Effect of Proactive Digital Accounting Support on FirmSustainability of Exporting Business in Thailand

Chaloemkiat Ranglek

A Thesis Submitted in Partial Fulfillment of Requirements for

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ABSTRACT

There is an increasing interest in organizations for the use of digital accounting relating to competitive advantage and sustainability (The Stock Exchange of Thailand, 2021), yet, current literature has not been fully embraced relating to impact or engagement to firm sustainability. The primary objective of this research is to examine the direct effects of proactive digital accounting support on firm sustainability. Moreover, the effects of proactive digital accounting support on business innovation effectiveness, modern product creativity, and organizational trust are investigated. In addition, the impacts of business innovation effectiveness, modern product creativity, and organizational trust on firm sustainability are examined. Furthermore, this research investigated the effects of antecedents (including ambidextrous of top management, technological innovation, and market competition pressures) on proactive digital accounting support. Finally, this research tests the moderating effects of proactive culture on the relationships among proactive digital accounting support and its consequences (including business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability); the moderating effects of stakeholder awareness on the relationships among business innovation effectiveness, modern product creativity, and organizational trust and firm sustainability; and the moderating effects of disruptive technology on the relationships among antecedents (including ambidextrous of top management, technological innovation, and market competition pressures) and proactive digital accounting support.

This research used survey research. Data for the study is based on the data from 225 entrepreneurs exporting businesses in Thailand, with a response rate was approximately 34.67%. The Structural Equation Modeling (SEM) technique is a method for testing hypotheses. In addition, Harman's single- factor test technique was implemented to confirm Common Method Variance's minimal risk. The maximum variance explained by one factor was 38.75%. The data were validated and passed the convergent and discriminant validity tests through various analyses, where factor

loading ranged from 0.644 to 0.90, composite reliability (CR) ranged from 0.84 to 0.91, and average variance extracted (AVE) ranged from 0.525 to 0.717.

The results of this research indicate that digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system of the proactive digital accounting support significantly positively affect business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. While ambidextrous of top management, technological innovation, and market competition pressures also significantly affect proactive digital accounting support. Eventually, the finding supported the moderating effect of proactive culture, particularly in the relationship between proactive digital accounting support and firm sustainability. In addition, the findings also supported the remarkably positive moderating effects of stakeholder awareness in the relationship between business innovation effectiveness, modern product creativity, organizational trust and firm sustainability. Further, disruptive technology moderated the relationship between ambidextrous of top management, technological innovation, market competition pressures and proactive digital accounting support. The findings suggest that proactive digital accounting support has practical implications for organizations, which will help to contribute significantly to improving operational performance and lead to sustainability goals. Moreover, these findings provide theoretical and managerial contributions as well as future research directions.

Keyword : Proactive digital accounting support, Business innovation effectiveness, Modern product creativity, Organizational trust, Firm sustainability

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CHAPTER I

INTRODUCTION

Overview

Nowadays, the volatility of global economic environments and markets, including business environments, is increasingly competitive, and dynamics and uncertainty on business operations affect all countries, and all business types, either manufacturing or non-manufacturing firm, large, medium or small firm, Etc. In such conditions, the organization's ability to anticipate and respond to external fluctuations is critical to its survival and will lead to firm sustainability, the final episode (Erokhin et al., 2019). Firm sustainability is becoming more critical for all companies because it has linked to financial performance and can reflect that the business has good corporate governance and is managed with transparency, effectively manage risk into account the stakeholders, have competitive potential and generate in the long term returns (The Stock Exchange of Thailand, 2021). In addition, firm sustainability can be viewed as a business approach to creating long-term value for owners/shareholders. In particular, building corporate growth and profits are essential. However, profitability maximum ceases to be the sole criterion when companies are under pressure from economic, environmental, and social legislation and conditions of consumers, suppliers, and government policy (Kocmanova et al., 2017), and firm sustainability is becoming a hot topic because of the ongoing changes in global governance (Park et al., 2021).

The higher and ever-increasing levels of competitive pressures have forced their work processes to seek effective managing a competitive advantage, to contribute both to the company's financial and non-financial performance, and at the same time, add value to the stakeholders (Gliaubicas & Kanapickiene, 2015), companies are increasingly taking more proactive approaches by emphasizing to the anticipate and

respond future needs, and create superior value than competitors (Brege & Kindström, 2020).

Today, further changes as the world moves into the digital age may profoundly impact an organization's functioning processes, especially management accounting practices (Bhimani, 2020). Technology is rapidly and significantly transforming finance, accounting and tax functions (CGMA, 2019). Especially in the field of accounting information and management control systems, which are under-explored, to understand the potentiality, the benefits and the disadvantages of that kind of technology. The fundamental mechanisms driving the changes in accounting practices to digitalization are digital technology innovations such as the organization of data using internet-based technologies (cloud, big data and analytics, block chain, and Artificial Intelligence) and the development of integrated enterprise resource planning systems (cloud ERP). These drive data growth, and the rise of digital technology presents organizational participants with opportunities to utilize both structured and unstructured information for the objective of new management control system (MCS) configurations and associated practices (Bhimani, 2020; Kruskopf et al., 2020). Therefore, it requires an additional effort of management accounting research the study contexts where digital data forms are drawn to provide information to support decision-making involving creating a competitive advantage and firm sustainability (Erokhin et al., 2019).

Chartered Global of Management Accountants (CGMA) is the global designation for management accounting, is gets started with an introduction to what firms need to adapt and thrive during the digital transformation (CGMA, 2019). This will lead to proactive digital accounting involving cost management, data analytics, allocation and provisioning of resources, and risk management. Proactive Digital Accounting Support (PDAS) is the provision and analysis of management accounting and finance data involving a business and competitors in electronic form through adopting digital technology in operations to manage future-oriented organizations (Bhimani, 2020).

Context studies are available that encompass Proactive Digital Accounting Support under three pillars of CGMA (2019) consist: The Enterprise Pillar focuses on the role of the finance function using data and technology involving digitalization; The Performance Pillar focuses on using the tools and techniques of management accounting and risk management, involves managing the costs, investment decision-making, managing and controlling the performance, and risk management; The Financial Pillar focuses the financial accounting, including integrated reporting or reporting automation.

CIMA (2019) introduced cost management methodology by applying activity-based management (ABM), target costing, value chain analysis, and life cycle costing to manage costs, improve profitability, and improve value creation. One of the reasons for calculating costs is to enable organizations to manage and possibly transform their costs, which has become very important in the digital world (CIMA, 2019). Aguilar & Ittner (2018) stated that cost management in the digital era harness the power of digital technology to increase efficiency and effectiveness and could deliver increasing savings in much less time and the ability to be implemented more quickly. For investment decision-making, big data analytics can provide more value to enterprises in various ways and enhance enterprises' productivity and competitiveness. There is a wide variety of analytic tools that can be used to perform big data analytics (BDA), among others, on the basis of SQL queries, statistical analysis, data mining, fast clustering, natural language processing, text analytics, data visualization, machine learning, and artificial intelligence (AI) (Skourletopoulos et al., 2018). Diagnostic data analysis is the process of studying big data by exploiting these tools and techniques to identify possible trends, events, and behaviors in the future based on historical and current data such as customer behaviors, supplier behavior, marketing, etc. These capabilities provide organizations with data available to make investment decision-making in any project provide easily and rapidly (Oncioiu et al., 2019). Gupta et al. (2019) highlight that analyzing big data using diagnostic techniques to predict future probabilities and trends in the market will be necessary for decision-making support. Also, resource allocation is necessary for

managing and controlling organizations' performance in a dynamic competitive environment. Suhaimi et al. (2016) argue that the advancement of technologies transforms the way businesses operate from labor to a machine-intensive process and improves organizational control. In particular, the enterprise resource planning (ERP) system is an excellent device for dynamic resource allocation as it helps organizations identify wastage at the earliest possible time. Gupta et al. (2019) commented that organizations widely implement enterprise resource planning (ERP) systems to optimize resource allocation and seek competitive advantages in the dynamic market. Their empirical study found that integrating the Internet of Things (IoT) with an Enterprise Resource Planning System (cloud ERP) has positive impacts on firm performance. Therefore, cloud computing has become a digital technology that can optimize resource allocation in enterprises (Vinothina et al., 2012). Modern businesses, however, face a much more diverse collection of obstacles and potential dangers. Companies identify all the risks they face and decide which risks will manage actively including involves making that action plan available to all stakeholders, shareholders, and potential investors, as part of their annual report. A fundamental risk of the organization is that its strategy is the wrong one and that even if implemented perfectly, it will achieve the wrong outcome for the organization. Also, some risks are of such high significance that they can affect the organization's very existence. According to Uyar (2018), if an enterprise can effectively use the risk assessment information system (or enterprise risk management: ERM), the business's economic success will increase significantly. Saeidi et al. (2019) showed that ERM had a positive relationship with the firms' competitive advantage and performance. Besides, the study of Ivanov et al. (2019) found that digital technologies facilitate a new quality of risk management infrastructure at the proactive stage. Also, Wang et al. (2020) argue that Big Data Analytics Methods are used to extract practical information in the process of enterprise risk management, and systematically show the logic between the data, and pay attention to the indicators with a higher risk in advance to support decisions making for users.

Therefore, Proactive Digital Accounting Support consists of four proposed dimensions: digital cost management, diagnostics data analytics, dynamic resource allocation, and risk assessment information system. Under Proactive Digital Accounting Support (PDAS), digitalization has resulted in the automation and robotics of routine processes, the introduction of business intelligence, and data analytics applications by connecting products and allowing products to collect data using digital technology or digital literacy. Therefore, Proactive Digital Accounting Support (PDAS) can generate depth, breadth, variety, and rapid data that far exceeds authorized access in the past and can be implemented more quickly, which will help support the manager's decision-making not only to achieve the survival of the firm but also to support the firm sustainability (Park et al., 2021).

However, although many authors criticize many benefits ascribed to management accounting practices have evolved in the modern era, traditional accounting techniques are still being used in many firms (Ogungbade et al., 2017), which is consistent with the literature on contingency-based that identify how the operation and effects of management accounting are not universal but depend on the contexts within which it operates (Petera & Šoljaková, 2020). According to contingency theory, in contrast to best-practice approaches, contingency theory proposes that companies' effectiveness stems from adjusting their management control systems to the specific circumstances (internal and external factors) in which the companies operate. By the concept of the contingency theory of management accounting began to develop in the 1970s in an attempt to explain practices of management accounting that were apparent at that time has relevant to set which forms of the organizational structure were most appropriate to specific circumstances (Otley, 2016). Therefore, it is essential for contingency theory to identify the critical contingent variables that affect specific aspects of Proactive Digital Accounting Support.

This study extrapolates that Proactive Digital Accounting Support (PDAS) usage as a digitalization management accounting technique depends on the ambidextrous of top management, technological innovation is an internal factor, and

market competition pressures is an external factor, via the moderating disruptive technology role. Pavlatos & Kostakis (2018) argue that top management influences strategic choices (for example, adopting management accounting tools) and organizational outcomes. Jingjing Du & Chen (2018) states that the ambidextrous of top management allows firms to exploit the existing capabilities while simultaneously not neglecting the effort undertaken in developing new capabilities. Moreover, admittedly, creativity is encompassed in top management's ambidextrous, contributing to the adoption of management accounting tools significantly and has been extensively used in accounting research (Pavlatos & Kostakis, 2018; Piórkowska, 2016). The research results by Pavlatos & Kostakis (2018) and Dranev et al. (2020) show that ambidextrous top management influences the adoption and use of modern accounting techniques more extensively to improve their decision-making. According to Tanui (2020) argues that adopted modern accounting techniques are influenced by technological innovation and market competition pressure. Alamri (2019) argues that effective management accounting information systems are based on modern technological applications. Likewise, Günther & Gäbler (2014) stated that the quality of existing information technology systems is a signal for progress and innovativeness in satisfying accounting information quality. Awa et al. (2016) propose that enterprises with strong and sophisticated technology and financial competencies show more adoption likelihood. While market competition pressure, as a result of the increased competition and the changes in behaviors or practices of competitors, customers, and suppliers, leads to the link with management accounting practices as more reliable management accounting information is likely to be needed by the firms, to support making decisions and compete effectively (Ahmad & Zabri, 2015; Zainuddin & Sulaiman, 2016). Based on a study conducted by Tanui (2020); Awa et al. (2016); Ahmad & Mohamed Zabri (2015); and Rodríguez-Espíndola et al. (2022) indicates that technological innovation and market competition pressure have a significant influence on adopting modern management accounting practices.

To complete the relationship, this study provides that disruptive technology as a moderator influences relationships between the antecedents and Proactive Digital Accounting Support (PDAS) in each dimension. On the one hand, the organization has adopted and used innovative management accounting tools more extensively as a result of the disruptive technology because it destroys and makes obsolete established competence (Coccia, 2020). Saputro et al. (2021) argue that most roles and tasks of management accounting practice are influenced by emerging technologies and the implementation of information technology systems to gather and process raw data; their study found that disruptive technologies enable streamlining the accounting practice process, such as real-time accounting, providing information to monitor and supervise organization performance. Also, the Project Management Institute (PMI) report states that disruptive technology presents the opportunity to evolve their best practices to the next practices, practices that will carry them into the future (PMI, 2018). Thus, the disruptive technology may affect the relationship between the antecedent variable (ambidextrous of top management, technological innovation, and market competition pressure) and the Proactive Digital Accounting Support (PDAS). Hence, contingency theory will be applied to explain antecedents of Proactive Digital Accounting Support and the moderating effect of the relationships between Proactive Digital Accounting Support and its antecedents. Thus, in this research, there is required the examination of the positive relationships among the anticipated antecedent variables (consist: ambidextrous of top management, technological innovation, and market competition pressures) and each dimension of Proactive Digital Accounting Support (consist: digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system).

All four of Proactive Digital Accounting Support for determining the cash needed to create goods and services. A firm's decision to use either accounting technique can have lasting implications on how the business interprets financial data and makes business decisions. In the other hand, these factors are most worthy of continuing investment, providing a way to see a startup or innovation project as a formal financial instrument that has a precise value and reflects a range of future costs and financial

outcomes. Especially, firms need to adopt proactive culture for Proactive Digital Accounting Support for decision making. It helps able to business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability.

Management accounting's primary focus has always been to improve the organization's performance by providing relevant information for planning, controlling, and economic decision-making. Additionally, Management Accounting facilitates the appropriation of the benefits of business innovation effectiveness in organizations. Innovation is one of the keys to growing a business and increasing its competitiveness. It can help to improve productivity, reduce costs and become more profitable and draw a clear picture of future opportunities that lie ahead for the organization (Rajapathirana & Hui, 2018). Recent studies found that management accounting tools could help managers develop and monitor organizational activities, supporting the potential benefits of business innovation effectiveness (Lopez-Valeiras et al., 2015). On the one hand, to accelerate modern product creativity and make a company's products enter the market, a timely. Management accounting can give managers information regarding changes in the market, consumer demand, and competitor activities, Tsai et al. (2020) find that management accounting practice positively affects modern product creativity.

Moreover, management accounting is concerned with building organizational trust because management accounting practices are one of the central performance measurement systems known as management accounting and control systems, which involves individuals' behavior within an organization (Dahal, 2018). Management accounting and control systems (MACS) make employees feel facilitated or motivated by the existing rules and systems. A study by Beuren et al. (2020) showed management accounting leads to MACS, affect employees' motivation regarding their work environment, which contribute to companies dealing effectively within a high-risk business environment. Kulkarni et al. (2020) emphasized that developing an effective accounting strategy is essential for creating a sustainable work environment and increasing employees' potential toward new knowledge while achieving organizational goals. It is an essential factor to employees' motivation, which ultimately leads to

organizational trust. While growing sensitivity towards social and environmental issues, it is impossible to create long-term value for an organization without considering social, environmental, and economic aspects (Park et al., 2021). As a result, companies are essential to finding the method that enables them to run there to firm sustainability. Kumarasiri (2012) stated that management accounting practice could play a significant role in an organization by integrating all relevant information and providing such information for managerial decision-making. In addition, Harris et al. (2019) reveal that management accounting practice has significant roles to play in strategic sustainability orientation, as management accounting techniques may deliver better information for steering an organization's functioning and decision-making processes relating to sustainability issues.

However, cultural values (e.g., innovative culture, people-oriented culture, outcome-oriented culture, proactive culture, attention to detail culture, team-oriented culture, and stable culture) are prominent barriers to the implementation of new management accounting practices (Ogungbade & Oyerogba, 2020). Results study by Oliveira (2015) showed that proactive cultures have a significant positive impact on the firm performance and suggest that proactive cultures are essential for the firm sustainability and profitability growth in increasingly dynamic, turbulent, and competitive markets. Ogungbade & Oyerogba (2020) also stated that companies with proactive culture would focus on competition and create an edge over the competitors by continually searching for available opportunities. Therefore, Proactive Digital Accounting Support (PDAS) may need cooperation from this to support business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability.

In this research, Proactive Digital Accounting Support can be considered the development of new capabilities that will make organizations create a competitive advantage through business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability, which is a superior capability to what was had before. Which consistent with the dynamic capabilities framework that tries to

explain how the new capabilities can be developed, and the new combination of resources and capabilities helps to achieve or maintain a competitive advantage under the conditions of technological and market changes (D. J. Teece et al., 1997).

According to dynamic capabilities theory (D. J. Teece et al., 1997), Proactive Digital Accounting Support (PDAS) is a management accounting practice which regarded as the firm's ability to integrate, build and reconfigure internal and external capabilities to cope with the dynamic changing market, which reflects the organization's ability to achieve new and innovative competitive advantage given path market orientation. Thus, in this research, there is required the examination of the positive relationships among each dimension of Proactive Digital Accounting Support (PDAS) and (1) business innovation effectiveness, (2) modern product creativity, (3) organizational trust, and (4) firm sustainability. Also, dynamic capabilities theory explains the proactive culture as it is the moderating effect between Proactive Digital Accounting Support and its consequences. While, the key factors that create a competitive advantage and contribute to firm sustainability are business innovation effectiveness, modern product creativity, and organizational trust. These factors result in (1) resource management and utilization to get maximum efficiency (business innovation effectiveness) by using innovations to improve production processes that ensure quality products/services and the least waste generation, (2) making a difference in a product/service (modern product creativity) by providing products to meet consumer needs continuously, and (3) could maintain business competitiveness (organization trust) because trust is fundamental to drive a business strategy to achieve a specific set of goals (The Stock Exchange of Thailand, 2021). Yu et al. (2018) commented that when employees trust in and identify with the organization, the employees will be more willing to react and behave from the organization's perspective, and they are also willing to put more effort into the organization.

However, based on the literature review, stakeholder theory has suggested that advancing toward corporate sustainability requires recognizing the importance of stakeholders by building stakeholder awareness because raising stakeholder awareness

of the corporate sustainable goals may enhance pro-sustainable behavior (Tomomi Yamane & Kaneko, 2021). And the stakeholders are the group that relates to both direct and indirect activities carried out by an organization (Forin et al., 2020). It is therefore an essential motivation for an organization to pursue their sustainable performance (Gong et al., 2019). According, Gong et al. (2019) showed that stakeholder awareness has a significantly positive effect on their sustainability performance. Therefore, creating an advantage toward firm sustainability needs to be done via stakeholder awareness.

Therefore, this research is required to examine the positive relationships among the consequences of Proactive Digital Accounting Support consisting of business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. In addition, stakeholder theory not only is operated to explain the relationship between business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability but also explains the stakeholder awareness as it is the moderating effect between business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability.

Based on the literature review, for the most part, believed that Proactive Digital Accounting Support (PDAS) offers companies opportunities to operate efficiently, create effectively competitive advantage, and lead to economic benefits include social and environmental (see Gitau et al., 2020; Jagoda & Wojcik, 2019; Jasim et al., 2019; Oncioiu et al., 2019; Ramadan et al., 2020; Zhao et al., 2021), but Proactive Digital Accounting Support (PDAS) is an expensive exercise that might not be worth the investment (Deshmukh, 2005) and might not be the effect or engage on firm sustainability. Ogungbade et al. (2017) showed that the traditional management accounting practices are still being used in developed, emerging, and developing countries while the management accounting practices that change over time to reflect new forms and practices have not been fully embraced by many companies. In addition, Erokhin et al. (2019) stated that accounting management practices have received less attention as these are considered less related to support strategic scope on firm

sustainability. Moreover, there are many studies focus on investigating strategic adaptation to the volatile economic environment, and most case studies in developed countries, there has been little research examining management accounting (MA) as a proactive accounting to support firm sustainability decision-making (Erokhin et al., 2019), especially when the world moves into the digital age. Thus, management accounting practices and business sustainability in a digital era is important issues to be explored to addressing the question of how Proactive Digital Accounting Support effects of firm sustainability. It gives challenges and opportunities for companies that require new capabilities and organizational adaptation (Park et al., 2021).

This study investigates entrepreneurs in the Thailand exporting businesses sector because Thailand is a developing country (Kittipanya-ngam & Tan, 2020) and a newly industrialized country with an export sector at the heart of the economic system that generates a considerable income each year. But in the last ten years, Thailand's overall export has grown significantly slower. Especially from 2018 until the present, the export value has been surprisingly reduced (Ministry of Commerce, 2021), partly due to the competitiveness and intensity of technology use (Kiatruangkrai et al., 2020). The Deloitte survey reports that Thailand's industries were partially successful in improving business performance through digital technology and emphasized that digital technology and innovation are crucial for Thailand's industries (Deloitte Thailand, 2020). Recently, the Department of International Trade Promotion of Thailand has set up a government action plan to develop Thai entrepreneurs' potential to create innovation and value-added products/services through innovation and applying digital technology in business operations for the Thai export business to be successful (Department of International Trade Promotion, 2021). Therefore, it poses a challenge to understanding how Proactive Digital Accounting Support can improve the effectiveness of exporting business in Thailand.

The main research question in this study is, "How does Proactive Digital Accounting Support influence firm sustainability?" Key participants are chief financial officers, managing directors, or accounting executives of each exporters firm, as they

were more likely to have a comprehensive overview of the strategic issues across the whole company (Alamri, 2019) and are in a position to use management accounting tools to make strategic decisions and leading the organization to success (Sumkaew & Intanon, 2020). Data were collected using questionnaires. Overall, this research contributes to the literature on firms' managerial accounting by examining the impact of Proactive Digital Accounting Support (PDAS) on businesses' firm sustainability in Thailand. Besides providing theoretical and managerial support, the theoretical contribution relates to conceptualizing Proactive Digital Accounting Support (PDAS) through the multi-dimension, integrated dimension. Moreover, this research seeks to examine the antecedent and consequences of Proactive Digital Accounting Support (PDAS), including moderating and mediating in a new model. Furthermore, this research presents the logical link between the conceptual framework by the dynamic capabilities and contingency theories. Finally, this study's results may contribute to managerial practices that concentrate on Proactive Digital Accounting Support (PDAS) to create a competitive advantage and support and actions to improve the sustainability survival of export businesses in Thailand.

Research Questions

The key research question is, "How does Proactive Digital Accounting Support influence firm sustainability?" Moreover, the specific research questions are presented as follows:

1. How does each dimension of Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system) relate to business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability?

2. How do business innovation effectiveness, modern product creativity, and organizational trust have an impact on firm sustainability?

3. How do ambidextrous of top management, technological innovation, and market competition pressures influence each dimension of Proactive Digital Accounting Support?

4. How do proactive culture relationships moderate the influence of each of four dimensions of Proactive Digital Accounting Support on business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability?

5. How do stakeholder awareness relationships moderate the influence of business innovation effectiveness, modern product creativity, organizational trust and firm sustainability?

6. How does disruptive technology moderate the relationships among ambidextrous of top management, technological innovation, and market competition pressures on each dimensions of Proactive Digital Accounting Support?

Purposes of the Research

The following explains all research objectives:

1. To investigate the effects of each dimension of Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system) and firm sustainability;

2. To investigate the effects of the four dimensions of Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system) on business innovation effectiveness, modern product creativity, and organizational trust.

