



Management Accounting Information Usage and Corporate Sustainability: An
Empirical Assessment of Electrical and Electronics Businesses in Thailand

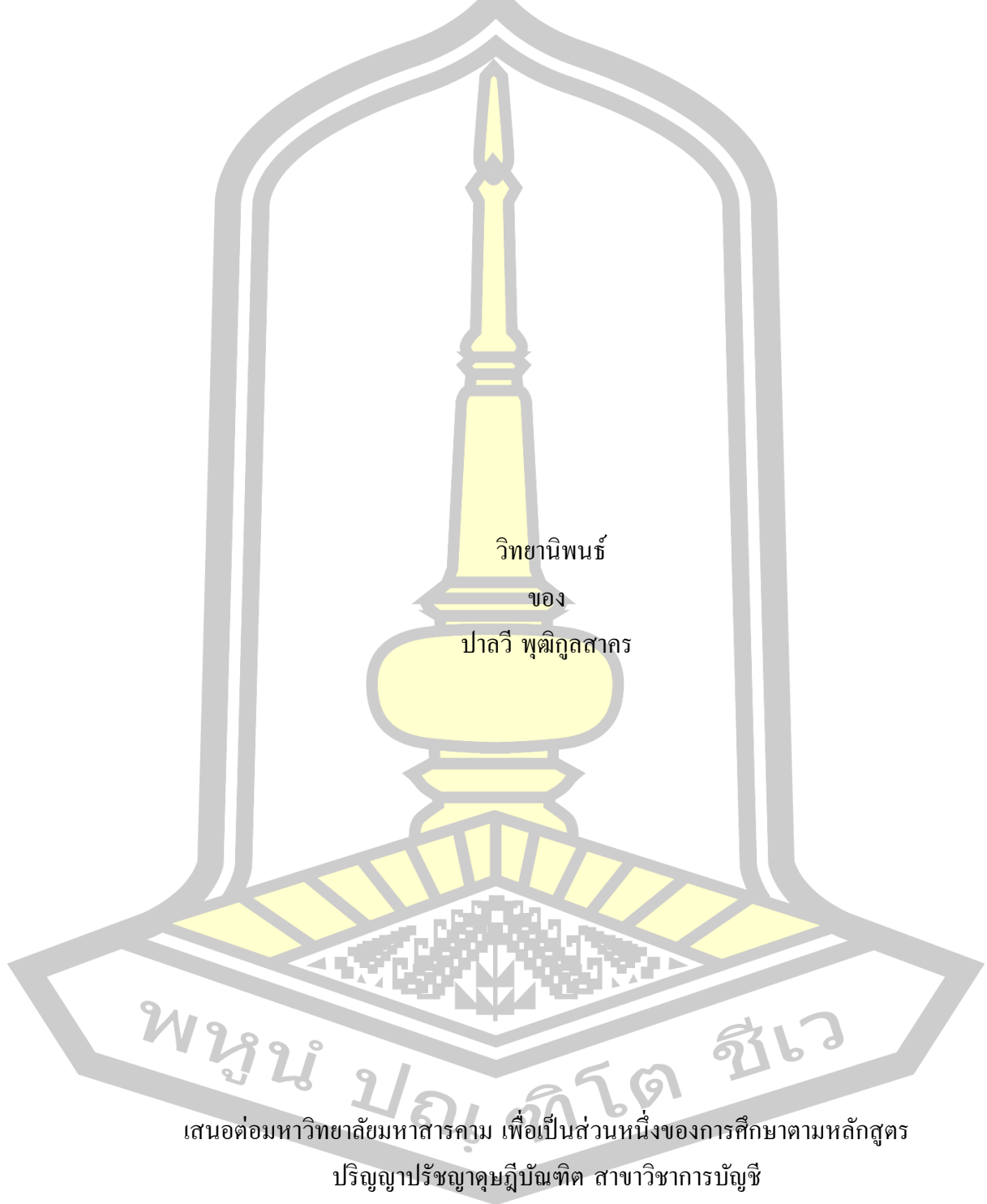
Palawee Puttikunsakon

A Thesis Submitted in Partial Fulfillment of Requirements for
degree of Doctor of Philosophy in Accounting

April 2020

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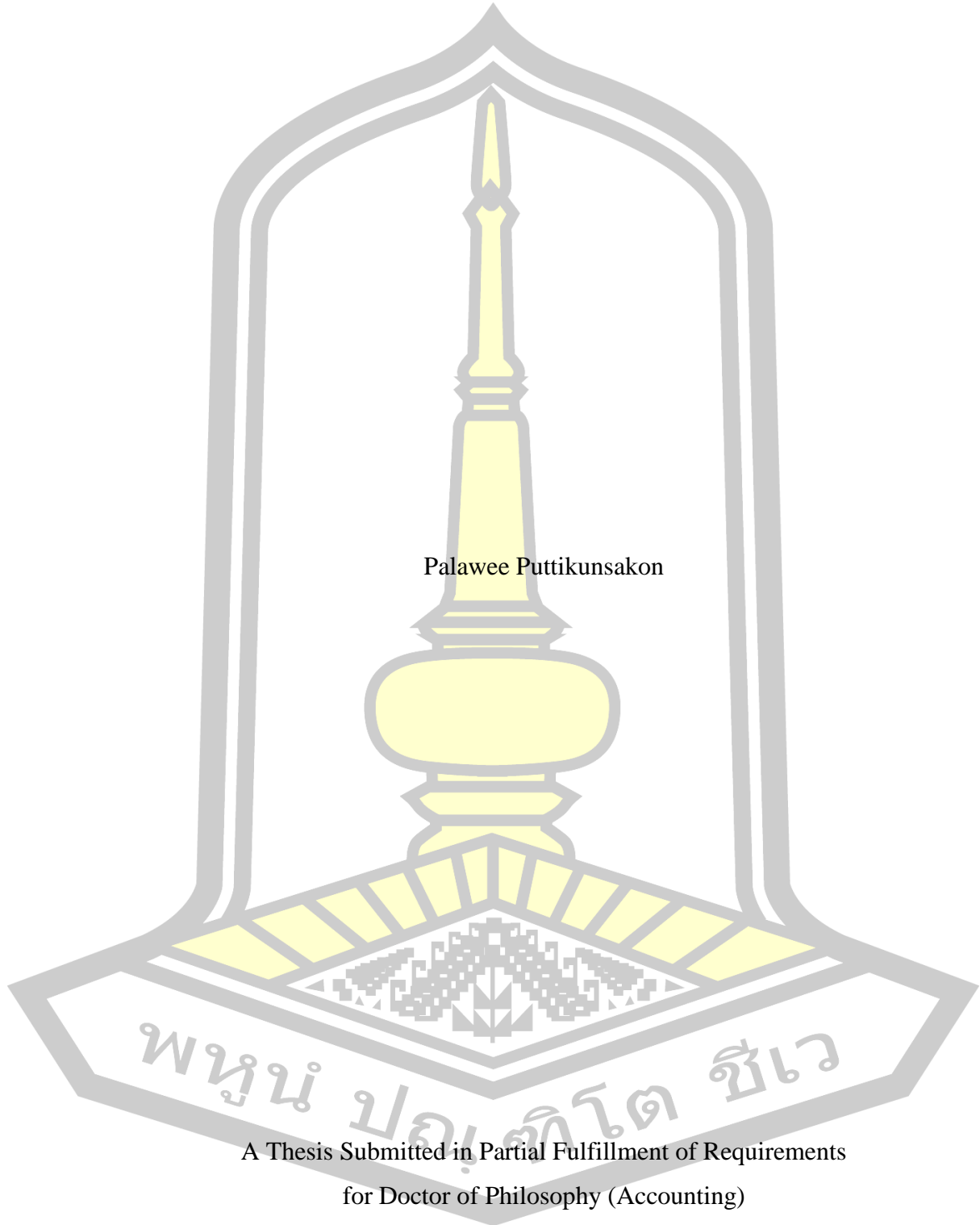


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April 2020

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ABSTRACT

Management accounting information usage refers to the process of using accounting information in corporate management by using information in various dimensions includes product costing system, technical information, and customer service system for use in planning, control, and decisions that lead to value-based risk management, value creation and corporate sustainability. Therefore, the main research objective is to examine the effects of management accounting information usage on corporate sustainability. The resource-advantage theory (R-A theory), stakeholder theory, and the contingency theory are applied to explain the relationship between these variables. The population and sample are the Electrical and Electronics businesses in Thailand, totaling 210 firms. The effective response rate was approximately 24.98%. The data were collected by a mail survey, and chief accounting officer of each firm is the key informant. The ordinary least squares (OLS) regression analysis was used for hypothesis testing.

The results demonstrate that all dimensions of management accounting information usage have an influence on all of the consequences. Especially, technical information and customer service system have the highest effect on corporate sustainability. Furthermore, the research finds that value-based risk management has a significant positive effect value creation and corporate sustainability. Similarly, that value creation which positively influences corporate sustainability.

From these findings, executives can be helped to analyze and justify key components that may be more critical in utilize the components of management accounting information usage including product costing system, technical information, and customer service system to succeed in value-based risk management, value creation, and corporate sustainability. Besides, executives can be implement the product costing system that provide the important cost information for decision-making such as sourcing, product pricing, target pricing focus, producing design, and increasing or decreasing the product. In order to increase the level of firm's ability to develop modern product design and service that meet the needs of customers very well from using customer service system information. Furthermore, allow

management to continually plan for improving their technical information in order to maintain and increase of production process to eliminate wastage continuously (lean). The technical information is used of information and communication technologies in the social field to be useful in the management a way to eliminate the risk and not waste in the production process (six sigma) which technical information usage led to value creation and corporate sustainability. Moreover, the accounting information will help build on its capable platform, and make the capabilities more inimitable to achieve competitive advantage and sustainability.

Keyword : Management accounting information usage, Value-based risk management, Value creation, Corporate sustainability



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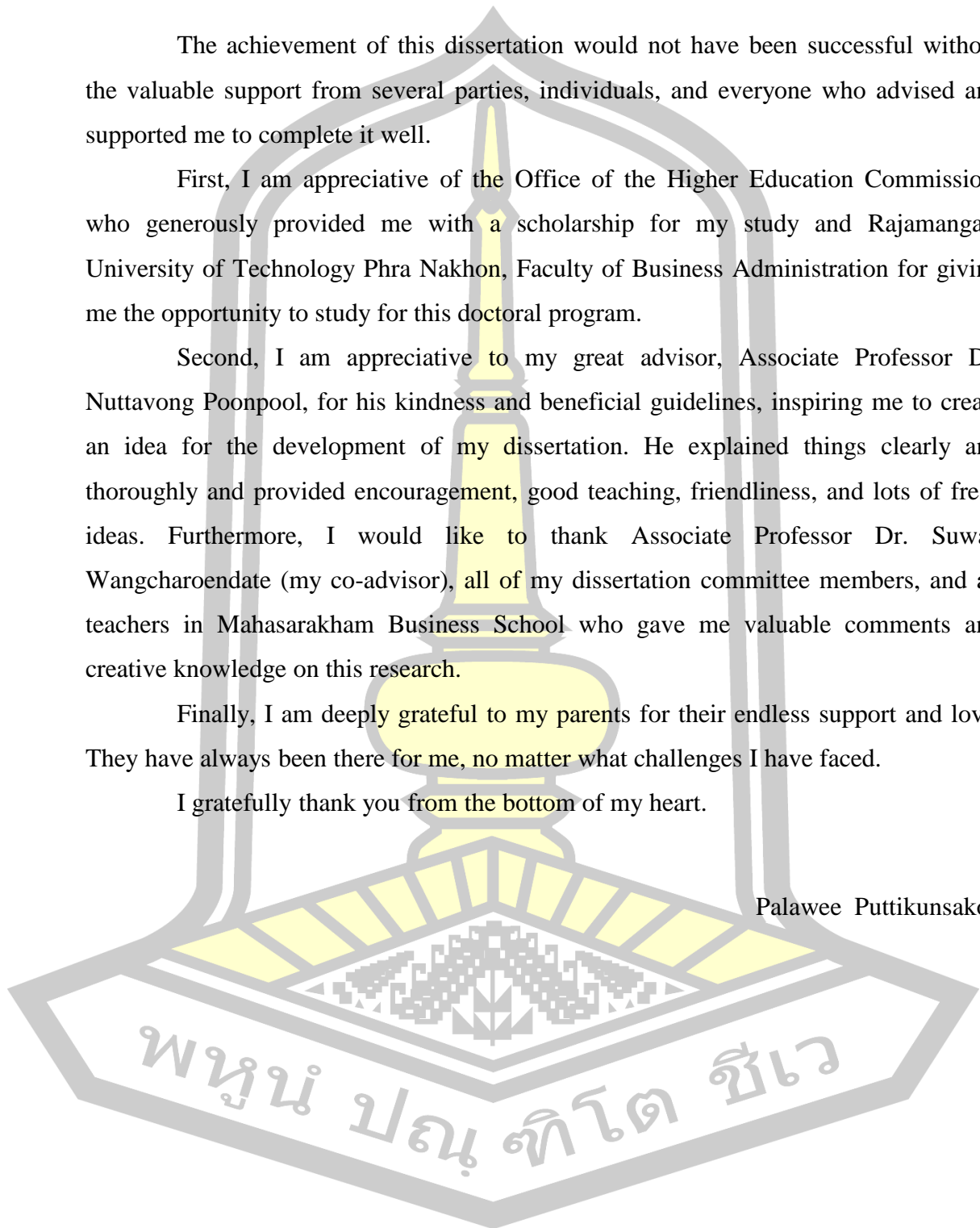
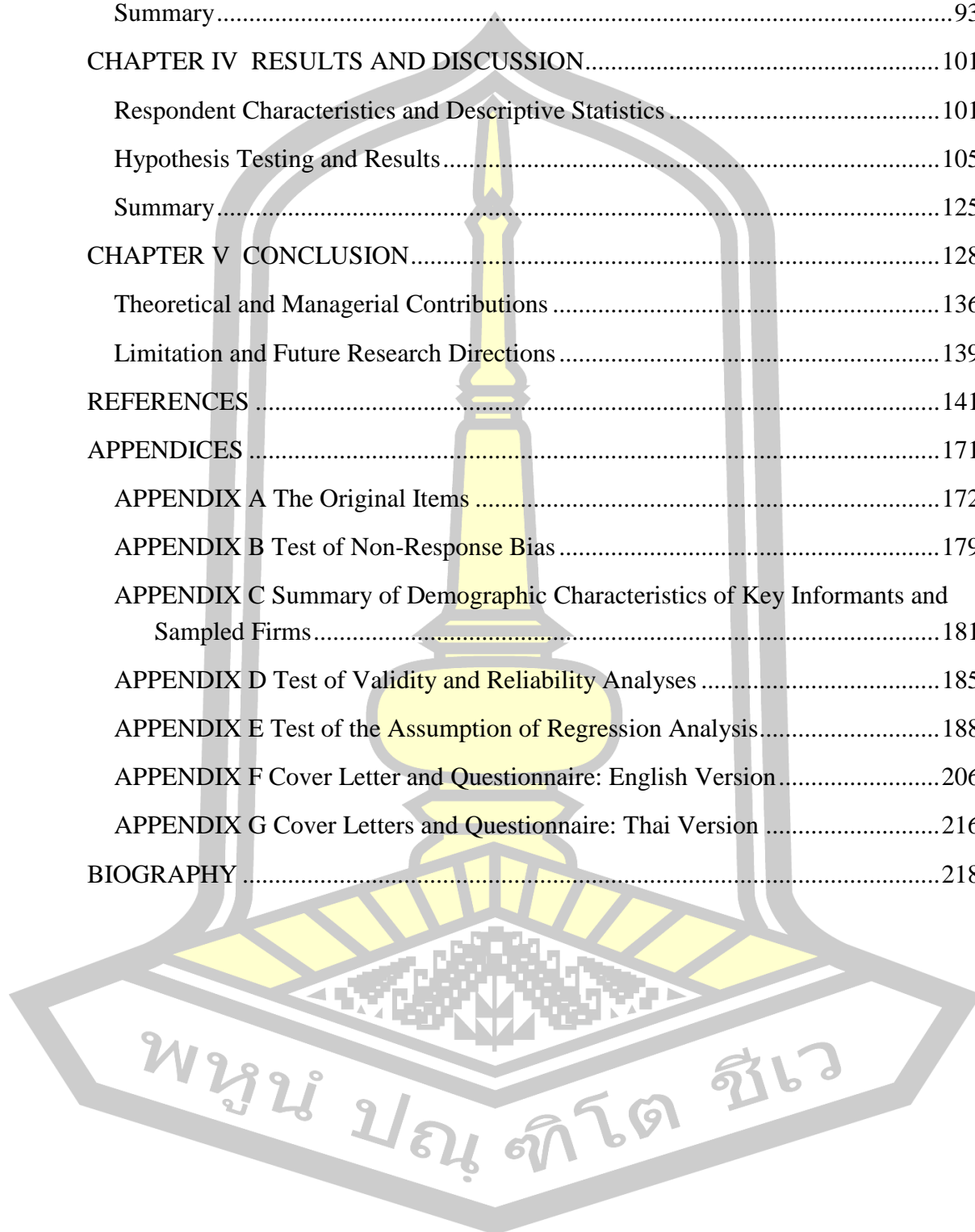


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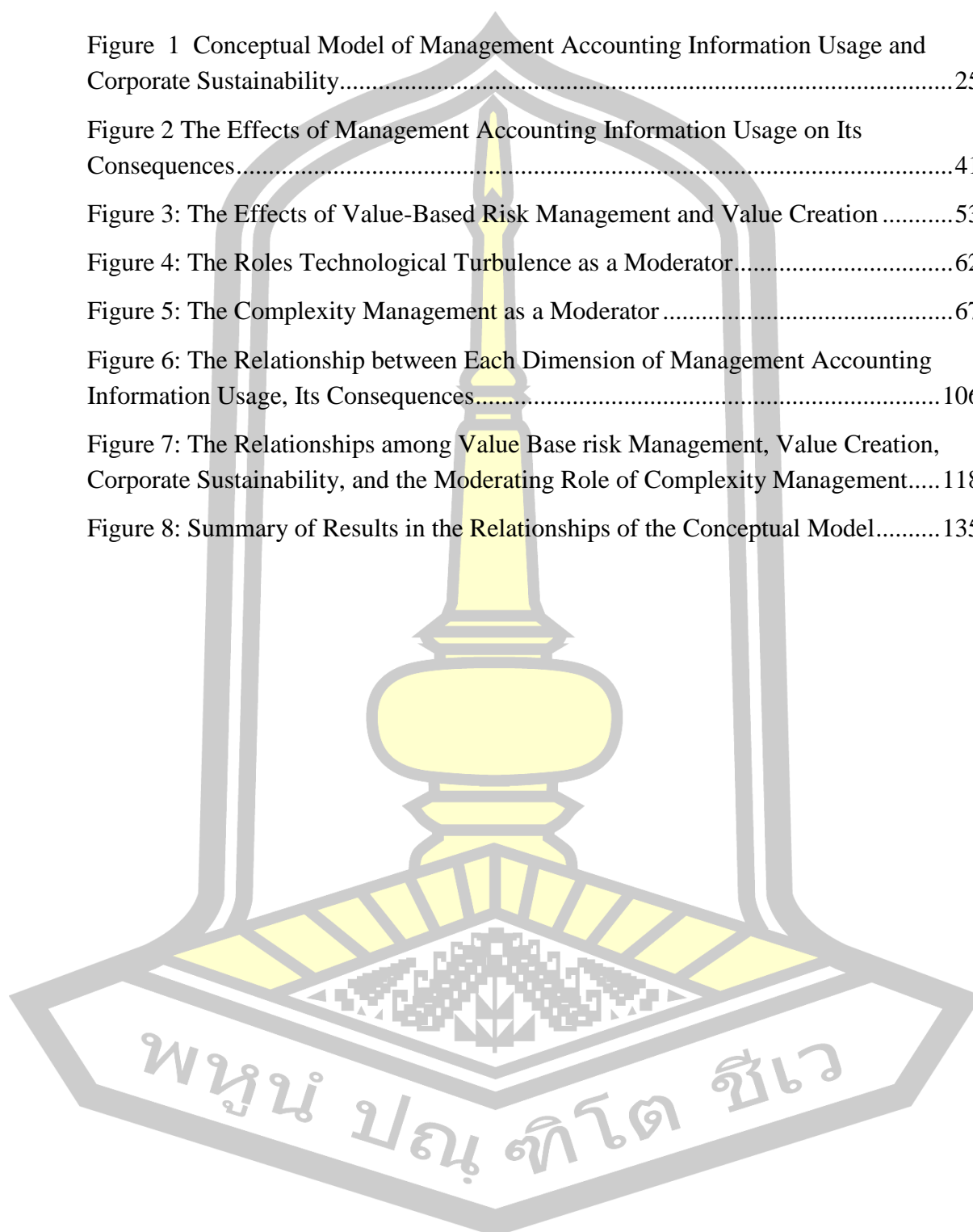


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CHAPTER I

INTRODUCTION

Overview

When today's world has entered the era of digitalization society, rapid development in science and technology has caused many new innovations. In addition, changes in the economy, society, and politics, these things lead to the situation of more intense business competition (Day, 2015). The most organizations are trying to find methods and tools of performance to be effective, including value creation for products and services. The creating different innovations will support strengthen the companies in dealing with advancement, complexity under the context of technological, economic and social changes (Calabretta and Kleinsmann, 2017). Moreover, as a guideline for creating success, increasing opportunities to profit, and generating returns for various stakeholders with the main objective to create the survival of the business, on the other hand, when businesses cannot be adaptation to the changes will eventually be a failing firms (Starbuck, 2017).

Likewise, Jurisch et al. (2014) suggest that in the new economic environment is a factor affecting on the innovation creation process due to the rapid of technological and digital advance affect to consumption behavior and changing customer demands. Moreover, resistance from strict independent organizations on the environment, and the impact of intense internal and external competition, especially in the Electrical and electronic business industry groups (Richins et al., 2017). These situations enabling executives need to improve the management style and operational strategies to that the organization can survive sustainably, and have a good foundation for future operations. However, the success of the organization depends on the ability of managers to planning, controlling, directing, and decisions making to solve problems and leading to organization goal (Moffitt and Vasarhelyi, 2013). Therefore, the corporate's executives try to scramble a competitive advantage, strategic decisions, and solving problems in various situations of business efficiently and

quickly. They need to use management accounting information as the tool for planning and decision making (Lindgreen, 2012).

Moreover, management accounting has played an important role in the compilation various knowledge of business management in order to meet the needs of managers, and can use those information to be useful in the development of work processes continuously and systematically (Schmitt and Klärner, 2015). Particularly, the business has entered the era of "The knowledge-based economy" which focuses on information reliance to enhance knowledge and intelligence in order to maximize from the decision-making of firms executives (Jorgensen and Messner, 2010). This is consistent with (Sutton, 2010) found that the management accounting information is most importance to the achievement of firms. The management accounting information usage has resulted in the creation to an efficiency and effectiveness of operations system from using past error information to develop operational processes for future planning.

Similarly, Hopwood (1973) explains that management accounting information is being a medium for linking information between various departments of the organization in order to achieve the ultimate goal. The management accounting information usage is recognized as one of the furthest important intangible resources in the organization. Likewise, Zawawi and Hoque (2010) suggest that in the new economic environment forces the organizations to create innovations, especially related to management accounting information usage techniques. These are situation makes the organization have to learn and adapt to keep up with changes by creativity and innovation to enhance the level of products, services, and process as lead to create value for all stakeholders of firms (Sullivan et al., 2012; Moller, 2006).

Besides, Kaplan and Norton (1996) describe that management accounting information covers both financial and non-financial information, which encourages organizations to be more successful. For the following reasons: first, the use of management accounting information to balance performance measurement between performance indicators and outcomes. That is the performance indicators result in increased market share, while the result may be driven by performance indicators such as increased customer satisfaction, product or service availability quality, etc. Second, focus on both short and long term success, that is management accounting

information is presented in monetary terms that focus on short-term performance such as product sales, revenue, and profits including information that cannot be described as money, customer satisfaction, internal work processes, learning and growth, etc. Finally, management accounting information provided a broader management perspective and cover different perspectives across the organization. In addition, executives will be able to perceive that the financial performance has increased or decreased from the non-financial performance indicators. This will result in better learning and better performance for the organization (Kaplan and Norton, 1996; Ittner and Larcker, 1998).

Therefore, in this research, management accounting information usage refers to the process of using accounting information in corporate management by using information in various dimensions includes product costing system, technical information, and customer service system for use in planning, controlling, evaluation, and decision-making that lead to value-based risk management, value creation and corporate sustainability. The literature review found that the management accounting information usage was associated in value creation and sustainability of corporate. In the study of Turner and Hilton (2006) found that the product costing information has effect of planning and decision-making on volume annual de production. The information usage to help calculate results, appropriate cost allocation, accuracy in pricing of products and services, throughout the product costs reporting without errors even though the production system is highly complex (Al-Omiri and Drury, 2007). Furthermore, production cost information is beneficial to executives in the development and improvement of production processes, cost reduction, the use of new innovations in order to differentiate goods and services, respond to needs and create maximum satisfaction on customers as well as stakeholders effectively and long-term competitive ability (Zainuddin et al., 2015; Andersch et al., 2013; Fons, 2012; Horngren et al., 2008).

In addition, the research of Adler et al. (2003) indicates that management accounting information is used as a tool to develop advanced production techniques effectively. Similarly, Kraft and Truex (1994) explained that the concept of modern industrial management is focused on changing high-cost manufacturing processes to the use of advanced technology and appropriate production techniques, Lean

techniques are used to transform wastes and losses into all forms to value creation (Fullerton et al., 2013). Using six sigma to reduce errors and deal with problems that arise during production. The six sigma method is approach to improve the production processes, goods and services, and continually reducing defects in the organization (Kwak and Anbari, 2006). The theory of constraints (TOC) to focus is eliminating the inefficiencies of the production process to improve the performance (Andersson et al., 2006). In addition, today is used information and communication technology (Green ICT) to help manage the resources available, to develop the production process and environmental friendly products lead to sustainable growth (Bloom et al., 2014)

Furthermore, the other role of management accounting information is the reporting of customer information. Changes in the economy, society, and technology have resulted in rapid changes in behavior and demand of customer. This is situation increasingly intense competitive results in companies having to find strategies to interact with competitors (Guilding and McManus, 2002). Thus, the organizations must track changes to report information to manager use for plan and making decisions so they can adapt to the changing needs of their customers and creating an advantage over competitors. Consistent with the Chang et al. (2014) and Zainuddin et al. (2015) explain that the customers' information usage lead to capacity building customer profitability analysis, forecast profits and earned from customer future, and tracks customers warranty claims.

Certainly, the management accounting information usage is related to creating value both from value-based risk management and value creation lead to corporate sustainability. Firstly, the modern enterprise management focuses on risk management by using management accounting information as a tool to plan, control, track, promote and coordinate to reduce the risks that arise from the production process. This is consistent with Donnell (2005) explained that management accounting information helps to reduces complexity and uncertainty in the workplace including risks that may occur in the production process and identify events that could threaten business process performance. And to develop advanced production techniques to increase productivity and reduce losses caused by the production process. Similarly, Olson and Dash (2010) explain that customer demand is changing rapidly, using customer satisfaction reports reduces the risk of losing old customers

that may affect to product sales and profits of the company. Thus, customer information has been applied as a tool for business risk management.

Secondly, the management accounting information is related to the value creation of corporate. In the research of Wang et al. (2006) found that the management accounting information usage positively impacts the cost effectiveness, profitability and growth of market share, the product development, brand equity, customer value and satisfaction, pricing excellence, build global reach, and improved innovation between suppliers and customers (Leek and Christodoulides, 2012; Faroughian et al., 2012; Toon et al., 2012; Berghman et al., 2012; Wang et al., 2006). The organizations with value creation can create wide and varied markets, and devote themselves to creating, delivering, and exchanging products or services that have value for customers and lead to long-term success, competitive advantage, firm's survival and leading to corporate sustainability (Lindgreen et al., 2012; Ulaga and Chacour, 2001).

Next, the previous researches indicate the organizations that aim at develop themselves to achieve sustainability can be reflected by the financial and non-financial performance of the firms. This is consistent with Szekely and Knirsch (2005) argue that corporate sustainability is continuous to increase of business income and of profitability, including improved product and service quality and growth of market share. Likewise Dyllick and Hockerts (2002) explain that improved goods and service quality to meet customer satisfaction is important in creating an excellent product brand. Similarly, Payne and Frow (2005) show that customer relationship management by focusing on creating new purchaser together with building good association with old customers that can affect market share growth and achieve long-term performance. Furthermore, Fombrun (2012) suggested that both branding and reputation of corporate are associated with building confidence and loyalty among all stakeholders, which are on the basis of values that help deliver good results in terms of reducing marketing costs, consistent increase in revenue, and leading to sustainable success. Moreover, today's sustainability concept places emphasis on being able to adapt to rapid change, by developing insights that lead to the development of creativity and innovation to create value for the organization (Welford, 2016).

Additionally, from the literature review, there are factors that are the catalyst for the impact of management accounting information usage. Due to companies have changed the way they do business. The speed with which technology evolves and changes has made a big influence on the innovativeness of companies (Lusia, 2016). In addition, the advancement of information technology has resulted in learning and understanding of how work and strategies are developed to create a competitive advantage. Therefore, organizations must be able to cope with the fluctuations in technology with rapid change (Mu et al., 2009). In the same way Lane et al. (2006) stresses that the corporate learning necessary to their survival because absorptive capacity is a mechanism used to fortify, composition, or refocus a firm's knowledge base. Furthermore, the executives need to use more information technology to allocate resources, to plan, and change work processes to keep up with changes and create value for the company (Chenhall, 2003). Thus, the firms must consistently keep maintaining adaptability and flexibility in ever changing world (Rosenzweig et al., 2011; Tapscott, 1996).

Besides, large organizations may face complexity, these include the complexity of the organizational structure, the complexity of the work process, the complexity of the management, or the complexity of the production. These problems are the cause of the failure of the organization. So, valuable organizations will be able to adapt to changing business and it has ability to create work processes, methods, and new innovations to solve problems or to improve the organization's work processes (Alavi et al., 2001). Similar, Chen et al. (2005) provides that the value creation of organization is the result of knowledge creation is fundamental to the survival of a business. Creating knowledge leads to effective planning and management to search, reduce, and eliminate work complexity by creative way or innovation to solving problems, and improve the work process of the organization better (Karababa and Kjeldgaard, 2014). Therefore, if valuable organizations are faced with complexity, they will need to find ways to manage such complexities and reduce the problem of work related errors, and will lead to sustainable future business survival (Smith et al., 2014; Smith et al., 2008).

This study aimed to investigate the use of management accounting information of electrical and electronics businesses in Thailand due to the electricity and

electronics business is one of the important industries for the Thai economy, it can generate a lot of revenue from the export of goods, has been expanding rapidly, continuously, and performs an important role in the employment of large numbers of workers in the industry. In addition, the electricity and electronics industry in Thailand is one of the ten industries in which the Thai government aims to develop in the digital age (Electrical and Electronics Institute, 2018). However, the electricity and electronics business are severely affected by the rapid changes of environment in the economy, society, and technology, due to the products and services of the electrical and electronics businesses have short product life cycles. And from the increasingly intense business competition both domestic and foreign markets as a result of the liberalization of trade and China has begun to play a greater role in the global market (Electrical and Electronics Institute, 2018). As a result, Thai manufacturers will have to improve their management efficiency and upgrade their products and services to diversity and differentiate themselves from competitors in order to create more value, avoid price competition, and create new marketing opportunities. Therefore, the electricity and electronics businesses are interested in this study, which is expected to show that the use of management accounting information is important and can value creation and corporate sustainability.

The contributions of this research are as follows. Firstly, the much of empirical researches focuses the strategic aspects of management accounting information usage involving increasing of the firm performance but in the few studies to affects to create value. Secondly, the finding of this research may ascertain new three dimensions of management accounting information usage. These dimensions are product costing system, technical information, and customer service system which is integration to lead the organization towards sustainable business goals. Third, this research expands knowledge of relationships among management accounting information usage, value-based risk management, value creation, and corporate sustainability. The findings of this research may be useful for organizations to improve and develop production processes that will encourage add value to goods and services. Aiming to enable the business to create growth and be ready to support the continued development of the business in the future in a sustainable manner with an emphasis on management accounting information usage. Lastly, this study is

empirical evidence that gives insight into the results of management accounting information usage for electronic and electrical businesses in Thailand to creating value and corporate sustainability.

Finally, this research provides an important contribution to theory, by advocating and expanding the resource-advantage theory, contingency theory, and stakeholder theory that are used to explain the conceptual model in this research. Moreover, resource-advantage theory and the contingency theory are used to explain management accounting information usage as a resource and capability of the corporate which is generated from based on learning and adaptation to business situations for long-term operational and organizational survival. According to the resource-advantage theory, the differences in resources and capabilities lead to achieving competitive advantage and gain higher performance in environmental changes. According to the contingency theory, this research uses to demonstrate the value of technological turbulence and complexity management that positively affect the relationships among management accounting information usage, management accounting, usage outcomes, and sustainability outcomes.

Purpose of the Research

The main research objective is to examine the effects of management accounting information usage on corporate sustainability. The following explains all research objectives:

1. To examine the effects of each dimension of management accounting information usage (product costing system, technical information, and customer service system) on value-based risk management, value creation, and corporate sustainability;
2. To investigate the effects of value-based risk management on value creation and corporate sustainability;
3. To explore the impacts of value creation on corporate sustainability;
4. To test the moderating effect of technological turbulence that has influences on the relationships among each dimension of management accounting information usage, value-based risk management, and value creation, and;

5. To examine the moderating effect of complexity management that has influences on the relationships among value-based risk management, value creation, and corporate sustainability.

Research Questions

The key research question is, How does management accounting information usage influence corporate sustainability? Moreover, the specific research questions are presented as follows:

1. How does each dimension of management accounting information usage (product costing system, technical information, and customer service system) have an influence on value-based risk management, value creation, and corporate sustainability?
2. How does value-based risk management have an influence on value creation and corporate sustainability?
3. How does value creation have an influence on corporate sustainability?
4. How does technological turbulence moderate the relationships among each dimension of management accounting information usage, value-based risk management, and value creation? And
5. How does complexity management moderate the relationships among value-based risk management, value creation, and corporate sustainability?

Scope of the Research

This research focuses on the examination of the impact of management accounting information usage (product costing system, technical information, and customer service system) on corporate sustainability through the mediator variables (value-based risk management and value creation). In addition, this research needs to study the moderating effects of technological turbulence on the relationships among three dimensions of management accounting information usage and value-based risk management and value creation. Furthermore, this research demonstrates the

moderating effects of complexity management on the relationships among value-based risk management, value creation and corporate sustainability.

In this research, management accounting information usage refers to the process of using accounting information in corporate management by using information in various dimensions includes product costing system, technical information, and customer service system for use in planning, controlling, evaluation, and decision-making that lead to value-based risk management, value creation and corporate sustainability. Management accounting information usage comprises three dimensions: product costing system, technical information, and customer service system. Product costing system refers to system of production cost information reporting include direct materials, direct labor, and manufacturing overhead for calculation product cost, selling price, standard cost reporting includes price variance, material usage variance, labor price variance, labor quantity variance, spending variance, efficiency variance, and capacity variance, the analysis, measurement, and reporting to costs of prevention damage or lack of quality, appraisal costs of production processes quality, and failure costs of improving and correcting about the quality of goods and services. Technical information refers to a set of technical information for reporting the use of production techniques lean, six sigma, theory of constraints (TOC) and environmental information and communication technologies (green ICT) to improve the production process, damage reduction, environmental management, and reduce the restrictions on the work appropriate. Customer service system refers to the process in collection, reporting, and information usage of customer service for sales forecast, forecast revenue and profits from target customers, determining market share, analyzing and evaluating customer profitability, tracking, and management to reduce costs of customers warranty claims.

The consequences of management accounting information usage include value-base risk management, value creation, and corporate sustainability. Value-based risk management is the corporate competence to risk management about searching, identifying, defining guidelines for action, determination of indicators, risk assessment and management, monitoring the performance of risk management plan, the promotion and coordination to understand the risk management of personnel in the organization to find effective ways to prevent potential business risks include risk

of fluctuation of raw material price, customers risk, competitor risk, and financial risk. Value creation as the corporate ability to take advantage of resources include man, money, material and machine, and management, creating efficient production processes, modern product and service design, the value co-creation of all stakeholders, the creating corporate image to be outstanding, unique, unlike, and difficult to imitate by using brand, symbol, slogan, and distribution channels to create a competitive advantage. Besides, value-based risk management and value creation are expected to have an impact on corporate sustainability. The independent variable in this research is corporate sustainability. It refers to the result of achieving in long-term objectives from the increase of sales, income, profit from operations, financial position, trends in investment growth, expansion of production and export, establishing good relationships and loyalty of all the stakeholders, creating competitive advantage, learning and adaptation to business situations, and protecting the environment and society to support and improving the quality of life of people in society.

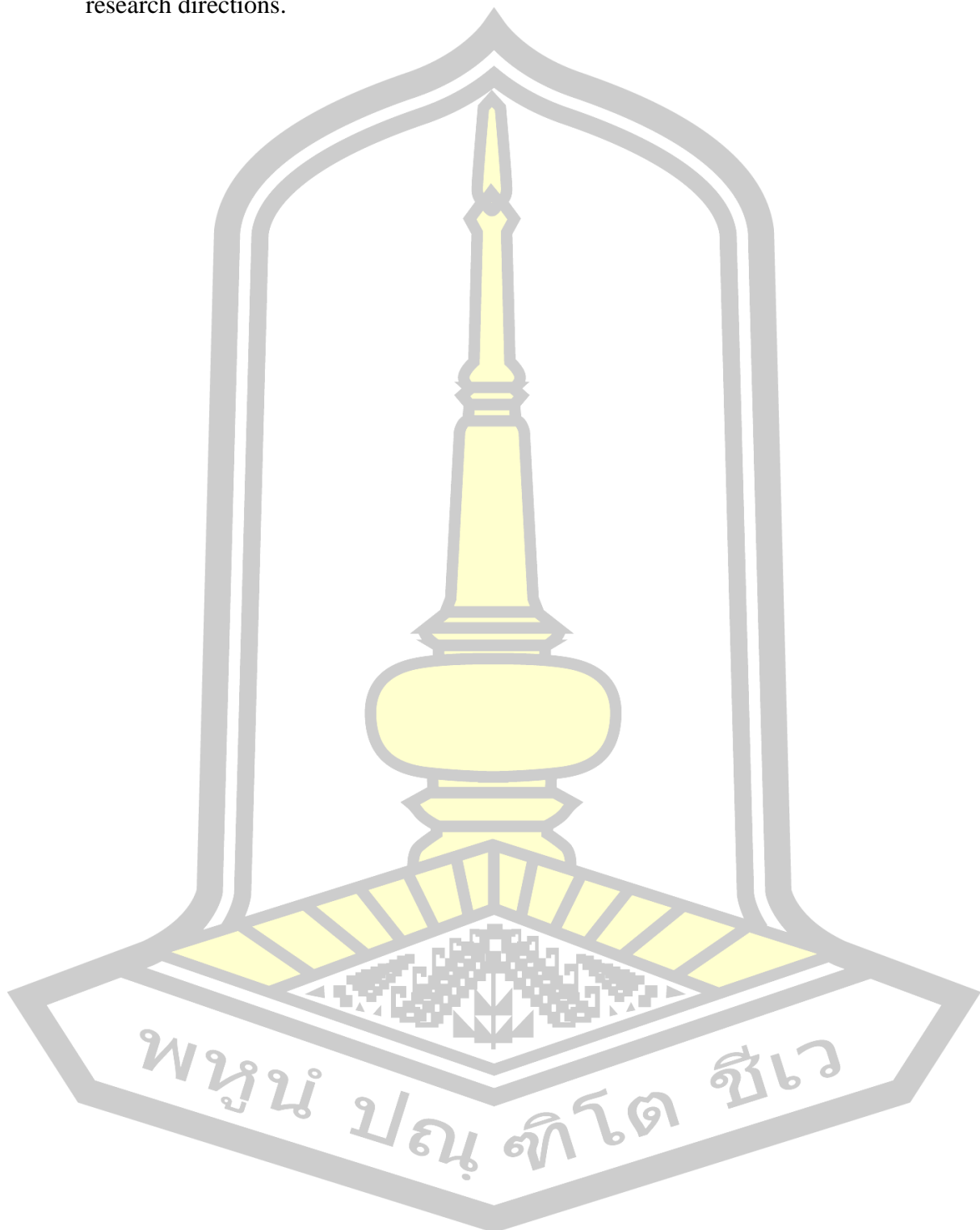
This research proposes that a technological turbulence moderates the relationship between each dimension of management accounting information usage and its consequences (value-based risk management and value creation). Meanwhile, technological turbulence is the corporate competence about learning and adaptation to technological advances to contribute to the analysis, decision-making, and strategy formulation for producing quality products and services to create a competitive advantage, can make the most benefit to develop the value of the corporate, and risk monitoring effectively and effectiveness. Furthermore, complexity management is a moderator variable between the consequences (value-based risk management and value creation) and corporate sustainability. Complexity management relates to the ability of the corporate to plan the work to achieve good management, determining appropriate responsibilities, creation of knowledge about complexity management leads to a reduction in workflow to create a production and service process with good quality. This research develops a framework by using three theories consisting of the resource-advantage theory, stakeholder theory, and contingency theory to explain the relationship between the variables.

In addition, the population in this research is the electrical and electronics businesses in Thailand, which were taken from the database of the website: www.thaieei.com of the Electrical and Electronics Institute of the Ministry of Industry in Thailand. The electrical and electronics businesses in Thailand are businesses of interest for this research due to the fact that these firms are severely affected by the rapid change of economic, social, and technological environment because the products and services of the electricity and electronics business have a short life cycle and need to adapt to the technology, rapid change of customer behavior, and competitor. In addition, the electrical and electronics businesses in Thailand are one of the ten industries that the Thai government aims to develop in the digital age. Therefore, the electrical and electronics businesses are of interest in this study, which results are expected to demonstrate that management accounting information usage is important and increases to create value and sustainability for the organization. In this research, chief accounting officer from each firm are the key participants. The questionnaire is a tool used to collect data. The test of hypotheses by using multiple regression analysis.

Organization of the Dissertation

This research is organized in five chapters. Firstly, chapter one demonstrates an overview, the motivation of study, research gap, purposes of the research, research questions, and scopes of the research. Second, chapter two comprises a related literature review and research hypotheses with the extensive description on all constructs in the conceptual framework, theoretical foundations, the definition of each variable studied, and describe the relationships between constructs based on the theoretical framework used to support and confirm hypotheses for the empirical testing. Following, chapter three represents the research method, including population and sample selection, data collection procedures, variable measurements of each construct, statistical techniques equations to test the hypotheses, the exam of validity and reliability, and the non-response bias testing of this research. After that, chapter four demonstrates the empirical result of this research and discussion. Finally, chapter five exhibits the results and conclusions of all hypotheses testing, the

theoretical and managerial contributions, limitations, and suggestions for future research directions.



CHAPTER II

LITERATURE REVIEWS AND CONCEPTUAL FRAMEWORK

Chapter one provides the overview of the information with management accounting information usage which entails the research motivation, the purposes of the research, the key research questions, and the scope of the research. This chapter demonstrates to better understand management accounting information usage which emphasizes the theoretical foundation, the conceptual framework, the relevant literature review, and the research hypothesis development. The key construct of the conceptual model of this research is management accounting information usage. This research provides empirical evidence that management accounting information usage may enhance corporate sustainability with regards to the consequences of management accounting information usage. The resource-advantage theory is applied in this research to explain how management accounting information usage affects value-based risk management, value creation, and corporate sustainability, and describes how value-based risk management influences on value creation.

In addition, the stakeholder theory will be used to expound how value-based risk management and value creation affect corporate sustainability. Furthermore, the contingency theory is useful to give an explanation how technological turbulence moderates of the linkage among the management accounting information usage including product costing system, technical information, and customer service system on value-based risk management and value creation, and complexity management moderate the relationships among value-based risk management, value creation, and corporate sustainability.

The literature review is conducted to provide an understanding of all constructs in the proposed conceptual model and to develop the research hypotheses for testing. The contents are divided into three sections: the theoretical foundations which are used to explain the conceptual model, relevant literature reviews, and research hypotheses development, and summary, respectively.

Theoretical Foundations

This section explains the theoretical foundation which supports the links between conceptual relationship models. Many theories have been used in previous studies to explain management accounting information usage. For example, resource-based view (RBV) is the theory which focuses on internal organization factors, both tangible and intangible consist of all assets, capabilities, organizational process and attribute, information, knowledge, and know-how that controlled by firm. It can be used to implement competitive strategies which led to efficiency and effectiveness of the firm and achieved to sustainable competitive advantage (Hunt, 2012; Maijoor and Witteloostuijn, 2002; Barney, 1991; Wernerfelt, 1984). Knowledge-based view (KBV) which was developed from RBV determines knowledge as a very important strategic resource because knowledge crucially enables an organization to obtain firm performance (Wang et al., 2014). The knowledge creation process directly concerns with humans to produce resources as important factors of production and results in differences of assets or performances among the organizations. This depends on knowledge and ability to use and develop knowledge inside the organization for transferring knowledge and making competitive advantages in the rapidly changing environment (Curado and Bontis, 2006).

Moreover, capability-based view is applied to strategic resource leading to create knowledge and special capability for the use intangible asset to perform better operational control of organization. These are specific capability and knowledge of firms which comprise two attributions that are asset accumulation replicability and inimitability to develop innovative operational management and control forms, leading to sustained competitive advantages and performance (Cabral et al., 2015; Zhou and Wu, 2010). Organizational theory is the theory to explain organization structure management and provides administrative options for the organization to obtain efficiency and effectiveness (Fanelli et al., 2009; Dekker, 2003).

In addition, organizational learning theory is the concept of organizational process which concerns with collectives of learning through interaction with the environments (Sinkula, 2006; Fiol and Lyles, 1985) in need of responding to the environmental change. Organizational learning is the development of new knowledge

or insight potential of changing behavior (Huber, 2008). Organizational learning theory comprises multi dimension constructs, including information acquisition, distribution, interpretation, and memory. Knowledge acquisition reflects the process of gaining the knowledge, which concludes three steps, namely, information acquisition, dissemination, and interpretation (Yeniyurt, et al., 2005). In addition, the organizational learning concept that is found in most academic literature is recognized as an important component of a sustainable competitive model (Van Grinsven and Visser, 2011). As same as Giniuniene and Jurksiene (2015) argues that corporate learning is associated with dynamic capabilities that affect firm's performance. While Breznik and Hisrich (2014) indicates that the learning process leads to innovation. Franco and Haase (2009) found that learning in the organization positively impacts the financial and non-financial performance of the firm's.

Furthermore, Information richness theory is ability present various information for negotiation of different interpretations to resolve ambiguity and facilitate understanding between each other (Daft and Lengel, 1984). In research on consumer behavior found that a variety of information and a sufficient amount will help reduce the risk or uncertainty about the product, which results in customers making the decision to buy that product (Hoffman and Novak, 1997). Similarly, businesses that have a lot of information and can valuable information usage to improve the operational efficiency, include increasing data integrity for decision-making in production planning and control to achieve key organizational goals (Ben Amor et al., 2017).

