ปัจจัยที่มีผลกระทบต่อทัศนคติและความตั้งใจที่จะใช้ระบบวัดผลที่สมดุลย์แบบอัตโนมัติ (Automated Balanced Scorecard System): กรณีศึกษาบริษัทปิโตรเคมี ในประเทศไทย

นางสาวลลิตา หงษ์รัตนวงศ์

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FACTORS INFLUENCING USERS ATTITUDE AND INTENTION TO USE THE AUTOMATED BALANCED SCORECARD SYSTEM: A CASE STUDY OF A THAI PETROCHEMICAL MANUFACTURER

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By	Miss Lalita Hongratanawong
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ลลิตา หงษ์รัตนวงศ์ : ปัจจัยที่มีผลกระทบต่อทัศนคติและความตั้งใจที่จะใช้ระบบวัดผลที่สมดุลย์แบบอัตโนมัติ (Automated Balanced Scorecard system): กรณีศึกษาบริษัทปิโตรเคมี ในประเทศไทย. (FACTORS INFLUENCING USERS ATTITUDE AND INTENTION TO USE THE AUTOMATED BALANCED SCORECARD SYSTEM: A CASE STUDY OF A THAI PETROCHEMICAL MANUFACTURER) อ. ที่ปรึกษา : ศาสตราจารย์ ดร. อุทัย ตันละมัย, 127 หน้า. ISBN 974-17-1390-8.

การศึกษานี้นำเสนอกรณีศึกษาเกี่ยวกับความสำเร็จและล้มเหลวในการนำระบบวัดผลที่สมดุลย์แบบอัตโนมัติมาใช้ โดยวัดจากทัศนคติที่มีต่อระบบวัดผลนี้และความตั้งใจที่จะใช้ระบบตามแผนงานที่ตั้งไว้ ปัจจัยที่มีผลกระทบต่อทัศนคติและความตั้งใจที่จะใช้ระบบวัดผลที่สมดุลแบบอัตโนมัติพัฒนาจากกรอบของการนำระบบสารสนเทศมาใช้ เช่น การมีส่วนร่วม ความรู้สึกร่วม การสนับสนุนจากผู้บริหาร การฝึกอบรมอย่างมีประสิทธิภาพ และข้อมูลส่วนบุคคล

การทดสอบแบบไม่ใช้พารามิเตอร์จากแบบสอบถามที่ถูกรวบรวมมาและการสัมภาษณ์แบบเจาะลึกกับผู้บริหารระดับสูง ผู้ซึ่งเป็นผู้ใช้หลักในระบบวัดผลที่สมดุลย์แบบอัตโนมัติ ได้ถูกนำมาใช้เพื่อทดสอบปัจจัยที่มีผลต่อความสำเร็จและล้มเหลวในการนำระบบวัดผลที่สมดุลย์แบบอัตโนมัติมาใช้

ผลทดสอบความสำเร็จในการนำระบบมาใช้สำหรับองค์กรหนึ่งนั้นแสดงให้เห็นว่าการมีส่วนร่วมและความรู้สึกร่วม มีความสัมพันธ์กับทัศนคติที่มีต่อระบบวัดผลและความตั้งใจที่จะใช้ระบบ การสนับสนุนจากผู้บริหารมีความสัมพันธ์กับความตั้งใจที่จะใช้ระบบ และการฝึกอบรมอย่างมีประสิทธิภาพมีความสัมพันธ์กับทัศนคติที่มีต่อระบบวัดผล ในขณะที่ข้อมูลส่วนบุคคล เช่น อายุ เพศ การศึกษา อายุงานในตำแหน่งปัจจุบัน และประสบการณ์ในการทำงานโดยใช้คอมพิวเตอร์ ถูกพบว่าไม่มีความสัมพันธ์กับทัศนคติที่มีต่อระบบวัดผลและความตั้งใจที่จะใช้ระบบ

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This study reports on a case study of the success and failure of implementing an Automated Balanced Scorecard (ABSC), which was determined by the users' attitudes toward this new system and their intention to use the system as planned. Factors influencing the success or failure were explored by using the information systems implementation framework, such as user participation, user involvement, management support, effective training, and personal factors.

Non-parametric tests from collected questionnaires and the in-depth interviews with top executives who are the key user of the ABSC were employed to test factors influencing the success and failure of an ABSC implementation.

The examination of the implementation success in a single organization indicated that user participation and user Involvement were related to user attitude and intention to use the ABSC. Manager support was related to users' intention to use the ABSC. Also Effective Training was related to user attitude toward the ABSC. In contrast, demographic data such as age, gender, education, job tenure, and work experience with computer were found no relationship with user attitude and intention to use the ABSC.

Field of study Information Technology in Business Student's signature .....

Academic year 2002 Advisor's signature .....

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Lalita Hongratanawong

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Chapter I

Introduction

Background of the Study

In the modern business world, organizations have to devise different tactics so as to achieve competitive advantages. Both external control of environment and internal control of process efficiency are the focus of today's management. Porter's (1980, 1991) Five Forces Model and his Strategic Group Model of management outlined different external forces the organizations must observe and analyze in order to compete effectively. These forces are stakeholders (i.e. government, community), bargaining power of suppliers, substitute products, and new entrants. The bargaining power of customers is also one of the important forces the firm has to carefully scrutinize. On the other hand, McKinsey's 7 S model (Peter and Waterman, 1982) and Porter (1985) 's Value Chain model emphasize the internal control of an organization. Whether they be Strategy, Structure, Systems, Style, Staff, Skill, and Shared Values as in McKinsey's model or Firm Infrastructure, Human Resource Management, Technology Development, Procurement, Inbound/Outbound Logistics, Operations, Sales and Services as in the Value Chain model, are the internal process components that the firm must manage effectively in order to be competitive in the long run.

To be able to act quickly, today's managements are very much concerned with how the firms can evaluate their performance. Yet, they often use financial measurements in the evaluation because financial performance is a traditional and most prominent way to compare one organization to another. However, studies have shown that financial measurements do not truly reflect the overall performance of the whole organization and may lead to organizational myopia (Hitt, 1995). To deal with this short-coming, Kaplan and Norton (1996) had developed the concept of Balanced Scorecard which included measurements from not only the financial perspective but also three other perspectives, namely, customer, internal process, and learning and growth. The Balanced Scorecard concept allows management to see the linkage between strategy and performance clearer. As a result, the use of Balance Scorecard method as a performance

measurement system will help the organizations to better manage and compete more effectively.

The popularity of Balanced Scorecard is astounding. According to the Renaissance Worldwide survey (1998), 54% of the surveyed companies are using the balanced scorecard approach as a strategic performance measurement and management tool and the percentage is expected to be growing all the times. With this popularity, there is no surprise that the so-called Automated Balanced Scorecard software (ABSC hereafter) is popping up in the new product lines of prominent enterprise solution software vendors such as Oracle Balanced Scorecard, SAP Strategic Enterprise Management module, and so on. Smaller software vendors also compete for a piece of this pie. Some examples include Corvu, Gentia Balanced Scorecard, Performance Plus, QPR Scorecard, SAS Strategic Vision Designer, and PBView (Balanced Scorecard Collaborative, Inc., 2002)

Like any other automated management information tools, organizations invested in the ABSC to increase the efficiency and effectiveness, and in particular to fasten the pace of measuring their performance. They also employ the systems to control and communicate their strategic directions to the lower levels of management (Malina and Selto, 2001).

While there is tremendous support to the use of ABSC in organizations, very few empirical results could confirm the success or, sometimes, the failure of the ABSC implementation. Not much research has studied the factors influencing the implementation of this type of system. Are the factors that have an effect on the implementation of other automated systems also have an effect on the ABSC? To what extent can the theoretical models underlining the use of a typical computer-based information system are applied to that of the ABSC?

Using the information systems implementation framework, the present study proposes to investigate the success and failure of implementing an ABSC in a large public company in Thailand. The implementation success or failure is determined by the users' attitudes toward the ABSC and their intention to use this system as planned.

Factors influencing the success or failure are also explored, such as User Participation, User Involvement, Management Support, Effective Training, and Personal Factors.

Research Questions

The main research question in this study was "What factors influence the success or failure of implementing an Automated Balanced Scorecard System?" Other questions included whether these factors are the same or different from those influencing the implementation of any new information systems, which factors are more important than the others, and how a firm's specific characteristics contribute to the implementation process of an ABSC.

Research Objectives

1. To identify the factors that influence the success/ failure of an ABSC implementation.

2. To provide a solid foundation for further empirical investigation into the impact of these factors on the ABSC implementation.

Scope of the Study

1. The study's context centered on the development of ABSC in one public petrochemical firm in Thailand, which is the only company in the chemical industry that uses software package to implement the balanced scorecard during the research period.

2. The theoretical frameworks used in this study were based on the literature of the user attitudes toward a computer-based information system implementation, the balanced scorecard, organizational behaviors, and change management.

Limitations of the Study

The implementation of the ABSC systems in any organization can be quite unique. The process of choosing the ABSC systems is very specific to the setting of performance measurement in the organization. A single organizational context will limit its applicability, however, the study of performance measurement systems lend itself to be organizational specific that the organization can control the variation better than the study on different organizations. Due to the specific characters of the organization, such as cultures, politics, technological needs, and level of technological development, the results cannot be generalized to other organizations.

It should be noted that at the time of this thesis write-up, the petrochemical organization has finished its system conversion stage. The firm has started using its ABSC fully at the end of January 2002 when the first set of data were collected and analyzed by management. In March 2002, the vendor in charge of the chosen ABSC went out of business. A new version is no longer released; however, the firm can still use its ABSC. To this uncomfortable situation, the software vendor selling this ABSC is in the process of making an offer to change the already paid, trained systems to the other ABSC.

Contributions

1. This study is interdisciplinary in nature as it integrates the bodies of knowledge from information systems, information technology, and strategic management. Thus, this study contributes to a better understanding of user attitude toward the development a new performance management system and intention to use that system, an important framework of the implementation of computer-based information systems field. Both the personal and organizational factors pertinent to the implementation of an automated performance measurement system were examined.

2. As both quantitative and qualitative data (detailed organizational and implementation settings) are collected in this study, the result yields

rich information on the implementation of one of the most popular management tools, the Balanced Scorecard. Although every organization has its own culture and environment, the insights and evidence provided from one firm's implementation could provide other organizations with something to learn about their own implementation.

This thesis was organized as follows: Chapter one stated the background of the study, research objectives, scope of the study, limitations of the study, and contributions of the study. Chapter two reviewed literatures of performance management system; types of users and their attitudes and intention toward a new system implementation; factors affecting information system implementation; and theories behind this study's conceptual framework. Hypotheses were proposed in Chapter three. Chapter four discussed methodological issues including sampling, procedures, data collection, and methods of the data analysis. Results of the data analysis were presented in Chapter five. Chapter six includes the results' discussion, implication, limitation, and conclusion.

Chapter II

Literature Review

One of the most frequently asked questions in the information systems implementation research is what would it take to have a successful and effective implementation. Several empirical studies (Davis, 1989; Barki and Hartwick, 1994) found that the success of information systems effectiveness is directly linked to usage behavior and user attitudes toward Information System implementation. User satisfaction and systems usage are typically used as the measures of systems implementation success (Ein-Dor and Segev, 1978; Hamilton and Chervany, 1981; Ives and Olson, 1984, Soegiharto, 2001). Factors influencing the information system implementation success were also founded to be in different levels of organization involving organizational, management, analysts, and contextual (ibid).

The remainder of this literature review will be organized into four sections. Immediately after this paragraph is a brief description of performance management systems in general and specifically the Balanced Scorecard and its automated version. The next section provides the review of different types of users, their attitudes and intention toward a new system implementation. A review of empirical studies of different factors affecting computer-based systems implementation will follow, including user participation, user involvement, management support, user's training, and personal factors. Finally, the conceptual model used for this research will be presented as a summary of this literature review.

Performance Management Systems

Modern management tools, especially in the area of performance management, have been invented by frustrated management and executives as a way to bring value into their professional management offerings. In recent years, prominent executives and management consultants have made available several well known tools

such as the Balanced Scorecard/Balanced Management System, Key Performance Indicators, Total Quality Management, Six Sigma, Best Practices, and a War-Room or Decision Room like a Management Cockpit. These new management tools were invented in order to help managers and executives run their businesses. The effective use of a performance management system will allows these business professionals in the monitoring, evaluation, and control of the firm's operations, which in turns can bring about handsome financial outcomes as a result.

Balanced Scorecard The concept of Balanced Scorecard was introduced by Kaplan and Norton (1996). It is one type of performance management systems that enables businesses to drive strategies and to translate them into objectives and subsequence course of actions. The Balanced Scorecard takes into account both financial and non-financial performance measurements at every management level in the organization. These measurements are grouped into four perspectives: financial, customer, internal process and learning and growth. The thrust of the Balanced Scorecard System is to provide a balance way of measuring and evaluating the firm's performance.

The four perspectives link lagging and leading measures of financial and non-financial performance into a coherence cause-and-effect relationship. For example, in order to reach financial success, one might start with the learning and growth perspective. There, executives can determine whether specific business units should improve the quality of employees by providing more employee trainings and/or investing in additional management system infrastructure. These actions will affect the internal process perspective because the improvement in employee quality will lead to an improvement in the firm's internal capabilities and processing efficiency. Customers will in turn benefit from the efficiency, resulting in more satisfied and loyal customers, and adding value to the firm's ability to make financial gain in the long run.

Not only can the Balanced Scorecard help organizations develop a new set of performance measures but it might also help the firms refining their management systems, such as the strategic planning systems, organizational communication

systems, and control and monitoring systems. Many proponents of the use of Balanced Scorecard as performance management systems have claimed that organizations will be able to compete better (Malina and Selto, 2001).

Automated Balanced Scorecard Silk (1998) distinguished the concept of Automated Balanced Scorecard (ABSC) from Executive Information System (EIS). According to Silk (ibid), EIS is an application providing a graphical representation of some key high-level indicators. He mentioned that Balanced Scorecard differs from traditional Executive Information System solutions in that the information in the ABSC systems is relatively fluid and changes constantly based on how people take the actions to meet their goals. EIS, on the other hand, contains information historical data and some future trends. Also, EIS typically focuses on measuring lagging indicators while ABSC measures both leading and lagging indicators.

A true ABSC must support the balanced scorecard framework. To be called an ABSC, Silk (1998) said that the application must be enterprise deployable and easy to use. Moreover, it should be able to provide comprehensive analysis and should have open network architecture with centralized security. To capture the benefits of using ABSC, Balanced Scorecard Collaborative, Inc., led by Drs Robert Kaplan and David Norton, reviews the software of all Balanced Scorecard software providers that are found compliant with Balanced Scorecard functional standard and gives a certificate to software vendors. The examples of the certified software vendors from Balanced Scorecard Collaborative, Inc. are ABC Technologies, CorVu, Crystal Decisions, Fiber, Gentia, etc.

Types of Users, Their Attitudes and Intention toward a New System Implementation

Cousins and Whitmore (1998) defined users as a collaborative group of people who involve in the implementation process. They participated in the systems evaluation in as much as used the systems after implementation. Yaverbaum (1988), on the other hand, focused on the end users and defined them as those individuals who are

not programmers or analysts but directly interact with the computer systems as part of their job. Other researchers categorized user types more broadly into different roles. Churchman and Schainblatt (1965) defined three types of users: user, manager, and analyst. Davis and Olson (1985) classified users according to the tasks involved with the system, as a primary user who mainly uses the systems output, and as a secondary user who interacts with the system to input data and/or obtain the output without directly utilizes the output in his or her job. In the context of the present study, two types of users were rolled into one: the naive executives whose main responsibilities are to use the new systems in their day-to-day management and the expert executives who will not only use the systems themselves but also help other executives when needed.

Information System Implementation The implementation has been defined in various way. Aline and David (1993) defined Information System implementation as a process of technological innovation and organizational change, in which stakeholders' expectations about the changes caused by the system introduction play a major role in determining the process's outcomes. Churchman (1968) defined implementation as a process that takes place when managers of the organization are influenced by system designers' recommendations and put these recommendations into action. Ginzberg (1979) said that implement starts at the beginning of system development and ends after the projects is completed or abandoned. This study followed Ginzberg's definition. The ABSC implementation will end when the company adopts or abandons the ABSC as a new performance measurement system.

Stages of Information System Implementation Cooper and Zmud (1990) modified a six-stages model (Kwon and Zmud, 1987) to study the diffusion approach of material requirements planning (MRP) systems. They found that the managerial tasks with the information technology effected on the adoption and infusion of that technology. The six-stages include Initiation, Adoption, Adaptation, Acceptance, Routinization and Infusion, which are defined in Table 2.1.

Anderson (1995) provided evidence from one company that the success factors in activity-based costing (ABC hereafter) implementation vary from stage to

stage. Kip (1998) studied further on the implementation stages of ABC and the impact of contextual and organizational factors modified a ten-stages model included Not considered, Considering, Considering then rejected, Approved for implementation, Analysis, Getting Acceptance, Implemented the abandoned, Acceptance, Routine system and Integrated system, which are defined in Table 2.1. Kip (1998) had developed a ten-stages of ABC implementation model from a six-stage model (Kwon and Zmud, 1987)

In this study, the stage of BSC Implementation for NPC is scope during the Acceptance stage and Routinization stage as in six-stages model of Cooper and Zmud (1990) and during Acceptance stage and Routine system stage as in ABC implementation model of Kip (1998). The application is just used commonly by the steering committee to monitor the performance of the organization in balanced scorecard concept. The benefits of BSC implementation have been watching by both steering committee and researcher. When the ABSC implementation has been accepted, it will be used within the organization from corporate scorecard through a personal scorecard with a pay-for-performance based.

Table2.1 Comparison of Cooper and Zmud (1990) Implementation Model and ABC Implementation Model (Kip, 1998)

	Cooper and Zmud (1990)	ABC Implementation model
		(A) Not considered. ABC has not been seriously considered. Use either single or departmental/ multiple plant-wide allocation methods only.
Initiation	Process: Active and/ or passive scanning of organizational problems/ opportunities and IT solutions are undertaken. Pressure to change evolves	(B) Considering. ABC is being considered and implementation is possible, but implementation has not been approved. (C) Considered then rejected. ABC

Table2.1 Comparison of Cooper and Zmud (1990) Implementation Model and ABC Implementation Model (Kip, 1998)

	Cooper and Zmud (1990)	ABC Implementation model
	from either organizational need (pull), technological innovation (push), or both. Product: A match is found between an IT solution and its application in the organization.	has been considered (not implemented) but was later rejected as a cost assignment method.
Adoption	Process: Rational and political negotiations ensue to get organizational backing for implementation of the IT application. Product: A decision is reached to invest resources necessary to accommodate the implementation effort.	(D) Approved for implementation. Approval has been granted to implement ABC and devote/ spend the necessary resources, but analysis has not yet begun.
Adaptation	Process: The IT application is developed, installed, and maintained. Organizational procedures are revised and developed. Organizational members are trained both in the new procedures and in the IT application. Product: The IT application is available for use in the organization.	(E) Analysis. ABC implementation team is in the process of determining project scope and objectives, collecting data and/ or analyzing activities and cost drivers. (F) Getting acceptance. Analysis is complete and ABC model has project/ implementation team support, but ABC information is not yet used outside of accounting department for decision making.