3. To examine the effects of business innovation effectiveness, modern product creativity, and organizational trust on firm sustainability;

4. To investigate the effects of ambidextrous of top management, technological innovation, and market competition pressures on each dimension of Proactive Digital Accounting Support;

5. To examine the moderating effects of proactive culture on the relationships among each dimension of Proactive Digital Accounting Support and business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability;

6. To examine the moderating effects of stakeholder awareness on the relationships among business innovation effectiveness, modern product creativity, and organizational trust and firm sustainability, and;

7. To examine the moderating effects of disruptive technology on the relationships among ambidextrous of top management, technological innovation, and market competition pressures and each dimensions of Proactive Digital Accounting Support.

Scope of the Research

This research focuses on the examination of the Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system) on firm sustainability, including exploring the mediation role of business innovation effectiveness, modern product creativity, and organizational trust in the relationship between Proactive Digital Accounting Support to firm sustainability. In addition, this research concentrates on examination the antecedents (ambidextrous of top management, technological innovation, and market competition pressures) of Proactive Digital Accounting Support.

Moreover, this research needs to study the moderating effects of proactive culture on the relationships between four dimensions of Proactive Digital Accounting Support and business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability, and study the moderating effects of stakeholder awareness on the relationships between business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. Similarly, this research demonstrates the moderating effects of disruptive technology on the relationships between each antecedent variable (ambidextrous of top management,

technological innovation, and market competition pressures) and all dimensions of Proactive Digital Accounting Support.

In this research, a request is to obtain a more comprehensive knowledge of the relationship between Proactive Digital Accounting Support and firm sustainability in the context of exporting businesses in Thailand. For an overview of this research has three main parts. Firstly, investigates the direct effects of each dimension of Proactive Digital Accounting Support on consequences, including the mediation role of those effects consequences of Proactive Digital Accounting Support. Secondly, concentrates on the antecedents of Proactive Digital Accounting Support. Thirdly, concentrates on the role of moderator variables affecting those effects. In this context, Proactive Digital Accounting Support is composed of four dimensions: digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system. Digital cost management is the adoption of costing techniques (i.e., activity-based management (ABM), value chain analysis, life-cycle costing, target costing) to provide relevant cost information for organizations to manage costs by using digital technology to assist in the data analysis. Diagnostic data analytics applies statistical analysis and technologies on data to predict what will happen regarding behaviors or practices of competitors, customers, and suppliers for improving decision-making and enhancing superior organizational efficiency. Dynamic Resource Allocation is the organization's resource management to meet the unlimited demand and access to on-going processes, and that can be adjusted quickly and just in time for maximum efficiency. Risk assessment information system is discovering, identifying, and assessing unknown risks, leading to risk management to provide reasonable assurance about the achievement of the objectives of the organization. The four dimensions of Proactive Digital Accounting Support are hypothesized to positively affect business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. The consequences of Proactive Digital Accounting Support include business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. Business innovation effectiveness involves using innovation to

increase efficiency and effectiveness in work processes and benefit businesses long and short term. Modern product creativity is the design and launch of new products, as well as the improvement of modernizing additive existing products. Organizational trust is a practice that reflects the goodwill of the organization toward their employees about success and sustainable existence. In addition, business innovation effectiveness, modern product creativity, and organizational trust are expected to have an impact on firm sustainability. The independent variable in this study is firm sustainability. It refers to the firm's ability to keep its business activities feasible and affect the firm's survival and achievement in the long term while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future.

Also, the antecedents of Proactive Digital Accounting Support in this research include three variables: (1) Ambidextrous of top management, (2) Technological innovation, and (3) Market competition pressures. Ambidextrous of Top Management refers to the management's practice in promoting, supporting to pursuing new methods or practices, and increasing efficiency in the existing things to support management decisions. Technological innovation is the adoption of new technologies to support operations in an agile manner and success. Market competition pressure is the tensions arising from business competition, which involves the market participants, including market share, directly related to the business.

This research proposes that proactive culture moderates the relationship between each dimension of Proactive Digital Accounting Support and its consequences (business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability). Proactive Culture focuses on the competition, dares to take risks, and can respond to change by constantly seeking market opportunities. Moreover, examining stakeholder awareness moderates the relationship between business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. Stakeholder Awareness involves raising awareness among external stakeholders by disclosing sustainability information that the business operates responsibly toward the environment, society, and economy. Furthermore, disruptive

technology is a moderator variable between the antecedents and Proactive Digital Accounting Support. Disruptive technology is the impact of emerging technologies and technology change, generating a process of actual substitution of a new technique for the old one on impacts the development of practices within the organization. This research develops a framework using two theories consisting of the dynamic capabilities theory and contingency theory to explain the relationship between the variables.

In addition, the population in this research is the exporting businesses in Thailand, which were taken from the database of the Ministry of Commerce, Thailand on their website: https://www.moc.go.th. In this research, chief financial officers, managing directors, or accounting executives from each exporter are the key participants. The data were collected by means of questionnaire. Statistical techniques, which include descriptive analysis, factor analysis, variance inflation factors, correlation analysis, Confirmatory Factor Analysis (CFA), and analysis to test hypotheses, were conducted using Structural Equation Modeling (SEM).

Organization of the Dissertation

This research is organized into the following five chapters: Chapter I provide an overview and the motivation, the usefulness of Proactive Digital Accounting Support (PDAS), the purposes of the research, the research questions, the scope of the research, and the organization of this research. Chapter II includes a review of previous research and relevant literature detailing all constructs in the conceptual framework, the definition of each construct, and explains the relationship between the constructs with the support for the theoretical framework to be applied in this research to confirm all hypotheses in the empirical testing. Chapter III shows the research methods, including sample selection and data collection procedure, the variable measurements of all construct, including validity and reliability tests to measure the questionnaire, and the statistical techniques that were applied in this research. Chapter IV illustrates the descriptive statistics that reflect the characteristics of the exporting businesses in

Thailand. In addition, the analysis of the survey data is described and then based on testing the hypotheses using structural equation modeling. Finally, chapter V concludes the crucial findings of this research. It is divided into the discussion, conclusion, theoretical contribution, managerial contribution, limitations and future research.

CHAPTER II

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

The previous chapter describes the overview of the information with Proactive Digital Accounting Support (PDAS), 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 Proactive Digital Accounting Support (PDAS), which emphasizes the theoretical foundation, the conceptual framework, the relevant literature review, and the research hypothesis development. The core construct of the conceptual model of this research is the Proactive Digital Accounting Support (PDAS) phenomenon. This research provides empirical evidence that Proactive Digital Accounting Support (PDAS) may enhance firm sustainability with regards to the antecedents and the consequences of Proactive Digital Accounting Support (PDAS). Hence, endeavor to integrate theoretical perspectives that support how Proactive Digital Accounting Support (PDAS) affects firm sustainability. The core research is the Proactive Digital Accounting Support (PDAS) identified by dynamic capability theory and contingency theory. In an earlier overview of the literature, the role of the antecedents and the consequence of Proactive Digital Accounting Support (PDAS) are drawn. The literature review is intended to provide an understanding of the proposed conceptual framework's founding fields and develop the research hypotheses for testing.

The contents are divided into three sections: Section I introduce theories that back up the conceptual model of the research. Section II provides a literature review and hypotheses development. Section III presents the summary.

Theoretical Foundations

The theoretical foundation is the foundation from which all knowledge is constructed for a research study. It serves as the structure and support for the rationale for the study, the problem statement, the purpose, the significance, and the research questions. The theory is the foundation of research, which could also reflect available knowledge of current practices. It has long been recognized that theories have been used to provide a context-sensitive understanding of management accounting (Bromwich & Scapens, 2016).

This research attempts to determine three theoretical perspectives on how Proactive Digital Accounting Support affects firm sustainability. The three main theories promoting this research are dynamic capability, stakeholder, and contingency theories. Indeed, the dynamic capability theory is highlighted to introduce the relationship between Proactive Digital Accounting Support (PDAS) and the consequent variable and explains proactive culture as the moderating effect of Proactive Digital Accounting Support (PDAS) and its consequences. The stakeholder theory describes the relationship between digital accounting support consequences (business innovation effectiveness, modern product creativity, and organizational trust) and firm sustainability, including stakeholder awareness as the moderator effect of such relationships. Finally, the contingency theory describes the linkage among antecedents of Proactive Digital Accounting Support (PDAS) and has applied them to explain disruptive technology as the moderating effect between each antecedent and each dimension of Proactive Digital Accounting Support (PDAS). Therefore, each theory is described in the following.

Dynamic Capability Theory

The dynamic capability theory was initially introduced by D. Teece & Pisano (1994). The concept seeks to provide a coherent framework that integrates existing conceptual and empirical knowledge on sustainable competitive advantage (Kitenga &

Thuo-Kuria, 2014). D. J. Teece et al. (1997) refer to dynamic capabilities as the firm's ability to integrate, build and reconfigure internal and external capabilities to cope with the rapidly changing environment.

The dynamic capabilities can deploy, integrate, create, and configure new capabilities inside and outside the company to resolve the dynamically changing market (Gupta et al., 2019). At the same time, corporate sustainability is becoming a hot topic because of the ongoing changes in global governance (Park et al., 2021). Karman & Savanevičienė (2021) has highlighted the requiring for business sustainability in the face of technological advancements and increasing stakeholder expectations, which is necessary to reflect on organizational practices that will lead to sustainability through dynamic capabilities. Wu et al. (2014) stated that dynamic capabilities enable organizations to examine the emerging sustainability requirements of various stakeholders, seize sustainable development opportunities based on rapidly changing stakeholder expectations, and configure existing functional capabilities for firm sustainability. Hence, dynamic capabilities reflect the organization's ability to achieve competitive advantage and sustainability expectations of stakeholders by modifying and reconfiguring the existing functional capabilities for firm sustainability (Karman & Savanevičienė, 2021). Døving & Gooderham (2008) describe an example pertinent to firms' accountancy practices by considering a hypothetical company in equilibrium. This organization maintains revenue by producing and selling the same products simultaneously and to the same customers over time. The capabilities used in the stationary process are zero-level capabilities, which are the capabilities to earn a living at the moment. The company could not collect revenue from customers who allowed them to buy additional inputs and do the whole thing over again. By contrast, the capabilities to change the product, production process, scale, or customer (markets) it serves are not zero-level capabilities. New product development, as practiced by many companies, is the first prototypical example of dynamic capabilities. The winner in the global marketplace is a company that can demonstrate timely responses and velocity, and flexible product innovation, coupled with the ability to manage, coordinate, and

effectively deploy internal and external capabilities (D. J. Teece et al., 1997). There is no agreement on what must be understood as dynamic capabilities. The dynamic capabilities are the skill of a company to restructure resources and routines that are considered core competencies (Vargas-Hernández & Muratalla-Bautista, 2017). Lawson & Samson (2001) have highlighted the dynamic capabilities that support companies to improve profitability by managing a firm's capabilities, such as performance, quality, rapid, flexibility, Etc. in dynamic and uncertain environments. Given the need for rapid responsiveness of a firm to increasingly dynamically changing environments, Vogel & Güttel (2013) suggested that dynamic capabilities will naturally have a strategic relevance with companies to keep up with the competitive dynamics with the company's resource treasury's rapid response (Gupta et al., 2019).

Proactive Digital Accounting Support (PDAS) is a comprehensive set of firm abilities that enable firms and organizations to identify, evaluate, and select strategic projects, and combine their resources and capabilities to fortify and patronize innovative outcomes and may have effects on sustainable long-term. Therefore, Proactive Digital Accounting Support (PDAS) is regarded as an enterprise resource that none can make in a comprehensive or easily imitated manner (Rui Alexandre et al., 2015). Proactive Digital Accounting Support (PDAS) can be viewed as unique and resource-specific for one particular firm. It provides the firm with the ability to deploy the resources necessary that develop new products and operations to satisfy market demand and the sustainability expectations of stakeholders. Likewise, Proactive Digital Accounting Support (PDAS) is viewed as the intangible resource which creates an advantage for a marketplace pioneer position, leading to the sustainability of superior outcomes. The components of the sustainable superior outcome in this research are assessed by business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. As such, dynamic capability theory would be regarded as a distinct process that focuses on learning and change capabilities to relate Proactive Digital Accounting Support (PDAS) to business innovation

effectiveness, modern product creativity, organizational trust, and firm sustainability, including proactive culture and stakeholder awareness as a moderator variable.

Consequently, this research address theoretically how the PDAS is contingent upon the contingency variables of business innovation effectiveness, modern product creativity, organizational trust and firm sustainability.

Table 1 Summary of definitions of dynamic capability theory

Source	definitions
Teece et al. (1997); Teece & Pisano (1994)	The company's ability to integrate, build and reconfigure internal and external capabilities to cope with the rapidly changing environment.
Vogel & Güttel (2013)	Dynamic capabilities will naturally have a strategic relevance with companies to keep up with the competitive dynamics with the company's resource treasury's rapid response.
Wu et al. (2014)	Dynamic capabilities enable organizations to configure functional competencies to address and examine the emerging sustainability requirements of various stakeholders.
Gupta et al. (2019)	The ability to deploy, integrates, create, and configure new capabilities inside and outside the company to resolve the dynamically changing market.
Karman & Savanevičienė (2021)	Dynamic capabilities reflect the organization's ability to reconfigure competencies to achieve competitive advantage and corporate sustainability.

Stakeholder theory

The development of the stakeholder theory is based on Barnard's framework since 1938 in The Functions of the Executive, which presents a positive view of managers in advocating social and environmental responsibility. This theory states that

an organization should create value for all stakeholders, not just for the benefit of shareholders. Later, Freeman (1984) supported that executives must satisfy a wide range of people who influence the outcomes of the companies. Examples are employees, owners, investors, customers, suppliers, creditors, the local community, society, and the government. Therefore, the stakeholders are groups or individuals who may be affected and have a legitimate interest in operating the organization or business. Consistent with Post et al. (2002), a stakeholder is a person or group affected by organizational decisions, policies, and practices.

Stakeholder theory explains why a corporation tends to have good practices in economic, social, and environmental responsibility, while stakeholders are any person or entity that has a significant interest in the operations, activities, success, or failure of a business. This theory is the foundation of the social function of the organizations and the interdependent relationship between the economic, social, and environmental responsibility concepts (Uyar, 2018). This theory is the need to gain support from influential stakeholders to ensure that the organization can achieve sustainability (Žukauskas et al., 2018). In addition, one of the objectives of stakeholder theory is to keep ethics and economics in line long with achieving the organization's goals. It propels the firm to generate a competitive advantage and allows it to generate outstanding performance, determined in terms of its social, environmental, and economic metrics (Freeman et al., 2004). Likewise, Shim (2014) argues that stakeholder theory perspective, the organization exists not only for the benefit of shareholders but also for that of the employees, suppliers, and customers and to some extent, for the benefit of society. It promotes ethical business operation and focuses on firm sustainability by emphasizing creating a competitive advantage over its competitors and generating corporate social and environmental responsibility.

In the search for more significant competitive advantage and sustainable ways of doing business, business innovation, modern product creativity, and trust in the organization are bound to play a crucial role (Evans et al., 2017). Schaltegger & Wagner (2011) suggest that building a competitive advantage for sustainability requires

reconfiguring several business aspects, especially maintaining positive stakeholder relationships internally and externally by developing superior production processes, products and services.

This research examines the impacts of business innovation effectiveness, modern product creativity, and organizational trust on firm sustainability, including stakeholder awareness as a moderator variable.

Table 2 Summary of definitions of stakeholder theory

Source	definitions
Freeman (1984)	The organization must satisfy a wide range of people who influence the outcomes of the companies, such as employees, owners, investors, customers, suppliers, creditors, the local community, society, and the government.
Freeman et al. (2004)	Organizations need to demonstrate the value they created explicitly in doing business and build relationships and responsibility with stakeholders to deliver on their objectives.
Harrison et al. (2010)	Managing stakeholders by creating relationships and attending to the interests of those stakeholders can build competitive advantages to be corporate sustainability.
Argandoña (2011)	An organization should create value for all stakeholders, not just for the benefit of shareholders.
Harrison & Wicks (2013)	Businesses can only be considered successful when they deliver value to the majority of their stakeholders.
Harrison et al. (2015)	The organization must have honest, fair practices for all stakeholders and give generously.

Contingency theory

Austrian psychologist Fred Edward Fiedler introduced the Contingency theory in 1964. Fiedler (1964) concluded that there could be better approaches to the management practice of an organization. However, it depends on the different types and specifics of the firm. Similarly, Lim & Teoh (2019) suggest that the best way to organize depends on the nature of the environment in the organization must involve.

Contingency theory, in contrast to best-practice approaches, proposes that the effectiveness of companies stems from adjusting their management practice of organization to the specific circumstances (contingencies) in which the companies operate (Petera & Šoljaková, 2020). The critical principle of contingency theory is to design an optimal structure that best fits the given strategy and results in the best possible performance (Turner et al., 2017). The concept of a contingency theory of management accounting began to develop in the 1970s in an attempt to explain the varieties of management accounting practices that were apparent at that time to codify which forms of the organizational structure were most appropriate to specific circumstances (Otley, 2016). Contingency theory has been used in most of the studies that deal with management accounting, concluding that factors that originate from the internal environment of the company and the external environment affect the use of management accounting practices (Pavlatos & Kostakis, 2018). Furthermore, contingency theory posits that there is no single best-fitting control system or best way. Thus, the properties of the organization of management accounting practice need to be adjusted to internal and external contextual factors to be successful (Günther & Gäbler, 2014). Likewise, management accounting is considered efficient in adapting to an organization's environment of internal and external changes (Jaafar et al., 2019). Also, the design of an organization relies on the entity's technology and environment, and the effectiveness of managerial procedures is a widespread view of contingency theory (Kumarasinghe & Haleem, 2020). The premise within contingency perspectives is that organizational contexts follow a trajectory that overarches the particularity of enterprise characteristics whereby technological, market, strategic, and other contextual variables

exhibit replicating interdependencies in relation to organizational structuring, underpinning management accounting practice changes (Bhimani, 2020) . The fundamental principles of contingency theory hold that company performance causes an appropriate fit between the Proactive Digital Accounting Support and contingency factors. Hence, it is extrapolated that high-performing and low-performing companies exist due to more or less compatible combinations of Proactive Digital Accounting Support and contingency factors (Kalkhouran et al., 2017).

Therefore, this research uses the contingency theory to examine the effectiveness of the antecedent variable, namely ambidextrous top management, technological innovation, and market competition pressures, including disruptive technology as a moderator variable, which can enhance Proactive Digital Accounting Support (PDAS) success.

Table 3 Summary of definitions of contingency theory

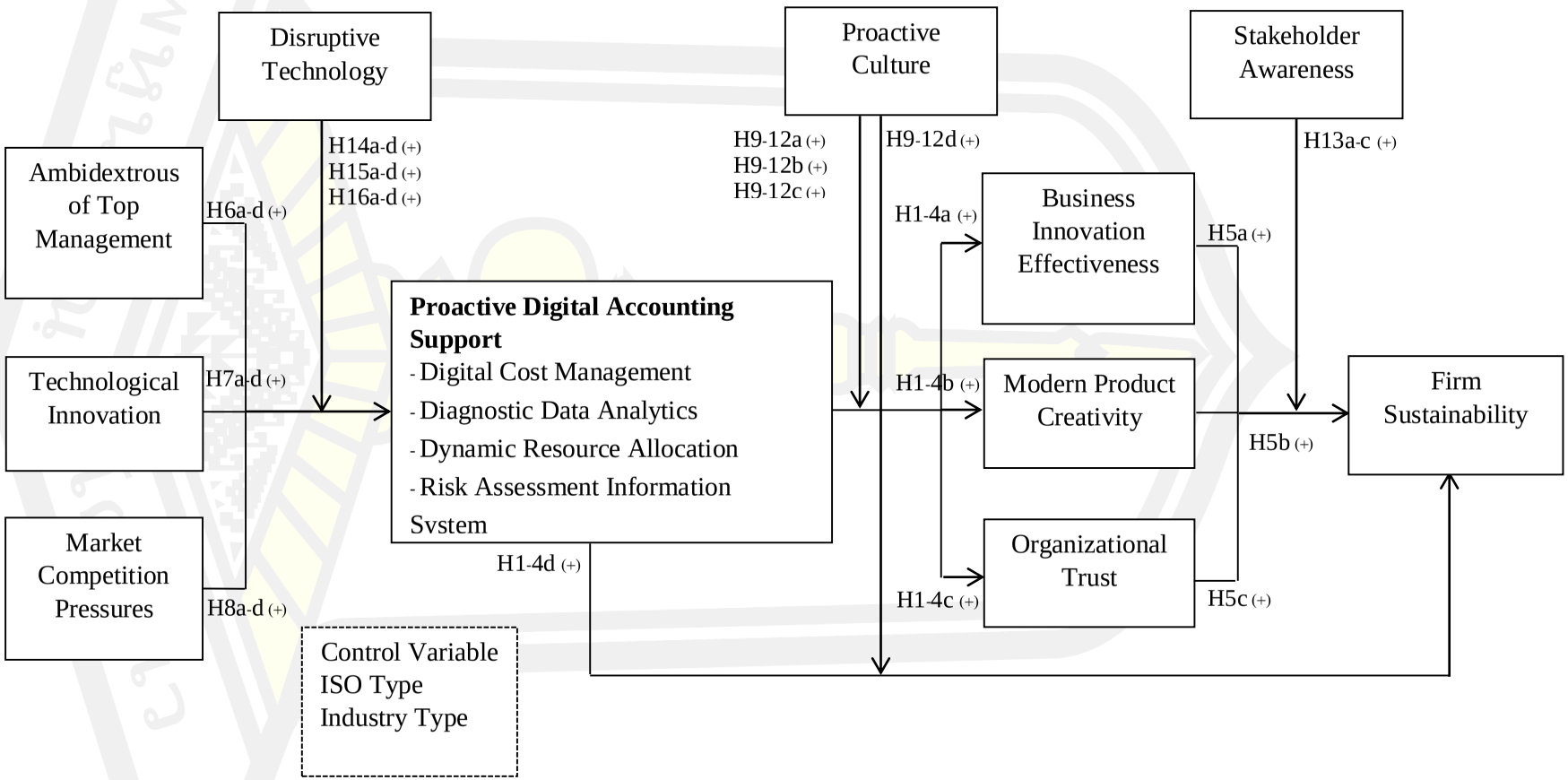
Source	definitions
Fiedler (1964)	There could not be the best approach for the management practice of an organization, but it depends on the different types and specifics of the firm.
Lim & Teoh (2019)	The best way to organize depends on the nature of the environment in which the organization must involve.
Petera & Šoljaková (2020)	The effectiveness of companies stems from adjusting their management practice to the specific circumstances (contingencies) in which the organization operate.
Turner et al. (2017)	The critical principle of contingency theory is to design an optimal structure that best fits the given strategy and results in the best possible performance.
Pavlatos & Kostakis (2018)	The factors that originate from the company's internal and external environment affect management accounting practices.

Relevant Literature Reviews and Research Hypotheses Development

This section demonstrates the literature review that is relevant to the conceptual framework. According to the theoretical foundations, this is developed toward integrating the dynamic capability theory and contingency theory. Proactive Digital Accounting Support is the primary variable and the center of this research. In order to understand all relationships, the literature review is divided into four sections.

Firstly, as described earlier, this research proposes that four dimensions of Proactive Digital Accounting Support are positively and directly associated with firm sustainability. Secondly, business innovation effectiveness, modern product creativity, and organizational trust are supposed to affect firm sustainability positively. Thirdly, the antecedents of Proactive Digital Accounting Support are composed of ambidextrous top management, technological innovation, and market competition pressures that are investigated and are expected to affect positive relationships. Fourthly, this research also determines that the strength of proactive culture increases the relationships between Proactive Digital Accounting Support and its consequences. Moreover, including stakeholder awareness increases the relationships between Proactive Digital Accounting Support consequences (business innovation effectiveness, modern product creativity, and organizational trust) and firm sustainability. Similarly, disruptive technology is expected to strengthen the relationship between Proactive Digital Accounting Support and antecedents. The entire conceptual model is illustrated in Figure 1 as follows.

Figure 1 Conceptual model of the Effect of Proactive Digital Accounting Support on Firm Sustainability of Exporting Business in Thailand



Proactive Digital Accounting Support

Currently, the ever-increasing and higher level of competitive pressures make the process operate of entities in organizations forced to seek effective methods to manage their competitive advantage, including financial and non- financial performance, to lead firm sustainability, and increase the value for stakeholders (Gliaubicas & Kanapickiene, 2015).