However, in this research, only three theories were used to explain the relationship linkage of the conceptual model. The three main theories promoting this research are the resource-advantage theory, the stakeholder theory, and the contingency theory that were selected for explaining the links of conceptual relationship models in order to understand all relationship clearly. Likewise, the resource-advantage theory is premised on the notion that process in creating competitive advantage to the based on the use of administrative accounting information which was the intangible resource (Hunt and Morgan, 2006). The use of information brings in knowledge and understanding in creativity new innovations that are tools and techniques for planning processes, products that are difference,

outstanding and unique that will lead to customer satisfaction (Hunt, 2011; Hughes and Morgan, 2007). In addition, the resource-advantage theory suggests that when firms employ the resource information advantage for value creation, and create competitive advantage from capability fosters and maximize of both management and employees leading to higher corporate sustainability (Hunt, 2012; Hughes and Morgan, 2007; Bourguignon, 2005; Makadok, 2001)

Furthermore, the stakeholder theory is a concept for the connection between a variety of stakeholders and firms. The stakeholder theory explains how value creation and value-based risk management can create corporate sustainability. Indeed, the contingency theory is used to describe the phenomenon of external environmental factor change about technological turbulence moderator variables influencing on relationship between management accounting information usage lead to value base risk management, value creation, and create the corporate sustainability (Cilliers, 2011). And internal environments factor for complexity management moderator variables in organization which is moderator variables to influence on relation among value-based risk management, value creation, and corporate sustainability.

Resource-Advantage Theory

The resource-advantage theory (R-A theory) is a theory explaining the evolution of the competitive process that has been developed from many concepts include marketing, management, supply chain management, ethics, economics, law, social sciences, and general business (Hunt and Morgan, 1995). This theory is part of the a general theory of competition (GTC) that considers the factors that affect business competition consist resources, competences, productivity, and economic growth (Hunt, 1995). Besides, Hunt (1997) given that competition is not just separating limited resources, but it's to more value creation for resources.

Furthermore, Hunt and Lambe (2000) stresses that The foundational premises of R-A theory include (1) heterogeneous demand and dynamic of industries (2) imperfect and costly of consumer information (3) imperfect and costly of firm's information (4) human motivation is constrained self-interest seeking (5) financial performance excellent (6) the firm's resources are financial, informational, organizational, and relational physical (7) heterogeneous and imperfectly mobile of

resource (8) the role of strategic management and (9) disequilibrium-provoking from innovation endogenous is competitive dynamics. Thus, the R-A theory focusing on heterogeneous and disadvantages in resources firms, proactive and reactive innovations contribute to the value creation and competitive advantage (Hunt and Madhavaram, 2006).

Likewise, Hunt (2011) states that the R-A theory demonstrated to significance the heterogeneous resources, the competitive advantages and disadvantages of firms. The resources are categorized into financial, physical, legal, human, organizational, informational, and relational. Examples of tangible resources are cash, plants, and equipment; whereas intangible resources include legal (trademarks and licenses), human (skills and knowledge of employees), relational (the relationships with suppliers and customer), organizational (controls, policies, processes, cultures, capabilities, and competences), informational (knowledge acquired from customers, competitive intelligence, and the firms' information of their own products and production processes) (Hunt, 2011; Hughes and Morgan, 2007).

In fact, R-A theory is a combination of resource-based view theory and knowledge base theory that is the basis for building firms competitive strength. The resource-based view theory explains that resources in an organization are important factors in creating value and can create a competitive advantage. With the following characteristics: 1) valuable resources 2) rare resources 3) imitate resources and 4) non-substitutable resources (Wooliscroft and Hunt, 2012; Hlland and Wade, 2004; Morgan et al., 1997; Barney, 1991). The knowledge base theory is the ability of the individual and the organization's resources. The body of knowledge can create organizational capacity that leads to the development of competitiveness and survival (Ranft and Lord, 2002). Therefore, the R-A theory is a way to achieve sustainable competitiveness and business success. In accordance with Hughes and Morgan, (2007) explain that the capabilities and competencies are the components of competitive ability that result from the combination of skills, experience, and the accumulation of company knowledge. Likewise, Teece et al. (1997) rationale that the integration of resources and capabilities will lead to creates the firms unique capabilities.

Hughes and Morgan (2007) explain that R-A theory argues that creating competitive advantage is the result of creating more differentiation and value creation superior business competitors, based on heterogeneous resources between firms. In addition, Hunt (1997) indicates that excellent financial performance is the main objective of the business, but the firms will not be able to achieve success if 1) executives lack the ability and lack of information that good 2) the interests and goals of executives are different from business owners 3) financial performance is under pressure by executive's ethics. Consistent with the Hunt and Lambe (2000) argues that business competition has disequilibrium-provoking, a continuous process, and competition between businesses at all times in order to gain comparative advantages of resources. Likewise, Hunt and Lambe (2000) indicating that the comparative advantages in resources stimulates learning and adaptation for the organization, market position advantage, excellent financial performance, and sustainable business success. In this research, the R-A theory is applied to explain that management accounting information usage (including product costing system, technical information, and customer service system) is the intangible resource which creates to the value creation advantage (including value-base risk management and value creation) leading to corporate sustainability outcomes.

Stakeholder theory

Stakeholder theory is a fundamental theory of the concept of corporate management under the business ethics. The stakeholders are individual, groups of individuals, various segments related to the operations, and organizations who have a significant influence on the company's success. The Stakeholders are divided into two main groups, which are (1) the main stakeholders consist of customers, competitors, producers, employees and shareholders. And (2) secondary stakeholders include government, community organizations, the environment, or various activists (Freeman, 2010; Freeman, et al., 2010; Freeman and Cavusgil, 1984). Similarly, Roberts (1992) states that stakeholder theory is presented in terms of the relationship between the firms and many stakeholders, those groups or individuals can affect or be affected both positively and negatively from the activities or firms operations.

Moreover, firms performance efficiency is not only increasing profits, work process optimization, cost reduction, and creating a competitive advantage, good relationships with stakeholders are considered long-term success factors that will help promote the exchange of knowledge, the sharing of useful resources between each other, participation in social development, and overall results will affect the positive image of the organization (Iazzolino and Laise, 2016; Harrison and Wicks, 2013; Freeman, 2010; Freeman, et al., 2010; Harrison et al., 2010; Donaldson and Preston, 1995). Furthermore, Freeman, et al. (2010) stresses that giving importance to stakeholders is a value creation and mutual benefit between the company and other interested parties.

In addition, Harrison et al. (2015) and Walsh (2005) indicating that stakeholder theory is the development of a model relating to ethics and business, improving and resolving capitalism to create an understanding about to self-interest and profit-seeking legitimate, sharing and helping society, producing environmentally safe products and consumers. Likewise, James (2009) explains that creating economic value by increasing profits and benefits to shareholders is the primary duty and responsibility of the organization. On the other hand, value creation by creating financial security coupled with community, social, and environmental awareness. For example, the production of quality oriented products is important, innovative products that are environmentally of friendly and reducing waste from the production process to recognize the importance of the rights of all stakeholders. The broad stakeholder focuses direct predictors of firm enhanced capacity to deliver competitive sustainability performance (Kantabutra, 2014; Jiao, 2010).

The important thing that managers must consider in the context of business management is the decision-making process linked to the diversity of the stakeholders (Preston and Sapienza, 1990). Therefore, the application of executive stakeholder theory must analyze the pattern of operation with the stakeholder salience in order to create the best way, reduce the impact of significant risks, and dangerous conflicts in the operation. As the result of the decision will inevitably have both positive and negative effects on those groups or individuals involved (Mitchell et al., 1997). Similarly, Brugha and Varvasovszky (2000) explains that stakeholder analysis reflects the characteristics of the stakeholders that influence the decision-making

process in relation to the development of strategies and the direction of the organization's policies in order to be able adaptation and prepare for uncertainty and rapid change both present and future environment.

In accordance with, Ketchen et al. (2007) stating that stakeholders such as competitors are a stimulus for the creation of new innovations, the exchange of knowledge and useful information, product and service development, as well as ways to In effective strategic management in order to continually strengthen and gain trade advantages. In addition, stakeholders help to promote more good relationships with customers. Executives are able to understand and recognize the changing needs of the consumption of products and services quickly (Iglesias et al., 2019; Iglesias et al., 2018; Khandabi et al., 2014). Similarly, stakeholders have helped the company to understand the reality and see the importance of the business environment, such as economy, society, politics, culture, as well as environmental resource issues that promote good image of the organization and can adjust to cleverly fits the situation (Watson et al., 2018; Delmas and Toffel, 2004). Therefore, stakeholders are involved in creating value and helping to reduce risk from various impacts in the operations of the organization to contribute to the success and firms sustainability (Gyrd-Jones and Kornum, 2013; Newman, 2007). In this research, the stakeholder theory is applied to explain that how consequence variables (including value-base risk management and value creation) of management accounting information usage lead to corporate sustainability outcomes.

Contingency Theory

The contingency theory was presented in 1967 by Fred E. Fiedler. This theory is relevant to administration under predicament, including business environment that affects the operations of the organization. Contingency theory is a concept that was developed based on the conceptual independence that states that the suitability of an organization is to have a structure and system that corresponds to the environment and the reality it appears (Otley, 2016; Fiedler, 2006). In accordance with Chenhall (2003) indicating that management efficiency leads to sustainable success of the organization may not be based solely on having the best methods or tools, but it depends on the ability of the executive to use those methods or tools to suit the firm's situation.

Consistent with Sousa and Voss (2008) stresses that situational management is a concept that explains that predicament will determine the appropriate administration and decision-making style, therefore management must be able to analyze the predicament as best possible.

In addition, previous research has adopted contingency theory to explain the results of both internal and external environments. Sauser et al. (2009) found that external environmental factors, such as rapid technological changes, uncertainty in the business environment, social pressures, economic conditions, politics and society and the intensity of competition affecting firms performance. Organizational management that is appropriate for the situation under technological change, competitors, and customers is related to growth and survival ability of the firms (Kittikunchotiwut et al., 2013; Moilanen, 2008; Chenhall, 2003; Husted, 2000). Moreover, most managerial accounting research, contingency theory is used to explain the theoretical framework of the relationship between external factors and corporate governance and risk management (Jokipii, 2010), auditing (Curtis and Payne, 2008), and management accounting systems (Tse and Gong, 2009; Donaldson, 2001; Tushman et al., 1986).

Furthermore, this theory is used to describe in detail the relationships between internal environmental factors such as organizational structure, leadership, work processes, strategies, and organizational culture that may affect the situation within the firms. Lee and Yang (2011) found that different organizational structures are situation factors that will affect the appropriateness of the selection of the management system that leads to the firm performance. Additionally, Chen et al. (2011) stresses that the contingency theory describes the phenomenon of how to adapt strategies to suit the changing business environment. These things will help to promote the development of innovation or new things, helping to reduce the risk of dynamic organization operations, and create a sustainable competitive advantage. Besides, organizations with a flexible culture can adapt to survive at any time as the situation changes (Henri, 2006). Including the vision and experience of leaders is a factor that influences best practices. These are value creation in the development and improvement of the organization to suit the changing circumstances to achieve sustainable growth and survival (Ganescu, 2013; Betts et al., 2011).

Consequently, in this research the contingency theory is used to describe the phenomenon of management accounting information usage within the context of external environmental change about to rapid technological advances (technological turbulence). Moreover, technological turbulence influencing on relationship between management accounting information usage leads to value base risk management, value creation, and creation the corporate sustainability (Cilliers, 2011). This study aims to link understand on application of the theory of this research. Based on these rationales, it must be encouraging that this research implements the contingency theory to explain these moderator variables which link constructs between consequence variables and corporate sustainability. This is based on two factors: technological turbulence and complexity management, affecting a determined use of value creation management of a corporate. This is because firms will manage alternative method under the right circumstances. Thus, this study applies the contingency theory to explain the influence of moderator variable which is dynamic business environments factors including technological turbulence and complexity management.

In summary, the three theories explain the phenomena in this research, namely, the resource-advantage theory, stakeholder theory and contingency theory. The resource-advantage theory is applied to clarify the fact that management accounting information usage is the intangible resource of the firm which creates value-based risk management and value creation leads success to corporate sustainability. Also, the stakeholder theory is applied to explain the consequence (value-based risk management and value creation) of the management accounting information usage effects on corporate sustainability. Further, the contingency theory can explain that the moderator variable (technological turbulence and embracing complexity) which helps develop newer ways to manage corporate sustainability as shown in Figure 1.

Relevant Literature Reviews and Research Hypotheses

This section demonstrates the literature review that is relevant to the conceptual framework. According to the theoretical foundations, this is developed toward the integration of the resource-advantage theory, stakeholder theory, and contingency theory. Management accounting information usage is the main variable and the center of this research. In order to understand all relationships, the literature review is organized into three sections.

Firstly, as described earlier, this research purposes that three dimensions of management accounting information usage include product costing system, technical information, and customer service system are positively and directly associated with corporate sustainability. In addition, the mediating effects of value-base risk management and value creation are tested. Secondly, value-base risk management and value creation are supposed to have a positive relationship with corporate sustainability. Finally, this research also determines that the strength of technological turbulence increases the relationships between management accounting information usage and its consequences. Similarly, the complexity management is expected to strengthen the relationship between consequences and corporate sustainability. Therefore, figure 1 demonstrates the relationship among each dimension of management accounting information usage, consequences, and the moderating variable. Accordingly, the developed conceptual model of this research is illustrated in Figure 1 below.

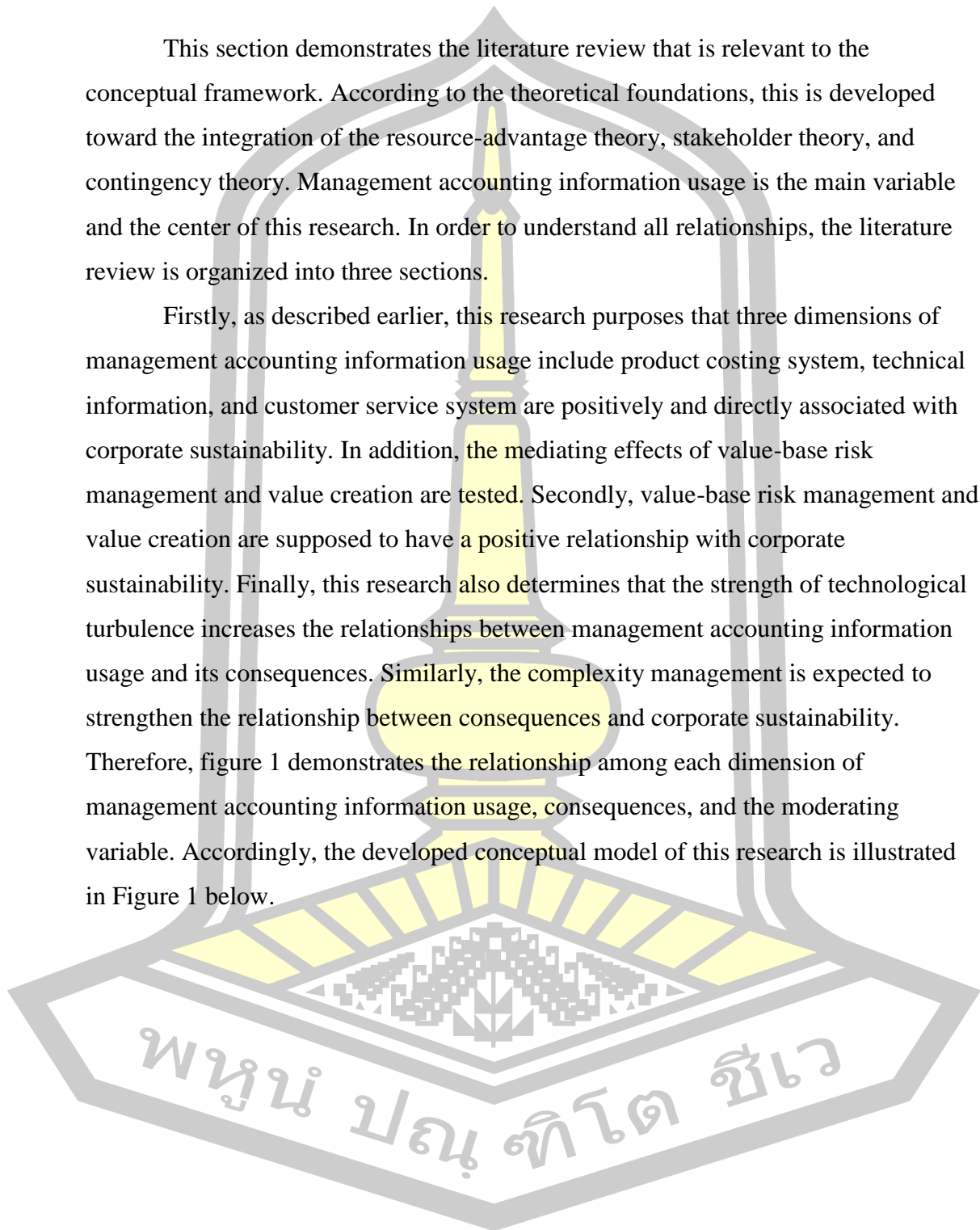
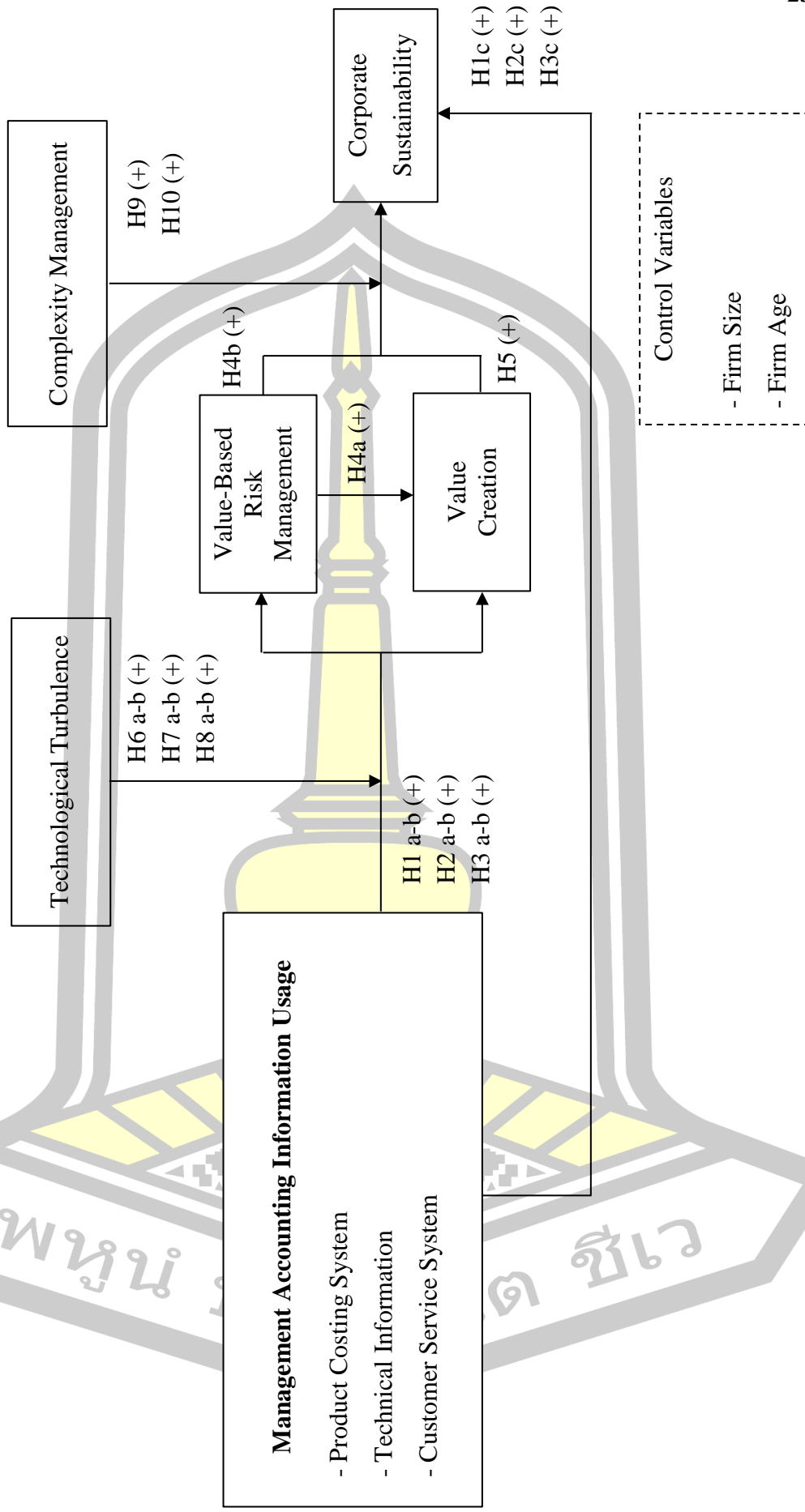


Figure 1 Conceptual Model of Management Accounting Information Usage and Corporate Sustainability



Management Accounting Information Usage Background

Management accounting information is the process of collecting, identifying, accumulating, leading to results analysis, valuation, interpretation, and presentation of financial information and information to executives and personnel within relevant organizations to utilize planning, directing, controlling, and support decision-making that are appropriate and responsible for resources (Alhtaybat and Von Alberti-Alhtaybat, 2013; Malmi and Granlund, 2009). Consistent with the Choe (2004) indicating that management accounting is a very important tool for executives to use for effective organizational management consisted of planning, organizing, staffing, directing, controlling, and decision-making. Similarly, Talha et al. (2010) reasoning that the key principles of managerial accounting to enable financial and non-financial information to support decision-making and forecast future business events. These information promotes executive capability in analyzing situations precisely, being able to choose best practices for coping with business risks, and solving immediate problems (Baines and Langfield-Smith, 2003). Moreover, Yeshmin and Hossan (2011) said that management accounting are used as a medium for linking information between various departments of the organization in the form of budgets or project that help build cooperation, coordination, and knowledge sharing to achieve the firms goals.

In the late 19th century, business organizations grew at a rapid pace due to the industrial revolution, the nature of business was complex and the number of business transactions increased. As well as pressure from stakeholders such as shareholders, investors, creditors, suppliers, and government agencies that require the preparation of financial statements in the same format under generally accepted accounting principles (Blocher et al., 2010). These reasons have caused financial accounting to play an important role in building trust among users of the firms information. Obaidat (2007) indicating that corporate executives and stakeholders focus on financial accounting data with the results of numerical information that can be easily understood about income, profit, and financial returns. Consistent with the Stanton and Stanton (2002) explains that financial accounting information must be audited for accuracy and suggestions by independent auditors. Thus, the past the management

accounting information has not been accepted and enthusiastically adopted in corporation (Gray, 2002).

However, under the fierce competition in the industry, the complexity of the production process, the expansion of the manufacturing industry, the rapid change in technology, and the management of modern organizations that affect the use of accounting information. The financial accounting information is not enough to create organizational success, as well as to decisions-making and solve problems effectively for executives (Salmon, 2013). Therefore, management accounting information are becoming increasingly important as financial accounting information cannot meet all needs of executives to management and operations planning in future (Pierce and O'Dea, 2003).

Kaplan and Norton (1996) describe that management accounting information helps organizations to be more successful. For the following reasons: first, the use of management accounting information to balance performance measurement between performance indicators and outcomes. That is, if the performance indicators result in increased market share, the result may be driven by performance indicators such as increased customer satisfaction, product or service availability quality, etc. Second, focus on both short and long term success, that is management accounting information is presented in monetary terms that focus on short-term performance such as product sales, revenue, and profits including information that cannot be described as money, customer satisfaction, internal work processes, learning and growth, etc. Finally, management accounting data provides a broader management perspective and covers different perspectives across the organization. In addition, executives will be able to perceive that the financial performance has increased or decreased from the non-financial performance indicators. This will result in better learning and better performance for the organization (Kaplan and Norton, 1996; Ittner and Larcker, 2003)

The management accounting information plays an important role in business operations by executives must have knowledge of systematic organization management. Having a system of good, accurate, complete, timely, and appropriate information can be utilized for planning, directing and motivating, controlling, and decision making future (Pierce and O'Dea, 2003). Consistent with Nodast et al. (2015) stating that having good information systems contributes to the efficiency and

effectiveness operations of the firms including creating an advantage over business competitors, and nowadays the management accounting information usage focuses on the benefits of being executive tools that lead to more decisions-making. Firstly, management accounting information is used to make use of production costs, which management can use to set prices for products or services, production cost reduction planning, target costing, increasing production efficiency, control of production efficiency by using standard costs or flexible budgets, short-term and long-term organizational cost decision making decisions, and cost volume profit analysis (Drury, 2006; Keating, 1991). Likewise, Bromwich (1990) explaining that managerial accounting information is the provision, collection, and analysis of financial information in the product market, cost structure, cost of competitors, and tracking the strategy of the enterprise and competitors. Similarly, Alles et al. (2008) found that the information gathering on production costs of firms leads to the ability to compare and evaluate the long-term benefits of an organization regarding business value added and competitive advantage.

Second, the management accounting is a source of information supporting management ideas for use in analyzing and evaluating situations and select the best practice solution for the problem, including technical tools to reduce the risk of errors and wasteland in operations of firms (Pitingolo, 2009). Many manufacturing industries have adopted the concept of production management in order to develop and improve production line processes respond to the needs for the market and customers instantly by focusing on the transition from waste to value creation in the receiver's perspective (Fry et al., 1995). The concept of organizational management that has been applied to consider the limitations of the production system that lead to sustainable production improvements that can create a great success for the company such as six sigma, lean management, theory of constraints (TOC) etc. (Nave, 2002). Consistent with the Collier et al. (2006) rationale that the information sources are very important in providing a description of past operations for use in cause analysis, event planning, estimates, and designing quality control systems that are suitable for the work process to ensure that there are not the risks in business. Likewise, Rom and Rohde (2007) indicates that managerial accounting are the most important source of corporate management information, stimulate learning, it's a medium for linking

information between various departments, and helps manage the diversity and problems that occur within the organization.

Finally, the various concepts of business operations have changed from the old style the manufacturer isn't longer playing an important role in determining the quality and price of the product, but rather as a customer or consumer with a significant influence on these factors. Moving to the full digital era, customers and consumers can easily access product and service information. The result is the intensity of competition and the response to the rapidly changing needs of customers. Delivering value to customers by focusing on developing new products, improving the quality of products and services, including creating differences in both products and costs that are better than competitors. The customer focus is the key to creating continuous customer satisfaction until it becomes a commitment and brand loyalty. The management accounting is therefore a strategic planning and management tool that connects the innovation of creating value in products and services to deliver to customers in the future. In accordance with Kaplan and Norton (1996) explains that management accounting is a tool to support the organization of effective management and evaluation of the organization. Which covers both financial and non-financial perspectives, including financial perspectives, customers perspectives, internal business perspectives, and learning and growth perspectives.

Appropriate management accounting information can be used to respond to the responsibility of bringing the company to the maximized shareholder's wealth, acceptable business risk, and organization has sustainable growth which these results are a measure of the company's long-term survival. Therefore, in this research, management accounting information usage refers to as the process of using accounting information in corporate management by using information in various dimensions includes product costing system, technical information, and customer service system for use in planning, controlling, evaluation, and decision-making that lead to value-based risk management, value creation and corporate sustainability (Trigo et al., 2016; Salmon, 2013; Hall, 2010; Mia and Goyal, 2006; Bouwens and Abernethy, 2000; Chong, 1996; Chia, 1995; Chenhall and Morris, 1986).

Management accounting and practice has moved into new domains and dimensions of management (Chenhall and Moers, 2015; Bhimani and Langfield-Smith, 2007; Thrane, 2007). The use of management accounting information nowadays focuses on the benefits of executive tools that lead to more decisions such as competitor accounting, performance measurements systems, product cost reporting, and customer accounting (Cadez and Guilding, 2008). Management accounting information usage enables executives to perceive, interpret, and use the information to accomplish various objectives for profitability, customer responsiveness, and competitiveness. Ability adapts to business uncertainty and sustainable competitive advantage. The information can be used to achieve the objectives of profitability, customer satisfaction, competitiveness; the ability of the organization adapts to business uncertainty and increases sustainable competitiveness (Latan et al., 2018; Tayles et al., 2007; Lokman Mia and Clarke, 1999). In addition, current management accounting information systems do more to stabilize organizations than when the situation is uncertain (Napitupulu and Dalimunthe, 2015; Hedberg and Jonsson, 1978; Argyris, 1977). Furthermore, Meiryani (2014) expressed that management accounting information could lessen uncertainty in decision making to help any firms to improve better planning, to create value and competitive advantages.

This research attempts to generate new dimensions from definitions and the concept of management accounting information usage includes the concepts of previous research. The definitions of management accounting in table 1 more clearly emphasize the broadening of the scope of management accounting information usage. Overall, the definitions of management accounting information usage are the accounting process of a corporation that is to bring set the dimension of education about the management accounting information usage focuses on three dimensions comprising product costing system, technical information, and customer service system. The key relevant literature reviews of the antecedents and consequences of the management accounting information usage. In sum, the measurement of the management accounting information usage applied by accounting information quality is shown in Table 1. In summary, literature review indicates management accounting information usage as shown in Table 2.

However, prior research of management accounting information usage terms is understood in different definitions and characteristics in the literature. Below is a summary of the empirical studies of management accounting information usage model as presented in Table 1.

Table 1 Summary of the Definitions of Management Accounting

Author(s)	Definitions and Characteristics of Management Accounting Information Usage
Zainuddin et al., (2015)	Management accounting information is the use of information to development the quality of products and services, customer satisfaction, competitor analysis, and helps organizations to monitor and evaluate the progress of the competitive strategy and long-term success in the market place.
Stair and Reynolds, (2012)	A direct connection to decision makers achieves organizational goals. It is able to help managing personnel and organizational problems more effectively and efficiently.
Cadez and Guilding, (2012)	Strategic management accounting (SMA) is a method part of the use of management accounting information that focuses on facilitating the use of accounting information in strategic planning and decision-making and strategic management processes. (Ma and Tayles, 2009; Bhimani and Langfield-Smith, 2007; Hoque, 2003; Roslender and Hart, 2003; Ittner and Larcker, 2001).
Yeshmin and Hossan, (2011)	Management accounting information is collecting, analyzing, evaluating, and reporting both financial and non-financial data in order to facilitate executive decision-making processes.
Ismail and Isa, (2011)	Strategic management accounting information refers to the information provided by management accounting system in an organization (Chenhall and Morris, 1986).

Table 1 Summary of the Definitions of Management Accounting (continued)

Author(s)	Definitions and Characteristics of Management Accounting Information Usage
Nikolaou and Evangelinos, (2010)	Addition of accounting reports includes products data, employees' interests, effect on environmental, and community activities, overall these information is disclosed on a voluntary basis.
Cinquini and Tenucci, (2010)	Strategic management accounting information is the focus of using accounting information in analyzing and evaluating the importance of competitors (related to cost, prices, market share, etc.) the development and monitoring business strategy to create long-term competitive advantages (Jones, 1988; Moon and Bates, 1993; Dixon and Smith, 1993; Bromwich, 1990).
Abdel-Kader and Luther, (2006)	Management accounting is the process of identification, measurement, accumulation, analysis, preparation, interpretation, and communication of information (both of financial and operating) used by management for planning, control and effective use of its resources.
Guilding et al., (2000)	Strategic management accounting information is the importance of accounting information about products, customers, competitors, suppliers, and all stakeholders.
Kaplan and Norton, (2001)	Information that is important and essential to executive that promote effective decision-making information skills based on the use of financial and non-financial accounting information to create operational capacity and competitive advantage.
Atkinson et al., (1997)	Management accounting information is the process that lead to the use of financial and cost accounting information for the planning, control, evaluation, and decision making of an organization executive.

Table 2 Summary of a Key Literature Review on Management Accounting Information Usage

Author(s)	Title	Independent Variables	Dependent Variables	Results
Gnawali, (2018)	Management Accounting Systems and Organizational Performance of Nepalese Commercial Banks.	Management Accounting System - Controlling and reporting - Planning and budgeting - Decision making - Performance evaluation system - Costing Systems	Performance - Employees' perceived - Organizational performance	The results of this study show the positive relationship between management accounting systems and organizational performance by MAS is an important predictor of corporate performance in Nepal.

Table 2 Summary of a Key Literature Review on Management Accounting Information Usage (continued)

Author (s)	Title	Independent Variables	Dependent Variables	Results
Zainuddin et al., (2015)	Performance outcomes of strategic management accounting information usage in Malaysia: insights from electrical and electronics companies	SMA Information Usage - Product-Related Information and Analysis - Competitor Strategy Information and Analysis - Customer Information and Analysis - Competitor Financial Information and Analysis	Firm Performance - Marketing and Production - Non-Financial - Financial	The results of the research concluded that the strategic management accounting information has a significant relationship with the company's performance.

Table 2 Summary of a Key Literature Review on Management Accounting Information Usage (continued)

Author (s)	Title	Independent Variables	Dependent Variables	Results
Mawali, (2013)	Performance consequences of management accounting system information usage in Jordan.	MAS information usage	Organizational performance	The purpose of this study is to guide the development of knowledge about management accounting systems to increase the efficiency of the manufacturing industry in Jordan. The results confirm that the use of strategic management accounting information can increase the company's production efficiency in Jordan.

Table 2 Summary of a Key Literature Review on Management Accounting Information Usage (continued)

Author (s)	Title	Independent Variables	Dependent Variables	Results
Salmon, (2013)	Role ambiguity as a mediator of the effect of integrative management information on managerial performance: an empirical study in Australia.	integrative management accounting information (MAI)	Managerial performance	The results showed a direct positive relationship between integrative management accounting information and managerial performance, and indirect relationships between the two variables through role ambiguity. In addition, the impact of the results of the study has been modified on the research methodology for measuring the results of management accounting information and managerial performance.

Table 2 Summary of a Key Literature Review on Management Accounting Information Usage (continued)

Author (s)	Title	Independent Variables	Dependent Variables	Results
Cinquini and Tenucci, (2010)	Strategic management accounting and business strategy: a loose coupling?	<p>Strategic management accounting (SMA) techniques usage</p> <ul style="list-style-type: none"> - Customer accounting - Competitive position monitoring - Competitor performance appraisal on published statements - Quality costing - Competitor cost assessment - Target costing - Benchmarking - Value chain costing - Integrated performance measurement systems - Life cycle costing 	<p>Business Strategy</p> <p>Strategic pattern, strategic mission</p> <p>strategic positioning</p>	<p>The results of the study show that Several Strategic management accounting techniques are widely used in Italian companies such as customer accounting, competitive position monitoring, competitor performance appraisal based on published financial statement and quality costing etc. And from the regression analysis both defender- and cost leader-type of strategy have adopted SMA techniques to manage expense information.</p>

Table 2 Summary of a Key Literature Review on Management Accounting Information Usage (continued)

Author (s)	Title	Independent Variables	Dependent Variables	Results
Noordin et al., (2009)	Strategic management accounting information elements: Malaysian evidence	SMA Information Elements: - Competitor Information Analysis - Customer Information Analysis - Product-Related Information Analysis	Firm Performance	The results imply that E&E companies use strategic management accounting elements extensively and the extent of the use of SMA data between organizations towards more externally focused and strategic material. It also supports the findings of many previous research, which suggests that companies operating in today's environment are more focused than traditional management accounting information.

Table 2 Summary of a Key Literature Review on Management Accounting Information Usage (continued)

Author (s)	Title	Independent Variables	Dependent Variables	Results
Cadez and Guilding, (2008)	An exploratory investigation of an integrated contingency model of strategic management accounting	SMA usage - Costing - Planning, control and Performance Measurement - Strategic decision making - Competitor accounting - Customer accounting	Performance - Financial performance, - Non-financial performance.	The results findings support contingency theory's tenet of no universally appropriate strategic management accounting system, with factors such as company size and strategy having a significant bearing on the successful application of SMA.

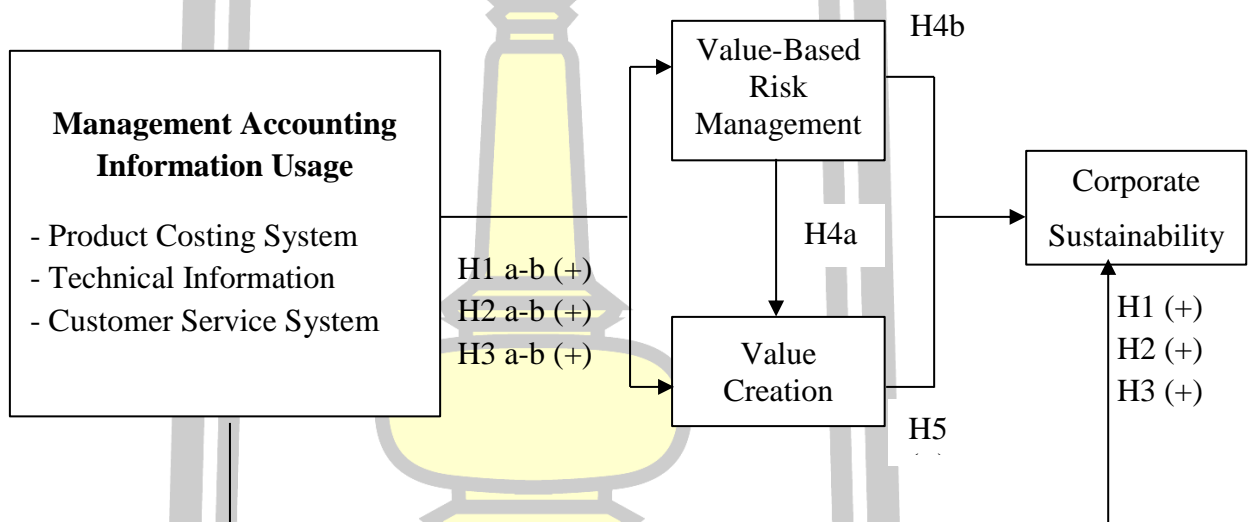
Table 2 Summary of a Key Literature Review on Management Accounting Information Usage (continued)

Author (s)	Title	Independent Variables	Dependent Variables	Results
Choe, (2004)	The relationships among management accounting information, organizational learning and production performance.	<ul style="list-style-type: none"> - MAIS Usage -Advanced Manufacturing Technology (AMT) 	Production Performance	The results of the study show that a positive correlation between the AMT level and the amount of management accounting information (i.e. planning and control information, and nonfinancial performance information). In addition, a significant positive relationship has been found between providing information and improving production efficiency.

The Effects of Management Accounting Information Usage on Its Consequences

This section investigates the effects of four dimensions of Management accounting information usage consisting of product costing system, technical configuration management, customer service system, and competitor intelligence on three consequences, including value-based risk management and value creation on corporate sustainability as shown in Figure 2.

Figure 2 The Effects of Management Accounting Information Usage on Its Consequences



Product Costing System

Product costing system is the first dimension of management accounting information usage, process costing is an accounting methodology of a manufacturing process used in controlling and traces both accumulates direct costs, and allocates indirect costs (Lere, 2001). Likewise, Anderson et al. (2013) emphasize that process costing is a method for ascertain the cost of a product at each process or stage of manufacture in operation. Besides, Chartered Institute of Management Accounting (CIMA) identify that the costing method has been applied to goods and services that result from continuous production processes or repeated operations by units produced during the period that is lower than the average cost. Hence, the industries produce

homogeneous products and have a continuous flow system which appropriate to use process costing. Certainly, product costing systems is all costs in product costs have been defined as sophisticated systems in the literature (Pavlatos and Kostakis, 2018; Zainuddin et al., 2015; Al-Omiri and Drury, 2007; Cabrita and Vaz, 2006; Drury and Tayles, 2005).

From the concept of cost management, the product costing system increasingly important to the business from the main duties and responsibilities in corporate management (Tichacek, 2006; Davila and Wouters, 2004). Therefore, cost information is used to support organization decisions. The important role of cost information is to decide on the pricing, cost reduction and quality improvement costs. The cost information usage leads to effective decision-making arising from the accuracy of cost allocation, the propriety of costs allocation and the calculation method (Himme, 2012). Consistent with the research of Scapens et al. (1996) found that the management accounting information usage especially related to product costing system plays an important role that providing scorecard information for the executives decision-making in the manufacturing industry of UK such as pricing and product profitability analysis (Drury et al., 1993).

In this research, product costing system is defined as the system of production cost information reporting include direct materials, direct labor, and manufacturing overhead for calculation product cost, selling price, standard cost reporting includes price variance, material visage variance, labor price variance, labor quantity variance, spending variance, efficiency variance, and capacity variance, the analysis, measurement, and reporting to costs of prevention damage or lack of quality, appraisal costs of production processes quality, and failure costs of improve and correct about the quality of goods and services (Zainuddin et al., 2015; Lawson et al., 2015; Thammavinyu and Ussahawanitchakit, 2014; Andersch et al., 2013; Fons, 2012; Raman et al., 2009; Dunk, 2004; Cooper and Kaplan, 1988; Groth and Kinney, 1994).

In research of Brierley (2010) found that the use of product cost information leads to correct and precise of product cost allocation, which is important for practitioners account in production planning to product pricing. Therefore, using the right cost data reduces the risk of product pricing especially companies with many

kinds of products (Chan and Lee, 2003). Using product cost information will increase firm performance, namely, sales growth, and with the firms' market-to-book ratio, reduce the risk of volatility of raw material prices in the future and decrease historical sales volatility (Anderson et al., 2013). The firm to utilize from production cost information related to both financial and non-financial information to support effective planning and decision-making, increase productivity, profits, and market share, strengthen long-term competitiveness (Laonamtha and Ussahawanitchakit, 2013). In addition, cost accounting information assists to improve and develop product quality, which is an important part of managing the risks that may arise from poor quality products and services (Cohen and Kaimenaki, 2011; McNair, 2007). Moreover, the frequency of using cost information allows managers to quickly identify potential problems and opportunities that affect financial performance and decision-making capabilities leading to sustainable operations of the firms (Rikhardsson and Yigitbasioglu, 2018; Laonamtha and Ussahawanitchakit, 2013; Rahahleh, 2010; Maines and Wahlen, 2006; Backstrom and Lind, 2005).

Additionally, production cost reporting enables executives can be used in planning, process improvement, and create to innovation in developing product quality, meet the needs of customers effectively, and low cost leads to long-term competitiveness (Jansen, 2011; Horngren et al., 2008). Likewise, Kachaner et al. (2011) suggested that most organizations focus on using low-cost leadership strategies to beat competitors and create competitive advantage. On the other side, the study of Chen, et al. (2014) argues that innovation is important to creating successful increasingly, the developing new products and services will help create new markets that are better than using cost-cutting strategies to maintain leadership in the old market. While Grant (2010) explained that the central aim of using information is a tool helps organizations adaptation and respond to risks from the uncertainty of business environments that may affect future operations.

Moreover, David (2003) further suggest that useful information provide direction for new product strategies. The product costing information is important for managers to have a good understanding of their organization's missions or new product development awareness before proceeding with the development of new products. The product improvement and development directly affects consequences of

effective customer response, competent competitive advantage and corporate performance (Jadesadalug and Ussahawanitchakit, 2009). Besides, product development awareness is positively associated with growth and in turn profitability (Wolff and Pett, 2006). While it makes sense that superior quality definitely increases market share and that reduced costs explicitly improve competitive positioning and improving profitability. In sum, Wheaton and Weimerskirch (1989) suggest that firms must become convinced to improve product quality that leads to new product development which results in improved market share, competitive position and corporate financial performance in long term.

Therefore, the use of product cost data is important for success in reducing risk and creating value for a firm. The knowledge about product costs of executives not only leads to operational decisions but also beneficial to achieving business goals (Milicevic and Cvetkovic, 2010). Additionally, the costing information's usage to help improved communication between business units, effective coordination, increases the profitability of business units, decreases of operating income fluctuations, and increases the value of stakeholders which brings value to the firms and continues to maximize profits (Backstrom and Lind, 2005). Thus, product costing system has the possible potential to positively affect the consequence variables: Value-based risk management and value creation and corporate sustainability. To summarize, the hypotheses are proposed as follows:

Hypothesis 1a: Product costing system will have a positive influence on value-based risk management.

Hypothesis 1b: Product costing system information will have a positive influence on value creation.

Hypothesis 1c: Product costing system information will have a positive influence on market corporate sustainability.

Technical Information

Technical information is the second dimension of management accounting information usage. As the role of management accounting extends to a wide range of business operations plans, including techniques and tools to identify weaknesses and increase efficiency in work processes, production, and services (Rom and Rohde, 2007). Accounting information has changed its role from the original that was used to prepare and present financial reports, focusing on the use of information for organizational management (Alsharari and Youssef, 2017). Thus, the management accounting is an important source of information that leads to the use of technical information aimed at reducing errors, eliminating wasteland, and developing production systems to be most effective to be able to create a competitive advantage (Nave, 2002).

Zwart et al. (2009) explains that technical information is an elementary part to perform technical configuration steps and on different systems into operation. Furthermore, Jiang et al. (2010) indicates that the technical information management is machine tool product design, and it also describes in detail for the information classification management, product configuration management and document management. Similarly with Bamel and Bamel (2018) stresses that technical information as a guideline for work process, design and allocation of appropriate organizational resources, including continuous improvement and development of operational systems. Likewise to Mascarenhas et al. (2015) explain that technical is combining how it works and collaborates with other resources or formulate or structure to create alternatives and create multiple values to meet the needs of the stakeholders. From the overall reasons, technical information is referred as a fully integrated set of the use techniques information for executive to assist in planning, controlling and evaluation of production activities, and improves a technical process to be a business aiding tool to solve system problems, process modification to maximum effective, creates and maintains consistency of performance (Krikhaar et al., 2009; Bowman-Amuah, 2001; Bruggeman and Slagmulder, 1995).

From the literature review in the use of managerial accounting as a technical information that supports decisions better of executive. Aside from presenting financial information, managerial accounting additionally presents non-financial information, as well as avoiding the use of accounting technical terminology in presenting financial reports to executives so that they can understand In financial reports easier. Therefore, the executives in many companies have adopted the techniques and methods of enterprise management to bring value in the production process such as lean, six sigma, TOC, and green ICT, etc. (Feng et al., 2010; Nave, 2002).

Grasso (2005) explains that industrial business uses lean techniques to improve and develop production processes to be efficiently, the key principle of lean is to reduce production costs and operating costs by eliminating waste that does not cause added value to products and services of firms, the seven waste consists of inventory, overproduction, motion, delay, defect, transportation, and processing. Similarly, Fullerton et al. (2014) indicating that lean thinking is creating value by focusing on eliminating wastage, increasing flexibility in operating systems by rethinking, creating value that covers work processes from initial planning to decision making, and identifying wastage to improve and eliminated from operations. This is consistent with Kennedy and Widener (2008) stresses that lean is an efficient system to eliminate all kinds of waste generated by combining all functions into a linked system so that every process in the system can add value to production and service, the continued improvement leads to a reduction in risk coupled with the shift from waste to value, and any activities that are unprofitable or value-added must be eliminated in the process, with the hope that the organization will receive both short-term and long-term rewards (Akintoye and MacLeod, 1997).

