206	
	Wald	(4.218)		(9.194)		(8.451)		(7.494)		(2.418)		(2.308)	
	p-value	(0.020)		(0.001)		(0.002)		(0.003)		(0.060)		(0.064)	
Control Variables													
SIZE	Coeff	0.058		0.036		0.041		0.047		0.051		0.051	
	Wald	(2.116)		(1.010)		(1.228)		(1.687)		(1.771)		(1.771)	
	p-value	(0.146)		(0.315)		(0.268)		(0.194)		(0.183)		(0.183)	
FIN	Coeff	0.956		0.757		1.223		1.280		1.375		1.098	
	Wald	(1.163)		(0.720)		(1.877)		(2.109)		(2.410)		(1.601)	
	p-value	(0.281)		(0.396)		(0.171)		(0.146)		(0.121)		(0.206)	
MANU	Coeff	-0.092	**	0.216		0.244		0.154		0.036		0.126	
	Wald	(0.029)		(0.149)		(0.192)		(0.079)		(0.004)		(0.056)	
	p-value	(0.029)		(0.699)		(0.661)		(0.779)		(0.947)		(0.814)	
Intercept1	Coeff	0.106		0.012		-1.525		-1.861		-0.126		0.314	
	Wald	(0.014)		(0.000)		(1.598)		(1.887)		(0.010)		(0.099)	
	p-value	(0.907)		(0.988)		(0.206)		(0.170)		(0.920)		(0.753)	
Intercept2	Coeff	-1.709	*	-2.034	**	-3.490	***	-3.7978	***	-1.930		-1.474	
	Wald	(3.456)		(6.457)		(7.567)		(7.089)		(2.326)		(2.128)	
	p-value	(0.063)		(0.011)		(0.006)		(0.008)		(0.127)		(0.145)	
ModelFittingInformation													
Chi-Square		12.061		18.983		17.581		16.162		10.933		10.363	
p-value		0.017		0.001		0.002		0.003		0.027		0.035	
Cox&Snell R^2		0.154		0.232		0.217		0.201		0.141		0.134	
Test of Parallel Lines													
Chi-Square		2.927		4.416		3.289		3.776		3.084		4.731	
p-value		0.570		0.353		0.511		0.437		0.544		0.316	

P-values are for one-tailed tests for independent variable in each model, and two-tailed for control variables.
***, **, * indicate significance at 0.01, 0.05, and 0.10 levels, respectively. Model specifications are described in section 3.3.1.1.1

Table 4-4: The results of direct effects in the determinant study (n = 72)

Panel B:	**Executional Factors**							
Independent variable		**TOP**		**CFO**		**TEAM**		**TRAIN**	
Expected sign +	Coeff	**0.046**	***	**0.049**	***	**0.052**	***	**0.052**	***
	StdCoeff	0.417		0.402		0.556		0.527	
	Wald	(5.653)		(5.515)		(7.067)		(6.791)	
	p-value	(0.009)		(0.009)		(0.004)		(0.005)	
Control Variables									
SIZE	Coeff	0.040		.041		0.035		0.028	
	Wald	(1.286)		(1.332)		(1.342)		(0.927)	
	p-value	(0.257)		(0.248)		(0.247)		(0.336)	
FIN	Coeff	1.499		1.463		1.532	*	1.546	
	Wald	(2.569)		()2.470		(2.704)		(2.656)	
	p-value	(0.109)		(0.116)		(0.100)		(0.103)	
MANU	Coeff	0.370		0.122		0.172		0.482	
	Wald	(0.394)		(0.044)		(0.083)		(0.635)	
	p-value	(0.530)		(0.834)		(0.773)		(0.426)	
Intercept	Coeff	-3.600	**	-3.759	**	-3.725	***	-3.761	**
	Wald	(5.169)		(5.038)		(6.124)		(6.101)	
	p-value	(0.023)		(0.025)		(0.014)		(0.014)	
ModelFittingInformation									
Chi-Square		15.151		14.837		18.343		17.292	
p-value		0.004		0.005		0.001		0.002	
Cox&Snell R^2		0.190		0.1862		0.225		0.214	

P-values are for one-tailed tests for independent variable in each model, and two-tailed for control variables.
***, **, * indicate significance at 0.01, 0.05, and 0.10 levels, respectively. Model specifications are described in section 3.3.1.1.1

External variable

Concerning the external factor, environment uncertainty is found to be positively and significantly associated with reaching higher stages of BSC application at 0.05 level, ceteris paribus. Therefore, H1 is supported. This evidence is in line with prior studies (Gosselin, 2005; Hendricks et al., 2004; Jusoh, 2008; Braam and Nijssen, 2008: Online) and supports the efficient choice perspective (Malmi, 1999).

When the environment uncertainty is high, firms can take action to reduce some of these uncertainties by collecting and processing necessary information. Specifically, uncertainty leads managers to adopt BSC to equip firms with relevant information for decision making. After adopting the BSC concept, firms have experienced some BSC-related administrative tasks (e.g., identifying and collecting nonfinancial measures). BSC seems to be an incremental innovation that results in a lesser degree of departure from the existing practices (Damanpour, 1996). Therefore, firms tend to implement BSC by deriving key measures from strategy and illustrating them as a cause-and-effect relationship.

Structural variables

As per the structural factors, participation (PART), formalization (FORM), and interconnectedness (INT) are found to be positively significant at 0.01 level, except for information system (IS) at 0.10 level, ceteris paribus; therefore, H2 (H2a-H2d) are supported. The higher degrees of participation, formalization, interconnectedness, and information system positively affect the organizational decision to adopt and implement BSC, holding other variables constant.

Consistent with prior studies (Damanpour, 1991; Chenhall, 2003; Rogers, 2003; Abernethy and Bouwens, 2005; Gosselin, 2005), higher degrees of participation positively affect the extent to which firms reach higher stages of BSC application. This is due to the fact that participation allows subordinates to share their ideas and relevant information with supervisors. Anecdotal evidence from the interview with CFO supports this notion; firms have decided to adopt BSC due to the recommendation from managers or employees who have learned the BSC concept.

Furthermore, the use of written rules, procedures, and documents can facilitate management intervention by developing and enforcing norms to improve a firm's performance measurement system. This is in line with the role of high power distance in Thailand (Hofstede, 2001) that makes Thai subordinates accept a hierarchical order and prefer a high degree of formal structure and control. The findings in this study provide qualitatively similar evidence as Wiersma's (2009) in the sense that the more action controls, the higher degrees of BSC usage. The results also reveal the importance of this determinant in the context of Thailand; this evidence can presumably be generalized to other Asian countries that have high power distance.

Interconnectedness is one of the key structural factors that assist a firm in reaching higher stages of BSC application as networks in the organization facilitate the flow of new ideas. This evidence is consistent with Roger's (2003) and Braam and Nijssen's (2008: Online).

Information system (IS) is marginally associated with reaching higher stages of BSC application as three main characteristics of IS (information, technical, and application architecture) assist data management. This empirically supports the suggestion of Assiri et al. (2006) and Kaplan (2010a: Online) that information system

promotes BSC application. Evidence from personal interview reveals that the spreadsheet program is mostly employed at the early stage of BSC application. Subsequently, information system is developed during the implementation process.

Overall, participation, formalization, interconnectedness and information system result in a positive response to BSC and putting BSC into use. This can be achieved by encouraging management to further improve a firm's performance measurement system to one that comprises financial and nonfinancial measures derived from organization's strategy and that entails the cause-and-effect linkages among these measures to illustrate an organization's value-creating processes.

Attitudinal variables

Regarding the attitudinal factor, the attitudes toward BSC (ATT) are found to be positively significant at 0.10 level, ceteris paribus. Thus, H3 is supported. That is, attitude appears to be one of the determinants in the decision to adopt BSC by introducing the idea of multidimentional perspectives containing both financial and nonfinancial measures. This evidence also supports the technology acceptance model and the organizational innovation in the sense that the attitude positively relates to intention to use (or adoption stage in this study.)