Table2.1 Comparison of Cooper and Zmud (1990) Implementation Model and ABC Implementation Model (Kip, 1998)

	Cooper and Zmud (1990)	ABC Implementation model
		(G) Implemented then abandoned. ABC was implemented and analysis performed but is not being pursued at this time.
Acceptance	Process: Organizational members are induced to commit to IT application usage. Product: The IT application is employed in organizational work.	(H) Acceptance. Occasionally used by non-accounting upper management or departments for decision making. General consensus among non-accounting departments that model provides more realistic costs. Still considered a project or model only with infrequent updates.
Routinization	Process: Usage of the IT application is encouraged as a normal activity. Product: The organization's governance systems are adjusted to account for the IT application; the IT application is no longer perceived as something out of the ordinary.	(I) Routine system. Commonly used by non-accounting upper management or departments for decision making and considered normal part of information system.
Infusion	Process: Increased organizational effectiveness is obtained by using the IT application in a more comprehensive and integrated manner to support	(J) Integrated system. ABC is used extensively and has been integrated with the primary financial system. Clear benefits can be identified, process

Table2.1 Comparison of Cooper and Zmud (1990) Implementation Model and ABC Implementation Model (Kip, 1998)

	Cooper and Zmud (1990)	ABC Implementation model
	higher level aspects of organizational work. Product: The IT application is used within the organization to its fullest potential.	performance improved, products priced better and strategic/ operating decisions improved.

User Attitude and Behavior Some studies showed that managers are often unwilling to use a new system even though the use of new system can help them work more productively (Alavi and Hendersen, 1981; Swanson, 1974). Previous research revealed that user attitude and the Intention to Use a New System are the critical factors that decide user acceptance of a new Information System (i.e. Fuerst and Cheney, 1982; Ginzberg, 1981; Baroudi, Ives and Olson, 1983). According to user attitude and behavior theories such as Fishbein and Ajzen (1975)' Theory of Reasoned Action (TRA here after) and Davis (1989)'s the Technology of Acceptance Model (TAM here after), user adoption and usage behaviors are determined by attitude toward a new system, and the intention to use a new system is determined by belief.

Fishbein and Ajzen (1975)'s TRA suggested that consciously intended behaviors are determined by a person's behavioral intention to perform that behavior, which is jointly determined by the person attitude and subjective norm concerning that behavior. Further, Davis (1989)'s TAM was adapted the generic Fishbein and Ajzen (1975)' TRA model to the particular domain of user acceptance of new system, which use to predict intention to use a word processing package.

From TRA and TAM model, there are critical factors affecting the adoption of a new system. First, user attitude toward a new system is users' perception toward the characteristics of features of the technological object. This attitude towards a new system can be used in term of favorability or unfavorability, liking or disliking, or

pleasantness or unpleasantness. Second, intention to use is the other critical factor affecting the adoption of a new system. In order to influence an intention or user behavior, it is necessary to change the fundamental beliefs of the users.

Factors Affecting Information Systems Implementation

Since there are several factors that affect the formation of users' beliefs and attitudes, it is important to understand the factors that positively influence user attitude and the intention to use a new system.

User Participation User Participation has long been considered as a key variable in the successful development of information systems (Barki and Hartwick, 1994; de Lancer Julnes, 2000; Wholey, 1999, 2000). Ives and Olson (1984) concluded that User Participation influenced key criterion such as system quality, user satisfaction, and use of a new system. Other researchers (Connor, 1992; Locke and Schweiger, 1979; Miller and Monge, 1986; Sagie, 1994; Scully, Kirkpatrick and Locke, 1995) also found that participation improved user attitude and increased their organizational commitment and job satisfaction.

An organization tends to increase User Participation because it seems to create a sense of self-esteem or perceived control in uncertain situations such as in the installation of the new technology (Ajzen, 1988). Furthermore, participation in the design of performance measurement systems is also an important determinant to the effective communication strategy. In order to successfully implement a new software application, De Lancer Julnes (2000) suggested that users (including management and non-management level), responsible units, and performance measurement experts should work together during the development period.

User Involvement User Involvement is another key variable in the successful development of information systems (Lucus, 1981; Barki and Hartwick, 1994; Bailey and Pearson, 1983, Baroudi, Ives and Olson, 1986). The study of Baroudi, Ives

and Olson (1986) showed that User Involvement in the development of information systems would enhance both system usage and the users' satisfaction.

In the system development context, Barki and Hartwick (1994) suggested that the term User Involvement should be used to describe a subjective psychological state reflecting the importance and personal relevance that related to user, for example, how good or bad the system was perceived to be in a theoretical model of User Participation and Involvement.

Management Support Some studies (Kwon and Zmud, 1987; Lucus, 1981) identified Management Support as an important factor that influences the success of a system. Based on Technology Acceptance Model (TAM), Davis (1989) proposed that organizational support affects perceived usefulness and perceived ease of use, which is User Attitude Toward the ABSC in this study. Igbaria (1997) added that to create a more conductive environment for information system success, Management Support could ensure a sufficient allocation of resources and act as a change agent. In this study, Management Support will measure any kind of supports from top management that user perceived concerning the management agreement and the allocation of resources.

Effective Training Some studies (Leonard-Barton and Deschamps, 1988; Bikson, 1987; Gattiker, 1992) identified Effective Training as an important factor that influences the success of a system. They concluded that the Effective Training is positively related to use of new information technology. Based on Davis (1989)'s Technology Acceptance Model (TAM), Effective Training influenced user acceptance and perceived usefulness, which is User Attitude Toward the ABSC in this study.

Klientop (1994) suggested that the Effective Training might directly affect user attitude towards the information technology by making them voluntarily and persistently use the new technology. In other hand, the information system implementation can be failure because there were lack of relevant and satisfactory education/ training programs provided for end users (Sang, Yeong and Jaejung, 1995).

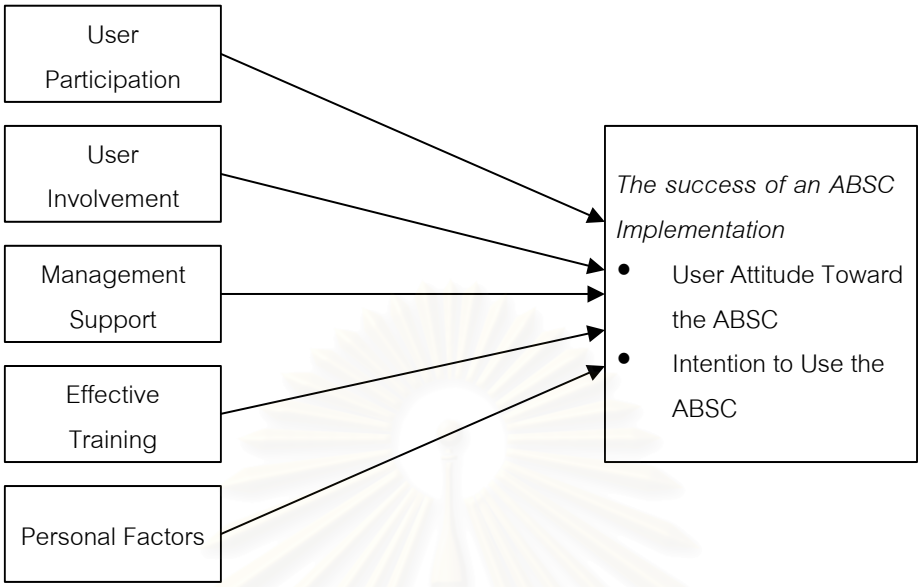
In this study, the purpose of the Effective Training is to emphasize the trainers the benefits of its usage.

Personal Factors Some studies (Fuerst and Cheney, 1982; Yaverbaum, 1988) identified Personal Factors as another key variable in the successful development of information systems. They concluded that Personal Factors or Individual's demographic data such as age, gender, education, job tenure and experience affected the training are contributed to user's attitude in system implementation. Igbaria (1993) added that age, education level, and gender, affect employee attitudes learning to turnover's intentions. Ali, David and Gupta (1996) studied the Personal Factors such as gender, educational background, level of computer literacy, year of computer experience, and level of expertise in using the appraise the software packages as a critical factors to software adoption. Gattiker (1992) supported that the previous knowledge and education will affect the intention to use a new system. Thus, these personal factors increase individual perception and behavior to understand and use a new system in performing one's task.

Conceptual Framework

The conceptual model was developed through the review of the relevant literatures as presented in Figure 2.1. Based on the prior studies, it was suggested that User Participation, User Involvement, Management Support, Effective Training, and Personal Factors influence the success of an ABSC implementation. A case study of the ABSC implementation in a Petrochemical industry would be analyzed to determined how the basic concepts and philosophy of the IS implementation framework can be applied to the ABSC implementation.

Figure 2.1 Conceptual Model



Chapter III

NPC: The challenges of the Balanced Scorecard Implementation

Company's background

National Petrochemical Public Company Limited or NPC was established on February 23, 1984 to carry out Thailand's first upstream petrochemical plant located in the Eastern Seaboard Development area at Map Ta Phut Industrial Estate in Rayong. The construction of the olefins plant started in 1986 and the commercial operation began in February 1992. NPC became a publicly listed company in the Stock Exchange of Thailand on February 8, 1994. It was established as a joint venture between PTT Plc., which holds 38%, and its down stream customers, including Siam Cement Plc. holding 22%.

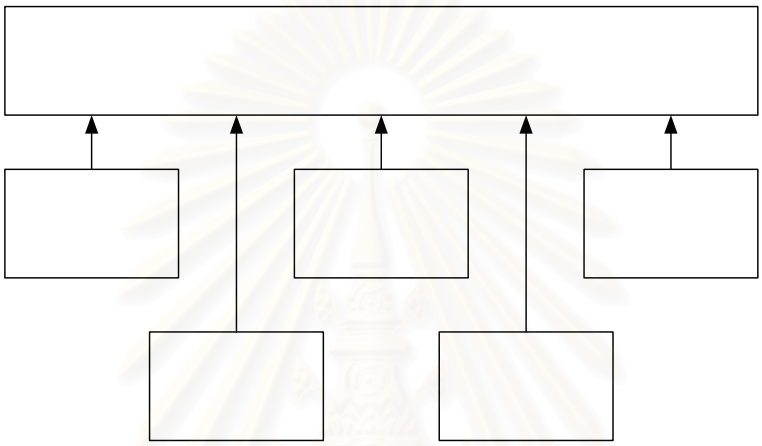
The company's business is the production and distribution of ethylene and propylene, which are olefins. In addition, NPC also produces water, steam, and electricity, and provides waste water management services both for its own olefins plant and for other downstream petrochemical plants at the Map Ta Phut Industrial Estate. The company has a number of other businesses including the operation of jetty and storage facilities for handing and storing olefins and other chemical products and providing technical services in relation to olefins production, safety, environment and other related matters. (see NPC's sources of income in Figure 3.1). Ethylene was sold to local downstream petrochemical producers and exported principally to Indonesia, Singapore and Philippines. Similar to Ethylene, propylene was sold locally and exported to China, Indonesia, and Philippines. In addition to olefins, NPC also carries out some additional businesses as follows:

1. Loading/unloading and storage services of chemical products for petrochemical downstream companies.

2. Construction and management of liquid bulk terminal and environmental management, services in plant support, legal affairs, and laboratory.

3. Training service in olefins production, safety and environmental management, services in plant support, legal affairs, and laboratory.

Figure 3.1 NPC's sources of income

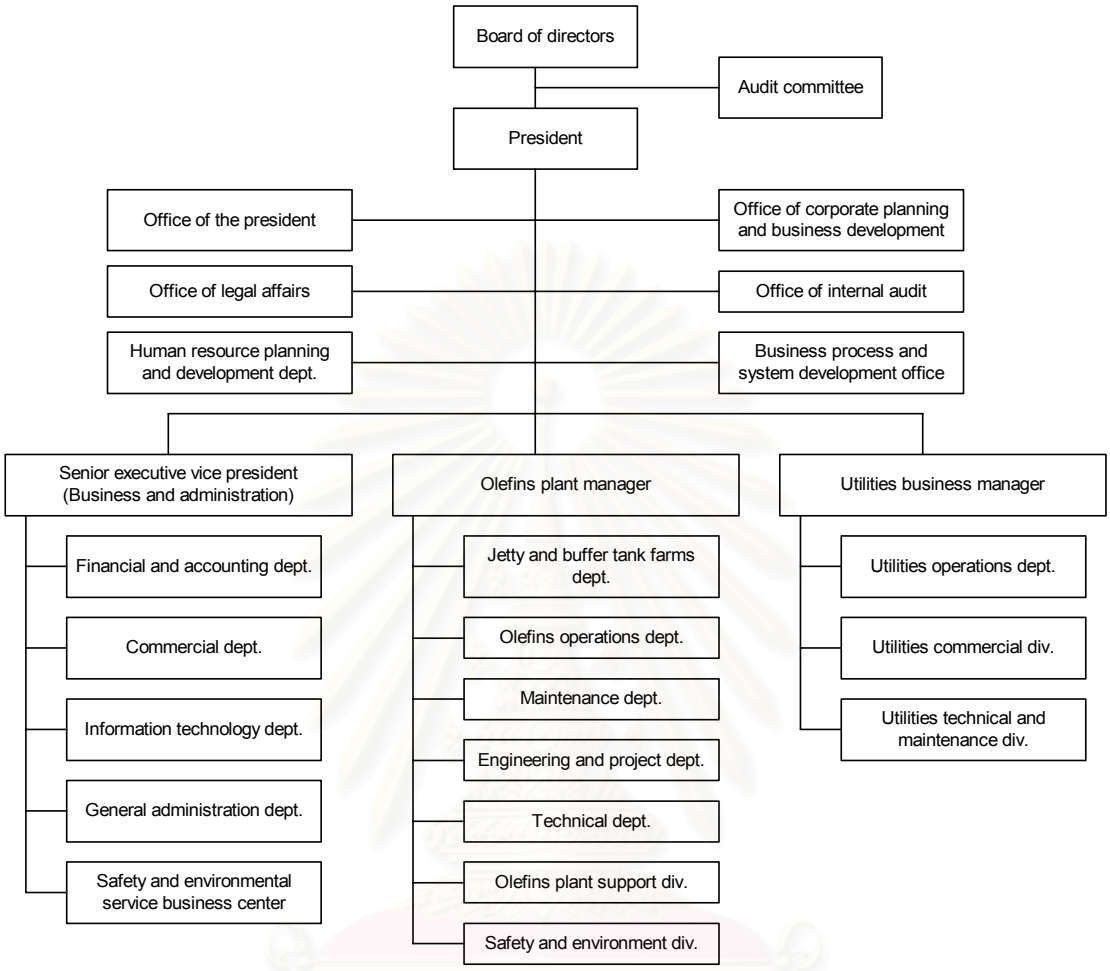


Sources: Consolidated Financial Statements for the year ended December 31, 2001

NPC's management

From the NPC's management chart (see NPC's management chart in Figure 3.2), the structure was appeared in three business unit such as business and administration, olefins plant, utilities business. There also were six independent offices supporting under the president.

Figure 3.2 NPC's Management chart



Source: http://www.npc.co.th

Board of directors

The board of directors has the authoritative obligation and responsibility to operate the business in compliance with the law, the company's objectives, the articles of association and the resolutions made at Shareholders' Meeting with a strong commitment to a practice of honesty, straight-forwardness and carefulness towards a maximum extent of effort to maintain the company's interest. In addition, the board is engaged in setting the company's policies and directions as well as ensuring that the management complies with the company's policies. Moreover, the board has decision-

making authority and also complies with decision taken at shareholders' meeting, as required by law.

Audit Committee

The Audit Committee takes action by the assignment from the board of directors, in compliance with rules and regulations of the Stock Exchange of Thailand. The committee's responsibilities focus on taking a review on the company's operational behaviors in order to ensure the sufficient and correct disclosure of the company's financial report, to ensure the effectiveness of the company's internal control and auditing system, and to ensure that the company follows the laws governing securities and stock exchange, the rules and regulations of the Stock Exchange of Thailand and any other laws relevant to business of the company.

President

The President is appointed and empowered by the board of directors to have authority to act for them in any or every affairs concerning to the company's business as stated in the Power of Attorney. In addition to requisite knowledge, skills and experience, the President must be able to work collectively with shareholders and protect the company's interests. His managerial behaviors must conform to the policies set by the board of directors, and, by his position the president has a duty to serve as the secretary to the board of directors.

Senior executive vice president

Under the direction of the board of directors, the senior executive vice president provides assistance to the president relating to business and administration policy. This business unit consists of five direct administrative support services such as financial and accounting, commercial, information technology, general administration, and safety and environmental service business center.

Olefins plant manager

The olefins plant manager provides assistance to the president relating to olefins plant under the direction of the board of directors. The main products of this business unit are olefins. The business unit consists of seven direct administrative support services such as Jetty and buffer tank farm, olefins operations, maintenance, engineering and project, technical, olefins plant, and safety and environment.

Utilities business manager

Under the direction of the board of directors, the utilities business manager provides assistance to the president relating to utilities business such as operation management, pricing strategy. The business unit consists of three direct administrative support services such as utilities operations, utilities commercial, and utilities technical and maintenance.

Other businesses

Under the direction of the board of directors, there are other businesses provide assistance to the president. These businesses consist of six direct administrative support services such as office of the president, office of legal affairs, human resource planning and development, office of internal audit, office of corporate planning and business development, and business process and system development office.

NPC's transition to performance management

As the competitors and customers are faster and more aggressive, managing only the financial performance is not enough. NPC has recognized human resources and information system as key factors that complimentarily support the management to highly achieved competitive advantages lying behind the strong commitment to the company's vision, mission and strategy.

NPC began implementing the Total Quality Management (TQM) in 1991, and since that time, it had made a number of significant improvements every year. All employees were required to attend training on basic quality development. The training emphasized the importance of meeting customers' satisfaction, controlling costs while still ensuring quality, and doing things right the first time, maintaining personal standards of excellence, and improving their performance continuously.

When it came to the performance appraisal system, NPC evaluated several possible new management models. Some of the executive members had taken the Advance management program in Harvard business school, Harvard University, U.S.A. They learned the balanced scorecard with Professor Kaplan, the originator of the balanced scorecard. They decided that a new approach to the performance management system by the way of employing balanced scorecard had the highest potential to simplify performance management and help the company distill its strategy into clear perspectives and focused performance indicators.

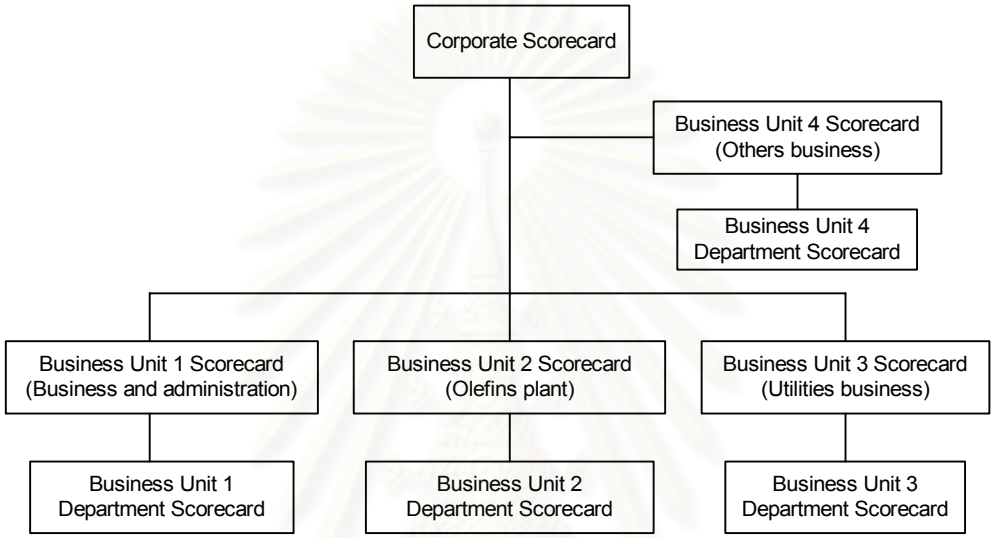
In 2001 NPC had implemented the key performance indicators and the balanced scorecard. A goal of the balanced scorecard was being created to monitor not only in financial perspective but also in non-financial perspectives by giving top priority to customer satisfaction, business process performance and employee's competency development. In order to manage its strategies effectively, NPC had requested the performance management experts to organize and re-design the key performance indicators.