In addition, another important technique that organizations use for the purpose of improving work processes is the six sigma. This approach has many benefits for firms in quality management that can lead to successfully. Consistent with the Kwak and Anbari (2006) identify that six sigma has several benefits, includes reduction process volatility, cost reductions caused by wastes, reduced failure rates, and improved the revenue and net profits, increase in market share, and building competitive advantage of firm (Kumar et al., 2006; Robinson, 2005; Lanyon, 2003).

Similarly, Snee (2010) explains that it's a concept that is not only focused on the production system but also about the quality development process by reducing defects or loss of products and services, and focusing on research and development, including improvement new applications designed for sustaining improvement and securing the success of business operation from beginning to the end (Pande et al., 2007).

In addition, the theory of constraints (TOC) technique has been developed from optimized production technology (OPT), TOC is to identify factors that are an important constraint that will prevent the success of the organization to lead to system improvements until there are not more factors limiting (Dugdale, 2013). Likewise, the theory of constraints (TOC) is a management paradigm that views any manageable system as being limited in achieving more of its goals by a very small number of constraints. There is always at least one constraint, and TOC uses a focusing process to identify the constraint and restructure the rest of the organization around it, that is geared to help organizations continually achieve their goals (Simsit et al., 2014). Furthermore, the TOC concept aims to identify limitations and improve operating profits by using non-bottleneck resources to support bottleneck activities so that the whole process is consistent throughout the system by the main goals consist of maximizing throughput, minimizing inventory, minimizing operating expenses. Consistent with the Gupta and Boyd (2008) indicating that TOC is utilized for production line level planning and control, which is a solution to the problem with the goal of generating maximum revenue by controlling the resources, determine production plans in order to achieve a balanced flow and consistent production, which results in resource efficiency and success in the production process.

Finally, the technique of using information and communication technology or green ICT is another way to help manage the resources available, to develop the production process and environmental friendly products lead to sustainable growth of firms (Dangelico and Pujari, 2010). Social and environmental responsibility, such as conserving resources and protecting the environment, conducting business ethically, improving the quality of life of people in society, and strengthening communities and societies, which must be treated in parallel with conducting business in order to create sustainability, these methods are considered important value creation methods for creating a good image of the organization to all stakeholders (Ward and Chapman,

2003). The value creation from protecting the environment can help companies survive in the short and long term (Bajaj, 2007). Therefore, the technical information in enterprise which ensures the accuracy of the production process, and also improves the product design efficiency, the use of technical information to adjust the production process to create value for products and organizations (Jiang et al., 2010; Sharma and Vredenburg, 1998; Russo and Fouts, 1997).

From these challenging problems, it is necessary for the firm to adopt new technical for environmental consideration in order to ensure firm success. The firm's value creation through production process that concentrates on environmental preservation encourages firms to create environmentally friendly products that can respond to customer needs, while having the least impact on the environment. Initially, the product designed and developed through reducing resource consumption, using environmentally friendly materials (De Ron, 1998) and processing of production must not have an impact on the environment (Gonzalez-Benito and Gonzalez-Benito, 2005). Hence, the organization has environmental considerations such as reducing waste, reducing energy consumption, and reducing the pollution that might arise from the production process, which is very important for consumer decision behaviors (Sprinkle and Maines, 2010; Ashton and Stacey, 1995).

Hence, in this research can explain the defined of technical information as a set of technical information for reporting the use of production techniques lean, six sigma, theory of constraints (TOC) and environmental information and communication technologies (green ICT) to improve the production process, damage reduction, environmental management, and reduce the restrictions on the work appropriate (Suryawanshi and Narkhede, 2015; Fullerton et al., 2014; Simsit et al., 2014; Fullerton et al., 2013; Mahmood et al., 2013; Sprinkle and Maines, 2010; King and Lenox, 2009; Kennedy and Widener, 2008; Arnheiter and Maleyeff, 2005; Bruggeman and Slagmulder, 1995). The technique deals with the concept of managing limited resources in the most efficient way, focusing on reducing time and costs and waste disposal. In addition, the comparison of relationship between cost and quality in the production process, the key factor leading to the development and improvement of the consistency by relying on the use of technical reports to increase efficiency at all stages of operations (Fullerton et al., 2013; Savitz and Weber, 2006).

Thus, Technical information has the possible potential to positively affect the value-based risk management and value creation and corporate sustainability. To summarize, the hypotheses are proposed as follows:

Hypothesis 2a: Technical information will have a positive influence on value-based risk management.

Hypothesis 2b: Technical information will have a positive influence on value creation.

Hypothesis 2c: Technical information will have a positive influence on market corporate sustainability.

Customer Service System

Customer service system is the third dimension of management accounting information usage. The customer service system is a system that facilitates both before and after delivering products and services to customers through the utilization of corporate resources such as information and technology (Alter, 2013).

Additionally, Kuo et al. (2009) stresses that the customer service system is to give confidence and trust in goods and services by maintaining quality and improving services better. Similar, Brady and Cronin (2001) explain that the customer service system is a customer focus process that has a direct relationship to creating satisfaction and recognition of the good image for the consumer towards the company. In addition, customer service is the key to understanding customer needs, which is an important in maintaining long-term customer relationships (Yee et al., 2010). This is consistent with Lee (2013) states that a quality customer service system will create a corporate brand that has a positive effect on customer loyalty.

However, from the concept of modern marketing, pointing out that the cornerstone of achieving a company's competitive advantage comes from the use of corporate resources to create value (Fullerton, 2006). Especially resources related to customer information, which is a big data that is important at utility for delivering superior value to the target customers of the firms (Khodakarami and Chan, 2014).

Consistent with the Malaval and Benaroya (2011) explain that large organizations use customer data in marketing management including analyzing the suitability of market positioning. Thus, it might be stated that customer service information usage are core data to monitor, diagnose, and take action to increase the company's marketing effectiveness (Morgan et al., 2005). In addition, the study of Guiding and Mcmanus (2002) stresses that customer accounting information is linked to assessing sales, cost, and profits of both the internal and external customers group. On the other side, Blocker et al. (2011) found that proactive customer orientation is driver on value creation, satisfaction, and loyalty from using information to competitive advantage.

In this research, customer service system is defined the process in collection, reporting, and information usage of customer service for sales forecast, forecast revenue and profits from target customers, determining market share, analyzing and evaluating customer profitability, tracking, and management to reduce costs of customers warranty claims (Zainuddin et al., 2015; Jumpapang et al., 2013; Mohammed and Bin Rashid, 2012; Narver and Slater, 2012; Wang and Feng, 2012; Rollins et al., 2012; Torres and Tribo, 2011; Korhonen-Sande, 2010; Raman et al., 2009; Theoharakis and Hooley, 2008; Guiding and McManus, 2002; Morgan et al., 2005; Yang et al., 1998; Narver et al., 1990). In addition, in the study of Nicolas and Castillo (2008) argues that customer's information leads to accurate analysis and forecasting about customer behavior, and the uncertainty of losing old customers. Reporting information about customers liken to the alarm sign that is to the organization, and can identify the risk of losing customers in the future. As such, that information to reflect for the numbers of both new and old customers is increasing and decreasing, satisfaction of service, and customer loyalty (Meier et al., 2010).

The customer information is part of management accounting to enables organizations can information usage for plan, control, and decision-making to assessing and analyzing risks from changing customer behavior. Prior literature has identified four main approaches or methods to respond to risks: risk avoidance, risk reduction, risk sharing/transfer, and risk retention (Dorfman, 1998; Bobbitt et al., 2006). Consistent with the concept of Dorfman, 1998 found that risk management can be defined as a logical process consisting of three main steps: identifying risks, choosing the risk response strategy, and monitoring the outcomes. In addition Steven

et al. (2012) and Roy and Cheruvu (2010) indicate that the customer information help operate more efficiently. Organizations can adaptation to change, the uncertainty of business environment, and the threat posed by risk to increase business opportunities.

Likewise, the using customer information leads to the creating superior value for the customer is the firm's capability to sense the customer's current needs and expectations, and anticipate future needs by identifying customer needs, and then firms use this knowledge to create and develop superior value of products and services, then deliver this value to the firm's customer in order to continuously satisfy needs (Narver and Slater, 2012). In the study of Fuchs (2007) argues that learning about the customer must rely on information leading to effective product development, that is the firm emphasizes on increasing the customer interaction to help evaluate the value of the products and the communication activities. In addition, the collection of information about customer needs is an important part in changing to create new innovations of all types, including administrative, production, products and services. The concept is the basic principle of customer focus in order to effectively manage the relationship between each other (Sharp, 1991). From the overall reasons, the use of information to support the customer service system creates a superior value can enhance customer satisfaction and loyalty, outstanding brands, increase in market share, sales growth and profits lead to firms sustainability (Markovic et al., 2018; Ciabuschi et al., 2012).

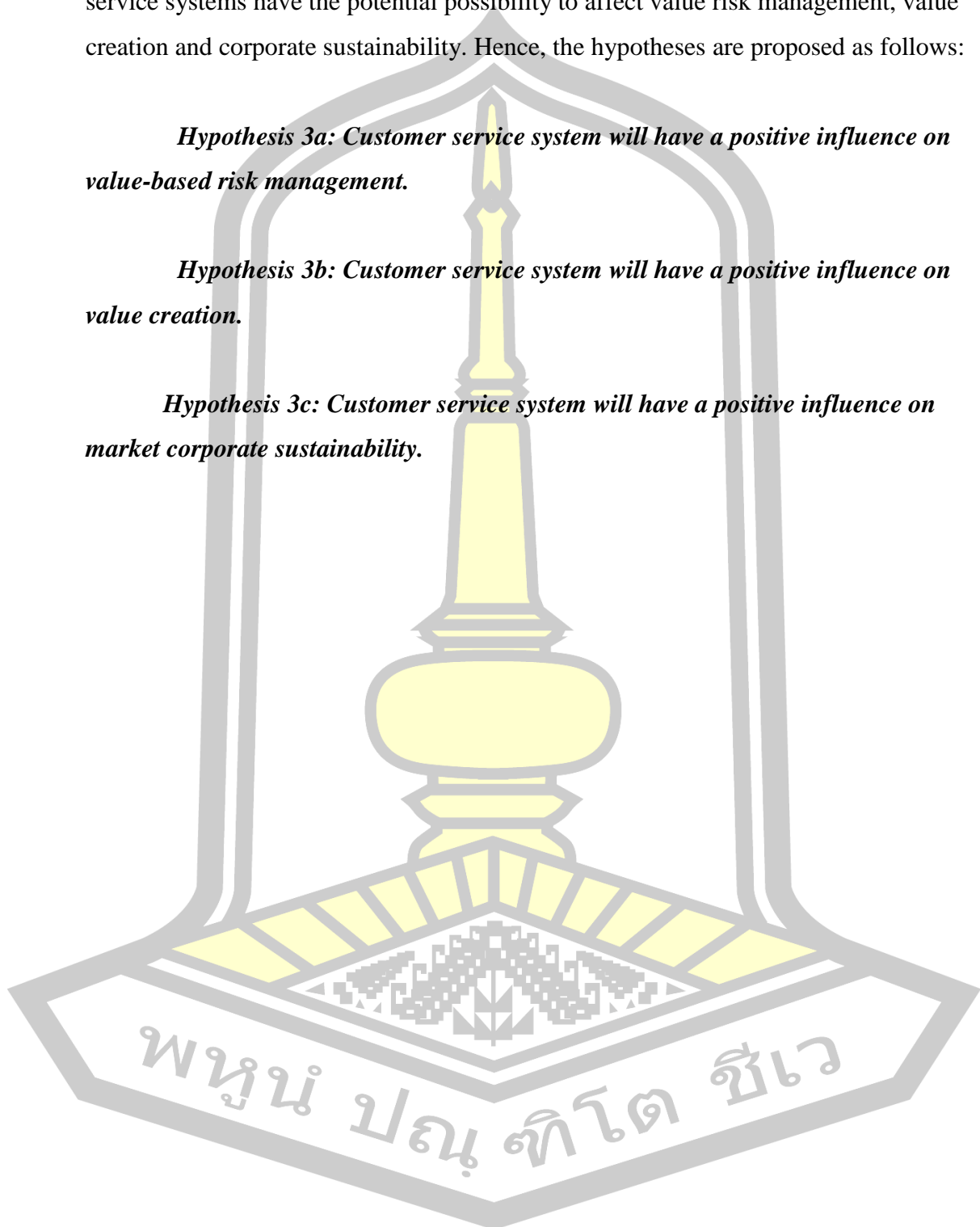
Similarly, Jiao et al. (2010) demonstrate that firms focus on the customer and use the dynamic perspective so as to achieve sustainable competitiveness. Hence, all of the outcomes lead to new product development performance, competitive advantage, and customer satisfaction. In addition, the study of (Jimenez and Navarro, 2007) found that customer orientation generates marketing intelligence pertaining to the present and future customer needs, including integrating the learning of customer culture, interested stakeholders, and responsiveness to market information. Therefore, the relationship between market orientation and learning leads to firm performance. Furthermore Jeong et al. (2006) study in the manufacturing firms show that the greater the customer orientation of the firm is enhanced, the better the performance of new products is - in terms of customer acceptance and technical performance. Moreover, Zhou and Li (2010) explains that a customer focus to increases the firm's

adaptive capability in China's emerging economic context. In summary, customer service systems have the potential possibility to affect value risk management, value creation and corporate sustainability. Hence, the hypotheses are proposed as follows:

Hypothesis 3a: Customer service system will have a positive influence on value-based risk management.

Hypothesis 3b: Customer service system will have a positive influence on value creation.

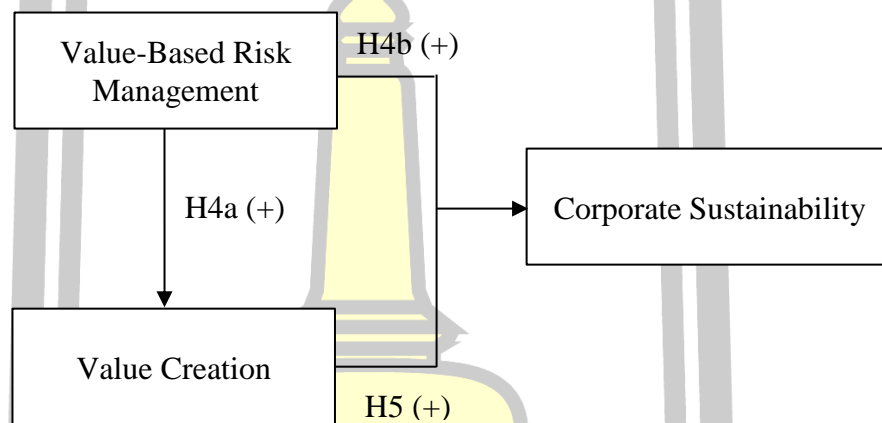
Hypothesis 3c: Customer service system will have a positive influence on market corporate sustainability.



The Effects of Value-Based Risk Management and Value Creation on Corporate Sustainability

This section examines influence of two mediator variables which consist of value-based risk management and value creation on corporate sustainability. It is assumed that there are positive relationships among all of them as depicted in Figure 3.

Figure 3 The Effects of Value-Based Risk Management and Value Creation on Corporate Sustainability



Value-Based Risk Management

Organizational risk refers to the opportunities of mistakes, damages, wasteland, and uncertain situations resulting in future operations not being successful in accordance with the objectives and goals of the organization (Palmer and Wiseman, 2002). Furthermore, Yu et al. (2015) provide that the organizational risk is the opportunity to mistakes, damages, wastes, unwanted events that may occur in the future, or which may affect make the operation unsuccessful to the purposes and objectives of the strategic, operational, financial, administrative organization. Organizational risk is important to operations and production process because to uncertainty is the cause of the dynamics that may have a negative impact on the company as a whole (Mu et al., 2009). Consistent with Andersen et al. (2013) emphasize that under uncertain business circumstances as a factor in increasing the risk to the company, and affecting the reputation, image, and success according to the

organization's goals. If the executives are unable to control and find ways to manage existing risks will be very difficult for the operational efficiency and corporate sustainability. There are several types of risks that can occur, including financial risk, business risk, market risk, and operational risk. The methods of risk assessment and approaches to hedge these risks may differ. Therefore, the risk management of the business at present, it is different from past risk management (Wu et al., 2014; Bolton et al., 2013; Andersen et al., 2012; Faroughian et al., 2012; Allen et al., 2009; Joshi, 2001).

Furthermore, Hoyt and Liebenberg (2011) explains that enterprise risk management refers to a systematic and continuous operation of the organization to help reduce the causes and opportunities for future damage to an acceptable level. Consistent with the Gates et al. (2012) stresses that enterprise risk management is the practice of identifying potential risks in future by analyzing risks and taking hedging steps to investigate, control, and minimize the impact of poor situation or to maximize the opportunities positive. In accordance with Mikes and Kaplan (2013) indicating that enterprise risk management is a management tool to control and reduce damage in a systematic manner, focusing on achieving organizational objectives and goals. Thus, modern enterprise management focuses on risk management by using management accounting information as a tool to plan, control, track, promote and coordinate to reduce the risks that arise from the production process and is an important tool in management of risk in the organization (O'Donnell, 2005). Besides, the efficiency risk management leads to higher profits and returns, which makes the analysis and assessment of this risk a mission of value management instead of operating the business, which must have the opportunity to confront with the uncertainty that comes from change. In particular, strategic decisions require consideration of long-term returns of firms (Callahan and Soileau, 2017; Bromiley et al., 2015; Shah et al., 2014; Thamhain, 2013).

The current risk management must integrate all risks together under the concept of value-based enterprise risk management must be risk management to reduce the uncertainty of the business and to add value to the business together. Therefore, the current objective of the company is to create the highest value and value for the stakeholders (Soltanizadeh et al., 2014; Arena et al., 2011). The

stakeholders of the company currently are not just the stockholders, but including creditors, customers, the general public, and employees. Therefore, creating value for stakeholders will enable both parties to receive the highest satisfaction and value added (Tang and Tang, 2012).

Most businesses need to use management accounting information as a tool to define both strategies proactive and reactive that can cope with future risks (Rasid et al., 2011). The information usage appropriate allows encourages assessment, control, and monitoring of risks systematically. The executives can analyze the uncertainty situation precisely and apply it in the formulation of strategic to risks management correctly (Loras, 2011). Therefore, risk management is the basis for creating value from prevention, avoiding, and eliminating damage that occurs within the organization (Andersen and Roggi, 2012). Moreover, effective risk management will help reduce costs in each processes or activities that are linked to competitiveness, increase in growth including returns that create satisfaction and confidence for all stakeholders in the long term (Clarke and Varma, 2002).

Hence, value-based risk management (VBM) is the ability to use integrated methods and tools for risk management to create opportunities and benefits appropriately (Hoyt and Liebenberg, 2011). Consistent with Hahn and Kuhn (2012) indicating that value-based risk management refer the effectiveness of the organization when faced with uncertainty as well as the ability to control the size of the damage to an acceptable level to add value to the stakeholders of the company. While (Grace et al., 2015) explains that value-based risk management is the quality of assessment, monitoring include management to create business opportunities and value creation for organizations to increase benefits from methods that can be used to reduce or avoid those uncertainties.

In this research, value-based risk management is defined as the corporate competence to risk management about searching, identifying, defining guidelines for action, determination of indicators, risk assessment and management, monitoring the performance of risk management plan, the promotion and coordination to understand the risk management of personnel in the organization to find effective ways to prevent potential business risks include risk of fluctuation of raw material price, customers risk, competitor risk, and financial risk (Khemawanit, 2016; Sprcic et al., 2016;

Jalilvand and Malliaris, 2013; Soin and Collier, 2013; Arena et al., 2011; Hoyt and Liebenberg, 2011; McShane et al., 2011; Olson and Dash, 2010; Tang, 2006; Beasley et al., 2005; Bartram, 2001; Froot et al., 1993).

The literature review, explain to link between of value-based risk management results that affect value creation from risk assessment effectiveness under uncertain circumstances. A businesses with the ability in eliminate operational losses will lead to sustainable growth opportunities for financial and non-financial performance (Andersen and Roggi, 2012). Therefore, enterprise risk management is an important mechanism and it is recognized that it can create value for stakeholders. The risk management approach has been continuously developed and developed at both internal and external levels. In addition, enterprise risk management is part of the good corporate governance is evident from the preparation and presentation of the details of the risk management shown in the corporate sustainability report every year. To achieve both long and short term goals together and in line with sustainable business development approach to the environment and society of the listed companies. Then, this research proposes that value-based risk management will increase value creation and corporate sustainability. Hence, the hypothesis is posited as follows:

Hypothesis 4a: Value-based risk management has a positive influence on value creation.

Hypothesis 4b: Value-based risk management has a positive influence on corporate sustainability.

พหุ ประถมศึกษา

Value Creation

Over the years, academics have offered ways to create value in many aspects (Ravald and Gronroos, 1996; Zeithaml, 1988). Zeng and Glaister (2018) perspective on value creation is “The organization of how to determine and management creates value for stakeholder and successful operations and realizes the organization of the value of the main process”. Furthermore, Payne et al. (2004) show that the organizational process of value creation consists of value determination, value creation, value delivery, and value assessment. In implementing a value management approach, organizations need to link the value creation process with customer value, shareholder value, and employee value. Moreover, Gronroos and Voima (2013) argue that value creation refers to customer’s creation of value-in-use; co-creation is a function of interaction. Both the firm’s and the customer’s actions can be categorized by spheres (provider, joint, customer), and their interactions are either direct or indirect, leading to different forms of value creation and co-creation. And the ability of organizations for creating value through environmental considerations from product development by the product designed and developed through reducing resource consumption, using environmentally friendly materials (De Ron, 1998) and processing of production must not have an impact on the environment (Gonzalez-Benito and Gonzalez-Benito, 2005).

For decades, value creation has been the primary goal or main objective of many organizations. Some authors state that an organization must create value for its owners, whereas others insist that value must be created not just for shareholders, but also for all stakeholders. From Haksever et al. (2004) utilitarianism viewpoint, value must be created for all stakeholders because it is morally the right thing to do. Haksever et al. (2004) define a stakeholder of an organization as any group or individual who can affect or is affected by the organization’s activities, and suggest that a firm have five groups of stakeholders which the firm must create value for owners/shareholders, employees, customers, suppliers, and the communities. Accordingly, a firm’s value is created when entrepreneurs or managers put together a deal that simultaneously, and over time, satisfies the groups of stakeholders who play a critical role in the ongoing success of a business (Brenner and Cochran, 2016; McVea and Freeman, 2005; Domingos and Richardson, 2004).

In this research, value creation is defined as corporate ability to take advantage of resources include man, money, material and machine, and management, creating efficient production processes, modern product and service design, the value co-creation of all stakeholders, the creating corporate image to be outstanding, unique, unlike, and difficult to imitate by using brand, symbol, slogan, and distribution channels to create a competitive advantage (Buonincontri et al., 2017; Garcia-Castro and Aguilera, 2015; Pang et al., 2015; Mahoney and Kor, 2015; Kim et al., 2013; Cabiddu et al., 2013; Ravasi et al., 2012; Maatman et al., 2010; Smith and Colgate, 2007; Lepak et al., 2007; Prahalad and Ramaswamy, 2004; Amit and Zott, 2001; Bowman and Ambrosini, 2000; Coff and Barney, 1999; Blair, 1998; Brandenburger and Stuart, 2010). Value in economics is formally defined as the willingness to pay from the end customer perspective (Brandenburger and Stuart, 2010). Generally, value creation refers to any activities that can result in an increase in the value as mentioned above (Ritala and Tidstrom, 2014). Value creation makes a difference and innovations of firms that can allow the economic system to perceive and implement new combinations between resources (Moran and Ghoshal, 2011) and to develop new knowledge and capacities so that the efficiency of using current amount of resources to produce outputs increases (Lin, 2017; Destri and Dagnino, 2005).

There are few conditions that need to be met so that value creation activities can exist. Firstly, the potential increase in the monetary amount arisen from the innovations received from the consumers must exceed the estimated producer's costs in pursuing the strategy where the expected premium in price received from consumer results from the perceived performance differences between the new value created and the closest substitutes (Lepak et al., 2007). Secondly, firms must possess specialized knowledge relating to the new task, process or service as well as their potential alternatives in the market in order to evaluate the novelty of the innovation (Poordanjani et al., 2015). Thirdly, firms also need to understand the social and cultural context where they are operating in to assess the potential value created from the novelty (Poordanjani et al., 2015; Bchini 2015).

Resources-based view changed the picture by including firm heterogeneity as a source of competitive advantage. In particular, whether or not a firm is able to generate value and obtain the related from its activities depends on the system of

resources that it controls and the efficiency for it to combine all the resources together during routine production processes (Barney, 2001; Kay et al., 2006; Gilbert, 2008). In order to obtain sustainable competitive advantage, a firm should develop a bundle of internal valuable, rare, inimitable and non-substitutable resources at the firm's disposal (Penrose, 2010; Peteraf, 1993; Barney, 1991; Wernerfelt, 1984) In particular, both the value creation and the pursuit of sustainable competitive advantage are commonly considered as important aspects of strategic management (Lepak et al., 2007; Amit and Zott, 2001; Wernerfelt, 1984). Then, this research proposes that value creation will increase and corporate sustainability. Therefore, the hypothesis is posited as follows:

Hypothesis 5: Value creation has a positive influence on corporate sustainability.

Corporate Sustainability

In previous research, Kuckertz and Wagner (2010) propose that corporate sustainability refers to the long-term performances that require corporate value to be maximized and marketing to be developed continuously which focuses on both profit and non-profit success. Similarly, Szekely and Knirsch (2005) argue that, corporate sustainability is continuous increase of business income and of profitability, improved product and service quality and growth of market share, relative to past operating results. Likewise Dyllick and Hockerts (2002) firm that has achieved long-term objectives, sales growth and profitability that is on target able to market share, and a good financial status as well as has ability to make a profit that is growing steadily, and the company has been accepted as a professional business. Schaltegger et al. (2012) indicating that corporate sustainability is the process of creating innovation in the enterprise management system and focusing on social responsibility which is an important mechanism for driving the organization to be successful and able to achieve its goals in both short and long term. This is consistent with Nascimento et al. (2017) and Kantabutra and Siebenhuner (2011) explains that the corporate sustainability is the ability to design and deliver value to customers both benefit value and costs and expenses value, which these will create a strong financial and non-financial

performance withstand difficult economic and social situations, including being a leadership in the relevant market. And recently, Avery and Bergsteiner (2011) stresses that the excellent brand and reputation of the organization can create satisfaction and loyalty to customers leading to an increase in financial and operational performance, and long-term stakeholder values.

Thus, a firm's sustainability may be defined as a continuous increase of business income and of profitability, improved product and service quality and growth of market share, relative to past operating results and the idea of doing business together with social and environmental responsibility in order to get good returns. It reflects the important role of the company that, in addition to creating business growth, can also support society and the environment for balanced development and growth, which is considered important and necessary for sustainable enterprise development (Garcia et al., 2016). Likewise, Kaplan and Norton (1992) explain that financial success alone is not likely to result in sustainable business success. Sustainable organizations must be successful both financially and non-financially. Consistent with the, Tomsic et al. (2015) found that positive correlation between the level of sustainability and profitability in a firm's which is a financial measure, including non-financial measure such increases in market share, sales volume, and new customer volume, etc. (Jaakkola et al., 2010; Kaynak and Kara, 2004). These factors are related to expanding business growth, increasing shareholder value, corporate prestige and reputation, and correspondingly improved customer relationships (Szekely and Knirsch, 2005).

Furthermore, the approach to sustainable development of business organizations in Thailand by His Majesty King Bhumibol Adulyadej called the sufficiency economy philosophy. The sufficiency economy is a social principle and process, from the procedure of rehabilitation and expansion of the basic production network to the industrial transformation stage by developing various academic skills, including technology, which will gradually developed from the base of resources and wisdom within the nation that focus on the value rather than worth (Kantabutra, 2014; Kantabutra and Avery, 2013; Kantabutra, 2012; Kantabutra, 2006). Found that the application of the sufficiency economy philosophy in business has 10 main principles, consisting of: (1) focusing on a long-term business perspective rather than maximize

short-term profitability; (2) continuously focusing on developing the ability of the personnel and genuinely value without abandoning them even in times of economic downturn; (3) the genuine concern on all stakeholders and business partners in creating fair mutual benefits for long-term and sustainable firms growth; (4) creating, developing and maintain innovation throughout the organization; (6) focusing on technology development to be efficient and low-cost, especially the creative from Thai wisdom; (5) management of organization resources efficiently and effectively; (7) business operations based on reasonableness, prudence, and carefulness; (8) giving priority to risk management of the organization according to the core competency of the firms by diversifying investment, products, and markets; (9) creating a business network to share knowledge with other people, including competitors of the company, for further marketing development that is beneficial to society and consumers; and (10) creating core values by developing a corporate culture of diligence, perseverance, adherence to morality and ethics (Kantabutra and Siebenhuner, 2011).

In addition, today's sustainability concepts need to be adapted and prepared to cope with the changing economic climate, and to keep pace with the advances in technology and information, along with creativity. Innovations to build and grow your business can create competitive advantage. So that, organizations need to change to lead to new ways or improve and development of beneficial to create value for customers, organizations, and the society (Appelbaum et al., 2016). Likewise, the study of Linnenluecke and Griffiths (2010) argues that businesses must be prepared to deal with future forecasts and developing solutions to minimize the negative effects while taking advantage of the positive effects of pressure and the crisis of future events. Therefore, the current concept of corporate sustainability is the future business adaptation that leads to firm sustainability (Appelbaum et al., 2016; Kim et al., 2012).

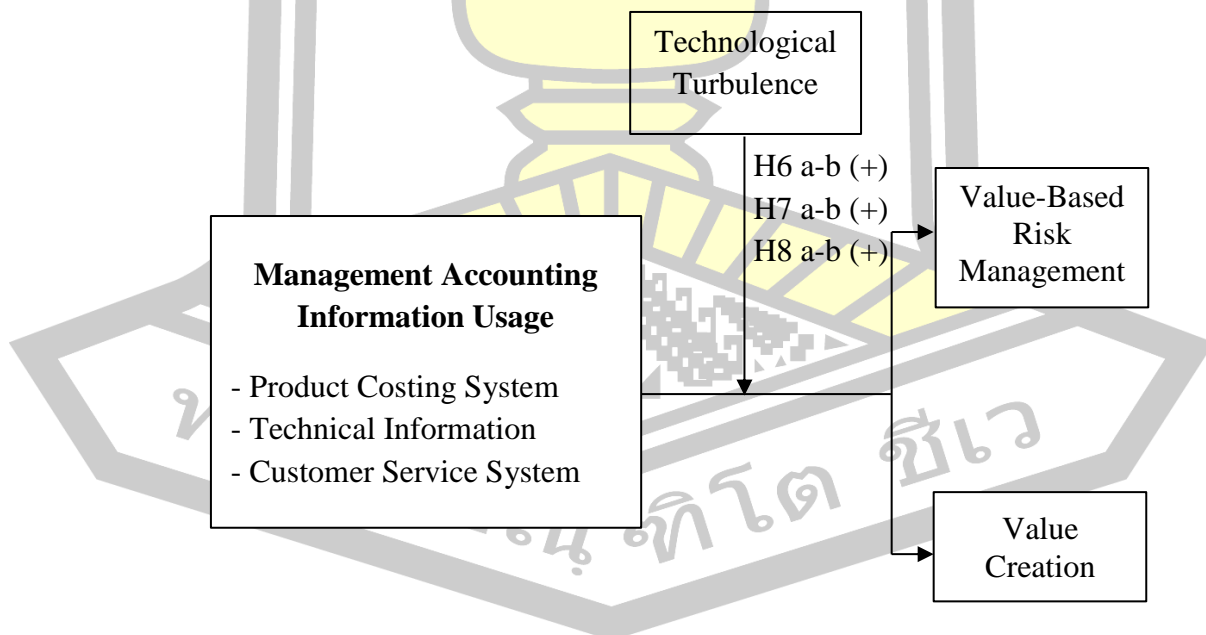
In this research, corporate sustainability refers to the result of achieving in long-term objectives from the increase of sales, income, profit from operations, financial position, trends in investment growth, expansion of production and export, establish good relationships and loyalty of all the stakeholders, create competitive advantage, learn and adaptation to business situations, and protecting the environment and society to support and improve the quality of life of people in society (Winit and Kantabutra, 2017; Breedam, 2016; Maletic et al., 2015; Buranapin and

Ratthawatankul, 2015; Kantabutra, 2014; Kantabutra, 2011; Kantabutra and Siebenhuner, 2011; Dyllick and Hockerts, 2002; Szekely and Knirsch, 2005; Blair, 1998).

The Role Moderating Effects of Management Accounting Information Usage

This research assigns technological turbulence and embracing complexity as the two moderating variables on the relationships among management accounting information usage and its outcomes. This part describes the influence of technological turbulence on the relationships among four dimensions of management accounting information usage (product costs system, technical configuration management, customer service system, and competitor intelligence), value-based risk management and value creation. As well as, the influence of embracing complexity on the relationships among value-based risk management, value creation and corporate sustainability are shown in Figure 4 below.

Figure 4 The Roles Technological Turbulence as a Moderator



Technological Turbulence

Factors of environmental turbulence may have many components, but the most cited components are technological turbulence besides market turbulence, competitive intensity, and government regulation. The technology turbulence refers to the rate of rapid change about the technological environment of an industry firm (Lusia, 2016; Lichtenthaler, 2009; Ngamkroekjoti and Speece, 2008; Jaworski and Kohli, 1993; Kohli and Jaworski, 1990). Likewise, Slater and Narver (1994) indicating that technological turbulence is the amount of unpredictability of rapid pace in product and process technologies within an industry. Furthermore, Adcroft and Mason (2007) stresses that is advances in technology and the confluence of computer, telecommunications and media industries. Thus, technological turbulence refers to the perception of firms with respect to the rapid changes in technology that affect firm operations. Uncertainty in the acceleration of technology and innovation has resulted in the modification of the operating processes of many companies in order to fit the turbulence (Hamad, 2016; Auh and Menguc, 2005).

Technological advances have played a role in the development of various work processes. The use of technology in industrial development can increase production efficiency, saves labor, reduce costs and maintain the environment to creating additional value for the production process, products and services. Consistent with the Ngamkroekjoti and Speece (2008) indicating that the small and medium enterprises (SMEs) in the Thai food processing industry use technology turbulence to examine environmental scanning in the new product development process which help improves new product performance. Similarly, Jeong et al. (2006) found that technological turbulence is related to the efficiency of new products and innovative products. In addition, modern technology and communication helps create contact channels between individuals and organization. Information technology makes the distribution of information fast (Pratono, 2016).

Therefore, technological turbulence has resulted in many changes in the industry. Thus, firms must be able to adapt to more efficiency by using different technologies. Especially communication technologies such as cloud, big data, robotics, machine learning to be used in operations which will help reduce risks and create value for the organization (Luo et al., 2014; Zhang and Duan, 2010). Consistent

with the Subramanian et al. (2013) indicating that under environmental conditions of high technological turbulence, the firm's top management team that are able to accept the risk will succeed in using the information in order to market orientation on firm performance and maintain a competitive advantage. Similarly Schilke (2014) explains that technological turbulence is propellant the use of information technology in order to develop the capabilities in many areas that are essential including the trend of risk management for executives. Furthermore, Subbanarasimha et al. (2003) found that turbulence increase is a factor that enables executives need to use management accounting information as a planning tools of strategic risk of firms.

In addition, technological turbulence has result in the use of information to communicate, build relationships and understanding with customers and related people more quickly, leading to the creation of competitive advantage and reduce the risk or error of data perception make production data reporting is less error prone and planning in the production system is more efficient (Rijsdijk et al., 2011). Moreover, technological turbulence is a signal that helps executives realize that the needs of consumers and customers are starting to change, and how the company can help meet the emerging needs of today's customers. Therefore, modern technology and communication contribute helps encourage executives to use management accounting information in value added to products and services in order to deliver value to consumers. Consistent with Pratono (2016) and Kohli and Jaworski (1990) found that technological turbulence has caused changes in production processes, products, customers, and competitors, those environments affect to work performance, decisions-making, and selection of tools and management methods of executives. Information quality is an important tool for executives to improve their ability to adapt and develop to keep up with the rapid technological change (Lusia, 2016). Jansen et al. (2006) indicates that environmental turbulence is factors influence creativity and innovation. Likewise, Baba et al. (2017) and Porter (2008) stresses that the role of technological turbulence leads to the ability to create organizational learning and development innovation in new ways operate that will help the company achieve sustainable success and create a competitive advantage over competitors.

However, there is little support for arguments the impact of technological turbulence. Similarly, Tina and Katharina (2015) explains that technological resources

have a high cost, the companies must consider the suitability and worthiness of the results obtained with the loss due to the use of advanced technology for enterprise management may not be the last thing, because if the executors cannot exploit those technologies, it will become a waste of investment (Salmon, 2013; Ngamkroekjoti and Speece, 2008). Consistent with the Salmon (2013) explains that The speed of technology may not be enough to achieve success without a vision of a leader that is important to lead the organization to overcome the change at any time in the current environment. Furthermore, the degree of technological environment change in product technology dynamism is characterized by uncertainty and risk as a result of increasing costs and payoffs (Allred and Swan, 2004).

Similarly, Lusia (2016) and Jaworski and Kohli (1993) found that a business with high growth and stability will use technology to create less competitive advantages. Although technological changes create customer pressures and competition, on the other hand, companies that are able to choose the right tools to operate will help organizations withstand those pressures (Lavie et al., 2010) such as management accounting information affects the quality of operational, products and services, including building good relationships with customers that will lead to satisfaction and loyalty in the brand and organization. This is consistent with Allred and Swan (2004) and Slater and Narver (1994) indicates that the firms are able to understand the needs of customers and offer products and services that meet the emerging needs are likely to create advantages through reduced technological innovation. Furthermore, according to the contingency theory, when the operating environment is changing rapidly, the organization's adjustment to create survival depends on the potential of the company in the selection of management tools to be applied to be appropriate between internal systems and organizational environments at that time (Hammad et al., 2010).

In this study, technological turbulence defined as the corporate competence about learning and adaptation to technological advances to contribute to the analysis, decision-making, and strategy formulation for producing quality products and services to create a competitive advantage, can make the most benefit to develop the value of the corporate, and risk monitoring effectively and effectiveness (Carbonell and Escudero, 2015; Huang and Tsai, 2014; Mahmood et al., 2013; Sicotte et al., 2012;

Li, 2012; Rijdsdijk et al., 2011; Ngamkroeckjoti and Speece, 2008; Borjesson et al., 2006; Jeong et al., 2006; Auh and Menguc, 2005; Lin and Germain, 2004; Van Riel et al., 2004). Hence, the hypotheses are proposed as follows:

Hypothesis 6a: The relationship between product costs system and value base risk management will be positively moderated by technological turbulence.

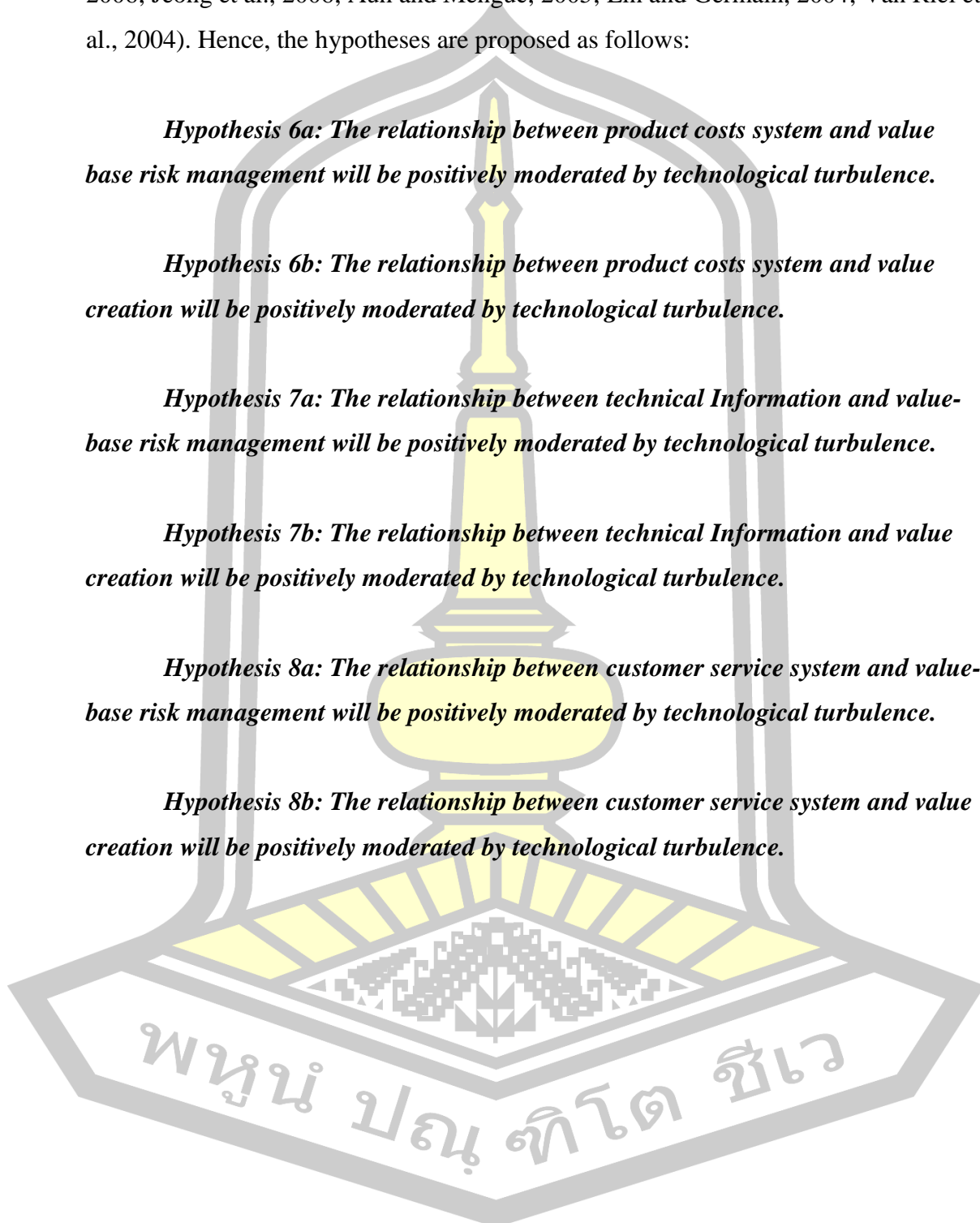
Hypothesis 6b: The relationship between product costs system and value creation will be positively moderated by technological turbulence.

Hypothesis 7a: The relationship between technical Information and value-base risk management will be positively moderated by technological turbulence.

Hypothesis 7b: The relationship between technical Information and value creation will be positively moderated by technological turbulence.

Hypothesis 8a: The relationship between customer service system and value-base risk management will be positively moderated by technological turbulence.

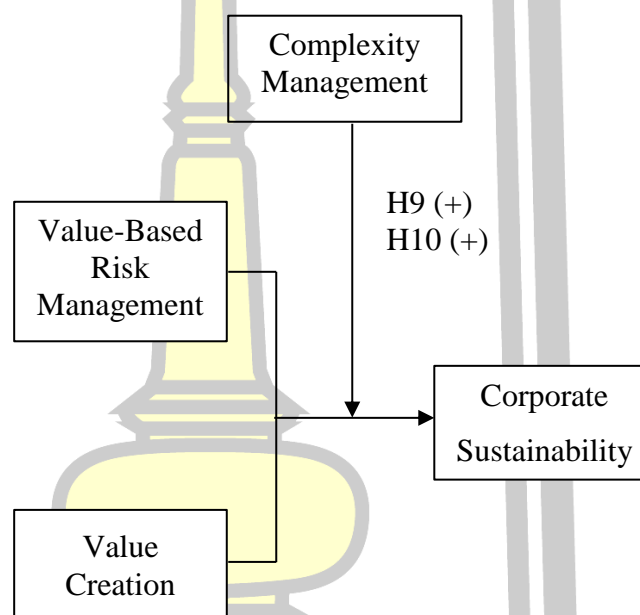
Hypothesis 8b: The relationship between customer service system and value creation will be positively moderated by technological turbulence.



The Role Moderating Effects of Value-Based Risk Management and Value Creation

This section explains the moderating effect of complexity management on the relationships between value-based risk management, value creation and corporate sustainability as shown in Figure 5.

Figure 5 The Complexity Management as a Moderator



Complexity Management

Today's executives must be able to face a variety of situations, challenges from complexity that affects disruption in business operations (Dong and Tomlin, 2012). The organization complexity is related to the operational system, the production process, the personnel, and various strategies that affect the firms operations (Chenhall, 2003). Furthermore, Frizelle and Woodcock (1995) explains that the complexity in the supply chain is the diversity and uncertainty associated with dynamic operational systems. For the complexity of this study focuses on the complexity with arises from the internal environment of the organization. The organizational complexity is the diversity of entities and the amount of resources within the organization consisting of organizational structure, organizational size,

manipulation, production process, corporate strategy, leadership, and corporate culture (Anderson, 2008; Browning, 2001; Baccarini, 1996). Consistent with Dooley (2002) states that the organizational complexity is the amount of differences that exist within the elements of the organizational context related to internal management. Similarly of Anderson (2008) explain that organizational complexity can also be observed via differentiation in structure, authority and locus of control, attributes of personnel, products, and technologies that is component of core operations in the organization (Anderson, 1999; Luhmann, 1995).

Under organization complexity will result in more diverse work processes and cause in task difficulty, the more complex it is, the higher the risk and error of each component of the operation process (Mollanazari and Abdolkarimi, 2012). This is consistent with Hu et al. (2008) the empirical studies have found that in the automotive industry, product diversity, complexity of assembly processes and supply chain operations all have a significant negative impact on operational efficiency, both in terms of quality and productivity. In addition, Mollanazari and Abdolkarimi (2012). explains that in a situation that is complicated in the operation, if the executive does not have enough information, it may result in a lack of understanding of the task, lack of effective planning, lack of proper decisions-making, and lack the correct process or principles in the operation. Likewise, Fujimoto et al. (2003) stresses that the firms that have a complex set of activities or steps in their production are most likely to be at risk from human or machine errors. The risk of defective products in the production process which affects the delivery of value of products and services to consumers.

Therefore, organizations with more complexity operations need a control system to reduce the risks from the complexity to an acceptable level. The complexity management is the way that leads to operations management that will reduce the complexity in the production process and work systems within the organization such as developing new technical innovations to streamline workflow processes, reduce duplication, and reduce errors that create a more efficient work system can create revenue and sustainability for the firms (Ganescu, 2012; Barney, 2001; Womack, et al., 1990). Besides, complexity management is a method of controlling product diversity and production processes by developing tools or programs to reduce diversity (Sanchez and Mahoney, 1996). Complexity management is a holistic

approach to control product diversity and production processes. By developing tools or programs that will help reduce diversity and domino effects that are involved within the entire value chain, and increase efficiency to eliminate complexity in the organization (Sanchez and Mahoney, 1996). Additionally, complexity management that is effective depends on the four main components consisting of strategy, transparency, total value chain, and sustainable (Allen, 2011; Bozarth et al., 2009; Burnes, 2005).