In addition, it can facilitate the implementation of BSC as revealed by the positive relationship between the attitude and the usage (or implementation stage in this study). This is also consistent with the technology acceptance model and prior studies (Hongratawong, 2002; Islam and Kellermanns, 2006). Additionally, the results support the argument of Speckbacher et al. (2003) in that attitude toward BSC is likely to affect the use of BSC.

Executional variables

On the subject of executional factors, this study finds that top management support (TOP), CFO's involvement (CFO), project team (TEAM), and training (TRAIN) are positively associated with reaching the stage of BSC implementation at 0.01 significance level, ceteris paribus. H4 (H4a-H4d) are supported. Holding other variables constant, each executional factor is positively associated with reaching the implementation stage of BSC.

This confirms the role of top management in supporting the implementation of BSC. In harmony with prior studies regarding innovation (Damanpour, 1991; Roger, 2003; Chenhall, 2003) and BSC (e.g., Kaplan, 2010a: Online; Braam and Nijssen, 2008: Online; Islam and Kellermanns, 2006; Radnor and Lovell, 2003), top management support is one of the most important variables in implementing BSC.

The extent to which CFO is the innovation champion in implementing BSC is consistent with Chen et al.'s (2006) and Braam and Nijssen's (2008: Online) and reveals another key person for BSC implementation process for organizational innovation study (Roger, 2003). This evidence promotes the role of CFO or accounting managers in developing the advanced performance measurement system, specifically BSC, and complements prior studies that rarely investigate this factor.

In addition, project team is another crucial factor for reaching BSC implementation stage as prior studies have pointed out (e.g., Abernethy et al., 2005; Assiri et al., 2006). Managers from different business units and departments in this project team can share their tacit knowledge and put in their efforts to successfully implement BSC.

Finally, training is another crucial factor for reaching BSC implementation stage. This evidence is compatible with prior studies (e.g., Olve et al, 1999; De waal, 2003; Radnor and Lovell, 2006; Assiri et al., 2006) and reveals that training keeps the BSC implementation process moving by motivating employees to accept and use BSC information regularly and thus conduct their work in the ways that contribute to the organization.

Control variables

Regarding control variables, SIZE is not found to be the key determinant of BSC application. Additionally, although the significant levels of industries are not found to be consistent in all models, the overall results suggest that industries are likely to affect the BSC application. Certain models show that industry variable is significant factor influencing the application of BSC. This provides marginal support for the results of Speckbacher et al. (2003) and Hendrick et al. (2004).

Sensitivity tests

When controlling for the number of SBUs or other management tools, the robustness tests provide qualitatively similar results. Specifically, all determinants still relate to the extent to which firms reach higher stages of BSC application. However, the number of SBUs is found to be an insignificant determinant. While most of management tools are insignificant determinants, some management tools (i.e., ISO, Target Costing) are found to be negatively and significantly associated with reaching higher stages of BSC application. Although the significance levels vary among the models, the results provide preliminary evidence contradicting the intuition and interviews with CFOs that other management tools are compatible with BSC (KN, 2001a). This may be due to the fact that the application of ISO and Target

costing requires a lot of time and resources and so impedes the development of performance measurement system.

Interestingly, this study has re-examined the implementation part by employing firms' self-assessed responses about the BSC application. Using 72 observations similar to the main study, the untabulated results show that the p-value of Chi-square test for each determinant test is greater than 0.10 level; hence, all of the predictors' regression coefficients are equal to zero for each model. In other words, when employing self-assessed responses as a dependent variable, the results report that all determinants are unlikely to affect the extent to which firms reach the application of BSC. However, one particular observation is a similar outlier for all models. When excluding one outlier, 71 observations are analyzed for each determinant test. The untabulated results suggest that only environment uncertainty (ENV), participation (PART), attitude toward BSC (ATT) and training (TRAIN) are positively significant at 0.10, 0.05, 0.05 and 0.05 significance levels, respectively. Surprisingly, formalization (FORM), interconnectedness (INT), information system (IS), top management support (TOP), CFO's involvement (CFO), and project team (TEAM) are found to be insignificant. This illustrates different evidence of key determinants assisting firms in reaching higher stages of BSC application and thus casts doubts on prior results relying on firms' self assessed responses.

4.3.2 Indirect effects of determinants through the attitudinal factor

Since the attitudinal factor is found to be significantly associated with reaching higher stages of BSC application, this study is able to examine the effects of each determinant on reaching higher stages of BSC application through the attitudinal factor.

Table 4-5: The results of indirect effects in the determinant study

Panel A: The effects of determinants on the attitudinal factor								
Determinants	**PART**	**FORM**	**INT**	**IS**	**TOP**	**CFO**	**TEAM**	**TRAIN**
Coeff (+)	2.300	0.653	0.759	0.495	0.709	0.553	0.518	0.628
Std Coeff	***0.357***	***0.615***	***0.612***	***0.434***	***0.645***	***0.461***	***0.561***	***0.637***
t-stat	(3.194)	(6.523)	(6.471)	(4.029)	(7.055)	(4.342)	(5.664)	(6.905)
p-value	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
F-value	10.201	42.550	41.869	16.235	49.774	18.856	32.080	47.682
p-value	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Adj R^2	0.115	0.369	0.365	0.177	0.407	0.201	0.305	0.397

Panel B: The effects of determinants on reaching higher stages of BSC application								
Determinants	**PART**	**FORM**	**INT**	**IS**	**TOP**	**CFO**	**TEAM**	**TRAIN**
Direct effects	0.464	0.440	0.406	0.223	0.417	0.402	0.556	0.527
Indirect effects	0.074	0.127	0.126	0.089	0.133	0.095	0.116	0.131

Panel A of Table 4-5 shows that each determinant is positively related to the attitudinal factor at 0.01 significance level. Together with the findings that the attitudinal factor significantly facilitates reaching higher stages of BSC application at 0.10 level (refer to Panel A of Table 4-4), ceteris paribus, each determinant is also found to be positively and indirectly associated with the extent to which firms reach higher stages of BSC application through the attitudinal factor. Thus, H5 and H6 are supported.

Panel B of Table 4-5 reveals the effect of each determinant on reaching higher stages of BSC application. Direct effects are the standardized coefficient of determinants of reaching higher stages of BSC application (refer to Table 4-4). Indirect effect is the product of the standardized coefficient of each determinant in

Panel A of Table 4-5 and the standardized coefficient of attitudinal factor in Panel A of Table 4-4.

All structural and executional factors are found to be positively associated with reaching higher stages of BSC application through the attitude toward BSC. These results confirm that the role of social influences and facilitating conditions reflected in each determinant positively affects the attitude toward firms' performance measurement systems in the context of BSC application. This evidence is consistent with the technology acceptance model (TAM) and related prior studies (e.g., Taylor and Todd, 1995, Venkatesh and Davis, 2000; Karahanna and Limayem, 2000; Nicolaou, 2000; Hongratanawong, 2002; Huh et al., 2009). More importantly, the findings bridge the gap among the organizational innovation, TAM and the contingency theory in the sense that firms' characteristics (structural factors) and key mechanisms (executional factors) directly and indirectly drive the implementation process through the attitudinal factor.

When controlling for the number of years in firms and in position and education in the model regressing attitudinal factor on each determinant, the results are qualitatively the same. This means that structural (exectutional) factors are found to be positively associated with reaching higher stages (implementation stage) of BSC application through the attitudinal factor.

4.4 The financial consequence of BSC application

Based on a total of 73 observations, only 27 are usable for financial consequence test. This is due to the fact that this part excludes (1) firms at Non-adoption stage, (2) firms with missing data regarding the year in which the measures are derived from strategy, the year in which firm's strategy map is established, or control variable, and (3) firms that have recently implemented BSC; thus, two-year lag financial performances cannot be computed. Out of 27 usable observations, 20 are BSC-implemented firms and 7 are BSC-adopted firms that have additional sub-attribute of Strategy attribute (BSC-adopted+ firms hereafter).

Table 4-6 summarizes the dependent variables, independent variables and control variables used in this financial consequence study. Table 4-7 provides the results of main study[19].