Building the scorecard

The management chart of NPC led to the design and introduction of nine corresponding scorecards for this ABSC implementation: one corporate scorecard, four business unit scorecards and four department scorecards (See the scorecard chart in Figure 3.3). KPIs and BSC, which went into operation in the middle of 2001, had been used to evaluate organizational performance since the beginning of 2002. Managers

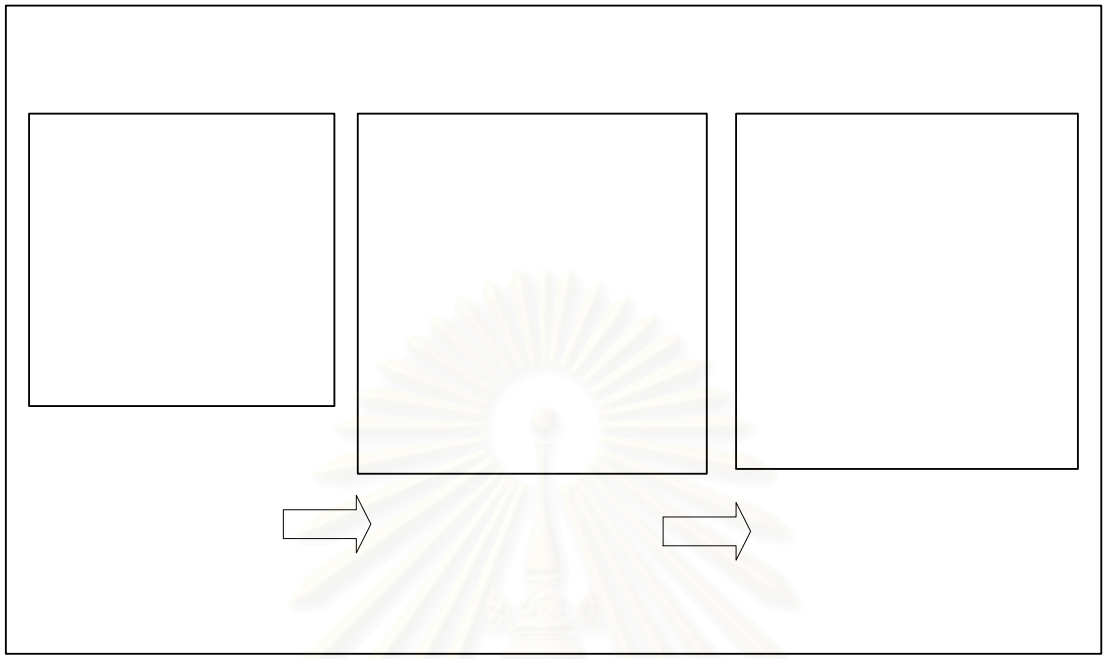
had been assigned to monitor individual indicators to ensure continuing improvement. These would complement other measures NPC had adopted to modernize management structures and boost its potential for successfully competing in regional and international markets over the long term.

Figure 3.3 NPC's Scorecard chart



During the balanced scorecard building process, there were several discussions between a scorecard team, a steering committee, and external consultants to confirm the strategy (See linkage to corporate strategy in Figure 3.4). A series of workshops were conducted to set balanced scorecard measures and targets that would monitor the achievement of the performance management. This process led to a greater understanding within the steering committee and project team of the scale of activity, and protected the suspicious among the management that the balanced scorecard was "just another management model".

Figure 3.4 Linkage to corporate strategy



Software application

With regard to the documentation of the Balanced Scorecard, and the reporting of measurement data, the Gentia Renaissance Balanced Scorecard (the Gentia hereafter), certified by Balanced Scorecard Collaborative, Inc., was selected. It was used to inform both strategic and operational measurement, evaluate the performance of each user and division as well as the company as a whole, and review discussions between a unit and the management's team.

The implementation of ABSC in this study aimed to put the balanced scorecard concepts into the information system. Since there was no a built-in measurement data warehouse, the measurement data must be key-in directly to the application by the data collection team.

Vision

NPC is a dynamic organization that always grows competitively in petrochemical industry wi prime concern in quality development, safety, occupational health and environmental care.

The balanced scorecard routinization

After the ABSC was developed, installed, and maintained, users were required to attend training both on-the-job training and off-the-job training in the new procedures and how to use the ABSC itself. From the training, users could develop the understanding of the ABSC and use it efficiently. Users were induced to commit to its usage and encouraged as a normal activity. For example, the ABSC served as the agenda for the steering committee's monthly meetings. At every meeting, the management must have the balanced scorecard prepared and be able to back up their opinions. The scorecard also published on the NPC's intranet, only ABSC users could log in, and was communicated through the assessments and comments.

Looking toward the future, the management would like to make its balanced scorecard even more accessible internally and cascade, if possible, to the operational personal scorecard within 1-2 years after the implementation. In addition, the link between performance and reward would be made with competencies and a simple incentive matrix to make the balanced scorecard more powerful.

The case study of NPC provided the qualitative data to explain the ABSC implementation. To better understanding in the ABSC implementation, a quantitative analysis followed the information system implementation framework was helped to emphasize its implementation. The hypotheses of the study were presented in the next chapter.

Chapter IV

Hypotheses

Empirical evidence has shown a number of factors that affect the success or failure of the new system implementation (Davis,1989; Delone and McLean, 1992). In this chapter, five critical factors are hypothesized as related to the implementation of the ABSC in a petrochemical company in Thailand. These factors are User Participation, User Involvement, Management Support, Effective Training, and Personal Factors, which influence User Attitude Toward the ABSC and the Intention to Use the ABSC.

User Participation

The User Participation is a way to ensure that the systems developed are used (Barki and Hartwick, 1994; de Lancer Julnes, 2000; Wholey, 1999, 2000). From the reviewed literature, participation has positively affected user attitude and increases their organizational commitment and job satisfaction.

H1a: The level of the User Participation is positively related to the level of User Attitude toward the ABSC.

H1b: The level of the User Participation is positively related to the level of User's Intention to Use the ABSC.

User Involvement

Barki and Hartwick (1994) concluded that involvement reflected an individual's beliefs or concerns about an object and user involvement was related to user attitude by means of how good or bad the system was perceived.

H2a: The level of the User Involvement is positively related to the level of User Attitude toward the ABSC.

H2b: The level of the User Involvement is positively related to the level of the User's Intention to Use the ABSC.

Management Support

As mentioned before, Management Support is a key variable to Information System implementation success (Churchman and Schainblatt, 1965, Davis, 1989). Especially the ABSC which is a strategic management system, Management Support has been highlighted as one of the important variables in the implementation of the ABSC (Scheiderman, 1999).

H3a: The level of the Management Support is positively related to the level of User Attitude toward the ABSC.

H3b: The level of the Management Support is positively related to the level of the User's Intention to Use the ABSC.

Effective Training

Effective Training is positively related to the usage of the new information system. Training significantly increases procedural knowledge, which affects perceived ease of use, perceived usefulness, and the usage frequency. In this study, Effective Training is proposed to be one of the variables that have a significant impact on User Attitude Toward the ABSC and the Intention to Use the ABSC.

H4a: The level of the Effective Training is positively related to the level of User Attitude Toward the ABSC.

H4b: The level of the Effective Training is positively related to the level of the User's Intention to Use the ABSC.

Personal Factors

Personal Factors are demographic data or background of the users. From literatures, Personal Factors have been found to affect success of IS implementation (Kraemer and Pinsonneault, 1990; Gattiker, 1992; Igbaria, 1993). Dalton and Thompson (1971) found that as a group the performance of engineers first increases with age and experience, performance then peaks in the mid to late thirties, performance declines slowly during the forties, and then more rapidly for professionals fifty. McDonald (1999) also examined the relationship between age and learning motivation of adults. Profiles of adults who participate in continuing education suggest the typical participant is younger, better educated, employed full-time, and involved in professional or technology-based occupations. The previous literature suggests that age, gender, education, job tenure and prior experience with computer could be important factors that affect User Attitudes Toward the ABSC and Intention to Use the ABSC.

Age

H5a: Age is related to the level of the User Attitude Toward the ABSC.

H5b: Age is related to the level of the User's Intention to Use the ABSC.

Gender

H6a: Gender is positively related to the level of the User Attitude Toward the ABSC.

H6b: Gender is positively related to the level of the User's Intention to Use the ABSC.

Education Level

H7a: The level of the education is positively related to the level of the User Attitude Toward the ABSC.

H7b: The level of the education is positively related to the level of the User's Intention to Use the ABSC.

Job Tenure

H8a: The level of the job tenure is positively related to the level of the User Attitude Toward the ABSC.

H8b: The level of the job tenure is positively related to the level of the User's Intention to Use the ABSC.

Prior Experience with Computer

H9a: The level of the prior experience with computer is positively related to the level of the User Attitude Toward the ABSC.

H9b: The level of the prior experience with computer is positively related to the level of the User's Intention to Use the ABSC.

In this study, these proposed factors such as User Participation, User Involvement, Management Support, Effective Training, and Personal Factors, have been found in literatures to have significant impact on User Attitude Toward the ABSC and their Intention to Use that system. To test whether these factors support the hypotheses, the researcher followed the methodology, which was explained in the next chapter.

Chapter V

Methodology

This chapter explored the methodology to examine the relationships between the five factors and the users' attitudes and intentions to use the new system within a single organization, the National Petrochemical Public Company Limited (NPC hereafter). Both detailed qualitative data through in-depth interviews and quantitative data collected via questionnaire method were employed. The research methods included the discussion of the populations and sample, followed by a questionnaire development, a data collection process and a brief review of the statistical methods used.

Populations

This study aimed to explore the factors correlating user's attitude and intention to use the ABSC. The populations were all users in the companies that had implemented the ABSC. These users were the executives whose main responsibilities were to use the ABSC in their performance management, and also the expert executives who would not only use the systems themselves but also facilitate and maintain the balanced scorecard design. The ABSC implementation was focused on the corporate level and cascaded to business unit level and department level respectively.

Sampling Units

Due to the specific characters of the organization, such as cultures, politics, technological needs, and level of the scorecard technological development, only one company, NPC, was selected from the listed company in the Stock Exchange of Thailand (SET). The selection of NPC was justified for its reputation in the petrochemical industry in Thailand. Also, NPC was the only company in the chemical

industry that used software package to implement the balanced scorecard. Since it had just implemented the ABSC from corporate level to department level, all relevant information to answer the study's research question was available.

Since ABSC at NPC was implemented at the high level of the organization, the end-users were all top twenty-three executives who are accountable for the performance measures of the firm. They can use the information directly to evaluate the performance from ABSC or from the document produced by this ABSC.

Questionnaire Development

Variables

The questionnaire development was prepared to explore the variables that correlate the success/ failure of an ABSC implementation that would provide a solid foundation for further empirical investigation into the impact of these factors on the ABSC implementation. Variables in the questionnaire were derived from the conceptual model. These variables might have an influence on the User Attitude Toward the ABSC and on the Intention to Use the ABSC. Measurements of all variables were adapted from the reviewed literatures. See Summary of variables in Table 5.1.

Table 5.1 Summary of variables

Explanatory Variables
1. User Participation
1.1. Responsibility
1.2. User-Information System relationship
1.3. Hands-on Activities
2. User Involvement
2.1. Importance
2.2. Personal Relevance

Table 5.1 Summary of variables (cont.)

3. Management Support 3.1. Management Encouragement 3.2. Allocation of Resources 4. Effective Training 5. Personal Factors 5.1. Age 5.2. Gender 5.3. Education Level 5.4. Job tenure 5.5. Work experience with computer
Dependent Variables 1. User Attitude Toward the ABSC 2. Intention to Use the ABSC

Explanatory variables Five variables were identified in the literature to possibly influence the success and failure of a new automated performance measurement system. The questionnaire instrument was developed from the construct of each individual variable as follows:

1. User Participation. The underlying construct used to measure User Participation was developed based on Barki and Hartwick (1994)'s concept. The measurements were included responsibility, user- information system relationship, and hands-on activities (Barki and Hartwick, 1994).

   1.1 Responsibility was referred to managerial assignments or activities that are typically performed by the project leader or manager.

   1.2 User-Information System relationship was the relationship that involved the participation between the users and the Information System, staff.

1.3 Hands-on activities were reflected by hands-on systems development activities that a user personally performs.

Yes/ no questions were used for the User Participation (Barki and Hartwick, 1994). Barki and Hartwick (1994) explained that there were two fundamental reasons for a separation in a yes/no question not a Likert scale measurement. First, many participation items were, by nature, two parts such as whether or not and how much each user views his/her participation in the ABSC implementation. Second, participation was conceptualized as having taken part in or having done things, which was different from participation viewed as frequency (i.e. the number of time one performs a given activity), effort (i.e. the time or energy invested in a given activity), or influence (i.e. the effect of a given activity). The questions of User Participation asked the person to look back and think about the activities he/she had performed. The correlation between each item of the user participation in the Barki and Hartwick's (1994) study ranges from 0.26 to 0.71 were found to correlated significantly ($p<.01$). The cronbach alphas for the scale were found to be 0.89.

2. User Involvement. The concept of involvement has significantly influenced work in the fields of social psychology, customer behavior, and management behavior. The underlying construct used to measure User Involvement was developed from Barki and Hartwick's (1994) concept. Barki and Hartwick (1994) developed two measures, the importance of involvement and personal relevancy, from Zaichowsky's (1985) instrument. These two measures were evaluated using a five-point Likert scale measurement ranging from 1 meaning strongly disagree to 5 meaning strongly agree. In the Barki and Hartwick's (1994) study, correlations between each of the scale items and the scale totals were found to be significant ($p<.001$), with correlations ranging from 0.67 to 0.82 for involvement. Cronbach alpha was 0.93.

3. Management Support. Management Support measured users' perception on the use of ABSC of the management agreement and the allocation of resources. The questionnaires were adapted from Igbaria (1990) using a five-point Likert scale

measurement ranging from 1 meaning strongly disagree to 5 meaning strongly agree. The internal consistency reliability of Management Support in her study was 0.92 in her study. The composite reliabilities of the different measures included the model range from .81 to .94, which exceed the recommended values in Nunnally's guidelines.

4. Effective Training. Since there were trainings from software vendor during and after the implementation process, the researcher would check whether the respondents had participated in the training class or not by using one yes/no question. To check effectiveness of training, the respondents were asked about their perception on the benefits of training using a five-point Likert scale measurement ranging from 1 meaning strongly disagree to 5 meaning strongly agree. The instrument used to measure this variable influencing the implementation of an ABSC developed by Soegiharto (2001). The reliability of this instrument ranged from .76 to .91.

5. Personal Factors. The respondents were asked about their age, gender, education, time on job, and experience. These data were expected to have direct effect with user attitude and the intention to use an ABSC.

Dependent variables Five-point Likert scales measurement ranging from 1 meaning strongly disagree to 5 meaning strongly agree were used for User Attitude Toward the ABSC and the Intention to Use that system.

1. User Attitude Toward the ABSC. The questions concerning user attitude toward the characteristics of new system were asked such as data accuracy, system effectiveness, adequacy, and productivity. One example is "Do you agree that the Gentia Balanced Scorecard helps your work easier?". The success of the implementation depended on how useful and user-friendly the system is in the eyes of the users. The instrument used to measure this variable influencing the implementation of an ABSC developed by Soegiharto (2001) that all reliabilities of his instrument were above 0.77.

2. Intention to Use the ABSC. For the Intention to Use the ABSC, the research question were asked “How often will you intend to use Gentia Balanced Scorecard as a performance management tools?” and “Are you willing to use Gentia Balanced Scorecard in the future?”. The implementation would be successful when users have an Intention to Use a New System. The instrument used to measure this variable influencing the implementation of the ABSC was developed by Soegiharto (2001).

Reliability and validity

As suggested by Churchill (1995), every multiple-item measure was subjected to a purification process. The purification process involved eliminating items that confused respondents and items that did not discriminate between subjects and fundamentally different positions on the construct. In this study, the purification of measures was to assess the reliability and the validity of the proposed measures. The reliability could tell “how consistent we are measuring whatever we are measuring”. The validity of a measure was concerned with “whether we are measuring what we say we are measuring” (Jerry, 2000).

Before the questionnaires were sent to NPC’s respondents, three pre-tests and one pilot test had been conducted. To pre-test, the questionnaires were checked for the appropriate length of the instruments, the format of the scales, construct validity, and reliability several times by face-to-face interview with academicians and colleagues in related field for the understanding of all questions. The researcher also assessed the content of the questionnaires with help from a group of managers who worked in the oil and gas industry, which was in the same field of the selected company. These managers were recruited since they were attending the BSC lectures in mini-MBA class.

To pilot test the instruments, questionnaires were sent to ABSC users in the Greensville Co., Ltd, Bangkok, Thailand. The reason for choosing this company was because the company had just implemented the same ABSC, the Gentia balanced scorecard software application, as the NPC. This pilot test resulted in additional

modification of a few question items so as to enhance the quality of responses and focus more on specific constructs.

After the pre-test and the pilot test, the actual data from NPC was collected. The reliability test or the internal consistency of all measures in this study, items were analyzed with coefficients alpha (Cronbach's alpha) for all multi-item scale measures. The alpha coefficients range from –1.00 to +1.00. Table 5.2 showed the results of Cronbach alpha test for the actual survey. In present study, the alpha coefficients of almost all constructs were over 0.7, as suggested by Nunnally (1981) to exhibit a satisfied level of multi-item reliability. The alpha value of User-Information System Relationship was 0.6776 which is very close to 0.7.

Table 5.2 Reliability of measurement

Scale item (N = 23)	Scale reliability (Cronbach's α)
User Participation	0.8498
Responsibility	0.7605
User-Information System relationship	0.6776
Hands-on Activities	0.7233
User Involvement	0.9337
Importance	0.9255
Personal Relevance	0.8569
Management Support	0.9218
Management Encouragement	0.9359
Allocation of Resources	0.8282
User Attitude Toward the ABSC	0.8701
Intention to Use the ABSC	0.7361

According to Aera et al. (1985), when a measure is expressed in term of multiple items of an instrument, factor analysis should be used to assess construct validity. In this study, the component analysis technique was first used to test the validity by extracting a set of eigenvectors and their associated eigenvalues by a step-wise

procedure. Furthermore, factor loading was used to describe how well each item correlates with, or “loads onto” the factor. Generally, the higher the factor loading, the better an items loads onto the factor that is, the closer the association between the latent variable and the individual item. Kim and Mueller (1990) said that when an item's factor loading is below approximately 0.3, the item does not load onto the factor. The results from factor analysis were presented in Appendix 5.

Survey Administration

The main data collection methods were done through questionnaires and in-depth interviews with the company’s top executives. The measure development began with a literature review and field interviews with top executives. To minimize any language barrier to the respondents, the questionnaires were translated into Thai. Most of interviewees agreed that balanced scorecard is a performance management system, which enable them to drive strategies and to translate them into objectives and subsequence course of actions. They bought in the concept of the balanced scorecard then they implemented the ABSC to maximize the efficiency of their scorecards.

Twenty-four questionnaires were sent to the office of corporate planning and business development. The officer in this department helped the researcher distribute the questionnaires to the ABSC users. The follow-up phone calls were done in a week after the initial questionnaires launching. The responses were validated for any inconsistency and reliability among answers to different questions. If there was any disparity, the respondents were contacted by telephone for clarification.

Twenty-three questionnaires were returned. One potential respondent had already resigned and another one is just to provide more than one’s need in order to the surplus. This total number of completed questionnaires was twenty-three or a full hundred percent of response rate. The in-depth interviews were done in two weeks after the initial questionnaires launching with the executives and the result was used during

the data analysis. The interview questions covered all areas or the factors correlating the success or failure of the ABSC implementation.

Analysis Framework

Operationalization

This research operationalized the factors that had relationships on the success or failure of the ABSC implementation as User Participation, User Involvement, Management Support, Effective Training, and Personal Factors. The implementation success or failure was determined by the users' attitudes toward the ABSC and their intention to use this system as planned. The measurement procedures for creating each variable used simple equations.