Accounting is a crucial and core part of a company's success (Kruskopf et al., 2020). In particular, managerial accounting can provide helpful financial information for planning, controlling, and making economic decisions (Sunarni, 2013). Forty years ago, Simmonds (1981) promoted the SMA as a tool to align accounting with strategy. After that, many accounting scholars have provided a considerable theoretical contribution to the literature on the topic. It makes management accounting practices the primary tool that provides relevant information pertinent, precise, and timely to various aspects of an organization's decision-making needs, leading to a competitive advantage that affects the survival and sustainability of the organization. New management accounting practices have emerged in recent decades to meet the changing economic environment challenges. Today, there are further changes as the world moves into the digital age, causing the accounting field to enter the fully digital age (Kruskopf et al., 2020). It is called upon to change managerial accounting practice in response to changing conditions by combining traditional practices with digital technology (Möller et al., 2020). In the finance function, digital technologies have resulted in the robotic automation of routine processes, the introduction of business intelligence, and data analytics applications. It enables various new forms of cooperation between companies, suppliers, customers, and employees, leading to new product and service offerings.

The Chartered Global Management Accountant (CGMA) recently introduced what firms need to adapt and thrive during digital transformation to match the current environment and circumstances. Including updated management accountants' competencies, significant costing, data analysis, forecasting, allocation and

provisioning of resources, and risk management. This result leads to proactive digital accounting.

Proactive digital accounting involves provision, analysis, and present forward-looking information for goals of the potential future relying on the information received from the past, and that is being experienced in the present, with the conceptual framework focuses on future events, emphasizes a mission that operates quickly, cost-effective, and high-quality for executive decision-making support. Research definition, the Proactive Digital Accounting Support is the ability of firms to provision and analysis of management accounting and finance data related to a business and competitors in electronic form through the adoption of digital technology to achieve the organization's objectives in four dimensions consisting of digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system. To generate new knowledge, proactive digital accounting is a management accounting practice that can support financial information to guide management decisions in driving the organization's success, survival, and sustainability. CGMA (2019) states that the role of proactive digital accounting can communicate with both internal and external stakeholders about considering the social impact the organization has on building its business sustainability model. Also, proactive digital accounting increases productivity and saves both cost and operational time (Kruskopf et al., 2020), leads to business innovation effectiveness, can deliver modern products/ services creativity, and creates trust between companies, suppliers, customers, and employees (Möller et al., 2020).

According to Nixon et al. (2011), management accounting practices, such as investment appraisal, risk management, cost and value management, and performance measurement, support the changes in the modern product creative management process innovation where management accounting is involved before these projects begin. CIMA (2019) introduced cost management methodology by applying activity-based management (ABM), target costing, value chain analysis, and life cycle costing to manage costs, improve profitability, and improve value creation. One of the reasons for

calculating costs is to enable organizations to manage and possibly transform their costs, which has become very important in the digital world. Digital cost management leads to cost transformation, quality management, and value creation of the product/service, and has the potential to deliver increasing savings in much less time and the ability to be implemented more quickly, giving the organizations with a cost advantage, which are priorities for organizations facing intense competition (Aguilar & Ittner, 2018). Also, analyzing big data using diagnostic techniques to predict future probabilities and trends in the market will be necessary for decision-making support (Gupta et al., 2019). In particular, dynamic resource allocation is necessary for support business strategic making decisions to create competitive advantage and actions to the sustainability of businesses (Maritan & Lee, 2017). Moreover, if an enterprise can effectively use the risk assessment information system, the business's economic success will increase significantly, able to create the firms' competitive advantage and performance (Saeidi et al., 2019; Uyar, 2018). Zhenkun Wang et al. (2020) argued that risk assessment information systems (by Big Data Analytics methods) could extract useful information in the process of enterprise risk management, and systematically show the logic between the data, and pay attention to the indicators with a higher risk in advance to support effective decision making for users.

Therefore, proactive digital accounting is very important for supporting managers' decision-making to effective and successful management at all levels, including business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability because the primary focus of Proactive Digital Accounting Support is to improve the organization's performance by providing relevant information for planning, controlling, and economic decision making as well as social and environmental. Kumarasiri (2012) suggested that to improve social and environmental performance along with gaining economic benefits. Hence, companies need to have appropriate management accounting practices that can integrate social and environmental information into their business strategies as well as provide relevant information for management decisions. Likewise, Harris et al. (2019) reveal that

management accounting practice has played a significant role in strategic sustainability orientation as management accounting techniques may deliver better information for steering an organization's functioning and decision- making processes relating to sustainability issues. According to Ibrahim Mahmood Al-Nuaimi et al. (2017) state that the practice of proactive accounting proffers the ability to disseminate timely and accurate information, resulting in improved managerial and employee decision-making process and its impact on firm performance. The management accounting tools could also help managers develop and monitor organizational activities, supporting the potential benefits of business innovation effectiveness (Lopez-Valeiras et al., 2015). Besides, management accounting tools can give managers information regarding changes in the market, consumer demand, and competitor activities, lead to accelerate modern product creativity and make a company's products enter the market, a timely (Tsai et al., 2020). Therefore, from a literature review, the Proactive Digital Accounting Support focuses on four dimensions: 1) digital cost management, 2) diagnostic data analytics, 3) dynamic resource allocation, and 4) risk assessment information system.

This research integrates the definition of proactive digital accounting and previous research, which develops four dimensions of Proactive Digital Accounting Support; digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system. Each dimension of Proactive Digital Accounting Support above can be clearly explained in the next section.

Table 4 Summary of definitions of proactive digital accounting

Source	Definitions
Deshmukh (2005)	The changes in accounting due to computing and networking technology and the representation of accounting information in the digital format, which can then be electronically manipulated and transmitted.
Bhimani & Willcocks (2014)	Digital accounting is activation with advanced technologies which are affect the potential and increasing roles for the finance function and for management accounting information provision in change the speed of operational processes.
Duong & Fledsberg (2019)	Digital accounting is the transformation manual to automated accounting systems, which has expanded the capabilities of accountants to a business partners.
Gbadegeshin (2019)	The provision and management of information, various assessments, and formal activities, the creation of big data, and activity of process become routine.
Heinzelmann (2019)	Digital accounting is the organization of data using the digital technologies has led to new configurations of management accounting and associated practices.
Lehner et al. (2019)	The digitalization and automatization of accounting processes based on emerging technologies.
Pavlykivska & Marushchak (2019)	The using digital technology tools to in simplifying the accounting process and to perform its functions in the most efficiency, its can transformation and transmission of information with aim of making the effective management decisions.

Table 4 Summary of definitions of proactive digital accounting (continued)

Source	Definitions
Shumeyko et al. (2019)	The use of digital technology to conduct financial, managerial, tax, strategic, transactional, and other types of accounting simultaneously in an electronic format.
Esmeray & Esmeray (2020)	The conducting all accounting transactions in an electronic form instead of using papers through changing technology.
Kruskopf et al. (2020)	The converting information from analog to digital format to organize, process, and evaluate financial data by machines such data analytics, automation and artificial intelligence (AI), including machine learning.
Möller et al. (2020)	The use of digital technology to transform a routine processes into automation and robotization, has resulted on management accounting practices and the finance function change.
Leitner-Hanetseder et al. (2021)	The use of digital technology driven to automatise work processes in accounting as well as create complex data fast and accuracy that can access actual real-time data.

Table 5 Summary of Key Literature Reviews on Proactive Digital Accounting

Source	Title	Conclusion
Dimitriu & Matei (2014)	A New Paradigm for Accounting through Cloud Computing	Advances in technology are shifting traditional accounting paradigms towards digital accounting. The new manner of designing, managing and providing financial packages introduces accounting in the digital era. Digitalization is Inevitable for most businesses and organizations should do their best to explore all opportunities and learn from the continuously changing environment.
Al Lami et al. (2019)	Management accounting information usefulness and cloud computing qualities among small-to medium enterprises	The effective and efficient of management accounting information (MAI) is a result of the related to digital technology adoption. MAI have a significance in managerial work, including how they can relate information choices to the business environment, specifically the role of cloud computing can be considered as important, could improve the knowledge of SME managers on the significance of digital technology. SMEs in Malaysia can benefit from cloud computing through the reduction of operating costs related to new technology adoption.

Table 5 Summary of Key Literature Reviews on Proactive Digital Accounting (Continued)

Source	Title	Conclusion
Duong & Fledsberg (2019)	Digitalization of the Accounting Industry	The participants have a limited understanding of the digitalization, and most of the companies are in the early stage of digitalization, which showed that they experience with how to make use of the new technological possibilities that come along with digitalization.
Shumeyko et al. (2019)	Informational platform of the digital accounting	The transition to digital technology is imperative in the global economy system. Digital accounting allows to organize solutions to the complex of management accounting tasks reliably and just in time, including the preparation of accounting for qualitative characteristics and analytical indicators on the basis of the right decision-making on the management of the organizations.
Bhimani (2020)	Digital data and management accounting: why we need to rethink research methods	Digitization has led to massive data growth both from informal structures, from management information systems producing and processing economic, and structured and unstructured data. Thus, the digitization of management accounting gives any organization gain access to greater depth, breadth, and variety of data.

Table 5 Summary of Key Literature Reviews on Proactive Digital Accounting (Continued)

Source	Title	Conclusion
Kruskopf et al. (2020)	Digital Accounting and the Human Factor: Theory and Practice	With continuous digitization and innovation, it impacts the accounting field especially robotics and artificial intelligence (AI) are at the center of transformation. Therefore, any organization is imperative and inevitable will need to adapt to change and prepare for a different future with new technologies that will improve their business.
Maelah et al. (2020)	Management accounting information usefulness and cloud computing qualities among small-to medium enterprises	In digitization, management accounting information, both financial and non-financial data, can benefit from cloud computing in planning, organizing, controlling, and decision-making and how to associate a selection of information to the business environment.
Sánchez et al. (2020)	Activity-based costing in smart and connected products production enterprises	The implementing of an activity-based costing (ABC) system to provide relevant cost information for organizations requires a digital technology for operating and monitoring it throughout its life. Basically, the cost estimation of activities related to data analytics and products' inspection is used as a reference to forecast future costs over the lifetime of the product.

Table 5 Summary of Key Literature Reviews on Proactive Digital Accounting (Continued)

Source	Title	Conclusion
Leitner-Hanetseder et al. (2021)	A profession in transition: actors, tasks and roles in AI-based accounting	Digital technology (AI-based) will be effective in a major change in the tasks and skills for existing professional occupations in the broader accounting context, some will not be performed by humans but by AI-based technology.

Firm Sustainability

Firm sustainability is becoming more important for all companies because it has linked to financial performance and can reflect that the business has good corporate governance and is managed with transparency, manage risk effectively taking into account the stakeholders, have competitive potential (The Stock Exchange of Thailand, 2021).

Firm sustainability can be viewed as a business approach that creates long-term value for owners/shareholders. However, profitability maximum ceases to be the sole criterion when companies are under pressure from economic, environmental, and social legislation and conditions of consumers, suppliers, and government policy (Kocmanova et al., 2017). Moreover, this today, it is impossible to create long-term value for organizations without considering ethical, social, environmental, and economic perspectives. In general, an organization's profitability and growth are essential for sustainability, but it is not just this. Instead, organizations should pursue sustainable development under the three pillars of corporate sustainability: economic, social, and environmental (Gil & Montoya, 2021). Likewise, firm sustainability revolves around responsible economic, social, and environmental management and must also ensure long-term value for stakeholders (Zenya & Nystad, 2018).

Fundamentally, the firm sustainability concept refers to the organization's goals to meet current stakeholder needs without compromising the ability to meet future stakeholder needs (Dyllick & Hockerts, 2002). This concept suggests that the corporate growth and profitability of the organization are essential; at the same time, if the business is to operate sustainably, it needs to have social and environmental goals related to sustainable development as well (Camilleri, 2017). According to Goyal et al. (2013), firm sustainability refers to the implementation of business strategies and activities that meet the needs of today's organizations and stakeholders meanwhile protecting, preserving, and empowering the human and natural resources that will be required in the future. However, the sustainability of businesses in the digital age may require new practices for business in the twenty-first century, which provides challenges and opportunities for companies that need new approaches and capabilities and organizational adaptation. From a literature review, Proactive Digital Accounting Support (PDAS) is a new practice of management accounting that reflects effective operation leading to firm sustainability. While the key factors that create a competitive advantage and contribute to sustainable business are business innovation effectiveness, modern product creativity, and organizational trust. These factors result in (1) resource management and utilization to get maximum efficiency (business innovation effectiveness) by using innovations to improve production processes that ensure quality products/services and the least waste generation, (2) make a difference in a product/service (modern product creativity) by providing products to meet consumer needs continuously, and (3) could maintain business competitiveness (organization trust) because trust is fundamental to drive a business strategy to achieve a specific set of goals. It will ultimately help in improving profitability and firm sustainability.

In summary, firm sustainability involves balancing economic, social, and environmental objectives. Therefore, this research defines firm sustainability as the firm's outcomes from its actions, which can keep its business activities feasible in the long term and achieve economic, social, and environmental objectives and goals (Parida & Wincent, 2019).

The firm sustainability framework, which is widely accepted and adopted, including in Thailand, is the Global Reporting Initiative (GRI) and Dow Jones Sustainability Indices (DJSI) (Corporate Social Responsibility Institute, 2018). However, the firm sustainability assessment framework in this research was developed from the concept of corporate management to sustainability that integrates environmental social and corporate governance (Environmental Social and Governance: ESG) into the business process to make the business sustainable in the long-term, as well as to create a positive impact on society, environment, and stakeholders, under the international standard guidelines by the Stock Exchange of Thailand, which is suitable for exporting business in Thailand (The Stock Exchange of Thailand, 2017).

The Effects of Each Dimension of Proactive Digital Accounting Support on Its Consequences

This section illustrates the examination of the effects of each dimension of Proactive Digital Accounting Support consisting of digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system; and four critical consequences, which are business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability as shown in Figure 2.

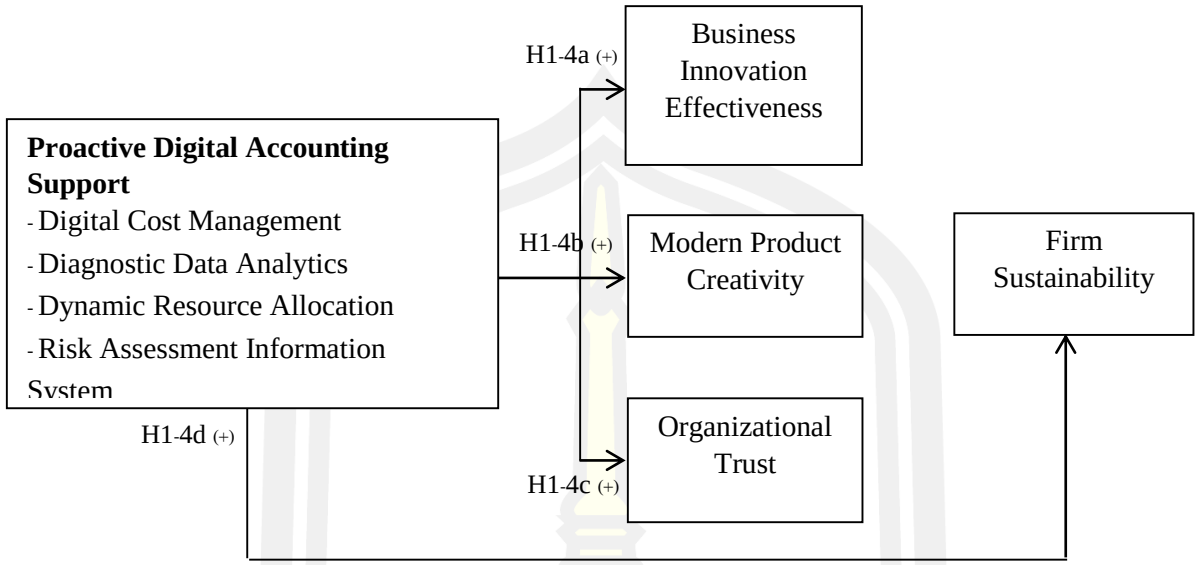


Figure 2 Effects of Proactive Digital Accounting Support on Its Consequences

Digital Cost Management

With the rapid changes and successive developments that have accompanied the creative destruction era, the business environment is faced with many challenges, including growing intense competition. One crucial problem is the high-cost products and low-quality of products. Assurance of competitive advantage is based on managers' decision-making process by formulating management policies based on modern business strategies and using modern cost tactics concepts (Al_Bdairi et al., 2020). Moreover, the creation of products and manufacturing processes has to be environmentally conscious because of pressures on economic development and environmental protection (Stavropoulos et al., 2018). Cost management efforts have focused on defensive actions in response to cost pressures. Nevertheless, in the face of rapidly changing global business environments, companies are increasingly taking more proactive approaches that emphasize appropriate cost management with the changing environment as a strategic lever to help fund growth and achieve sustainable profitability through structural cost efficiencies and improvements (Aguilar & Ittner, 2018). The costing function is a vital stakeholder of competitiveness. It must be able to respond to the demand of internal customers with ever greater precision and shorter

response times (Falahat et al., 2020). Aguilar & Ittner (2018) suggests that the emerging digital era makes new information sources and technologies even more critical to effective strategic cost management. Digital sources provide more significant volumes of structured and unstructured data with more incredible speed than ever before. Therefore, organizations should adopt digital technology and seek methods to increase operational efficiency.

In this research, digital cost management refers to a company's ability to use costing techniques to manage cost, quality and create value for different purposes such as activity-based management (ABM), value chain analysis, life-cycle costing, target costing through the use of digital technology is used to assist in the data analysis to obtaining the cost information of products/services suitable for the specific objectives of the organization (CIMA, 2019; Kanoa & Sorour, 2020). It is believed that the availability and accessibility, and advancement of information technology enhance the implementation of sophisticated costing techniques. Study results of Ibrahim Mahmood Al-Nuaimi et al. (2017) empirically show a significant relationship between digital technology, costing technique implementation, and firm performance, which is expected that digital technology to facilitate the successful adoption of the costing technique. Likewise, the results of Ramli et al. (2019) revealed that the success of the implementation of costing techniques was significantly influenced by digital technology, which the findings put forth to an organization aware of the key factors to consider in ensuring costing techniques implementation success, which in turn can enhance excellent operational processes and firm performance. Therefore digital cost management is essential to support cost information to manage costs, improve profitability, and improve value creation, leading to efficiency and effectiveness in operation and increasing the profitability of the organization. According to Kumar & Nagpal (2011) argued that cost management needs to include all aspects of the production process and delivering the product, which should be inherent to each stage of a product's life cycle, such as during the development, manufacturing, distribution and service life of a product. So, cost management is indispensable in introducing

modern products that meet customers' demands at the lowest cost and reduce the costs of existing products by eliminating waste. Digital cost management led to efficiently managing costs for process innovation (business innovation) based on an organizational structure. Several scholars suggest that well-defined strategic costing priorities support the success of modern product creativity, so companies that use cost tactics that are more suited to their characteristics will have a competitive advantage over companies that cannot do so (Morales Cueva, 2016). Similarly, Askarany et al. (2007) found that Digital cost management is associated with implementing business innovation. Efficient cost management related to cost control functions shows the need and opportunity to step up as a business sustainability tool. Such as waste reduction shows how well resources are used during the production process, including the cost of modern products. The fewer resources used, the more sustainable it becomes and will lead to business sustainability (Nită & Ştefea, 2014). On the one hand, Chwastyk & Kołosowski (2014) argues that organizations cannot plan for future costs management by relying solely on digital technologies because the accuracy of cost prediction depends on the accuracy of the information, level of knowledge, and the number and quality of information increases with the progress of the project.

Besides, digital cost management is a practice that harnesses the power of digital technologies to increase operational efficiency and effectiveness, especially the ability to be implemented more quickly, which enables any company to achieve more savings in much less time. Therefore, developing an effective practice is essential for creating a sustainable work environment that would further boost the growth of the organization (Kulkarni et al., 2020). It is also a developing the employee's role to establish the foundations of job security and foster capacity-building and participation in support of information to decision-making in the organization, which is the source of organizational trust (Jasim et al., 2019). However, Erokhin et al. (2019) point out that companies that focus on achieving immediate and direct results on profitability tend to give up on proactive sustainability-oriented cost management tools. Instead, they tend to employ less-sophisticated short-term management accounting instruments. While

Bendickson et al. (2017) argue that start-up new practice operations in the digital era to achieve success is often unclear for several reasons, such as organizations may lack focus on developing skill sets of employees related to innovation or a lack of effective communication for them to understand "what needs to be done" let to goal.

In summary, based on the literature reviewed above, digital cost management has the potential possibility to provide greater business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability.

Hence, the hypotheses are proposed as follows:

Hypothesis 1a: The higher the digital cost management of the proactive digital accounting is the more likely that the firm will achieve greater business innovation effectiveness.

Hypothesis 1b: The higher the digital cost management of the proactive digital accounting is the more likely that the firm will achieve greater modern product creativity.

Hypothesis 1c: The higher the digital cost management of the proactive digital accounting is the more likely that the firm will achieve greater organizational trust.

Hypothesis 1d: The higher the digital cost management of the proactive digital accounting is the more likely that the firm will achieve greater firm sustainability.

Diagnostic Data Analytics

Big data analytics for business are now influencing almost every aspect of a major company's decision-making, strategic analysis, and forecasts. Big data analytics for businesses are practice ubiquitous for the organization that wants to remain competitive (Appelbaum et al., 2017). Big data analytics are an opportunity to use new types of data to create more agile businesses to solve previously considered unsolvable problems, which will lead to better business results. This will lead to radical changes in

business operations that change from the use of a model-based mainly on the experience of decision-makers to an information model that gives real value to the business and organization itself (Oncioiu et al., 2019). Big data analytics (BDA) can add value and provide a new perspective by diagnostic data analytics. Diagnostic data analytics is a form of analysis conducted by leveraging artificial intelligence (AI) and machine learning to combine the insights generated to predict future behaviors is an opportunity to use new types of data to create more agile businesses and achieve timely, accurate results (Oncioiu et al., 2019). Gupta et al. (2019) highlight that analyzing big data using diagnostic techniques to predict future probabilities and trends in the market will be necessary for decision-making support. Also, big data analytics (BDA) with diagnostic analytics not only improves overall reliability, but also improves company efficiency.

In this research, diagnostic data analytics refers to the use of historical information provided by management accounting accumulated over time to analyze current marketing events and compute probable future events by techniques such as data mining, machine learning, artificial intelligence, Etc., regarding behaviors or practices of competitors, customers, and suppliers in an ethically and lawfully manner to lead strategic decision-making (Appelbaum et al., 2017; Köseoglu et al., 2020). According to Lozada et al. (2019), diagnostic data analysis has become an everyday process for companies, aiming to strengthen the decision-making process to add value for the organization, especially regarding its impact on the business innovation process and modern product/service processes. Their study results yield empirical evidence that diagnostic data analysis positively influences the business innovation process and the creation of modern product/service processes. Likewise, Urbinati et al. (2019) indicate that one of the benefits of diagnostic data analytics is the cost-effectiveness gained in product design and new product development (modern product), including creating opportunities for business innovation activities. The findings ensuing from the empirical analysis by Urbinati et al. (2019) showed that diagnostic data analytics results are essential for business innovation, new products and services, and quality management.

On the other hand, Mikalef & Krogstie (2018) suggest that the importance of diagnostic data analytics varies under different contextual factors, such as organizational goals, since goals directly influence the business process management practices and resources most suitable. Similarly, B. Sun & Liu (2021) argue that organizations that lack appropriate diagnostic data analytic technology capability may fail to identify and utilize new knowledge embedded in the connectivity and compatibility of big data to increase the knowledge benefits of product novelty design and provides flexible platform development.