Kermanshachi et al. (2016) found that complexity is the source of risk, therefore, managing complexity correctly will reduce the risk of operations in the firms. Which is consistent with Schulz et al. (2010) states that organizations with high perceived risk enable executives to use more financial and non-financial performance measurement systems to manage project complexity and uncertainty. Likewise, Arena et al. (2010) indicates that complexity management there is linked to risk management as a tool to help assess and examine the organization under the decisions and limitations of existing resources, so that the company can see business opportunities and support decisions that lead to creating added value for shareholders and stakeholders for sustainable growth. This is consistent with Barney (2001) stresses that the company needs to develop new innovations in order to create values in both operational and production systems to help reduce errors and complexity in the work to increase efficiency and effectiveness.

In this study, complexity management is defined as the ability of the corporate to plan the work to achieve good management, determining appropriate responsibilities, creation of knowledge about complexity management leads to a reduction in workflow to create a production and service process with good quality (Dekker et al., 2013; Cilliers, 2011; Dekker et al., 2011; DeRue, 2011; Greenwood et al., 2011; Rotmans and Loorbach, 2009; Lichtenstein et al., 2006; Styhre, 2002; Pich et al., 2002). Consequently, prior research suggests that the embracing complexity will positively moderate the relationship between value base risk management, value creation and corporate sustainability. To summarize, the hypotheses are proposed as follows:

Hypothesis 9: The relationship between value-based risk management and corporate sustainability will be positively moderated by complexity management.

Hypothesis 10: The relationship between value creation and corporate sustainability will be positively moderated by complexity management.

Summary

This chapter has detailed the literature review, the three theories that include the resource-based view, stakeholder theory, and contingency, and the conceptual framework, and the proposed set of twelve testable hypotheses. Management accounting information usage is the main concern of this research that is focused on its consequences (product costs system, technical information, and customer service system). Furthermore, this research also examines the moderating effects of technological turbulence and complexity management relationship as summarized in Table 2. The next chapter presents the sample selection and data collection procedure. Then, the results of measurements testing (validity and reliability), and statistics are also provided.

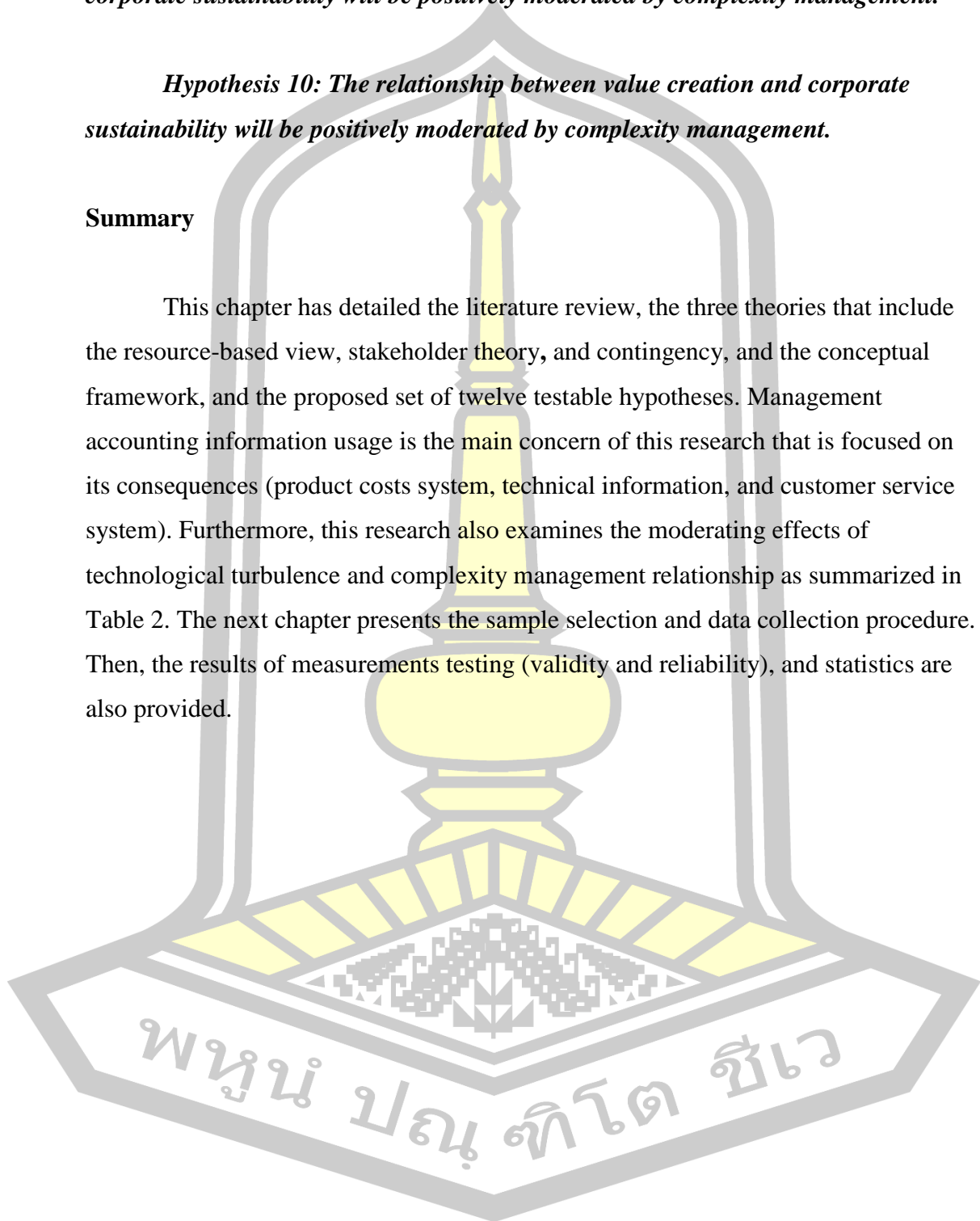
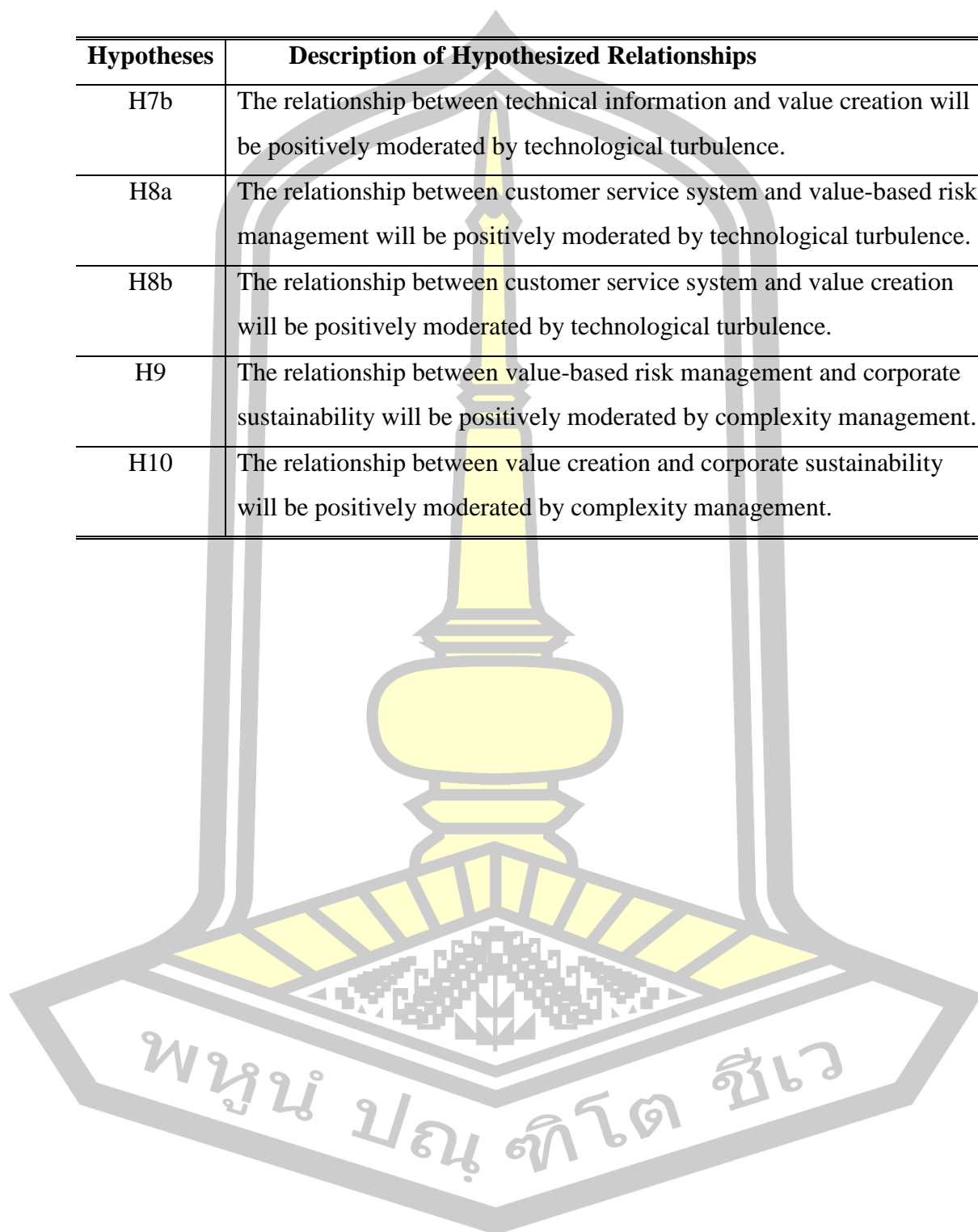


Table 3 Summary of Hypothesized Relationships

Hypotheses	Description of Hypothesized Relationships
H1a	Product costing system will have a positive influence on value-based risk management.
H1b	Product costing system will have a positive influence on value creation.
H1c	Product costing system will have a positive influence on corporate sustainability.
H2a	Technical information will have a positive influence on value-based risk management.
H2b	Technical information will have a positive influence on value creation.
H2c	Technical information will have a positive influence on corporate sustainability.
H3a	Customer service system will have a positive influence on value-based risk management.
H3b	Customer service system will have a positive influence on value creation.
H3c	Customer service system will have a positive influence on corporate sustainability.
H4a	Value-based risk management has a positive influence on value creation.
H4b	Value-based risk management has a positive influence on corporate sustainability.
H5	Value-based risk management has a positive influence on corporate sustainability.
H6a	The relationship between product costing system and value-based risk management will be positively moderated by technological turbulence.
H6b	The relationship between product costing system and value creation will be positively moderated by technological turbulence.
H7a	The relationship between technical information and value-based risk management will be positively moderated by technological turbulence.

Table 3 Summary of Hypothesized Relationships (continued)

Hypotheses	Description of Hypothesized Relationships
H7b	The relationship between technical information and value creation will be positively moderated by technological turbulence.
H8a	The relationship between customer service system and value-based risk management will be positively moderated by technological turbulence.
H8b	The relationship between customer service system and value creation will be positively moderated by technological turbulence.
H9	The relationship between value-based risk management and corporate sustainability will be positively moderated by complexity management.
H10	The relationship between value creation and corporate sustainability will be positively moderated by complexity management.



CHAPTER III

RESEARCH METHODS

The previous chapter presented a review of prior studies and relevant literature detailed of management accounting information usage and other variables in the conceptual model, the theoretical foundations, definition of all variables, and the hypotheses development. To understand the research methods, this chapter details them in four parts as follows. Firstly, the sample selection and data collection procedures, including the population and sample, the data collection, and the test of non-response bias are detailed. Secondly, the variable measurements are developed. Thirdly, the instrumental verification including the tests of validity and reliability, and the statistical analysis including the regression equations are presented. Finally, the table summarizing the variable definitions and operational definitions is included.

Sample Selection and Data Collection Procedure

Population and Sample

The population and sample of this research are the Electrical and Electronics businesses in Thailand, totaling 850 firms, which were acquired from the database of the Electrical and Electronics Institute of the Ministry of Industry in Thailand (<http://eiu.thaieei.com/Default.aspx> accessed on August 11, 2018). For this research, the electrical and electronics businesses are interesting to investigate for several reasons. First, the electrical and electronics products sector is greatly important to the country's economic development; it can prominently help create an international economy. Nowadays, the electrical and electronics businesses are relatively important to Thailand's economy in terms of production, exports, and employment. The production in electrical appliances and electronic parts businesses has grown continuously and attracted a large amount of foreign direct investment each year (Canova and Chiadamrong, 2010). But, these firms are severely affected by the rapid change of economic, social, and technological environment because the products and

services of the electricity and electronics business have a short life cycle and need to adapt to the technology, rapid change of customer behavior and competitor.

Secondly, the electrical and electronics businesses is one of the important industries in accordance with the policy of the Thai government in promoting economic development for the country to be able to escape from the middle income trap to countries that have developed. To developing the economic structure that originally had to rely on production to lead the economy using modern production with the basis of knowledge applied to advanced production. That will create added value and quality of products and services by pushing 10 potential industrial groups (S - Curve) to be a guideline that will lead to success in driving the country's economy continuously and sustainably (The Office of Industrial Economics, 2016).

Thirdly, stepping into the digital technology era causes the need to use various technologies to enhance the quality of operations and increase revenue for business operators, whether internet, big data, artificial intelligence (AI) and The development of the internet of things (IoT) has leads to changing consumer behaviors, which has a growing demand for new products with components of electrical and electronic components, which results in the electricity and electronic businesses needing to accelerate the development of the business potential to open up opportunities for growth to enter the organization.

Finally, the electrical and electronics businesses this industry has a complex manufacturing process with uncertainty of technology and competitive turbulence. The businesses in this industry need to have an effective information system to manage and help to be a competitive advantage. Moreover, March and Gunasekaran (1999) suggest that electronics and electrical manufacturing businesses highly depend on foreign customers. In addition, local producers are oriented to create satisfaction responses to stakeholders' expectations and promote initiative performance. Consistent with Hashim (2000) and Chelliah et al. (2014) indicating that electronics and electrical manufacturing businesses are aware focus on the importance of using accounting information management to enhance their knowledge of operations, create advanced manufacturing innovations to increase the value and quality of products and services of the organization to be sustainable.

The population and sample was selected by using Yamane (1967) who calculated the sample size. This formula calculates the sample size with a 95% confidence level, and acceptable error (e) = 0.05. When one knows the size of the population, the sample size is determined, based on the formula as follows:

Formula
$$n = \frac{N}{1 + N(e)^2}$$

Where:
 n = Sample size
 N = Number of population
 e = Acceptable error (0.05)

The values are set for the formula:

$$n = \frac{850}{1 + 850(0.05)^2}$$

$$n = 272$$

Therefore, the sample size is 272 firms. According to Aaker and Kumar (2001), the acceptable response rate of social science research will be acceptable at a 20% or greater response rate for a questionnaire mailing survey without an appropriate follow-up procedure. Thus, 1,360 firms ($272 \times 100/20$) are an appropriate sampling for a mail survey. Hence, this research follows by sending questionnaires as a mail survey that total 1,360 firms for acceptance at a 20% or greater response rate. However, the online database of the number of electrical and electronics businesses in Thailand, provides a total of 850 firms. Therefore, the total population is the sample.

In this research, the key informants were the chief accounting officer of each business to consist of the accounting director or accounting manager. Since the chief accounting officer has the central role and responsibilities for planning, control, inspection, coordination with the relevant departments, and the preparation of the management information of the business to suggest things that are beneficial to the decision top management and all stakeholders of the organization. Therefore, they are related to education from the positions that need to be used management accounting

information as a tool to lead to the creation of value and sustainability of the corporate (Apak et al., 2012).

Data Collection

In this research, data collection tools are the use of questionnaires by mail because it is a method that is widely used to collect large data of behavioral accounting research. This method helps to store large amounts of data at a relatively low price compared to other methods of data collection, the information received is accurate, and helps to reduce the bias of the respondents from Giving freedom to answer questions without wanting to disclose to others, which will help reduce the pressure on more respondents (Sharma and Iselin, 2012; Yasamorn, 2011; Djamba and Neuman, 2006; Kwok and Sharp, 1998). Moreover, the choice of questionnaire uses multiple choices and scale questions, because it is easier and quicker for respondents to answer and easier to code and statistically analyze (Djamba and Neuman, 2006).

A questionnaire which consists of six sections, the first section consists of seven questions; and respondents are requested to provide their personal information including gender, age, marital status, education level, working experience in their current firm, average monthly income at present, and working position at their current firm. The second section consists of seven questions about the organizational characteristics including industry type, location, registered capital, total assets, the period of business operation, number of employees, and average revenue per year. To be more specific, the third section collects the key concepts of management accounting information usage comprises three dimensions: product costing system, technical information and customer service system. The fourth section presents questions concerning the consequences of management accounting information usage include value-based risk management, value creation, and corporate sustainability. The fifth section includes questions regarding the factor of management accounting information usage of a set of questions relating to technological turbulence that affect the relationship between each dimension of management accounting information usage and consequences, and complexity management that affect between the consequences (value-based risk management, value creation, and corporate

sustainability). Finally, the sixth section provides an open-ended question to collect key respondent guidance and opinions. Altogether, there are a total of 43 items in the questionnaire which is shown in appendix F and G by present both English and Thai version of the questionnaire in this study. Moreover, a Likert five-point interval scale, ranging from 1= strongly disagree, to 5 = strongly agree, is employed. Finally, the sixth section provides an open-ended question.

The questionnaire is directly distributed to each of the electrical and electronics businesses in Thailand by a mail survey. The process of sending a questionnaire mail survey to the sample starts from packing each set that includes a cover letter with an explanation about the research, a questionnaire, and an envelope stamped for reply to the researcher. All 850 mailed packages were sent by post on October 20, 2018. After that, the researcher waited until November 14, 2018 to get the questionnaires back. Therefore, the data collection period was four weeks.

According to the questionnaire mailing, 9 surveys were undeliverable because these firms had moved location or go out of business. Therefore, from mailed 850 surveys, deducting the 9 undeliverable above, the valid mailing was 841 surveys. Finally, a collection of 210 responses was received. When the survey is complete and the response is only 210 responses (response rate was about 24.98%) less than the sample size obtained from the opening of the table 272 responses (response rate was about 32.34%). However, Hair et al. (2010) indicated that the acceptable minimum criterion of the sample size should not be lower than five observations for each interdependent variable. Therefore, 8×5 which is approximately 40. Hence, 210 firms are considered the sample size can be accepted for using multiple regression analysis. Additionally, Aaker and Kumar (2001) indicated that the 20% response rate of mail surveys without follow-up procedure shows that the sample size is appropriate and acceptable. Moreover, when considering the response rate obtained from the calculation and the actual received, the difference is approximately 7.36 (32.34% - 24.98%) which will not affect the accuracy of such results. Likewise, Holbrook et al. (2007) points out that the response rate was not related to the accuracy of the data analysis. A comparing the results of research from different response rates between 18% and 60%, it was found that different response rates did not make a difference in

the research results. Therefore, Table 4 is a presentation of the results from the mailing questionnaire for use in data analysis in this research.

Table 4 Detail of Questionnaire Mailing

Details	Number
Number of questionnaire mailing	850
Number of undelivered questionnaires	9
Number of successful questionnaire mailing	841
Number of received questionnaires	210
Number of questionnaires incomplete	0
Received and usable questionnaires	210
Response rate (210/841)	24.98%

Test of Non-Response Bias

The non-response bias or response errors are the problem that the respondent does not provide accurate information. Therefore, non-response bias test is used to protect the problems caused by bias, a possible response bias between the respondent and non-respondents. In the process of testing the non-response bias by comparing the format of the answers before and after received the response from the first week to the last weeks of the return mail (Armstrong and Overton, 1997). Next, the answers from all mailings are divided into two equal groups to compare the responses received from both the first and second group mailings. If there is no statistically significant difference between the responses received from mail delivery between the two groups, there is no non-response bias.

In this research, all 210 responses from received questionnaires were separated into two groups equally. The first 105 responses were kept as the early respondents. The second group was 105 responses as the later responding. The first group represented the early respondents and the second group represented the late respondents. Therefore, the first 105 responses were used to compare with last 105 respondents from the second group by using a t-test statistic. The t-test statistic is employed to verify the difference of organizational demographics in terms of

operational , business type, location, capital registered, total assets of the firm, period of business operation, number of employees, and the average revenues per year. The result showed the business type as $t = 0.458, p > 0.05$; the location as $t = 0.764, p > 0.05$; the capital registered as $t = 0.237, p > 0.05$; the total assets as $t = 0.326, p > 0.05$; period of business operation as $t = 0.822, p > 0.05$; number of employees as $t = 0.278, p > 0.05$; and the average revenues per years as $t = 0.145, p > 0.05$. These results showed evidence that there were no statistically significant differences between early and late groups at a 95% confidence level. Therefore, it can be said that a non-response bias is not a problem in this research. The results of non-response bias are presented in Appendix B.

Measurements

In this research, the measurement of development procedures involved the multiple-item for measuring each construct in the conceptual model. Actually, all variables in each constructs are abstractions that cannot be directly measured or observed. Thus, all constructs in the conceptual model were should be measured by multi-item scales for precise measurement (Churchill, 2006). In addition, also consider improvements to make the contents of research more diverse and reliable on the conceptual definitions (Djamba and Neuman, 2006). To measure each constructs were transformed to the operational variables for true measuring. To measure each construct in the conceptual model, all variables were developed for measuring from the definition, and all variables gained from the survey were measured on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Table 4 presents the definition of each construct, the operational variables, scale source, and sample questions and items. Thus, the variable measurements of the dependent variable, independent variables, and control variables of this research are described in the following.

Dependent Variable

Corporate sustainability refers to the result of achieving in long-term objectives from the increase of sales, income, profit from operations, financial position, trends in investment growth, expansion of production and export, establish good relationships and loyalty of all the stakeholders, create competitive advantage, learn and adaptation to business situations, and protecting the environment and society to support and improve the quality of life of people in society (Winit and Kantabutra, 2017; Breedam, 2016; Maletic et al., 2015; Buranapin and Rathawatankul, 2015; Kantabutra, 2014; Kantabutra, 2011; Kantabutra and Siebenhüner, 2011; Dyllick and Hockerts, 2002; Szekely and Knirsch, 2005; Blair, 1998). This construct is measured using a seven-item scale developed as adapt from Wirunphan (2018), Phetphongphan and Ussahawanitchakit (2017), Ekkaphan and Pratoom (2014), Kantabutra (2011), and Robkob and Ussahawanitchakit (2009), based on its definition and literature review.

Independent Variables

In this research, the independent variable is management accounting information usage and it is the core construct of this research. Management accounting information usage refers as the process of using accounting information in corporate management by using information in various dimensions includes product costing system, technical information, and customer service system for use in planning, controlling, and decisions that lead to value-based risk management, value creation and corporate sustainability. Furthermore, management accounting information which includes the following three dimensions: product costing system, technical information, and customer service system. These dimensions reflect good aspects of management accounting information.

Product costing system

Product costing system is defined as the system of production cost information reporting include direct materials, direct labor, and manufacturing overhead for calculation product cost, selling price, standard cost reporting includes price variance, material visage variance, labor price variance, labor quantity variance,

spending variance, efficiency variance, and capacity variance, the analysis, measurement, and reporting to costs of prevention damage or lack of quality, appraisal costs of production processes quality, and failure costs of improve and correct about the quality of goods and services (Zainuddin et al., 2015; Lawson et al., 2015; Thammavinyu and Ussahawanitchakit, 2014; Andersch et al., 2013; Fons, 2012; Raman et al., 2009; Dunk, 2004; Cooper and Kaplan, 1988; Groth and Kinney, 1994). This construct is measured using a six-item scale developed as adapt from Zainuddin et al., (2015), Jumpapang et al., (2013), and Raman et al., (2009) based on its definition and literature review.

Technical information

Technical information is defined as a set of technical information for reporting the use of production techniques lean, six sigma, theory of constraints (TOC) and environmental information and communication technologies (green ICT) to improve the production process, damage reduction, environmental management, and reduce the restrictions on the work appropriate (Suryawanshi and Narkhede, 2015; Fullerton et al., 2014; Şimşit et al, 2014; Fullerton et al., 2013; Mahmood et al., 2013; Sprinkle and Maines, 2010; Kennedy and Widener, 2008; Arnheiter and Maleyeff, 2005; Bruggeman and Slagmulder, 1995). This construct is measured using a five-item scale developed as a new scale, based on its definition and literature review.

Customer service system

Customer service system is defined to the process in collection, reporting, and information usage of customer service for sales forecast, the revenue forecasting and profits from target customers, determining market share, analyze and evaluate customer profitability, tracking, and management to reduce costs of customers warranty claims (Zainuddin et al., 2015; Jumpapang et al., 2013; Mohammed and Bin Rashid, 2012; Narver and Slater, 2012; Wang and Feng, 2012; Rollins et al., 2012; Torres and Tribo, 2011; Korhonen-Sande, 2010; Raman et al., 2009; Theoharakis and Hooley, 2008; Guilding and McManus, 2002; Morgan et al., 2005; Yang et al., 1998; Narver et al., 1990). This construct is measured using a five-item scale developed as

adapt from Chuwiruch (2016), Zainuddin et al., (2015), Jumpapang et al., (2013), and Raman et al., (2009) based on its definition and literature review.

Mediating Variables

The mediating variables include value-based risk management and value creation which are treated as the consequences of management accounting information usage in this research. The measure of each characteristic conforms to its definition to be discussed as follows.

Value-based risk management

Value-based risk management is defined as the corporate competence to risk management about searching, identifying, defining guidelines for action, determination of indicators, risk assessment and management, monitoring the performance of risk management plan, the promotion and coordination to understand the risk management in the organization to find effective ways to prevent potential business risks include risk of fluctuation of raw material price, customers risk, competitor risk, and financial risk (Khemawanit, 2016; Sprcic et al., 2016; Jalilvand and Malliaris, 2013; Soin and Collier, 2013; Arena et al., 2011; Hoyt and Liebenberg, 2011; McShane et al., 2011; Olson and Dash, 2010; Tang, 2006; Beasley et al., 2005; Bartram, 2001; Froot et al., 1993). This construct is measured using a five-item scale developed as a new scale, based on its definition and literature review.

Value creation

Value creation is defined as the corporate ability to take advantage of resources include man, money, material and machine, and management, creating efficient production processes, modern product and service design, the value co-creation of all stakeholders, the creating corporate image to be outstanding, unique, unlike, and difficult to imitate by to use brand, symbol, and slogan to create a competitive advantage (Buonincontri et al., 2017; Garcia-Castro and Aguilera, 2015; Pang et al., 2015; Mahoney and Kor, 2015; Kim et al., 2013; Cabiddu et al., 2013; Ravasi et al., 2012; Maatman et al., 2010; Smith and Colgate, 2007; Lepak et al., 2007; Prahalad and Ramaswamy, 2004; Amit and Zott, 2001; Bowman and

Ambrosini, 2000; Coff and Barney, 1999; Blair, 1998; Brandenburger and Stuart, 2010). This construct is measured using a five-item scale developed as adapt from Sungyuan and Ussahawanitchakit, (2017), Petchjul, (2014), and Jumpapang et al., (2013) based on its definition and literature review.

Moderating Variables

Technological turbulence is defined as the corporate competence about learning and adaptation to technological advances to contribute to the analysis, decision making, strategy formulation for producing quality products and services to create a competitive advantage, can make the most benefit to develop the value of the corporate, and risk monitoring effectively and effectiveness (Carbonell and Escudero, 2015; Huang and Tsai, 2014; Mahmood et al., 2013; Sicotte et al., 2012; Li, 2012; Rijdsdijk et al., 2011; Ngamkroekjoti and Speece, 2008; Borjesson et al., 2006; Jeong et al., 2006; Auh and Menguc, 2005; Lin and Germain, 2004; Van Riel et al., 2004). This construct is measured using a five-item scale developed as adapted from Khumyat and Ussahawanitchakit (2014), Thammavinyu and Ussahawanitchakit (2014), and Phokha and Ussahawanitchakit, (2011) based on its definition and literature review.

Complexity management

Complexity management is defined as the ability of the corporate to plan the work to achieve good management, determining appropriate responsibilities, creation of knowledge about complexity management leads to a reduction in workflow to create a production and service process with good quality (Dekker et al., 2013; Cilliers, 2011; Dekker et al., 2011; DeRue, 2011; Greenwood et al., 2011; Rotmans and Loorbach, 2009; Lichtenstein et al., 2006; Styhre, 2002; Pich et al., 2002). This construct is measured using a five-item scale developed as adapted from Prommarat and Pratoom (2016) and Ekkaphan and Pratoom (2014) based on its definition and literature review.

Control Variables

Two control variables were included to account for corporate characteristics that may influence the hypothesized relationships, which are firm size and firm age.

Firm age

Previous research indicates that firm age affects the operations of the organization to achieve success. Likewise, Capelleras and Rabetino (2008) indicated that firm age is important and has a direct relationship with the accumulation of work experience that can create a competitive advantage and the growth of the company. In addition, Talebnia et al. (2010) suggests that the firm age is an indicator of stability and the ability to survive sustainably, and that business organizations such as learning, new investment and development. In this research, firm age refers to the period of time or a firm's experience measured by the number of years a firm has been in operation (Biddle et al., 2009; Laonamtha and Ussahawanitchakit, 2013). Firm success may be influenced by firm age with able to achieve superior performance (Jumpapang et al., 2013). The question items in the questionnaire regarding the requirement for number of operational years were divided into dummy variables in which 0 means the firm had the period of time in proceeding business equal or lower than 20 years, and 1 more than 20 years.

Firm size

In the previous literature review indicated that the size of the company is an important variable that may affect the company's performance because large companies have the resources to management to create an advantage over smaller companies (Prempree and Ussahwanitchakit, 2012). Likewise, Sainio et al., (2011) found that companies with a lot of capital gain will be able to value creation from build brand management more than firms with less capital. Firm size is measured as the current operation capital in the firm (Leiblein et al., 2002). In this research, firm capital is measured by the amount of money a firm has registered to their business (Jumpapang et al., 2013). It is represented by a dummy variable (0 = total assets of the firm that are equal or lower than 200,000,000 Baht, and 1 = total assets of the firm that are equal or more than 200,000,000 Baht) (Phokha and Ussahawanitchakit, 2011)

Methods

In this research, the literature has been reviewed in the past to be used in the development and determination of all constructs in the conceptual model with adapted from related literature. In addition, the research collected data by using questionnaires mailed survey to create all conceptual models. Most constructs in the conceptual model that are adapted from prior research and some have been developed as a new scale. To examine the appropriateness of the questionnaire, this research used validity and reliability for evaluating the characteristics of an excellent instrument. Moreover, the questionnaire were double-checked by three academic experts and with extensive experience in research in management accounting, to reviewed the instrument and adjusted it to the best possible scale measure. Later, the pre-test method is appropriately conducted to assert the validity and reliability of a questionnaire. In this case, the thirty first set of questionnaires that have been returned will be conducted the pre-test, in order to verify the validity and reliability of each of the measure used in the questionnaire. Therefore, these thirty questionnaires are included in the final data analysis for hypotheses and assumptions testing of multiple regression analysis.

Validity and Reliability

The validity and reliability are the criteria upon which the validity and credibility of the research findings are judged, and are important in all research for the methods of achieving these qualities. The validity and reliability are a concern in this research because both ideas help establish the truthfulness, credibility, or believability of the findings (Neuman, 2006).

Validity

Validity is the degree to which instruments measure the data correctly and accurately from the questionnaire (Hair et al., 2010). It is necessary to examine the quality of the questionnaire as a powerful predictor of future behaviors (Piercy and Morgan, 1994; Wainer and Braun, 1988). In this research, the validity is appropriate for accurately confirming the concept or construct of the research. Three types of validity comprising face, content, and construct validity are tested.

Content validity

Content validity is an inspection system to reflect the content of the universe to which the instrument will be generalized. Content validity is the extent to which the items of the scales are sufficiently reflected by the interrelated theoretical domains (Green and Albaum, 1988). Moreover, Nunnally and Bernstein (1994) argue that content validity is the scales containing items which are adequate to measure what is intended. The content validity relies on subjective interpretation of the appropriateness of the items to the construct under study, the former from the point of the researcher gleaned knowledge from the literature, and the latter from professional academics. In this research there is content validity sufficiency by considering the expert opinion on the overall index of item objective congruence (IOC) as 0.89 from three professionals who have experience in this area were requested to verify and advise as to the instrument. Based on their feedback, some questions were deleted or adjusted accordingly to attain the best measurement. Thus, the Item Objective Congruence (IOC) must be more than 0.5, which shows that the content is consistent with the research objectives (Turner and Carlson, 2004). The details of this expertise are shown in Appendix I.

Construct validity

Construct validity refers to the congruence between a theoretical concept and a specific concept measuring the instrument or method which is internally consistent (Trochim, 1999). This research utilizes factor analysis to examine the construct validity of the data in this questionnaire (Fisher et al., 1997). As a result, all factor loadings must be more than 0.40; and illustrate acceptable construct validity (Nunnally and Bernstein, 1994).

Reliability

Reliability is the degree to which the measurement is true and error free of the observed variable; it indicates the degree of internal consistency between the multiple variables (Hair et al., 2010). Cronbach's alpha coefficient is commonly used as a measure of the internal consistency or reliability of the constructs (Hair et al., 2010). Thus, it is applied to evaluate the reliability. As suggested by Nunnally and

Bernstein (1994), Cronbach's alpha coefficient is recommended that its value should be equal or greater than 0.70, as widely accepted.

Item total correlation

This method evaluates the consistency between multi-item measurements in the same construct in that high value points out a more reliable scale (Hair et al., 2010). In addition, the scale of item total correlation must be more than 0.3 to show acceptance of item reliability (Thoumrunroje, 2013).

As shown in Table 5, the item total correlations were scaled from 0.591 to 0.950 which means that all scales are more than 0.3. This study indicates that item reliability is acceptable.

Table 5 Results of Validity and Reliability Testing

Variables	Factor Loading	Cronbach's alpha	Item total correlation
Product costing system (PCS)	0.844 – 0.930	0.953	0.782 - 0.898
Technical information (TI)	0.738 – 0.854	0.861	0.591 - 0.780
Customer service system (CSS)	0.743 – 0.907	0.888	0.618 - 0.840
Value-based risk management (VRM)	0.732 – 0.917	0.890	0.640 - 0.851
Value creation (VC)	0.718 – 0.887	0.878	0.593 - 0.791
Corporate sustainability (CS)	0.781 – 0.894	0.914	0.617 - 0.842
Technological turbulence (TT)	0.792 – 0.911	0.923	0.691 - 0.852
Complexity management (CM)	0.847 – 0.969	0.949	0.766 - 0.950

n = 30

Statistical Techniques

Before hypotheses testing, all of raw data were checked, encoded, and recorded in a data file. Then, the basis assumption of regression analysis is tested. This process involves checking the normality, heteroscedasticity, autocorrelation, and linearity. Moreover, the outlier problem is concerned.

Descriptive analysis

Descriptive analysis is an explanation of the results of the analysis of information about the demographic characteristics of chief accounting officer who is the key informants. In addition, this is a description of firm characteristics in the Electrical and Electronics businesses in Thailand as the population sample, which is considered by percentage. Moreover, the descriptive analysis regarding the mean and standard deviation of each construct (Trainor et al., 2014). Table 6 shows the results of descriptive analysis testing.

Table 6 Results of Descriptive Analysis Testing

Variables	Mean	Standard Deviation
Product costing system (PCS)	4.37	0.52
Technical information (TI)	4.28	0.53
Customer service system (CSS)	4.25	0.56
Value-based risk management (VRM)	3.93	0.57
Value creation (VC)	3.90	0.62
Corporate sustainability (CS)	3.98	0.60
Technological turbulence (TT)	4.05	0.61
Complexity management (CM)	4.19	0.58

n = 210

Factor analysis

Factor analysis is a statistical method used to reduce a large number of variables into fewer numbers of factors so that the measurement is accurate (Hair et al., 2010). This will consider the strength in the relationship between the item and a particular construct or factor from the factor loading score. However, Nunnally and Bernstein (1994) recommend that factor loadings should be equal to, or more than 0.40, which was the criteria condition in this research. Table 7 shows the results of factor analysis testing.

Table 7 Results of Factor Analysis Testing

Variables	Factor Loading	Cronbach's alpha
Product costing system (PCS)	0.844 – 0.930	0.953
Technical information (TI)	0.738 – 0.854	0.861
Customer service system (CSS)	0.743 – 0.907	0.888
Value-based risk management (VRM)	0.732 – 0.917	0.890
Value creation (VC)	0.718 – 0.887	0.878
Corporate sustainability (CS)	0.781 – 0.894	0.914
Technological turbulence (TT)	0.792 – 0.911	0.923
Complexity management (CM)	0.847 – 0.969	0.949

n = 210

Variance inflation factor (VIF's)

Variance inflation factor is an indicator to indicate a high degree of multicollinearity among the independent variables. The VIF is an index which measures the impact of collinearity among the predictors in a regression model on the precision of estimation. A rule of thumb is that when the VIF is equal or greater than 10, a problem with multicollinearity is severe (Hair et al., 2010; Burns and Burns, 2008; Stevens, 2002). That is, multicollinearity poses a great problem for multiple regressions such as limiting the size of correlation, and increasing variances of the

regression coefficients (Stevens, 2002). Typically, when a VIF value is greater than 10, it should be concerned about multicollinearity problems, while the value of a VIF that is less than 10 indicates that there is no statistically significant problem of multicollinearity between the predictor variables (Hair et al., 2010). That is, multicollinearity greatly poses a problem for multiple regression such as increasing variances of the regression coefficients, sign of correlation were not correct, limiting the size of the correlation, and that results show more statistical significance or less statistical significance than fact.

Correlation Analysis

Correlation Analysis is a term that refers to the strength of a relationship between two variables. Correlation coefficient (r) is a coefficient that indicates the strength of the association between any two metric variables. The sign (+ or -) indicates of the relationship the direction. The value can range from +1 to -1 indicating a positive relationship, 0 indicating no relationship, and -1 indicating a perfect negative or reverse relationship. Pearson correlation analysis is commonly used to test the correlations among all variables especially, and to test the relationship among independent variables to have a sign of multicollinearity problems indicated when the inter-correlation between explanatory variables exceeds 0.90 (Hair et al., 2010). This problem occurs when any single independent variable is highly correlated with other independent variables. In other words, a variable can be explained by the other variables in the analysis of multicollinearity. However, factor analysis is used to group highly correlated variables together, and the factor score of all variables is prepared to avoid the multicollinearity problems. Then, they are evaluated by the regression analysis.

Multiple regression analysis

The Ordinary Least Squares (OLS) regression analysis is used to test all hypotheses following the conceptual model. The regression equation origination is a linear association of the independent variables that best describes and predicts the dependent variable (Aulakh et al., 2000). OLS is appropriated to examine the relationship between dependent variables and independent variables of which all

variables are categorical and have interval data (Hair et al., 2010). The OLS regression is appropriate for examining the relationship between the independent variables and dependent variables because both variables are a categorical and interval scale (Hair et al., 2010). The basic assumption of regression analysis was tested before running a regression to test the hypotheses. This process involves checking Pearson Correlation for testing linearity, and VIF test for testing the multicollinearity problems. Before hypotheses testing, all raw data are diagnosed basic assumptions of regression analysis including autocorrelation, normality, heteroscedasticity, and linearity.

The investigation of the relationships between three dimensions of management accounting information usage and value-based risk management is presented in equation 1 as follows:

$$\text{Equation 1: VRM} = \alpha_{01} + \beta_1 \text{PCS} + \beta_2 \text{TI} + \beta_3 \text{CSS} + \beta_4 \text{FA} + \beta_5 \text{FS} + \varepsilon_1$$

The investigation of the relationships between three dimensions of management accounting information usage and value creation is presented in equation 2 as follows:

$$\text{Equation 2: VC} = \alpha_{02} + \beta_6 \text{PCS} + \beta_7 \text{TI} + \beta_8 \text{CSS} + \beta_9 \text{FA} + \beta_{10} \text{FS} + \varepsilon_2$$

The investigation of the relationships between three dimensions of management accounting information usage and corporate sustainability is presented in equation 3 as follows:

$$\text{Equation 3: CS} = \alpha_{03} + \beta_{11} \text{PCS} + \beta_{12} \text{TI} + \beta_{13} \text{CSS} + \beta_{14} \text{FA} + \beta_{15} \text{FS} + \varepsilon_3$$

The investigated role of the moderator, namely technological turbulence which moderates three dimensions of management accounting information usage and two consequence variables namely value-based risk management and value creation, which are presented in equations 4 and 5 as follows:

$$\text{Equation 4: VRM} = \alpha_{04} + \beta_{16}\text{PCS} + \beta_{17}\text{TI} + \beta_{18}\text{CSS} + \beta_{19}(\text{TT}*\text{PCS}) + \beta_{20}(\text{TT}*\text{TI}) + \beta_{21}(\text{TT}*\text{CSS}) + \beta_{22}\text{FA} + \beta_{23}\text{FS} + \varepsilon_4$$

$$\text{Equation 5: VC} = \alpha_{05} + \beta_{24}\text{PCS} + \beta_{25}\text{TI} + \beta_{26}\text{CSS} + \beta_{27}(\text{TT}*\text{PCS}) + \beta_{28}(\text{TT}*\text{TI}) + \beta_{29}(\text{TT}*\text{CSS}) + \beta_{30}\text{FA} + \beta_{31}\text{FS} + \varepsilon_5$$

The investigation of the relationships between value-based risk management on value creation is presented in equation 6 as follows:

$$\text{Equation 6: VC} = \alpha_{07} + \beta_{32}\text{VRM} + \beta_{33}\text{FA} + \beta_{34}\text{FS} + \varepsilon_7$$

The investigation of the relationships between value-based risk management and value creation on corporate sustainability is presented in equation 7 as follows:

$$\text{Equation 7: CS} = \alpha_{06} + \beta_{35}\text{VRM} + \beta_{36}\text{VC} + \beta_{37}\text{FA} + \beta_{38}\text{FS} + \varepsilon_6$$

Last, the investigation of the role of the moderator, namely complexity management which moderates value-based risk management, value creation, and corporate sustainability which are presented in equations 8 as follows:

$$\text{Equation 8: CS} = \alpha_{08} + \beta_{39}\text{VRM} + \beta_{40}\text{VC} + \beta_{41}(\text{CM}*\text{VRM}) + \beta_{42}(\text{CM}*\text{VC}) + \beta_{43}\text{FA} + \beta_{44}\text{FS} + \varepsilon_8$$

Where,

CS = Corporate sustainability

VRM = Value-based risk management

VC = Value creation

PCS = Product costing system

TI = Technical information

CSS = Customer service system

TT = Technological turbulence

CM = Complexity management

FA	=	Firm age
FS	=	Firm size
β	=	Regression coefficient
α	=	Constant
ε	=	Error

Summary

This chapter describes the research methods used in this investigation for collecting the data and examining the relationships among the constructs in the conceptual model to answer the research questions. The 850 electrical and electronics businesses in Thailand are chosen as the population and sample. The population and sample are chosen from the database of the Electrical and Electronics Institute of the Ministry of Industry in Thailand which was drawn in August 2018. The data collection procedure is a questionnaire mailed survey to the accounting executive, accounting director, or accounting manager of each of the electrical and electronics businesses firms in Thailand, who are proposed to be the key informants. The data is collected by the self-administered questionnaires and the non-response bias is tested, as well as the validity and reliability measurement. In addition, this chapter presents the variable measurements of each construct and summarizes them as shown in Table 6. Finally, fifteen statistical equations for hypotheses testing are also included.

In the next chapter, the descriptive statistics and correlation analysis that show the respondent characteristics and the main characteristics of the electrical and electronics businesses in Thailand are discussed. Then the results of the hypotheses testing, which include the important points and the twelve hypotheses proposed are tested and fully discussed to be clearly understood.