For the characteristic of User Participation was yes/ no answers (scalar 1 and 0), the summation was used to represent the total level of user participation. In the sense of User Involvement, Management Support, Effective Training, User Attitude Toward the ABSC, and Intention to Use the ABSC, each item was Likert scale, ranging from 1 to 5. The mean was used to measures the central tendency. For Personal Factors were nominal scale, identifying or assigning numbers to a nominal scale such as age, gender, educational level, do not retain meaning when subjected to mathematics manipulation. Therefore, each item was tested individually.

Before analyzing the relationship of the variables, the normality tests were required to test the representative subjects and equating raw scores with equivalent scores. From the result in Table 5.3, the normality tests indicated that User Involvement, Work Experience with Computer and User Attitude Toward the ABSC had normal distributions. Thus, these variables could use the parametric tests. However, after testing these variables using Pearson's r (see Table A-10 in Appendix 5) and comparing with non-parametric tests such as Kendall's Tau-b, the results indicated the same significant correlation (see Table 5-4). Hence, non-parametric tests were employed to estimate and test the relationship between the dependent and explanatory

variables, as they did not necessarily involve the inferences about population parameters even though they had less power than parametric tests.

Table 5.3 Normality Tests

(N = 23)	Kolmogorov-Smirnov[a]		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
User Participation	.257	.000	.878	.009
User Involvement	.143[c]	.200	.932[c]	.123
Management Support	.174[c]	.069	.877	.009
Effective Training[b]	.338	.000	.744	.000
Personal Factors				
Age	.190	.030	.918[c]	.059
Gender	.532	.000	.324	.000
Education Level	.347	.000	.639	.000
Job Tenure	.193	.032	.893	.021
Work Experience with Computer	.153[c]	.200	.946[c]	.336
User Attitude Toward the ABSC	.138[c]	.200	.971[c]	.724
Intention to Use the ABSC	.188	.035	.908	.037

a Lilliefors Significance Correction.

b n = 19.

c Normal Distribution at the .05 level (2-tailed).

Most non-parametric methods use the relative ranks of the sample observations, rather than their actual numerical values (McClave, Benson and Sincich, 1998). The two most frequently encountered measures of association between variables measure on an ordinal scale are Spearman's rank correlation and Kendall's Tau-b. In this study, correlation analysis between variables used Kendall rank-order correlation coefficient, symbolized as τ. One advantage of τ over Spearman's rank correlation (ρ_s) is that τ showed the more reliable and accurate *P*-values (Daniel, 1978). As Sidney and John (1988) put it, the differences between the essential features of the Kendall Tau-b and typical correlation coefficient are the correlation that can assume any value between –1 and +1. The sign of the correlation reflects the direction of the correlation. Whereas τ reflects the amount of shared variance between X and Y. Tests of significance can be

directional or non-directional, and when testing the statistical significance of τ, the null hypothesis is usually $\tau = 0$.

Nonetheless, there are also limitations to the use of the rank-order correlation coefficient. For example, when the ordinal or nominal data are used, any count or measurement data that are available maybe ignored and wasted (Sanders, 1995). Thus, the rank-order correlation coefficient such as Kendall Tau-b was not appropriate to test the relationships among the variables such as demographic data. Focusing on techniques that could be used for counting data items, the Chi square helped to test the statistical significance for bivariate tabular analysis.

Chi square is a rough estimate of confidence; it accepts weaker, less accurate data as input than parametric tests (like t-tests and analysis of variance, for example) and therefore has less status in the statistical tests (Connor-Linton, 1998). Nonetheless, its limitations are also its strengths; because Chi square is less limitation with the data it accepts, it can be used in a wide variety of research contexts. Chi square is used most frequently to test the statistical significance of results reported in bivariate tables. These tables are at the intersection of rows and columns. The rows represent one classification category, and the columns represent another such category.

The study treated User Participation, User Involvement, Management Support, Effective Training and Personal Factors as five the explanatory variables, and treated User Attitude Toward the ABSC and the Intention to Use it as two dependent variables. Kendall Tau-b was used to analyze the relationship between User Involvement, Management Support, and Effective Training and User Attitude Toward the ABSC and the Intention to Use the ABSC. On the other hand, Chi Square was used to analyze the relationship between Personal Factors and User Attitude Toward the ABSC and the Intention to Use this system. Participants in each item were grouped into 3 brackets, which were the smallest brackets to collect a large number of users in each category. SPSS 11 was used for data analysis. Results from the study were presented in the next chapter.

Chapter VI

Results

This chapter reported the results of the data analysis in two sections. First, raw data collected from the questionnaire were analyzed using descriptive statistics. Second, Kendall's Tau-b and Chi square were examined to answer the main research question -- "What factors influenced the success or failure of implementing an Automated Balanced Scorecard System (ABSC)?".

Descriptive Analysis

This section reported the demographic data of the respondents and discussed statistical descriptions of the study's key variables. Certain statistics were also given.

Participant's Demographics

Since top executives were the focus of this study, their profiles were shown in Table 5.1. Over half of the respondents (56.5%) were between forty-one to fifty years old. Only two persons were younger than thirty-five years old. They were the ABSC users who were commonly referred to as having a high-level career age profiles. The majority of them were male (91.3%). There were only two females in this case.

Respondents had the minimum of a bachelor degree. There was a half-and-half split between those completing undergraduate and graduate level. Almost half of the respondents (47.8%) had worked in their current position for less than three years. All of the respondents had worked with computers and the longest period a respondent worked with computers is 30 years.

Table 6.1 Participant's Demographic

Items		# of respondents (n=23)	Percent (%)
Age (years)	< 30	1	4.3
	31-35	1	4.3
	36-40	4	17.4
	41-45	6	26.1
	45-50	7	30.4
	> 50	4	17.4
Gender	Female	2	8.7
	Male	21	91.3
Education Level	Diploma or below	0	0
	Undergraduate	11	47.8
	Graduated	12	52.2
Job Tenure (years)	< 3	11	47.8
	3 - 6	7	30.4
	> 6	5	21.7
Work Experience with Computer	< 10	11	47.8
	10 - 20	10	43.5
	> 20	2	8.7

Dependent: User Attitude Toward the ABSC and Intention to Use the ABSC

Table 5.2 presents User Attitude Toward the ABSC and Intention to Use the ABSC categorized by demographic data. The results indicated that the respondents' age under 40 had positive attitude toward a new system. More than half of them (17.4%) intended to use the ABSC. For respondents' aged between 41 to 50, half of them (26.1%) had positive attitude toward the ABSC, while the other half (26.1%) had moderate feeling toward it. Slightly more than half of the respondents (30.4%) from this group also had a moderate intention to use the ABSC. Considering respondents aged more than 50 years old, while half of them (8.7%) had positive attitude and the other half (8.7%) had moderate feeling. All of them had intention to use the ABSC.

One female executive indicated that she had a strong intention to use the ABSC whereas the other had a moderate intention of its use. Most of male respondents had a positive attitude and had Intention to use the ABSC.

More than half of the respondents who had an undergraduate degree (26.1%) had positive attitude toward the ABSC, except only one had negative attitudes toward it. Slightly less than half of them (21.7%) intended to use the ABSC. There was also only one of them who was not willing to use the ABSC.

Concerning Job tenure, most respondents who were in their current position less than 3 years had positive attitude and had Intention to Use the ABSC. For respondents who had job tenure between 3-6 years, slightly less than half of them (13.0%) had positive attitude towards the ABSC and slightly more than half of them (17.4%) had intention to use it. All respondents who were in their current position for more than six years had positive attitude towards a new system. More than half of them (13.0%) had Intention to Use the ABSC, while the rest of them (8.7%) had a moderate feeling to use this system.

More than half of respondents who had been working with computer for less than ten years had positive attitude towards the ABSC (26.1%) and had intention to use it (26.1%). For those who had been working with computer between 10-20 years, most of them (34.8%) had high attitude toward the ABSC, while slightly more than a half of them (26.1%) had Intention to Use the ABSC. There were only two respondents who had been working with computer for more than 20 years. Both of them (8.7%) had moderate feeling toward the ABSC. However, one of them (4.3%) had Intention to Use the ABSC.

Table 6.2 Percentage of User Attitude Toward the ABSC and Intention to Use the ABSC

(n = 23)	Total	User Attitude Toward the ABSC *			Intention to Use the ABSC *		
		disagree	moderate	agree	disagree	moderate	agree
Age (years old)							
< 4o	26.1%	-	-	26.1%	-	8.7%	17.4%
41-50	56.5%	4.3%	26.1%	26.1%	4.3%	30.4%	21.7%
> 50	17.4%	-	8.7%	8.7%	-	-	17.4%
Gender							
Female	8.7%	-	8.7%	-	-	4.3%	4.3%
Male	91.3%	4.3%	26.1%	60.9%	4.3%	8, 34.8%	52.2%
Education Level							
Undergraduate	47.8%	4.3%	17.4%	26.1%	4.3%	21.7%	21.7%
Graduate	52.2%	-	17.4%	34.8%	-	17.4%	34.8%
Job Tenure (years)							
< 3	47.8%	4.3%	17.4%	26.1%	4.3%	17.4%	26.1%
3-6	30.4%	-	17.4%	13.0%	-	13.0%	17.4%
> 6	21.7%	-	-	21.7%	-	8.7%	13.0%
Work Experience with Computer (years)							
< 10	47.8%	4.3%	17.4%	26.1%	4.3%	17.4%	26.1%
10 - 20	43.5%	-	8.7%	34.8%	-	17.4%	26.1%
> 20	8.7%	-	8.7%	-	-	4.3%	4.3%

* The original measures in the questionnaires used a 5-scales, Strongly disagree, Disagree, Neither disagree nor agree, Agree, and Strongly agree. Due to a small number of respondents, the scales was combined into 3 categories: Strongly disagree and Disagree equal to Disagree, neither disagree nor agree equals to Neither disagree nor agree, and Strongly agree and Agree equal to Agree.

Explanatorations: User Participation, User Involvement, Management Support, and Effective Training

Table 5.3 presented User Participation and User Involvement categorized by demographic data. The results indicated that a half of the respondents' age under 40 had a moderate level of participation (8.7%). All of them (26.1%) perceived high involvement of the new system. More than a half of them (17.4%) perceived the support from management. Most of them (21.1%) perceived high benefit of the training. For respondents' age between 41 to 50, most of them had a little participation (43.5%) but perceived high involvement (43.5%), and supported from management (47.8%). Half of them (26.3%) perceived high benefit of the training. Considering respondents aged more than 50 years old, half of them (8.7%) had a moderate level of participation. However, all of them (17.4%) perceived high involvement, and supported from management (17.4%). None of them perceived low benefit of training.

For the only two females of all respondents, both of them had low level of participation. One of them perceived high involvement, high support from management and high level benefit of training, while the other perceived indifference involvement of the ABSC, indifference support from management, and moderate level benefit of training. More than a half of male respondents (47.8%) had low level of participation. However, most of male respondents perceived high involvement, high support from management, and high benefit of training.

Considering education level, more than half of respondents (30.4%) who had an undergraduate degree had low level of participation, and there was only one of them had high level of participation. More than a half of them (34.8%) perceived high involvement, high support from management. None of them perceived low benefit of training. For respondents who had a graduate degree, half of them (30.4%) had low level of participation. Only two respondents (8.7%) had high level of participation. All of them perceived good involvement. Most of them (47.8%) perceived high support from

management. Only one respondent (4.3%) had low support from management. However, none of them had low benefit of training.

Concerning Job tenure, most of respondents who were in their current position less than 3 years had low level of participation (30.4%) but perceive high involvement (39.1%) and high support from management (43.5%). None of them perceived low benefit of training. For respondents who had job tenure between 3-6 years, slight more than half of them (17.4%) had low level of participation while most of them perceived high involvement (26.1%) and high support from management (21.7%). None of them perceived low benefit of training. Only of the respondents who were in their current position for more than six years had high level of participation. Most of them perceived high involvement (21.7%), good management support (17.4%), and high benefit of training (15.8%). Only one of them perceived low support from management.

More than half of respondents who had been working with computer for less than ten years had low level of participation (26.1%) but perceive good involvement (39.1%), high management support (30.4%), and high benefit of training (31.6%). For those who had been working with computer between 10-20 years, more than a half of them (26.1%) had low level of participation. However, all of them perceived good involvement (43.5%), high management support (43.5%), and high benefit of training (31.6%). There were only two respondents who had been working with computer for more than 20 years. None of them had high level of participation and perceived low involvement. All of them perceived high support from management and moderate benefit of training.

Table 5.2 and 5.3 showed that there was a male respondent, age between 41 to 50, had a bachelor degree, works less than 3 years for the current position, and had experience with computer less than 10 years. He also had low level of participation, perceived low involvement, perceived low support from management, and perceived moderate benefit of training. This male respondent was the only one who had negative attitude toward the ABSC and had no intention to use this system.

Table 6.3 Percentage of User Participation, User Involvement, Management Support and Effective Training

	Total	User participation(n = 23) *			User involvement(n = 23) **			Management Support(n = 23) **			Effective Training (n = 19)**		
		Low	Medium	High	disagree	moderate	agree	disagree	moderate	agree	Low	Medium	High
Age (years old)													
< 40	26.1%	8.7%	13.0%	4.3%	-	-	26.1%	4.3%	4.3%	17.4%	-	5.3%	21.1%
41-50	56.5%	43.5%	8.7%	4.3%	4.3%	8.7%	43.5%	-	8.7%	47.8%	-	26.3%	26.3%
> 50	17.4%	4.3%	8.7%	4.3%	-	-	17.4%	-	-	17.4%	-	5.3%	15.8%
Gender													
Female	8.7%	8.7%	-	-	-	4.3%	4.3%	-	4.3%	4.3%	-	5.3%	5.3%
Male	91.3%	47.8%	30.4%	13.0%	4.3%	4.3%	82.6%	4.3%	8.7%	78.3%	-	31.6%	57.9%
Education Level													
Undergraduate	47.8%	30.4%	13.0%	4.3%	4.3%	8.7%	34.8%	-	13.0%	34.8%	-	26.3%	26.3%
Graduate	52.2%	26.1%	17.4%	8.7%	-	-	52.2%	4.3%	-	47.8%	-	10.5%	36.8%
Job Tenure (years)													
< 3	47.8%	30.4%	8.7%	8.7%	1, 4.3%	4.3%	39.1%	-	4.3%	43.5%	-	26.3%	26.3%
3-6	30.4%	17.4%	13.0%	-	-	4.3%	26.1%	-	8.7%	21.7%	-	10.5%	21.1%
> 6	21.7%	8.7%	8.7%	4.3%	-	-	21.7%	4.3%	-	17.4%	-	-	15.8%
Work Experience with Computer (years)													
< 10	47.8%	26.1%	13.0%	8.7%	4.3%	4.3%	39.1%	4.3%	13.0%	30.4%	-	26.3%	31.6%
10 - 20	43.5%	26.1%	13.0%	4.3%	-	-	43.5%	-	-	43.5%	-	-	31.6%
> 20	8.7%	4.3%	4.3%	-	-	4.3%	4.3%	-	-	8.7%	-	10.5%	-

* The original measures in the questionnaires were level of User Participation. The frequency was groups into 3 categories: level 0-4 equal low, level 5-9 equal medium, and level 10-14 equal high.

** The original measures in the questionnaires used a 5-scales, Strongly disagree, Disagree, Neither disagree nor agree, Agree, and Strongly agree. Due to a small number of respondents, the scales was combined into 3 categories: Strongly disagree and Disagree equal to Disagree, neither disagree nor agree equals to Neither disagree nor agree, and Strongly agree and Agree equal to Agree.

*** The original measures in the questionnaires used a 5-scales, very low, low, medium, high, and very high. Due to a small number of respondents, the scale was combined into 3 categories: Very low and Low equal Low, Medium equals Medium, High and Very high equals High.

Correlation analysis

In Table 5.4, Kendall's Tau-b correlation matrix for the research variables was presented. There was correlation among explanatory variables. The relationship between explanatory variables and User Attitude Toward the ABSC and their Intention to Use the ABSC were presented in detailed. User Participation had a positive significant relationship with User Involvement and Effective Training (τ = .403, p = .012; τ = .408, p = .043, respectively).

Table 6.4 Kendall's Tau-b correlation matrix

(n=23)	Mean (S.D.)	1	2	3	4	5	6
1. User Participation	4.78 (3.63)	1.000 .					
2. User Involvement	4.12 (.59)	.403* *(p=.012)*	1.000 .				
3. Management Support	4.02 (.82)	-.013 *(p=.935)*	.145 *(p=.361)*	1.000 .			
4. Effective Training †	3.47 (1.02)	.408* *(p=.043)*	.340 *(p=.087)*	-.114 *(p=.567)*	1.000 .		
5. User Attitude Toward the ABSC	3.57 (.52)	.492** *(p=.002)*	.310* *(p=.048)*	.113 *(p=.470)*	.438* *(p=.025)*	1.000 .	
6. Intention to Use the ABSC	3.76 (.76)	.358* *(p=.033)*	.518** *(p=.002)*	.352* *(p=.034)*	.277 *(p=.180)*	.346* *(p=.035)*	1.000 .

** Correlation is significant at the .01 level (2-tailed).

* Correlation is significant at the .05 level (2-tailed).

† n = 19

User Participation

As shown in Table 5.5, the result from Kendall's Tau-b indicated that User Participation had a significant positive relationship with User Attitude Toward the ABSC (τ = .492, p = .002), and with Intention to Use this system (τ = .358, p = .033). Hence, if User Participation in development increases, User Attitude Toward the ABSC and Intention to Use the ABSC also increases.

The underlying dimensions of User Participation were responsibility, user-information system relationship, and hands-on activities. These dimensions all

seemed to have a significant positive relationship with User Attitude Toward the ABSC. However, for the Intention to Use a New System, user-information system relationship appeared to be the only one that had a significant relationship. Hence, if User-Information System relationship increased, the Intention to Use the ABSC also increased.

Table 6.5 The relationship between User Participation and dependent variables

	User Attitude Toward the ABSC (n = 23)	Intention to Use the ABSC (n = 23)
User Participation	.492** *(p=.002)*	.358* *(p=.033)*
Responsibility	.617** *(p=.000)*	.266 *(p=.125)*
User-Information System relationship	.341* *(p=.035)*	.399* *(p=.019)*
Hands-on activities	.407* *(p=.017)*	.275 *(p=.127)*

** Significant at the .01 level (2-tailed).

* Significant at the .05 level (2-tailed).

From Table 5.5, the correlation between User Participation and User Attitude Toward the ABSC and Intention to use this system were positive and significant ($\mathfrak{l}$ = .492, p = .002; $\mathfrak{l}$ = .358, p = .033; respectively), supporting the H1a and H1b hypotheses.

User Involvement

Similar to User Participation, User Involvement had a significant positive relationship with User Attitude Toward the ABSC ($\mathfrak{l}$ = .310, p = .024), and with Intention to Use the ABSC ($\mathfrak{l}$ = .518, p = .001) as shown in Table 5.6.

For the relationship underlying dimensions of User Involvement such as Importance and Personal Relevance, the results indicated that Importance seemed to have a significant positive correlation with User Attitude Toward the ABSC. On the other hand, if users agreed that an ABSC was importance, User Attitude Toward the ABSC

tended to be high. Personal Relevance had no significant correlation with User Attitude Toward the ABSC while it had a significant correlation with Intention to Use the ABSC.

Table 6.6 The relationship between User Involvement and dependent variables

	User Attitude Toward the ABSC (n = 23)	Intention to Use the ABSC (n = 23)
User Involvement	.310* *(p=.024)*	.518** *(p=.001)*
Importance	.403* *(p=.011)*	.516** *(p=.002)*
Personal Relevance	.246 *(p=.128)*	.420* *(p=.014)*

** Significant at the .01 level (2-tailed).

* Significant at the .05 level (2-tailed).

From Table 5.6, the correlation between User Involvement and User Attitude Toward the ABSC and User's Intention to Use the ABSC were positive and significant ($\mathfrak{l}$ = .310, p = .024; $\mathfrak{l}$ = .518, p = .001; respectively) Therefore, both H2a and H2b hypotheses are supported.