Table 4-6: Descriptive statistics of variables in financial consequence study (n=27)

Variables		Average	Standard Deviation	Median	Min	Max
Dependent variable						
Percentage Change in ROE	ΔROE	-0.335	1.906	0.075	-8.729	2.828
Independent variables						
BSC implementation	IMPLE	0.741	0.447	1.000	0.000	1.000
Predicted probability of reaching the BSC implementation stage	PRE_ IMPLE	0.690	0.209	0.711	0.271	0.998
Control variables						
Industry – Finance/Insurance	FIN	0.185	N.A.	0.000	0.000	1.000
Industry - Manufacturing	MANU	0.370	N.A.	0.000	0.000	1.000
Firm's size (thousand million baht)	SIZE	0.009	0.014	0.002	0.0001	0.047
Growth opportunity	MB	1.283	0.887	0.954	0.209	4.183
Mergers and acquisitions	MA	0.444	N.A.	0.000	0.000	1.000

Remark: Variable measurements are defined in section 3.3.2.2

19 Variance inflation factor (VIF), Breush-pagan statistic and randomness test indicate that these multiple regressions have neither collinearity, error-dependence, nor heteroskedasticity problems. However, Shapiro-Wilk statistic reveals non-normality of error. This is due to small sample size. Therefore, the results should be carefully interpreted.

Table 4-7: The results of the financial consequence study (n=27)

Dependent variable			ΔROE_i	ΔROE_i	
Independent variables					
IMPLE	Coeff	+	**1.543**		
	t-stat		(1.876)		
	p-value		(0.038)		
PRE_IMPLE	Coeff	+		**5.032**	
	t-stat			(2.266)	
	p-value			(0.018)	**
Control variables					
FIN	Coeff		-0.493	-1.698	
	t-stat		(-0.488)	(-1.499)	
	p-value		(0.631)	(0.149)	
MANU	Coeff		-1.567	-2.232	
	t-stat		(-1.948)	(-2.654)	
	p-value		(0.066)	(0.015)	**
SIZE	Coeff		38.002	19.684	
	t-stat		(1.290)	(0.649)	
	p-value		(0.212)	(0.524)	
MB	Coeff		-0.274	-0.408	
	t-stat		(-0.608)	(-0.908)	
	p-value		(0.550)	(0.375)	
MA	Coeff		-1.352	-1.168	
	t-stat		(-1.795)	(-1.613)	
	p-value		(0.088)	(0.122)	
INTERCEPT	Coeff		-0.198	-1.802	
	t-stat		(-0.214)	(-1.385)	
	p-value		(0.833)	(0.181)	
F-value			1.980	2.345	
p-value			0.117	0.070	
Adj R^2			0.184	0.237	

Remarks: 1. P-values are for one-tailed tests where a directional prediction is made, and two-tailed otherwise.

2. Model specifications are described in section 3.3.2.1

The results statistically support the hypothesis that the BSC-implemented firms are likely to exhibit higher financial performance improvements than BSC-adopted+ firms.

Specifically, although the model using the categorical variable as a proxy for BSC implementation shows the p-value from F-test of 0.117 and thus inconclusive results, such a model becomes significant after controlling for endogeneity by employing the predicted probabilities of reaching the BSC implementation stage as a proxy for BSC implementation. It is found that the BSC implementation is positively associated with change in return on equity at 0.05 significance level, ceteris paribus. Therefore, H7 is supported. The BSC-implemented firms do exhibit, among sample firms, higher improvement in return on equity than BSC-adopted+ firms. The findings support Kaplan and Norton's (2001a) observations of higher returns within two years.

As prior studies have found that BSC-adopted firms outperform non-adopted ones, firms should adopt and implement BSC to achieve breakthrough performance results (Kaplan and Norton, 2001b).

This study contributes to the BSC literature by reporting another aspect of financial performance improvement as a result of BSC implementation. Particularly, the research results show that BSC-implemented firms are likely to exhibit higher improvement in return on equity than BSC-adopted+ firms.

Hence, this study has shown the evidence that encourages BSC-adopted firms to advance to the BSC implementation stage since firms at the stage of BSC implementation are likely to have higher financial performance improvement than BSC-adopted firms. This also implies that the benefits of BSC implementation exceed the implementation costs during the post-implementation period.

Regarding the control variables, it is found that only industry variable is associated with the financial performance improvement. Size, growth opportunity, and merger and acquisition activity are not found to affect the financial performance improvement.

This study also tests for one-year lag improvement in return on equity for the 27 sample firms. The untabulated results reveal insignificant F-test for both measurements of BSC implementation (categorical data and predicted probability data); therefore, this study is unable to provide evidence of significant financial performance improvement of BSC implementation over one-year lag period.

The overall results of this financial consequence study provide preliminary evidence that BSC-implemented firms are likely to have higher financial performance improvement than BSC-adopted firms. Thus, firms at BSC-adoption stage should attempt to achieve the implementation stage by giving greater attention to the determinants such as external, structural, attitudinal, and executional factors since the factors are found to be significant for reaching higher stages of BSC application.

CHAPTER V

CONCLUSIONS

5.1 Conclusions and discussions

This study develops the BSC framework to mitigate the different interpretations of BSC concept and subsequently examines the determinants and the financial consequence of BSC implementation among Thai companies listed on the Stock Exchange of Thailand (SET) and on the Market for Alternative Investments (MAI). Research questions and hypotheses are developed within the framework of the innovation in organization, the technology acceptance models and basic contingency theory.

5.1.1 The BSC framework

Concerning the developed BSC framework, this study provides the conceptionalization and operationalization of a systematic BSC framework for identifying BSC attributes, which can be employed to specify the BSC stages. Specifically, either Yes/No response method or 70-percent cutoff point can be further applied to future research examining the application of BSC in different contexts, such as among non-listed companies or companies in other countries.

More importantly, this framework helps mitigate the differences in BSC understanding so as to minimize the occasions leading to inconclusive findings as were the case in the prior studies. As aforementioned, most studies have taken firms' self-assessed responses about BSC application as given. Dissimilar understanding of BSC may cause firms to misclassify themselves and subsequently bias the results.

Particularly, the BSC framework developed in this study helps identify BSC attributes used for specifying BSC stages under the similar criteria for all responding firms. Hence, this framework should be employed as a starting point for identifying BSC attributes and for classifying BSC stages of sample firms before conducting any tests in order to control for the diverse stages of BSC application.

In addition, in most prior research studies, firms from several different stages are simply categorized into similar groups such as BSC and non-BSC firms; hence, testing certain determinant factors may distort their significant levels. As "adoption" and "implementation" have different meanings, this study has developed the BSC classification framework that categorizes firms into three stages: non-adoption, adoption and implementation.

Furthermore, the development of framework for indicating the characteristics of BSC highlights a research idea for building the structure of other organizational innovations or tools by considering their key features.

Finally, this study provides the evidence of the practical application of BSC concept among Thai listed companies to complement prior studies conducted in other countries.

5.1.2 The determinant study

With respect to the determinant study of BSC application, all determinants examining in this study (i.e., the external, the structural, the attitudinal, and the executional factors) are found to be positively associated with reaching higher stages of BSC application.

Specifically, the higher degree of environment uncertainty that firms face causes firms to enhance their performance measurement systems by incorporating the BSC concept. This external factor drives the BSC application of high-uncertainty-facing firms.

The structural factors or firms' characteristics are also found to affect the firms' reaching higher stages of BSC application. Participation facilitates the BSC implementation process as information can flow from top to bottom and vice versa. In contrast to the US's culture, formalization smoothes the progress of BSC application since Thai subordinates are likely to lean on their supervisors. Interconnectedness helps promote reaching higher stages of BSC application since information can flow throughout the organization. These three factors help communicate the need and promote BSC application in the organization. In addition, this study reveals the importance of information system capacity in easing the BSC implementation process in the organization.

The attitude toward BSC is found to be positively associated with the extent to which firms reach higher stages of BSC application. When BSC is perceived as useful and easy to use, firms are likely to adopt or implement it.