Table 8 Definitions and Operational Variables of Constructs

Constructs	Definitions	Operational Variables	Scale Sources
<p><u>Dependent variable</u> <i>Corporate sustainability</i> (CS)</p>	<p>The result of achieving in long-term objectives from the increase of sales, income, profit from operations, financial position, trends in investment growth, expansion of production and export, establish good relationships and loyalty of all the stakeholders, create competitive advantage, learn and adaptation to business situations, and protecting the environment and society to support and improve the quality of life of people in society.</p>	<p>The organization's performance in long-term, such as increase sales, income, profit, financial position, trends in investment growth, expansion of production and export, establish good relationships and loyalty of all the stakeholders, create competitive advantage, learn and adaptation to business situations, protecting the environment, support and improve the quality of life of people in society.</p>	<p>Adapt from Wirunphan (2018), Phetphongphan and Ussahawanitchakit (2017), Ekkaphan and Pratoom (2014), Kantabutra (2011), and Robkob and Ussahawanitchakit (2009),</p>

Table 8 Definitions and Operational Variables of Constructs (continued)

Constructs	Definitions	Operational Variables	Scale Sources
<p><u>Independent Variables</u> <i>Product costing system (PCS)</i></p>	<p>The system of production cost information reporting include direct materials, direct labor, and manufacturing overhead for calculation product cost, selling price, standard cost reporting includes price variance, material usage variance, labor price variance, labor quantity variance, spending variance, efficiency variance, and capacity variance, the analysis, measurement, and reporting to costs of prevention damage or lack of quality, appraisal costs of production processes quality, and failure costs of improve and correct about the quality of goods and services</p>	<p>The use of information about direct materials, direct labor, and manufacturing overhead for calculation product cost, selling price, standard cost reporting, cost of quality include appraisal cost, prevention costs, and failure costs of improve and correct about the quality of goods and services</p>	<p>Adapt from Zainuddin et al., (2015), Jumpapang et al., (2013), and Raman et al., (2009)</p>

Table 8 Definitions and Operational Variables of Constructs (continued)

Constructs	Definitions	Operational Variables	Scale Sources
<i>Technical Information (TI)</i>	A set of technical information for reporting the use of production techniques lean, six sigma, theory of constraints (TOC) and environmental information and communication technologies (green ICT) to improve the production process, damage reduction, environmental management, and reduce the restrictions on the work appropriate.	The use of information about Technical configuration management includes reporting to lean technical, six sigma, theory of constraints (TOC) and environmental information and communication technologies (green ICT)	New scale
<i>Customer service system (CSS)</i>	The process in collection, reporting, and information usage of customer service for sales forecast, the revenue forecasting and profits from target customers, determining market share, analyze and evaluate customer profitability, tracking, and management to reduce costs of customers warranty claims.	The use of information about customer service includes customer service for sales forecast, forecast revenue and profits from target customers, determining market share, analyze and evaluate customer profitability, tracking, and management to reduce costs of customers warranty claims.	Adapt from Chuwiruch (2016), Zainuddin et al., (2015), Jumpapang et al., (2013), and Raman et al., (2009)

Table 8 Definitions and Operational Variables of Constructs (continued)

Constructs	Definitions	Operational Variables	Scale Sources
<p><u>Consequences Variable</u> <i>Value-based risk management (VR)</i></p>	<p>the corporate competence to risk management about searching, identifying, defining guidelines for action, determination of indicators, risk assessment and management, monitoring the performance of risk management plan, the promotion and coordination to understand the risk management in the organization to find effective ways to prevent potential business risks include risk of fluctuation of raw material price, customers risk, competitor risk, and financial risk.</p>	<p>The corporate competence about searching, identifying, defining guidelines for action, determination of indicators, risk assessment and management, monitoring the performance of risk management plan, the promotion and coordination to understand the risk management of personnel in the organization to find effective ways to prevent potential</p>	<p>New scale</p>

Table 8 Definitions and Operational Variables of Constructs (continued)

Constructs	Definitions	Operational Variables	Scale Sources
<i>Value creation (VC)</i>	The corporate ability to take advantage of resources include man, money, material and machine, and management, creating efficient production processes, modern product and service design, the value co-creation of all stakeholders, the creating corporate image to be outstanding, unique, unlike, and difficult to imitate by to use brand, symbol, and slogan to create a competitive advantage.	The corporate ability about to take advantage of resources, creating efficient production processes, product design and service and creating a unique image, outstanding, unlike competitors, difficult to imitate, including the creation for value co-creation of all stakeholders.	Adapt from Sungyuan and Ussahawanitchakit, (2017), Petchjul, (2014), and Jumpapang et al., (2013)

Table 8 Definitions and Operational Variables of Constructs (continued)

Constructs	Definitions	Operational Variables	Scale Sources
<p>Moderator Variables</p> <p><i>Technological turbulence</i> (TT)</p>	<p>The corporate competence about learning and adaptation to technological advances to contribute to the analysis, decision making, strategy formulation for producing quality products and services to create a competitive advantage, can make the most benefit to develop the value of the corporate, and risk monitoring effectively and effectiveness.</p>	<p>The corporate competence about learning and adaptation to use the technological advances in analysis, decision-making, strategy formulation for producing quality products and services, and risk monitoring.</p>	<p>Adapt from Khumyat and Ussahawanitchakit (2014), Thammavinyu and Ussahawanitchakit (2014), and Phokha and Ussahawanitchakit, (2011)</p>
<p><i>Complexity management</i> (CM)</p>	<p>The ability of the corporate to plan the work to achieve good management, determining appropriate responsibilities, creation of knowledge about complexity management leads to a reduction in workflow to create a production and service process with good quality.</p>	<p>The ability of the corporate to plan the work, determine appropriate responsibilities, creation of knowledge about complexity management, reduction in workflow, creating a production and service process with good quality.</p>	<p>Adapt from Prommarat and Pratoom (2016) and Ekkaphan and Pratoom (2014)</p>

Table 8 Definitions and Operational Variables of Constructs (continued)

Constructs	Definitions	Operational Variables	Scale Sources
<p><u>Control Variables</u></p> <p><i>Firm age (FA)</i></p>	<p>The period of time or a firm's experience measured by the number of years a firm has been in operation (Biddle et al., 2009; Laonamtha and Ussahawanitchakit, 2013).</p>	<p>Dummy variable</p> <p>0 = less and equal 20 years.</p> <p>1 = more than 20 years</p>	<p>Adapt from Laonamtha and Ussahawanitchakit, (2013), Jumpapang et al., (2013), Biddle et al., (2009).</p>
<p><i>Firm size (FS)</i></p>	<p>Firm size is measured the capital in the operation of an organization by the amount of money a firm has registered to their business (Ussahawanitchakit, 2005; Leiblein et al., 2002).</p>	<p>Dummy variable</p> <p>0 = less and equal 200,000,000 Baht</p> <p>1 = more than 200,000,000 Baht</p>	<p>Adapted from Jumpapang et al., (2013), Prempre and Ussahawanitchakit, (2012). Phokha and Ussahawanitchakit, (2011), Sainio et al., (2011), Leiblein et al., (2002).</p>

CHAPTER IV

RESULTS AND DISCUSSION

The previous chapter describes the research methodology which consists of sample selection and data collection procedures, population and sample, data collection, and the test of non-response bias. In addition, the development for measuring each construct in the conceptual model, research methods, statistical techniques, data analysis and hypotheses testing are described. Accordingly, this chapter will present the results of the statistical testing as follows. Firstly, it presents the response characteristics and descriptive statistics to increase the understanding of the sample characteristics. Secondly, the hypotheses results and discussion are described. Finally, the comprehensiveness of all hypotheses outcomes is provided in a table format.

Respondent Characteristics and Descriptive Statistics

Respondent Characteristics

In this research, the key informants are the chief accounting officer of electrical and electronic businesses in Thailand who have the most comprehensive knowledge regarding corporate characteristics, management accounting information usage to serve organizational activities, including using the information to support many functions in the firm's operation to value creation and corporate sustainability. These key informants have operations that relate to the use of administrative accounting data to create value and sustainability of the organization. Thus, they could give the data according to the objective of this research.

Moreover, the descriptive statistics from the data was used to describe the mean, standard deviation, and correlation for all variables, correlation coefficients and direction in correlation matrix forms. In addition, the respondent's characteristics are shown in Table 1C (in Appendix C). The respondent characteristics are explained by the demographic characteristics, including gender, age, marital status, education level, work experience, average monthly income at present, and working position.

The result of demographic characteristics with a received mail survey of the 210 valid respondents, 84.8% are female. The age is between 30 - 40 years old is 37.6%, the most married respondents are 65.7%, education level of most respondents is undergraduate representing 59.5%, and those having work experience more than 20 years is 37.1%. The average monthly income at present is 50,000 - 100,000 bath at 45.2%. Finally, 59.5% of respondents working positions are that of accounting manager (percent). More details are shown in Appendix C.

Firm Characteristics

In addition, Table 2C (in Appendix C) exhibits the firm characteristics of electrical and electronics businesses in Thailand. The result of the 210 valid responses, is at 91.9% shows that most business types which came from the company limited. The most businesses are located in the central region at 52.9%. Moreover, the registered capital is 100 - 200 million baht at 29.0%. Furthermore, 66.2% of firm respondents have total assets more than 150 billion baht. In addition, more than two thirds of the firms have a period of business operation 11 - 15 years, representing 33.8%. Most of the firms have a number of employees of less than 250 employees at 36.2%. Finally, nearly half of firms have the average revenue per year more than 100 million baht at 73.3%. Additional is provided in Appendix C.

Descriptive Statistic

Descriptive statistics are used to explain the general characteristics of the data, including mean and standard deviation. The descriptive statistics show in Table 7. Overall, the mean of all constructs is ranged 3.90 - 4.37. Value creation variable, has the lowest mean (3.90), and the product costing system variable has the highest mean (4.37). In addition, the standard deviation of all constructs is between 0.52 and 0.62.

Correlation analysis

The Pearson's correlation is a statistical technique used to analyze linear relationships of each variable pair, and to detect multicollinearity in multiple regression assumption. Therefore, the multicollinearity problem might occur when inter-correlation of each predict variable that exceeds 0.80 (Hair et al., 2010). Table 7 shows the results of the correlation analysis of all constructs by the bivariate correlation procedure are subject to a two-tailed test of statistical significance at $p < 0.01$ and $p < 0.05$.

The correlation matrix can prove the correlation between two variables and verify the multicollinearity problems by the inter-correlations among the independent variables. The evidence suggests that they are significantly related among the three dimensions of management accounting information usage between 0.557 and 0.684, $p < 0.05$. These correlations are less than 0.80, as recommended by Hair et al. (2010). As a result, the multicollinearity problems should not be of concern.

The correlation matrix reveals a correlation between the consequences of the dimensions of management accounting information usage. The result indicates the dimensions of management accounting information usage relating to value-based risk management, value creation, and corporate sustainability that have a significant positive correlation between 0.392 and 0.554, $p < 0.05$.

Finally, the moderating variable, including technological turbulence, has correlations with all variables between 0.454 and 0.704, $p < 0.05$. However, most correlations are less than 0.80, as recommended by Hair et al. (2010). As a result, the multicollinearity problems should not be of concern.

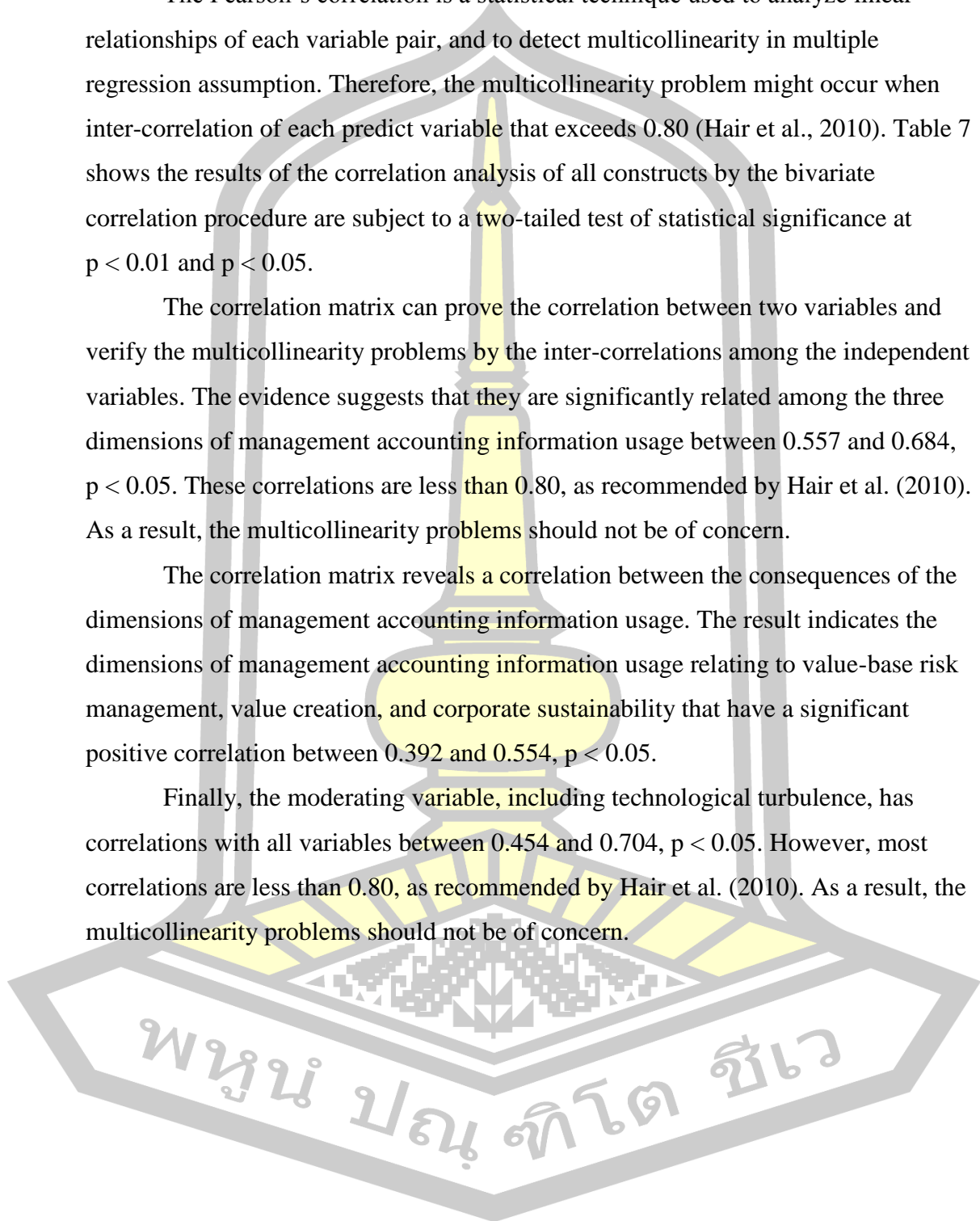


Table 9 Descriptive Statistics and Correlation Matrix of Management Accounting Information Usage and All Constructs

Variable	PCS	TI	CSS	VRM	VC	CS	TT	CM	FS	FA
Mean	4.37	4.28	4.25	3.93	3.90	3.98	4.05	4.19	n/a	n/a
S.D.	0.52	0.53	0.56	0.57	0.62	0.60	0.61	0.58	n/a	n/a
PCS	1									
TI	.635**	1								
CSS	.557**	.684**	1							
VRM	.488**	.528**	.554**	1						
VC	.392**	.462**	.424**	.736**	1					
CS	.444**	.520**	.478**	.788**	.800**	1				
TT	.454**	.612**	.492**	.619**	.644**	.704**	1			
CM	.433**	.574**	.470**	.607**	.640**	.678**	.782**	1		
FS	.176*	.184**	.115	.290**	.216**	.177*	.271**	.215**	1	
FA	.201**	.142*	.199**	.270**	.123	.167*	.165*	.160*	.263**	1

***p < 0.01, **p < 0.05, *p < 0.10

Hypothesis Testing and Results

In this research, multiple regressions by Ordinary Least Squares (OLS), regression is used to investigate hypotheses in research. Likewise, the regression equation is a linear combination of the independent variable that can interpret and predicted the dependent variable (Aulakh et al., 2000). Therefore, OLS was an appropriate method for examining the hypothesized relationships. This research, all hypotheses were transformed into 8 equations in this research that are illustrated in the previous chapter. Moreover, there were two dummy variables: firm size and firm age which were consistent with the data collection included in those equations for testing. The result of descriptive statistics and hypotheses testing are manifested regarding each equation as follows:

The Relationship between Each Dimension of Management Accounting Information Usage, Its Consequences, and Technological Turbulence as a Moderating Effect

As shown in figure 6, the relationships of each dimension of management accounting information usage and its consequences are represented in hypotheses H1a-c to H3a-c. The relationship in each hypothesis is presented to be in a positive direction. Thus, these hypotheses can be converted to the regression equation. Equations 1, 2, and 3 are used to test the above hypotheses. Moreover, the moderating role of technological turbulence relationships is proposed to positively influence the relationship among each of three dimensions of management accounting information usage which are shown in hypotheses H6a-b to H8a-b. The above mentioned hypotheses can be converted to the regression equation, which includes equations 4 and 5, respectively.

Figure 6 The Relationship between Each Dimension of Management Accounting Information Usage, Its Consequences, and Technological Turbulence as a Moderating Effect

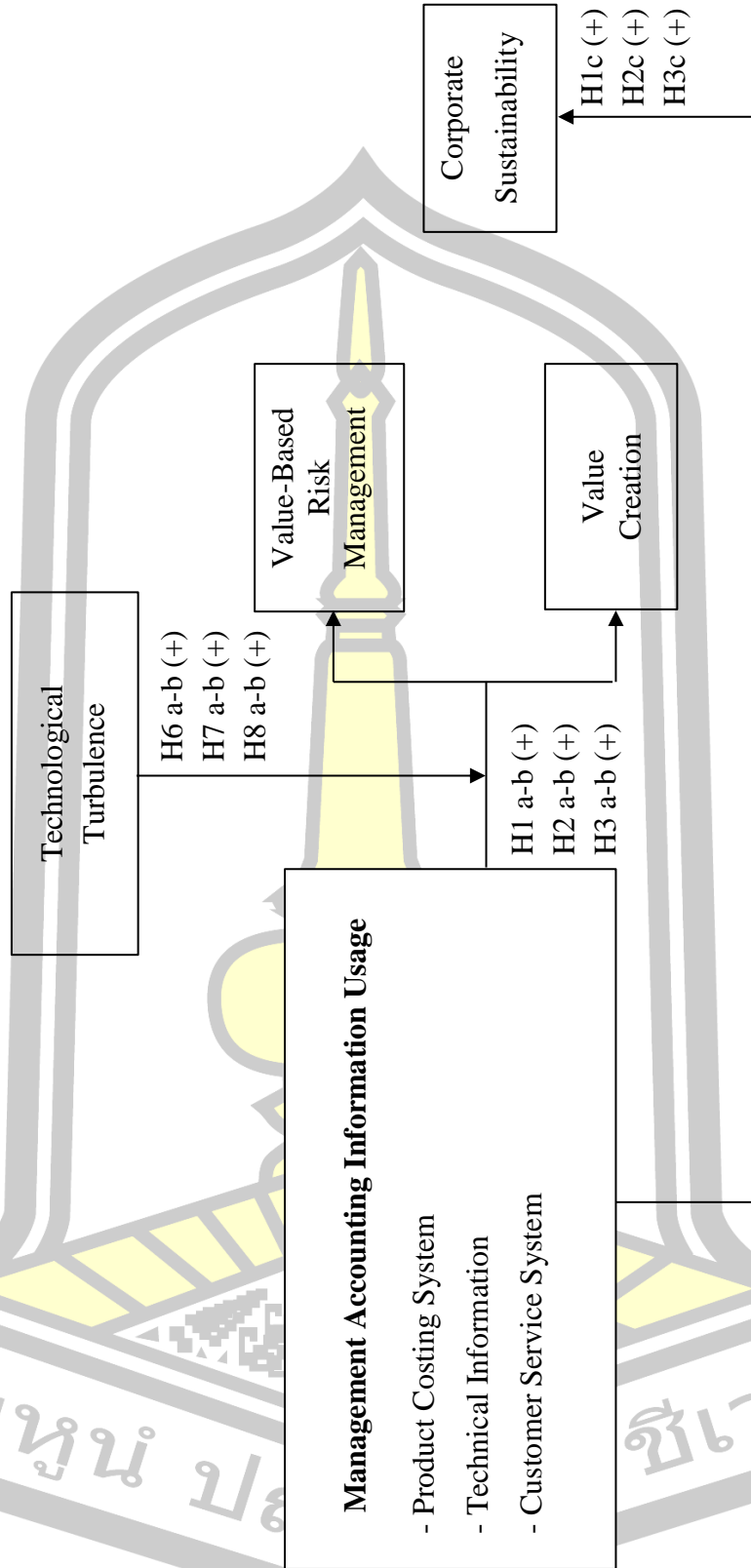


Table 10 Descriptive Statistics and Correlation Matrix of Each Dimension Management Accounting Information Usage, Its Consequences, and Technological Turbulence

Variable	PCS	TI	CSS	VRM	VC	CS	TT	FS	FA
Mean	4.37	4.28	4.25	3.93	3.90	3.98	4.05	n/a	n/a
S.D.	0.52	0.53	0.56	0.57	0.62	0.60	0.61	n/a	n/a
PCS	1								
TI	.635**	1							
CSS	.557**	.684**	1						
VRM	.488**	.528**	.554**	1					
VC	.392**	.462**	.424**	.736**	1				
CS	.444**	.520**	.478**	.788**	.800**	1			
TT	.454**	.612**	.492**	.619**	.644**	.704**	1		
FS	.176*	.184**	.115	.290**	.216**	.177*	.271**	1	
FA	.201**	.142*	.199**	.270**	.123	.167*	.165*	.263**	1

***p < 0.01, **p < 0.05, *p < 0.10

Table 10 illustrates the correlation among each dimension of management accounting information usage and its consequence. In the first dimension, the result demonstrates the positive correlation between product costing system and value-based risk management ($r = 0.488$, $p < 0.01$), value creation ($r = 0.392$, $p < 0.01$), and corporate sustainability ($r = 0.444$, $p < 0.01$). In the second dimension, technical information has a positive correlation to value-based risk management ($r = 0.528$, $p < 0.01$), value creation ($r = 0.462$, $p < 0.01$), and corporate sustainability ($r = 0.520$, $p < 0.01$). The last dimension, customer service system has a significant and positive correlation with value-based risk management ($r = 0.554$, $p < 0.01$), value creation ($r = 0.424$, $p < 0.01$), and corporate sustainability ($r = 0.478$, $p < 0.01$).

The findings in Table 10 found that the correlations among independent variables in equation 1 to 3 are less than 0.80 which are recommended by Hair et al. (2010). In addition, Table 11 shows that value of variance inflation factors (VIFs) are utilized to test the inter-correlation among three dimensions of management

accounting information usage on its consequences. The maximum value of VIF is 2.311, or well below the cut-off value of 10 (Hair et al., 2010). As a result, there are no substantial multicollinearity problems encountered in this regression analysis.

Next, Table 11 demonstrates the multiple regression analysis of the relationships among management accounting information usage (product costing system, technical information, and customer service system), its consequences (value-based risk management, value creation, and corporate sustainability), and the moderating effect of technological turbulence, as illustrated below.



Table 11 Result of Regression Analysis for the Relationships among Management Accounting Information Usage, Its Consequence, and Technological Turbulence

Independent Variables	Hypothesis	Dependent Variables				
		VRM		VC		CS
		Equation 1	Equation 4	Equation 2	Equation 5	Equation 3
PCS	(H1a-c)	.156** (.072)	.142* (.074)	.116 (.080)	.102 (.084)	.136* (.077)
TI	(H2a-c)	.171** (.081)	.198** (.085)	.243** (.091)	.263*** (.096)	.285*** (.088)
CSS	(H3a-c)	.309*** (.076)	.306*** (.082)	.179** (.085)	.183** (.092)	.192** (.082)
TT			-.296*** (.100)		-.127 (.112)	
PCS x TT	(H6a-b)		-.091 (.075)		-.072 (.084)	
TI x TT	(H7a-b)		.113 (.072)		.087 (.081)	
CSS x TT	(H8a-b)		-.017 (.067)		.011 (.075)	
FA		.224** (.116)	.219* (.118)	-.010 (.131)	-.010 (.132)	.090 (.126)
FS		.337* (.114)	.327*** (.115)	.266** (.128)	.251 (.130)	.135 (.123)
Adjusted R ²		.401	.401	.243	.238	.302
Maximum VIF		2.311	2.514	2.311	2.514	2.311

Beta coefficients with standard errors in parenthesis , *** p<0.01, ** p<0.05, * p<0.10

In Table 11, the result of the multiple regression analysis shows that there are the relationships among management accounting information usage (consisting of product costing system [PCS], technical information [TI], and customer service system [CSS]), its consequences (including value-based risk management [VRM], value creation [VC], and corporate sustainability [CS]), are these variables as shown in hypotheses H1a-c to H3a-c, and the equations 1, 2 and 3 are used to test these hypotheses. Moreover, the moderating effect that is technological turbulence (TT) as shown in hypotheses H6a-b to H8a-b, and the equations 4 and 5 are used to test these hypotheses.

The result of OLS regression analysis demonstrates that the first dimension, product costing system (H1a-c), is significantly and positively related to some of its outcomes: value-based risk management (H1a: $\beta_1 = 0.156$, $p < 0.05$), and corporate

sustainability (H1c: $\beta_{11} = 0.136$, $p < 0.10$). The findings suggest that the use of product costing system information will affect the risk management according to the value and lead to the corporate sustainability. Due to product cost information is linked to decision-making in risk management and planning to help managers know the mistakes or defects in business operations. It also includes finding ways to correct unwanted events in a timely manner and meeting the business needs as much as possible. In addition, cost information helps organizations evaluate, analyze, and manage risk to a reduced size or eliminate the risk from the operation. This will create the ability to create competitive advantage with other businesses in the long-term. Similarly, prior evidence shows that product costing system that is related to value-based risk management and corporate sustainability. The empirical studies by Brierley (2010) state that the use of product cost information leads to correct and precise of product cost allocation, which is important for practitioners account in production planning to product pricing. Therefore, using the right cost data can reduce the risk of product pricing especially companies with many kinds of products (Chan and Lee, 2003). Using product cost information will increase firm performance, namely, sales growth, and with the firms' market-to-book ratio, reduce the risk of volatility of raw material prices in the future and decreases historical sales volatility (Anderson et al., 2013). Moreover, the firm to utilize operational information that is both financial and non-financial, to support decision-making and maximize its profitability, market share, and competing continuously in the long term from use produce cost information (Laonamtha and Ussahawanitchakit, 2013). Besides, cost accounting information assists to improve and develop product quality, which is an important part of managing the risks that may arise from poor quality products and services (Cohen and Kaimenaki, 2011; McNair, 2007). Furthermore, consistent with the resource-advantage theory explained that the management accounting information and product cost information are intangible resources that will lead to innovation in production. Is the foundation of creating value in the work process and a competitive advantage over the company (Hughes and Morgan, 2007; Wooliscroft and Hunt, 2012). In addition, product cost information usage will promote managers' perception of product development, which is positively correlated with growth and profitability (Wolff and Pett, 2006). And increase market share, increase profitability, and long-term financial

and non-financial performance (Backstrom and Lind, 2005; Wheaton and Weimerskirch, 1989). **Thus, hypothesis 1a and 1c is supported.**

Thus, the finding illustrates that product costing system (H1b), is non-significant related to value creation (H1b: $\beta_6 = 0.116$, $p > 0.10$). Although earlier research has indicated that product costing information is part of a management accounting that plays an important role to reported information in the past for executives as a guideline at future company development. Also, cost accounting information is also related to the development of the production process and the overall operational efficiency of the organization. However, the use of most product costing information that are often being presented in the perspective for decisions making about planning, command, control, and evaluation (Horngren et al., 2008). There is a few amount of information that will be used as a part to create value for the organization (Bourguignon, 2005). The use of product cost information to create value will depend on the objectives and goals of the organization management of the executive. This is consistent with R-A theory suggested that executives be necessary to select and adapt of valuable resources to be a tool that is suitable for the operating environment. If management lacks the ability to make use of existing resources, it will be hardship for them to lead the organization to achieve success in creating value and sustainable competitive advantage (Hunt, 2011). Furthermore, compatible with Smith et al. (2008) found that most executives attach importance to the use of management account information in order to support their decision-making in the primary, while the use of information for the development of accounting innovations and the value creation for the organization will be arranged in the last order. In addition, product cost information does not affect the creation of values. It may depend on the vision and style of using information for the organization management of the executive. Similarly, Jansen (2011) identify that the executive leadership styles can affect the use of management accounting information. The considering the various activities of the company and setting operational guidelines to focus on achieving organizational goals. Likewise, Rikhardsson and Yigitbasioglu (2018) indicate that organizations must be able to adapt to respond to business changes. Hence, effective organization leaders will be able to apply the available resources to create new innovations, and focus on data analysis to support good decisions in creating value for their companies.

Therefore, product costing system has no influence on value creation. **Consequently, hypotheses 1b are not supported.**

Next, the second dimension that is technical information (H2a-c) is significantly and positively related to all three of its consequences which include value-based risk management (H2a: $\beta_2 = 0.081$, $p < 0.05$), value creation (H2b: $\beta_7 = 0.243$, $p < 0.05$), and corporate sustainability (H2c: $\beta_{12} = 0.285$, $p < 0.01$). The results support the hypothesized theoretical relationship that firms which value-based risk management, value creation, and corporate sustainability. These findings confirm that firms which pay more attention to the technical information. This is consistent with Feng et al. (2010) found that technical information will help the manufacturing process to be accurate and also optimize the product design of the organization. Besides, many techniques and methods in manage to apply reduce risk with create value of the manufacturing process in the organization such as lean, six sigma, TOC, and green ICT. Similarly, Kwak and Anbari (2006) identify that technical information improved the net profits increase, reduction in wastes, reduced failure rates, improve savings through cost reductions and volatility in the production process. And it's tools to provide better value to organization through processes in production which have continued improvement leads to a reduction in risk, coupled with the shift from waste to value (Fullerton et al., 2014; Kennedy and Widener, 2008; Krikhaar et al., 2009). Moreover, the use of technical information to adjust the production process to create value for products and organizations which puts emphasis on social and environment responsibility such as production process, product development, and selection material and package (Ashton and Stacey, 1995). The adaptation new technical for environmental consideration from value creation through production process that concentrates on environmental preservation encourages firms to create environmentally friendly products that can respond to customer needs, while having the least impact on the environment. Initially, the product designed and developed through reducing resource consumption, using environmentally friendly materials and processing of production must not have an impact on the environment (Gonzalez-Benito and Gonzalez-Benito, 2005; De Ron, 1998). Which value creation activities that concern environmental protection can help the firm survived in the short- term and long-term, and obtain a business sustainable, at the same time, it can improve the

quality of people's life in society (Savitz and Weber, 2006). In addition, consistent with the stakeholder theory explained that the responsibility of the organization to the community, society, and the environment through work processes, both production and service that can effectively create value and financial security for the organization to meet the needs of all stakeholders (Kantabutra and Siebenhuner, 2011). **Therefore, hypotheses 2a, 2b, and 2c are supported.**

Finally, the research demonstrates that customer service system (H3a-c) has a significant and positive influence on value-based risk management (H2a: $\beta_3 = 0.309$, $p < 0.01$), value creation (H2b: $\beta_8 = 0.179$, $p < 0.05$), and corporate sustainability (H2c: $\beta_{13} = 0.192$, $p < 0.05$). This result consistent with Nicolas and Castillo (2008) who states that customer's information leads to accurate analysis and forecasting about customer behavior, and the uncertainty of losing old customers. The analysis and reported of customer information as a good warning signal for the organization, and can identify the risk of losing customers in the future. Likewise, Meier et al. (2010) identify that the customer's information enables organizations to use information to plan, control, evaluate, and decisions-making to be prepared to cope and solve potential risks by reflect for the numbers of both new and old customers is increasing and decreasing, satisfaction of service, and customer loyalty (Meier et al., 2010). In addition, in the study of Fuchs (2007) argues that learning about the customer must rely on information leading to effective product development, that is, the firm emphasizes on increasing the customer interaction to help evaluate the value of the products and the communication activities. Moreover, the using customer information leads to the creating superior value for the customer is the firm's capability to sense the customer's current needs and expectations, and anticipate future needs by identifying customer needs, and then firms use this knowledge to create and develop superior value of products and services; then deliver this value to the firm's customer in order to continuously satisfy needs (Narver and Slater, 2012). Similarly, R-A theory explained that organizations with information resources management that are able to produce quality goods and services to meet the needs of customers in each market segment, indicates the ability to deliver superior value while using the cost lower than the competitors of the firms (Hunt, 2012). Besides, it can also increase customer satisfaction, customer loyalty, customer retention, post-

purchase intention, market share, sales growth, and marketing profitability of organization in long-term (Blocker et al., 2011). **Hence, hypotheses 3a, 3b and 3c are supported.**

For the control variable, the results indicated that firm age did not reflect a focus on value creation ($\beta_9 = -.010, p > 0.05$), and corporate sustainability ($\beta_{14} = .090, p > 0.05$). It may imply that firm age did not impact value creation and corporate sustainability. According to R-A theory explain that every organizations has the potential to access information to be used in developing goods and services that create value and sustainability of the firm (Hunt, 2012). In addition, consistent with Ciabuschi et al. (2012) explained that most new and old business organizations must respond to business changes in order to be able to adapt to the situation by developing knowledge to offer products and services that are different from competitors that can create growth and create survive sustainably. However, the findings showed that firm age had a significant positive effect on value base risk management ($\beta_4 = .224, p < 0.05$). Due to organizations that have been in business for a long time will have experience through pressure and the impact of risks in business as a result the organization has the ability to adjust and learn how to risks management appropriately. In accordance with Arena et al. (2011) indicates that internal auditors, management accountants, and risk specialists, who are playing an increasingly important role in the success of enterprise risk management.

Lastly, the results did not find the relationships among firm size and corporate sustainability ($\beta_{15} = 0.135, p > 0.05$). The result showed that firm size did not impact corporate sustainability. However, the findings showed that firm size had a significant positive effect on value-base risk management ($\beta_5 = 0.337, p < 0.10$), and value creation ($\beta_{10} = 0.266, p < 0.05$). This result showed that a large firm had more value base risk management and value creation than a small firm. This was consistent with prior studies which suggested that firm size is an important factor in the design of certain characteristics of value chain capability, as large organizations have more resources to finance the introduction of new systems and modern techniques in cost information for the firm (Joshi, 2001).

Moderating Role of Technological Turbulence

Technological turbulence is proposed as the moderator. This research has expected that technological turbulence positively moderates the relationships between management accounting information usage (product costing system, technical information, and customer service system) and its consequence as shown in hypothesis H6a-b to H8a-b. The regression equations 4 to 5 are analyzed to prove these hypotheses.

The correlation coefficients between technological turbulence and three dimensions of management accounting information usage are consistent with product costing system ($r = 0.454$, $p < 0.05$), technical information ($r = 0.612$, $p < 0.05$), and customer service system ($r = 0.492$, $p < 0.05$). The correlation coefficients between technological turbulence and two dependent variables, including value-based risk management ($r = 0.619$, $p < 0.05$), and value creation ($r = 0.644$, $p < 0.05$) are shown in table 10. Also, the maximum value of VIFs (2.514) is lower than the cut-off value of 10. Thus, the multicollinearity problem is of no concern.

As illustrated in Table 8, the moderating effect of technological turbulence on the relationship among three dimensions of management accounting information usage and its consequences are elaborated as follows. Firstly, the moderating effect of technological turbulence has no effect on the relationships among product costing system (H6a-b) or with value-based risk management (H6a: $\beta_{19} = -0.091$, $p > 0.10$), and value creation (H6b: $\beta_{27} = -0.072$, $p > 0.10$). Secondly, the result also demonstrates that the non-significant moderating effects of technological turbulence have no effect on the relationships among technical information (H7a-b) with value-based risk management (H7a: $\beta_{20} = 0.113$, $p > 0.10$), and value creation (H7b: $\beta_{28} = 0.087$, $p > 0.10$). Finally, the result illustrates the moderating effects of technological turbulence also has a non-significant effect on the relationships among customer service system (H8a-b) with value-based risk management (H8a: $\beta_{21} = -0.017$, $p > 0.10$), and value creation (H8b: $\beta_{29} = -0.011$, $p > 0.10$). Due to the management accounting information is historically that is useful for planning, control, evaluation, management decisions and future organizational development. Most potential organizations will focus on the use of management accounting information in order to achieve an efficient work system and coordination throughout the organization such

as to creation innovation in product and service manufacturing, business risk management system. In particular, the formulation of strategic plans and long-term plans for technological change, in order to determine the direction of applications and solutions that may arise from the use of technology (Subbanarasimha et al., 2003). Therefore, in a business organization that has good information, it can adapt and use the resources available to develop the organization to keep pace with technological changes quickly. In accordance with Lusia (2016) indicating that organizations with potential will have the ability to change the way of work in accordance with the changing environment quickly and can create a very competitive advantage in the dynamic market. Furthermore, according to the contingency theory, when the operating environment is changing rapidly, the organization's adjustment to create survival depends on the potential of the company in the selection of management tools to be applied to be appropriate between internal systems and organizational environments at that time (Hammad et al., 2010). Additionally, the business operation in the Industry 4.0 era, it is difficult to deny that technological leap growth has played an important role in the manufacturing sector. However, in the executive perspective, the development of an era in which the organization must be driven by value creation, the use of management accounting information plays a role in planning and decision-making, which is critical to the success of creating values. On the other hand, the use of advanced technology for enterprise management may not be the last thing, because if the executors cannot exploit those technologies, it will become a waste of investment (Salmon, 2013; Ngamkroekjoti and Speece, 2008). Similarly, Lusia (2016) and Jaworski and Kohli (1993) found that in a business that is growing and stable at a good level, technology is used to create a less competitive advantage. In addition, management account information affects the quality of products and services, including building good relationships with customers that will lead to satisfaction and loyalty in the brand and organization. Therefore, companies that are able to understand the needs of customers and offer products and services that meet the emerging needs are likely to create advantages through reduced technological innovation (Allred and Swan, 2004; Slater and Narver, 1994). Therefore, technological turbulence has no influence the relationships between management accounting information usage (product costing system, technical information, and

customer service system) and its consequence. **Consequently, hypotheses 6a-b, 7a-b, and hypotheses 8a-b are not supported.**

In the term of control variable, firm age has no significant influence on the moderating effect of technological turbulence as to the relationships among dimensions of management accounting information usage and value creation ($\beta_{30} = -0.010, p > 0.10$). Thus, the moderating effect of technological turbulence on the relationships among dimensions of management accounting information usage its consequences are not influenced by firm age. However, the findings showed that firm age had a significant positive relationship effect of dimensions of technological turbulence relationships as to the relationships among dimensions of management accounting information usage and value base risk management ($\beta_{22} = 0.219, p > 0.10$). Thus, the moderating effect of technological turbulence on the relationships among dimensions of management accounting information usage its consequences are influenced by firm age.

Lastly, the results did not find the relationships among firm size on the moderating effect of technological turbulence as to the relationships among dimensions of management accounting information usage and value creation ($\beta_{31} = -0.010, p > 0.10$). Thus, the moderating effect of technological turbulence on the relationships among dimensions of management accounting information usage its consequences are not influenced by firm size. However, the findings showed that firm size had a significant positive relationship effect of dimensions of technological turbulence relationships as to the relationships among dimensions of management accounting information usage and value base risk management ($\beta_{23} = 0.219, p > 0.10$). Thus, the moderating effect of technological turbulence on the relationships among dimensions of management accounting information usage its consequences are influenced by firm size.

The Relationships among Value Base risk Management, Value Creation, Corporate Sustainability, and the Moderating Role of Complexity Management

As shown in figure 7, the relationships among value-based risk management value creation and corporate sustainability are represented in hypotheses H4a-b to H5. Therefore, these hypotheses can be translated to the regression equation. Equations 6

and 7 are used to test the above hypotheses. Furthermore, the moderating role of complexity management relationships is proposed to positively influence the relationship among value-based risk management, value creation and corporate sustainability which are shown in hypotheses H9 to H10. The above mentioned hypotheses can be converted to the regression equation. These hypotheses are converted into the regression equations and test by equation 8, which is presented in Table 12 below.

Figure 7 The Relationships among Value Base risk Management, Value Creation, Corporate Sustainability, and the Moderating Role of Complexity Management

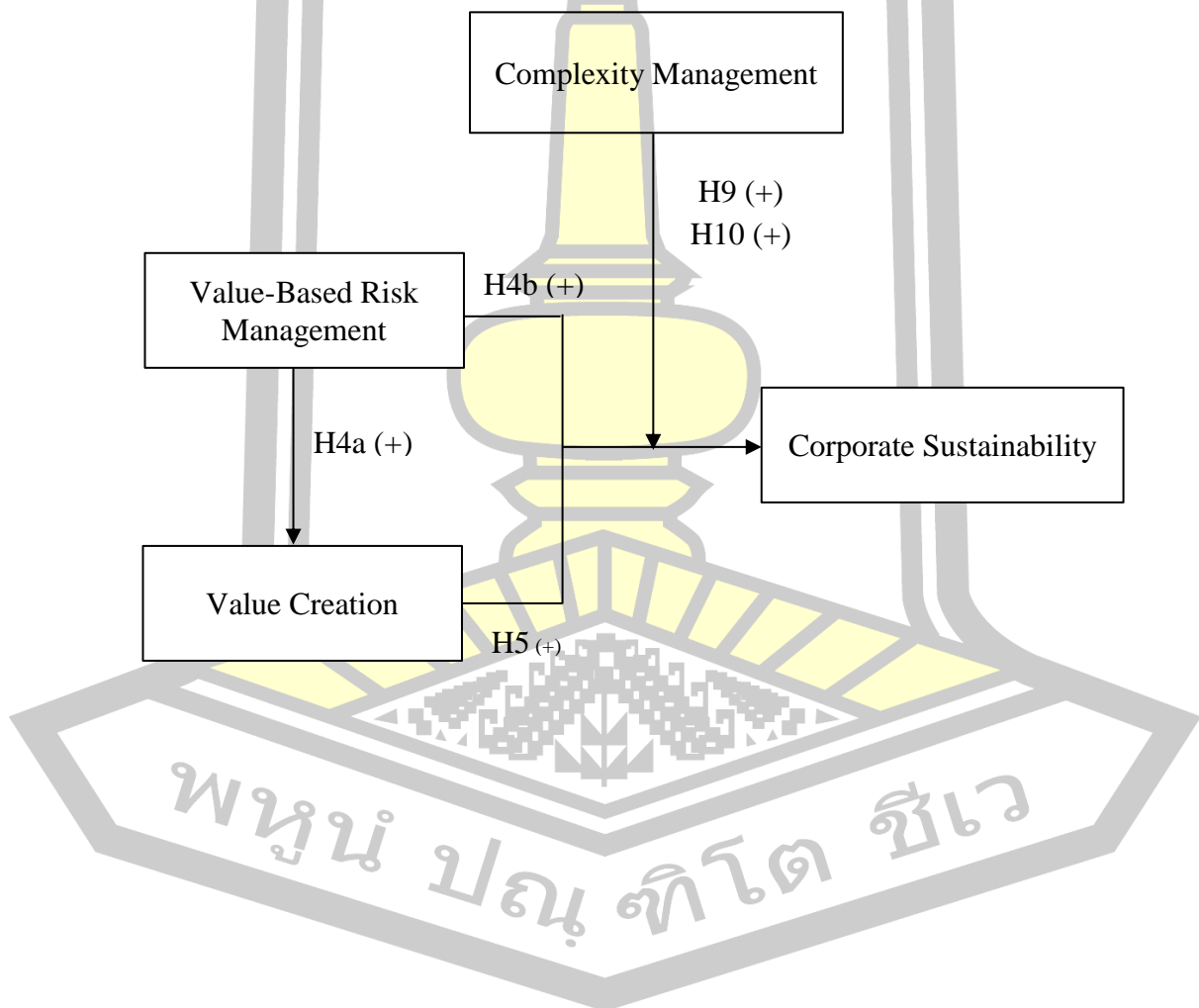


Table 12 Descriptive Statistics and Correlation Matrix of Value-Based risk Management, Value Creation, Corporate Sustainability, and Complexity Management

Variable	VRM	VC	CS	CM	FS	FA
Mean	3.93	3.90	3.98	4.19	n/a	n/a
S.D.	0.57	0.62	0.60	0.58	n/a	n/a
VRM	1					
VC	.736**	1				
CS	.788**	.800**	1			
CM	.607**	.640**	.678**	1		
FS	.290**	.216**	.177*	.215**	1	
FA	.270**	.123	.167*	.160*	.263**	1

***p < 0.01, **p < 0.05, *p < 0.10

Table 12 illustrates the correlation among value-based risk management, value creation, and corporate sustainability. The result shows that value-based risk management is positively correlated to value creation ($r = 0.736$, $p < 0.05$), and corporate sustainability ($r = 0.788$, $p < 0.05$). Moreover, value creation has a positive, significant correlation to corporate sustainability ($r = 0.800$, $p < 0.05$). However, the correlations are higher than 0.80 which is the first indication of substantial multicollinearity. To assess the multicollinearity problem, a second measure VIF is used to test the correlation among independent variables in each regression analysis. Table 13 the results show that the maximum value of VIF is 2.394, or well below the cut-off value of 10 (Hair et al., 2010). As a result, the multicollinearity problems should not be of concern.

Table 13 Result of Regression Analysis for the Effects among Value-Based risk Management, Value Creation, Corporate Sustainability, and Complexity Management

Independent Variables	Hypothesis	Dependent Variables		
		VC Equations 6	CS Equations 7	CM Equations 8
VRM	(H4a-b)	.753*** (.050)	.451*** (.056)	.447*** (.054)
VC	(H5)		.481*** (.054)	.487*** (.054)
CM				.052 (.069)
VRM x CM	(H9)			.065 (.051)
VC x CM	(H10)			-.063 (.047)
FA		-.176* (.102)	.033 (.080)	.004 (.080)
FS		.041 (.101)	-.118 (.078)	-.128 (.078)
Adjusted R2		.541	.725	.725
Maximum VIF		1.142	2.394	2.400

Beta coefficients with standard errors in parenthesis, *** p<0.01, ** p<0.05, * p<0.10

In Table 13, results show that value-based risk management has a significant and positive effect on value creation (H4a; $\beta_{32} = 0.753$, $p < 0.01$) and corporate sustainability (H4b; $\beta_{35} = 0.451$, $p < 0.01$). This result consistent with O'Donnell (2005) who states that modern enterprise management focuses on risk management by using management accounting information as a tool to plan, control, track, promote and coordinate to reduce the risks that arise from the production process and is an important tool in management of risk in the organization. Likewise, the study of Yu et al. (2015) argues that businesses must be prepared to deal with future forecasts and

developing solutions to minimize the negative effects while taking advantage of the positive effects of pressure and the crisis of future events. The businesses need management accounting information usage as a tool to define both strategies proactive and reactive that can cope with future risks (Rasid et al., 2011). The principles of risk management are fundamental to the organization's existence to create added value for its stakeholders. To prevent, avoid, and eliminate the risk while at the same time to increase the opportunities that affect the increase or decrease in value for the stakeholders of the organization (Iazzolino and Laise, 2016). Furthermore, consistent with the stakeholder theory explained that creating value is increasing profits and benefits for shareholders, which is the main duty and responsibility of the organization, coupled with awareness for the community, society, and the environment (Watson et al., 2018). In addition, the study of Kantabutra (2014) found that the companies that have adopted the sufficiency economy philosophy of His Majesty King Bhumibol Adulyadej as a guideline for business operations will be able to generate profits from a long-term operational perspective, using caution for business expansion, product distribution, markets and portfolios, knowledge sharing with competitors to minimize risk, the product and services development based on providing benefits to society and consumers. These will lead to the sustainability of the organization on excellent brand and reputation, customer satisfaction, stability in financial performance and operations, and long-term shareholder value and long-term stakeholder value. **Thus, Hypotheses 4a and 4b are supported.**

The findings also show that value creation have a significant, positive effect on corporate sustainability (H5; $\beta_{36} = 0.481$, $p < 0.10$). Consistent with the Garcia-Castro and Aguilera (2015) explained that value creation is corporate ability to take advantage of resources include man, money, material and machine, and management, creating efficient production processes, modern product and service design, the value co-creation of all stakeholders, the creating corporate image to be outstanding, unique, unlike, and difficult to imitate by using brand, symbol, slogan, and distribution channels to create a competitive advantage. Thus, value creation makes a difference and innovations of firms that can allow the economic system to perceive and implement new combinations between resources (Moran and Ghoshal, 2011) and to develop new knowledge and capacities so that the efficiency of using current amount

of resources to produce outputs increases (Destri and Dagnino, 2005). It can the pursuit of a long-term objective supported by resource's implementation lead to continuous increase of business income and of profitability, improved product and service quality and growth of market share, include to expanding business growth, increasing shareholder value, corporate prestige and reputation, and correspondingly improved customer relationships (Brenner and Cochran, 2016; McVea and Freeman, 2005; Domingos and Richardson, 2004). Besides, Blocker et al. (2011) confirm that the company focuses on creating innovation to deliver superior value and lower production costs than competitors, which will create satisfaction and loyalty for all customers and stakeholders. In addition, the firms will be able to create a long-term in competitive advantage and leads to highly stable of firm performance (Garcia-Castro and Aguilera, 2015; Pang et al., 2015; Kuo et al., 2009). According to the theory of stakeholders, Lin (2017) explained that value creation is increasing profits and benefits for shareholders, which is the main duties and responsibility of executives. Furthermore, the firms must be able to perform in parallel with creating maximum customer satisfaction, awareness in the community, society, and environment which will lead the company to sustainability. **Thus, Hypotheses 5 are supported.**

For the control variable, the results indicated that firm age had a significant negative relationship with value creation ($\beta_{30} = -0.176$, $p < 0.10$). This was interpreted that a firm with more than 20 years in business operation had less operational value creation. The new businesses has value creation more than old businesses because the new generation corporate executives often have a modern concept view, open new ideas and methods to develop knowledge and create business understanding quickly. The extension to creative thinking techniques and developing innovation that creates value. Moreover, the organization can adapt to change, especially in the digital society (Ciabuschi et al., 2012). However, firm age did not reflect a focus on corporate sustainability ($\beta_{22} = 0.033$, $p > 0.10$). It might imply that firm age did not impact corporate sustainability. Due to the length of time the operation cannot indicate that the company will be able to continuously grow in the long run. The firms that are able to grow sustainably must know how to adapt to various situations, both from technological progress, competitors, and consumer behavior changes rapidly. Consistent with that Ciabuschi et al. (2012) argues that new and old organizations

have to adjust themselves in accordance with the changing situation in order to maintain the survival and growth to achieve sustainability of the firms.