Management Support

As shown in Table 5.7, there was no significant correlation with User Attitude Toward the ABSC between Management Support, Management Encouragement and Allocation of Resources ($\mathfrak{l}$ = .113, p = .470; $\mathfrak{l}$ = .056, p = .737; $\mathfrak{l}$ = .135, p= .400, respectively). While there were significant correlation with Intention to Use the ABSC between Management Support and Management Encouragement ($\mathfrak{l}$ = .352, p = .034; $\mathfrak{l}$ = .459, p = .009; respectively).

Table 6.7 The relationship between Management Support and dependent variables

	User Attitude Toward the ABSC (n = 23)	Intention to Use the ABSC (n = 23)
Management Support	.113 *(p=.470)*	.352* *(p=.034)*
Management Encouragement	.056 *(p=.737)*	.459** *(p=.009)*
Allocation of Resources	.135 *(p=.400)*	.294 *(p=.083)*

** Significant at the .01 level (2-tailed).

* Significant at the .05 level (2-tailed).

As shown in Table 5.7, the result appeared that there was a positive significant correlation between Management Support and Intention to Use the ABSC ($\mathfrak{l}$ = .352, p = .034), thus supporting only H3b hypothesis.

Effective Training

For the result of the trained users as shown in Table 5.8, Effective Training had a significant positive relationship with User Attitude Toward the ABSC ($\mathfrak{l}$ = .438, p = .025). In contrast, Effective Training has no significant positive relationship with Intention to Use the ABSC ($\mathfrak{l}$ = .277, p = .180). Thus, only hypothesis H4a was supported.

Table 6.8 The relationship between Effective Training and dependent variables

	User Attitude Toward the ABSC (n=19)	Intention to Use the ABSC (n=19)
Effective Training	.438* *(p=.025)*	.277 *(p=.180)*

** Significant at the .01 level (2-tailed).

* Significant at the .05 level (2-tailed).

Personal Factors

The analysis for Personal Factors in this study included age, gender, education, job tenure and work experience. Since Personal Factors were counted data

items, Chi square was fit to test the relationship between their Personal Factors and User Attitude Toward the ABSC and Intention to Use the ABSC. As shown in Table 5.9, the Chi square relationship between Personal Factors; age, gender, education, job tenure and work experience; and User Attitude Toward the ABSC and their Intention to Use the ABSC had a p-value (p=.226, .128, .537, .236, .194, respectively). Correspondence with the relationship between Personal Factors; age, gender, education, job tenure and work experience; and the Intention to Use the ABSC that had a p-value (p=.258, .915, .414, .885, .875, respectively). The results presented no significant relationship between Personal Factors and User Attitude Toward the ABSC and their Intention to Use the ABSC.

Table 6.9 The relationship between Personal factors and dependent variables

	User Attitude Toward the ABSC (n = 23)	Intention to Use the ABSC (n = 23)
Age	5.655 *(p=.226)*	5.303 *(p=.258)*
Gender	4.107 *(p=.128)*	.178 *(p=.915)*
Education Level	1.245 *(p=.537)*	1.763 *(p=.414)*
Job tenure	5.547 *(p=.236)*	1.157 *(p=.885)*
Work Experience with computer	6.064 *(p=.194)*	1.219 *(p=.875)*

** Significant at the .01 level (2-tailed).

* Significant at the .05 level (2-tailed).

However, in the crosstab table (see Appendix 6), 88.9%, 66.7%, 66.7%, 88.9%, and 77.8% of the crosstab table between Personal Factors; age, gender, education, job tenure and work experience, respectively; and their attitude toward the ABSC had expected count less than 5. Moreover, 77.8%, 66.7%, 66.7%, 88.9%, and 77.8% of the crosstab table Personal Factors; age, gender, education, job tenure and work experience, respectively; and their Intention to Use the ABSC had expected count less than 5. This was because of a small number of respondents.

The result shown in Table 5.9 appeared that there was no significant relationship between Personal Factors and User Attitude Toward the ABSC. Therefore, as to Personal Factors, none of these hypotheses was accepted.

Summary of Hypothesis Testing

The results of hypothesis testing were summarized in Table 5.10. Based upon the research findings, it was concluded that four factors including User Participation, User Involvement, Management Support, Effective Training were supported the hypotheses. Except for Management Support, which was not found to support the hypothesis H3b; and Effective Training, which was not found to support the hypothesis H4a. The discussion and conclusion of this study were presented in the next chapter.

Table 6.10 Summary of hypothesis testing

	Hypotheses	User Attitude Toward the ABSC	Intention to Use the ABSC
User Participation	H1	Supported	Supported
User Involvement	H2	Supported	Supported
Management Support	H3	Not Supported	Supported
Effective Training	H4	Supported	Not Supported
Personal Factors			
Age	H5	Not Supported	Not Supported
Gender	H6	Not Supported	Not Supported
Education	H7	Not Supported	Not Supported
Job Tenure	H8	Not Supported	Not Supported
Work experience with computer	H9	Not Supported	Not Supported

Chapter VI

Discussion and Conclusion

Although Balanced Scorecard concepts have been used widely in modern organizations, the implementations of the ABSC often failed. In previous chapters, a conceptual model was proposed and tested to examine the factors that influenced the success in, or failure of, implementing the ABSC. The model was developed from the theoretical perspectives and empirical findings of other implementation research. This chapter includes the discussion of finding factors influencing the success of ABSC implementation and the interrelationships among variables. The implications for management, the limitations and suggestions for future research, and the conclusion were also presented.

Factors influencing the success of ABSC implementations

User Participation

Overall users in this study appeared to have low participation. Little participation scores were likely a result of the company's implementation strategy -- by outsourcing the implementation of the ABSC to the consulting firm instead of by IT department in-house. This was consistent with the role change described by Martinsons (1993) and Rockart (1988) that the recent evolution towards end-user computing and the propensity for outsourcing the information system had changed in the dynamics of the partnerships between management and technical specialists. Much of the responsibility for Information System had been passed on to external consultants, project managers and steering committees. These people had essential functions such as setting up the direction of ABSC implementation activities, providing the resource in implementation, and also advising and auditing the ABSC implementation activities.

Despite the little participation scores, the results supported what Barki and Hartwick (1994) had found that User Participation significantly influenced User Attitude Toward the ABSC and Intention to Use the ABSC. Users who had high participation tend to have positive attitude toward the system. This was because User Participation created a sense of self-esteem or perceived control in uncertain situations such as in the installation of the new technology (Ajzen, 1988; MeLone, 1990).

User Involvement

Similar to the result of Barki and Hartwick (1994), the present study found that User Involvement significantly was related User Attitude Toward the ABSC and Intention to Use the ABSC. Since User Involvement had created a strong personal relevance or sense of belonging to the ABSC that leaded to a positive attitude toward the system. The positive effects of User Involvement could be attributed to a number of factors such as an important of the ABSC, its benefit to their work and their personal relevance. If the system was important and personally relevant, users were likely to focus on their own personal feelings and formed their intentions to use the ABSC.

Management Support

Inconsistent with other findings (Kwon and Zmod, 1987; Lucus, 1981; Igbaria, 1997), Management Support was not found in this study to be an important factor relating to User Attitude Toward the ABSC. Although Management Support facilitates people's work, which increases intention to use, the reason why Management Support had no relationship with User Attitude Toward the ABSC could be explained that in a short period after implementation of the ABSC, users had not much practical experience in using the system (Klientop, 1993a). Therefore, with their heavy daily workload, it took a lot of time for them to use the system. Also, users' attitude could be affected with their expectation on this system. For most users, the support provided was far less than the support that they expected.

The observation and in-depth interview could provide additional explanation for the Management Support that the steering committees had encouraged users to use the ABSC in their monthly meeting. However, since the company has lack of real-time orientation, lack of flexible enrichment of transaction data, and no centralized system to transferred data into central database or key performance indicators (KPIs) database, each responsibility unit had to send the data to the KPIs data collector to key-in. In practice, there were some problems in gathering data because some responsibility units did not give much cooperation. For example some of them sent the data after deadline, this caused blank performance for that data. It also was a barrier to manage performance follow by the balanced scorecard. These were the obstacles to the perception on Users Attitude Toward the ABSC.

However, the result from correlation indicated that there was a significant relationship between Management Support and Intention to Use the ABSC, another IS success measure in this study. This highlights the importance of management support in adoption decisions. In order to increase user intention to use the ABSC, management must provide sufficient support to users. This would reduce risk and uncertainty of users' adoption (Karahanna, Strub, Chervany, 1999).

Effective Training

Inconsistent with other findings (DeLone, 1988; Fuerst and Cheney, 1982; Igbaria at al, 1989; Kraemer et al., 1993; Raymond, 1988) Effective Training was not found to be an important factor influencing the success of a new system in terms of result in positive Intention to Use the ABSC. Not all training results are related to their intention to use the new system. This could be explained that as the Information System evolution level may be mature, a long history of Information System researches and implementations, the number of systems and the software applications in each area dramatically increase. Currently, all of the users are using several software to help them manage the organization in several aspects. ABSC is another software or management tool in which they need extra hours to use, so they do not specifically have strong

preference to use ABSC over other software. Clearly, no matter how much the benefit of training user's perceived, it had no relationship with their intention to use the ABSC.

However, users should perceive the benefit of ABSC training, and this in term of significantly related to their attitudes toward the system. This supported previous empirical studies that training could provide users with conceptual and procedural knowledge that influenced the perceived ease of use (Nelson, 1990; Venkatesh, 1999; Venkatesh and Davis, 2000), and attitudes (Raymond, 1990). Young (1984) reported that as many as 25% of microcomputers sold end up collecting dust primarily because their owners never learned how to use them. With training, users could develop a better understanding of the strengths and weaknesses of the new system through practicing in their environment.

Personal Factors

Many studies (Gattiker and Larwood, 1988, 1989, 1990; Jaskolka et al., 1985) had empirically suggested that Personal Factors enhance effectiveness of information system adoption. Inconsistent with previous studies, the results of Personal Factors indicate no significant relationship between them and User Attitude Toward the ABSC nor the Intention to Use the ABSC. This could be explained to the ABSC implementation framework by the fact that almost all the respondents had similar characteristics and uniqueness. They had same seniority, well educated, job tenure, experience with computer, and almost of them were male. Since the implemented of ABSC was at the corporate level, the majority of system users were from high level positions. Also, these computers had been used widely for more than ten years, there was no different in the experience with computer – they all were familiar with using it. Therefore, the effect of personal factors was not apparent in this organizational setting.

The relationships among explanatory variables

The correlation analysis revealed several interesting findings that can be explored in the future research. This study supported the results of Barki and Hartwick (1994) that there was a significant interrelation between User Participation and User Involvement. User Participation and User Involvement develop feeling of ownership, a better understanding of the new system, and satisfying their needs when they actual participate in the ABSC implementation. The interrelation between User Participation and Effective Training could be explained that users created a better perception on the benefit of training when users actual participate in the ABSC implementation.

Like what others had found (Baroudi et. al, 1986; Choe, 1996; Soegiharto, 2001), there was a significant relationship between the success of implementing the ABSC, User Attitude Toward the ABSC and Intention to Use the ABSC. It can be implied that when users had positive attitudes with the ABSC and these attitudes create their intention to use it.

Implications for theory

In this study, most of the Balanced Scorecard literature comes from the originators (Kaplan and Norton, 1996). The Balanced Scorecard called “Automated Balanced Scorecard” when the Information Technology was used to support the Balanced Scorecard framework. To measure the success of the ABSC implementation, this study used Information System implementation framework which based on the Information Technology innovation and attitude and intention-based theories by providing empirical evidence that User Participation, User Involvement, Management Support, and Effective Training. These are key variables that influence the success or failure of implementing an ABSC.

Interestingly, Personal Factors were not related to the ABSC implementation. Unlike the characteristic of other Information System users, most

demographic data of the ABSC users are potentially subject to the unique characteristic of ABSC users, high-rank position professional. It is important to recognize that the present study was scoped in the ABSC implementation from the corporate level through department. While the limitations warrant continued studies using variety samples, it is noteworthy that this study includes a reasonably sample for the Information System implementation study.

Implications for management

The empirical results of this study suggest some managerial implications of relating factors. To implement an ABSC effectively, the results in the study suggested that User Participation and User Involvement aimed to increase the awareness of an ABSC, which could help the management to reduce the post implementation conflict. Management Support had a direct effect on users' Intention to Use the ABSC. This suggested that management must support and encourage the use of the ABSC for a performance management or a variety of tasks, and also emphasize the benefits that can be achieved with the use of the ABSC. Effective Training had a strong influence on User Attitude Toward the ABSC. This result indicated a strong need for management, consultant, or vendor to assist users in perceiving the benefit of the ABSC training by improving the self-efficacy of users (Bandura, 1982). These were important in the design of ABSC and the associated implementation plans that will lead to the success of the ABSC implementation.

Limitations and suggestions for future research

The hypotheses in this study were only partially supported. This partial support was likely due to the limitations of the study. The limitations and possible future research efforts were suggested as follows.

1. The use of a single case study might potentially constrain the generalizability of the results as usual. The ABSC implementation in this study was conduct in corporate level. The users shared similar characteristic. Hence, it was not appropriate to infer that the ABSC implementation framework was generalizable without an empirical test in another organization or another level of ABSC implementation.

2. Since the total population of this study was small (n=23), the statistical analyses appeared to give weak support to the existing propositions. For example the results from validity test among variables and correlation test between Personal Factors and dependent variables were not consistent with the other studies. Future research was needed to replicate the study in different organizational settings with a larger sample size.

3. This was a one-time post implementation study (3-4 months after the implementation). Thus, User Attitudes, and Intention to Use the ABSC might change over time as the user direct-use experience increase. Future research can extend the pre- and post-implementation period of the study time frame.

Conclusion

The theoretical of the Balanced Scorecard (i.e. Kaplan and Norton, 1996) and the ABSC vendors (i.e. Silk 1998) indicate that an ABSC is one of the performance management tools that helps management in translating their strategy into action automatically. This study has described which factors had related to the success of implementing an ABSC by using the information systems implementation framework (i.e. Davis and Olson, 1985; Barki and Hartwick, 1994). The ultimate purpose of understanding the success of implementation is determined by the users' attitudes toward this new system and their intention to use it.

To be successful in implementing the ABSC, User Participation, User involvement, Management Support, and Effective Training are powerful factors for enhancing the users' attitudes toward this new system and their intention to use it.

Management may create effective persuasive strategies to increase level of User Participation and User Involvement. Effective Training should be used to enable users to gain conceptual and procedural processing of ABSC so that positive user' attitudes toward this new system and intention to use it will be formed. In terms of increasing the intention to use, management should provide enough support to enable users to use the ABSC conveniently. Although the result of Personal Factors in this study indicates no significant relationship to the success of ABSC implementation, this finding has shed some light to the perhaps unique characteristic of ABSC users. Most of them were in powerful position or in high-ranked. Most of ABSC users were similar to other users.

From the results, this study suggests that suitable factors relating the success in ABSC implementation may not cover all area of framework. There are some factors, which are not included in this study such as the flexibility, features and functions of an ABSC, the stakeholders' expectation to the ABSC, service and support from vendor, and integration to other systems. As pointed out in the recent literature (Hammer, 1990; Martinsons, 1995), the potential benefits of IT can not be fully realized if existing workflows are merely automated. Instead, for a further study, it is necessary to fundamentally rethink the business, and redesign its tasks and processed beyond to organization's strategy, desired outcomes, and technological capabilities.

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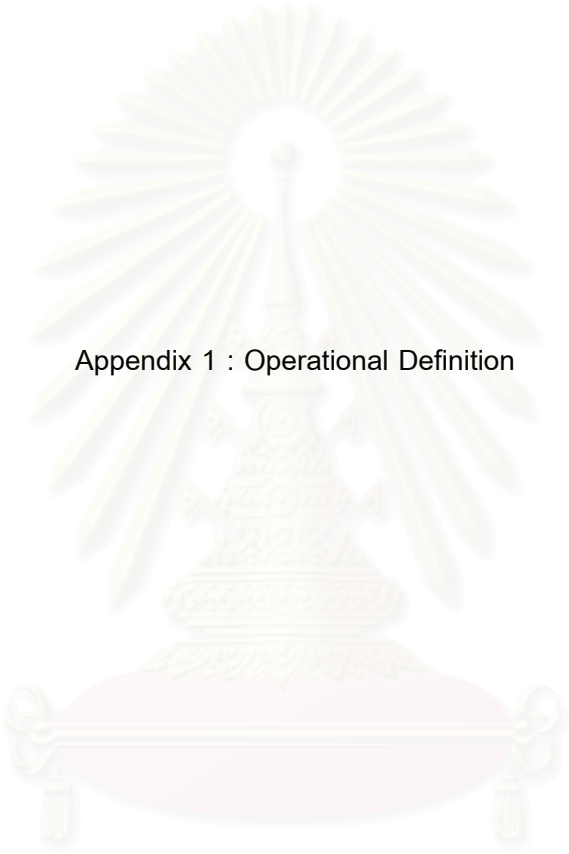
Appendices

Appendix 1 : Operational Definition



Appendix 1: Operational Definitions

Automated Balanced Scorecard is a performance management application system that is designed according to the concepts and methodology of Kaplan and Norton's balanced scorecard.

Balanced Scorecard (Kaplan and Norton, 1996) is defined as a performance management concept that enables businesses to drive strategies, translate theirs strategies into objectives with related measures in four perspectives; including financial, customer, internal process, and learning and growth, and also enable businesses communicate their strategies related by cause-and-effect relationship within organization.

Effective Training is defined to emphasize the benefits of training that users perceived.

Implementation is defined as a process that solves the existing problem by designing new system function that focuses on the organizational changing processes necessary for system's acceptance and installation.

Intention to Use a New System came from Davis (1989)'s Theory of Technology Acceptance Model re-adapted from Fishbein and Ajzen (1975)' Theory of Reasoned Action, which is attitudinal that user intents to use a new system.

Management Support is defined as any support user perceived from top management concerning management agreement and allocation of resource.

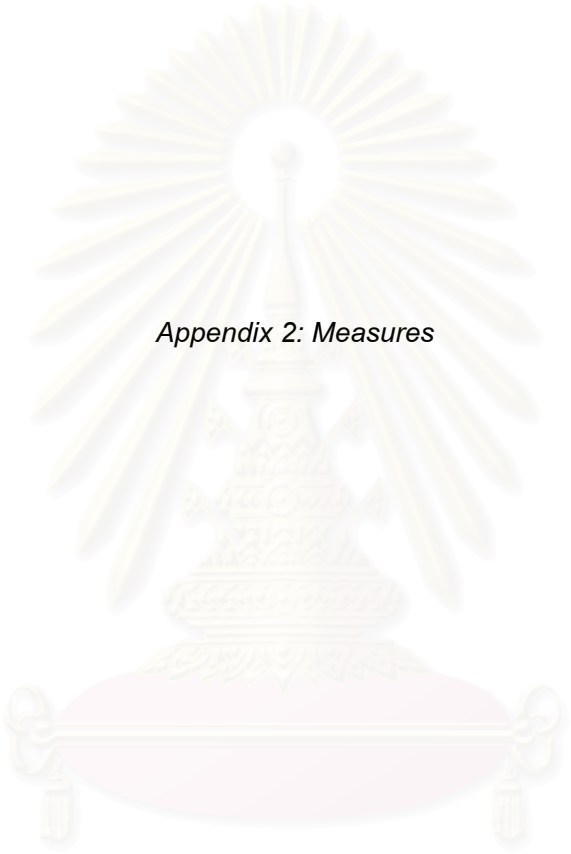
Personal factors are demographic data of users such as age, job tenure, position, and experience, which their effect on user attitude are studied individually.

User attitude (Ajzen, 1988) is defined as a disposition to responded favorably or unfavorably to an object, person, institution, or event.

User Involvement (Barki and Hartwick, 1994) is defined as a subjective psychological state reflecting the importance and personal relevance that a user attached to a given system.