In addition, firms that decide to adopt BSC must concern the executional factors reflecting mechanisms that support or drive the implementation process (Anderson and Young, 1999) in order to successfully implement BSC. In particular, top management and CFO are the key persons for making BSC implementation possible. Top management provides support in terms of resources and time for BSC. CFOs take part in and smooth the progress of BSC implementation. Project team also facilitates the BSC implementation since it consists of representatives from various business units and departments and produces the harmony in implementing BSC. Additionally, training is one of the key determinants for implementing BSC successfully as it enhances the understanding of BSC concept of people in the organization and then implicitly reduces the resistance to new innovation.

Overall, this study suggests determinants that ease the advancement from one stage to another in the context of Thailand to complement with prior studies conducted in other countries. Environment uncertainty is found to be the important external factor that influences the application of BSC. To ease the BSC application, firms should thoroughly consider their characteristics and internal mechanisms. Specifically, firms should have higher degrees of participation, formalization and interconnectedness as well as information system capacity in order to adopt or implement BSC. Moreover, top management support, CFO's involvement, project team, and training are needed for successfully moving to the implementation stage of BSC application.

More importantly, this study has extended prior literature by going further into details of the determinant-innovation relationship. In particular, it is found that structural and executional factors are indirectly associated with reaching higher stages of BSC application through the attitudinal factor. This helps bridge the gap among the organizational innovation, the technology acceptance model and the contingency theory to reveal how the structural, the executional and the attitudinal factors simultaneously influence reaching higher stages of BSC application.

5.1.3 The financial consequence study

This part of the study aims to provide evidence of financial consequence of BSC implementation in different aspects. In particular, this part has examined whether BSC-implemented firms exhibit higher financial performance improvement than BSC-adopted firms. This study is the first to directly compare the improvement in financial performance of firms at implementation stage with those at adoption stage taking on additional important sub-attribute(s) in an attempt to achieve the status of BSC-implemented firms.

The results reveal that, among sample firms, the BSC-implemented firms significantly have higher performance improvement than BSC-adopted firms. Therefore, this study encourages firms to enhance their performance measurement systems to attain the implementation stage of BSC application. This also highlights key factors that facilitate firms to reach the implementation stage of BSC application, to which business should give more attention.

5.2 Limitations

While this study has attempted to mitigate the limitations of prior studies, some weaknesses do remain.

Mail survey is appropriate for study that explores interesting issues in a large sample at a relatively low cost; however, self-response bias is an inevitably common limitation of this type of data collection. Sample size and low response rate limit generalization since only listed companies are included in this study. In addition, this study relies on the responses given by the firms with respect to the years in which the sub-attributes have been used.

In some returned questionnaires the respondents select the interval range of percentage scores instead of specifying the percentage; thus, this research follows Pholnaruksa (2007) by assigning the midpoint of interval range for the corresponding selected interval.

The data are gathered only from the top executive of each company in the sample in order to represent the actual behavior with regard to BSC. Since there is no way to determine how truly these data represent the firm's behavior concerning the innovation (Roger, 2003), this study mitigates this limitation by gathering data from Chief Financial Officers (CFO), presumed to be the most knowledgeable persons about firms' performance measurement systems.

In addition, this study examines the application of BSC at the corporate level, not at business unit level, so the results should be carefully interpreted.

As outside investors rely on financial statement data to assess the performance of firms, this study has primarily focused on return on equity (ROE), a comprehensive indicator of a firm's performance from the view of capital market (Kaplan and Norton, 1992, 2001b). The change in ROE presumably reflects the financial performance, or the bottom-line, improvement. Specifically, no adjustments are made to ROE as this study assumes that accounting policies and capital structure exhibit little variation for a single firm over time. Moreover, this study does not scrutinize the details of strategy maps. Thus, ROE may not be included in firm's Balanced Scorecards; this measure of financial performance (i.e., ROE) would become in an inadequate representative of the financial measures truly employed by certain sample firms

Regarding multiple regression analysis, tests for assumptions of regression analyses show homoskedasticity, independence and no collinearity problem; however, normality of residual is violated due to small sample size. Therefore, the results should be carefully interpreted.

5.3 Future research

The developed systematic BSC framework can be applied to future research; this study can be replicated to examine the BSC application in different contexts with larger sample size. The identification of BSC attributes can rely on either Yes/No responses or 70-percent cutoff-point. Prior determinant and consequence studies can be re-performed by using the BSC framework developed in this paper as a starting point for identifying BSC stage.

Other organizational innovations can be investigated by developing framework for identifying the application of such innovations without taking self-assessed responses in order to mitigate different interpretations of such innovations. In addition, the proposed determinants and consequence framework can be employed as a starting point for further research projects.

Other determinants of BSC application can be examined, such as the extent of multinational organization or the requirement from customers or suppliers along the value chain.

The action research can also be conducted to complement this study to illustrate how Balanced Scorecard is developed in detail.

The financial consequence study can be replicated in different contexts with larger sample size. The evidence will contribute to BSC literature by revealing whether or not BSC-implemented firms have higher financial performance improvement than BSC-adopted firms. While this study does not make any adjustments to return on equity (ROE), future studies should consider the significant change in accounting standards that may affect the financial performance of the firm during the chosen periods of study, earnings management in financial statement information that may alter the true picture of the firm's performance and a change in capital that may create unnecessary noises to the computation of ROE.

In addition, other financial performance measures should be investigated, including return on equity, return on capital employed (ROCE) and cost of capital. These three measures can be employed to compute economic value added (EVA) in both simple and complex formulas to thoroughly reveal the impacts of BSC implementation on shareholder value. This definitely extends prior studies and

contributes to the BSC literature as BSC is developed to be one of the management accounting techniques supporting shareholder value creation (Kaplan, 2006).

As this study focuses on the financial performance measure from the capital market view, such measure may nevertheless be inconsistent with the measures actually used in firms' BSCs. Future consequence study should consider firms' strategy maps or cause-and-effect relationships in detail so as to directly examine the financial consequences of BSC implementation by employing the actual financial performance measure(s) actually used in the sample firms. This also offers an opportunity to develop a comprehensive performance measure to reflect how BSC implementation improves the overall performance covering all measures in all perspectives within firms' Balanced Scorecards.

Moreover, a certain degree of consideration should be given to the objectives of BSC implementation since BSC can be employed to fulfill different goals among the sample firms.

Last, future survey research should require respondents to specify the years that firms have started using each BSC attribute. This will offer a great opportunity to perform rigorous tests of financial consequence of BSC implementation. In particular, the study can compare the financial results or improved financial results between BSC-implemented and BSC-adopted firms or among firms at adoption, partial implementation, and full implementation stages.

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APPENDICES

Appendix A : Tests of BSC classification framework

This study identifies the BSC attributes from Yes/No responses (section 3 in the questionnaire). However, if Yes/No responses are missing, the percentage responses (section 4 in the questionnaire) are considered. Specifically, the 70% cutoff point is employed to classify the firm as to whether it has each attribute (following Soderberg, 2006; Soderberg et al., 2011).

Regarding Yes/No responses, although it is consistent with prior studies (Speckbacher et al., 2003; Yongvanich and Guthrie, 2009), one may doubt that firms with Yes (No) responses do (not) have such practices in their organizations. Since the actual practices are unobservable, in this study a questionnaire is developed to best reflect the degree of employment of each BSC attribute. In this regard, the respondents are required to specify the degree of agreement in percentage term (0-100%) to reflect the degree of BSC attributes embedded in their firms' performance measurement systems (section 4 in questionnaire).

Logically, firms with specific BSC attributes should exhibit higher degrees of employment than those without. Hence, the mean percentage of each attribute for firms perceiving themselves as firms with such attributes (Yes-firms) should be greater than those without (No-firms).

Furthermore, although the use of each BSC attribute can be classified by Yes/No responses, the 70-percent cutoff point is still necessary due to the fact that Yes/No responses are missing in some observations of certain attributes. If firms do not provide Yes/No responses, the 70-percent cutoff point is employed. This cutoff-

point is the midpoint in the "some" column, which is qualitatively similar to the cutoff point used in Soderberg's (2006) and Soderberg et al.'s (2011).