Lastly, the results did not find the relationships among firm size with value creation ($\beta_{31} = 0.041$, $p < 0.10$), and corporate sustainability ($\beta_{15} = -0.118$, $p > 0.10$). The result showed that firm size did not impact value creation and corporate sustainability because the process of creating value is adding value to products or services by using brain capital, intelligence, and creativity instead of investing mass production with raw materials, labor, and machinery according to the original concept of the manufacturing industry economy lead to a higher level of business competitiveness and able to create success in business development sustainably. Similarly to Bchini (2015) argue that the role of corporate value creation is the result of intellectual capital that is increasingly important in today's knowledge economy and plays an important role in creating effective manufacturing innovation and organizational competitiveness. Moreover, in the knowledge economy era, investing in intangible assets is seen as a strategic component for growth, profitability and competitiveness. Therefore, organizations must focus on intangible assets rather than physical or financial factors.

The Moderating Role of Complexity Management

As illustrated in Table 11, the moderating effect of complexity management on the relationships are among the value-based risk management, value creation and corporate sustainability. The result and discussion on hypotheses testing are as below.

For the moderating effect of complexity management has no effects on the relationships between corporate sustainability (H9) and value-based risk management (H9; $\beta_{39} = 0.065$, $p > 0.10$). For the moderating effect of complexity management has an effect on the relationships between corporate sustainability (H9) and value-based risk management (H9; $\beta_{39} = 0.065$, $p > 0.10$). Meanwhile, the complexity management moderating has an effect on the relationships between corporate sustainability (H10) and value creation (H10; $\beta_{40} = -0.063$, $p > 0.10$). Forasmuch as the organizations that have new innovations and effective risk management will help reduce the complexity of work in each business activity (Thamhain, 2013). The value-base risk management is an organization's verification tool for dealing with diverse,

complex, and uncertain situations. Moreover, it helps the company to behold opportunities, and support investment decisions, run new businesses that lead to added value for shareholders and stakeholders to grow sustainably (Arena et al., 2010). This is consistent with, Barney (2001) found that developing new innovations is a process change that reduces steps, reduces duplication and reduces errors more quickly, the working more efficient, and creating new processes that can generate revenue and sustainability for the organization. Besides, according to contingency theory of Ganescu (2012) suggests that executives be necessary to select and adapt of resources in the organization to be a tool that is suitable for the operating environment, an assist them to reach the success point that can create competitive advantage and sustainable survival of the organization. Therefore, value-base risk management and value creation cover the management of complexities within the organization. Is the reason to complexity management has no influence the relationships between corporate sustainability value-based risk management and value creation. **Therefore, hypotheses 9 and 10 are not supported.**

In the term of control variable, firm age has no significant influence on the moderating effect of complexity management as to the relationships among corporate sustainability, value-based risk management and value creation ($\beta_{43} = 0.004$, $p > 0.10$). Thus, the moderating effect of complexity management on the relationships among corporate sustainability, value-based risk management and value creation is not influenced by firm age.

In addition, firm size also demonstrates no significant relationship on the moderating effect of complexity management as to the relationships among corporate sustainability, value-based risk management and value creation ($\beta_{44} = -0.128$, $p > 0.10$). Therefore, the moderating effect of complexity management on the relationship among corporate sustainability, value-based risk management and value creation is not influenced by firm size.

Summary

In this chapter, the main content presented is a multiple regression analysis result by a total of ten hypotheses. The first part demonstrates the respondent's characteristics and demographics information of the firm. Subsequently, the correlations among all variables are analyzed and are illustrated as a correlation matrix. This part is explained by using descriptive statistics to include mean, standard deviation, and percentage. Another part highlights the results and discussions of hypotheses testing. To prove the hypotheses, ordinary least squares (OLS) are the regression analysis technique used. This chapter described the results and discussion of all 10 hypotheses tested. The results reveal that among the dimensions of management accounting information usage, three dimensions are product costing system, technical information, and customer service system which have a significant, positive effect on value-based risk management and value creation have an impact on corporate sustainability. Moreover, value-based risk management has positive effects on value creation and corporate sustainability. In addition, value creation has positive effects on corporate sustainability.

On the part of technological turbulence moderates the relationships between dimension of management accounting information usage (product costing system, technical information, and customer service system) among value-based risk management and value creation. Similarly, complexity management moderates the relationships among value-based risk management, value creation, and corporate sustainability.

In conclusion, the results suggest that there were four fully-supported hypotheses (hypotheses 1, 3, 4, and 5), ten partially-supported (hypotheses 2), and nine unsupported hypotheses (hypotheses 6, 7, 8, 9 and 10). Finally, the summary of the results of hypotheses testing is presented in Table 12 below.

Table 14 Summary of the Results of Hypotheses Testing

Hypothesis	Description of Hypothesized Relationships	Results
H1a	Product costing system is positively related to value-based risk management.	Supported
H1b	Product costing system did not positively related to value creation.	Not Supported
H1c	Product costing system is positively related to corporate sustainability.	Supported
H2a	Technical information is positively related to value-based risk management.	Supported
H2b	Technical information presentation is positively related to value creation.	Supported
H2c	Technical information presentation is positively related to corporate sustainability.	Supported
H3a	Customer service system is positively related to value-based risk management.	Supported
H3b	Customer service system is positively related to value creation.	Supported
H3c	Customer service system is positively related to corporate sustainability.	Supported
H4a	Value-based risk management is positively related to value creation.	Supported
H4b	Value-based risk management is positively related to corporate sustainability.	Supported
H5	Value creation is positively related to corporate sustainability.	Supported
H6a	Technological turbulence did not positively moderate the relationship between product costing system and value-based risk management.	Not Supported

Table 14 Summary of the Results of Hypotheses Testing (continued)

Hypothesis	Description of Hypothesized Relationships	Results
H6b	Technological turbulence did not positively moderate the relationship between product costing system and value creation.	Not Supported
H7a	Technological turbulence did not positively moderate the relationship between technical information and value-based risk management.	Not Supported
H7b	Technological turbulence did not positively moderate the relationship between technical information and value creation.	Not Supported
H8a	Technological turbulence did not positively moderate the relationship between customer service system and value-based risk management.	Not Supported
H8b	Technological turbulence did not positively moderate the relationship between customer service and value creation.	Not Supported
H9	Complexity management did not positively moderate the relationship between value-based risk management and corporate sustainability.	Not Supported
H10	Complexity management did not positively moderate the relationship between value creation and corporate sustainability.	Not Supported

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CHAPTER V

CONCLUSION

This research investigates the relationships among management accounting information usage, value-based risk management, value creation, and corporate sustainability in the Electrical and Electronics businesses in Thailand. The newly-proposed dimensions of management accounting information are comprised of product costing system, technical information, and customer service system. Through the mediation effects of each of three dimensions of management accounting information usage, these relationships were investigated alongside the moderating role of technological turbulence. In addition, complexity management is designed to moderate the relationships among the value-based risk management, value creation, and corporate sustainability.

This study investigated the key research question is, how does management accounting information usage relate to corporate sustainability? In detail, there are five specific research questions as follows: (1) How does each dimension of management accounting information usage (product costing system, technical information, and customer service system) have an influence on value-based risk management, value creation, and corporate sustainability? (2) How does value-based risk management have an influence on value creation and corporate sustainability? (3) How does value creation have an influence on corporate sustainability? (4) How does technological turbulence moderate the relationships among each dimension of management accounting information usage, value-based risk management, and value creation? And (5) How does complexity management moderate the relationships among value-based risk management, value creation, and corporate sustainability?

Both the resource-advantage theory (R-A theory), stakeholder theory, and the contingency theory are employed to explain the relationships and phenomena that are found in the research model. The R-A theory is applied to explain that relationship between each dimension of management accounting information usage (including product costs system, technical information, and customer service system) and its consequent (including value-based risk management and value creation). Likewise,

the stakeholder theory has also explained the relationship between the value-based risk management, value creation, and corporate sustainability. In addition, the contingency theory to explain the influence of moderator variable which is dynamic business environments factors including technological turbulence moderate the relationships among each dimension of management accounting information usage, value-based risk management, and value creation, and complexity management moderate the relationships among value-based risk management, value creation, and corporate sustainability.

For the study the Electrical and Electronics businesses in Thailand are selected as the population sample due to interesting to investigate for several reasons. First, these firms are severely affected by the rapid change of economic, social, and technological environment because the products and services of the electricity and electronics business have a short life cycle and need to adapt to the technology, rapid change of customer behavior, and competitor. Secondly, the electrical and electronics businesses in Thailand are one of the ten industries that the Thai government aims to develop in the digital age, to be a guideline that will lead to success in driving the country's economy continuously and sustainably. Thirdly, stepping into the digital technology leads to changing consumer behaviors, which has a growing demand for new products with components of electrical and electronic components, which results in the electricity and electronic businesses needing to accelerate the development of the business organization.

Finally, the electrical and electronics businesses this industry has a complex manufacturing process with uncertainty of technology and competitive turbulence. The businesses in this industry need to have an effective information system to manage and help to be a competitive advantage. Therefore, the electrical and electronics businesses are of interest in this study, which results are expected to demonstrate that management accounting information usage is important and increases value-based risk management, create value and sustainability for the organization. The population sample of this research is provided by the Electrical and Electronics Institute of the Ministry of Industry in Thailand, accessed on August 11, 2018. Based on this database, there are 850 firms that are the key participants of this research. The questionnaires are an instrument for this data collection, and they were

developed from the literature reviews. Thus, 850 questionnaires were sent to chief accounting officer including accounting directors and accounting managers, who are the key informants of the Electrical and Electronics businesses in Thailand. The mail survey resulted in 219 returned mailings, but only 210 usable; thus, 24.98 percent is an effective response rate. The multiple regression analysis was used to analyze hypothesis testing.

According to the first research question, the result found that two of the three dimensions of management accounting information usage (technical information and customer service system) have a significant positive association with all its consequents: technical information is significantly and positively related on value-based risk management (H2a: $\beta_2 = 0.081$, $p < 0.05$), value creation (H2b: $\beta_7 = 0.243$, $p < 0.05$), and corporate sustainability (H2c: $\beta_{12} = 0.285$, $p < 0.01$). And customer service system has a significant and positive influence on value-based risk management (H2a: $\beta_3 = 0.309$, $p < 0.01$), value creation (H2b: $\beta_8 = 0.179$, $p < 0.05$), and corporate sustainability (H2c: $\beta_{13} = 0.192$, $p < 0.05$). While product costing system has a positive influence on value-based risk management (H1a: $\beta_1 = 0.156$, $p < 0.05$), and corporate sustainability (H1c: $\beta_{11} = 0.136$, $p < 0.10$), but without significant influence on value creation.

In the second specific research question, the result illustrates that value-based risk management have a significant positive impact on value creation (H4a; $\beta_{32} = 0.753$, $p < 0.01$) and corporate sustainability (H4b; $\beta_{35} = 0.451$, $p < 0.01$). Forasmuch as risk management is a preventive, avoid, and eliminate the risk basis, which is a tool for increasing the benefits for shareholders in accordance with the main duties along with responsibility for the community, society, and the environment of the company.

In the third specific research question, the result demonstrates that value creation have a significant positive impact on corporate sustainability (H5; $\beta_{36} = 0.481$, $p < 0.10$). As the value creation is the ability of the organization in development to create new innovations. The creating corporate image to be outstanding, unique, unlike, and difficult to imitate that will lead to the creation of satisfaction, loyalty to customers, including stakeholders, able to create a competitive advantage in the long term, and corporate sustainability.

The discovery in the fourth specific research question, the finding exhibits that technological turbulence has a significant positive moderate effect on the relationship between each dimension of management accounting information usage (product costing system, technical information, and customer service system) on value-based risk management and value creation due to the most executives focus on the use of administrative accounting data in planning, control, and decision-making that will lead to risk management and value creation rather than using advanced technology. Because it may be a business losses if the firm is unable to make use of those technologies that are worthiness the investment.

Finally, for the fifth specific research question, the finding reveals that the moderating effect of complexity management has no significant influence of the relationship between value base risk management and value creation on corporate sustainability. Because organizations that create new innovations and have effective risk management will help eliminate the complexity along with uncertainty of work in each business activity.

Furthermore, for two control variables - firm age and firm size, the result indicates that firm age has a significant positive effect on value base-risk management, whereas it has a significant negative effect on value creation. Additionally, firm size has a significant positive influence on value base-risk management and value creation.

In summarize, the key research question is supported by the empirical evidence. In addition, the particular research questions are supported and partially supported as well. However, the supported hypotheses are summarized and illustrated in Figure 8 as shown below. Accordingly, the result indicates that management accounting information usage can encourage value-based risk management, value creation and corporate sustainability. In particular, technical information and customer service system seem to be the key components of management accounting information usage which lead to the increment in value-based risk management, value creation and corporate sustainability. Moreover, value-based risk management and value creation are two of the consequent that enhance corporate sustainability. As described earlier, the summary of all research questions and the results is exhibited in Table 15 as shown below.

Table 15 Summary of the Results and Conclusions of All Hypotheses Testing

Research Questions	Hypotheses	Results	Conclusions
<p>Key research Question:</p> <p>How does management accounting information usage influence corporate sustainability?</p>	Hypotheses 1c, 2c,3c	<ul style="list-style-type: none"> - Product costing system is positively related to corporate sustainability. - Technical information is positively related to corporate sustainability. - Customer service system is positively related to corporate sustainability. 	Supported
<p>Specific Research Question:</p> <p>(1) How does each dimension of management accounting information usage (product costing system, technical information, and customer service system) relate to value-based risk management, value creation, and corporate sustainability?</p>	Hypotheses 1a-c	- Product costing system is positively related to value-based risk management and corporate sustainability except value creation.	Partially supported
	Hypotheses 2a-c	- Technical information is positively related to value-based risk management, value creation, and corporate sustainability.	Supported
	Hypotheses 3a-c	- Customer service system is positively related to value-based risk management, value creation, and corporate sustainability.	Supported

Table 15 Summary of the Results and Conclusions of All Hypotheses Testing (continued)

Research Questions	Hypotheses	Results	Conclusions
(2) How does value-based risk management have an influence on value creation and corporate sustainability?	Hypotheses 4a	- Value-based risk management is positively related to value creation.	Supported
	Hypotheses 4b	- Value-based risk management is positively related to corporate sustainability.	
(3) How does value creation have an influence on corporate sustainability?	Hypotheses 5	- Value creation is positively related to corporate sustainability.	Supported
(4) How does technological turbulence moderate the relationships among each dimension of management accounting information usage, value-based risk management, and value creation?	Hypotheses 6a-b	- Technological turbulence did not positively moderate the relationship between product costing system and value-based risk management, value creation.	Not supported
	Hypotheses 7a-b	- Technological turbulence did not positively moderate the relationship between technical information and value-based risk management, value creation.	Not supported
	Hypotheses 8a-b	- Technological turbulence did not positively moderate the relationship between customer service system and value-based risk management, value creation.	Not supported

Table 15 Summary of the Results and Conclusions of All Hypotheses Testing (continued)

Research Questions	Hypotheses	Results	Conclusions
(5) How does complexity management moderate the relationships among value-based risk management, value creation, and corporate sustainability?	Hypotheses 9	- Complexity management did not positively moderate the relationship between value-based risk management and corporate sustainability.	Not supported
	Hypotheses 10	- Complexity management did not positively moderate the relationship between value creation and corporate sustainability.	Not supported

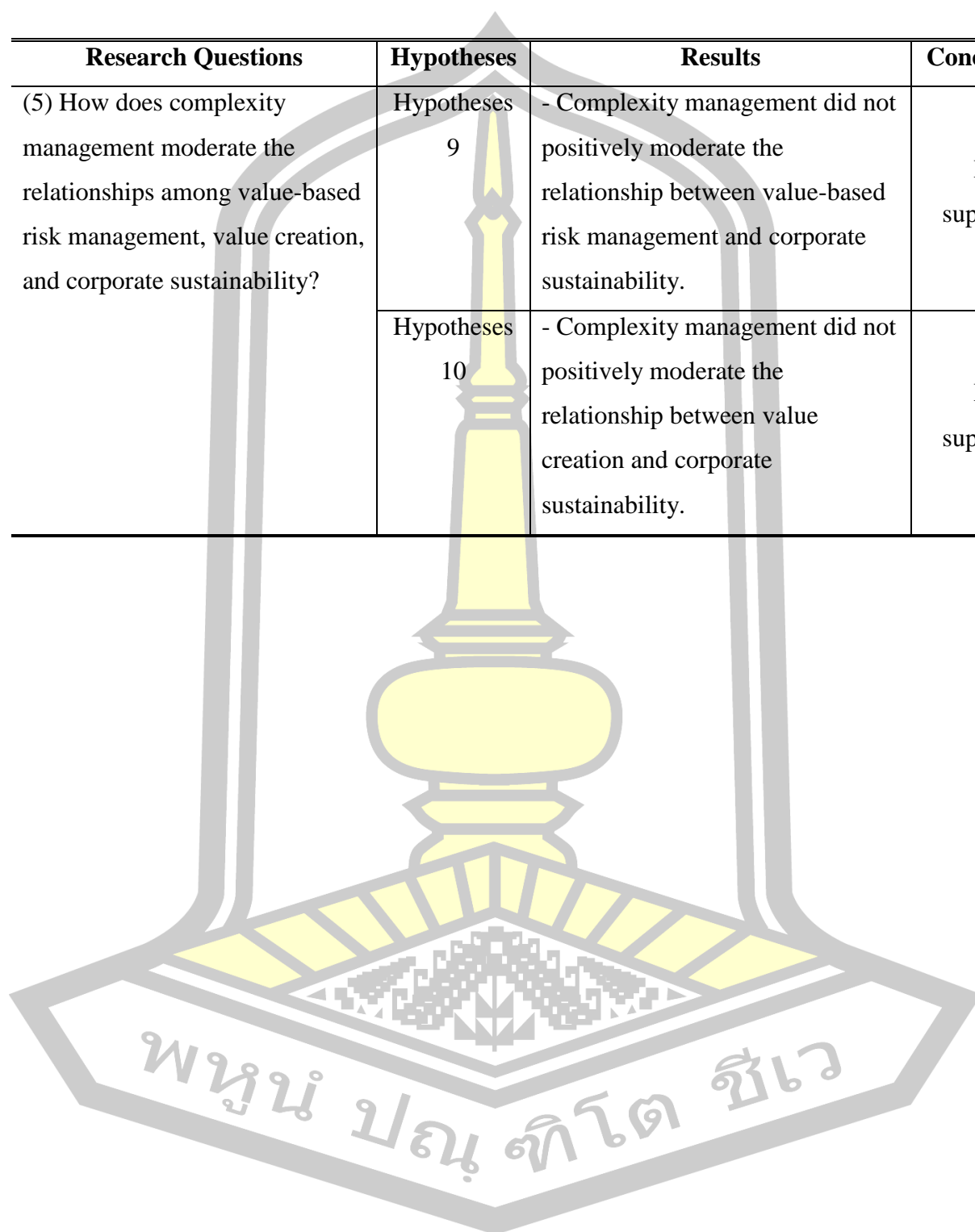
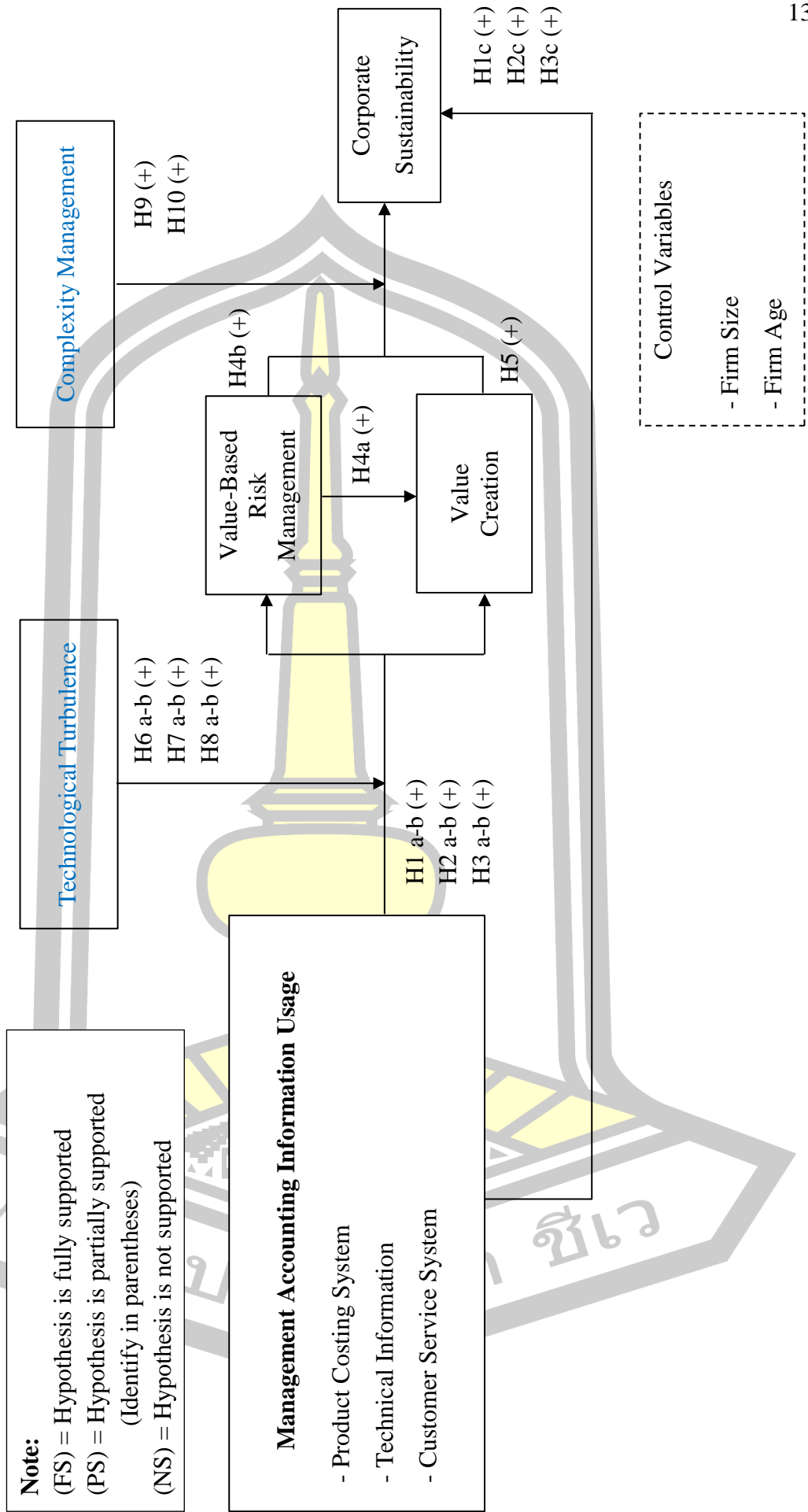


Figure 8 Summary of Results in the Relationships of the Conceptual Model



Theoretical and Managerial Contributions

Theoretical Contribution

This paper attempts to expand the management accounting information usage the importance of corporate sustainability in Electrical and Electronics businesses in Thailand to enhance corporate sustainability in an environment of intensive competition. Especially, it more clearly broadens the view of three new dimensions of specific management accounting information usage.

This study is useful in testing resource-advantage theory, the stakeholder theory, and the contingency theory. It tested the three theories to explain events or it can be used as a guide for practice in developing business, especially in Electrical and Electronics businesses in Thailand. Overall, these results reveal that Resource-advantage theory (R-A theory) is the main theory to explaining resource about management accounting information usage in the creating corporate image to be outstanding, unique, and unlike difficult to imitate, which lead to value creation and corporate sustainability. This study indicates that the R-A theory plays of the firm's information for the role of management is to recognize, understand, create, select, implement, and modify strategies. When firms employ the resource advantage, it is the foundation for value creation, reducing production costs, and improving work processes beyond, creating competitive advantage in the market leading to higher corporate sustainability.

This study, the stakeholder theory is applied to explain that how consequence variables (including value-base risk management and value creation) of management accounting information usage leading to corporate sustainability outcomes. Overall, these results reveal that stakeholder theory can be used to explain the relationship among management accounting information usage and its consequences because shareholders is the primary duty and responsibility of the organization. This theory is the foundation of a variety of stakeholders in their decision-making process. Moreover, stakeholders are group and individual who can affect or is affected by the achievement of the organization's objectives. In this study, indicates that firm's stakeholders have relationship with management accounting information, which may be possible, since management accounting information usage is just for creating the

participation. This is evident from the results that found the management accounting information usage effect maximizes value-based risk management and value creation on context of the stakeholder theory.

The contingency theory was useful for explaining relationships between the internal and external factor that impacts on management accounting information usage. The results illustrate factors of design the accounting systems in order for them to be appropriate for the environment changing by uncertainty of organizational were the most appropriate to specific circumstance's product costing system, technical information, and customer service system that affect management accounting information usage. It shows that firms attach importance to these factors to drive the use of management account information that will lead to risk management, to increase the value, and corporate sustainability.

Managerial Contribution

The research results has managerial implication for the chief accounting officer (executives and accounting executives) who are important responsibilities in planning, directing, and making decisions to determine the direction of the company's operations to achieve the ultimate goal, which is the reason for applying management accounting information to support the potential of the organization leading to the creation of value and sustainability of the Electrical and Electronics businesses in Thailand. This finding of study suggest three components of management accounting information usage (product costing system, technical information, and customer service system) which are the key components lead to the creation of a risk management system, value creating, and focusing on corporate sustainability. From a practical and managerial contribution, many important insights can be gained from this research.

Firstly, the findings reveal that technical information is the second dimension of the management accounting information usage that has the greatest influence on corporate sustainability. Therefore, the executives must focus on the use of technical information to create efficiency in planning, command, control, and decision making, especially in the industrial age 4.0. The organization must learn to adapt and prepare for the rapid changes of the business environment. Technical information is a tool that

helps develop and solve various problems in the production process, to eliminate the risks and losses that occur in all work processes. It aims to create value for products and services that will meet the needs and create maximum satisfaction for the company's customers. In addition, the use of technical information will lead to the creation of new innovations that will add value to products and services as well as reduce the cost of losses from efficient use of resources. Certainly, the organization can increase the productivity and business profits that affect growth and create a sustainable competitive advantage in the long term. Moreover, the organization can respond to expectations and build confidence among all stakeholders with potential. Additionally, this information usage will help create environmentally friendly production processes to enhance the quality of life of people in society that will lead to truly corporate sustainability.

Finally, the result reveals that value creation is mediator variable that has the highest effect on corporate sustainability. In addition, the technical information, and customer service system are both having the highest effect on value creation. This finding above has the greatest effect on management accounting information usage. Therefore, the executives have to emphasize on the use of management accounting information to determine and value creation management for stakeholder and successful operations and realizes the organization of the value is the main process. Hence, value creation will be the creating corporate image to be outstanding, unique, unlike, and difficult to imitate to value determination, value assessment, and value delivery. Besides the implementing a value management approach, organizations need to link the value creation process with customer value, shareholder value, and employee value. The customer's value creation of co-creation is a function for interaction between companies and customers in order to create appropriate service experience, leading to different forms of value creation and value co-creation. And can creating value through environmental considerations from product development by the product designed and developed through reducing resource consumption, and using environmentally friendly materials which is creating mutual value for all stakeholders. Moreover, executives should focus on implement the technical information and customer service system, to improving their technical in order to increase the level of firms. The creating efficient production processes, modern

product and service design, can respond to individual customer requirements, in order to gain a competitive advantage and achieve service performance. The executives must focus on forecasting sales of companies based on customer data to use for planning activities with efficiency and effectiveness. Furthermore, the use of customer reports will be beneficial in forecasting revenues and profits from target customers that are consistent with current and future scenarios.

Limitation and Future Research Directions

Limitations

This study has some limitations that should be mentioned. Firstly, the measurements of all constructs in this study are newly developed with some modifications, based on literature reviews and related theories. Though the measurements are developed using the content validated by experts, it may be doubtful without an in-depth interview from the firm's practitioners (executives' firm of electrical and electronics businesses). Thus, the interpretations of the results should be carefully made and implemented. Next, the results of this study are derived from the data solely collected from the electrical and electronics businesses in Thailand. Thus, the findings of this study may be narrow they lack a general concept like other sectors.

Future Research Directions

According to the limitations of this study, there are a number of suggestions for future research that should be discussed.

Firstly, the findings exhibit that product costing system does not affect the value creation. The causes might be because the administrators of the organization using the product costing system, focusing on the decision-making in the production process as the first priority. While the company places importance on the use of information to value creation for products and services in the next below. Thus, it is depend on the vision and strategies using information of the executive for the organization management. Moreover, most electrical and electronic businesses in Thailand are firms that produce products from the midstream to downstream until the

hands of consumers therefore it's difficult to create new innovations that depend on the parent company. Hence, future research should consider an in-depth interview from the firm's practitioner. The executives' firm of electrical and electronics businesses, and research should be extended to the remaining samples according 10 target industries consist of 5 formerly potential industries (First S - Curve) and 5 Future Industries (New S-Curve).

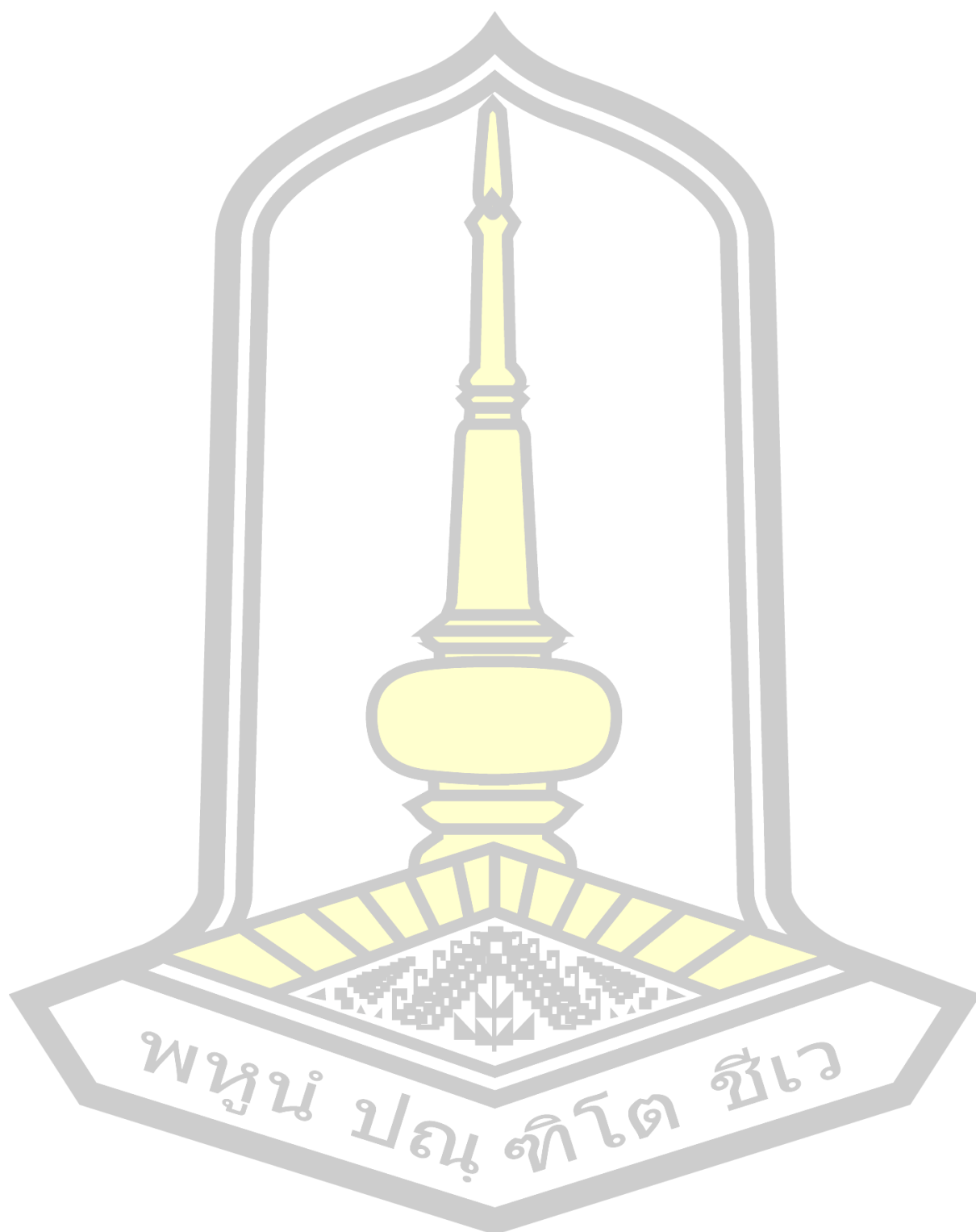
Secondly, the technological turbulence is a moderator variable not encourage the relationship among each dimension of management accounting information usage with value-based risk management, and value creation. This might be because the management accounting information usage as the main tool of administrators in planning, control, and decision-making. On the other side, executives may not have the need to use those advanced technologies if they are not related to business operations decisions. The future research have better consider from other moderator variable such as facilitators of learning organization etc.

Finally, the study finds complexity management moderate variable not support the relationship among value-based risk management, value creation, and corporate sustainability because the organization can effectively risk management together with the use of innovation to eliminate the complexity as well as the uncertainty of working in each business activity. Thus, future research might determination the other moderator variable such as leadership styles etc.

Moreover, in order to extend the results of the study in the future, one should consider other research methods (for example in-depth interviews), which may help to confirm the result's strength. In addition, structural equation modeling (SEM) is a statistical technique that may illustrate the hidden relationships of all constructs under the conceptual framework of management accounting information usage.

พหุ ประเด็น ทิศ ชาติ ชีวะ

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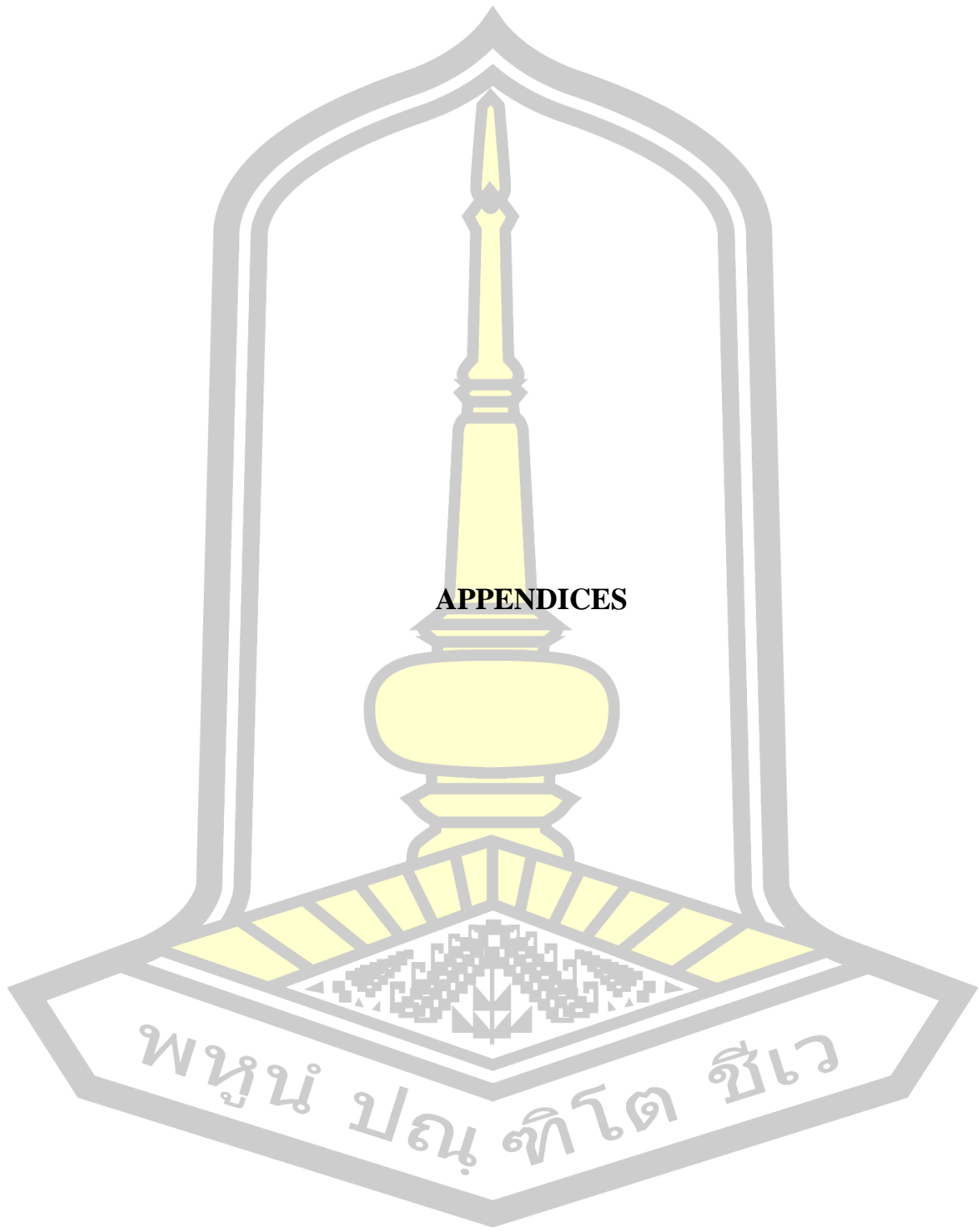
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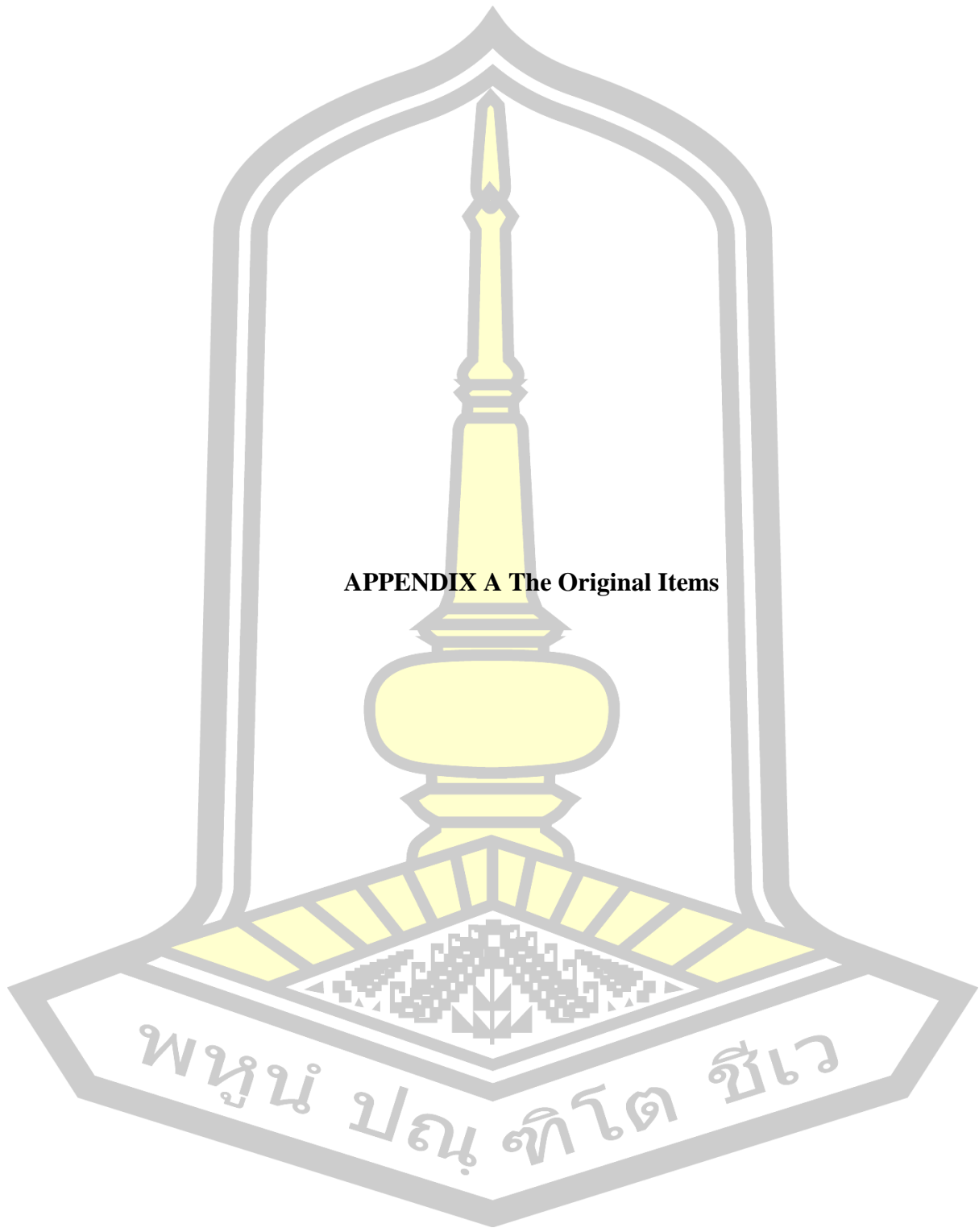
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APPENDICES

พหุจน์ ปณฺ ทิโต ชีเว



APPENDIX A The Original Items

พหุบัณฑิตวิทย์

Table A Original Items in Scales

Construct	Items
Product Costing System (PCS)	
PCS1	The firm focuses use of information reports related to raw material, labor, and manufacturing overhead are used to calculate the cost of the product to be as accurate as possible.
PCS2	The firm believes that the use of accurate cost data reports will make the determination pricing of products more efficient.
PCS3	The firm supports the use of standard cost reports to analyze the price variance and Quantity Variance, Rate Variance and Efficiency Variance difference in price and quantity of raw materials. Wage difference and working time Payout difference Performance and capacity are useful for planning, controlling, and executing decisions to the benefit of planning, control, and management decisions.
PCS4	The firm emphasize on cost analysis and measurement to prevention quality or damage to products and services.
PCS5	The firm focuses focus on cost data to assess the quality of production processes, and factors related to the production process of goods or services.
PCS6	The firm focuses are conscious of the preparation of a report to show the cost information for the improvement or modification of the quality of the goods or services before and after delivery to the customer.
Technical Information (TI)	
TI1	The firm realizes of use of the improvement of production process to eliminate wastage continuously (Lean) to push the process to work in accordance with the systematic and effective.
TI2	The firm emphasizes on the possibility of potential damage. It is a way to eliminate the risk and not waste in the production process (Six Sigma).

Table A Original Items in Scales (continued)

Construct	Items
Technical Information (TI)	
TI3	The firm supports the use of information and communication technologies in the social field to be useful in the management and development of the organization, leading to sustainable growth.
TI4	The firm focuses on finding barriers to work, including preventing, detecting, correcting, and promoting the reduction of work restrictions from the system.
TI 5	The firm focuses on the use of information to optimize the efficiency and effectiveness of the organization's resources, such as recycling of waste and waste in the production process, the use of clean technology, and produce of products that are environmentally friendly.
Customer Service System (CSS)	
CSS 1	The firm believes that the use of customer reports will be beneficial in forecasting revenues and profits from target customers that are consistent with current and future scenarios.
CSS 2	The firm focuses on the use of revenue and consumption data of customers to determine the market share of the existing customers and to create new customers in the market.
CSS 3	The firm use customer order quantity data for production planning as well as analysis and measurement of profitability of current and future customers.
CSS 4	The firm focuses on forecasting sales of companies based on customer data to use for planning activities with efficiency and effectiveness.
CSS 5	The firm recognizes that the use of statistical information about the problems of after-sales service increases the efficiency of monitoring and management, in order to reduce the cost of ongoing complaints, warranties, and services.

Table A Original Items in Scales (continued)

Construct	Items
Value-Based Risk Management (VRM)	
VRM 1	The firm has the ability to set guidelines and hedging plans for business operations, including fluctuations in the price of raw materials, risk from customers, competitors and financial risks.
VRM 2	The firm can be discovered set the metric assess and evaluate the potential risks, to plan and identify the most effective risk management methods.
VRM 3	The firm can manage the risk of the organization to reduce volatility of profits and diversification of investment, including the expansion of domestic and overseas growth.
VRM 4	The firm can be aware of the follow-up of the implementation of the risk management plan to ensure efficiency and appropriateness need to make adjustments if the plan is not effective enough.
VRM 5	The firm has supports, promotes and coordinates all personnel to effectively manage the risk in accordance with the policy and guidelines.
Value Creation (VC)	
VC1	The firm has the ability to develop modern product design and service that meet the needs of customers very well.
VC 2	The firm has the ability to lead the way of production superior to competitors.
VC 3	The firm can increase the quantity and quality of resource utilization, including people, money, raw materials and machinery, and the existing management to maximize value.
VC 4	The firm can create value through cooperation between customers, organizations and stakeholders (Value Co-Creation) to be able to learn and meet the needs of all parties.