User Participation (Barki and Hartwick, 1994) is defined as assignments, activities, and behaviors of users or their representatives performed during the systems development process.

Appendix 2: Measures



Appendix 2: Measures

The questionnaires were following the items with respect to their attitude and intention to use a Gentia Balanced Scorecard. The notation (R) meant the item was reverse code. The questionnaires were developed into seven sections as follows:

Section 1: User participation (based on Barki and Hartwick, 1994)

Overall responsibility scale (0 = No, 1 = Yes)

1. Did you have responsibility for estimating development costs of the ABSC?
2. Did you have responsibility for requesting additional funds to cover unforeseen time/ cost overruns?
3. Did you have responsibility for selecting the hardware and/ or software needed for the ABSC?
4. Did you have responsibility for the success of implementing the ABSC?
5. Did you have main responsibility for the development project during a scorecard definition, during a scorecard design, and during its implementation?

User-IS relationship (0 = No, 1 = Yes)

1. Did you work closely with the Information systems / Data processing staff to draw up a formalized agreement of the work-to-be-done project during a scorecard definition, during a scorecard design, and during its implementation?
2. Were you able to make changes to the formalized agreement of the work-to-be-done project during a scorecard definition, during a scorecard design, and during its implementation?
3. Did the implementers keep you informed concerning progress and/ or problems during a scorecard definition, during s scorecard design, and during its implementation?
4. Did you formally review work done by implementers during a scorecard definition, during a scorecard design, and during its implementation?

5. Did you formally approve work done by the implementers during a scorecard definition, during a scorecard design, and during its implementation?
6. Did you evaluate the information requirement analysis developed by the implementers?

Hands-on Activity Scale (0 = No, 1 = Yes)

1. Did you define/ help to define input/ output forms?
2. Did you define/ help to define report formats?
3. Did you design the user-training program for the ABSC?
4. Did you create the user procedure manual for the ABSC?

Section 2: User involvement (based on Barki and Hartwick, 1994)

Important (Scale anchors: 1 = strongly disagree, 5 = strongly agree)

1. Do you agree that the ABSC is important?
2. Do you agree that the ABSC is needed for your work?
3. Do you agree that the ABSC is essential for your work?
4. Do you agree that the ABSC is trivial for your work? (R)
5. Do you agree that the ABSC is significant for your work?

Personal relevance (Scale anchors: 1 = strongly disagree, 5 = strongly agree)

1. Do you agree that the ABSC is means nothing to you? (R)
2. Do you agree that the ABSC is of no concern to you? (R)
3. Do you agree that the ABSC is irrelevant to you? (R)
4. Do you agree that the ABSC is matter to you?

Section 3: Management support (based on Igbaria, 1990)

Management encouragement (Scale anchors: 1 = strongly disagree, 5 = strongly agree)

1. Do you agree that management is aware of the benefits that can be achieved with the use of the ABSC?
2. Do you agree that management always support and encourage the use of the ABSC for job-related work?

Allocation of resources (Scale anchors: 1 = strongly disagree, 5 = strongly agree)

1. Do you agree that management provides most of the necessary help and resources to enable people to use a Gentia Balanced Scorecard?
2. Do you agree that management is easily keen to see that people are happy with using Gentia Balanced Scorecard?
3. Do you agree that management provides good access to hardware resources when people need them?

Section 4: Effective Training (based on Soegiharto, 2001)

1. Did your company or department have a training program to teach staffs how to correctly use the ABSC? (0 = No, 1 = Yes).
2. How many levels of the benefit do you perceive from this training? (Scale anchors: 1 = Low, 5 = High)

Section 5: Personal factors

Age

How old are you? (30 years or younger, 31-35 years, 36-40 years, 41-45 years, 45-50 years, 51 years or older)

Gender

Please indicate your gender (Male, Female)

Education

What is your latest education status? (Diploma or below, Undergraduate, Postgraduate)

Job Tenure

How long have you been work for this job? (10 years or less, 10-20 years, 20 years or more)

Work experience with computer

How long have you been working with computer? (1 year or less, 1-3 years, 3-5 years, 5-7 years, 7 years or more)

Section 6: Attitude toward new system (based on Soegiharto, 2001)

(Scale anchors: 1 = strongly disagree, 5 = strongly agree)

1. Do you agree that the ABSC helps your work easier?
2. Do you agree that the ABSC is essential for the successful performance of your department?
3. Do you agree that the ABSC has increased your job satisfaction?
4. Do you agree that the ABSC always gives the information wanted by your department?
5. Do you agree that the other applications (i.e. spreadsheet) can be used to extract and manipulate the information to fulfill requirements? (R)
6. Do you agree that the ABSC is convenience to use?
7. Do you agree that the ABSC has enabled your department to carry out its work more easily and efficiently?
8. Do you agree that the ABSC has made a contribution to achieving the organizational goals and objectives?
9. Do you agree that the majority of employees in your department want to use the ABSC?
10. Do you agree that the information that the ABSC has been providing is accurate and reliable?
11. Do you agree that the ABSC can be easily adjusted to any new conditions, demands, or circumstances that arise now or in the future?

Section 7: Intention to use (based on Soegiharto, 2001)

1. How often will you intend to use the ABSC as a performance management tools? (Scale anchors: 1 = Infrequently, 5 = frequently)
2. Are you willing to use the ABSC in the future? (Scale anchors:1 = Reluctant to use, 5 = Willing to use)

Appendix 3: Questionnaires

Appendix 3: Questionnaires

Questionnaire

Factors influencing users attitude and Intention to use the Automated Balanced Scorecard system: A case study of a Thai Petrochemical Manufacturer

Introduction: This questionnaire is part of research undertaken for Master degree study in Information technology in Business, the Faculty of Commerce and Accountancy, Chulalongkorn University.

The aim of this study is to examine the implementation success and failure in term of the users' attitudes toward a Gentia Balanced Scorecard, as a performance management tool, and their intention to use this system.

Notes:

1. In completing this questionnaire, I am interested in ***your*** opinion of the Gentia Balanced Scorecard and your abilities to work in the organization.
2. All the information you give will be kept confidential.
3. In total, there are 7 pages. Please answer every question.
4. I'm interested in your first impressions, so the questions should be answered quickly. **The questionnaire should take no more than 30 minutes of your time to complete.**

Thank you for your time and effort that are contributed to this study.

Lalita Hongratanawong
Student, M.Sc. IT in Business,
Phone 01-330-6805

Date interviewed: _____

User Participation

For questions 1 to 15, please tick on the _____ available, which best represents, your answer to the questions.

1. Did you have responsibility for estimating development costs of the ABSC?
   _____ Yes _____ No
2. Did you have responsibility for requesting additional funds to cover unforeseen time/ cost overruns? _____ Yes _____ No
3. Did you have responsibility for selecting the hardware and /or software needed for the ABSC? _____ Yes _____ No
4. Did you have responsibility for the success of implementing the ABSC?
   _____ Yes _____ No
5. Did you have main responsibility for the development project during a scorecard definition, during a scorecard design, and during its implementation?
   _____ Yes _____ No
6. Did you work closely with the implementers to draw up a formalized agreement of the work-to-be-done project during a scorecard definition, during a scorecard design, and during its implementation? _____ Yes _____ No
7. Were you able to make changes to the formalized agreement of the work-to-be-done project during a scorecard definition, during a scorecard design, and during its implementation? _____ Yes _____ No
8. Did the implementers keep you informed concerning progress and/ or problems during a scorecard definition, during s scorecard design, and during its implementation? _____ Yes _____ No
9. Did you formally review work done by implementers during a scorecard definition, during a scorecard design, and during its implementation?
   _____ Yes _____ No

10. Did you formally approve work done by the implementers during a scorecard definition, during a scorecard design, and during its implementation?

_____ Yes _____ No

11. Did you evaluate the information requirement analysis developed by the implementers? _____ Yes _____ No

12. Did you define/ help to define input/ output forms? _____ Yes _____ No

13. Did you define/ help to define report formats? _____ Yes _____ No

14. Did you design the user-training program for the ABSC?

_____ Yes _____ No

15. Did you create the user procedure manual for the ABSC?

_____ Yes _____ No

16. Personally, how do you involve in the Balanced Scorecard implementation?

_____

_____

_____

_____

User Involvement

For question 17 to 25, please circle the number in the scale which best represents the importance and personal relevance of the ABSC implementation, quickly and as honestly as possible.

	Strongly Disagree				Strongly Agree
17. Do you agree that the ABSC is important?	1	2	3	4	5
18. Do you agree that the ABSC is needed for your work?	1	2	3	4	5
19. Do you agree that the ABSC is essential for your work?	1	2	3	4	5
20. Do you agree that the ABSC is trivial for your work?	1	2	3	4	5
21. Do you agree that the ABSC is significant for your work?	1	2	3	4	5
22. Do you agree that the ABSC is means nothing to you?	1	2	3	4	5
23. Do you agree that the ABSC is of no concern to you?	1	2	3	4	5
24. Do you agree that the ABSC is irrelevant to you?	1	2	3	4	5
25. Do you agree that the ABSC is matter to you?	1	2	3	4	5

Management Support

For question 26 to 30, please circle the number in the scale, which best represents the Management Support of the ABSC implementation, quickly and as honestly as possible.

	Strongly Disagree				Strongly Agree
26. Do you agree that management is aware of the benefits that can be achieved with the use of the ABSC?	1	2	3	4	5
27. Do you agree that management always support and encourage the use of the ABSC for job-related work?	1	2	3	4	5
28. Do you agree that management provides most of the necessary help and resources to enable people to use the ABSC?	1	2	3	4	5
29. Do you agree that management is easily keen to see that people are happy with using the ABSC?	1	2	3	4	5
30. Do you agree that management provides good access to hardware resources when people need them?	1	2	3	4	5

Effective Training

For questions 31, please tick on the _____ available, which corresponds to your answer. For questions 32 please circle the number in the scale which best represents the Effective Training during the ABSC implementation, quickly and as honestly as possible.

31. Did your company or department have a training program to teach staffs how to correctly use the ABSC?

_____ Yes _____ No, proceed to Question 33

	Low				High
32. How many levels of the benefit do you perceive from this training?	1	2	3	4	5

Attitude Toward the ABSC

For question 33 to 43, please circle the number in the scale, which best represents the degree of satisfaction with the ABSC, quickly and as honestly as possible.

	Strongly Disagree				Strongly Agree
33. Do you agree that the ABSC helps your work easier?	1	2	3	4	5
34. Do you agree that the ABSC is essential for the successful performance of your department?	1	2	3	4	5
35. Do you agree that the ABSC has increased your job satisfaction?	1	2	3	4	5
36. Do you agree that the ABSC always gives the information wanted by your department?	1	2	3	4	5
37. Do you agree that the other applications (i.e. spreadsheet) can be used to extract and manipulate the information to fulfill requirements?	1	2	3	4	5
38. Do you agree that the ABSC is convenience to use?	1	2	3	4	5
39. Do you agree that the ABSC has enabled your department to carry out its work more easily and efficiently?	1	2	3	4	5
40. Do you agree that the ABSC has made a contribution to achieving the organizational goals and objectives?	1	2	3	4	5
41. Do you agree that the majority of employees in your department want to use the ABSC?	1	2	3	4	5
42. Do you agree that the information that the ABSC has been providing is accurate and	1	2	3	4	5

	Strongly Disagree				Strongly Agree
reliable?					
43. Do you agree that the ABSC can be easily adjusted to any new conditions, demands, or circumstances that arise now or in the future?	1	2	3	4	5

Intention to Use the ABSC

For question 44 to 45, please circle the number in the scale, which best represents the degree of satisfaction with the ABSC, quickly and as honestly as possible.

	Infrequently				Frequently
44. How often will you intend to use the ABSC as a performance management tools?	1	2	3	4	5

	Reluctant to use				Willing to use
45. Are you willing to use the ABSC in the future?	1	2	3	4	5

Demographic Questions:

46. How old are you? (years)

☐ < 30 ☐ 31-35 ☐ 36-40 ☐ 41-45 ☐ 45-50 ☐ > 50

47. Please indicate your gender

☐ Female ☐ Male

48. What is your latest education status? (Please indicate your degree i.e. Bachelor of Industrial Engineering, etc.)

☐ Diploma or below _____

☐ Undergraduate _____

☐ Postgraduate _____

49. What department are you in? _____

50. How long have you been working in your present job? _____ years

51. How long have you been working for this firm? _____ years

52. How long have you been working with computer? _____ years

53. Have you use performance measurement/ management tools in the past?

☐ Yes ☐ No

if the answer is yes, what tools have you ever used and how long?

_____ Years _____

_____ Years _____

_____ Years _____

54. Comments and Suggestions:

_____

_____

_____

_____

แบบสอบถาม

ปัจจัยที่มีผลกระทบต่อทัศนคติและความตั้งใจที่จะใช้ระบบวัดผลที่สมดุลย์แบบอัตโนมัติ (Automated Balanced Scorecard system): กรณีศึกษาบริษัทปิโตรเคมี ในประเทศไทย

แบบสอบถามนี้เป็นส่วนหนึ่งของการวิจัยในการศึกษาระดับปริญญามหาบัณฑิต สาขาวิชาเทคโนโลยีสารสนเทศทางธุรกิจ คณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย

การวิจัยนี้มีจุดประสงค์เพื่อศึกษาความสำเร็จและล้มเหลวในการนำระบบวัดผลที่สมดุลย์แบบอัตโนมัติ (Automated Balanced Scorecard system) มาใช้ โดยเน้นเรื่องทัศนคติและความตั้งใจที่จะใช้ที่มีต่อโปรแกรม Gentia Balanced Scorecard เพื่อเป็นเครื่องมือช่วยในการจัดการประสิทธิภาพการดำเนินงาน และความตั้งใจที่จะใช้โปรแกรมนี้ต่อไปในอนาคต

ข้อแนะนำในการตอบแบบสอบถาม:

1. ในการตอบแบบสอบถามนี้ กรุณาให้ข้อมูลเกี่ยวกับโปรแกรม Gentia Balanced Scorecard และความสามารถในการทำงานในองค์ของท่าน
2. ข้อมูลที่ได้จากท่านจะถูกเก็บเป็นความลับ
3. แบบสอบถามนี้มี 7 หน้า (รวมหน้านี้) กรุณาตอบคำถามทุกข้อ
4. ผู้ทำวิจัยต้องการความคิดครั้งแรกของท่าน ดังนั้นควรตอบคำถามอย่างรวดเร็ว โดยไม่ควรใช้เวลาทำแบบสอบถามจนเสร็จนานเกินกว่า 30 นาที

ขอขอบพระคุณที่ท่านกรุณาสละเวลาตอบแบบสอบถามนี้

นางสาวลลิตา หงษ์รัตนวงศ์
นิสิตสาขาวิชาเทคโนโลยีสารสนเทศทางธุรกิจ
สังกัดคณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย
โทรศัพท์ 01-330-6805

วันที่: _____

การมีส่วนร่วม

คำถามที่ 1 ถึง 15 กรุณาใส่เครื่องหมาย √ ลงในช่องที่ใกล้เคียงหรือตรงกับความคิดเห็นของท่านมากที่สุด

1. ท่านมีหน้าที่รับผิดชอบในการประเมินค่าใช้จ่ายในการวางระบบ Balanced scorecard หรือไม่ _____ ใช่ _____ ไม่ใช่
2. ท่านมีหน้าที่รับผิดชอบในการอนุมัติงบประมาณ หรือค่าใช้จ่ายอื่นที่เพิ่มขึ้นจากงบประมาณของการวางระบบ Balanced scorecard ตามที่ตั้งไว้ หรือไม่ _____ ใช่ _____ ไม่ใช่
3. ท่านมีหน้าที่รับผิดชอบในการเลือกอุปกรณ์คอมพิวเตอร์และโปรแกรมประยุกต์ที่จะใช้ในระบบ Balanced scorecard หรือไม่ _____ ใช่ _____ ไม่ใช่
4. ท่านมีหน้าที่รับผิดชอบในความสำเร็จของการวางระบบ Balanced scorecard หรือไม่ _____ ใช่ _____ ไม่ใช่
5. ท่านมีหน้าที่รับผิดชอบในการวางระบบ Balanced scorecard ในช่วงต่างๆ เช่น ในช่วงการกำหนดระบบ Balanced scorecard ช่วงการออกแบบระบบ Balanced scorecard และช่วงการนำระบบ Balanced scorecard มาใช้หรือไม่ _____ ใช่ _____ ไม่ใช่
6. ท่านทำงานใกล้ชิดกับผู้วางระบบเพื่อสร้างข้อตกลงให้งานที่ต้องสำเร็จไม่ว่าจะเป็นช่วงการกำหนดระบบ Balanced scorecard ช่วงการออกแบบระบบ Balanced scorecard และช่วงการนำระบบ Balanced scorecard มาใช้หรือไม่ _____ ใช่ _____ ไม่ใช่
7. ท่านสามารถเปลี่ยนแปลงข้อตกลงที่เป็นทางการเกี่ยวกับงานที่ต้องทำ ในช่วงการกำหนดระบบ Balanced scorecard ช่วงการออกแบบระบบ Balanced scorecard และช่วงการนำระบบ Balanced scorecard มาใช้หรือไม่ _____ ใช่ _____ ไม่ใช่
8. ผู้วางระบบแจ้งความคืบหน้าของโครงการในช่วงต่างๆ เช่น ช่วงการกำหนดระบบ Balanced scorecard ช่วงการออกแบบระบบ Balanced scorecard และช่วงการนำระบบ Balanced scorecard มาใช้ ให้ท่านทราบหรือไม่ _____ ใช่ _____ ไม่ใช่

9. ท่านมีหน้าที่ตรวจสอบความเรียบร้อยของงานที่ทำเสร็จจากผู้วางระบบในช่วงเวลาต่างๆ เช่น ช่วงการกำหนดระบบ Balanced scorecard ช่วงการออกแบบระบบ Balanced scorecard และช่วงการนำระบบ Balanced scorecard มาใช้หรือไม่

_____ ใช่ _____ ไม่ใช่

10. ท่านมีหน้าที่อนุมัติงานที่ทำเสร็จจากผู้วางระบบในช่วงเวลาต่างๆ เช่น ช่วงการกำหนดระบบ Balanced scorecard ช่วงการออกแบบระบบ Balanced scorecard และช่วงการนำระบบ Balanced scorecard มาใช้หรือไม่ _____ ใช่ _____ ไม่ใช่

11. ท่านมีหน้าที่ประเมินผลหรืออนุมัติการวิเคราะห์ข้อมูลที่ต้องการ ที่วางขึ้นโดยผู้วางระบบหรือไม่ _____ ใช่ _____ ไม่ใช่

12. ท่านได้กำหนด หรือช่วยกำหนดรูปแบบข้อมูลที่จะนำเข้าและรูปแบบผลลัพธ์หรือไม่

_____ ใช่ _____ ไม่ใช่

13. ท่านได้กำหนด หรือช่วยกำหนดรูปแบบรายงาน และหน้าจอแสดงผลลัพธ์ของระบบ Balanced Scorecard หรือไม่ _____ ใช่ _____ ไม่ใช่

14. ท่านมีส่วนร่วมในการออกแบบโปรแกรมการฝึกอบรมระบบ Balanced Scorecard หรือไม่ _____ ใช่ _____ ไม่ใช่

15. ท่านมีส่วนในการจัดทำคู่มือการใช้งานระบบ Balanced Scorecard หรือไม่

_____ ใช่ _____ ไม่ใช่

16. ในส่วนตัวแล้วท่านมีความเกี่ยวข้องในการวางระบบ Balanced scorecard อย่างไร

_____

_____

_____

_____

ความรู้สึกร่วม

คำถามที่ 17 ถึง 25 กรุณาวงกลมตัวเลขที่ใกล้เคียงหรือตรงกับความคิดเห็นของท่านมากที่สุด ในเรื่องความสำคัญและความรู้สึกเกี่ยวข้องที่มีต่อระบบ Balanced Scorecard (กรุณาตอบทุกข้ออย่างรวดเร็ว)