More importantly, although this cut-off point is qualitatively similar to prior studies, statistical tests should be performed to test whether 70-percent is an appropriate cutoff point. The results from this analysis provide the valid cut-off point for percentage responses, which can be used in future research. If the mean percentage score for a specific BSC attribute is greater than 70, it implies that firms have employed such a particular BSC attribute.

Table A-1: Details of the BSC attributes (n=73)

BSC Attributes		N of ques-tions	Cron-bach's alpha	YES		NO		Miss-ing N	Total N
				Avg%	N	Avg%	N		
Strategy	S								
Financial and non-financial measures along with multiple perspectives	M	2	0.805	78.51	65	45.31	8	0	73
Strategy-linked measures with well-defined strategy	SL	3	0.952	78.08	61	46.83	10	2	73
Cause-and-effect relationships	CL	3	0.888	72.88	47	50.61	25	1	73
Alignment	A	4	0.901	74.35	63	42.97	8	2	73
Communication	C	4	0.869	76.82	51	52.50	21	1	73
Feedback	F	8	0.964	78.56	55	55.36	18	0	73

Remark: At the end of this appendix, table A-6 shows Yes/No questions and percentage-score questions of each BSC attribute

Table A-1 provides details of each attribute. Some BSC attributes have missing Yes/No responses; the number of usable observations of each attribute ranges from 71 to 73. Cronbach's alpha of each attribute is above the lower limits of normal acceptable value (Nunnally and Bernstein, 1994), confirming the reliability of all constructed BSC attributes.

For each attribute, the mean percentage score of Yes-firms is greater than that of No-firms. Furthermore, it is larger than 70 percent. This provides preliminary evidence to reaffirm that Yes/No responses are able to reflect the degree of use for each attribute and that the 70-percent cutoff point can be properly employed.

Statistically, to determine whether the classification of BSC attributes by Yes/No responses is appropriate, this study employs two-sample t-tests to compare the mean percentage scores of Yes-firms and No-firms.

Table A-2: Two-sample t-test results

BSC Attributes	YES		NO		Yes > No	
	Avg%	N	Avg%	N	t-stat	p-value
Strategy						
M	78.508	65	45.313	8	4.832	0.000
SL	78.082	61	46.833	10	4.420	0.000
CL	72.876	47	50.613	25	1.383	0.001
Alignment	74.345	63	42.969	8	5.225	0.000
Communication	76.824	51	52.500	21	6.287	0.000
Feedback	78.564	55	55.361	18	4.273	0.000

Remark: p-values are for one-tailed tests.

The results show that the mean percentage response of Yes-firms is greater than that of No-firms at 0.01 significance level for all attributes. Hence, the Yes/No responses can be employed to identify the BSC attributes and subsequently to classify the stage of BSC application.

To test whether 70-percent is appropriate to be used as a cutoff-point, this study performs (1) one-sample t-tests to determine whether the mean percentage score of Yes-firms is greater than 70 percent and (2) a test for agreement between the attribute classification using Yes/No responses and that using 70-percent cutoff point.

Regarding one-sample t-tests, for each attribute, this study has tested whether the mean percentage score of Yes-firms (No-firms) is greater (less) than 70% percent.

Table A-3: One-sample t-test results

BSC Attributes	YES		NO		Yes > 70		No < 70	
	Avg%	N	Avg%	N	t-stat	p-value	t-stat	p-value
Strategy								
M	78.508	65	45.313	8	3.962	0.000	-2.697	0.016
SL	78.082	61	46.833	10	4.588	0.000	-3.384	0.004
CL	72.876	47	50.613	25	1.355	0.091	-4.201	0.000
Alignment	74.345	63	42.969	8	2.238	0.015	-3.728	0.004
Communication	76.824	51	52.500	21	3.227	0.001	-5.145	0.000
Feedback	78.564	55	55.361	18	4.570	0.000	-2.872	0.006

Remark: p-values are for one-tailed tests.

The results show that, for each attribute, the mean percentage score of Yes-firms (No-firms) is significantly greater (less) than 70 percent at conventional significance levels. Hence, the 70-percent can be applied as a cutoff point for all BSC attributes. Firms with greater-than-70-percent average response of particular BSC attributes will be considered as having such attributes.

Finally, a test for agreement between the attribute classification using Yes/No responses and that using 70-percent cutoff point has been performed.

Table A-4: Kappa test results

BSC Attributes	N	Agreement Test		
		Kappa value	p-value	Rate of Agreement
Strategy				
M	73	0.385	0.000	79.45%
SL	71	0.450	0.000	81.69%
CL	72	0.361	0.003	68.06%
Alignment	71	0.245	0.007	67.61%
Communication	72	0.447	0.000	73.61%
Feedback	73	0.446	0.000	76.71%

The Kappa test results show that the agreement between the two classification methods (i.e., Yes/No method VS 70-percent-cutoff-point method) is statistically significant at 0.01 significance level. Both classification methods provide statistically similar results. The rates of agreement range from 67.61% to 81.69%.

Overall, the results from three tests support the identification of BSC attribute for each responding firm by considering Yes/No responses. In addition, when the Yes/No responses are missing, the 70% cutoff point can be employed to identify the use of each BSC attribute, particularly for the three firms with Yes/No responses missing.

Therefore, specifying the BSC attributes embedded in performance measurement system from Yes/No responses (for 70 firms) and from percentage responses (for 3 firms) results in the classification of BSC stages as discussed in Chapter 4.

Table A-5: The survey results

BSC Stages	**Classified by BSC attributes**				**Classified by Self-assessed responses**	
	YES/NO	**70%**	**Total**	**Propor -tion**	**BSC firms**	**Non- BSC firms**
Non-Adoption	8		8	11%	1	7
Adoption	18	1	19	26%	6	13
Implementation						
Partial	12		12	16%	10	2
Full	32	2	34	47%	16	18
Subtotal	70	3	73	100%	33	40

This section also provides the evidence of misclassification by showing the stages of BSC application classified by BSC attributes proposed in this paper in comparison with those classified by self-assessed responses. Firms may dissimilarly interpret the BSC concept and classify themselves differently as such.

The result is not surprising since many academics have expressed their concerns about various definitions of BSC concept (e.g., Malmi, 2001; Ittner et al., 2003; Kaplan, 2010a: Online).

One out of eight firms claims to be BSC user despite the fact that it is only at the non-adoption stage. It is found that this firm has just started the BSC project. Six out of nineteen firms claim themselves to be BSC users despite the fact that they are only at the adoption stage. One firm does not even have strategy-linked-measure sub-attribute, while the other five firms do not have causal-links among the strategic objectives or measures. Regarding BSC-implemented firms, only two out of twelve partially-implemented firms and eighteen out of thirty-four fully-implemented firms misclassified themselves. This may be a result of different interpretations of the BSC concept.

Overall, the disagreement (or misclassification) rate is 37% (27 out of 73 firms). Although 63% of responding firms can correctly classify themselves, this evidence still highlights the importance of proper classification of BSC application with similar criteria in the initial stage of determinant and consequence study.

Table A-6: The Yes/No and percentage-score questions for each BSC attribute.

BSC attributes		Yes/No questions (Section 3 in questionnaire)	Percentage-score questions (Section 4 in questionnaire)
Strategy	S		
Financial and nonfinancial measures along with multiple perspectives	M	1. Both financial and nonfinancial (or operating) measures are identified. 2. The measures are grouped into perspectives (e.g., financial, customer, internal processes and learning and growth, etc).	1. Your PMS contains both financial and nonfinancial measures. 2. The measures or objectives are grouped into perspectives (e.g., financial, customer, internal process, learning and growth, etc.)
Strategic-linked measures with well defined strategy	SL	1. Organization's strategy is well defined. 2. Objectives or measures are derived explicitly from strategy.	1. Your organization's strategy is well defined. 2. The measures or objectives are derived from firm's strategy. 3. The firm's strategy is translated into the measures.
Cause-and-effect relationships	CL	1. Organization's strategy is described via strategy map (or cause-and-effect relationships). 2. The measures are interrelated and can be illustrated as a chain of the cause-and-effect relationships (driver-outcome or lead-lag relations) between performance drivers and outcome measures.	1. There are explicit cause-and-effect relationships (strategy map, business model, driver-outcome relations, or lead-lag relations) that help you understand the relationships among all of the key measures or objectives. 2. The relationships among the measures are illustrated in a cause-and-effect manner, indicating how measures affect each other. 3. The organization's strategy can be inferred from the measures and the linkages (driver-outcome or lead-lag relations) among them.
Alignment	A	1. Business units' or support functions' strategies are influenced by corporate strategy. 2. The organization's objectives and measures are disseminated throughout the organization.	1. There is a cascading process to translate a corporate strategy into aligned and integrated strategies at lower-level units. 2. Firm's objectives and measures are disseminated throughout the organization. 3. Your PMS provides information that influences you to restructure the processes, services, and competences. 4. Each department has to create its own performance objectives and measures which are relevant to everyday works.