Table A Original Items in Scales (continued)

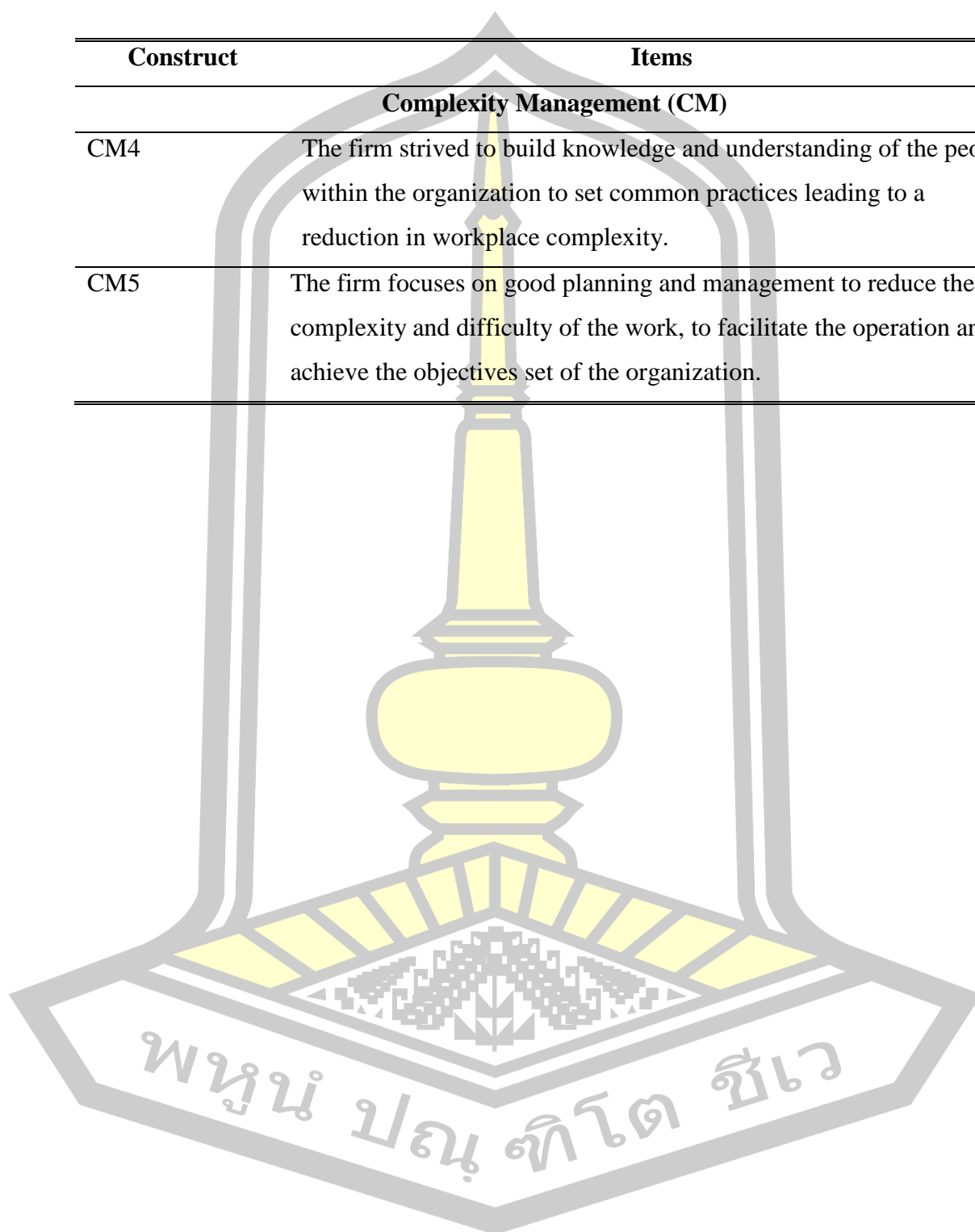
Construct	Items
Value Creation (VC)	
C 5	The firm can create a distinctive, identifiable, and difficult to copy image by using the brand, trademarks, and slogans are tools to convey quality that outweighs competitors.
Corporate Sustainability (CS)	
CS1	The firm has the ability to create competitive advantage in both the short and long term.
CS2	The firm is likely to grow business from investment, with the expansion of production and exports every year.
CS3	The firm continued growth in sales and market share has affected revenue and profitability.
CS4	The firm has a stable financial status and stable operating performance that can continue its business in the long term.
CS5	The firm can build good relationships with partners and loyalty of all stakeholders in a long-term.
CS6	The firm can learn and adjust to the situation, can innovate in new products to meet the needs of customers continuously.
CS7	The firm can protect society and the environment, along with the growth of the business as an organization that helps to promote and improve the quality of life of people in society for continued improvement.
Technological Turbulence (TT)	
TT1	The firm focuses importance to learning and adaptation to the advancement of accounting information technology, to make the best use of technology change.

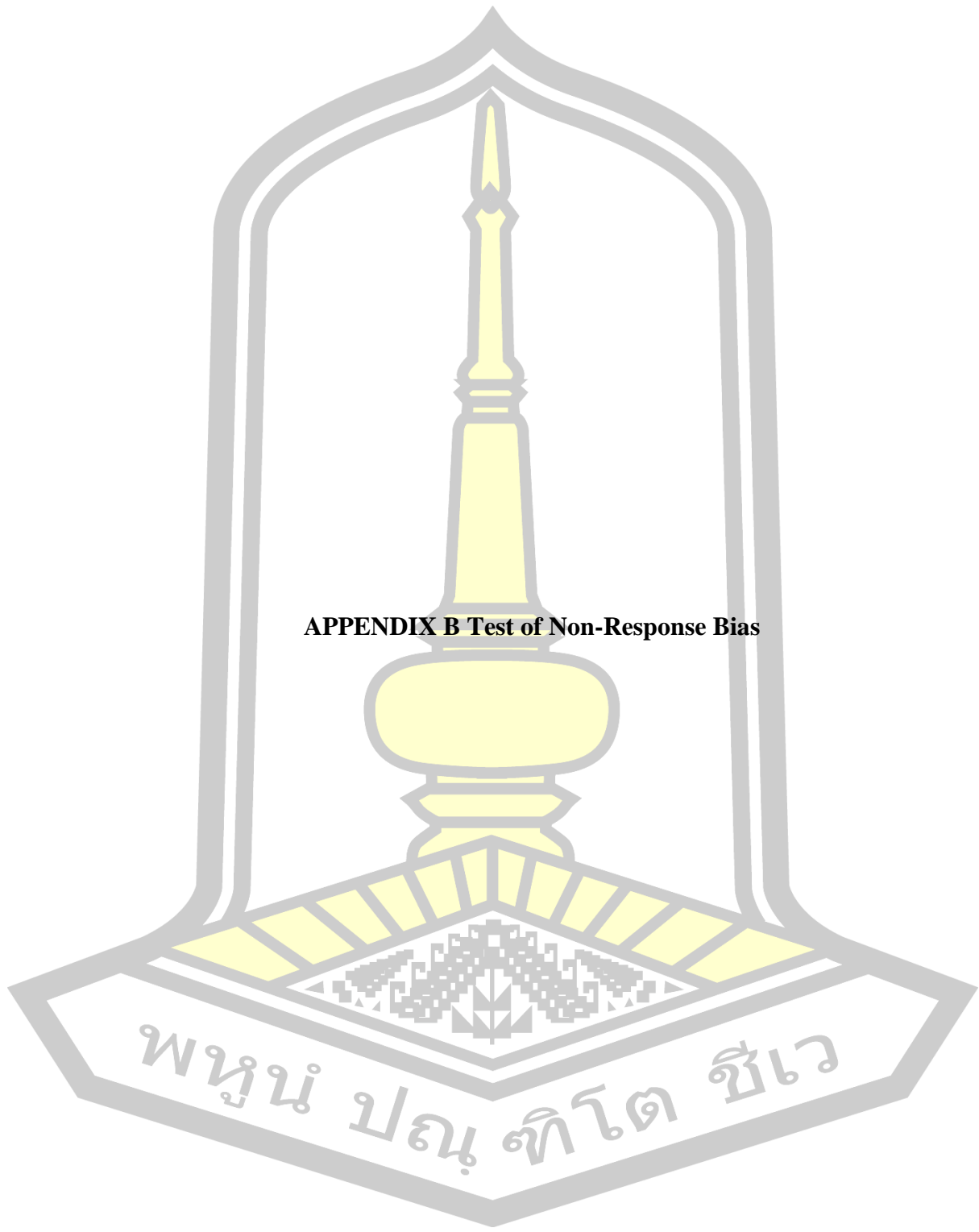
Table A Original Items in Scales (continued)

Construct	Items
Technological Turbulence (TT)	
TT2	The firm to promote the use of equipment advanced tools and information technologies are used to analyze and make decisions on the production of quality products and services based on the current and future demand for more and more customers.
TT3	The firm is committed to the use of accounting information technology. This is used as a basis for setting strategies and procedures for meeting the expectations of stakeholders and to continuously creating competitive advantage.
TT4	The firm emphasize on the reform of information technology system in Thailand. 4.0 as a tool to develop, value and manage operational risk effectively and efficiently.
TT5	The firm aims to use technology as a means to communicate information and to coordinate among people in the organization, to lead to the development and improvement of work processes to the maximum efficiency.
Complexity Management (CM)	
CM1	The firm focuses on good planning and management to reduce the complexity and difficulty of the work, to facilitate the operation and achieve the objectives set of the organization.
CM2	The firm supports the organization management, properly assigning tasks, responsibilities, and responsibilities to reduce administrative complexity responsive to mission and potential goals.
CM3	The firm promotes the appropriate reduction of work procedures, and can produce quality products and services to build trust and acceptance from customers.

Table A Original Items in Scales (continued)

Construct	Items
Complexity Management (CM)	
CM4	The firm strived to build knowledge and understanding of the people within the organization to set common practices leading to a reduction in workplace complexity.
CM5	The firm focuses on good planning and management to reduce the complexity and difficulty of the work, to facilitate the operation and achieve the objectives set of the organization.





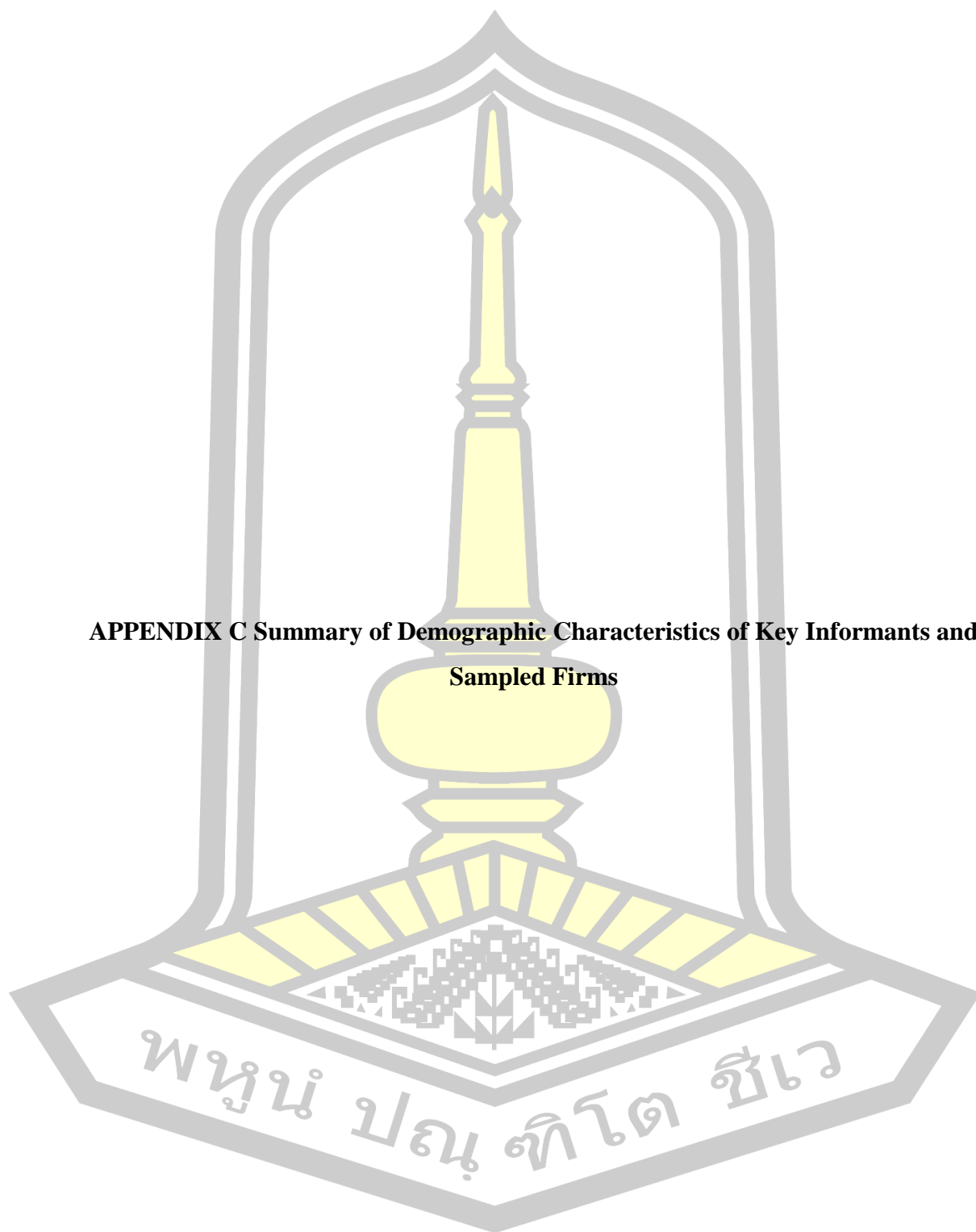
APPENDIX B Test of Non-Response Bias

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Appendix B – Test of Non-Response Bias

Table B Non-Response Bias Tests

Comparison		n	Mean	S.D.	t	Sig
Business owner type:						
-	First Group	105	2.05	.255	.743	.458
-	Second Group	105	2.08	.300		
Location:						
-	First Group	105	1.96	1.192	.300	.764
-	Second Group	105	2.01	1.105		
Registered capital:						
-	First Group	105	2.32	1.197	1.187	.237
-	Second Group	105	2.51	1.128		
Total assets:						
-	First Group	105	3.30	1.039	.985	.326
-	Second Group	105	3.44	.919		
The period of business operation:						
-	First Group	105	2.82	.918	.226	.822
-	Second Group	105	2.85	.918		
Number of employees:						
-	First Group	105	2.22	1.156	1.087	.278
-	Second Group	105	2.14	1.129		
Average revenue per year:						
-	First Group	105	3.48	.969	1.464	.145
-	Second Group	105	3.54	.816		



**APPENDIX C Summary of Demographic Characteristics of Key Informants and
Sampled Firms**

Appendix C – Summary of Demographic Characteristics of Key Informants and Sampled Firms

Table 1C Summary of Demographic Characteristics of Key Informants

Descriptions	Categories	Frequencies	Percent (%)
1. Gender	Male	32	15.2
	Female	178	84.8
	Total	210	100.0
2. Age	Less than 30 years old	13	6.2
	30 - 40 years old	79	37.6
	41 - 50 years old	78	37.1
	More than 50 years old	40	19.0
	Total	210	100.0
3. Marital Status	Single	67	31.9
	Married	138	65.7
	Divorced	5	2.4
	Total	210	100.0
4. Education Level	Undergraduate	125	59.5
	Higher than undergraduate	85	40.5
	Total	210	100.0
5. Working Experience	Less than 10 years	28	13.3
	10 - 15 years	52	24.8
	16 - 20 years	52	24.8
	More than 20 years	78	37.1
	Total	210	100.0
6. Average monthly income	Less than 50,000 Baht	69	32.9
	50,000–100,000 Baht	95	45.2
	100,001–150,000 Baht	32	15.2
	More than 150,000 Baht	14	6.7
	Total	210	100.0

Table 1C Summary of Demographic Characteristics of Key Informants (continued)

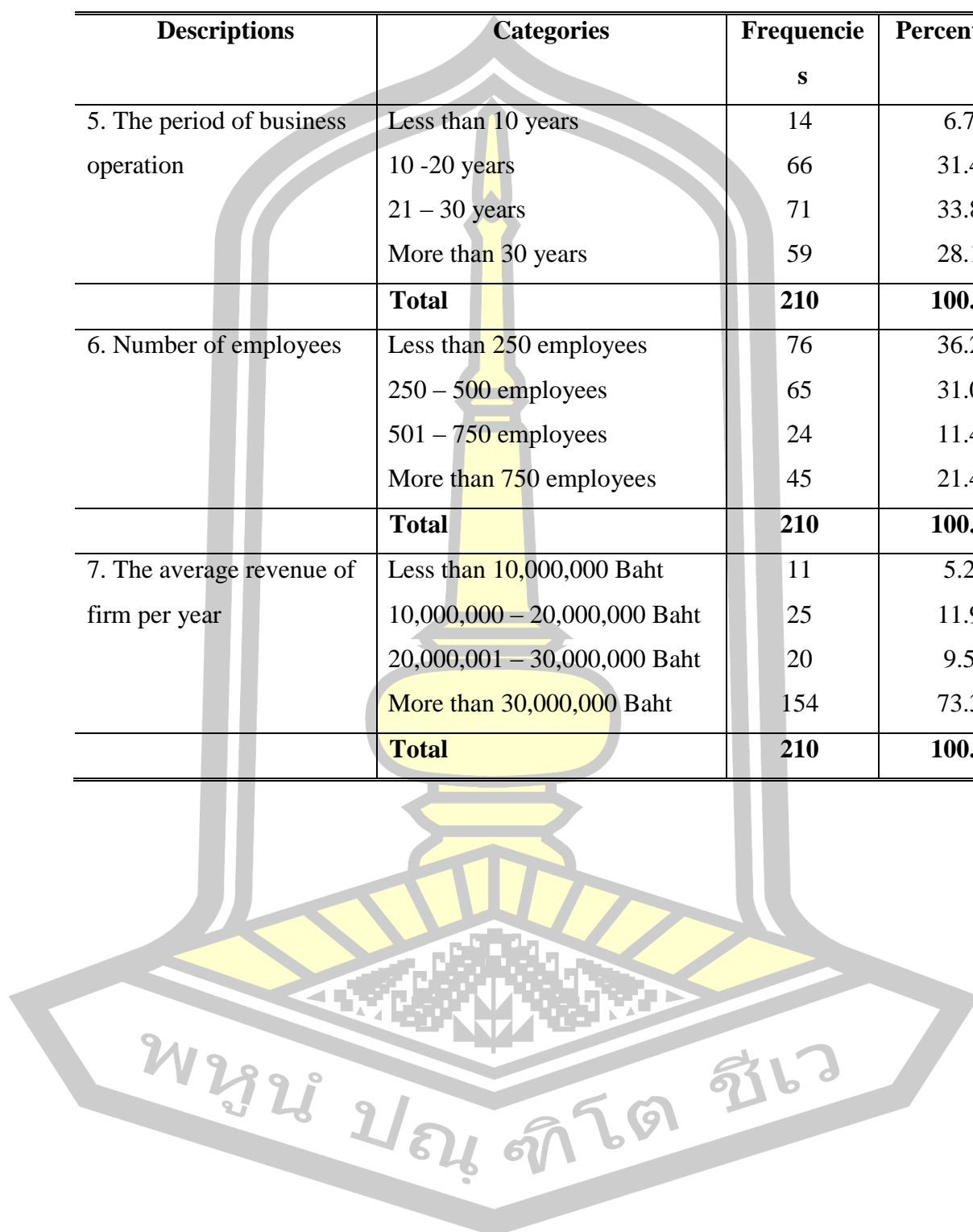
Descriptions	Categories	Frequencies	Percent (%)
7. Working position at your current company	Accounting director	18	8.6
	Accounting manager	125	59.5
	Others (Please specify)...	67	31.9
	Total	210	100.0

Table 2C Summary of Sampled Firm Characteristics

Descriptions	Categories	Frequencies	Percent (%)
1. Business Owner Types	Partnerships	2	1.0
	Company limited	193	91.9
	Partnership	15	7.1
	Total	210	100.0
2. Location	Central region	111	52.9
	Northern region	11	5.2
	Eastern region	76	36.2
	Western region	4	1.9
	Northeastern region	8	3.8
	Southern region		
	Total	210	100.0
3. Registered capital	Less than 100,000,000 Baht	59	28.1
	100,000,000 – 200,000,000 Baht	61	29.0
	200,000,001 – 300,000,000 Baht	33	15.7
	More than 300,000,000 Baht	57	27.1
	Total	210	100.0
4. Total assets	Less than 50,000,000 Baht	15	7.1
	50,000,000 – 100,000,000 Baht	31	14.8
	100,000,001 – 150,000,000 Baht	25	11.9
	More than 150,000,000 Baht	139	66.2
	Total	210	100.0

Table 2C Summary of Sampled Firm Characteristics (continued)

Descriptions	Categories	Frequencies	Percent (%)
5. The period of business operation	Less than 10 years	14	6.7
	10 -20 years	66	31.4
	21 – 30 years	71	33.8
	More than 30 years	59	28.1
	Total	210	100.0
6. Number of employees	Less than 250 employees	76	36.2
	250 – 500 employees	65	31.0
	501 – 750 employees	24	11.4
	More than 750 employees	45	21.4
	Total	210	100.0
7. The average revenue of firm per year	Less than 10,000,000 Baht	11	5.2
	10,000,000 – 20,000,000 Baht	25	11.9
	20,000,001 – 30,000,000 Baht	20	9.5
	More than 30,000,000 Baht	154	73.3
	Total	210	100.0





APPENDIX D Test of Validity and Reliability Analyses

Appendix D – Test of Validity and Reliability

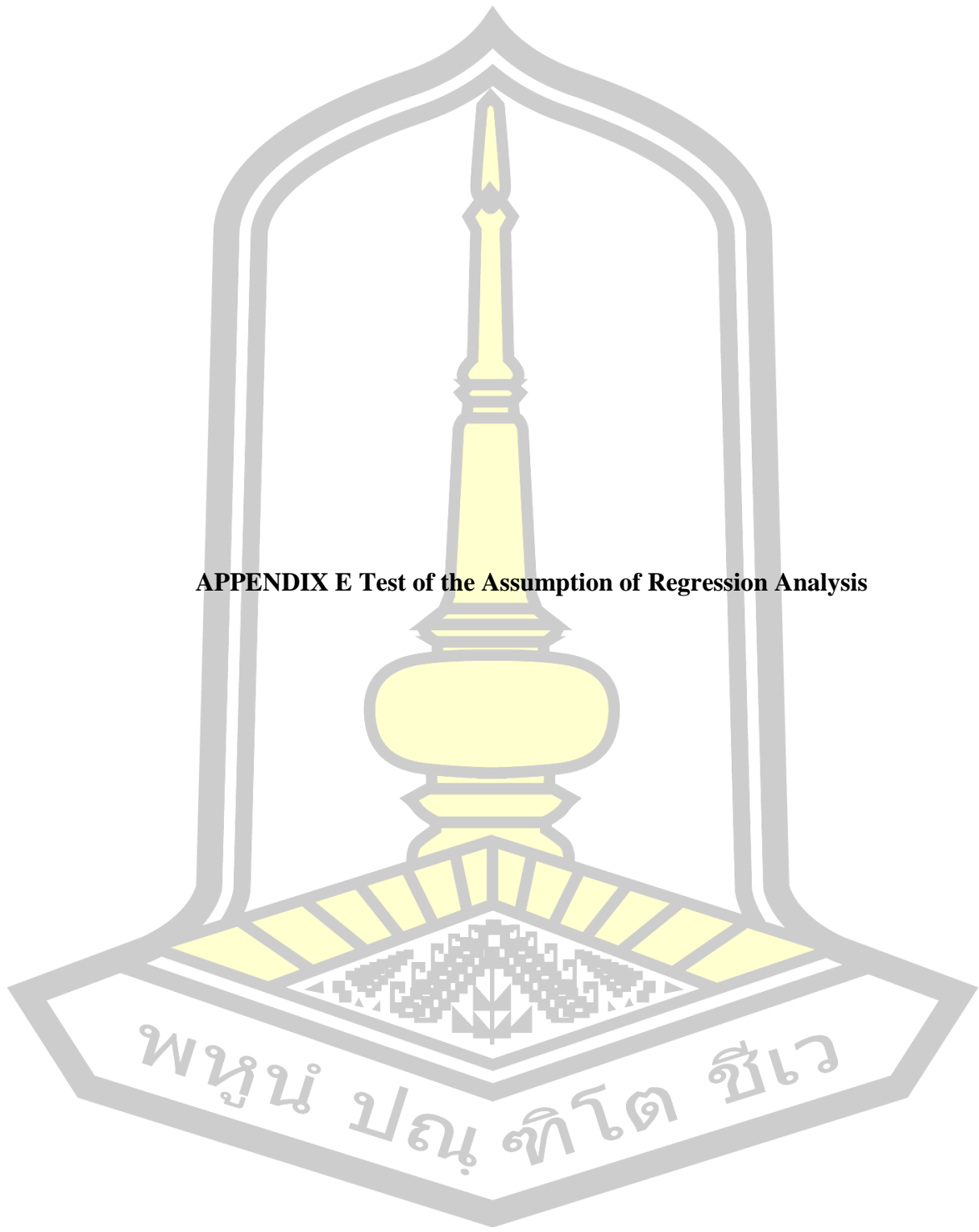
Table D Factor Loadings and Alpha Coefficient of Constructs

Constructs	No	Items	Factor Loadings	Reliability (Cronbach's Alpha Coefficient)
Product costing system (PCS)	30	PCS1	.927	.953
		PCS2	.870	
		PCS3	.930	
		PCS4	.929	
		PCS5	.926	
		PCS6	.844	
Technical information (TI)	30	TI1	.738	.861
		TI2	.871	
		TI3	.854	
		TI4	.799	
		TI5	.748	
Customer service system (CSS)	30	CSS1	.799	.888
		CSS2	.907	
		CSS3	.902	
		CSS4	.807	
		CSS5	.743	
Value-based risk management (VRM)	30	VRM1	.761	.890
		VRM2	.917	
		VRM3	.872	
		VRM4	.732	
		VRM5	.873	
Value creation (VC)	30	VC1	.805	.878
		VC2	.852	
		VC3	.887	
		VC4	.850	
		VC5	.718	

Table D Factor Loadings and Alpha Coefficient of Constructs (continued)

Constructs	No	Items	Factor Loadings	Reliability (Cronbach's Alpha Coefficient)
Corporate sustainability(CS)	30	CS1	.832	.914
		CS2	.818	
		CS3	.843	
		CS4	.787	
		CS5	.894	
		CS6	.802	
		CS7	.718	
Technological turbulence (TT)	30	TT1	.911	.923
		TT2	.908	
		TT3	.792	
		TT4	.888	
		TT5	.873	
Complexity management (CM)	30	CM1	.847	.949
		CM2	.932	
		CM3	.969	
		CM4	.891	
		CM5	.923	

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APPENDIX E Test of the Assumption of Regression Analysis

Appendix E- Results of testing basic assumption of regression analysis

Regression analysis (OLS) is used to test the interrelationship between the various independent and dependent variables by SPSS program. From the relation model and the hypotheses, the following 8 equation models are presented including assumptions of regression model as follows.

1. Linearity of phenomenon measured
2. Normality of the error term distribution
3. Independence of the error terms
4. Constant variance of the error terms (Homoscedasticity)
5. Test of multicollinearity

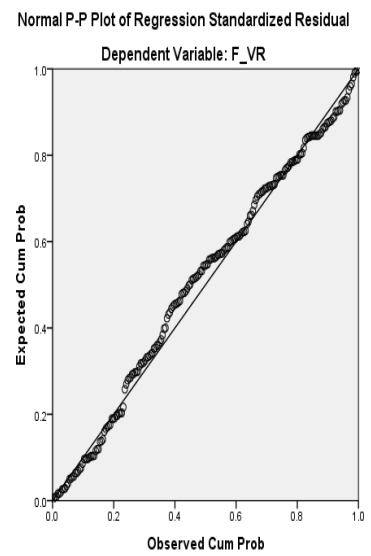
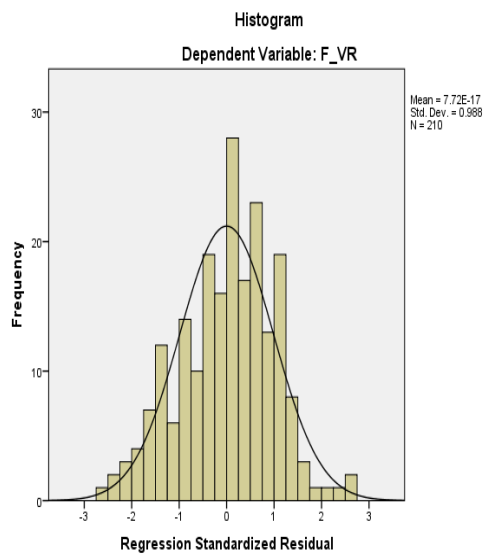
1. Linearity of Phenomenon Measured

The linearity of the dependent – independent variables relationship describes the degree change in the dependent variable as related to the independent variable. This research uses residual plots to examine on linearity of any bivariate relationship. The results of linearity testing do not demonstrate any nonlinear pattern to the residuals. Thus, in overall, each model is linear.

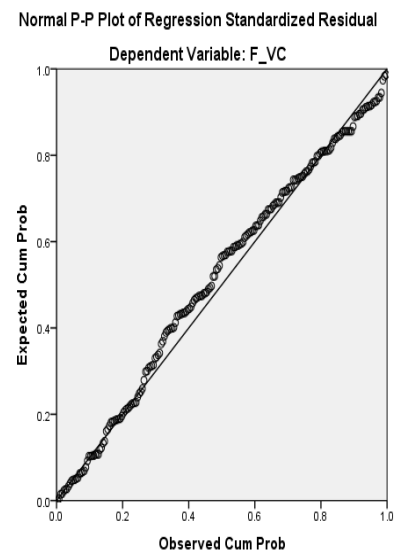
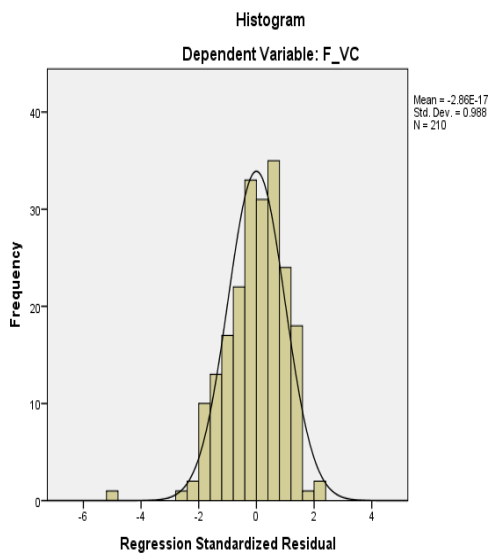
2. Normality of the Error Term Distribution

The test normal distribution for checking the set of independent variables in the equation is a histogram of residuals, with a visual check for a distribution approximating the normal distribution. A method is the use of normal probability plots (Hair et al., 2010). Thus, the research uses the normal probability plots method. The normal probability plot is compared the observed values with those expected from a normal distribution. If the data display the characteristics of normality, the points will fall within a narrow band a straight line.

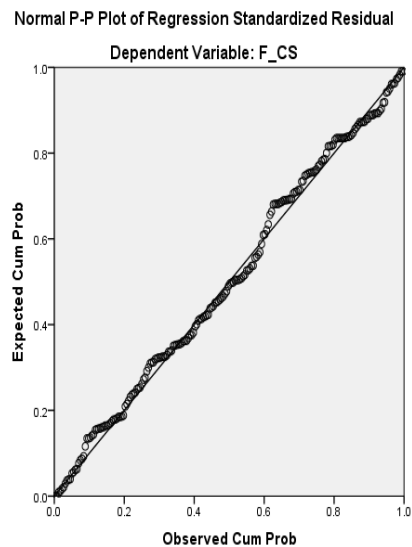
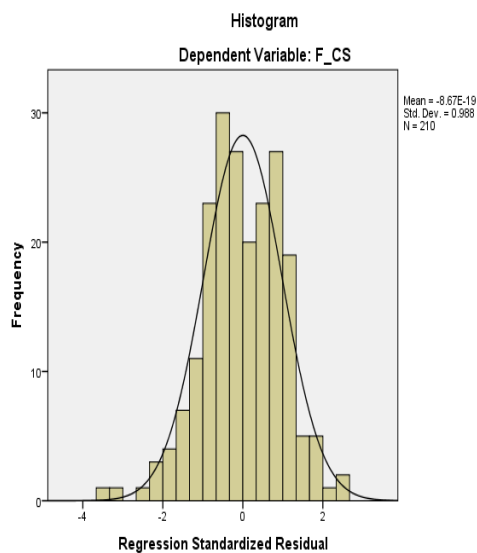
$$\text{Equation 1: VRM} = \alpha_{01} + \beta_1\text{PCS} + \beta_2\text{TI} + \beta_3\text{CSS} + \beta_4\text{FA} + \beta_5\text{FS} + \varepsilon_1$$



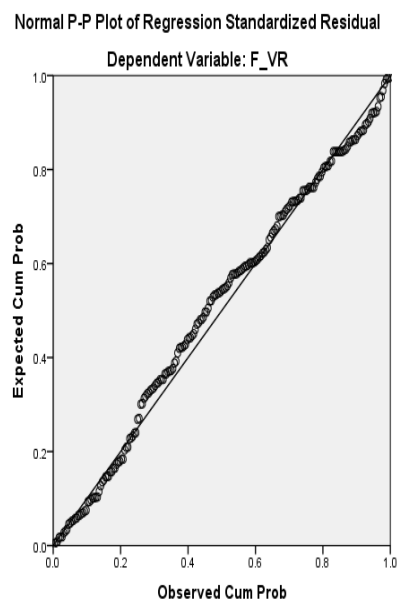
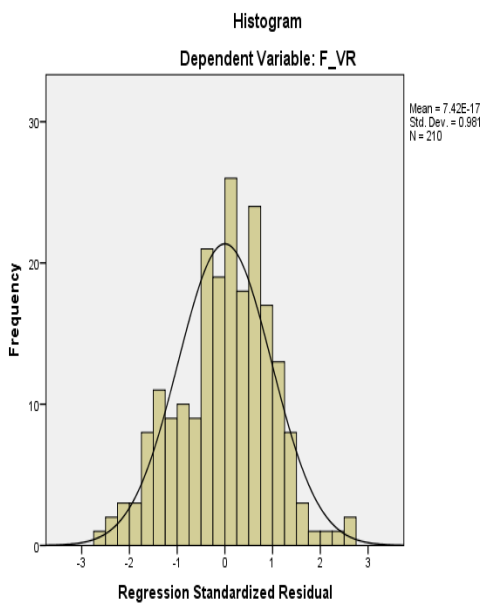
$$\text{Equation 2: VC} = \alpha_{02} + \beta_6\text{PCS} + \beta_7\text{TI} + \beta_8\text{CSS} + \beta_9\text{FA} + \beta_{10}\text{FS} + \varepsilon_2$$



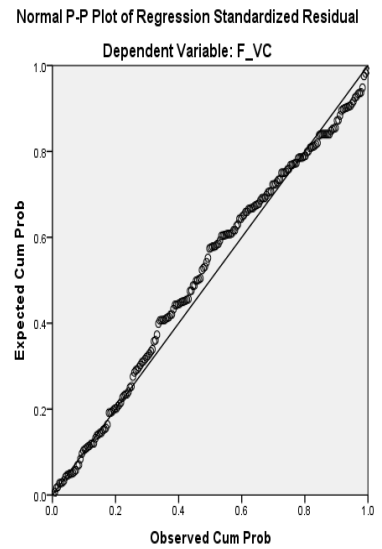
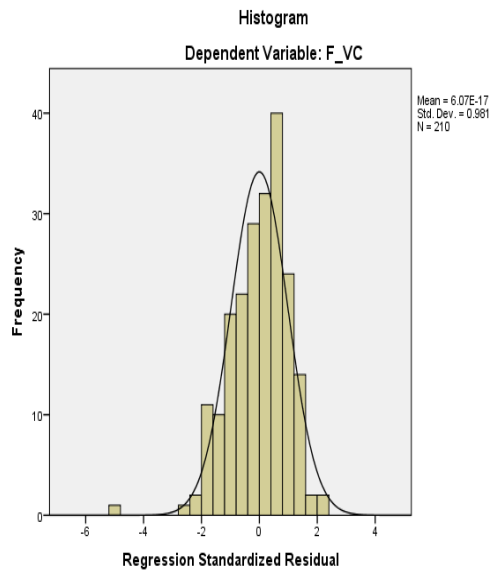
$$\text{Equation 3: CS} = \alpha_{03} + \beta_{11}\text{PCS} + \beta_{12}\text{TI} + \beta_{13}\text{CSS} + \beta_{14}\text{FA} + \beta_{15}\text{FS} + \epsilon_3$$



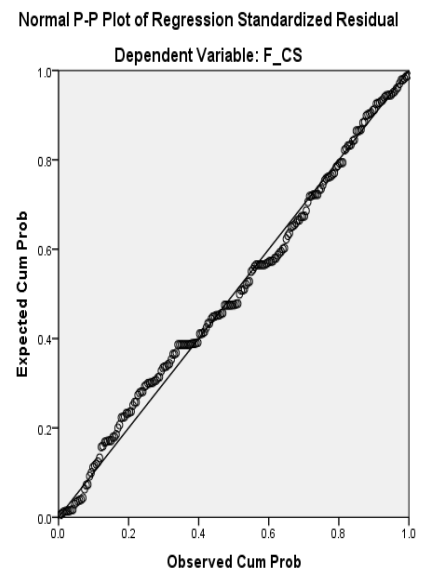
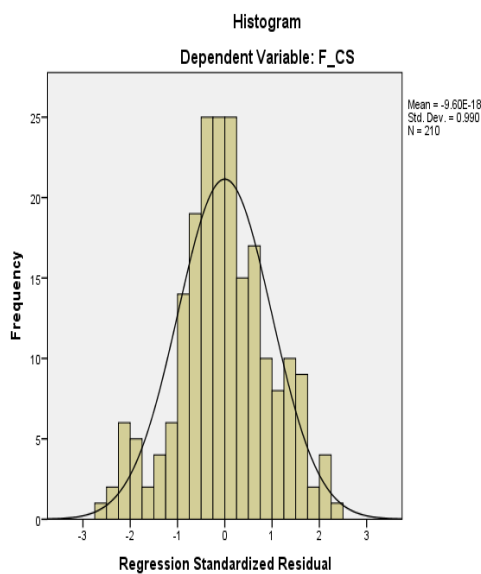
$$\text{Equation 4: VRM} = \alpha_{04} + \beta_{16}\text{PCS} + \beta_{17}\text{TI} + \beta_{18}\text{CSS} + B_{19}(\text{TT}*\text{PCS}) + B_{20}(\text{TT}*\text{TI}) + B_{21}(\text{TT}*\text{CSS}) + \beta_{22}\text{FA} + \beta_{23}\text{FS} + \epsilon_4$$



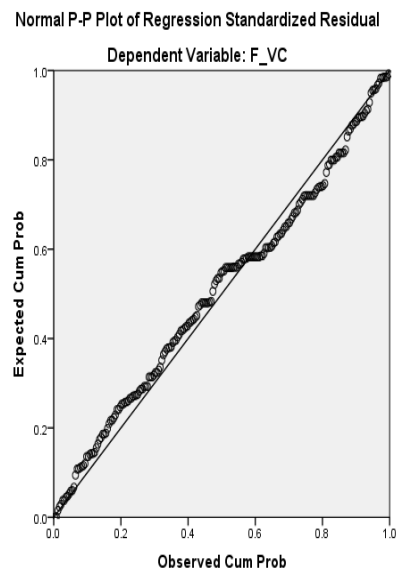
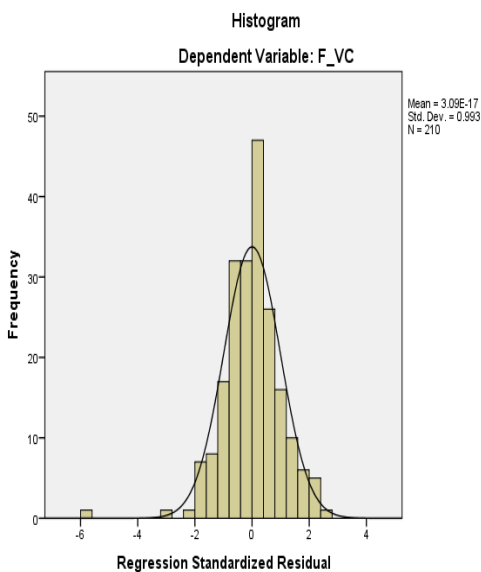
$$\text{Equation 5: VC} = \alpha_{05} + \beta_{24}\text{PCS} + \beta_{25}\text{TI} + \beta_{26}\text{CSS} + B_{27}(\text{TT}*\text{PCS}) + B_{28}(\text{TT}*\text{TI}) + B_{29}(\text{TT}*\text{CSS}) + \beta_{30}\text{FA} + \beta_{31}\text{FS} + \epsilon_5$$



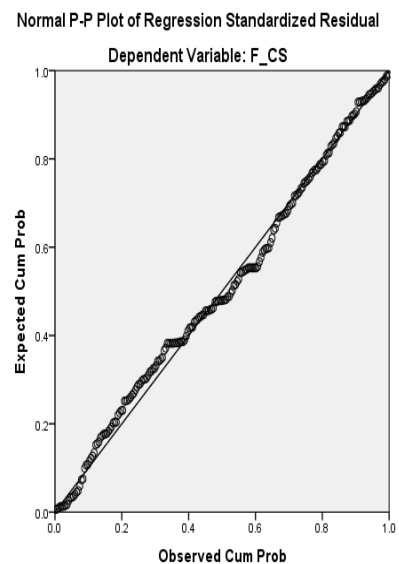
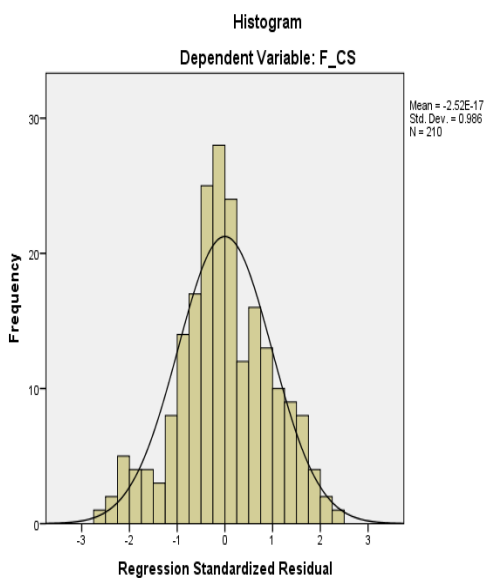
$$\text{Equation 6: CS} = \alpha_{06} + \beta_{32}\text{VR} + \beta_{33}\text{VC} + \beta_{34}\text{FA} + \beta_{35}\text{FS} + \epsilon_6$$



$$\text{Equation 7: VC} = \alpha_{07} + \beta_{36}\text{VR} + \beta_{37}\text{FA} + \beta_{38}\text{FS} + \varepsilon_7$$



$$\text{Equation 8: CS} = \alpha_{08} + \beta_{39}\text{VR} + \beta_{40}\text{VC} + B_{41}(\text{CM} * \text{VR}) + B_{42}(\text{CM} * \text{VC}) + \beta_{43}\text{FA} + B_{44}\text{FS} + \varepsilon_8$$



3. Independence of the Error Terms

In regression analysis, it is assumed that each predicted value is independent. The predicted value is not related to any other prediction; that is they are not sequenced by any variable. This research employs Durbin-Watson to test on the assumption of autocorrelation. At the rule of thumb, if Durbin-Watson (d statistics) is found nearly 2 ($1.5 < d < 2.5$), it is assumed that there is no autocorrelation. From the results of Durbin-Watson d statistics, are about 1.845 – 2.245. The result from Table E1 demonstrates that Durbin-Watson statistics of all equations are around 2. Hence, it could be assume that the error terms are independence or no autocorrelation for all models.