	ไม่เห็นด้วยอย่างยิ่ง				เห็นด้วยอย่างยิ่ง
17. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard เป็นสิ่งสำคัญสำหรับท่าน	1	2	3	4	5
18. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard เป็นมีความจำเป็นสำหรับงานของท่าน	1	2	3	4	5
19. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard มีความจำเป็นอย่างยิ่งและเป็นปัจจัยสำคัญสำหรับงานของท่าน	1	2	3	4	5
20. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard ไม่เป็นสาระสำคัญสำหรับงานของท่าน	1	2	3	4	5
21. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard เป็นนัยสำคัญสำหรับงานของท่าน	1	2	3	4	5
22. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard ไม่มีประโยชน์สำหรับท่าน	1	2	3	4	5
23. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard ไม่เกี่ยวข้องสำหรับท่าน	1	2	3	4	5
24. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard ไม่มีความสัมพันธ์กับท่าน	1	2	3	4	5
25. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard เป็นสิ่งที่เกี่ยวเนื่องกับท่าน	1	2	3	4	5

การสนับสนุนจากผู้บริหาร

คำถามที่ 26 ถึง 30 กรุณาวงกลมตัวเลขที่ใกล้เคียงหรือตรงกับความคิดเห็นของท่านมากที่สุด ในเรื่องการสนับสนุนจากผู้บริหารในการใช้ระบบ Balanced Scorecard (กรุณาตอบทุกข้อ อย่างรวดเร็ว)

	ไม่เห็นด้วยอย่างยิ่ง				เห็นด้วยอย่างยิ่ง
26. ท่านเห็นด้วยหรือไม่ว่าผู้บริหารได้เล็งเห็นถึงประโยชน์จากการใช้งานระบบ Balanced Scorecard	1	2	3	4	5
27. ท่านเห็นด้วยหรือไม่ว่าผู้บริหารคอยสนับสนุนและกระตุ้นให้มีการใช้ระบบ Balanced Scorecard ในงานที่เกี่ยวข้องกัน	1	2	3	4	5
28. ท่านเห็นด้วยหรือไม่ว่าผู้บริหารจัดเตรียมความช่วยเหลือที่จำเป็น และสิ่งอำนวยความสะดวกในการใช้ระบบ Balanced Scorecard	1	2	3	4	5
29. ท่านเห็นด้วยหรือไม่ว่าผู้บริหารแสดงให้เห็นว่าอยากเห็นพนักงานมีความพอใจในการใช้ระบบ Balanced Scorecard เพื่อช่วยในการประเมินผลการดำเนินงาน	1	2	3	4	5
30. ท่านเห็นด้วยหรือไม่ว่าผู้บริหารจัดเตรียมอุปกรณ์คอมพิวเตอร์เพิ่มเมื่อมีคนต้องการใช้ระบบ Balanced Scorecard	1	2	3	4	5

การฝึกอบรมอย่างมีประสิทธิภาพ

คำถามที่ 31 กรุณาใส่เครื่องหมาย √ ลงในช่องที่ใกล้เคียงหรือตรงกับความคิดเห็นของท่านมากที่สุด และในคำถามที่ 32 กรุณาวงกลมตัวเลขที่ใกล้เคียงหรือตรงกับความคิดเห็นของท่านมากที่สุด ในเรื่องการฝึกอบรมอย่างมีประสิทธิภาพในการใช้ระบบ Balanced Scorecard (กรุณาตอบทุกข้อ อย่างรวดเร็ว)

32. บริษัทหรือแผนกของท่านมีการจัดอบรมให้ท่านสามารถใช้ระบบ Balanced Scorecard ได้อย่างถูกต้องหรือไม่

_____ ใช่ _____ ไม่ใช่, ข้ามไปคำถามที่ 33

	น้อยที่สุด				มากที่สุด
32. ท่านได้รับประโยชน์จากการฝึกอบรมมากน้อยแค่ไหน	1	2	3	4	5

ทัศนคติที่มีต่อระบบ Balanced Scorecard

คำถามที่ 33 ถึง 43 กรุณาวงกลมตัวเลขที่ใกล้เคียงหรือตรงกับความคิดเห็นของท่านมากที่สุด ในเรื่องทัศนคติที่มีต่อระบบ Balanced Scorecard (กรุณาตอบทุกข้อ อย่างรวดเร็ว)

	ไม่เห็นด้วยอย่างยิ่ง				เห็นด้วยอย่างยิ่ง
33. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard ช่วยให้งานของท่านง่ายขึ้น	1	2	3	4	5
34. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard จำเป็นต่อความสำเร็จในการวัดประสิทธิภาพการดำเนินงาน	1	2	3	4	5
35. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard เพิ่มความพอใจในงานของท่าน	1	2	3	4	5
36. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard ช่วยให้ข้อมูลที่ท่านและแผนกของท่านต้องการ	1	2	3	4	5
37. ท่านเห็นด้วยหรือไม่ว่าโปรแกรมอื่นๆ เช่น Spreadsheet หรือโปรแกรมอื่นๆ ที่เคยใช้สามารถช่วยทำงานแทนระบบ Balanced scorecard ที่ใช้อยู่ได้ตามความต้องการของท่าน	1	2	3	4	5
38. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard สะดวกในการใช้	1	2	3	4	5
39. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard ช่วยให้พนักงานทำงานได้ง่ายขึ้นและมีประสิทธิภาพมากขึ้น	1	2	3	4	5
40. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard มีส่วนในความสำเร็จในการบรรลุเป้าหมายและวัตถุประสงค์ขององค์กร	1	2	3	4	5

	ไม่เห็นด้วยอย่างยิ่ง				เห็นด้วยอย่างยิ่ง
41. ท่านเห็นด้วยหรือไม่ว่าพนักงานส่วนใหญ่ในองค์กรมีความต้องการใช้ระบบ Balanced Scorecard ในการประเมินผลการปฏิบัติงาน	1	2	3	4	5
42. ท่านเห็นด้วยหรือไม่ว่าข้อมูลที่ได้จากระบบ Balanced Scorecard ถูกต้องและน่าเชื่อถือ	1	2	3	4	5
43. ท่านเห็นด้วยหรือไม่ว่าระบบ Balanced Scorecard สามารถรองรับความต้องการในการประเมินผลการปฏิบัติงาน และสามารถปรับเปลี่ยนให้เข้ากับเหตุการณ์ได้	1	2	3	4	5

ความตั้งใจที่จะใช้

คำถามที่ 44 ถึง 45 กรุณาวงกลมตัวเลขที่ใกล้เคียงหรือตรงกับความคิดเห็นของท่านมากที่สุด ในเรื่องความตั้งใจที่จะใช้ระบบ Balanced Scorecard (กรุณาตอบทุกข้อ อย่างรวดเร็ว)

	ไม่บ่อย				บ่อย
44. ท่านตั้งใจที่จะใช้ระบบ Balanced Scorecard เพื่อเป็นเครื่องมือวัดประสิทธิภาพการดำเนินงานบ่อยแค่ไหน	1	2	3	4	5
	ลังเลที่จะใช้				เต็มใจที่จะใช้
45. ท่านเต็มใจที่จะใช้ระบบ Balanced Scorecard ต่อไปในอนาคตมากน้อยแค่ไหน	1	2	3	4	5

<u>ข้อมูลส่วนบุคคล:</u>

46. ท่านอายุเท่าไหร่ (ปี)

☐ < 30 ☐ 31-35 ☐ 36-40 ☐ 41-45 ☐ 45-50 ☐ > 50

47. เพศ

☐ หญิง ☐ ชาย

48. สถานะภาพการศึกษาขั้นสูงสุดของท่านคืออะไร (กรุณาใส่รายละเอียดการศึกษา เช่น ปริญญาตรี สาขาวิศวอุตสาหการ)

☐ ระดับอนุปริญญาหรือต่ำกว่า_____

☐ ระดับปริญญาตรี _____

☐ ระดับปริญญาขั้นสูง _____

49. ท่านทำงานในแผนกใด _____

50. ท่านทำงานในตำแหน่งปัจจุบันระยะเวลานานแค่ไหน _____ ปี

51. ท่านทำงานในบริษัทนี้นานเท่าไหร่ _____ ปี

52. ท่านทำงานกับคอมพิวเตอร์นานเท่าไหร่ _____ ปี

53. ท่านเคยใช้เครื่องมือวัดผลการดำเนินการตัวอื่นหรือไม่

☐ ไม่ใช้

☐ ใช้

ถ้าคำตอบคือใช้, ท่านเคยใช้เครื่องมืออะไร และระยะเวลานานเท่าไหร่

_____ ปี _____

_____ ปี _____

_____ ปี _____

54. ท่านมีทัศนคติและความต้องการที่จะใช้ระบบ Balanced scorecard อย่างไร โปรดให้ความเห็น

_____

_____

Appendix 4 : In-depth Interview

Appendix 4 : In-depth Interview

Interview period: May 2002; 5 months after implementation

Interviewer: Ms. Lalita Hongratanawong

Interviewees: Executives of National Petrochemical Company (NPC)

- Director and President
- Senior Executive Vice President
- Vice President, Office of Corporate Planning and Business Dept
- Senior Executive Vice President, Olefins Plant Manager and Utility Business Manager

The common characteristics of the interviewees can be summarized that they are top executives of the company. They also work in steering committees. Most of them have been trained in Advance Management Program at Graduate School of Business Administration, Harvard University, U.S.A. They learnt about a balanced scorecard in this program with the balanced scorecard originators; Kaplan and Norton.

Questions:

1. How do you know the Balanced Scorecard?
2. Why do you decide to implement the ABSC?
3. Who is the ABSC users' target group? Why?
4. Do you know other performance management tools? If yes, can you explain why you choose to implement the ABSC compare to other performance management tools?
5. What factor do you think as the most critical success factor when you decide to implement the ABSC?
6. Is there any problem occurring during the implementation?
7. What is you role during the ABSC implementation?
8. Do you think the support from management is enough?
9. Have you trained about the ABSC? If yes, can you explain about it?
10. How often do you use the ABSC? For what purpose?

11. After use the ABSC for a short period, what do you think about it?

12. Do you think the ABSC implementation is successful for this company?

Appendix 5 : Factor Analysis

Appendix 5 : Factor Analysis

The degree of empirical reliability was also estimated by using the Kaiser-Meyer-Olkin (KMO) and the Bartlett's Test of Sphericity. KMO is a measure used to determine whether the given data are adequate for factor analyses. The KMO values range between 0 and 1, where the value 1 implies that every variable can be predicted without error from other variables in the set (Kim and Mueller, 1990). Hair et.al. (1995) suggested that the values above 0.50 indicate appropriateness. The Bartlett's Test of Sphericity is a statistical test for the overall significance of all correlations within a correlation matrix. Both the KMO and the Bartlett's Test of Sphericity indicate an adequacy of the data for the analyses and the significance of the correlation for every multiple-item measure.

Factor loading were used to describe how well each item correlates with, or “loads onto” the factor. Generally, the higher the factor loading, the better an items loads onto the factor-that is, the closer the association between the latent variable and the individual item. When an item's factor loading is below approximately 0.3, the item does not load onto the factor (Kim and Mueller, 1990).

Developing single scales of User Participation

To test the three factors; Responsibility, User-Information System Relationship, and Hands-on Activities for User Participation, the factor analysis was assessed by using the principal component analysis, extracting factors with eigenvalues greater than one, and the examination of the correlation, KMO and Bartlett's Test, communalities for each scale and factor loading.

Generally, there was no such a problem in the questionnaires. However, in question number 8, all participants answered the same; therefore, there was no variance. The deletion of this item must do to analyze the User Participation factor. The result was not interpretable. The set of variables were not related in the same component as suggested by Barki and Hartwick (1994). Eventhough the KMO value was

.663 (See Table A5-1), which the values above 0.50 indicated appropriateness. Also the Bartlett's Test showed significance of the correlation for every multiple-item measure (See Table A5-1). This was because of the small sample sizes.

Table A5-1 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.663
Bartlett's Test of Sphericity	*Approx. Chi-Square*	180.047
	df	91
	Sig.	.000

The result of each variable' communalities were presented in Table A5-2. All extraction values were above .5, indicated that its squared multiple correlation between that variable and the other variables in the analysis was sufficient to explain User Participation. The Kendall Tau-b's correlation matrix was presented in Table A5-3.

Table A5-2 Communalities

	Initial	Extraction
PAR1	1.000	.654
PAR2	1.000	.697
PAR3	1.000	.731
PAR4	1.000	.858
PAR5	1.000	.672
PAR6	1.000	.672
PAR7	1.000	.845
PAR9	1.000	.832
PAR10	1.000	.743
PAR11	1.000	.762
PAR12	1.000	.684
PAR13	1.000	.740
PAR14	1.000	.726
PAR15	1.000	.878

Table A5-3 The Kendall Tau-b's correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
PAR1	1.000													
PAR2	.422*	1.000												
PAR3	.489*	.109	1.000											
PAR4	.601**	.442*	.388*	1.000										
PAR5	.294	.112	.294	.664**	1.000									
PAR6	.385*	.283	.164	.641**	.580**	1.000								
PAR7	.441*	.483*	.225	.555**	.589**	.586**	1.000							
PAR9	.500**	-.012	.500**	.649**	.516**	.342	.163	1.000						
PAR10	.489*	.422*	.489*	.601**	.505**	.385	.657**	.500**	1.000					
PAR11	.128	-.112	.128	.214	.220	-.032	.124	.215	.128	1.000				
PAR12	.073	.230	-.167	.321	.224	.398	.273	.018	.073	.172	1.000			
PAR13	.036	-.178	.036	.523*	.439*	.335	-.133	.628**	.036	.020	.273	1.000		
PAR14	.422*	-.150	.109	.442*	.371*	.283	-.046	.530**	.109	.146	.230	.503**	1.000	
PAR15	.211	-.120	-.163	.352*	.295	.225	-.247	.423*	-.163	.013	.183	.673**	.797**	1.000

** Correlation was significant at the .01 level (2-tailed).

* Correlation was significant at the .05 level (2-tailed).

However, in Table A5-4 All items in the analysis loaded greater than .50 on User Participation with eigenvalues greater than 1 are considered. A factor scores from component 1 which had highest values of the initial eigenvalues and the percent of variance was used to test the relationship with the dependent variables.

Table A5-4 Component matrix

	Components			
	1	2	3	4
PAR4	.922	-3.708E-02	6.669E-02	-3.261E-02
PAR5	.776	1.405E-02	7.587E-02	.252
PAR9	.759	.275	-.424	-1.336E-03
PAR6	.710	-9.169E-02	.392	-7.386E-02
PAR1	.686	-.208	-.235	-.292
PAR10	.677	-.496	-.195	2.645E-02
PAR15	.409	.805	.124	-.217
PAR13	.519	.682	7.598E-02	-6.087E-03
PAR7	.600	-.633	.254	.140
PAR14	.570	.624	-6.014E-02	-9.503E-02
PAR2	.349	-.574	.318	-.380
PAR12	.347	7.806E-02	.701	.257
PAR3	.466	-.286	-.657	-2.786E-02
PAR11	.229	2.657E-02	-.174	.824
Total variance explained				
Initial Eigenvalues	5.094	2.696	1.581	1.122
% of varience	36.386	19.260	11.295	8.013
Cumulative %	36.386	55.646	66.941	74.954

Correlation analysis

To quantitatively assess whether User Participation corresponded to User Attitude Toward the ABSC and Intention to Use the ABSC, a Kendall's Tau-b correlation is performed. The associations between items are significant as presented in Table A5-5.

Table A5-5 Correlations

(n = 23)	User Attitude Toward the ABSC	Intention to Use the ABSC
User Participation	.430** *(p=.002)*	.243 *(p=.132)*

** Significant at the .01 level (2-tailed).

* Significant at the .05 level (2-tailed).

Developing single scales of User Involvement

To test the two factors; Importance and Personal relevance for User Involvement, the factor analysis was assessed by using the principal component analysis, extracting factors with eigenvalues greater than one, and the examination of the correlation, KMO and Bartlett's Test, communalities for each scale and factor loading.

Although the KMO value was .782 (See Table A5-6), which the values above 0.50 indicated appropriateness. Also the Bartlett's Test showed significance of the correlation for every multiple-item measure (See Table A5-6).

Table A5-6 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.782
Bartlett's Test of Sphericity	Approx. Chi-Square	191.976
	df	36
	Sig.	.000

The result of each variable' communalities was presented in Table A5-7. All extraction values were above .5, indicated that its squared multiple correlation between that variable and the other variables in the analysis was sufficient for the explanation.

Table A5-7 Communalities

	Initial	Extraction
INV17	1.000	.820
INV18	1.000	.919
INV19	1.000	.860
INV20	1.000	.654
INV21	1.000	.752
INV22	1.000	.834
INV23	1.000	.933
INV24	1.000	.864
INV25	1.000	.705

However, the item-to-item relationship between items in correlation matrix (see Table A5-8) were different from expected. Not only for the inter-relationships between sub-items, but also most of the items were related positively significance.

Table A5-8 Correlation

	INV17	INV18	INV19	INV20	INV21	INV22	INV23	INV24	INV25
INV17									
INV18	.848**								
INV19	.775**	.850**							
INV20	.593**	.530**	.584**						
INV21	.612**	.724**	.711**	.415*					
INV22	.402*	.496**	.462**	.577**	.457**				
INV23	.482**	.436*	.439*	.635**	.397*	.832**			
INV24	.458*	.407*	.382*	.653**	.354*	.742**	.915**		
INV25	.629**	.655**	.571**	.188	.581**	.252	.260	.271	

** Correlation was significant at the .01 level (2-tailed).

* Correlation was significant at the .05 level (2-tailed).

In Table A-9, All items in the analysis loaded greater than .50 on User Involvement with eigenvalues greater than 1 were considered. However, a factor scores from component 1 which had the highest values of the initial eigenvalues and the percent of variance was used to test the relationship with the dependent variables.

Table A5-9 Component Matrix

	Component	
	1	2
INV18	.901	-.327
INV19	.879	-.295
INV17	.834	-.352
INV21	.824	-.270
INV23	.811	.524
INV24	.802	.470
INV22	.779	.477
INV20	.762	.272
INV25	.722	-.429
Total variance explained		
Initial Eigenvalues	5.968	1.373
% of variance	66.311	15.252
Cumulative %	66.311	81.536

Correlation analysis

To quantitatively assess whether User Involvement corresponded to User Attitude Toward the ABSC and Intention to Use the ABSC, Kendall's Tau-b correlation was performed. The associations between items were presented in Table A5-9.

Table A5-9 Correlation

(n = 23)	User Attitude Toward the ABSC	Intention to Use the ABSC
User Involvement	.342* *(p=.026)*	.389* *(p=.016)*

** Significant at the .01 level (2-tailed).

* Significant at the .05 level (2-tailed).

As shown in Table A5-9, User Involvement had a significant positive relationships with User Attitude Toward the ABSC ($\mathbf{l}$ = .310, p=.024). Also, User Participation had a significant positive relationships with Intention to Use the ABSC ($\mathbf{l}$ =.518, p=.001).

Considering the normal distribution variables; User Involvement, Work Experience with Computer, and User Attitude Toward the ABSC, in Pearson's correlation matrix (Table A5-10), there was only a significant relationship between User Involvement and User Attitude Toward the ABSC. While the others variables had no significant relationship.