However, digital technology is driving transformation in employee productivity and the future business environment that significantly impacts organizations (AbRahman et al., 2016). The rise of modern information technology has required organization need to strengthen the skills of their employees to keep pace with advances in technology, from basic digital technology through to a deeper expertise in cloud computing, cyber-security, data analytics and digital cost management (CGMA, 2019) , through leverage the opportunities provided by the digital information revolution, for the organization's operating performance and competitive advantage (Brands & Holtzblatt, 2015). Therefore, practices of diagnostic data analytics would provide directions to employees to operate for the organization's competitive advantage and survival (Kulkarni et al., 2020). The results of AbRahman et al. (2016) revealed that the usefulness of management accounting practices in the company improved employee accountability and firm performance. Diagnostic data analytics is becoming a prevalent concept in academia and industry. It has become a promising tool for supporting the competitive advantages of firms by enhancing data-driven performance. However, the scarcity of resources on a worldwide level has forced firms to consider sustainable-based performance as a critical issue. According to study results at Raut et al. (2019) shows that diagnostic data analysis (regarding the internal business process, behaviors or practices of competitors, customers, and suppliers) have a significant influence on sustainability practices. However, Oncioiu et al. (2019) argue that the main reason why a company's diagnostic analytics for sustainability failing is the difficulty of analyzing

large volumes of data to achieve timely, accurate results because to a lack of investment in training and human resource development for extensive data analytics needed as well as the acceptance and use of new technologies within an organization. While, Ramadan et al. (2020) confirms that diagnostic data analytics has a significant effect on firm sustainability via business innovation.

In summary, based on the literature reviewed above, diagnostic data analytics has the potential possibility to provide greater business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability.

Hence, the hypotheses are proposed as follows:

Hypothesis 2a: The higher the diagnostic data analytics of the proactive digital accounting is the more likely that the firm will achieve greater business innovation effectiveness.

Hypothesis 2b: The higher the diagnostic data analytics of the proactive digital accounting is the more likely that the firm will achieve greater modern product creativity.

Hypothesis 2c: The higher the diagnostic data analytics of the proactive digital accounting is the more likely that the firm will achieve greater organizational trust.

Hypothesis 2d: The higher the diagnostic data analytics of the proactive digital accounting is the more likely that the firm will achieve greater firm sustainability.

Dynamic Resource Allocation

Resource allocation plays a pivotal role in determining organizational changes towards international growth. It could deliver sustainable competitive advantages and operational efficiency (H. Chen & Hsu, 2010). The decisions that must be made to ensure efficient resource allocation require various information that only management accounting can make available to managers (Carmen & Corina, 2009). Resources are

considered to be the assets that can be applied with the main aim of managing productivity and performance. In contrast, resource allocation is majored on ensuring that the available resources are assigned in a more effective and efficient way to ensure that the organizational goals and objectives are achieved accordingly (Gitau et al., 2020). For enacting business processes, resources (including human, financial, and physical resources) are indispensable. Given that many resources are cost-intensive and limited, the main challenge for efficient process execution is to find a perfect balance between having enough resources available at all times to execute processes without delays and not having too many available resources under-utilized (Ihde et al., 2019). Moreover, in a dynamic environment, the organization's resource allocation needs to be able to change mission operations from moment to moment because dynamic situations and change rapidly, such as consumer demand for goods and services, government policy, therefore the organizations must be able to flexibly and effectively react to events of not prepared or planned in advance events (Hansen et al., 2012). However, because the resources should be made available to the end-user with minimal management and an efficient resource allocation mechanism has to be adopted in a way to avoid the situations of over-provisioning and under-provisioning, resource allocation on cloud computing is one of the essential utilities in the present era of the technological world, allowing organizations to access over the internet (Asha & Rao, 2013). Resource allocation on cloud computing provides firms extensive facilities and capabilities to share and transfer data and processes of organizations inside and outside, and with its predictive ability, may help to resolve high uncertainties and gain more competitive advantages than other competitors in the dynamically changing market (Gupta et al., 2019). The same as Belgacem et al. (2020) and Pandya & Bheda (2014) stated that dynamic resource allocation is a good feature of the cloud computing environment.

In this research, dynamic resource allocation refers to the ability of companies to allocate financial, information technology infrastructure, and human resources efficiently to attain the firm's growth and development as well as access to on-going

processes and can be adjusted to match strategy quickly and just in time (Hamdar, 2020; Maritan & Lee, 2017).

Gupta et al. (2019) highlighted that dynamic resource allocation could support enterprises to improve profits by managing a firm's capabilities in a dynamic and uncertain environment, with the need for the rapid response of the firm's resource stock to increasingly dynamically changing environments. In addition, proper dynamic resource allocation can promote unique skills in employees that accord with the attainment of a sustainable competitive advantage and maintain sustainability for the organization (Elrehail et al., 2020). Gitau et al. (2020) believed dynamic resource allocation could help managers identify the presence of employees in a particular task, help managers in managing the workload of their employees, which the manager will be able to check the task list of the employees and know who is having more than adequate tasks and those who have been undersigned. This will help give the employees motivation to improve their productivity because they will not feel overworked, and leading to organizational trust. Güllü et al. (2018) highlight that as the motivation of employees increased, organizational trust increased as well. More recently, the study by Al-Aali (2021) found that dynamic resource allocation has a significant and positive effect on employee trust in an organization. They suggest that new creative resource allocation practices are important to manufacturing companies. Additionally, organizations should be designing or changing dynamic resource allocation practices, and surveys should be performed among employees regularly to setting their satisfaction concerning existing practices. Accordingly, a plausible explanation can be inferred that dynamic resource allocation reflects achieving job security and empowering employees, meanwhile, reflects the employees' organizational trust (Jasim et al., 2019).

In today's fast-moving markets, modern product launches may also cause a more likely failure than succeed. However, competitive pressure requires firms to continue investing in modern product projects, as it can help to drive sales and profits (Klingebiel & Rammer, 2014). Meanwhile, any organization tries to apply process innovation to

help make the production process more efficient, such reduce action times, reduce waste levels and production costs, including improved product design and quality, to gain a competitive advantage and achieve sustainability (Sapsanguanboon & Auanguai, 2020). Recently, Klingebiel & Rammer (2014) examined resource allocation strategies on process innovation performance and new products. Their study empirically showed that the resource allocation strategy affects process innovation (business innovation) performance, and allocating resources strategy is most excellent for firms to create relatively novel products. Likewise, Zhao et al. (2021) argue that dynamic resource allocation is an essential aspect of successful modern product development. In addition, proper resource allocation can contribute to the firm sustainability (Moizer & Tracey, 2010).

Resource allocation investments are intended to improve organizational efficiency and effectiveness, both financial and non-financial indicators, ultimately. For business initiatives, the implementations of resource allocation may enable economies of scale, which in turn avoid creating additional headcount costs and general, selling, and administrative costs. Hunton et al. (2003) stated that resource allocation might result in product reliability, customer service, and knowledge management in crucial business areas. Kallunki et al. (2011) have extended existing research on resource allocation systems by exploring the effects of resource allocation adoption on the subsequent financial and non-financial performance of a firm. Their results show that resource allocation results in improved firm performance in the long run, which helps firms, achieve sustainable performance goals. In addition, Gitau et al. (2020) examined the influence of organizational resource allocation on organizational performance under a dynamic business environment. Their results showed that resource allocation had a positive and significant effect on organizational sustainability. On the one hand, Huang et al. (2019) suggest that companies must clearly understand their existing resources and have a more robust understanding of dynamic resource allocation, especially investing in integrated information system tools for resource allocation in a dynamic environment for leading to sustainability.

In summary, based on the literature reviewed above, dynamic resource allocation has the potential possibility to provide greater business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. Hence, the hypotheses are proposed as follows:

Hypothesis 3a: The higher the dynamic resource allocation of the proactive digital accounting is the more likely that the firm will achieve greater business innovation effectiveness.

Hypothesis 3b: The higher the dynamic resource allocation of the proactive digital accounting is the more likely that the firm will achieve greater modern product creativity.

Hypothesis 3c: The higher the dynamic resource allocation of the proactive digital accounting is the more likely that the firm will achieve greater organizational trust.

Hypothesis 3d: The higher the dynamic resource allocation of the proactive digital accounting is the more likely that the firm will achieve greater firm sustainability.

Risk Assessment Information System

Risk assessment is one of the elements of risk management as the concept of COSO Enterprise Risk Management. Risk assessment is the process of assessing the probabilities and consequences of risk events, and it allows any organization for the systematic evaluation and prioritization of risks in terms of expected likelihood of occurrence and the potential result if and when the risk event occurs. In addition, the risk assessment helps for the identification, sourcing, and measurement of critical business risks and providing additional decision support risk information for the manager in positioning the organization to master its risks and ultimately create value, that is, risk management (Garvey, 2008). Therefore, the success of an Enterprise Risk Management (ERM) program depends on a robust risk assessment process because

ERM requires the intentional identification, assessment, and mitigation of risks (Saeidi et al., 2019).

Under uncertainty conditions, the increases in production costs, reductions in profit margins, and operational risk increase indicate that manufacturing companies need a more strong management accounting system and corporate risk management practices. The critical information provided by management accounting strengthens the risk management structure of the business and facilitates the decision making processes of the managers, and contributes to the organizational performance. Risk management affects the ability of the firm to accurately identify and mitigate the threats it faces, thereby protecting the firm's portfolio and improving corporate performance (Uyar, 2018).

Risk is a negative outcome with a known or estimated probability of occurrence based on experience or some theory. The risk of an adverse outcome only becomes a salient problem when the outcome is relevant to stakeholder concerns and interests (Willcocks & Margetts, 1994). Therefore, risk management within the organization is essential for the manager to have a hands-on approach in all aspects, from strategy to implementation (Saeidi et al., 2019). However, digital technology has expanded the role of risk management, involves working with business functions across the organization, and is linked with the organization's strategic decisions aimed at sustainability. With the help of digital technology, it offers exponentially augmenting opportunities for risk management to access clean data, advanced analytics, and appropriate risk models, making risk management a more efficient, timely, and practical approach to accurate risk decisions (Narasimhan & Youssef, 2020). Likewise, Ivanov et al. (2019) stated that the support of digital technologies facilitates a new quality of proactive planning of risk management infrastructure.

Many authors support the idea that rapid identification and quantification of new risks and risk assessment in reporting activities are essential in risk management to integrate traditional information sources with unstructured data acquired from various internal and external sources using advanced technological tools and new data-

intensive techniques for the construction of a shared platform called BDA (Dicuonzo et al., 2019). Wang et al. (2020) state that the risk assessment information system through advanced analytics is used to extract practical information in the process of enterprise management, and systematically show the logic between the data for users to make relevant decisions, and pay attention to the indicators with a high-risk in advance, to prevent the overall collapse of firm's situation.

In this research, risk assessment information system refers to the firm's ability to the preparation of financial and non-financial information using advanced analytics to discover, identify, and assess the previously unknown risks, lead risk management of the organization to provide reasonable assurance about achieving the organization's objectives (Köse & Ağdeniz, 2019). Uyar (2018) emphasized that a well-designed and efficient management accounting system helps managers improve their organization towards higher performance by making accurate and rational decisions. Protecting firm assets under dynamic uncertainty is possible through properly designing the risk assessment information system and effective business operations. Risk assessment information system affects the firm's ability to accurately discover, identify, and mitigate the threats it faces, thereby protecting the firm's portfolio and improving firm performance. While investors increasingly demand a holistic view from corporate boards on the interrelations between strategy, risk, and corporate sustainability, risk assessment information can help an organization determine its material sustainability metrics to design and deploy appropriate responses (Deloitte Southeast Asia Ltd, 2019). In addition, the risk assessment information system is an authority by which the company gains access to monitor risks from all avenues to increase the long and short-term value of the firm and lead to sustainability. Saeidi et al. (2021) explored the effect of risk assessment information on firm performance, both financial and non-financial. The findings revealed that risk assessment positively correlated with firm performance, while organizational trust did not affect it. However, competitive advantage is at the core of the firm performance in competitive markets. Specifically, competitive advantage involves business innovation and modern products. To gain a competitive

advantage, a firm must have low production unit costs and differentiation of products/ services over rivals (Alqershi, 2019). Keep in mind that investment in innovation is often expensive, while many great new products fail. Thus, the effort of uncertain innovation and new product creation projects are daunting (risk) tasks for many corporate decision-makers (Klingebiel & Rammer, 2014). Hence, the ability to assess and manage risk is a significant activity in the success of the survival and sustainability of the organization (Gurunathan, 2018). The risk assessment information system helps a firm to set up and manage its risks in an integrated manner. Especially if a company knows more about its industry's risks than its competitors, it will manage those risks properly by actively aggressive actions (Saeidi et al., 2019).

The impact of risk assessment on business innovation and modern products is studied. Bowers & Khorakian (2014) found that risk management provides a tangible link to the innovation project creation process, particularly customizations to highlight the unique aspects of the innovation project. Mu et al. (2009) concluded that the correct use of risk assessment techniques led to effective risk management strategies is a factor affecting firms' success in modern product development and sustainable performance of the organization. Gurunathan (2018) point out that risk assessment greatly influences the modern product development process success. The findings of Sun et al. (2020) showed that effective risk assessment and risk management can reduce the process innovation risk in the manufacturing industry and also ensure the progress of production innovation. Also, risk assessment practice is developing the employee's role to establish and foster capacity-building and participation in information support to management decision-making while safeguarding employees' interests, leading to trust in the organization (Jasim et al., 2019). Sax & Torp (2015) demonstrated a positive and significant relationship between risk assessment information systems and employee trust in the organization. They highlight the importance of combining traditional risk management data (discover, identify, and assess) with finding from advanced technologies to identify and hedge potential risks and exploit potential opportunities rapidly. Furthermore, this makes employees feel trust in the organization with existing

rules and systems because enabled systems are considered to facilitate their responsibilities (Beuren et al., 2020).

Moreover, Risk assessment has become the most important part of management for all organizational types, especially sustainability. As a consequence of stakeholders expectations to request that businesses should act responsibility to the economy, society and the environment in terms of sustainable economic growth without harming society and the environment (Narumon, 2013). Narumon (2013) conclusion that the most essential factor for risk management under sustainability platform is active roles of the board of directors and senior executives because the board of directors, in concert with senior management, can set the appropriate "tone from the top" to ensure that ERM system under sustainability platform remains at the forefront of strategic and operating decisions made within the business. Jagoda & Wojcik (2019) propose a framework outlining how organizations are implementing risk assessment and risk analysis to determine sustainable operations and methods in developing low-risk outcomes. Jagoda & Wojcik (2019) point out that a risk management technique used in an organization can take a proactive role in reducing risk while incorporating risk assessment and risk management can be an important asset for sustainable business practice.

Based on the earlier discussion, the higher the risk assessment information system will positively influence business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. Hence, the hypotheses are proposed as follows:

Hypothesis 4a: The higher the risk assessment information system of the proactive digital accounting is the more likely that the firm will achieve greater business innovation effectiveness.

Hypothesis 4b: The higher the risk assessment information system of the proactive digital accounting is the more likely that the firm will achieve greater modern product creativity.

Hypothesis 4c: The higher the risk assessment information system of the proactive digital accounting is the more likely that the firm will achieve greater organizational trust

Hypothesis 4d: The higher the risk assessment information system of the proactive digital accounting is the more likely that the firm will achieve greater firm sustainability.

Consequences of Proactive Digital Accounting Support

This section investigates the effects on consequences of Proactive Digital Accounting Support consisting of business innovation effectiveness, modern product creativity, and organizational trust on firm sustainability. It is extrapolated that there are positive relationships among all of them, as depicted in Figure 3.

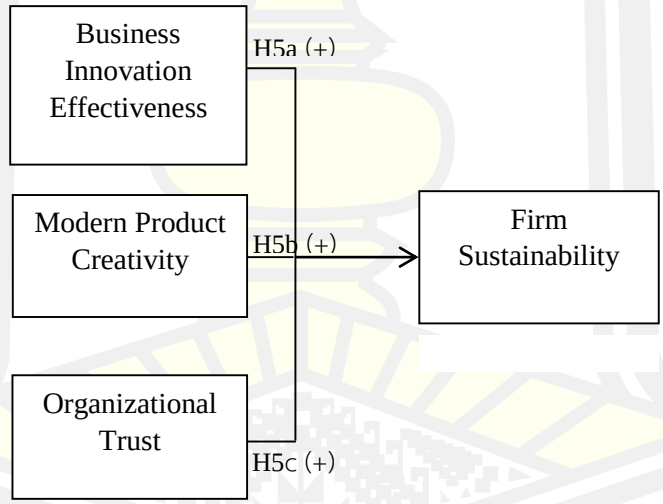


Figure 3 The Effects of Business Innovation Effectiveness, Modern Product Creativity, and Organizational Trust on Firm Sustainability

Business Innovation Effectiveness

Business innovation involves the radical redesign of manufacturing-related processes and systems to achieve dramatic improvements in critical manufacturing performance measures, encompassing various activities. Some innovation initiatives

focus on technological innovation, and others may intend to change work processes and organizations' behavioral routines. Some organizations adopt new technological solutions or work methods externally available, while others may develop and adopt novel technologies or organizational routines that are new to the state of the art (Yamamoto & Bellgran, 2013). For example, PTT Global Chemical Public Company Limited has developed a cleaning innovation for the heat exchanger in the aromatics plant, which replaces the current physical cleaning procedures with chemical cleaning. This innovative technology has increased the efficiency of the heat exchanger by 15 per cent and has, consequently, reduced heat exchanger-related expenses by over 4 million baht per year. Furthermore, with this new technology, the lifetime of the heat exchanger has been extended by over 50 per cent of the total usage period due to the simplification of the disassembly process, which reduces the risks of chemical exposure. However, different focus in innovation initiatives requires different approaches and preconditions for achieving desired outcomes. With the global trend of sustainable development and the tightening legal environment, enterprises need to integrate their various resources to promote environmental-friendly operation processes innovation (Yang et al., 2017). Therefore, any organization has developed new technology principles to increase the potential of the production process, reduce production costs and reduce environmental pollution, including waste minimization in the production process (Sapsanguanboon & Auanguai, 2020).

In this research, business innovation effectiveness refers to the ability of the company to implement innovation, leading to improvements in the manufacturing process and effective operation management or processes that can eliminate waste to a minimum within an operation activity (Kneipp et al., 2019). Sapsanguanboon & Auanguai (2020) highlighted that firms that focus on business innovation would lead to sustainable competitive advantage. Fuentes et al. (2018) analyzed how an internal strategic decision, process innovation, interacts with some features of the external environment to explain sustainability engagement by companies. Their results showed that companies that perform business innovation are strong links with corporate

sustainability engagement at the beginning; after that, it fades away because they require achieving economic growth.

In summary, the influence of business innovation effectiveness is likely to influence firm sustainability. Hence, the hypotheses are proposed as follows:

Hypothesis 5a: The higher business innovation effectiveness is the more likely that the firm will achieve greater firm sustainability.

Modern Product Creativity

As the global competition intensifies, technological advancement accelerates, and product life cycles shorten (Tsai et al., 2020), the modern product is an essential guide for organizations to adapt to market dynamics and compete effectively (Pasch, 2019). Modern product activity is considered one way to maintainability competitive and crucial for the growth, success, and survival of firms. In general, the primary objective of the modern product is to generate superior customer value, gain a competitive advantage through the creations of new products and services, and lead to the firm's sustainability (Aydin, 2020).

In this research, modern product creativity refers to a company's ability to innovate, design, and present new products or improve existing additive products to be a unique feature, creative and modern, to continuously respond to consumers' needs (Aydin, 2020). However, businesses face sustainability compliance pressure from both internal and external stakeholders, resulting in a wider acceptance of sustainability by the firms, and adopt relevant approaches to avoid customers and public disfavor (Jha & Rangarajan, 2020). Recent research by Obal et al. (2020) and S. Du et al. (2016) depict such a link between modern product development and sustainability orientation. Obal et al. (2020) concluded that sustainability orientated firms are likely to realize the improved market performance of modern products as firms with a sustainability orientation are likely to view the customer centered value creation for modern product development from the social and sustainability perspectives that may be increasingly

important to customers. While May et al. (2012) argue that companies still consider sustainability as a limitation rather than an opportunity for eco-friendly products as fully integrating sustainability in modern product creativity (MPC) projects costs them higher than the gain they could have achieved (higher costs lead to lower profits).

In summary, the influence of modern product creativity is likely to influence firm sustainability. Hence, the hypotheses are proposed as follows:

Hypothesis 5b: The higher modern product creativity is the more likely that the firm will achieve greater firm sustainability.

Organizational Trust

Trust is essential in every aspect of operating a business and is at the heart of any good relationship. It can encourage friendship and as a way to resolve the conflict between the organization and employees, customers, suppliers, shareholders, or investors, and can create favorable bargaining situations (Yu et al., 2018). Therefore, building trust with employees, customers, suppliers, and other stakeholders is essential to organizational success. However, for firm sustainability, generating employee trust in their organization is essential for any business operations and strengthening the efficiency of an organization (Kulkarni et al., 2020). Yeh et al. (2020) believe that the long-term success of an organization depends on building trust among the members of an organization because organizational trust formed by its members reflects their collective intentions and acts on behalf of the company. In turn, the basis of trust within an organization does not necessarily mean placing the interest of customers, suppliers, and other stakeholders above self-interest, but it would be altruism (Sołoducho-Pelc, 2017). Thus, this research investigates how organizational trust in the context of an employee leads to firm sustainability.

The increasing rate of socially, environmental and economic change, the increased demand for flexibility and cooperation, appreciation of the team and team performance, and transformation of the relations with the employees and career patterns

have raised the importance of organizational trust. It is estimated that organizations cannot reach their goals without the trust of their employees (Yu et al., 2018). Trust is a crucial indicator of social exchange relationships, which entails one party's positive expectations of another party (Men et al., 2020). While, organizational trust is the confidence of employees, which is related to being valuable and beneficial in the future and representing a relationship between the organization and employees (Halim & Rahayu, 2016). Moreover, employees are one of the company's stakeholders as internal parties who gives support to the corporate in achieving short and long-term goals (Halim & Rahayu, 2016), and employee organizational trust is fundamental for the most successful of the organization (Men et al., 2020). Therefore, encouraging employees to have organizational trust is the ideal goal of every organization. Many previous scholars have admitted that organizational trust (OT) is firmly linked to organizational citizenship behavior (e.g., Dirks & Ferrin, 2002; Y. Lay et al., 2020; Makhdoom et al., 2016; Petrella, 2013; U. Singh & Srivastava, 2009, 2016), such as an organization's ethical working environment, organizational justice. Thus, Organizational Citizenship Behavior (OCB) is interchangeable with organizational trust.

In this research, organizational trust refers to promoting and maintaining trust within the organization by recognizing employee satisfaction and attitudes about accepting work routines and implementing management accounting practices, reflecting their expectations about the organization's success and sustainable existence (Men et al., 2020). Lay et al. (2020) argues that trust given by the organization to each of the employees can motivate them to contribute to organizational development, leading to firm sustainability. According to Yu et al. (2018), organizational trust impacts employee work attitudes and performance. The more employees trust the organization, the more effort they will make for the organization. They are willing to work hard and expend energy for their organization when they trust, and when employees trust and identify with the organization, they will be more willing to respond and act by the organization's policies, and they are also more willing to be more dedicated to the

organization. A recent study by Lee (2020) found that employee behavior can significantly impact firm sustainability performance, where employee behavior can either encourage more organizational citizenship behavior or alleviate counterproductive work behavior.

To summarize, in this research, organizational trust may lead to firm sustainability. Thus, the hypothesis is posited as follow:

Hypothesis 5c: The higher organizational trust is the more likely that the firm will achieve greater firm sustainability.

Firm Sustainability

Firm sustainability is becoming more important for all companies because it has linked to financial performance and can reflect that the business has good corporate governance and is managed with transparency, manage risk effectively taking into account the stakeholders, have competitive potential (The Stock Exchange of Thailand, 2021).

Firm sustainability can be viewed as a business approach that creates long-term value for owners/shareholders. However, profitability maximum ceases to be the sole criterion when companies are under pressure from economic, environmental, and social legislation and conditions of consumers, suppliers, and government policy (Kocmanova et al., 2017). Moreover, this today, it is impossible to create long-term value for organizations without considering ethical, social, environmental, and economic perspectives. In general, an organization's profitability and growth are essential for sustainability, but it is not just this. Instead, organizations should pursue sustainable development under the three pillars of corporate sustainability: economic, social, and environmental (Gil & Montoya, 2021). Likewise, firm sustainability revolves around responsible economic, social, and environmental management and must also ensure long-term value for stakeholders (Zenya & Nystad, 2018).