Table A-6 (Cont'): The Yes/No and percentage-score questions for each BSC attribute.

BSC attributes		Yes/No questions	Percentage scale questions
Communication	(C)	1. The organization's vision, mission, and strategy are communicated throughout the organization. 2. Employees are aware of and understand the organization's strategy. 3. Firm's performance measurement system has measures linked to employees' reward system.	1. Firm communicates its chosen objectives and measures to every level of firm. 2. Employees have recognized what the organization is trying to accomplish. 3. Employees have recognized how they can contribute to achieve the firm's goals. 4. The measures are used to reward some or all of firm's employees.
Feedback	(F)	1. Firm's strategy is linked to operating plans and budgeting system. Targets and action plans are determined for strategic measures. 2. There is an information system (or feedback and reporting system) that supports strategy review. 3. There is a process of formulating, learning, and reviewing firm's strategy. 4. There is a process of questioning and refining firm's strategy.	1. The strategy is linked to planning and budgeting process. 2. Targets and action plans are set for each objectives or measures. 3. Potential initiatives, investments, and capital expenditures are screened whether they are in line with organization's strategy. 4. There are analytic and information system designed to support strategy review. 5. Feedback information is provided for adjusting strategic plan. 6. Management regularly checks that actions related to achievement of targets are taken. 7. Deviation from planned results causes the management to question the strategy. 8. The measures are regularly discussed and revised, if needed, in management meetings.

Appendix B : Supplements

Table B-1: Correlations among variables in the determinant study (n=72)

	ADOPT	IMPLE	ENV	PART	FORM	INT	IS	TOP	CFO	TEAM	TRAIN	ATT	SIZE	FIN	MANU
ADOPT	1.000	0.437***	0.171	0.336***	0.298**	0.363***	0.121	0.491***	0.275**	0.355***	0.410***	0.241**	0.128	0.009	-0.008
p-value		(0.000)	(0.151)	(0.004)	(0.011)	(0.002)	(0.311)	(0.000)	(0.019)	(0.002)	(0.000)	(0.042)	(0.283)	(0.940)	(0.947)
IMPLE	0.437***	1.000	0.238**	0.449***	0.380***	0.280**	0.190	0.350***	0.335***	0.392***	0.398***	0.185	0.224*	0.159	-0.068
p-value	(0.000)		(0.044)	(0.000)	(0.001)	(0.017)	(0.110)	(0.003)	(0.004)	(0.001)	(0.001)	(0.119)	(0.059)	(0.184)	(0.568)
ENV	0.126	0.269**	1.000	0.343***	0.491***	0.470***	0.258**	0.382***	0.377***	0.319***	0.396***	0.468***	0.149	0.107	0.028
p-value	(0.290)	(0.022)		(0.003)	(0.000)	(0.000)	(0.029)	(0.001)	(0.001)	(0.006)	(0.001)	(0.000)	(0.211)	(0.372)	(0.818)
PART	0.284**	0.370***	0.398***	1.000	0.436***	0.316***	0.265**	0.531***	0.380***	0.433***	0.556***	0.357***	0.270**	0.166	-0.165
p-value	(0.016)	(0.001)	(0.001)		(0.000)	(0.007)	(0.024)	(0.000)	(0.001)	(0.000)	(0.000)	(0.002)	(0.022)	(0.165)	(0.165)
INFLEX	0.242**	0.381***	0.494***	0.435***	1.000	0.700***	0.530***	0.615***	0.465***	0.524***	0.572***	0.615***	0.260**	-0.027	-0.121
p-value	(0.041)	(0.001)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.027)	(0.822)	(0.313)
INT	0.264**	0.245**	0.479***	0.278**	0.653***	1.000	0.612***	0.744***	0.548***	0.602***	0.666***	0.612***	0.130	-0.074	-0.102
p-value	(0.025)	(0.038)	(0.000)	(0.018)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.277)	(0.535)	(0.392)
IS	0.104	0.165	0.304***	0.315***	0.594***	0.663***	1.000	0.441***	0.495***	0.515***	0.511***	0.434***	0.149	-0.249**	0.119
p-value	(0.385)	(0.166)	(0.009)	(0.007)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.210)	(0.035)	(0.320)
TOP	0.348***	0.296**	0.338***	0.437***	0.544***	0.650***	0.501***	1.000	0.628***	0.662***	0.731***	0.645***	0.231*	-0.016	-0.168
p-value	(0.003)	(0.012)	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.051)	(0.892)	(0.159)
CFO	0.162	0.291**	0.428***	0.340***	0.594***	0.534***	0.542***	0.554***	1.000	0.707***	0.578***	0.461***	0.215	-0.105	0.002
p-value	(0.174)	(0.013)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.070)	(0.382)	(0.990)
TEAM	0.265**	0.328***	0.329***	0.363***	0.631***	0.638***	0.628***	0.606***	0.689***	1.000	0.688***	0.561***	0.177	-0.075	-0.052
p-value	(0.025)	(0.005)	(0.005)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.137)	(0.533)	(0.662)
TRAIN	0.267**	0.360***	0.396***	0.453***	0.558***	0.673***	0.560***	0.644***	0.499***	0.613***	1.000	0.637***	0.283**	-0.020	-0.204*
p-value	(0.024)	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.016)	(0.867)	(0.086)
ATT	0.157	0.220*	0.505***	0.319***	0.626***	0.650***	0.507***	0.686***	0.614***	0.604***	0.610***	1.000	0.222*	0.029	-0.104
p-value	(0.188)	(0.063)	(0.000)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		(0.061)	(0.807)	(0.384)

Table B-1 (Cont'): Correlations among variables in the determinant study (n=72)

	ADOPT	IMPLE	ENV	PART	INFLEX	INT	IS	TOP	CFO	TEAM	TRAIN	ATT	SIZE	FIN	MANU
SIZE	0.213	0.156	0.203*	0.285**	0.309***	0.228*	0.198*	0.286**	0.247**	0.318***	0.389***	0.277**	1.000	0.014	-0.135
p-value	(0.072)	(0.191)	(0.087)	(0.015)	(0.008)	(0.055)	(0.095)	(0.015)	(0.036)	(0.006)	(0.001)	(0.019)		(0.905)	(0.260)
FIN	0.009	0.159	0.092	0.160	-0.059	-0.109	-0.263**	-0.075	-0.186	-0.210*	-0.076	-0.025	-0.127	1.000	-0.359***
p-value	(0.940)	(0.184)	(0.442)	(0.179)	(0.625)	(0.363)	(0.025)	(0.529)	(0.117)	(0.077)	(0.524)	(0.834)	(0.287)		(0.002)
MANU	-0.008	-0.068	-0.018	-0.081	-0.076	-0.119	0.121	-0.188	-0.031	-0.013	-0.188	-0.113	-0.019	-0.359***	1.000
p-value	(0.947)	(0.568)	(0.879)	(0.497)	(0.526)	(0.320)	(0.312)	(0.114)	(0.794)	(0.914)	(0.114)	(0.347)	(0.874)	(0.002)	

Remarks: The upper-right reports Pearson Correlation; the lower-left reports Spearman's rho.
***, **, * indicates significance at 0.01, 0.05, and 0.10 level (2-tailed), respectively.