Table A5-10 Pearson's correlation matrix

(n=23)	1	2	3	4	5	6	7	8	9	10	11
1. User participation	1.000 .										
2. User involvement	.551* *(p=.006)*	1.000 .									
3. Management support	.093 *(p=.674)*	.240 *(p=.270)*	1.000 .								
4. Effective Training †	.458* *(p=.049)*	.416 *(p=.076)*	-.147 *(p=.550)*	1.000 .							
5. Age	.044 *(p=.840)*	.257 *(p=.236)*	.521* *(p=.011)*	-.300 *(p=.213)*	1.000 .						
6. Gender	.242 *(p=.266)*	.125 *(p=.570)*	.010 *(p=.964)*	.111 *(p=.650)*	.176 *(p=.421)*	1.000 .					
7. Education	.211 *(p=.334)*	.189 *(p=.378)*	.226 *(p=.299)*	.157 *(p=.522)*	.143 *(p=.514)*	.013 *(p=.950)*	1.000 .				
8. Job Tenure	.172 *(p=.434)*	.017 *(p=.939)*	-.285 *(p=.188)*	.465* *(p=.045)*	.464* *(p=.026)*	.197 *(p=.368)*	.234 *(p=.283)*	1.000 .			
9. Work Experience with Computer	.084 *(p=.704)*	.123 *(p=.577)*	. 331 *(p=.123)*	-.043 *(p=.862)*	.445* *(p=.033)*	.107 *(p=.627)*	.277 *(p=.201)*	.150 *(p=.496)*	1.000		
10. User Attitude Toward the ABSC	.689** *(p=.000)*	.697** *(p=.000)*	.094 *(p=.668)*	.531* *(p=.019)*	.059 *(p=.790)*	.236 *(p=.278)*	.299 *(p=.166)*	.151 *(p=.492)*	-.102 *(p=.643)*	1.000 .	
11. Intention to Use the ABSC	.372 *(p=.080)*	. 708** *(p=.000)*	.408 *(p=.054)*	.337 *(p=.159)*	.154 *(p=.483)*	.107 *(p=.626)*	.275 *(p=.204)*	-.027 *(p=.902)*	.060 *(p=.786)*	.604** *(p=.002)*	1.000 .

** Correlation is significant at the .01 level (2-tailed).

* Correlation is significant at the .05 level (2-tailed).

Appendix 6 : Chi square and Crosstab table

Appendix 6 : Chi square and Crosstab table

Table A6-1 Pearson Chi square matrix

(n=23)	Mean (S.D.)	1	2	3	4	5	6	7	8	9	10	11
1. User participation	4.78 (3.63)	1.000 .										
2. User involvement	4.12 (.59)	2.654 *(p=.617)*	1.000 .									
3. Management support	4.02 (.82)	2.962 *(p=.564)*	2.825 *(p=.588)*	1.000 .								
4. Effective training †	3.47 (1.02)	3.310 *(p=.191)*	6.107* *(p=.047)*	1.810 *(p=.405)*	1.000 .							
5. Age	4.26 (1.32)	5.241 *(p=.263)*	2.654 *(p=.617)*	3.807 *(p=.433)*	1.595 (p=.451)	1.000 .						
6. Gender	1.91 (.28)	1.685 *(p=.431)*	4.737 *(p=.094)*	2.671 *(p=.263)*	.166 *(p=.683)*	1.927 (p=.382)	1.000 .					
7. Education	2.52 (.51)	.511 *(p=.775)*	3.764 *(p=.152)*	4.439 *(p=.109)*	1.571 *(p=.210)*	5.557 *(p=.062)*	.004 *(p=.949)*	1.000 .				
8. Job tenure	4.22 (2.77)	2.710 *(p=.608)*	1.912 *(p=.752)*	5.880 *(p=.208)*	2.526 *(p=.283)*	5.305 *(p=.257)*	.754 *(p=.686)*	1.994 *(p=.369)*	1.000 .			
9. Work experience with computer	11.55 (8.32)	.887 *(p=.926)*	6.430 *(p=.169)*	5.282 *(p=.260)*	7.279* *(p=.026)*	2.851 *(p=.583)*	.214 *(p=.898)*	.448 *(p=.799)*	1.335 *(p=.855)*	1.000		
10. User Attitude Toward the ABSC	3.57 (.52)	6.553 *(p=.161)*	27.025** *(p=.000)*	2.133 *(p=.711)*	4.600 *(p=.100)*	5.655 *(p=.226)*	4.107 *(p=.128)*	1.245 *(p=.537)*	5.547 *(p=.236)*	6.064 *(p=.194)*	1.000 .	
11. Intention to use the ABSC	3.76 (.76)	3.383 *(p=.496)*	26.322** *(p=.000)*	3.014 *(p=.555)*	6.107* *(p=.047)*	5.303 *(p=.258)*	.178 *(p=.915)*	1.763 *(p=.414)*	1.157 *(p=.885)*	1.219 *(p=.875)*	23.449** *(p=.000)*	1.000 .

** Chi square value was significant at the .01 level (2-tailed).

* Chi square value was significant at the .05 level (2-tailed).

† n = 19

Table A6-2 User participation and User Attitude Toward the ABSC

		User Attitude Toward the ABSC			Total
		disagree	neither disagree nor agree	agree	
User participation	0-4	1	7	5	13
	5-9		1	6	7
	10-14			3	3
Total		1	8	14	23

Table A6-3 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.553	4	.161
Likelihood Ratio	7.975	4	.093
Linear-by-Linear Association	5.340	1	.021
N of Valid Cases	23		

a 8 cells (88.9%) have expected count less than 5. The minimum expected count is .13.

Table A6-4 User participation and Intention to Use the ABSC

		Intention to Use the ABSC			Total
		disagree	neither disagree nor agree	agree	
User participation	0-4	1	6	6	13
	5-9		3	4	7
	10-14			3	3
Total		1	9	13	23

Table A6-5 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.383	4	.496
Likelihood Ratio	4.747	4	.314
Linear-by-Linear Association	2.525	1	.112
N of Valid Cases	23		

a 7 cells (77.8%) have expected count less than 5. The minimum expected count is .13.

Table A6-6 User involvement and User Attitude Toward the ABSC

		User Attitude Toward the aBSC			Total
		disagree	neither disagree nor agree	agree	
User involvement	disagree	1			1
	neither disagree nor agree		2		2
	agree		6	14	20
Total		1	8	14	23

Table A6-7 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.025	4	.000
Likelihood Ratio	12.633	4	.013
Linear-by-Linear Association	9.840	1	.002
N of Valid Cases	23		

a 7 cells (77.8%) have expected count less than 5. The minimum expected count is .04.

Table A6-8 User involvement and Intention to Use the ABSC

		Intention to Use the ABSC			Total
		disagree	neither disagree nor agree	agree	
User involvement	disagree	1			1
	neither disagree nor agree		2		2
	agree		7	13	20
Total		1	9	13	23

Table A6-9 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.322	4	.000
Likelihood Ratio	12.096	4	.017
Linear-by-Linear Association	8.952	1	.003
N of Valid Cases	23		

a 7 cells (77.8%) have expected count less than 5. The minimum expected count is .04.

Table A6-10 Management support and User Attitude Toward the ABSC

		User Attitude Toward the ABSC			Total
		disagree	neither disagree nor agree	agree	
Management support	disagree			1	1
	neither disagree nor agree		2	1	3
	agree	1	6	12	19
Total		1	8	14	23

Table A6-11 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.133	4	.711
Likelihood Ratio	2.499	4	.645
Linear-by-Linear Association	.015	1	.903
N of Valid Cases	23		

a 7 cells (77.8%) have expected count less than 5. The minimum expected count is .04.

Table A6-12 Management support and Intention to Use the ABSC

		Intention to Use the ABSC			Total
		disagree	neither disagree nor agree	agree	
Management support	disagree		1		1
	neither disagree nor agree		2	1	3
	agree	1	6	12	19
Total		1	9	13	23

Table A6-13 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.014	4	.555
Likelihood Ratio	3.425	4	.489
Linear-by-Linear Association	1.244	1	.265
N of Valid Cases	23		

a 7 cells (77.8%) have expected count less than 5. The minimum expected count is .04.

Table A6-14 Effective training and User Attitude Toward the ABSC

		User Attitude Toward the ABSC			Total
		disagree	neither disagree nor agree	agree	
Effective training	neither disagree nor agree	1	4	2	7
	agree		3	9	12
Total		1	7	11	19

Table A6-15 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.600	2	.100
Likelihood Ratio	5.016	2	.081
Linear-by-Linear Association	4.354	1	.037
N of Valid Cases	19		

a 5 cells (83.3%) have expected count less than 5. The minimum expected count is .37.

Table A6-16 Effective training and Intention to Use the ABSC

		Intention to Use the ABSC			Total
		disagree	neither disagree nor agree	agree	
Effective training	neither disagree nor agree	1	4	2	7
	agree		2	10	12
Total		1	6	12	19

Table A6-17 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.107	2	.047
Likelihood Ratio	6.557	2	.038
Linear-by-Linear Association	5.721	1	.017
N of Valid Cases	19		

a 5 cells (83.3%) have expected count less than 5. The minimum expected count is .37.

Table A6-18 Age and User Attitude Toward the ABSC

		User Attitude Toward the ABSC			Total
		disagree	neither disagree nor agree	agree	
Age	< 40			6	6
	41-50	1	6	6	13
	> 50		2	2	4
Total		1	8	14	23

Table A6-19 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.655	4	.226
Likelihood Ratio	7.836	4	.098
Linear-by-Linear Association	2.409	1	.121
N of Valid Cases	23		

a 8 cells (88.9%) have expected count less than 5. The minimum expected count is .17.

Table A6-20 Age and Intention to Use the ABSC

		Intention to Use the ABSC			Total
		disagree	neither disagree nor agree	agree	
Age	< 40		2	4	6
	41-50	1	7	5	13
	> 50			4	4
Total		1	9	13	23

Table A6-21 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.303	4	.258
Likelihood Ratio	7.004	4	.136
Linear-by-Linear Association	.315	1	.575
N of Valid Cases	23		

a 7 cells (77.8%) have expected count less than 5. The minimum expected count is .17.

Table A6-22 Gender and User Attitude Toward the ABSC

		User Attitude Toward the ABSC			Total
		disagree	neither disagree nor agree	agree	
Gender	female		2		2
	male	1	6	14	21
Total		1	8	14	23

Table A6-23 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.107	2	.128
Likelihood Ratio	4.593	2	.101
Linear-by-Linear Association	2.012	1	.156
N of Valid Cases	23		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .09.

Table A6-24 Gender and Intention to Use the ABSC

		Intention to Use the ABSC			Total
		disagree	neither disagree nor agree	agree	
Gender	female		1	1	2
	male	1	8	12	21
Total		1	9	13	23

Table A6-25 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.178	2	.915
Likelihood Ratio	.260	2	.878
Linear-by-Linear Association	.003	1	.957
N of Valid Cases	23		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .09.

Table A6-26 Education and User Attitude Toward the ABSC

		User Attitude Toward the ABSC			Total
		disagree	neither disagree nor agree	agree	
Education	undergraduate	1	4	6	11
	post graduate		4	8	12
Total		1	8	14	23

Table A6-27 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.245	2	.537
Likelihood Ratio	1.629	2	.443
Linear-by-Linear Association	.742	1	.389
N of Valid Cases	23		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .48.

Table A6-28 Education and Intention to Use the ABSC

		Intention to Use the ABSC			Total
		disagree	neither disagree nor agree	agree	
Education	undergraduate	1	5	5	11
	post graduate		4	8	12
Total		1	9	13	23

Table A6-29 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.763	2	.414
Likelihood Ratio	2.153	2	.341
Linear-by-Linear Association	1.498	1	.221
N of Valid Cases	23		

a 4 cells (66.7%) have expected count less than 5. The minimum expected count is .48.

Table A6-30 Job tenure and User Attitude Toward the ABSC

		User Attitude Toward the ABSC			Total
		disagree	neither disagree nor agree	agree	
Job tenure	< 3	1	4	6	11
	3 - 6		4	3	7
	> 6			5	5
Total		1	8	14	23

Table A6-31 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.547	4	.236
Likelihood Ratio	7.345	4	.119
Linear-by-Linear Association	2.291	1	.130
N of Valid Cases	23		

a 8 cells (88.9%) have expected count less than 5. The minimum expected count is .22.

Table A6-32 Job tenure and Intention to Use the ABSC

		Intention to Use the ABSC			Total
		disagree	neither disagree nor agree	agree	
Job tenure	< 3	1	4	6	11
	3 - 6		3	4	7
	> 6		2	3	5
Total		1	9	13	23

Table A6-33 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.157	4	.885
Likelihood Ratio	1.541	4	.819
Linear-by-Linear Association	.252	1	.616
N of Valid Cases	23		

a 8 cells (88.9%) have expected count less than 5. The minimum expected count is .22.

Table A6-34 Work experience with computer and User Attitude Toward the ABSC

		User Attitude Toward the ABSC			Total
		disagree	neither disagree nor agree	agree	
Work experience with computer	< 10	1	4	6	11
	10 - 20		2	8	10
	> 20		2		2
Total		1	8	14	23

Table A6-35 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.064	4	.194
Likelihood Ratio	6.898	4	.141
Linear-by-Linear Association	.002	1	.962
N of Valid Cases	23		

a 7 cells (77.8%) have expected count less than 5. The minimum expected count is .09.

Table A6-36 Work experience with computer and Intention to Use the ABSC

		Intention to Use the ABSC			Total
		disagree	neither disagree nor agree	agree	
Work experience with computer	< 10	1	4	6	11
	10 - 20		4	6	10
	> 20		1	1	2
Total		1	9	13	23

Table A6-37 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.219	4	.875
Likelihood Ratio	1.599	4	.809
Linear-by-Linear Association	.145	1	.703
N of Valid Cases	23		

a 7 cells (77.8%) have expected count less than 5. The minimum expected count is .09.

Appendix 7 : Code Book

Appendix 7 : Code Book

Table A7-1 Code Book

Name	Label	Question	Value Label
PAR1	Responsibility for estimating development costs of a Gentia Balanced Scorecard	1	0 No 1 Yes
PAR2	Responsibility for requesting additional funds to cover unforeseen time/ cost overruns	2	Same as PAR1
PAR3	Responsibility for selecting the hardware and/ or software needed for a Gentia Balanced Scorecard	3	Same as PAR1
PAR4	Responsibility for the success of implementing a Gentia Balanced Scorecard	4	Same as PAR1
PAR5	Main responsibility for the development project during a scorecard definition, during a scorecard design, and during its implementation	5	Same as PAR1
PAR6	Working closely with the implementers to draw up a formalized agreement of the work-to-be-done project during a scorecard definition, during a scorecard design, and during its implementation	6	Same as PAR1
PAR7	Ability to make changes to the formalized agreement of the work-to-be-done project during a	7	Same as PAR1

Name	Label	Question	Value Label
	scorecard definition, during a scorecard design, and during its implementation		
PAR8	Implementers keep you informed concerning progress and/ or problems during a scorecard definition, during s scorecard design, and during its implementation	8	Same as PAR1
PAR9	Formally review work done by implementers during a scorecard definition, during a scorecard design, and during its implementation	9	Same as PAR1
PAR10	Formally approve work done by the implementers during a scorecard definition, during a scorecard design, and during its implementation	10	Same as PAR1
PAR11	Evaluate the information requirement analysis developed by the implementers	11	Same as PAR1
PAR12	Define/ help to define input/ output forms	12	Same as PAR1
PAR13	Define/ help to define report formats	13	Same as PAR1
PAR14	Design the user-training program for a Gentia Balanced Scorecard	14	Same as PAR1

Name	Label	Question	Value Label
PAR15	Create the user procedure manual for a Gentia Balanced Scorecard	15	Same as PAR1
INV17	Agree that a Gentia Balanced Scorecard is important	17	1 strongly disagree 2 disagree 3 neither disagree nor agree 4 agree 5 strongly agree
INV18	Agree that a Gentia Balanced Scorecard is needed for your work	18	Same as INV17
INV19	Agree that a Gentia Balanced Scorecard is essential for your work	19	Same as INV17
INV20	Agree that a Gentia Balanced Scorecard is trivial for your work	20	Same as INV17
INV21	Agree that a Gentia Balanced Scorecard is significant for your work	21	Same as INV17
INV22	Agree that a Gentia Balanced Scorecard is means nothing to you	22	Same as INV17
INV23	Agree that a Gentia Balanced Scorecard is of no concern to you	23	Same as INV17
INV24	Agree that a Gentia Balanced Scorecard is irrelevant to you	24	Same as INV17
INV25	Agree that a Gentia Balanced Scorecard is matter to you	25	Same as INV17
MGRSUP26	Agree that management is aware of the benefits that can be achieved with the use of a Gentia Balanced Scorecard	26	1 strongly disagree 2 disagree 3 neither disagree nor agree

Name	Label	Question	Value Label
			4 agree 5 strongly agree
MGRSUP27	Agree that management always support and encourage the use of a Gentia Balanced Scorecard for job-related work	27	Same as MGRSUP26
MGRSUP28	Agree that management provides most of the necessary help and resources to enable people to use a Gentia Balanced Scorecard	28	Same as MGRSUP26
MGRSUP29	Agree that management is easily keen to see that people are happy with using Gentia Balanced Scorecard	29	Same as MGRSUP26
MGRSUP30	Agree that management provides good Access to hardware resources when people need them	30	Same as MGRSUP26
TR31	Your company or department have a training program to teach staffs how to correctly use a Gentia Balanced Scorecard	31	0 No 1 Yes
TR32	Levels of the benefit do you perceive from this training	32	1 strongly disagree 2 disagree 3 neither disagree nor agree 4 agree 5 strongly agree
AT33	Agree that the Gentia Balanced Scorecard helps your work easier	33	1 strongly disagree 2 disagree

Name	Label	Question	Value Label
			3 neither disagree nor agree 4 agree 5 strongly agree
AT34	Agree that the Gentia Balanced Scorecard is essential for the successful performance of your department	34	Same as AT33
AT35	Agree that the Gentia Balanced Scorecard has increased your job satisfaction	35	Same as AT33
AT36	Agree that the Gentia Balanced Scorecard always gives the information wanted by your department	36	Same as AT33
AT37	Agree that the other applications (i.e. spreadsheet) can be used to extract and manipulate the information to fulfill requirements	37	Same as AT33
AT38	Agree that the Gentia Balanced Scorecard is convenience to use	38	Same as AT33
AT39	Agree that the Gentia Balanced Scorecard has enabled your department to carry out its work more easily and efficiently	39	Same as AT33
AT40	Agree that the Gentia Balanced Scorecard has made a contribution to achieving the organizational goals and objectives	40	Same as AT33

Name	Label	Question	Value Label
AT41	Agree that the majority of employees in your department want to use the Gentia Balanced Scorecard	41	Same as AT33
AT42	Agree that the information that the Gentia Balanced Scorecard has been providing is accurate and reliable	42	Same as AT33
AT43	Agree that the Gentia Balanced Scorecard can be easily adjusted to any new conditions, demands, or circumstances that arise now or in the future	43	Same as AT33
INTENT44	Intend to use Gentia Balanced Scorecard as a performance management tools	44	1 strongly infrequently 2 infrequently 3 neither infrequently nor frequently 4 frequently 5 strongly agree
INTENT45	Willing to use Gentia Balanced Scorecard in the future	45	Same as INTENT44
AGE46	Age	46	1 < 30 2 31-35 3 36-40 4 41-45 5 45-50 6 > 50
SEX47	Gender	47	1 female 2 male
EDU48	Education status	48	1 undergraduate or

Name	Label	Question	Value Label
			below 2 undergraduate 3 post graduate
DEPT49	Department	49	Actual Value
JOBTEN50	Job tenure	50	1 < 3 2 3 - 6 3 > 6
COMPW51	Work experience in company	51	1 < 10 2 10 - 15 3 > 15
WCOMPU52	Work experience with computer	52	1 < 10 2 10 - 20 3 > 20
USEDPM53	Used of performance measurement/ management tools	53	0 No 1 Yes
PMYR54	Period of tools used	53	Actual Value

Biography

Lalita Hongratanawong is a management cockpit officer at Faculty of Commerce and Accountancy, Chulalongkorn University and an independent consultant. She was born in Bangkok, Thailand on November 30, 1977. In 1999, she received a Bachelor's degree in Accountancy from Chulalongkorn University.

Prior to her working at Chulalongkorn University, she worked at Andersen (formerly Arthur Andersen) as a business consultant, providing business process improvement and performance management consulting services to clients' organization in both private and public sectors until 2000.