Fundamentally, the firm sustainability concept refers to the organization's goals to meet current stakeholder needs without compromising the ability to meet future stakeholder needs (Dyllick & Hockerts, 2002). This concept suggests that the corporate growth and profitability of the organization are important. At the same time, if the business is to operate sustainably, it needs to have social and environmental goals related to sustainable development as well (Camilleri, 2017). According to Goyal et al. (2013), firm sustainability refers to the implementation of business strategies and activities that meet the needs of today's organizations and stakeholders meanwhile protecting, preserving, and empowering the human and natural resources that will be required in the future. However, the sustainability of businesses in the digital age may require new practices for business in the twenty-first century, which provides challenges and opportunities for companies that need new approaches and capabilities and organizational adaptation. From a literature review, Proactive Digital Accounting Support (PDAS) is a new practice of management accounting that reflects effective operation leading to firm sustainability. While the key factors that create a competitive advantage and contribute to sustainable business are business innovation effectiveness, modern product creativity, and organizational trust. These factors result in (1) resource management and utilization to get maximum efficiency (business innovation effectiveness) by using innovations to improve production processes that ensure quality products/services and the least waste generation, (2) make a difference in a product/service (modern product creativity) by providing products to meet consumer needs continuously, and (3) could maintain business competitiveness (organization trust) because trust is fundamental to drive a business strategy to achieve a specific set of goals. It will ultimately help in improving profitability and firm sustainability.

In summary, firm sustainability involves balancing economic, social, and environmental objectives. Therefore, this research defines firm sustainability as the firm's outcomes from its actions, which can keep its business activities feasible, long term, and achieve economic, social, and environmental objectives and goals.

For the firm sustainability framework, which is widely accepted and adopted, including in Thailand, is the Global Reporting Initiative (GRI) and Dow Jones Sustainability Indices (DJSI) (Corporate Social Responsibility Institute, 2018). However, the firm sustainability assessment framework in this research was developed from the concept of corporate management to sustainability that integrates environmental social and corporate governance (Environmental Social and Governance: ESG) into the business process to make the business sustainable in the long-term, as well as to create a positive impact on society, environment, and stakeholders, under the international standard guidelines by the Stock Exchange of Thailand, which is suitable for exporting business in Thailand (The Stock Exchange of Thailand, 2017).

Antecedents of Proactive Digital Accounting Support

This section illustrates the influence of the antecedents on Proactive Digital Accounting Support. This research uses contingency theory to describe the antecedents of Proactive Digital Accounting Support. The concept of contingency is the opposite of best practice; the company's effectiveness causes by its optimum management according to specific situations in the company operated, which depends to contingent upon the internal and external situations (Uddin & Akhter, 2019). Therefore, the contingency perspective leads to internal and external factors that may affect each dimension of Proactive Digital Accounting Support.

The antecedents consist of ambidextrous top management, technological innovation, and market competition pressures, as shown in Figure 4.

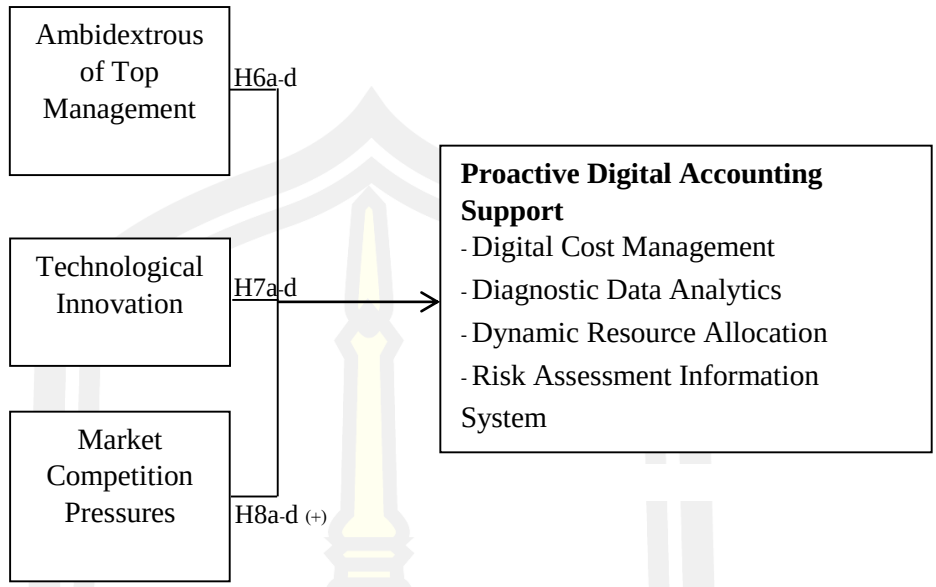


Figure 4 Effects of among each Antecedent on Proactive Digital Accounting Support

Ambidextrous of Top Management

According to Alabadi et al. (2018) stated that ambidextrous was coined by Duncan in 1976, with premise that organizations should be recognized for any change in their structure in order to enable itself for any innovation and change. The ambidextrous in organizational was first introduced by March (1991), considering the company's exploitation and exploration activities.

Exploitation activities improve performance- oriented and risk- reducing practices incrementally and faster. At the same time, the exploration involves creating new opportunities in the distant future, increasing uncertainty, and esplanade for management flexibility, according to J. Du & Chen (2018), ambidexterity allows firms to exploit the existing capabilities while not neglecting the effort undertaken in developing new capabilities. In addition, they concluded that the organizational ambidexterity is perfectly applied by the high-tech giant companies in China, both exploitative and explorative, which make those companies capable of reacting to success and competitiveness.

However, the organization reflects the top management (Hambrick & Mason, 1984). J. Du & Chen (2018) argued that the cognition of the top management team plays a vital role in the capabilities that an organization demonstrates, reflecting how ambidextrous functions. Thus, the challenges of managing the competing objectives of exploitation and exploration depend on the top management of the organization (Lubatkin et al., 2006). Lubatkin et al. (2006) described that ambidextrous of top management (ATM) involves exploration and exploitation activity, where exploration activity to the pursuit of new methods, e.g. changing routines and setting up new objectives, allowing room and time for experimentation and doing things differently, stimulating people to challenge the status quo. On the other hand, exploitation activity aims to increase performance and encompass increased monitoring, setting and controlling adherence to guidelines and taking corrective actions to increase standardization. However, both exploration and exploitation are sometimes coherent activities that are inseparable (Bledow et al., 2009).

In this study, ambidextrous of top management refers to the management's practice in promoting, supporting, and guiding the organization's employees to be creative in pursuing new methods or practices and improve or develop to increase the effectiveness of existing practices (Dranev et al., 2020; Jingjing Du & Chen, 2018). Lien (2020) concludes that the ambidextrous of top management is crucial for any company today to stay relevant in the fast pace of change.

In addition, top management is critical to implementing the new practice in an organization because they allow the transfer of knowledge acquisition outcomes to other parts of the company and allow knowledge to transform into tangible outcomes such as corporate strategy (Vásquez & Naranjo-Gil, 2020). The results study by Piórkowska (2016) concluded that ambidextrous of top management had a positive relationship with innovative practice performance. Tamayo-Torres et al. (2017) and Bawono (2022) conclude that the ambidextrous of top management is a basis and enabler for improving digital costing innovation, especially in enhancing firm performance in a dynamic environment. In addition, the study by Severgnini et al. (2019)

suggests that the ambidextrous of top management positively influence the risk assessment information system. They concluded that managers in small and large firms should focus on decision-making by engaging risk assessment information systems in a strategic decision.

Thus, ambidextrous of top management may be an antecedent of all Proactive Digital Accounting Support dimensions. Hence, the research relationships are hypothesized as shown below:

Hypothesis 6a: The higher the ambidextrous of top management is the more likely that the firm will achieve greater the digital cost management of the Proactive Digital Accounting Support.

Hypothesis 6b: The higher the ambidextrous of top management is the more likely that the firm will achieve greater the diagnostic data analytics of the Proactive Digital Accounting Support.

Hypothesis 6c: The higher the ambidextrous of top management is the more likely that the firm will achieve greater the dynamic resource allocation of the Proactive Digital Accounting Support.

Hypothesis 6d: The higher the ambidextrous of top management is the more likely that the firm will achieve greater the risk assessment information system of the Proactive Digital Accounting Support.

Technological Innovation

Nowadays, information technology is an integral part of every business, and any company that cannot keep up with new technology will slowly fade away. Technology innovation is an essential and beneficial tool for the accounting department in any business for management accounting practices (e.g., organizing, analyzing, process, and evaluating financial data). It will improve productivity and save on both cost and time. In addition, the current accounting processes are being done by machines such as expense management, accounts receivable and payable processing, artificial intelligence-powered invoice management, and supplier onboarding, which signal

progress and innovativeness (Kruskopf et al., 2020). Thus, the quality of the existing technology systems in an organization is essential to deal with such situations because this prevents problems during implementation and positively affects the success of management accounting practice.

In this study, technological innovation refers to firms' ability to adopt new technologies to apply as support and permit to execute their functions, actions, activities, and operations in an agile manner and success (Zwirtes & Alves, 2014). The adoption of technological innovation has resulted in structural changes in the organizations, and these have influenced institutional costs and the reorganization of their business processes to make them more competitive (Zwirtes & Alves, 2014).

Recently, Azudin & Mansor (2018) examined the impact of corporate technology innovation on management accounting practices in Malaysia. The study results show that technology innovation has a significant positive impact on management accounting practices. Furthermore, one explanation for this research outcome is implementing improved technology, produced management accounting practices increased efficiency. Likewise, Chongruksut (2002) insisted that technological innovation played crucial role in helping to lead an organization to successful the implementation of advanced management accounting. Omorogbe (2014) concluded that the application of digital cost management on the platform of technological innovation applications would increase operational efficiency if a fit exists between technology capability and cost management system applications of organizations. While Bibri & Krogstie (2017) suggest that diagnostic data analytics relies on the functionality of technological innovation, such as data processing platforms, hardware and software needed to enable cloud computing, and wireless networks for efficient operation. The study by Lutfi et al. (2022) stated that technological innovation enhances the adoption of dynamic resource allocation in organizations. In addition, Teymouri & Ashoori (2011) suggests that technological innovation can facilitate flexibility, compatibility, and integration of risk management processes (identifying, assessing, controlling, and reporting).

Thus, technological innovation may be an antecedent of Proactive Digital Accounting Support. Hence, the research relationships are hypothesized as shown below:

Hypothesis 7a: The higher the technological innovation is the more likely that the firm will achieve greater the digital cost management of the Proactive Digital Accounting Support.

Hypothesis 7b: The higher the technological innovation is the more likely that the firm will achieve greater the diagnostic data analytics of the Proactive Digital Accounting Support.

Hypothesis 7c: The higher the technological innovation is the more likely that the firm will achieve greater the dynamic resource allocation of the Proactive Digital Accounting Support.

Hypothesis 7d: The higher the technological innovation is the more likely that the firm will achieve greater the risk assessment information system of the Proactive Digital Accounting Support.

Market Competition Pressure

Market competition pressures are the level of external influences that threaten the firm success as competitors' actions and success results in more problematic planning and control (T. A. Lay & Jusoh, 2014). The high market competition pressures increase demand for management accounting information (Günther & Gäbler, 2014) as clients have increased demands concerning quality and efficiency; thus, accounting systems must incorporate more non-financial information, additional predicting, and more frequent reporting (Hill, 2000), including the monitoring and analysis of customer, competitors, and supplier trends (Nuseir & Aljumah, 2020). Likewise, Ahmad & Mohamed Zabri (2015) argued that, as market competition pressures increases, companies need to use more reliable management accounting information to compete effectively and avoid planning misinformation-based when making decisions.

In this research, market competition pressures refer to the pressures arising from the strength of business competition, which involves the market participants such as competitors, consumers, and suppliers, including market share, directly related to the business (Günther & Gäbler, 2014; Setiawan, 2020). Jun Du & Chen (2010) believed that market competition pressures provide a firm's incentives to increase efficiency, cost management, risk management, resources management, and operations. This belief has encouraged management to enhance management accounting systems and adopt sophisticated management accounting practices (Ahmad & Zabri, 2015). Since the early 1980s, many innovative management accounting techniques have been developed to support modern technologies and new management processes and the search for competitive advantage to meet the challenge of global competition. It has been argued that market competition pressures have affected sophisticated management accounting practices (Abdel-Kader & Luther, 2006). Ahmad & Mohamed Zabri (2015) investigated factors that affect management accounting practices in Malaysian medium-sized firms in the manufacturing sector. The findings indicate that market competition pressures significantly influence sophisticated management accounting practices. Likewise, Abdel□Maksoud et al. (2012) investigate the influence of market competition pressures on deploying contemporary management accounting practices in Egyptian firms. The research found to indicate that consistent significant positive associations between market competition pressures and management accounting practices. Rodríguez-Espíndola et al. (2022) argue that market competition pressure (external factor) is a critical enabler in adopting the risk assessment system to support resetting and enhancing risk management processes across the organization. In addition, Abdel-Kader & Luther (2006) studied management accounting practices in the UK food and drinks industry. The study aimed to explore the current use of management accounting practices and understand the level of management accounting practices sophistication and the factors that affect the implementation of management accounting practices in the industry. From the findings, increased international competition suggests the need for more companies in the food and drinks sector to identify improvement opportunities

through consider adopting more advanced management accounting practices. On the one hand, Nylén & Holmström (2015) argue that the unique properties of digital technology in accounting practice enable new types of innovation processes that are exceptionally fast and difficult to implement successfully.

Thus, market competition pressures may be antecedents of Proactive Digital Accounting Support. Hence, the research relationships are hypothesized as shown below:

Hypothesis 8a: The higher the market competition pressure is the more likely that the firm will achieve greater the digital cost management of the Proactive Digital Accounting Support.

Hypothesis 8b: The higher the market competition pressure is the more likely that the firm will achieve greater the diagnostic data analytics of the Proactive Digital Accounting Support.

Hypothesis 8c: The higher the market competition pressure is the more likely that the firm will achieve greater the dynamic resource allocation of the Proactive Digital Accounting Support.

Hypothesis 8d: The higher the market competition pressure is the more likely that the firm will achieve greater the risk assessment information system of the Proactive Digital Accounting Support.

The Moderators of Proactive Digital Accounting Support

This section shows the moderating effect of proactive culture on the consequences of each of the four dimensions of Proactive Digital Accounting Support as in figure 5. And stakeholder awareness as the moderator of Proactive Digital Accounting Support consequences-firm sustainability as in figure 6.

Also, the moderating effect of disruptive technology on the influence of Proactive Digital Accounting Support and antecedents are shown in figure 7.

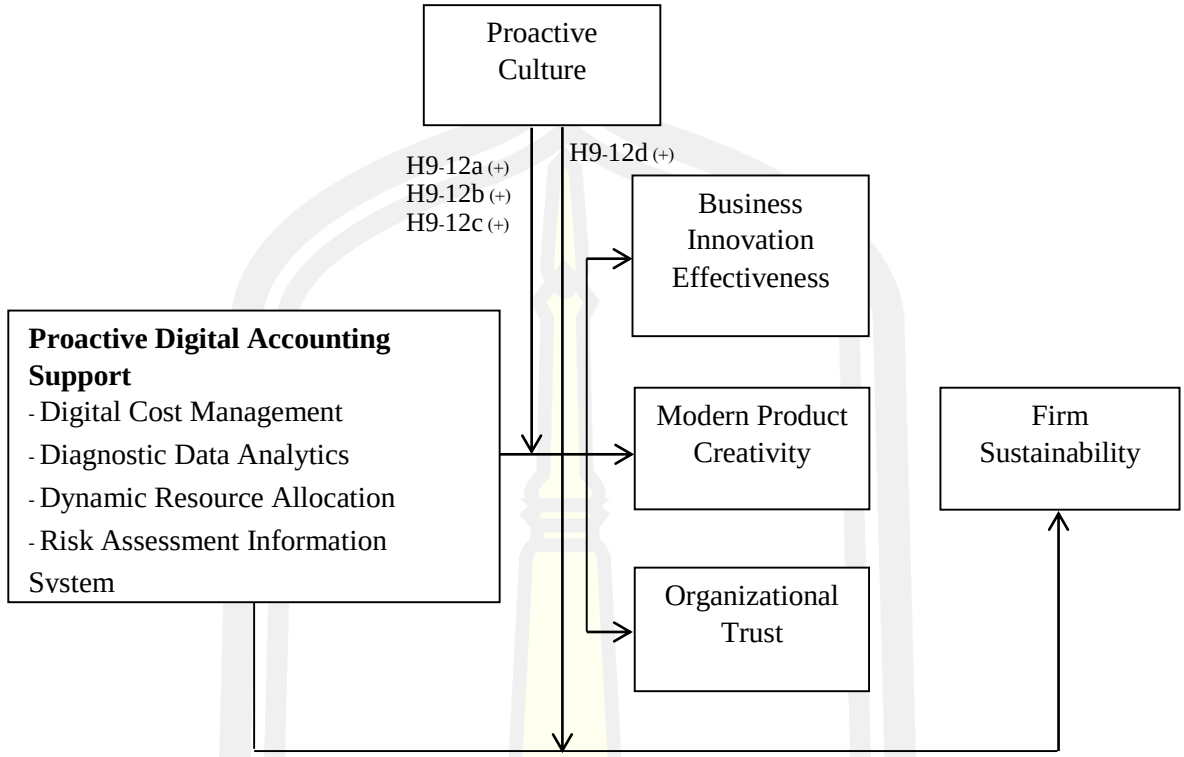


Figure 5 The Moderating Role of Proactive Culture on the Relationships among Proactive Digital Accounting Support, Business Innovation Effectiveness, Modern Product Creativity, Organizational Trust, and Firm Sustainability.

Proactive Culture

In today's increasingly competitive environment, organizational culture as one of the factors influencing for the survival and the success of the organization (Aktaş et al., 2011). In particular, proactive culture, Ogungbade & Oyerogba (2020) stated that an organization with this culture will be emphasize competition and seek an edge over the competitors. The companies tend to challenge direct and intensively its competitors when entering into a market or to enhance its position outperforming its rivals (Oliveira, 2015). To achieve competitive edge over competitors, business innovation effectiveness and modern product creativity are the heart of the organization (Hamid & ABBASI, 2020). According to Bendak et al. (2020), the culture that exists in any organization has the potential to influence product creativity and business innovation of that

organization. Creating and enhancing an appropriate culture is a precondition for creativity and innovation in an organization, which is considered of the key factors that influence the long-term success of any organization. Research by Ceausu et al. (2017) indicated that organizational culture is a promoter of companies to adapt to shorter production cycles, modern product creativity, and structures and processes to enhance the performance of their company. Dezdar & Ainin (2012) argue that dynamic resource allocation is a system to assign and manage resources enterprise-wide for any project, so there may be disagreements of interests in this process from the use of a reengineering. Thus, the success of dynamic resource allocation implementation requires an organizational culture that focuses on pursuing new things and tolerates the risks that may arise to enhance the business innovation effectiveness. However, Okibo & Shikanda (2011) argues that new practices of corporations that will lead to business innovation effectiveness may need time to familiarize themselves with innovation strategies and create the necessary integration by prioritizing the internal environment to achieve business innovation capabilities. Besides, Aroyeun et al. (2018) argue that an organization with a proactive culture needs to assimilate new sources of technologies, skills, and core competencies to use as a tactic in battle, which may harm the competitive advantage because employees may be inexperienced, lack the skills and knowledge about the new practices on the practical implementation.

In addition, organizational cultures to be one of the factors that can stimulate the most trust behavior among the members of the organization. Since organizational culture can be defined as the values, beliefs and hidden assumptions that organizational members have in common (Naranjo-Valencia et al., 2011). Dezdar & Ainin (2012) state that proactive culture encourages employees to participate and are committed to any project to create a competitive advantage. This involvement gives them a sense of possession, and they feel more in control of their jobs, encouraging them to accept organizational practice and earn employees' trust in the successful implementation of the dynamic resource allocation practice. On the other hand, Wibawa et al. (2014) explained that the proactive culture tends to be externally focused on creating an edge over the competitors, which cannot influence building trust with employees as internal

stakeholders. However, Abbett et al. (2010) have posited that organizational culture and corporate sustainability are closely intertwined, although business culture is often blamed for the devastation of sustainability.

Many companies have learned that sustainability is a different competitive opportunity to help gain a competitive advantage, but not all companies successfully manage these opportunities and challenges. In addition, an organizational culture that fosters sustainability activities also reduces the risk of the company being viewed as misrepresenting its environmental performance and reduces the risk that the company being perceived as green sheen, which affects a company's profitability, ultimately (Szabo & Webster, 2020). Abbett et al. (2010) studied corporate culture and the success of corporate sustainability initiatives to understand the relationship between organizational culture and sustainability initiative success across 23 companies, and this study found statistically significant evidence of the relationship between company culture and the success of sustainability initiatives. Likewise, Baird et al. (2018) and Stępień (2019) explained that the proactive culture is more likely to accept new ideas and innovative accounting practices, resulting in group members being more readily poised to experiment with and respond positively to new practices. In particular, innovative practices will increase the likelihood of providing information to an organization about the sustainability impact of providing current and future products. According to Ameen et al. (2018) argued that companies looking to remain competitive and keep profitability must adopt management accounting practices as part of their organizational culture because once the system is integrated into the organization culture, the system becomes a belief or principle that influence every aspect of the organization, which leads to continuous value or benefits from the process. Furthermore, the research results of Ogungbade & Oyerogba (2020) suggest a relationship between company culture and management accounting practices.

Accordingly, in this research, proactive culture can be defined as an organization that focuses on pursuing new things, daring to take risks, and can respond to change by constantly seeking new market opportunities and an edge over competitors

(Wegwu, 2019). However, creating a firm's competitive advantage (business innovation effectiveness, modern product creativity, and organizational trust) and sustainability through Proactive Digital Accounting Support (PDAS) may require proactive culture collaboration as a moderator variable. Hence, this research indicates that the proactive culture, as a moderator, influences each dimension of Proactive Digital Accounting Support and its consequences. Also, the research proposes the hypotheses as follows:

Hypothesis 9a: Proactive culture will positively moderate the digital cost management of the proactive digital accounting to business innovation effectiveness.

Hypothesis 10a: Proactive culture will positively moderate the diagnostic data analytics of the proactive digital accounting to business innovation effectiveness.

Hypothesis 11a: Proactive culture will positively moderate the dynamic resource allocation of the proactive digital accounting to business innovation effectiveness.

Hypothesis 12a: Proactive culture will positively moderate the risk assessment information system of the proactive digital accounting to business innovation effectiveness.

Hypothesis 9b: Proactive culture will positively moderate the digital cost management of the proactive digital accounting to modern product creativity.

Hypothesis 10b: Proactive culture will positively moderate the diagnostic data analytics of the proactive digital accounting to modern product creativity.

Hypothesis 11b: Proactive culture will positively moderate the dynamic resource allocation of the proactive digital accounting to modern product creativity.

Hypothesis 12b: Proactive culture will positively moderate the risk assessment information system of the proactive digital accounting to modern product creativity.

Hypothesis 9c: Proactive culture will positively moderate the digital cost management of the proactive digital accounting to organizational trust.

Hypothesis 10c: Proactive culture will positively moderate the diagnostic data analytics of the proactive digital accounting to organizational trust.

Hypothesis 11c: Proactive culture will positively moderate the dynamic resource allocation of the proactive digital accounting to organizational trust.

Hypothesis 12c: Proactive culture will positively moderate the risk assessment information system of the proactive digital accounting to organizational trust.

Hypothesis 9d: Proactive culture will positively moderate the digital cost management of the proactive digital accounting to firm sustainability.

Hypothesis 10d: Proactive culture will positively moderate the diagnostic data analytics of the proactive digital accounting to firm sustainability.

Hypothesis 11d: Proactive culture will positively moderate the dynamic resource allocation of the proactive digital accounting to firm sustainability.

Hypothesis 12d: Proactive culture will positively moderate the risk assessment information system of the proactive digital accounting to firm sustainability.