Table B-2: Correlations among variables in financial consequence test (n=27)

	ΔROE	IMPLE	PRE_IMPLE	SIZE	MB	FIN	MANU	MA
ΔROE	1.000	0.344*	0.356*	0.19	0.154	0.206	-0.38*	-0.233
p-value		(0.079)	(0.068)	(0.343)	(0.442)	(0.303)	(0.05)	(0.241)
IMPLE	0.163	1.000	.492***	0.262	0.340*	0.064	-0.071	0.189
p-value	(0.417)		(0.009)	(0.186)	(0.083)	(0.749)	(0.724)	(0.345)
PRE_IMPLE	0.037	.467**	1.000	.515***	0.314	.464**	0.051	0.049
p-value	(0.854)	(0.014)		(0.006)	(0.11)	(0.015)	(0.8)	(0.808)
SIZE	0.086	0.174	.473**	1.000	0.296	0.226	-0.003	0.323
p-value	(0.669)	(0.386)	(0.013)		(0.135)	(0.256)	(0.989)	(0.101)
MB	-0.084	0.358*	0.287	0.178	1.000	0.066	-0.346*	0.151
p-value	(0.678)	(0.067)	(0.147)	(0.374)		(0.743)	(0.077)	(0.452)
FIN	0.184	0.064	.526***	0.073	0.147	1.000	-0.366*	-0.235
p-value	(0.359)	(0.749)	(0.005)	(0.716)	(0.465)		(0.061)	(0.239)
MANU	-.482**	-0.071	0.01	0.069	-0.315	-0.366*	1.000	0.086
p-value	(0.011)	(0.724)	(0.961)	(0.733)	(0.109)	(0.061)		(0.671)
MA	-0.191	0.189	0.038	.411**	0.096	-0.235	0.086	1.000
p-value	(0.339)	(0.345)	(0.85)	(0.033)	(0.635)	(0.239)	(0.671)	

Remarks: The upper-right reports Pearson Correlation; the lower-left reports Spearman's rho.
***, **, * indicates significance at 0.01, 0.05, and 0.10 level (2-tailed), respectively.

Appendix C : Questionnaire

[Date]

Dear Respondent,
Enclosures: Questionnaire and the returned envelope

Miss WASATORN SHUTIBHINYO, a Ph.D. candidate in accounting and an accounting lecturer at Chulalongkorn Business School, Chulalongkorn University, is currently working on dissertation, the topic of which is "The determinants and consequence of Balanced scorecard implementation: The case of listed companies in Thailand" under the supervision of Assoc.Prof.Vorasak Toommanon.

The aims of this study are (1) To explore the stage of implementing the Balanced Scorecard or a performance measurement system containing a set of integrated financial and nonfinancial performance measures that are explicitly linked to firm's strategy implementation, and (2) To investigate the determinants and consequence of such application.

Since you are in the position to oversee and control firm's performance measurement system, your participation in this dissertation is crucial to the advancement of the management accounting literature concerning the implementation of the performance measurement system that is of financial and nonfinancial measures derived from organization's strategy, as well as the determinants and consequence of such system.

All the information you provide will be kept strictly confidential. Only aggregate results will be presented in the dissertation or in any publication based on this research. The numbers you see at the end of the questionnaire and on the returned envelope are used only as a code to match respondent's company with the financial statements in order to complete the second objective of the study and to do a follow-up-contact with non-respondents.

Please return the completed questionnaire in the self-addressed, stamped envelope within xx xxx, 2011.

The success of this study depends upon your help. Accordingly, your participation is greatly appreciated. Thank you in advance for your time and effort that are contributed to this study.

Sincerely,

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Section 1: Organization's profile

1. Industry: ☐ Manufacturing ☐ Wholesaling or retailing ☐ Services
   ☐ Finances or insurances ☐ Others (Please specify .....)
2. Number of strategic business units in your organization: .....
3. Number of employees in your organization: .....
4. In the current situation, which of the following other management accounting innovation(s) or management tool(s) is (are) implemented in your organization?

☐ Activity-Based Costing (ABC[1])	☐ Total Quality Management (TQM[2])
☐ Just-in-Time (JIT[3])	☐ Target costing[4]
☐ Activity-Based Budgeting (ABB[5])	☐ ISO
☐ Others (Please specify.....)	☐ Others (Please specify.....)

Section 2: Respondent's profile

1. Position title: .....
2. How long have you served in this position? : ..... Years ..... Months .....
3. How long have you worked in this company? : ..... Years ..... Months .....
4. Education Level (Please tick the highest level of your current education):
   ☐ Bachelor's degree ☐ Master's degree ☐ Doctorate degree

---

[1] *ABC = Costing method that overhead costs are assigned to product on the basis of the activities they required.*
[2] *TQM = A product-quality program that the objective is complete eliminate of product defects.*
[3] *JIT = A comprehensive inventory and manufacturing control system in which no materials are purchased and no products are manufactured until they are needed.*
[4] *Target costing = After estimating the market price of product, management attempts to ensure that the cost of product will be low enough to provide an adequate profit margin.*
[5] *ABB = A method of budgeting that develops budgets based on expected production level and potential activities, which are tied to strategic goals. ABB stands in contrast to traditional, cost-based budgeting practices.*

Section 3: Strategy, performance measurement system and management processes in your company

Please **select** (with a tick) whether the following **statements have existed** in your organization.

1. Organization's strategy is well defined. ☐ Yes ☐ No

2. Organization's strategy is described via strategy map (or cause-and-effect relationships).

☐ Yes (Please specify ***the year*** in which ***firm's strategy map is established*** .....)

☐ No

3. Objectives or measures are derived explicitly from strategy.

☐ Yes (Please specify ***the year*** in which ***the measures are derived from strategy*** .....)

☐ No

4. Both financial and nonfinancial (or operating) measures are identified. ☐ Yes ☐ No

5. The measures are grouped into perspectives (e.g., financial, customer, internal processes and learning and growth, etc). ☐ Yes ☐ No

6. The measures are interrelated and can be illustrated as a chain of the cause-and-effect relationships (driver-outcome or lead-lag relations) between performance drivers and outcome measures. ☐ Yes ☐ No

7. Business units' or support functions' strategies are influenced by corporate strategy. ☐ Yes ☐ No

8. The organization's objectives and measures are disseminated throughout the organization. ☐ Yes ☐ No

9. The organization's vision, mission, and strategy are communicated throughout the organization. ☐ Yes ☐ No

10. Employees are aware of and understand the organization's strategy. ☐ Yes ☐ No

11. Firm's performance measurement system has measures linked to employees' reward system. ☐ Yes ☐ No

12. Firm's strategy is linked to operating plans and budgeting system. Targets and action plans are determined for strategic measures. ☐ Yes ☐ No

13. There is an information system (or feedback and reporting system) that supports strategy review. ☐ Yes ☐ No

14. There is a process of formulating, learning, and reviewing firm's strategy. ☐ Yes ☐ No

15. There is a process of questioning and refining firm's strategy. ☐ Yes ☐ No

Section 4: Performance measurement system (PMS) and management processes in your company

Please **specify the percentage** for each feature that **BEST** describes your firm's PMS and management processes (or specify **0%** if there is **NO** such feature in your organization).

For example	Least 0-20%	Little 21-40%	Average 41-60%	Some 61-80%	Most 81-100%
PMS seems to be appropriate.		*25%*			
Employees are free from rules and procedures.	*0%*				

	Least 0-20%	Little 21-40%	Average 41-60%	Some 61-80%	Most 81-100%
Your firm has a clear mission and vision.					
Your organization's strategy is well defined.					
The measures or objectives are derived from firm's strategy.					
Your PMS contains both financial and nonfinancial measures.					
The measures or objectives are grouped into perspectives (e.g., financial, customer, internal process, learning and growth, etc.)					
There are explicit cause-and-effect relationships (strategy map, business model, driver-outcome relations, or lead-lag relations) that help you understand the relationships among all of the key measures or objectives.					
The firm's strategy is translated into the measures.					
The relationships among the measures are illustrated in a cause-and-effect manner, indicating how measures affect each other.					
The organization's strategy can be inferred from the measures and the linkages (driver-outcome or lead-lag relations) among them.					
There is a cascading process to translate a corporate strategy into aligned and integrated strategies at lower-level units.					
Firm's objectives and measures are disseminated throughout the organization.					
Your PMS provides information that influences you to restructure the processes, services, and competences.					
Each department has to create its own performance objectives and measures which are relevant to everyday works.					
Firm communicates its chosen objectives and measures to every level of firm.					
Employees have recognized what the organization is trying to accomplish.					
Employees have recognized how they can contribute to achieve the firm's goals.					
The measures are used to reward some or all of firm's employees.					
The strategy is linked to planning and budgeting process.					
Targets and action plans are set for each objectives or measures.					