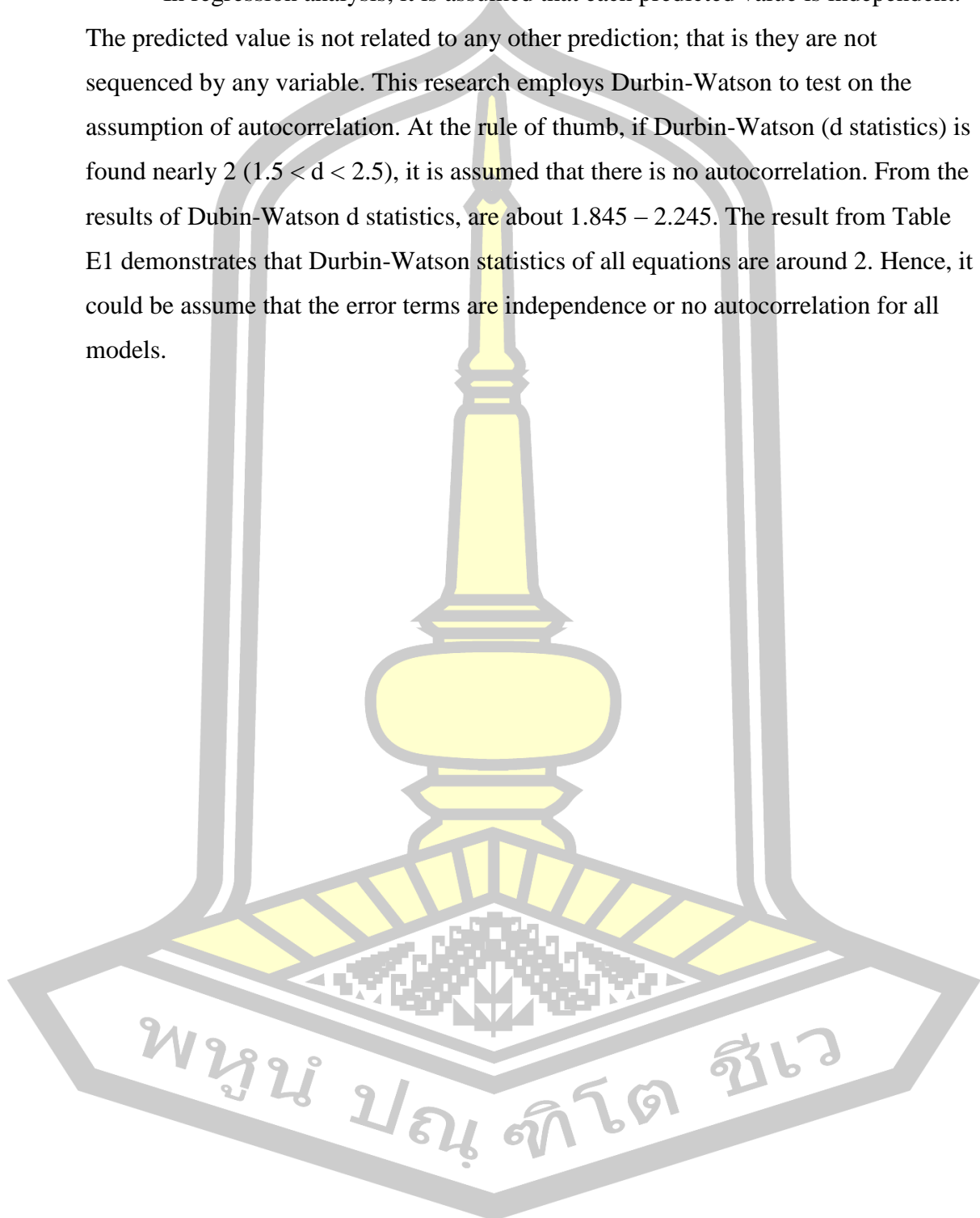
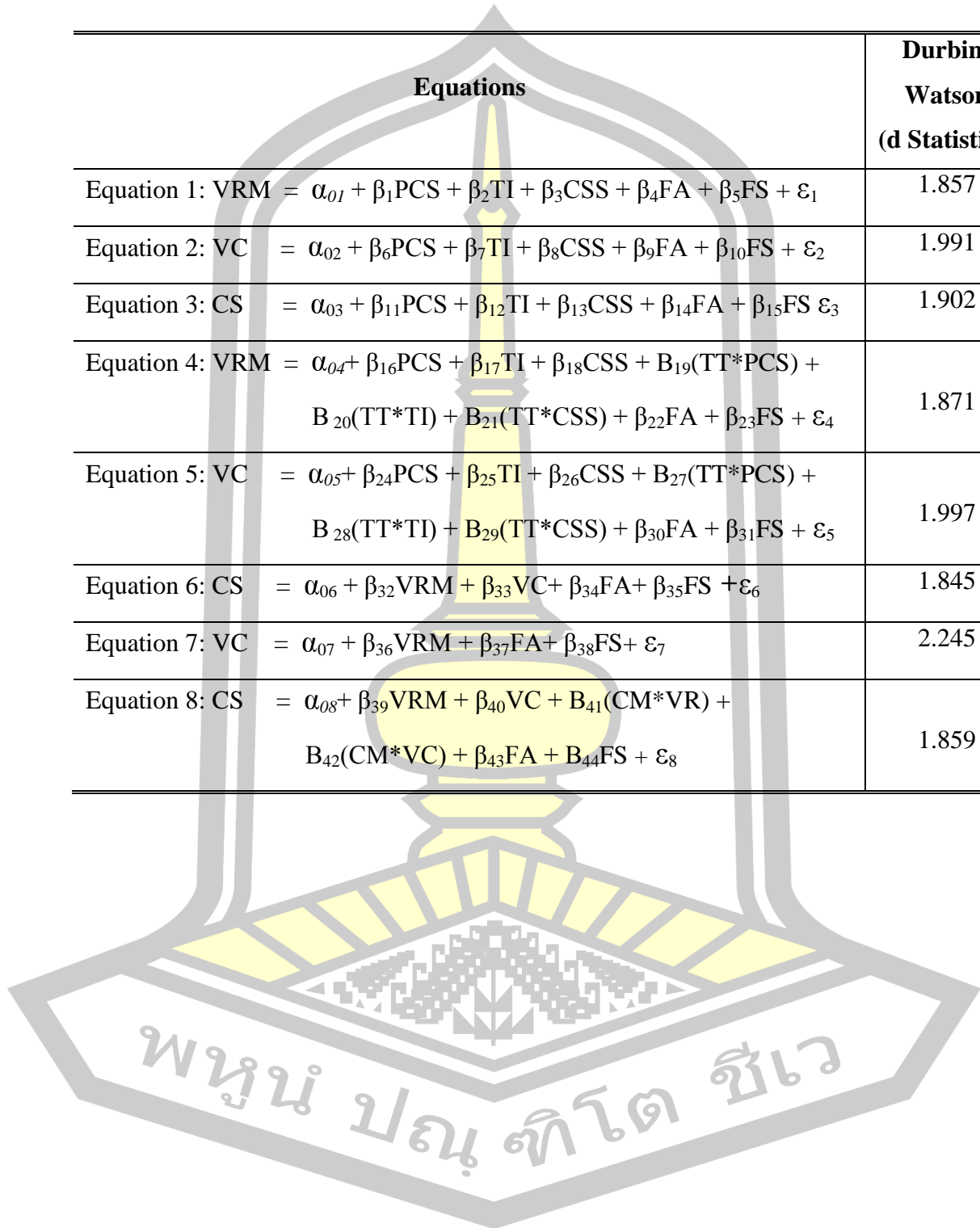


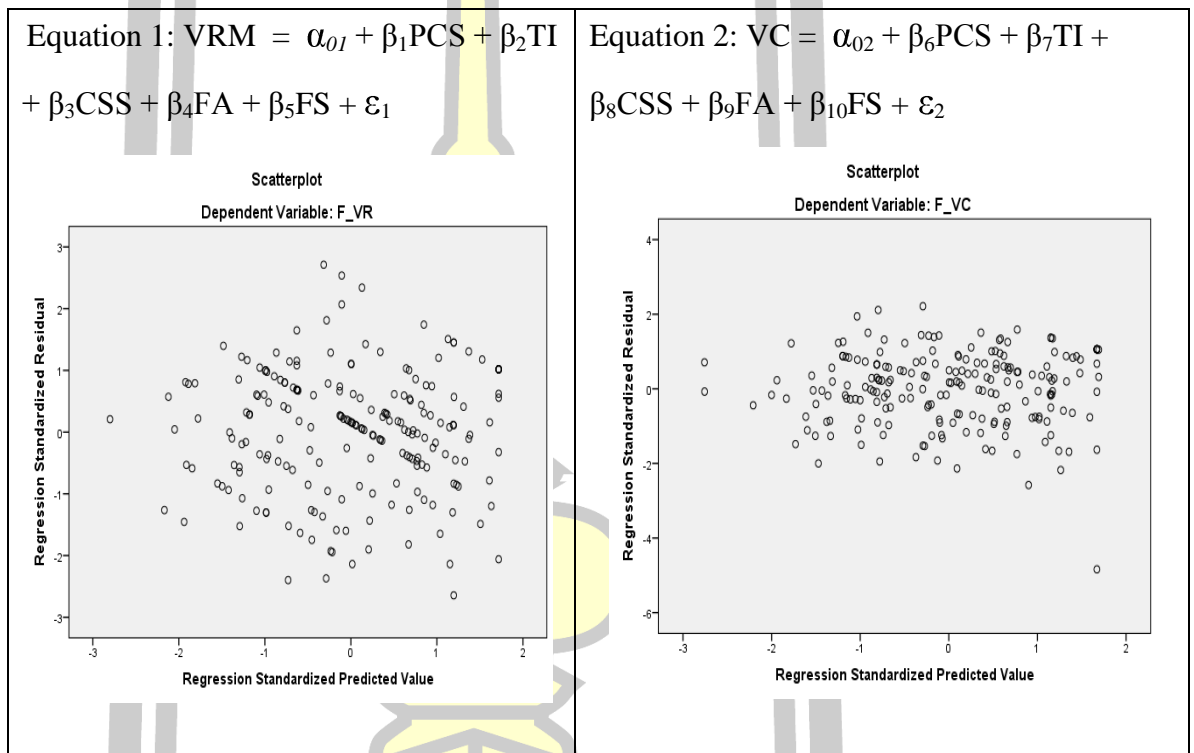
Table E1 Results of Autocorrelation Testing

Equations	Durbin-Watson (d Statistics)
Equation 1: $VRM = \alpha_{01} + \beta_1 PCS + \beta_2 TI + \beta_3 CSS + \beta_4 FA + \beta_5 FS + \varepsilon_1$	1.857
Equation 2: $VC = \alpha_{02} + \beta_6 PCS + \beta_7 TI + \beta_8 CSS + \beta_9 FA + \beta_{10} FS + \varepsilon_2$	1.991
Equation 3: $CS = \alpha_{03} + \beta_{11} PCS + \beta_{12} TI + \beta_{13} CSS + \beta_{14} FA + \beta_{15} FS + \varepsilon_3$	1.902
Equation 4: $VRM = \alpha_{04} + \beta_{16} PCS + \beta_{17} TI + \beta_{18} CSS + B_{19}(TT*PCS) + B_{20}(TT*TI) + B_{21}(TT*CSS) + \beta_{22} FA + \beta_{23} FS + \varepsilon_4$	1.871
Equation 5: $VC = \alpha_{05} + \beta_{24} PCS + \beta_{25} TI + \beta_{26} CSS + B_{27}(TT*PCS) + B_{28}(TT*TI) + B_{29}(TT*CSS) + \beta_{30} FA + \beta_{31} FS + \varepsilon_5$	1.997
Equation 6: $CS = \alpha_{06} + \beta_{32} VRM + \beta_{33} VC + \beta_{34} FA + \beta_{35} FS + \varepsilon_6$	1.845
Equation 7: $VC = \alpha_{07} + \beta_{36} VRM + \beta_{37} FA + \beta_{38} FS + \varepsilon_7$	2.245
Equation 8: $CS = \alpha_{08} + \beta_{39} VRM + \beta_{40} VC + B_{41}(CM*VR) + B_{42}(CM*VC) + \beta_{43} FA + B_{44} FS + \varepsilon_8$	1.859

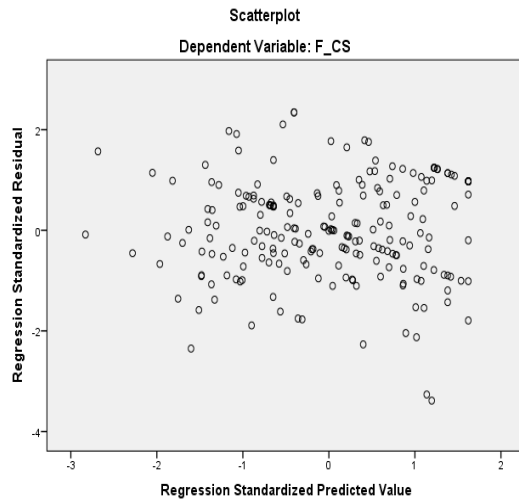


4. Constant variance of the error terms (Homoscedasticity)

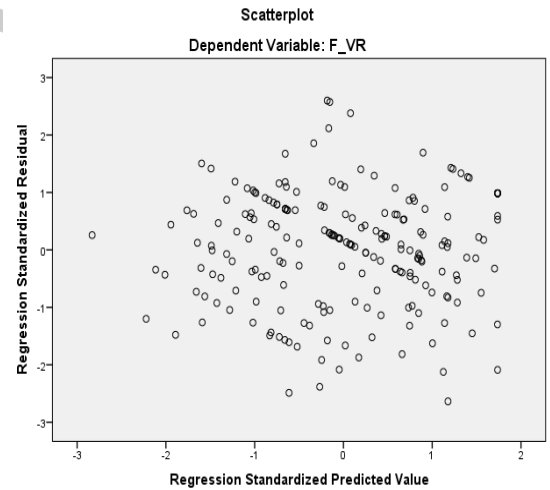
This assumption is constancy of the error variance or heteroscedasticity problem which can distort the results by increasing on possibility of a Type I error. The examinations both visual residual plots against the predictor variables and the Breusch-Pagan test are employed to test for heteroscedasticity.



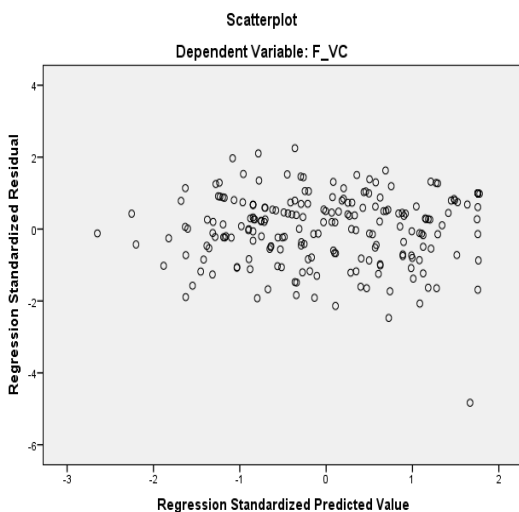
$$\text{Equation 3: } CS = \alpha_{03} + \beta_{11}PCS + \beta_{12}TI + \beta_{13}CSS + \beta_{14}FA + \beta_{15}FS + \varepsilon_3$$



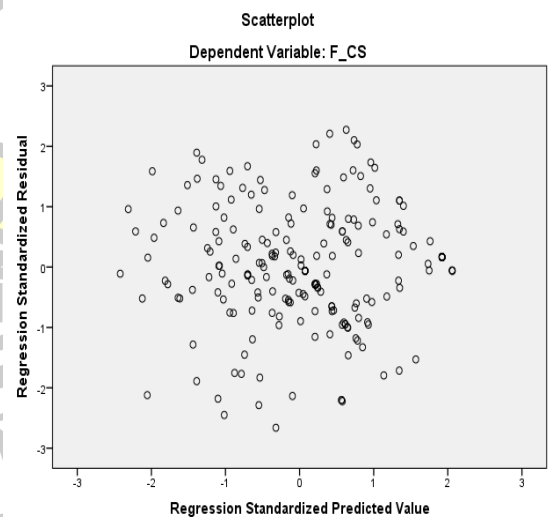
$$\text{Equation 4: } VRM = \alpha_{04} + \beta_{16}PCS + \beta_{17}TI + \beta_{18}CSS + \beta_{19}(TT*PCS) + \beta_{20}(TT*TI) + \beta_{21}(TT*CSS) + \beta_{22}FA + \beta_{23}FS + \varepsilon_4$$

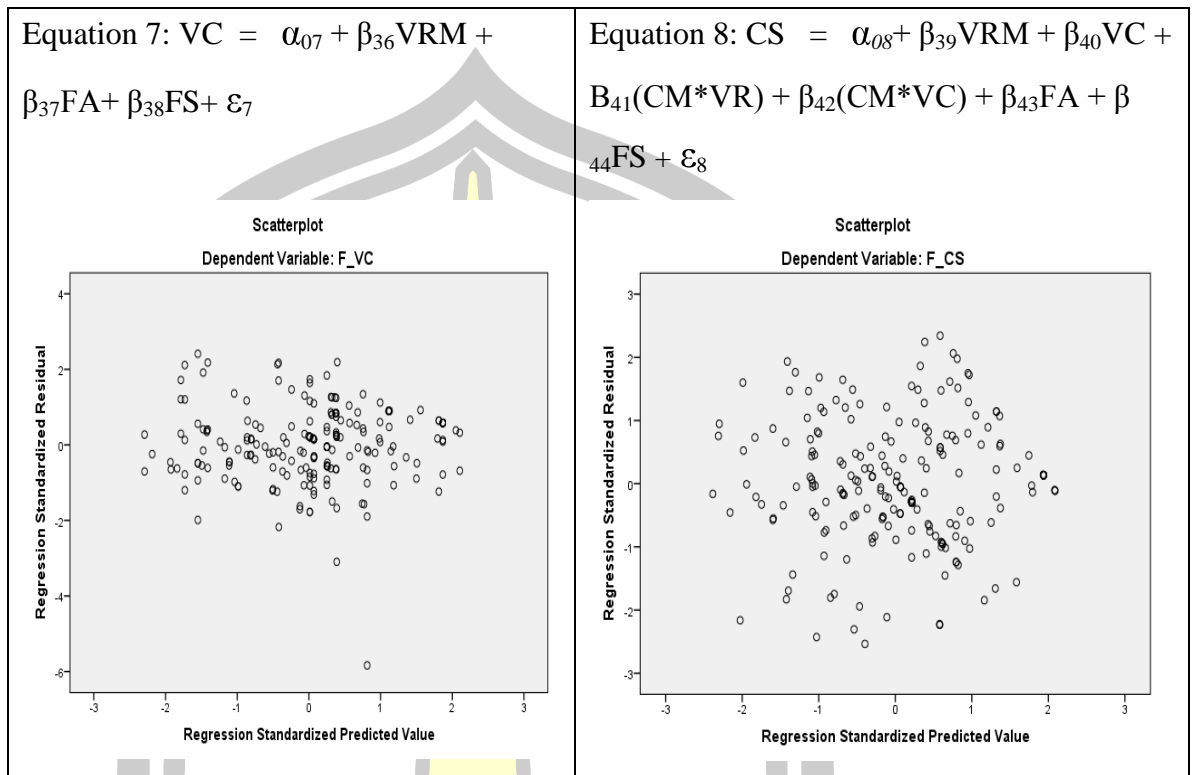


$$\text{Equation 5: } VC = \alpha_{05} + \beta_{24}PCS + \beta_{25}TI + \beta_{26}CSS + \beta_{27}(TT*PCS) + \beta_{28}(TT*TI) + \beta_{29}(TT*CSS) + \beta_{30}FA + \beta_{31}FS + \varepsilon_5$$



$$\text{Equation 6: } CS = \alpha_{06} + \beta_{32}VRM + \beta_{33}VC + \beta_{34}FA + \beta_{35}FS + \varepsilon_6$$





5. Test of Multicollinearity

The ideal situation for research would have a number of independent variables highly correlated with the dependent variable, but with little correlation among themselves. Multicollinearity will occur when any single independent variable is highly correlated with other independent variables. If the independent variables have highly correlated with themselves, it impacts to result of regression analysis. Consequently, the result of regression analysis is not believable. In order to multicollinearity, this research uses Variance Inflation Factor (VIF). Nunnally (1978) explain if VIF value greater than 10, it has multicollinearity. The VIF of each equation model is less than 10 implying that there is no multicollinearity.

Coefficients^a

Model	Unstandardized Coefficients		Std. Error	Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B			Beta				Tolerance	VIF
1 (Constant)	-.283		.093			-3.029	.003		
F_PCS	.156		.072	.156		2.181	.030	.559	1.789
F_TI	.171		.081	.171		2.107	.036	.433	2.311
F_CSS	.309		.076	.309		4.075	.000	.499	2.006
D_Size	.337		.114	.167		2.966	.003	.904	1.107
D_Age	.224		.116	.109		1.923	.056	.892	1.121

a. Dependent Variable: F_VRM

Coefficients^a

Model	Unstandardized Coefficients		Std. Error	Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B			Beta				Tolerance	VIF
1 (Constant)	-.108		.105			-1.026	.306		
F_PCS	.116		.080	.116		1.443	.150	.559	1.789
F_TI	.243		.091	.243		2.658	.008	.433	2.311
F_CSS	.179		.085	.179		2.095	.037	.499	2.006
D_Size	.266		.128	.132		2.086	.038	.904	1.107
D_Age	-.010		.131	-.005		-.078	.938	.892	1.121

a. Dependent Variable: F_VC

Coefficients^a

Model	Unstandardized Coefficients		Std. Error	Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B			Beta				Tolerance	VIF
1									
(Constant)	-.114		.101			-1.128	.261		
F_PCS	.136		.077	.136		1.755	.081	.559	1.789
F_TI	.285		.088	.285		3.240	.001	.433	2.311
F_CSS	.192		.082	.192		2.343	.020	.499	2.006
D_Size	.135		.123	.067		1.104	.271	.904	1.107
D_Age	.090		.126	.044		.716	.475	.892	1.121

a. Dependent Variable: F_CS

Coefficients^a

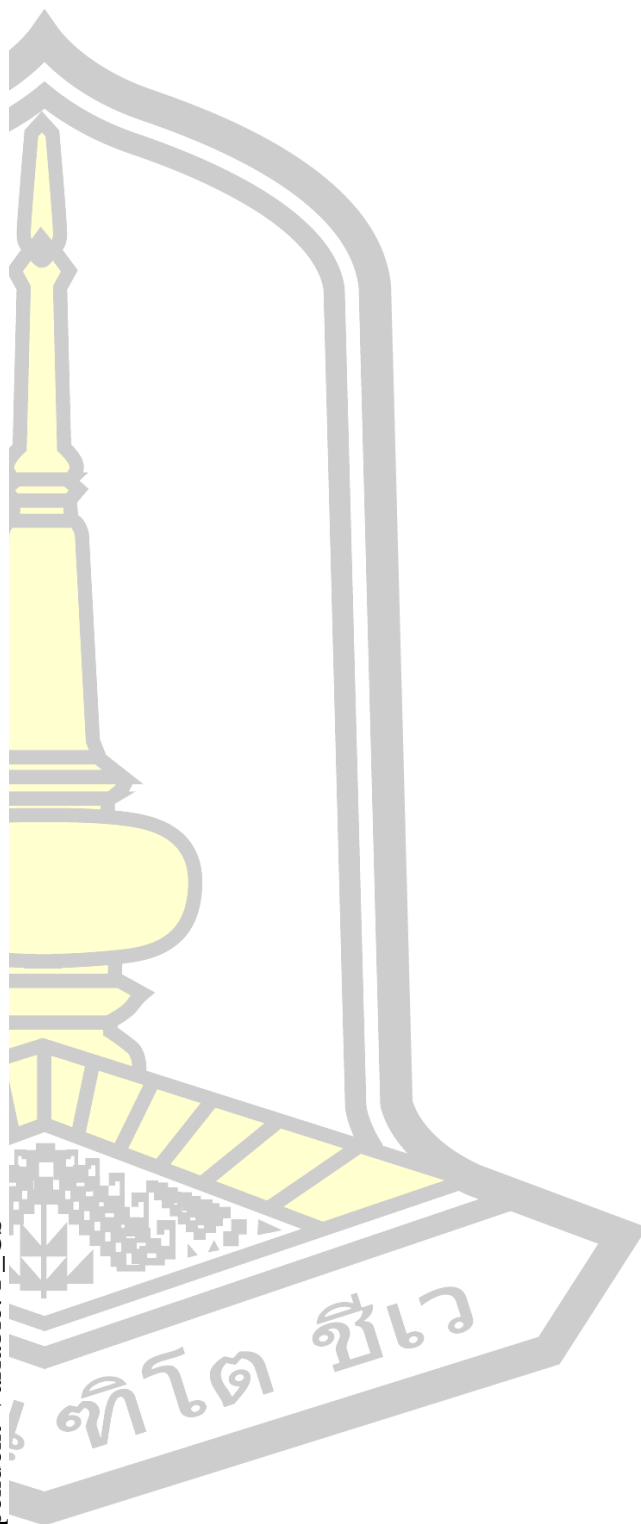
Model	Unstandardized Coefficients		Std. Error	Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B			Beta				Tolerance	VIF
1									
(Constant)	.091		.083			1.092	.276		
F_VRM	.753		.050	.753		15.027	.000	.875	1.142
D_Size	.041		.101	.020		.409	.683	.879	1.138
D_Age	-.176		.102	-.085		-1.721	.087	.890	1.124

a. Dependent Variable: F_VC

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
1								
(Constant)	.049	.065			.751	.454		
F_VRM	.451	.056	.451		8.042	.000	.418	2.394
F_VC	.481	.054	.481		8.927	.000	.452	2.210
D_Size	-.118	.078	-.059		-1.513	.132	.878	1.139
D_Age	.003	.080	.002		.041	.967	.877	1.140

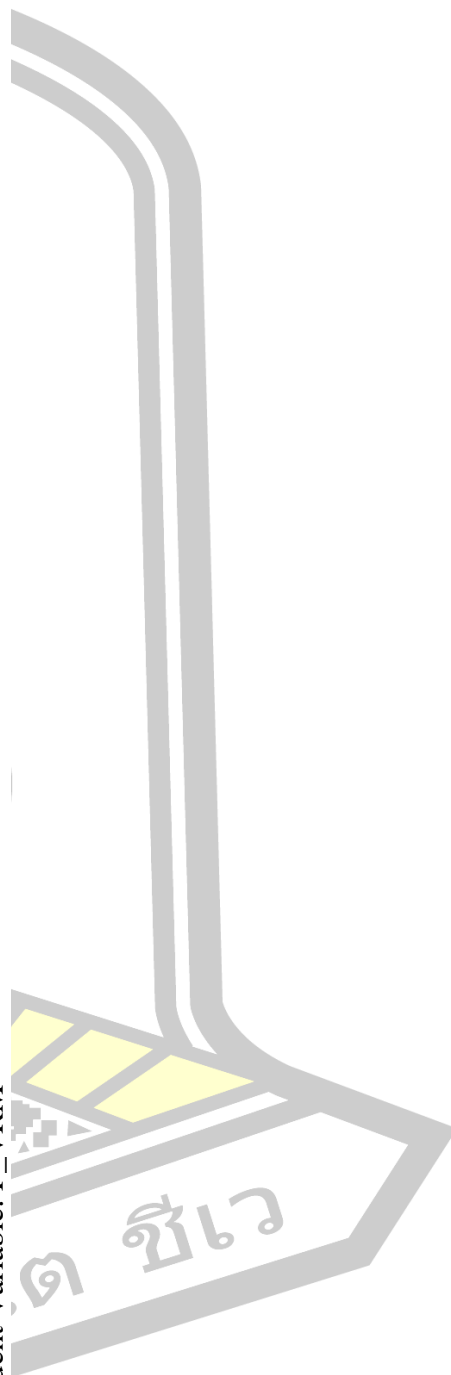
a. Dependent Variable: F_CS



Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
1								
(Constant)	-.296	.100			-2.969	.003		
F_PCS	.142	.074	.142		1.922	.056	.523	1.913
F_TI	.198	.085	.198		2.327	.021	.398	2.514
F_CSS	.306	.082	.306		3.745	.000	.430	2.323
D_Size	.327	.115	.162		2.845	.005	.881	1.135
D_Age	.219	.118	.107		1.867	.063	.876	1.141
MO_TTPCS	-.091	.075	-.093		-1.214	.226	.490	2.040
MO_TTTI	.113	.072	.130		1.579	.116	.421	2.377
MO_TTCSS	-.017	.067	-.019		-.261	.794	.565	1.771

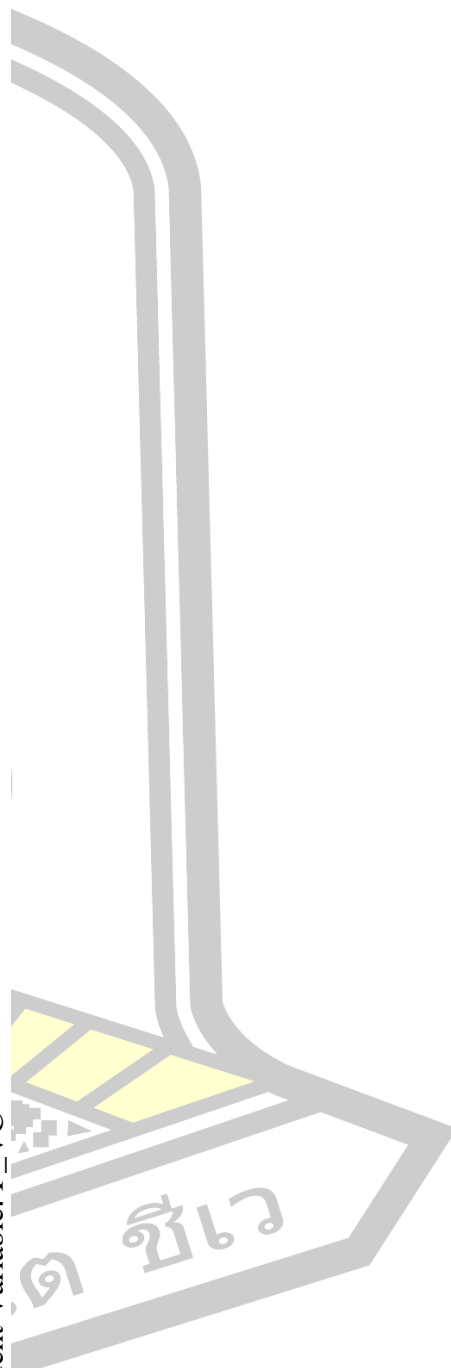
a. Dependent Variable: F_VRM



Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
1								
(Constant)	-.127	.112			-1.132	.259		
F_PCS	.102	.084	.102		1.222	.223	.523	1.913
F_TI	.263	.096	.263		2.752	.006	.398	2.514
F_CSS	.183	.092	.183		1.984	.049	.430	2.323
D_Size	.251	.130	.124		1.933	.055	.881	1.135
D_Age	-.010	.132	-.005		-.079	.937	.876	1.141
MO_TTPCS	-.072	.084	-.074		-.857	.392	.490	2.040
MO_TTTI	.087	.081	.100		1.077	.283	.421	2.377
MO_TTCSS	.011	.075	.012		.150	.881	.565	1.771

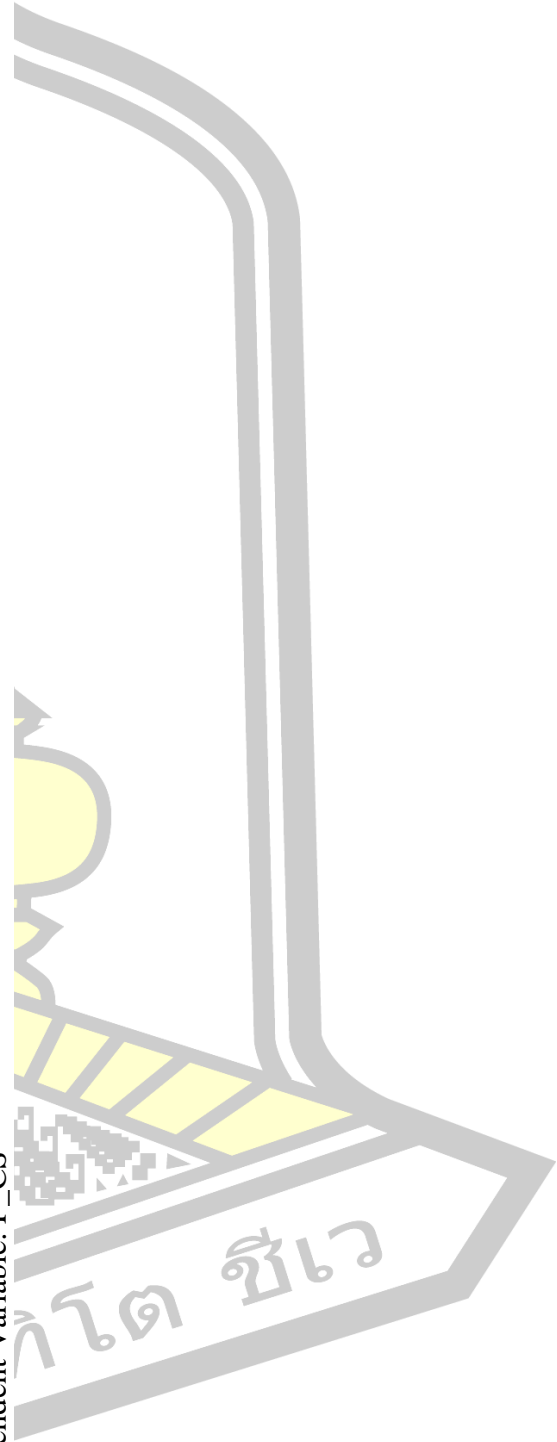
a. Dependent Variable: F_VC



Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
1								
(Constant)	.052	.069			.762	.447		
F_VRM	.447	.056	.447		7.966	.000	.417	2.400
F_VC	.487	.054	.487		9.008	.000	.450	2.223
D_Size	-.128	.078	-.063		-1.627	.105	.869	1.151
D_Age	.004	.080	.002		.053	.957	.873	1.145
MO_CMVRM	.065	.051	.070		1.293	.198	.453	2.206
MO_CMVC	-.063	.047	-.072		-1.335	.183	.456	2.194

a. Dependent Variable: F_CS





APPENDIX F Cover Letter and Questionnaire: English Version

พหุจน์ ปณฺ ทิโต ชีเว



Questionnaire for the Ph. D. Dissertation Research
**“Management Accounting Information Usage and Corporate Sustainability:
An Empirical Assessment of Electrical and Electronics businesses in Thailand”**

Direction:

The objective of this research is to test the relationships between Management Accounting Information Usage and Corporate Sustainability of Electrical and Electronics businesses in Thailand.

This research is a section of doctoral dissertation of Mrs. Palawee Puttikoonsakron at the Faculty of Accountancy and management, Maharakham University.

The questionnaire is divided into 6 sections:

Section 1: General information of accounting executive of electrical and electronics businesses in Thailand.

Section 2: General information of electrical and electronics businesses in Thailand.

Section 3: Opinions in management accounting information usage of electrical and electronics businesses in Thailand.

Section 4: Opinions in consequences of management accounting information usage of electrical and electronics businesses in Thailand.

Section 5: Opinions in effect of factor on management accounting information usage of electrical and electronics businesses in Thailand.

Section 6: Recommendations and suggestions in management accounting information usage of electrical and electronics businesses in Thailand.

Your information will not be revealed to any outside party without your permission. If you need a summary of this research, please indicate your E-mail address with this questionnaire, which it will be mailed to you when the analysis is completed.

Do you wish to receive a summary of this research?

Yes () Your E-mail No ()

Thank you for your time answering all questions. Your answer will give the valuable information for the dissertation and contribute to the academic literature. When you have any questions with regard to this questionnaire, please contact me, Mrs. Palawee Puttikoonsakron, mobile phone 08 1592 4665 or E-mail: palawee_g@hotmail.com

Sincerely yours,

(Palawee Puttikoonsakron)

Faculty of Accountancy and Management

Maharakham University

Section 1 General information of accounting executive listed firms in Thailand.

1. Gender

Male

Female

2. Age

Less than 30 years old

30 – 40 years old

41 – 50 years old

More than 50 years old

3. Marital status

Single

Married

Divorced

4. Education Level

Undergraduate

Higher than undergraduate

5. Working experience in your current firm

Less than 10 years

10 – 15 years

16 – 20 years

More than 20 years

6. Average monthly income present

Less than 50,000 Baht

50,000 – 100,000 Baht

100,001 – 150,000 Baht

More than 150,000 Baht

7. Working position at your current firm

Accounting director

Accounting manager

Others (Please specify).....

พหุ ประถมศึกษา

Section 2 General information of electrical and electronics businesses in Thailand.

1. Business owner type

- Partnerships Company limited
 Company limited

2. Location

- Central region Northern region
 Eastern region Western region
 Northeastern region Southern region

3. Registered capital

- Less than 100,000,000 Baht 100,000,000 - 200,000,000 Baht
 200,000,001 - 300,000,000 Baht More than 300,000,000 Baht

4. Total assets

- Less than 50,000,000 Baht 50,000,000 - 100,000,000 Baht
 100,000,001 - 150,000,000 Baht More than 150,000,000 Baht

5. The period of business operation

- Less than 10 years 10 - 20 years
 21 - 30 years More than 30 years

6. Number of employees

- Less than 250 250 - 500
 501 - 750 More than 750

7. Average revenue per year

- Less than 10,000,000 Baht 10,000,001 - 60,000,000 Baht
 60,000,001 - 100,000,000 Baht More than 100,000,000 Baht

Section 3 Opinions in management accounting information usage of electrical and electronics businesses in Thailand.

Management Accounting Information Usage	Level of Agreement				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
<u>Product Costing System</u>					
1. The firm focuses use of information reports related to raw material, labor, and manufacturing overhead are used to calculate the cost of the product to be as accurate as possible.					
2. The firm believes that the use of accurate cost data reports will make the determination pricing of products more efficient.					
3. The firm supports the use of standard cost reports to analyze the price variance and quantity variance, Rate Variance and Efficiency Variance difference in price and quantity of raw materials. Wage difference and working time Payout difference Performance and capacity are useful for planning, controlling, and executing decisions to the benefit of planning, control, and management decisions.					
4. The firm emphasize on cost analysis and measurement to prevention quality or damage to products and services.					
5. The firm focuses focus on cost data to assess the quality of production processes, and factors related to the production process of goods or services.					
6. The firm focuses are conscious of the preparation of a report to show the cost information for the improvement or modification of the quality of the goods or services before and after delivery to the customer.					
<u>Technical Information</u>					
7. The firm realizes of use of the improvement of production process to eliminate wastage continuously (Lean) to push the process to work in accordance with the systematic and effective.					
8. The firm emphasizes on the possibility of potential damage. It is a way to eliminate the risk and not waste in the production process (Six Sigma).					
9. The firm supports the use of information and communication technologies in the social field to be useful in the management and development of the organization, leading to sustainable growth.					

Section 3 Opinions in management accounting information usage of electrical and electronics businesses in Thailand (continued)

Management Accounting Information Usage	Level of Agreement				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
<u>Technical Information</u>					
10. The firm focuses on finding barriers to work, including preventing, detecting, correcting, and promoting the reduction of work restrictions from the system.					
11. The firm focuses on the use of information to optimize the efficiency and effectiveness of the organization's resources, such as recycling of waste and waste in the production process, the use of clean technology, and produce of products that are environmentally friendly.					
<u>Customer Service System</u>					
12. The firm believes that the use of customer reports will be beneficial in forecasting revenues and profits from target customers that are consistent with current and future scenarios.					
13. The firm focuses on the use of revenue and consumption data of customers to determine the market share of the existing customers and to create new customers in the market.					
14. The firm use customer order quantity data for production planning as well as analysis and measurement of profitability of current and future customers.					
15. The firm focuses on forecasting sales of companies based on customer data to use for planning activities with efficiency and effectiveness.					
16. The firm recognizes that the use of statistical information about the problems of after-sales service increases the efficiency of monitoring and management, in order to reduce the cost of ongoing complaints, warranties, and services.					

Section 4 Opinions in consequences of management accounting information usage of electrical and electronics businesses in Thailand.

Consequences	Level of Agreement				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
<u>Value-Based Risk Management</u>					
1. The firm has the ability to set guidelines and hedging plans for business operations, including fluctuations in the price of raw materials, risk from customers, competitors and financial risks.					
2. The firm can be discovered set the metric assess and evaluate the potential risks, to plan and identify the most effective risk management methods.					
3. The firm can manage the risk of the organization to reduce volatility of profits and diversification of investment, including the expansion of domestic and overseas growth.					
4. The firm can be aware of the follow-up of the implementation of the risk management plan to ensure efficiency and appropriateness need to make adjustments if the plan is not effective enough.					
5. The firm has supports, promotes and coordinates all personnel to effectively manage the risk in accordance with the policy and guidelines.					
<u>Value Creation</u>					
6. The firm has the ability to develop modern product design and service that meet the needs of customers very well.					
7. The firm has the ability to lead the way of production superior to competitors.					
8. The firm can increase the quantity and quality of resource utilization, including people, money, raw materials and machinery, and the existing management to maximize value.					
9. The firm can create value through cooperation between customers, organizations and stakeholders (Value Co-Creation) to be able to learn and meet the needs of all parties.					
10. The firm can create a distinctive, identifiable, and difficult to copy image by using the brand, trademarks, and slogans are tools to convey quality that outweighs competitors.					

Section 4 Opinions in consequences of management accounting information usage of electrical and electronics businesses in Thailand (continued)

Consequences	Level of Agreement				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
Corporate Sustainability					
11. The firm has the ability to create competitive advantage in both the short and long term.					
12. The firm is likely to grow business from investment, with the expansion of production and exports every year.					
13. The firm continued growth in sales and market share has affected revenue and profitability.					
14. The firm has a stable financial status and stable operating performance that can continue its business in the long term.					
15. The firm can build good relationships with partners and loyalty of all stakeholders in a long-term.					
16. The firm can learn and adjust to the situation, can innovate in new products to meet the needs of customers continuously.					
17. The firm can protect society and the environment, along with the growth of the business as an organization that helps to promote and improve the quality of life of people in society for continued improvement.					

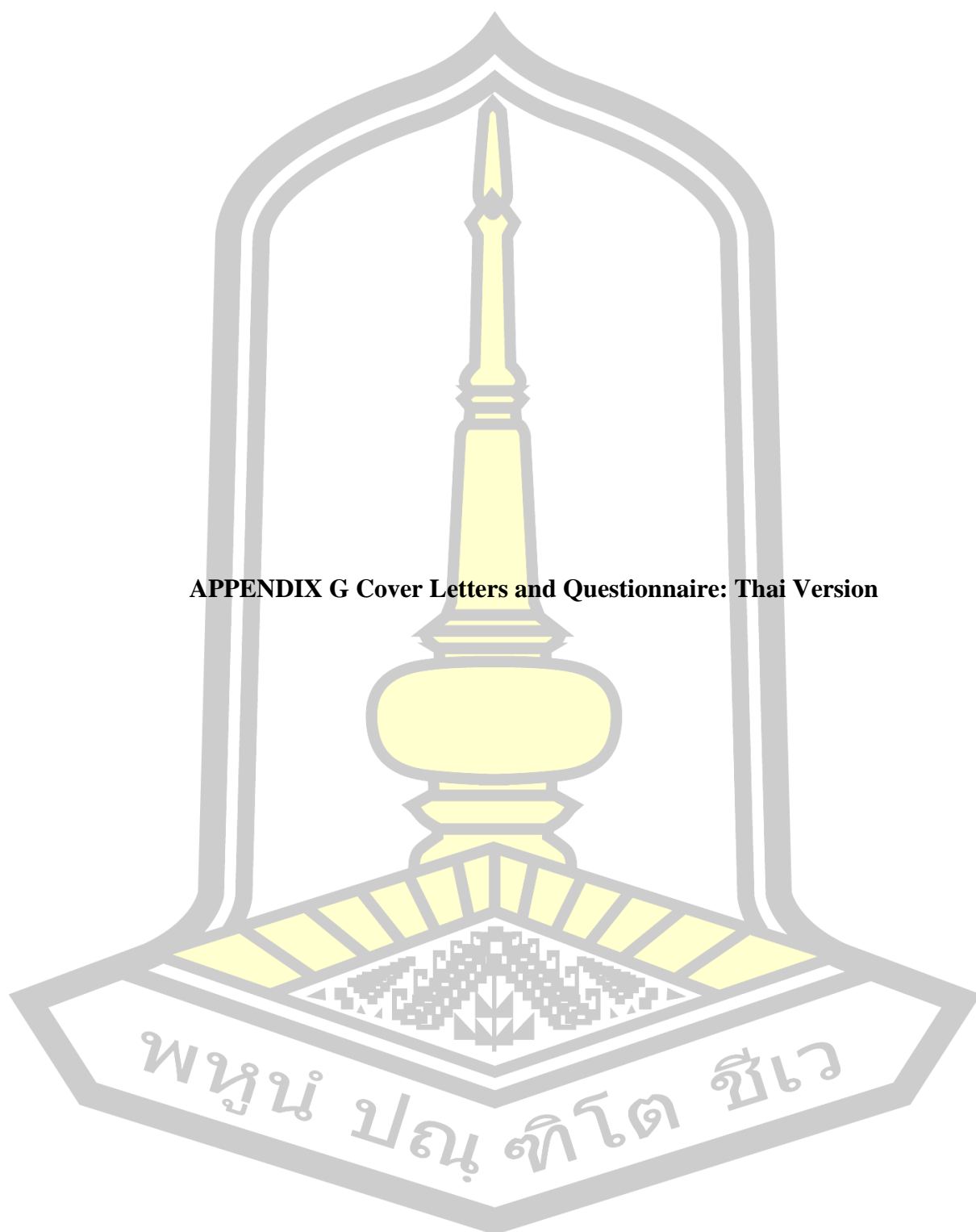
Section 5 Opinions in effect of factor on management accounting information usage of electrical and electronics businesses in Thailand.

Factor on management accounting information usage	Level of Agreement				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
Technological Turbulence					
1. The firm focuses importance to learning and adaptation to the advancement of accounting information technology, to make the best use of technology change.					

Section 5 Opinions in effect of factor on management accounting information usage of electrical and electronics businesses in Thailand (continued)

Factor on management accounting information usage	Level of Agreement				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
2. The firm to promote the use of equipment advanced tools and information technologies are used to analyze and make decisions on the production of quality products and services based on the current and future demand for more and more customers.					
3. The firm is committed to the use of accounting information technology. This is used as a basis for setting strategies and procedures for meeting the expectations of stakeholders and to continuously creating competitive advantage.					
<u>Technological Turbulence</u>					
4. The firm emphasize on the reform of information technology system in Thailand. 4.0 as a tool to develop, value and manage operational risk effectively and efficiently.					
5. The firm aims to use technology as a means to communicate information and to coordinate among people in the organization, to lead to the development and improvement of work processes to the maximum efficiency.					
<u>Complexity Management</u>					
6. The firm focuses on good planning and management to reduce the complexity and difficulty of the work, to facilitate the operation and achieve the objectives set of the organization.					
7. The firm supports the organization management, properly assigning tasks, responsibilities, and responsibilities to reduce administrative complexity responsive to mission and potential goals.					
8. The firm promotes the appropriate reduction of work procedures, and can produce quality products and services to build trust and acceptance from customers.					
9. The firm strived to build knowledge and understanding of the people within the organization to set common practices leading to a reduction in workplace complexity.					
10. The firm focuses on good planning and management to reduce the complexity and difficulty of the work, to facilitate the operation and achieve the objectives set of the organization.					

APPENDIX G Cover Letters and Questionnaire: Thai Version





แบบสอบถามเพื่อการวิจัย

เรื่อง การใช้ข้อมูลบัญชีบริหารและความยั่งยืนขององค์กร: การศึกษาเชิงประจักษ์ของธุรกิจไฟฟ้า
และอิเล็กทรอนิกส์ในประเทศไทย

คำชี้แจง

โครงการวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาวิจัยเรื่อง “การใช้ข้อมูลบัญชีบริหารและความยั่งยืนขององค์กร: การศึกษาเชิงประจักษ์ของธุรกิจไฟฟ้าและอิเล็กทรอนิกส์ในประเทศไทย” เพื่อเป็นข้อมูลในการจัดทำวิทยานิพนธ์ในระดับปริญญาเอกของผู้วิจัยในหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาการบัญชี คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จังหวัดมหาสารคาม หมายเลขโทรศัพท์ 043-754333

ข้าพเจ้าใคร่ขอความอนุเคราะห์จากท่านผู้ตอบแบบสอบถาม ได้โปรดตอบแบบสอบถามชุดนี้ โดยรายละเอียดของแบบสอบถามประกอบด้วยส่วนคำถาม 6 ตอน ดังนี้

- ตอนที่ 1 ข้อมูลทั่วไปของผู้บริหารฝ่ายบัญชีของธุรกิจไฟฟ้าและอิเล็กทรอนิกส์ในประเทศไทย
- ตอนที่ 2 ข้อมูลทั่วไปเกี่ยวกับธุรกิจไฟฟ้าและอิเล็กทรอนิกส์ในประเทศไทย
- ตอนที่ 3 ความคิดเห็นเกี่ยวกับการใช้ข้อมูลบัญชีบริหารของธุรกิจไฟฟ้าและอิเล็กทรอนิกส์ในประเทศไทย
- ตอนที่ 4 ความคิดเห็นเกี่ยวกับผลการดำเนินงานของธุรกิจไฟฟ้าและอิเล็กทรอนิกส์ในประเทศไทย
- ตอนที่ 5 ความคิดเห็นเกี่ยวกับปัจจัยที่ส่งผลต่อการดำเนินงานของธุรกิจไฟฟ้าและอิเล็กทรอนิกส์ในประเทศไทย
- ตอนที่ 6 ความคิดเห็นและข้อเสนอแนะเพิ่มเติมเกี่ยวกับการบริหารงานของธุรกิจไฟฟ้าและอิเล็กทรอนิกส์ในประเทศไทย

คำตอบของท่านจะถูกเก็บรักษาเป็นความลับ และจะไม่มีการใช้ข้อมูลใดๆ ที่เปิดเผยเกี่ยวกับตัวท่านในการรายงานข้อมูลรวมทั้งจะไม่มีการร่วมใช้ข้อมูลดังกล่าวกับบุคคลภายนอกอื่นใดโดยไม่ได้รับอนุญาตจากท่าน

ท่านต้องการรายงานสรุปผลการวิจัยหรือไม่

() ต้องการ E-mail

() ไม่ต้องการ

หากท่านต้องการรายงานสรุปผลการวิจัย โปรดระบุ E-mail Address ของท่าน หรือแนบนามบัตรของท่านมากับแบบสอบถามชุดนี้

ผู้วิจัยขอขอบพระคุณที่ท่านได้กรุณาเสียสละเวลาในการตอบแบบสอบถามชุดนี้อย่างถูกต้องครบถ้วน และหวังเป็นอย่างยิ่งว่าข้อมูลที่ได้รับจากท่านจะเป็นประโยชน์อย่างยิ่งต่อการวิจัยในครั้งนี้ และขอขอบพระคุณอย่างสูงมา ณ โอกาสนี้ หากท่านมีข้อสงสัยประการใดเกี่ยวกับแบบสอบถาม โปรดติดต่อผู้วิจัย นางปาลวี พุฒิกุลสาคร หมายเลขโทรศัพท์เคลื่อนที่ 081-5924665 หรือ E-mail : palawee_g@hotmail.com

(นางปาลวี พุฒิกุลสาคร)

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Research output	<p>2020 Puttikoonsakron, Palawee, and Poonpool Nuttavong , and Wangcharoendate Suwan. “Management Accounting Usage and Corporate Sustainability: An Empirical Assessment of Electrical and Electronic Businesses in Thailand.</p>

พหุบัณฑิต ชีวะ