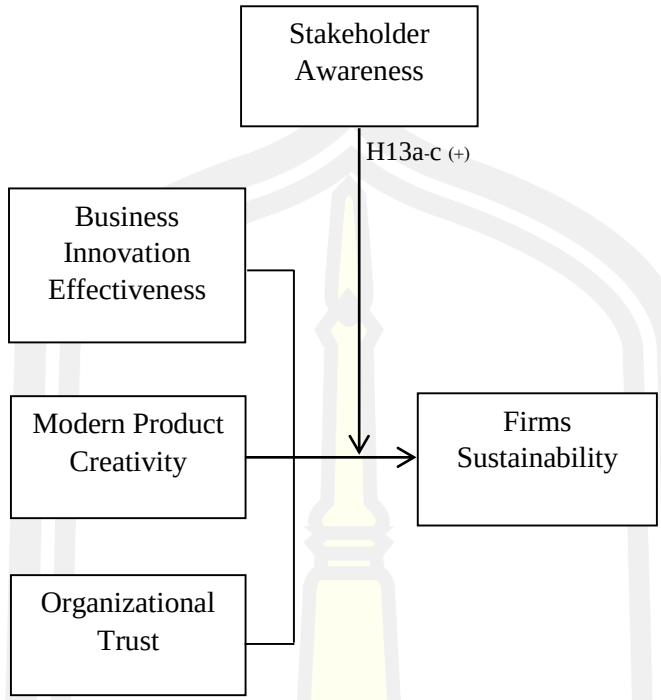


Figure 6 The Moderating Role of Stakeholder Awareness in Proactive Digital Accounting Support consequences-Firm Sustainability

Stakeholder Awareness

The business world has been accused of lurking behind social, environmental, and economic problems (Porter & Kramer, 2011). As a result, companies are stimulated to engage more extensively in corporate sustainability activities (Xu & Zeng, 2020). In addition, many firms strive to improve their sustainability positions by presenting their sustainability efforts to stakeholders thoroughly (Szabo & Webster, 2020) to enable businesses to have economic growth along with social and environmental development (The Stock Exchange of Thailand, 2019). However, the goal of sustainability activities performed by corporations is to help gain a competitive advantage, appeal to consumers' most valued environmental sustainability, and affect a company's profitability (Szabo & Webster, 2020). Recently, Deloitte surveyed consumer attitudes to environmental and ethical sustainability, suggesting that businesses need to plan for ways to make their products more sustainable and build accountability into their value

chain, as sustainability remains a key consideration for consumers (Deloitte, 2021). In addition, Rudyanto & Siregar (2018) argued that consumers, as the stakeholder, tend to pay more attention to companies that have close relations with end consumers, and companies that produce goods consumed for final consumers tend to receive more attention than companies that produce production goods, this forced the company to pay attention to their actions and operate in accordance with the wishes of consumers (stakeholder).

Stakeholders are any individual, group, organization, or institution that has the same interest or is affected by operations that achieve the objectives of a particular organization. Without the support of stakeholders, companies will not survive (Rudyanto & Siregar, 2018). According to Baric (2017), the stakeholders represent a key factor that affects the success of the firm's sustainability. Therefore, the firms are essential to creating stakeholder awareness by showing that they operate not only for the benefit of the economy but also to benefit society and the environment (Rudyanto & Siregar, 2018). In this research, stakeholder awareness is defined as raising awareness in response to sustainability issues and concerns of any individual, group, organization, or institution that pays interest in the organization's performance (Gong et al., 2019). Verenych et al. (2019) argued that organizations necessary need to find an effective approach to create stakeholder awareness about the operating processes, projects, and products, when stakeholders understand all project processes and characteristics of the project product correctly and properly, the implementation thereafter is carried out without significant time expenditures. Yamane & Kaneko (2021) concluded that increasing stakeholder awareness of the Sustainable Development Goals might enhance the organization's sustainable behavior. In addition, the results of the study by Gong et al. (2019) showed that stakeholder awareness has a significantly positive effect on firm sustainability. Hence, this research indicates that the stakeholder awareness, as a moderator, influences Proactive Digital Accounting Support consequences (business innovation effectiveness, modern product creativity, and organizational trust) and firm sustainability. Also, the research proposes the hypotheses as follows:

Hypothesis 13a: Stakeholder Awareness will positively moderate the business innovation effectiveness to firm sustainability.

Hypothesis 13b: Stakeholder Awareness will positively moderate the modern product creativity to firm sustainability.

Hypothesis 13c: Stakeholder Awareness will positively moderate the organizational trust to firm sustainability.

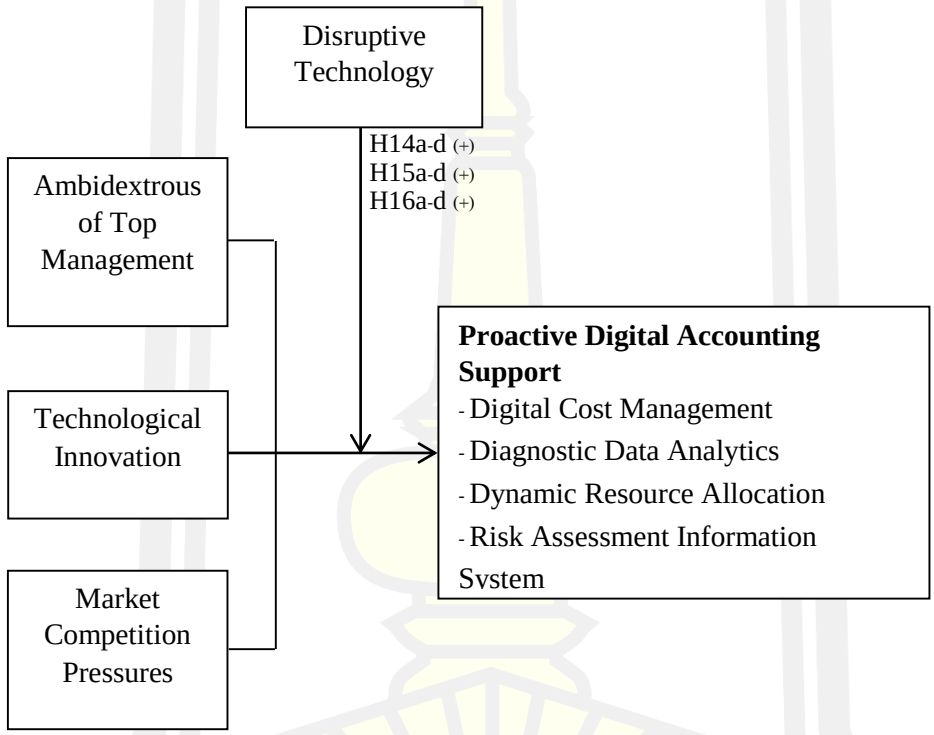


Figure 7 The Moderating Role of Disruptive Technology on the Relationships among Proactive Digital Accounting Support and Antecedents

Disruptive Technology

Disruptive technology, including big data and data analytics, artificial intelligence, block chain, machine learning, robotics process automation, and cloud computing have started to challenge management accounting practices (UKEssays, 2018). Disruptive technology is constantly evolving, and these technologies are changing the method organizations conducted, further add value to the organization's existing offerings, which results in better efficient and effective business operations (D.

Singh et al., 2019). Similarly, Q. Chen et al. (2019) emphasized that the good practice of organizations can be enhanced through adaptive capability by enhancing their technological capacity. Saputro et al. (2021) stated that Disruptive technology is an external factor that impacts the management accounting practice involves collect, store, process, analyze information, and transform data into insights which useful to support decision making, planning, and controlling of decision-makers.

In addition, management accounting practice is viewed as a field that susceptible to disruptive technologies. While most of the roles and functions of management accountants are influenced by emerging technology and the adoption of information technology systems. In CGMA Competency Framework (2019) stated that management accountants need to keep pace with advances in technology and be able to manage and guide the finance function in a digital world (CGMA, 2019). Kumarasinghe & Haleem (2020) examines the impact of digitalization on business models with special reference to management accounting in small and medium enterprises in Colombo district, in their study showed that, digital technology has a favorable influence on business model practices and management accounting practices. D. Singh et al. (2019) examined the relationship between disruptive technology and firm performance among SMEs in Malaysia. In their study highlights the importance of implementation of disruptive technologies in predicting firm performance and suggested that the organization should position and emphasize implementation of disruptive technologies to ensure enhanced overall firm performances. Singh et al. (2019) highlight that Organizations need to recognize the importance and benefits of disruptive technologies that cause create cost management capabilities to depend on the top management abilities for appropriate technology choices with resources and capabilities present within the organization.

Besides, Saputro et al. (2021) study through a systematic literature review revealed that disruptive technology enables the user to do real-time accounting, gather data for supervising and monitoring functions and streamline the accounting practice process. On the one hand, Muharam et al. (2020) argue that disruptive technology is

often valued for its most critical performance significance or value when the organization can acquire and exploit it. Therefore, the organizations seeking to develop disruptive technology have to be receptive to a new context to eliminate the initial inferiority and be highly skilled at translating cues into get-the-job-done objectives coupled with the capability of exploiting disruptive technology.

Accordingly, in this research, disruptive technology can be defined as the perception of the impact of emerging technologies and technology change, generating a process of actual substitution of a new technique for the old one with combining technologies to create a future capability that impacts the development of management accounting practices (Saputro et al., 2021).

In this research, it is considered that disruptive technology will encourage the relationship between ambidextrous top management, technological innovation, market competition pressures, and the dimension of Proactive Digital Accounting Support. Hence, the hypotheses are posited as follows:

Hypothesis 14a: Disruptive technology will positively moderate the ambidextrous of top management to the digital cost management of the Proactive Digital Accounting Support.

Hypothesis 14b: Disruptive technology will positively moderate the ambidextrous of top management to the diagnostic data analytics of the Proactive Digital Accounting Support.

Hypothesis 14c: Disruptive technology will positively moderate the ambidextrous of top management to the dynamic resource allocation of the Proactive Digital Accounting Support.

Hypothesis 14d: Disruptive technology will positively moderate the ambidextrous of top management to the risk assessment information system of the Proactive Digital Accounting Support.

Hypothesis 15a: Disruptive technology will positively moderate the technological innovation to the digital cost management of the Proactive Digital Accounting Support.

Hypothesis 15b: Disruptive technology will positively moderate the technological innovation to the diagnostic data analytics of the Proactive Digital Accounting Support.

Hypothesis 15c: Disruptive technology will positively moderate the technological innovation to the dynamic resource allocation of the Proactive Digital Accounting Support.

Hypothesis 15d: Disruptive technology will positively moderate the technological innovation to the risk assessment information system of the Proactive Digital Accounting Support.

Hypothesis 16a: Disruptive technology will positively moderate the market competition pressure to the digital cost management of the Proactive Digital Accounting Support.

Hypothesis 16b: Disruptive technology will positively moderate the market competition pressure to the diagnostic data analytics of the Proactive Digital Accounting Support.

Hypothesis 16c: Disruptive technology will positively moderate the market competition pressure to the dynamic resource allocation of the Proactive Digital Accounting Support.

Hypothesis 16d: Disruptive technology will positively moderate the market competition pressure to the risk assessment information system of the Proactive Digital Accounting Support.

Summary

In this chapter, the conceptual model of Proactive Digital Accounting Support and firm sustainability is supported by the two principal theories, including dynamic capability theory and contingency theory.

This chapter presents the relevant literature review and the hypothesis to explain the overall relationships of constructs in the conceptual model. This research has also offered a set of sixty-two testable hypotheses. These relationships are classified into four groups: the first group is relevant to the linkages among Proactive Digital Accounting Support and its consequence, consisting of business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. The second group contains the relationships among three consequences of Proactive Digital Accounting Support and firm sustainability. The third group shows the influence of three antecedents (ambidextrous top management, technological innovation, and market competition pressures) on each of the four dimensions of Proactive Digital Accounting Support. The last group relates to the moderation role of proactive culture, stakeholder awareness, and disruptive technology. All hypotheses are presented in table 6.

Table 6 Summary of Hypothesized Relationships

Hypotheses	Description of Hypothesized Relationships
H1a	The higher the digital cost management of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater business innovation effectiveness.
H1b	The higher the digital cost management of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater modern product creativity.
H1c	The higher the digital cost management of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater organizational trust.
H1d	The higher the digital cost management of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater firm sustainability.
H2a	The higher the diagnostic data analytics of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater business innovation effectiveness.
H2b	The higher the diagnostic data analytics of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater modern product creativity.
H2c	The higher the diagnostic data analytics of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater organizational trust.
H2d	The higher the diagnostic data analytics of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater firm sustainability.

Table 6 Summary of Hypothesized Relationships (Continued)

Hypotheses	Description of Hypothesized Relationships
H3a	The higher the dynamic resource allocation of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater business innovation effectiveness.
H3b	The higher the dynamic resource allocation of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater modern product creativity.
H3c	The higher the dynamic resource allocation of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater organizational trust.
H3d	The higher the dynamic resource allocation of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater firm sustainability.
H4a	The higher the risk assessment information system of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater business innovation effectiveness.
H4b	The higher the risk assessment information system of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater modern product creativity.
H4c	The higher the risk assessment information system of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater organizational trust.
H4d	The higher the risk assessment information system of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater firm sustainability.
H5a	The higher business innovation effectiveness is the more likely that the firm will achieve greater firm sustainability.

Table 6 Summary of Hypothesized Relationships (Continued)

Hypotheses	Description of Hypothesized Relationships
H5b	The higher modern product creativity is the more likely that the firm will achieve greater firm sustainability.
H5c	The higher organizational trust is the more likely that the firm will achieve greater firm sustainability.
H6a	The higher the ambidextrous of top management is the more likely that the firm will achieve greater the digital cost management of the Proactive Digital Accounting Support.
H6b	The higher the ambidextrous of top management is the more likely that the firm will achieve greater the diagnostic data analytics of the Proactive Digital Accounting Support.
H6c	The higher the ambidextrous of top management is the more likely that the firm will achieve greater the dynamic resource allocation of the Proactive Digital Accounting Support.
H6d	The higher the ambidextrous of top management is the more likely that the firm will achieve greater the risk assessment information system of the Proactive Digital Accounting Support.
H7a	The higher the technological innovation is the more likely that the firm will achieve greater the digital cost management of the Proactive Digital Accounting Support.
H7b	The higher the technological innovation is the more likely that the firm will achieve greater the diagnostic data analytics of the Proactive Digital Accounting Support.
H7c	The higher the technological innovation is the more likely that the firm will achieve greater the dynamic resource allocation of the Proactive Digital Accounting Support.

Table 6 Summary of Hypothesized Relationships (Continued)

Hypotheses	Description of Hypothesized Relationships
H7d	The higher the technological innovation is the more likely that the firm will achieve greater the risk assessment information system of the Proactive Digital Accounting Support.
H8a	The higher the market competition pressure is the more likely that the firm will achieve greater the digital cost management of the Proactive Digital Accounting Support.
H8b	The higher the market competition pressure is the more likely that the firm will achieve greater the diagnostic data analytics of the Proactive Digital Accounting Support.
H8c	The higher the market competition pressure is the more likely that the firm will achieve greater the dynamic resource allocation of the Proactive Digital Accounting Support.
H8d	The higher the market competition pressure is the more likely that the firm will achieve greater the risk assessment information system of the Proactive Digital Accounting Support.
H9a	Proactive culture will positively moderate the digital cost management of the Proactive Digital Accounting Support to business innovation effectiveness.
H9b	Proactive culture will positively moderate the digital cost management of the Proactive Digital Accounting Support to modern product creativity.
H9c	Proactive culture will positively moderate the digital cost management of the Proactive Digital Accounting Support to organizational trust.
H9d	Proactive culture will positively moderate the digital cost management of the Proactive Digital Accounting Support to firm sustainability.

Table 6 Summary of Hypothesized Relationships (Continued)

Hypotheses	Description of Hypothesized Relationships
H10a	Proactive culture will positively moderate the diagnostic data analytics of the Proactive Digital Accounting Support to business innovation effectiveness.
H10b	Proactive culture will positively moderate the diagnostic data analytics of the Proactive Digital Accounting Support to modern product creativity.
H10c	Proactive culture will positively moderate the diagnostic data analytics of the Proactive Digital Accounting Support to organizational trust.
H10d	Proactive culture will positively moderate the diagnostic data analytics of the Proactive Digital Accounting Support to firm sustainability.
H11a	Proactive culture will positively moderate the dynamic resource allocation of the Proactive Digital Accounting Support to business innovation effectiveness.
H11b	Proactive culture will positively moderate the dynamic resource allocation of the Proactive Digital Accounting Support to modern product creativity.
H11c	Proactive culture will positively moderate the dynamic resource allocation of the Proactive Digital Accounting Support to organizational trust.
H11d	Proactive culture will positively moderate the dynamic resource allocation of the Proactive Digital Accounting Support to firm sustainability.
H12a	Proactive culture will positively moderate the risk assessment information system of the Proactive Digital Accounting Support to business innovation effectiveness.

Table 6 Summary of Hypothesized Relationships (Continued)

Hypotheses	Description of Hypothesized Relationships
H12b	Proactive culture will positively moderate the risk assessment information system of the Proactive Digital Accounting Support to modern product creativity.
H12c	Proactive culture will positively moderate the risk assessment information system of the Proactive Digital Accounting Support to organizational trust.
H12d	Proactive culture will positively moderate the risk assessment information system of the Proactive Digital Accounting Support to firm sustainability.
H13a	Stakeholder Awareness will positively moderate the business innovation effectiveness to firm sustainability.
H13b	Stakeholder Awareness will positively moderate the modern product creativity to firm sustainability.
H13c	Stakeholder Awareness will positively moderate the organizational trust to firm sustainability.
H14a	Disruptive technology will positively moderate the ambidextrous of top management to the digital cost management of the Proactive Digital Accounting Support.
H14b	Disruptive technology will positively moderate the ambidextrous of top management to the diagnostic data analytics of the Proactive Digital Accounting Support.
H14c	Disruptive technology will positively moderate the ambidextrous of top management to the dynamic resource allocation of the Proactive Digital Accounting Support.
H14d	Disruptive technology will positively moderate the ambidextrous of top management to the risk assessment information system of the Proactive Digital Accounting Support.

Table 6 Summary of Hypothesized Relationships (Continued)

Hypotheses	Description of Hypothesized Relationships
H15a	Disruptive technology will positively moderate the technological innovation to the digital cost management of the Proactive Digital Accounting Support.
H15b	Disruptive technology will positively moderate the technological innovation to the diagnostic data analytics of the Proactive Digital Accounting Support.
H15c	Disruptive technology will positively moderate the technological innovation to the dynamic resource allocation of the Proactive Digital Accounting Support.
H15d	Disruptive technology will positively moderate the technological innovation to the risk assessment information system of the Proactive Digital Accounting Support.
H16a	Disruptive technology will positively moderate the market competition pressure to the digital cost management of the Proactive Digital Accounting Support.
H16b	Disruptive technology will positively moderate the market competition pressure to the diagnostic data analytics of the Proactive Digital Accounting Support.
H16c	Disruptive technology will positively moderate the market competition pressure to the dynamic resource allocation of the Proactive Digital Accounting Support.
H16d	Disruptive technology will positively moderate the market competition pressure to the risk assessment information system of the Proactive Digital Accounting Support.

CHAPTER III

RESEARCH METHODS

The previous chapter demonstrates a literature review of Proactive Digital Accounting Support, its theoretical foundation, the definition of all variables, and the hypothesis development. Subsequently, this chapter illustrates the research method that helps to increase the understanding of the hypothesis testing process.

Therefore, this chapter is organized as follows. Firstly, the sample selection and data collection procedure, including population and sample, and data collection. Secondly, the measurement of all constructs in the context of the dependent variable, independent variable, moderating variable, mediating variable, and control variable. Thirdly, explain the methods useful in this research, including validity and reliability tests to measure the questionnaire. Finally, the statistical technique presented that was applied in this research is the Structural Equation Model (SEM).

Sample Selection and Data Collection Procedures

Population and Sample

The population and sample of this research are the exporting businesses that are manufacturers registered as a limited partnership, limited company, and public limited company, totaling 5,527 firms, which were acquired from the database of the Ministry of Commerce of Thailand (www.moc.go.th), accessed on October 26, 2021.

The sample was selected by using Yamane (1973) to calculate the sample size. This formula was used to calculate the sample size was 95% confidence level, and 5% sample acceptable error was considered and calculation of sample size is proposed as follows:

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

Where: n = Sample size

N = Population size

e = Acceptable error (.05)

The values are set for the formula:

Where: $n = \frac{5,527}{1+5,527(.05)^2}$

$= 373$

Therefore, the sample size in this research comprises 373 exporters. However, according to Salkind (2012), sending surveys or questionnaires by mail is necessary to increase the sample size by at least 40 per cent to account for lost mail and non-cooperative volunteers. Thus, this research required oversampling to provide enough sample size and reliable estimates. Hence, the sample size is estimated at 650 exporters (373*75%), which is consistent with Bentler & Chou (1987) recommendation that the sample size requirements for structural equation modeling require at least 5- 10 participants per estimated parameter to be adequately powered to test the model. In addition, to ensure that the sample in this study were companies with aggressive competitive dynamics (Cormier et al., 2009). Therefore, the criterion for selecting the sampling is the entrepreneur that the high export values (Jha & Rangarajan, 2020), according to information from the Ministry of Commerce. The stratified random sampling technique was adopted to constitute the study samples and calculate the sample size from four industries under the Ministry of Commerce, Thailand regulations for estimating the population proportion. Details of this composition are shown in Table 7.

Table 7 Sample composition by industry group

Industry Group	Number of population	Samples size
Agricultural products	1,440	169
Agro-industry products	1,458	171
Industrial products	1,485	175
Mineral and fuel products	1,144	135
Total	5,527	650

Source: Database of the Ministry of Commerce, Thailand, accessed on October 26, 2021

The exporting industry in Thailand is necessary for economic growth and sustainability because Thailand is a new industrial country with an export sector at the heart of the economic system that generates a considerable income each year. In the last ten years, Thailand's overall export has grown significantly slower. Especially from 2018 until the present, the export value has been surprisingly reduced, partly due to the competitiveness and intensity of technology use (Kiatruangkrai et al., 2020). Recently, the Department of International Trade Promotion of Thailand has set up a government action plan to develop Thai entrepreneurs' potential to create innovation and value-added products/services through innovation and applying digital technology in business operations for the Thai export business to be successful (Department of International Trade Promotion, 2021). Therefore, it poses a challenge to understanding how Proactive Digital Accounting Support can improve the effectiveness of exporting business in Thailand.

Data Collection

The questionnaire survey is an instrument for collecting data in this research because it is a widely-used method for large-scale data collection in behavioral accounting. A representative sample can be collected from the chosen population in diverse locations at a low cost (Kwok & Sharp, 1998).

In this research, the survey was issued a mailed questionnaire to 650 respondents with a detailed explanation of the research to ensure that questionnaire survey participants were based on sample selection criteria (Wright, 2005), including the researcher undertook that all individual responses will be kept entirely confidential and not disclosures are made to third parties without the consent of the respondents. This reduced possible desirability bias (Eivarsen & Våland, 2014).

Furthermore, this tool is appropriate because it helps give a more significant number of firms at a lower cost and consumes less time, there is less distribution bias, puts less pressure for an immediate response on the potential informants, and gives respondents a more incredible feeling autonomy (Betton et al., 2020).

The invitations are direct to each exporter entrepreneur's chief financial officers, managing directors, or accounting executives by mail in the middle of March 2022. Besides, for the convenience of a follow-up mailing, each return envelope was assigned a coded number at the innermost of the envelope.

The planned schedule was to collect the data within eight weeks. In the first stage, the questionnaires were answered and sent back to the researcher in the first four weeks after the sent mailing and found that the course was well received by participants based on response rates. The overall response rate to the survey was more than 25 per cent, relative to the original number for the survey (170/650). Aaker et al. (2001) stated that a response rate of more than 20 per cent without questionnaire tracking was an acceptable response rate. After four weeks, however, to increase the response rate, a follow-up email was sent to the partial exporter businesses to implore the respondent to cooperate in answering a questionnaire.

In this research, the questionnaire consists of seven parts. Part one asks about the respondent's demographics, such as gender, age, marital status, educational level, working experience, salary, and working position. Part two is about the general information of the exporting business consisting of the business type such as business entity, industry type, period of business, registered capital, number of employees, average annual income, and ISO certification. Parts three to six are related to evaluating

each of the constructs in the conceptual model. The final part is an open-ended question for the respondent's suggestions and opinions. The questionnaire details are attached in Appendix C (English version) and Appendix D (Thai version).