Section 4 (Cont'): PMS and management processes in your company					
	Least 0-20%	Little 21-40%	Average 41-60%	Some 61-80%	Most 81-100%
Potential initiatives, investments, and capital expenditures are screened whether they are in line with organization's strategy.					
There are analytic and information system designed to support strategy review.					
Feedback information is provided for adjusting strategic plan.					
Management regularly checks that actions related to achievement of targets are taken.					
Deviation from planned results causes the management to question the strategy.					
The measures are regularly discussed and revised, if needed, in management meetings.					

Section 5: Organizational factors

Please **specify the percentage** for each situation that **BEST** describes your organization (or specify **0%** if there is **NO** such situation in your organization).

	Least 0-20%	Little 21-40%	Average 41-60%	Some 61-80%	Most 81-100%
Formalizaion					
Employees are given written operating instructions or procedures for their jobs.					
Supervisors and management are supervised to ensure compliance with formal rules and procedures.					
Supervisors and management are free from rules, procedures, and policies when making decisions.					
Formal rules and procedures exist within the firm.					
Interconnectedness					
There are coalitions of employees in differentiated units.					
There is information exchange among organization's members.					
There is information exchange among departments.					
There is information exchange among business units.					
Information system					
The firm's information systems are highly integrated with each other (e.g., sales, manufacturing, purchasing, etc).					
A wide array of data is available in firm's information systems.					
Data in information systems are updated in a timely manner.					
Regular maintenance and updating are performed for firm's information systems.					

Section 5 (Cont'): Organizational factors					
	Least 0-20%	Little 21-40%	Average 41-60%	Some 61-80%	Most 81-100%
Top management support					
Top management communicates the need for change or new innovation, if any.					
Top management allocates adequate resources and time for change or innovation.					
Top management actively involves in developing and implementing the firm's performance measurement system.					
Top management supports and encourages every attempt to improve the firm's performance measurement system.					
Top management allocates adequate resources and time in order to improve the firm's performance measurement system.					
CFO involvement					
Accounting and finance department actively involves in improving (i.e., developing and implementing) the firm's performance measurement system.					
Management accountants have worked closely with managers in the organization.					
Management accountants have strong, even dominant, positions in projects improving the firm's performance measurement system.					
Project Team					
To improve the firm's performance measurement system, special project team has been approved and worked closely with top management.					
Team members have various skills, knowledge and have a very detailed understanding of functional areas in the organization.					
Team members are from different departments.					
Team members can gather and analyze detailed data for clear communication with others.					
Training					
An emphasis is placed on skills development and training in the company.					
There are formal and informal training sessions for employees concerning the use of firm's performance measurement system.					
When performance measurement system has been updated or newly introduced in the organization, there is adequate training that enables employees to understand and learn how to use it.					

Section 6: Attitude toward the performance measurement system (PMS)

Please **specify the degree of your agreement in percentage** that **BEST** represents your **attitude toward using performance measurement system (PMS)** *that is of financial and nonfinancial measures derived from organization's strategy. The cause-and-effects linkages among these measures can describe an organization's value-creating processes.*

	Least 0-20%	**Little 21-40%**	**Average 41-60%**	**Some 61-80%**	**Most 81-100%**
Learning to use **such PMS** is easy.					
It is easy to get **such PMS** to do what you want it to do.					
The information provided by **such PMS** is accurate and reliable.					
Such PMS can be easily adjusted to any new conditions, demands, and circumstances that arise now or in the future.					
Such PMS always gives the information that your company want.					
Such PMS is convenient to use.					
Such PMS has made a contribution to achieving the firm's goals and objectives.					
Such PMS has enabled you to carry out your work more efficiently.					
Such PMS is essential for the successful performance of your organization.					
Such PMS has enabled you to carry out your work more easily.					
Such PMS helps your work easier.					
Such PMS is useful.					

Section 7: Participation

Please **select** (with a tick) the description below that **best** describes your organization.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

The following statements describe the degree of participation in the organization.

1 You have made decisions yourself, using information available to you at the time.

2 You have obtained the necessary information from your subordinates, and then have made decisions yourself. You may or may not describe your decisions to them when asking for the information. The role played by the subordinates is clearly one of providing necessary information to you, rather than generating or evaluating the decision making.

3 You have shared your decisions with the relevant subordinates individually, getting their ideas and suggestions without bringing them together as a group.
Then you have made decisions, which may or may not reflect your subordinates' influence.

4 You have shared your decisions with the relevant subordinates as a group, obtaining their collective ideas and suggestions.
Then you have made decisions, which may or may not reflect your subordinates' influence.

5 You have shared your decisions with the relevant subordinates as a group. Together you have discussed and evaluated various alternatives and have attempted to reach agreement (consensus) on a solution. Your role is much like that of a chairman. You do not try to influence the group into adopting "your" decision, and you are willing to accept and implement any decision which has the support of the entire group.

Section 8: Environment Uncertainty

How intense is each of the following in your industry? Please **specify the percentage** of intensity that your firm has faced (or specify **0%** if your firm has **not** faced such intensity).

	Least 0-20%	**Little 21-40%**	**Average 41-60%**	**Some 61-80%**	**Most 81-100%**
Price competition					
Quality-based competition					
Competition by diversity of products					
Competition for manpower					
Competition for selling and distribution					
Bidding for purchases or raw materials					
Others (Please specify .....)					

Section 9: The application of Balanced scorecard (BSC)

Please **select** (with a tick) whether following **statements have existed** in your company.

1. Your organization **implements** (or uses) the Balanced scorecard.

☐ Yes. Please ***specify the month/year*** in which your organization have implemented BSC (MM/YY)...../.....

☐ No. Please skip to question 3.

2. Your organization **implements** (or uses) the Balanced scorecard in which degree.

☐ To somewhat extent (Occasionally used by upper management or departments for decision making)

☐ Extensively (Commonly used by upper management or departments for decision making and considered as normal part of information system)

3. Your organization **rejected the use of** the Balanced scorecard.

☐ Yes. Please specify **the year** in which **implementing (or using) BSC** .....

Please specify **the year** in which **rejecting BSC** .....

Please inform **why rejecting** BSC .....
End of the questionnaire.

☐ No.

4. Your organization **plans to use** the Balanced scorecard.

☐ No. Not consider adopting BSC.

☐ Yes. Consider adopting BSC, but no concrete steps have been taken so far.

☐ Yes. Approval has been granted to start the BSC. Firm has devoted the necessary resources.

Thank you very much for your participation.

You are able to add any additional comments on a separate piece of paper.

Regardless of whether you choose to participate, if you would like to receive a copy of the summary of the results, please attach your business card with this questionnaire or provide your name and mailing address in the space below. This information will be used only to send you a copy of the executive summary of the results.

Name:.....
Address:.....
.....
.....

Should you have any questions concerning the questionnaire, please feel free to contact me at xxx-xxx-xxxx, xx-xxx-xxxx or wasatorn@acc.chula.ac.th, wasatorns@gmail.com

BIOGRAPHY

Wasatorn Shutibhinyo in 2001 and 2004 graduated from Chulalongkorn University, Thailand, with a Bachelor of Accountancy and a Master of Accountancy, respectively. Since 2004 she has been a faculty member of Faculty of Commerce and Accountancy, Chulalongkorn University, and has been awarded a scholarship to pursue her Ph.D. study with accounting major at Chulalongkorn University.