In this study, the total received questionnaires were 229 responses. However, 4 responses were eliminated because there were incomplete, leaving the final sample consisting of 225 responses, which were complete and usable questionnaires. When calculating the response rate, it was approximately 34.67%, and research by Aaker et al. (2001) states that a response rate of more than 20% is considered acceptable. In addition, Comrey & Lee (1992) suggest that a sample size of 200 is fair, while 300 is good. Hair et al. (1998) suggest that a sample size (n) of more than 200 is relatively large if many factors affect the required sample size. However, Anderson & Gerbing, (1988) recommend that a 150 sample size be sufficient for analysis using structural equation modeling. Therefore, the 225 sample size of this research presents no problem and meets the requirement of sample size in structural equation modeling. The details of the online questionnaire survey are shown in Table 8

Table 8 Details of Questionnaire Mailing

Details	**Numbers**
Mailed Questionnaires	650
Returned Questionnaires	1
Received questionnaire	229
Unusable Questionnaires	4
Usable Questionnaire	225
Response Rate (225/649) x 100	34.67

Test of Non-Response Bias

The non-response bias is always a problem in survey research because it can result in misleading or inaccurate findings. The test of non-response bias is a method to prevent possible response bias problems between respondents and non-respondents

(Lewis et al., 2013). Lindner et al. (2001) suggested that to test non-response bias the respondents might be grouped as early and late respondents, to compare means between two groups on their responses using the t-test analysis to indicate any significant differences. If there are no statistically significant differences between early and late respondents, then there is no non-response bias between respondents (Lewis et al., 2013; Rogelberg & Stanton, 2007).

As mentioned above, therefore, to test non-response bias, all the received questionnaires from 225 samples were divided into essentially two equal groups: the first 113 responses were treated as the early respondents (the first group), and the last 112 responses were treated as the late respondents (the second group). The results from the data analysis showed no differences for each variable from both early and late respondents, excluding diagnostic data analytics. The diagnostic data analytics difference may arise due to the respondent's refusal, reluctance, or difficulty in answering the questionnaires, which may be inevitable when conducting survey research. Despite diagnostic data analytics showing the difference, there will be no effects on the final results because they are instinctual opinions.

The results of non-response biased testing are as follows: Digital cost management ($t = -1.008$, $p = 0.314$), Dynamic Resource Allocation ($t = -0.674$, $p = 501$), Risk Assessment Information System ($t = -1.845$, $p = 0.066$), Business Innovation Effectiveness ($t = -0.076$, $p = 0.939$), Modern Product Creativity ($t = -0.147$, $p = 0.883$), Organizational Trust ($t = -0.560$, $p = 0.576$), Firm Sustainability ($t = 0.885$, $p = 0.377$), Ambidextrous of Top Management ($t = 0.680$, $p = 0.497$), Technological Innovation ($t = 1.291$, $p = 0.198$), Market Competition Pressures ($t = 0.546$, $p = 0.586$), Proactive Culture ($t = 0.274$, $p = 0.785$), Stakeholder Awareness ($t = 0.778$, $p = 0.438$), Disruptive Technology ($t = 0.517$, $p = 0.606$).

These results provide evidence that there were no statistically significant differences between the two groups at a 95% confidence level. Therefore, the finding has no problem of non-response bias, and this research can analyze the statistical

outcomes for hypothesis testing. The results of the non-response bias test are shown in Appendix B.

Measurements

The measure of development procedures involves multiple items development for measuring each construct in the conceptual model. All constructs are transformed into the operational measure by the adaptation or development from the relevant literature. All variables are measured by multiple items because all variables are abstract constructs that cannot be directly measured (Churchill, 1979). To measure each construct in the conceptual model, all variables are developed for measuring from the definition, and all variables gained from the survey are measured by a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Therefore, the variable measurements of the dependent variable, independent variables, and control variables of this research are described as follows.

Dependent Variable

Firm Sustainability

Firm sustainability refers to the firm's outcomes from good practices and actions, which can keep its business activities feasible, long term, and achieve economic, social, and environmental goals (Parida & Wincent, 2019). This construct is measured using a five-item scale consisting of setting a vision and mission, good practice, achieving the goals and objectives, friendly products, and responsibility to the community and society.

Independent Variables

In this research, the independent variable is Proactive Digital Accounting Support, and it is a core construct of this research. Proactive Digital Accounting Support (PDAS) is the provision and analysis of management accounting and finance data about a business and competitors in electronic form through the adoption of digital

technology, which includes the four dimensions: digital cost management, analytic data diagnostic, dynamic resource allocation, and risk assessment information system. These attributes reflect the characteristics of Proactive Digital Accounting Support. The measure of each attribute depends on its definition, as detailed below.

Digital Cost Management

Digital cost management refers to a company's ability to use costing techniques to manage cost, quality and create value for different purposes such as activity-based management (ABM), value chain analysis, life-cycle costing, target costing through the use of digital technology is used to assist in the data analysis to obtaining the cost information of products/services suitable for the specific objectives of the organization (CIMA, 2019; Kanoa & Sorour, 2020). This construct is developed as a new five-item scale from the definition and literature review, which consist of appropriate cost management, modern cost management concepts, adoption of new technologies, seeking digital methods, and excellent operational process.

Diagnostic Data Analytics

Diagnostic data analytics refers to the use of historical information provided by management accounting accumulated over time to analyze current marketing events and compute probable future events by techniques such as data mining, machine learning, artificial intelligence, Etc., regarding behaviors or practices of competitors, customers, and suppliers in an ethically and lawfully manner to lead strategic decision-making (Appelbaum et al., 2017; Köseoglu et al., 2020). Thus, the measure is created from the definition and literature review with a five-item scale: forecasting probable future events, advanced analytics tools, analyzing competitor behavior trends, developing information-generating methods, and analyzing business competition situations.

Dynamic Resource Allocation

Dynamic resource allocation refers to the ability of companies to allocate financial, information technology infrastructure, and human resources that efficiently to attain the company's growth and development and access to on-going processes, resulting in aligning a resource allocation that can be adjusted to strategic choices, quickly and just in time (Hamdar, 2020; Maritan & Lee, 2017). This construct is developed as a new five-item scale based on its definition and literature review; keywords of scale consist of resource allocation (financial, technological, and human resources), analysis of resource utilization data, capabilities of modern technology to allocate resources, corporate resource planning system, and allocate resources suitable for operations.

Risk Assessment Information System

Risk assessment information system refers to the firm's ability to the preparation of financial and non-financial information through analytics leveraging advanced technologies to discover, identify, and assess previously unknown risks, which lead to risk management to provide reasonable assurance about the achievement of the organization's objectives (Köse & Ağdeniz, 2019). This construct is measured using a five-item scale: discovering, identifying, and assessing risks, anticipating potential adverse events, information systems for risk management, improved and developed information systems, and reasonable assurance about achieving objectives.

Mediating Variables

Business Innovation Effectiveness

Business innovation effectiveness refers to the ability of the company to implement innovation, leading to improvements in the manufacturing process and effective operation management or processes that can eliminate waste to a minimum within an operation activity (Kneipp et al., 2019). Hence, the measure is created based on its definition and literature review, which consists of a five-item scale: production

processes and operating systems, develop the production process, reduce the steps and time spent, adjust how it operates, and reduce waste from operating activities.

Modern Product Creativity

Modern product creativity refers to a company's ability to innovate, design, and present new products or improve existing products to a unique feature, creative and modern, to continuously respond to customers' needs (Aydin, 2020). This construct is developed as a new five-item scale: constantly creating modern products, developing outstanding products, designing products, customer acceptance, and increasing market share.

Organizational Trust

Organizational trust refers to promoting and maintaining trust within the organization by recognizing employee satisfaction and attitudes about accepting work routines and implementing management accounting practices, reflecting their expectations about the organization's success and sustainable existence (Men et al., 2020). This construct is measured using a five-item scale adapted from the definition and literature review; keywords of scale consist fairly policies and operating guidelines, developing the knowledge and abilities, progress at work, working environment, and employee engagement in meetings.

Antecedent Variables

Ambidextrous of Top Management

Ambidextrous of top management refers to the management's practice in promoting, supporting, and guiding the organization's employees to be creative in pursuing new methods or practices and improve or develop to increase the effectiveness of existing practices (Dranev et al., 2020; Jingjing Du & Chen, 2018). This construct is measured using a five-item scale consisting of innovative practices, learning and training techniques, allocating budgets and related resources, application of modern technology, and innovative practices-optimizing existing practices.

Technological Innovation

Technological innovation refers to firms' ability to adopt new technologies to apply as support and permit to execute their functions, actions, activities, and operations in an agile manner and success (Zwirtes & Alves, 2014). So, this construct is developed as a new scale from the definition and literature review, including a five-item scale: implementing appropriate technology, promoting the application of modern technology, investment budgets in technology, operations agile and successful, and operations processes efficient.

Market Competition Pressures

Market competition pressures refer to the pressures arising from the strength of business competition, which involved the market participants such as competitors, consumers, and suppliers, including market share, directly related to the business (Günther & Gäbler, 2014; Setiawan, 2020). This construct is developed as a new five-item scale: competitive intensity, improved marketing strategy, product quality development, ability to compete, and competitors' potential development.

Moderating Variables

Proactive Culture

Proactive culture refers to an organization that focuses on pursuing new things, dared to take risks, and can respond to change by constantly seeking market opportunities and seek an edge over the competitors (Wegwu, 2019). The measure is created from the definition and literature review with a five-item scale: giving opinions, improving market position, introducing new products first market, creating products according to future market conditions, and responding quickly to change.

Stakeholder Awareness

Stakeholder awareness is defined as raising awareness in response to sustainability issues and concerns to any individual, group, organization, or institution that pays interested in the organization's performance (Gong et al., 2019). This construct

is measured using a five-item scale adapted from the definition and literature review, which consists of the importance of communication, environmental and social policies, compliance regulations, the process and nature of product projects, and stakeholder acceptance.

Disruptive Technology

Disruptive technology can be defined as the perception of the impact of emerging technologies and technology change, generating a process of actual substitution of a new technique for the old one with combining technologies to create a future capability that impacts the development of management accounting practices (Saputro et al., 2021). This construct is developed as a new five-item scale based on its definition and literature review; keywords of scale consist of technology influence, growth of communication networks, the occurrence of tools, processes, and support systems, emerging technological diversity, and new capabilities of technology.

Control Variables

ISO Type

Prior study indicates that the International Organization for Standardization is undoubtedly factor that have favored, or perhaps imposed, changes in production methods toward creating a system geared to adopting practices capable of generating measurable long-term benefits for social and environmental development (Dicuonzo et al., 2020; Valdez-Juárez et al., 2019). Because International Organization for Standardization (ISO 9001, 14001, and 26001) can help industries sector and other manufacturers enable the ability to effectively design, manufacture, and deliver quality products and services with fewer environmental impacts (Zimon et al., 2020).

The study by Maletič et al. (2015) examined the mechanisms through which ISO can contribute to firm sustainability. The results suggested that ISO could be a reciprocal causal mechanism linking environmental performance and economic performance and can be an effective tool for pursuing sustainable development. Likewise, Zimon et al. (2020) studied the influence of ISO on sustainable supply chain

management in the textile industry (operating in Poland, Slovakia, and the Czech Republic) showed that the organizations that have implemented ISO 14001 have a significant impact on the implementation of sustainability processes. Especially organizations that have implemented both ISO 9001 and ISO 14001 have the most favorable results. The above results are further supported by Salim et al. (2018), who assert that in light of continued concerns over global environmental impacts and climate change, ISO 14001 serves to demonstrate an organizational commitment to sustainable production processes. In addition, Valdez-Juárez et al. (2019) analyzed the influence of ISO 14001 and 26001 on the image and profitability of SMEs in the State of Sonora in Mexico found that ISO 14001 was the most influences the improvement of the business image and the level of profitability of the SME, while ISO 26001 had a partial influence on the image and profitability of the SME.

In this research, ISO is chosen as a control variable because it may affect firm sustainability. Thus, these are dummy variables in which 000 is not certified ISO, 100 is certified ISO 9001, 010 is certified ISO 14001, and 001 is certified ISO 26001.

Industry Type

Industry effects have long played an essential role in strategic management research; some researchers have shown that empirical results differ depending on industry sectors (Sharp et al., 2013).

From the sustainability perspective, certain firms fall into specific are inherently controversial either because of their products or because of the process they adopt to achieve their business objectives, which may impact the environment and society (Jha & Rangarajan, 2020). Previous studies point out that industry type has a significant influence on the disclosure of firm sustainability practices (Frista & Fernando, 2020). Hence, industry type is a control variable because it may affect the disclosure of firm sustainability practices. According to Jha & Rangarajan (2020), industry types are the most prominent variables used in sustainability studies. Their research showed that industry type has a significant effect on the social and

environmental dimensions of sustainability. Additionally, Abbas (2020) used industry type as a control variable to study the impact of total quality management on corporate sustainability through the mediating effect of knowledge management and found that industry type has a significant impact on corporate sustainability.

Previous research showed that the classification of industry groups consisting of agro and food industry, consumer products, property & construction, industrials, resources, services, and technology, excludes the financial as they are not directly associated with various manufacturing (Laskar, 2018). In addition, some companies fall into specific categories known as sensitive industries because the products or processes they adopt to achieve their business objectives may have an impact on the environment and society. For examples of sensitive industries are petroleum, oil and gas, steel, chemical, pharmaceutical, and tobacco-based industries (Jha & Rangarajan, 2020). However, this research classification of industry group follows the manufactured product category for export of Thailand under the regulations of the Ministry of Commerce, Thailand consist agricultural products, agro-industry products, industrial products, and mineral and fuel products excludes other (special transactions) as they are not directly related to the manufacturing industries.

Thus, these are dummy variables in which 0 is sensitive industry groups (industrial products and mineral and fuel products), and 1 is non-sensitive industry groups (agricultural products and agro-industry products).

Methods

All constructs in the conceptual model are newly developed in this research, including being adapted from the relevant literature, and questionnaires were used to collect survey data. To create credibility and accuracy, five academic experts reviewed and adjusted the measurement in the questionnaire to achieve the best possible scale measure. This research used validity and reliability to evaluate the instrument's characteristics to examine the suitability of the questionnaires.

Validity

Validity is the degree of measurement that accurately evinces the concept of consideration (Hair et al., 2010). In order to verify the research instrument of accuracy and validity, two types of validity, comprising content validity and construct validity, are tested.

Content validity

Content validity is the rational judgments by academics that evaluate the adequacy of the measurement, which assesses the connection between the individual items and the concept (Hair et al., 2010). In this study, face and content validity are improved by an extensive review of the literature questionnaires. In addition, professional academics reviewed and suggested the necessary recommendations to examine the instrument to ensure that all constructs were sufficient to cover the contents of the variables based on the relevant theory and literature review (Rosier, Morgan, & Cadogan, 2010). If the result of item-objective congruence (IOC) equals or exceeds 0.50, it is acceptable (Green et al., 1988).

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 (Hair et al., 2010). This research utilizes confirmatory factor analysis (CFA), Average Variance Extracted (AVE), and Composite Reliability (CR) to examine the construct validity of the data in this questionnaire. To ensure the construct validity, the size of the factor loading must be larger than the 0.50 cut-off and be statistically significant (Costello & Osborne, 2005). The AVE value must be greater than 0.50; it is acceptable (Fornell & Larcker, 1981). In addition, the CR value should be greater than 0.70 (Nunnally & Bernstein, 1994).

Reliability

Reliability refers to the degree of the measurement in the questionnaire that is true and error-free of the observed variable, which designates the internal consistency between the multiple variables (Hair et al., 2010). The way to estimate the reliability indicator is Cronbach's alpha coefficient (Tavakol & Dennick, 2011). Thus, this research employs internal consistency for evaluating the reliability of the measurement by using Cronbach's alpha to assure internal consistency.

Cronbach's alpha coefficient values of more than 0.7 are considered good, but more than 0.5 are acceptable. In addition, Hair et al. (2014) suggest that in exploratory research, values of composite reliability or Cronbach alpha between 0.60 - 0.70 are acceptable. Thus, this research shows that the reliability test of all constructs is shown in Table 9. Furthermore, the result of Cronbach's alpha coefficients was between 0.827to0.896, which exceeds the acceptable cut-off score (Hair et al. (2014). Therefore, it can be concluded that the internal consistency of the full scale exists in this research.

Table 9 Reliability Value of Try Out Questionnaire

Variable	Item	Cronbach's alpha (α)
Digital Cost Management	5	0.876
Diagnostic Data Analytics	5	0.860
Dynamic Resource Allocation	5	0.892
Risk Assessment Information System	5	0.827
Business Innovation Effectiveness	5	0.885
Modern Product Creativity	5	0.890
Organizational Trust	5	0.885
Firms Sustainability	5	0.870
Ambidextrous of Top Management	5	0.896
Technological Innovation	5	0.884
Market Competition Pressures	5	0.894
Proactive Culture	5	0.868
Stakeholder Awareness	5	0.853
Disruptive Technology	5	0.895

Note: N= 225

Statistical Techniques

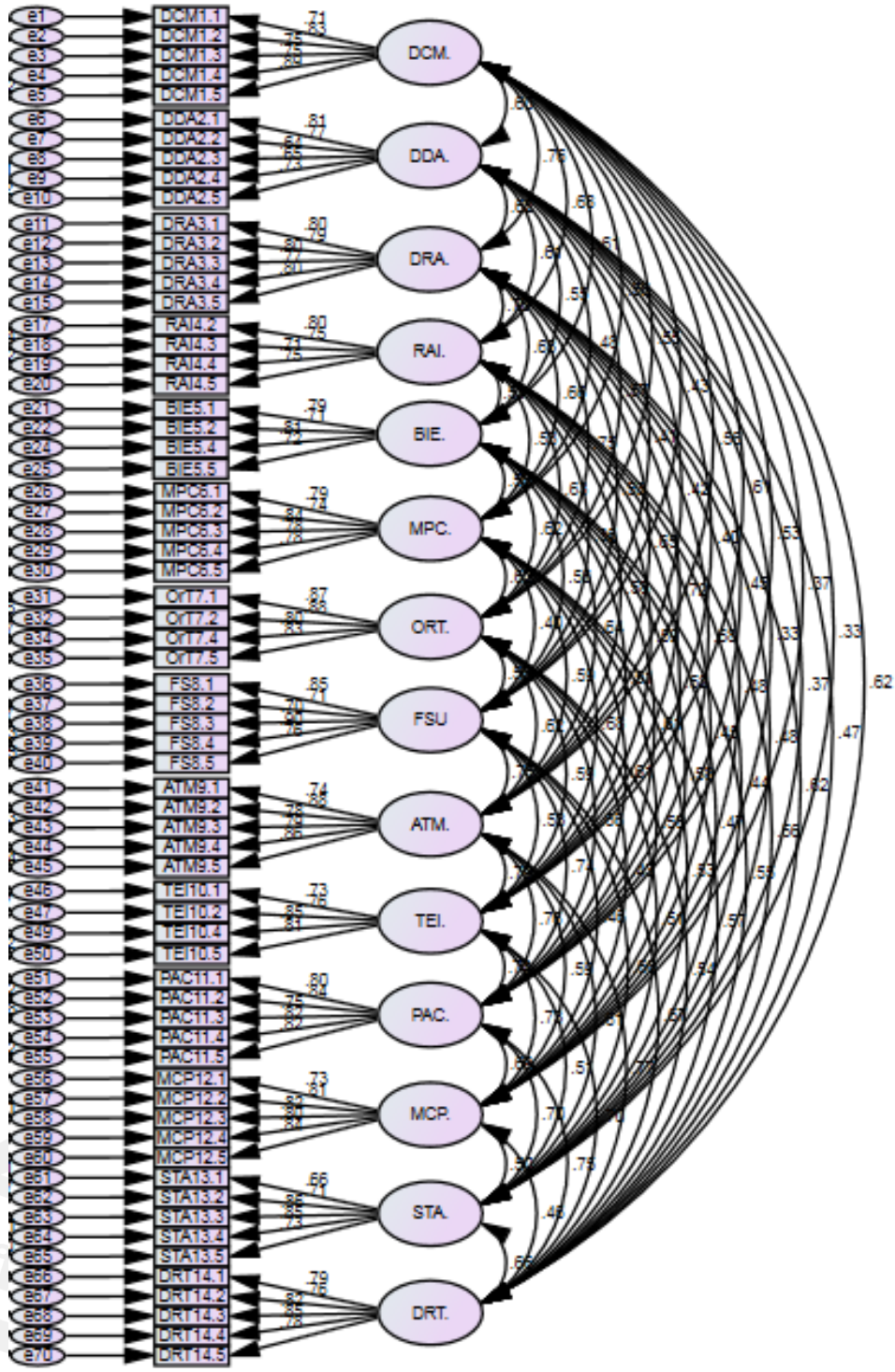
To answer the research questions and prove the proposed hypotheses, the data derived from the survey is analyzed to test the research hypotheses. In this research, data were analyzed using several statistical techniques such as descriptive analysis (e.g., Frequency, Percentage, Mean ($\bar{x}$), Standard Deviation (S.D)), Confirmatory Factor Analysis (CFA), and analysis to test hypotheses were conducted using Structural Equation Modeling (SEM) to test the relationships between the constructs and determine the predictive power of the model. A brief description of the main methods used is presented in the subsequent sections.

Confirmatory Factor Analysis (CFA)

The data collected were tested for reliability and validity by using confirmatory factor analysis (CFA) to test the measurement model of Proactive Digital Accounting Support constructs. The factor analysis was performed with the data obtained from the questionnaires administered for all variables to examine that each of the constructs measured something different and to evaluate the significance of the factor. In addition, confirmatory factor analysis (CFA) aims to verify that each of the questions measured the construct as designed, which illustrates the validity of constructs in the research model. Moreover, any items can be removed if the test results are unsatisfactory or inappropriate for the model evaluation (Fuzi et al., 2018).

This research follows the criteria of goodness-of-fit indexes that take a more pragmatic approach to the evaluation process. One of the first fit statistics to address this problem is the $\chi 2$/degree of freedom ratio, which appears as CMIN/DF in the AMOS output file. Many alternative indexes of fit were considered as criteria for evaluation model-fitting.

The result of CFA for all variables suggests that this measurement model fits the data. The $\chi 2$/df index is equal to 1.665, which is below the referable threshold of 2.00 (Hair et al., 2010), the RMSEA index (0.054) is under the 0.80 (Steiger, 2000), the CFI = .914 valued greater than 0.90 recommended by Byrne (2001). The IFI = .917, which values above 0.90 (Bollen, 1989). All regression coefficients between each measurement item and its corresponding dimension in the first-order confirmatory factor analysis are significant at the p-value < 0.001 level, as shown in Figure 8.



$\chi 2 = 2799.152$, df = 1681, $\chi 2/df = 1.665$, IFI = 0.917,

CFI = 0.914, RMSEA = 0.054

Figure 8 The Confirmatory Factor Analysis

Testing the construct validity

Before examining the hypothesized structural model, the measurement instruments need to be evaluated. For this, the procedure outlined by Hair et al. (2014) was performed to examine the measurement model for indicator reliability, internal consistency reliability, convergent validity, and discriminant validity, using reflective indicators for all constructs. Thus, indicator reliability was evaluated by each indicator loading, and factor loading ranged from 0.644 to 0.90, with all variables having a factor loading higher than 0.5 (Costello & Osborne, 2005), which indicates that the measurement model is entirely satisfactory. Internal consistency reliability was examined using composite reliability (CR). For all constructs, the SEM-based CR ranged from 0.84 to 0.91, which exceeded the suggested cutoff value of 0.70 or above (Fornell, C., & Larcker, 1981; Nunnally & Bernstein, 1994).

Convergent validity was tested by inspecting the average variance extracted (AVE), in which reading values should be greater than 0.5 (Fornell & Larcker, 1981). For all constructs, the AVE ranged from 0.525 to 0.717. Therefore, the results provide evidence for validity. The indicator factor loading, CR and AVE values are shown in Table 10.

Table 10 Factor Loading, Composite Reliability and Average Variance Extracted

Items	Factor loading	CR	AVE
Digital Cost Management:		0.892	0.625
DCM1	0.715		
DCM2	0.829		
DCM3	0.751		
DCM4	0.754		
DCM5	0.891		
Diagnostic Data Analytics:		0.846	0.525
DDA1	0.813		
DDA2	0.768		
DDA3	0.644		
DDA4	0.650		
DDA5	0.734		
Dynamic Resource Allocation:		0.893	0.626
DRA1	0.799		
DRA2	0.786		
DRA3	0.803		
DRA4	0.772		
DRA5	0.795		
Risk Assessment Information System:		0.840	0.567
RAI1	0.429 (cut)		
RAI2	0.797		
RAI3	0.749		
RAI4	0.709		
RAI5	0.754		

Table 10 Factor Loading, Composite Reliability and Average Variance Extracted (Continued)

Items	Factor loading	CR	AVE
Business Innovation Effectiveness:		0.845	0.577
BIE1	0.787		
BIE2	0.709		
BIE3	0.433 (cut)		
BIE4	0.812		
BIE5	0.725		
Modern Product Creativity:		0.890	0.619
MPC1	0.789		
MPC2	0.742		
MPC3	0.836		
MPC4	0.781		
MPC5	0.781		
Organizational Trust:		0.910	0.717
ORT1	0.874		
ORT2	0.880		
ORT3	0.483 (cut)		
ORT4	0.798		
ORT5	0.832		

Table 10 Factor Loading, Composite Reliability and Average Variance Extracted (Continued)

Items	Factor loading	CR	AVE
Firms Sustainability:		0.891	0.623
FSU1	0.854		
FSU2	0.706		
FSU3	0.701		
FSU4	0.900		
FSU5	0.765		
Ambidextrous of Top Management:		0.906	0.659
ATM1	0.741		
ATM2	0.881		
ATM3	0.784		
ATM4	0.790		
ATM5	0.855		
Technological Innovation:		0.868	0.622
TEI1	0.726		
TEI2	0.760		
TEI3	0.449 (cut)		
TEI4	0.850		
TEI5	0.813		
Market Competition Pressures:		0.899	0.642
MCP1	0.735		
MCP2	0.808		
MCP3	0.821		
MCP4	0.799		
MCP5	0.839		

Table 10 Factor Loading, Composite Reliability and Average Variance Extracted (Continued)

Items	Factor loading	CR	AVE
Proactive Culture:		0.904	0.652
PAC1	0.798		
PAC2	0.844		
PAC3	0.753		
PAC4	0.815		
PAC5	0.825		
Disruptive Technology:		0.898	0.638
DRT1	0.786		
DRT2	0.756		
DRT3	0.816		
DRT4	0.854		
DRT5	0.777		
Stakeholder Awareness:		0.875	0.586
STA1	0.663		
STA2	0.709		
STA3	0.862		
STA4	0.847		
STA5	0.727		

Note: (cut) = factor loading < 0.50, which factor loading should be higher than the .50, factor loading cut - off (Costello & Osborne, 2005).

Testing the Correlation Analysis and Discriminant Validity

In this research, there are two purposes for testing correlation on all variables; (1) exploring the relationships among variables and (2) verifying the multicollinearity problem, which might exist when inter- correlation between independent variables

exceeds 0.80 (Hair et al., 2014). The correlation analyses of all variables found that none of the correlations exceeds 0.80, which may not be concerned about multicollinearity problems. In addition, all variables were positively and significantly correlated ($p < 0.001$). The correlation coefficient ranged from 0.328 (digital cost management and stakeholder awareness) to 0.787 (ambidextrous top management and technological innovation).

This research investigated discriminant validity via evaluating the results of the square root of average variance extracted for each dimension according to the guidelines of Fornell & Larcker (1981), where the square root of the AVE should be above the values of both horizontal and vertical correlation coefficients between constructs, and the loading value of an indicator on its construct should be higher than all of its cross-loadings (Chin, 1998; J. F. Hair et al., 2011). As Fornell & Larcker (1981) recommended, the latent factor correlations between pairs of constructs were smaller than the square root of AVE for each construct. The result shows that the square root of AVE was higher than inner construct correlations, which indices are ranging from 0.725 for diagnostic data analytics (DDA) to 0.847 for organizational trust (ORT), which supports the "discriminant validity" and satisfactory internal consistency of the constructs. It concludes that the constructs are free from construct validity problems. These data can be seen in Table 11.

Table 11 Descriptive Statistics, Correlations Coefficients, and Square Root of AVE

Variables	DCM	DDA	DRA	RAI	BIE	MPC	ORT	FSU	ATM	TEI	PAC	MCP	STA	DRT
DCM	**.790**[a]													
DDA	.599***	**.725**[a]												
DRA	.764***	.624***	**.791**[a]											
RAI	.681***	.611***	.701***	**.753**[a]										
BIE	.609***	.553***	.627***	.514***	**.759**[a]									
MPC	.563***	.478***	.657***	.533***	.559***	**.786**[a]								
ORT	.554***	.568***	.750***	.629***	.615***	.621***	**.847**[a]							
FSU	.431***	.407***	.532***	.356***	.558***	.400***	.560***	**.789**[a]						
ATM	.557***	.417***	.650***	.582***	.637***	.587***	.618***	.753***	**.812**[a]					
TEI	.610***	.404***	.718***	.594***	.514***	.679***	.594***	.534***	.787***	**.789**[a]				
PAC	.528***	.453***	.684***	.524***	.611***	.610***	.659***	.744***	.760***	.740***	**.808**[a]			
MCP	.372***	.335***	.480***	.454***	.577***	.576***	.433***	.463***	.592***	.728***	.690***	**.801**[a]		
STA	.328***	.369***	.479***	.439***	.467***	.531***	.506***	.681***	.613***	.509***	.702***	.500***	**.765**[a]	
DRT	.621***	.466***	.617***	.562***	.545***	.573***	.536***	.674***	.771***	.700***	.746***	.457***	.661***	**.799**[a]
Mean	4.055	4.161	4.114	3.943	4.044	4.076	4.121	4.164	4.063	3.981	4.128	4.136	4.101	4.044
S.D.	0.533	0.488	0.564	0.483	0.550	0.576	0.591	0.515	0.562	0.543	0.552	0.545	0.540	0.536

Note: N= 225 *** Correlation is significant at the 0.001 level (2-tailed).

[a] The square root of AVE was shown as bold numbers on the diagonals

Common Method Variance

The Common method variance (CMV) is a potential problem in our research because a single respondent completed the survey for each firm, used the same measurement method, or always used positives or negatives questions, which will affect results in analysis error (Podsakoff et al., 2003).

The Common method variance (CMV) in this research was evaluated through Harman's single-factor test. Ideally, a single factor should not explain more than 50% of the variation (Sami et al., 2018). Exploratory Factor Analysis (EFA) showed that the maximum variance explained by one factor was 38.75%. Hence, it was confirmed that common method variance was not an issue in this study, are shown in table 12.

Table 12 Total Variance Explained (partial indicated)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	25.577	38.753	38.753	25.577	38.753	38.753
2	3.848	5.830	44.583			
3	3.159	4.786	49.369			
4	2.670	4.045	53.414			
.	.	.	.			
.	.	.	.			
66	0.041	0.062	100.000			

Extraction Method: Principal Component Analysis.

Testing the Assumptions of Structural Equation Model

This research used SEM in path analysis to examine the influence of ambidextrous of top management, technological innovation, market competition pressures, and the dimension of Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk

assessment information system), business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability.

Many scholars (e.g., Hair et al., 1998; Sit, Ooi, Lin, & Chong, 2009) have suggested the two-stage method of modeling to perform SEM, through which CFA is verified before the examination of the structural model. In this research, AMOS (Analysis of Moment Structures) version 24 is used to assess the construct measures and model fitting. SEM can perform Path Analysis for all of these tasks. However, Lee et al. (2010) stated that, before conducting Path analysis, the assumptions of multivariate analysis must be investigated first. This is followed by an assessment of the structural model. The procedures adopted for these processes will be discussed in the following subsections.

Sample size

Before the data examination, statistical assumptions and hypotheses related to the SEM sample size should be analyzed first (Lee et al., 2010). Comrey and Lee's (1992) study suggested that a sample size of 200 is fair while 300 is good. However, Anderson and Gerbing (1988) recommend that 150 samples size be sufficient for analysis using structural equation statistics.

Thus, the sample size of this study (n = 225) was within the acceptable range and can be considered adequate, which meets the requirement of sample size in SEM.

Univariate Normality Test

The normality test used in this study was performed to measure skewness and kurtosis along with the standard error of skewness and standard error of kurtosis. Nonetheless, skewness is a measurement of how irregular the probability distribution is in relation to a normal distribution. Before testing a hypothesis, it must also undergo Kurtosis, which is the process to evaluate the combined distribution of data in the tails. According to Kline (2005) has recommended that in terms of absolute values, skewness

will be considered as highly expressed if it is more than 3.00. In addition, the research of Hair et al. (2006) considers the skewness value, which is not more than ± 2 is considered within acceptable criteria. Meanwhile, the absolute values of kurtosis greater than ± 3.00 in magnitude may be considered as problematic (Westfall & Henning, 2013). This study, consider the skewness value, it was found that within the range of -0.26 to 0.074, which is not more than ± 2 is considered within acceptable criteria (Hair et al., 2006). While, the kurtosis, falls within the range -0.931 to -0.212, which is not more than ± 3 is considered within acceptable criteria (Westfall & Henning, 2013). The results of the Univariate Normality Test are shown in Appendix C.

Multicollinearity

There was a need to test for multicollinearity because it could cause parameter estimation problems between constructs (Hair et al., 2016). To detect multicollinearity, variance inflation factors (VIFs) and tolerances were assessed for each construct component. The VIFs of indicators ranged from 1.63 to 3.56. Tolerances ranged from 0.28 to 0.61. All VIFs and tolerances were within acceptable threshold levels (VIF < 5, tolerance > 0.20) (Hair et al., 2016). These findings indicated that multicollinearity is not a problem. These results are demonstrated in Table 13.

Table 13 Variance Inflation Factor (VIF) and Tolerance Value

Constructs	VIF	Tolerance
Digital Cost Management	2.75	0.36
Diagnostic Data Analytics	1.63	0.61
Dynamic Resource Allocation	3.17	0.32
Risk Assessment Information System	2.36	0.42
Business Innovation Effectiveness	2.09	0.48
Modern Product Creativity	1.99	0.50
Organizational Trust	2.63	0.38
Ambidextrous of Top Management	2.97	0.34
Technological Innovation	2.88	0.35
Market Competition Pressures	2.29	0.44
Proactive Culture	3.56	0.28
Stakeholder Awareness	2.02	0.49
Disruptive Technology	2.97	0.34

Note: Dependent variable: Firm Sustainability

Structural Equation Model (SEM)

This research used Structural Equation Modeling (SEM) were the principal method to test the relationships between the constructs and determine the predictive power of the model from data surveys. Structural Equation Modeling (SEM) is used for hypothesis testing as it is a technique that combines aspects of multiple regression and factor analysis that can examine a series of interrelated dependence relationships among the measured variables and latent constructs simultaneously (Fuzi et al., 2018). Another reason for the adoption of this method is the ability to examine the relationships between variables with the hypothesis, measurement hypothesis testing, measurement errors can be minimized, and provide modeling skills with theory (Weston & Gore Jr., 2006). Assessment of model fit, the relevance of the model was indicated by the

goodness-of-fit between the hypothesized model and the sample data. Goodness-of-fit statistics used were Chi-square, Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), Comparative Fit Index (CFI), and Good ness of Fit Index (GFI). The goodness of fit indices for the specified measurement is reported in Table 14.

Table 14 Fit Indices and Acceptable Thresholds of Structural Equation Model Analysis

Fit Index	**Descriptions**	**References**
CMIN ($\chi 2$)	p-value > 0.05	(Hair et al., 2010)
CMIN/DF ($\chi 2$/df) (Absolute Fit Index)	< 2.00 (N < 100) good fit < 2.50 (N < 200) acceptable < 3.00 (N > 200) acceptable	(Hair et al., 2010)
GFI (Goodness of Fit Index)	> 0.90 acceptable > 0.95 perfect fit	(Byrne, 2001) (Hair et al., 2010)
CFI (Comparative Fit Index)	> 0.90 acceptable > 0.95 perfect fit	(Byrne, 2001) (Hair et al., 2010)
NFI (Normed Fit Index)	$\geq$ 0.90 acceptable	(Bollen, 1989)
IFI (Incremental Fit Index)	$\geq$ 0.90 acceptable	(Bollen, 1989)
RFI (Relative Fit Index)	$\geq$ 0.90 acceptable	(Hu & Bentler, 1999)
RMSEA (Root Mean Square Error of Approximation)	< 0.05 perfect fit < 0.08 acceptable	(Steiger, 2000)

Summary

This chapter illustrates the research method used to investigate the collected data and to test the relationships of all constructs in the conceptual model, and answer the research questions. A total of 5,527 firms are from the database of the Ministry of Commerce database in Thailand, Information Technology and Communication Center (www.moc.go.th). A questionnaire mail survey was sent to the chief financial officers, managing directors, or accounting executives of each entrepreneur as the key informants. This chapter also provides the measurements of each construct and summarizes those which are based on the literature review as shown in Table 15.

Table 15 Operational Definitions and Keywords of Constructs

Constructs	Operational Definitions	Keywords	Scale Sources
Dependent variable Firm Sustainability (FSU)	The firm's outcomes from good practices and actions, which can keep its business activities feasible, long term, and achieve economic, social, and environmental goals.	- setting a vision and mission - good and efficient practice - achieves the goals and objectives - friendly products - responsibility to the community and society	Parida & Wincent (2019)
Independent Variables Digital Cost Management (DCM)	The firm's ability to use costing techniques to manage cost, quality and create value for different purposes such as activity-based management (ABM), value chain analysis, life-cycle costing, target costing through the use of digital technology to obtaining the cost information of products suitable for the specific objectives of the organization.	- appropriate cost management - modern cost management concepts - adopting new technologies - seeks digital methods - excellent operational process	CGMA (2019); Kanoa & Sorour (2020)

Table 15 Operational Definitions and Keywords of Constructs (Continued)

Constructs	Operational Definitions	Keywords	Scale Sources
Diagnostic Data Analytics (DDA)	The use of historical information provided by management accounting accumulated over time to analyze current marketing events and compute probable future events by variety of advanced techniques through digital technology.	- forecasting probable future events - advanced analytics tools - analyze competitor behavior trends - developing information-generating methods - analyzing business competition situations	Appelbaum et al. (2017); Köseoglu et al. (2020)
Dynamic Resource Allocation (DRA)	The ability of companies to allocate financial, information technology infrastructure, and human resources that efficiently to attain the company's growth and development and access to on-going processes, resulting in align a resource allocation that can be adjusted to strategic choices, quickly and just in time	- resource allocation (financial, technological, and human resources) - analyzes resource utilization data - capabilities of modern technology to allocate resources - corporate resource planning system - allocate resources suitable for operations	Hamdar (2020); Maritan & Lee (2017)

Table 15 Operational Definitions and Keywords of Constructs (Continued)

Constructs	Operational Definitions	Keywords	Scale Sources
Risk Assessment Information System (RAI)	The ability to the preparation of financial and non-financial information through analytics leveraging advanced technologies to discover, identify, and assess previously unknown risks, which lead to risk management to provide reasonable assurance about the achievement of the organization's objectives.	- discover, identify, and assess risks - anticipate potential adverse events - information systems for risk management - improved and developed information systems - reasonable assurance about achieving objectives	Köse & Ağdeniz (2019)
Consequence Variables			
Business Innovation Effectiveness (BIE)	The ability of the company to implement innovation, leading to improvements in the manufacturing process and effective operation management or processes that can eliminate waste to a minimum within an operation activity.	- production processes and operating systems - develop the production process - reduce the steps and time spent - adjust how it operates - reduce waste from operating activities	Kneipp et al. (2019)

Table 15 Operational Definitions and Keywords of Constructs (Continued)

Constructs	Operational Definitions	Keywords	Scale Sources
Modern Product Creativity (MPC)	The company's ability to innovate, design, and present new products or improve existing products to a unique feature, creative and modern, to continuously respond to customers' needs.	- constantly creates modern products - develop outstanding products - design products - customer acceptance - increase market share	Aydin (2020)
Organization Trust (ORT)	Promoting and maintaining trust within the organization by recognizing employee satisfaction and attitudes about accepting work routines and implementing management accounting practices, reflecting their expectations about the organization's success and sustainable existence.	- fairly policies and operating guidelines - developing the knowledge and abilities - progress at work - working environment - employee engagement in meetings	Men et al. (2020)

Table 15 Operational Definitions and Keywords of Constructs (Continued)

Constructs	Operational Definitions	Keywords	Scale Sources
Antecedent Variables			
Ambidextrous of Top Management (ATM)	The management's practice in promoting, supporting, and guiding the organization's employees to be creative in pursuing new methods or practices and improve or develop to increase the effectiveness of existing practices.	- innovative practices - learn and train techniques - allocating budgets and related resources - application of modern technology - innovative practices and optimizing existing practices	Dranev et al. (2020); Jingjing Du & Chen (2018)
Technological Innovation (TEI)	The firms' ability to adopt new technologies to apply as support and permit to execute their functions, actions, activities, and operations in an agile manner and success.	- implementing appropriate technology - promotes the application of modern technology - investment budgets in technology - operations agile and successful - operations processes efficient	Zwirtes & Alves (2014)

Table 15 Operational Definitions and Keywords of Constructs (Continued)

Constructs	Operational Definitions	Keywords	Scale Sources
Market Competition Pressures (MCP)	The pressures arising from the strength of business competition, which involved the market participants such as competitors, consumers, and suppliers, including market share, directly related to the business.	- competitive intensity - improve marketing strategy - product quality development - ability to compete - competitors' potential development	Günther & Gäbler (2014); Setiawan (2020)
Moderating Variables			
Proactive Culture (PAC)	The organization that focuses on pursuing new things, dared to take risks, and can respond to change by constantly seeking market opportunities and seek an edge over the competitors.	- giving opinions - improve market position - introducing new products first market - create products according to future market conditions - responding quickly to change	Macaulay Enyindah (2019)

Table 15 Operational Definitions and Keywords of Constructs (Continued)

Constructs	Operational Definitions	Keywords	Scale Sources
Stakeholder Awareness (STA)	As raising awareness in response to sustainability issues and concerns to any individual, group, organization, or institution that pays interested in the organization's performance.	- importance of communicates - environmental and social Policies - compliance regulations - process and nature of product projects - acceptance from stakeholders	Gong et al. (2019)
Disruptive Technology (DRT)	The perception of emerging technology generates a process of actual substitution of a new technique for the old one with combining technologies to create a future capability that impacts the development of management accounting practices.	- technology influence - growth of communication networks - occurrence of tools, processes, and support systems - emerging technological diversity - new capabilities of technology	Saputro et al. (2021)

Table 15 Operational Definitions and Keywords of Constructs (Continued)

Constructs	Operational Definitions	Keywords	Scale Sources
Control Variables			
ISO Type (ISO)	The firms with International Organization for Standardization (ISO) certified and implemented the ISO 9001or the ISO 14001 or ISO 26001.	Dummy variable 000 = do not achieved ISO 100 = achieved ISO 9001 010 = achieved ISO 14001 001 = achieved ISO 26001	-
Industry Type (INT)	The classification of a listed company's industry by incorporating similar businesses into the same group.	Dummy variable 0 = sensitive industry groups 1 = non-sensitive industry groups	-

CHAPTER IV

RESULTS

The previous chapter has described the research methods which concern the population, sample selection, data collection, and the test of non- response bias. Accordingly, research methods help to clarify the testable hypotheses in order to achieve the research objectives and research questions. In this chapter, the results of the hypothesis testing are illustrated and describe the respondent's and the entrepreneurial characteristics with descriptive statistics. This chapter is organized as follows. Firstly, this chapter presents the demographic profile and business profile. Secondly, the hypothesis testing and the results with detail. Finally, the summary of the hypothesis testing. In addition, abbreviations of statistical values in this research are presented below.

The abbreviations of all variables:

DCM	=	Digital Cost Management
DDA	=	Diagnostic Data Analytics
DRA	=	Dynamic Resource Allocation
RAI	=	Risk Assessment Information System
BIE	=	Business Innovation Effectiveness
MPC	=	Modern Product Creativity
ORT	=	Organizational Trust
FSU	=	Firms Sustainability
ATM	=	Ambidextrous of Top Management
TEI	=	Technological Innovation
MCP	=	Market Competition Pressures
PAC	=	Proactive Culture
STA	=	Stakeholder Awareness

DRT	=	Disruptive Technology
ISO	=	ISO Standard Type
INT	=	Industry Type

The abbreviations of statistical symbols:

α	=	Coefficient alpha
AVE	=	Average Variance Extracted
β	=	Beta
CFI	=	Comparative Fit Index
CR or ρ	=	Composite Reliability
df	=	Degree of freedom
GFI	=	Goodness of Fit Index
IFI	=	Incremental Fit Index
NFI	=	Normed Fit Index
r	=	Correlation coefficients
p-value	=	Level of marginal significance
R^2	=	Squared factor loading
RFI	=	Relative Fit Index
RMSEA	=	Root Mean Square Error of Approximation
S.D.	=	Standard Deviation
t-value	=	t-statistics
χ^2	=	Chi-square
$\chi^{2/df}$	=	Chi-square Mean/Degree of Freedom
$\bar{x}$	=	Mean

Demographic Profile and Business Profile

Respondent Characteristics

The exporting businesses in Thailand were selected for this survey, resulting in 225 usable questionnaires for analysis. In this research, the respondents are chief financial officers, managing directors, or accounting executives of each exporters firm, as they were more likely to have a comprehensive overview of the strategic issues across the whole company (Alamri, 2019). The descriptive statistics are used to show the characteristics of the respondents in Table 7. This table consists of the main characteristics of the respondents. The respondent characteristics are described by demographic characteristics, including gender, age, and marital status, education level, working experience, salary, and working position. Mostly, the respondents are female (81.3%). The age of respondents is 41-50 years old (51.1%). The marital status of the respondents is married (51.6%). The educational level of the respondents is a bachelor's degree or lowers (58.2%). The working experiences are more than 20 years of working experience (55.5%). The salary of the respondents is 50,001 - 100,000 baht (41.3%). Finally, questions about the respondents' perspective of the working position in the business were mostly accounting executive/manager (54.7%). For more details, see Table 16.

Table 16 Demographic Profile of Respondents

Variable	Scale	Total	Percent
Gender	Male	42	18.7
	Female	183	81.3
Age	Not over 30 years	11	4.9
	31-40 years	24	10.7
	41-50 years	115	51.1
	More than 50 years	75	33.3

Table 16 Demographic Profile of Respondents (Continued)

Variable	Scale	Total	Percent
Marital status	Single	100	44.4
	Married	116	51.6
	Divorced	9	4.0
Educational Level	Bachelor's degree or lower	131	58.2
	Higher than Bachelor's degree	94	41.8
Working experience	Not over 10 years	18	8.0
	11 - 15 years	42	18.7
	16 - 20 years	40	17.8
	More than 20 years	125	55.5
Salary	Not over 50,000 Baht	49	21.8
	50,001 - 100,000 Baht	93	41.3
	100,001 - 150,000 Baht	67	29.8
	More than 150,000 Baht	16	7.1
Working position	Chief financial officers	57	25.3
	Accounting executive/manager	123	54.7
	Managing director	12	5.3
	Others	33	14.7

Profile Characteristics of Businesses

The results of the demographic characteristics of 225 businesses surveyed indicated that most respondents had registered as a company limited (80.5%). Most of the industry types surveyed were industrial products (42.2%). In addition, the majority of respondents have been the periods of business have more than 15 years (76.9%). The registered capitals are not over 200,000,000 baht (41.3%). Most businesses surveyed have more than 600 employees (48.0 %). In the section dealing with average annual income, the majority of respondents identified had revenues of more than 150,000,000

baht (77.3%). Besides, questions about ISO showed that most exporting businesses have ISO 9001 (48.7%). (For more details, see Table 17).

Table 17 Profile of Exporting Business

Variable	Scale	Total	Percent
Business Entity	Company Limited	181	80.5
	Public Company Limited	39	17.3
	Limited Partnership	5	2.2
Industry type	Agricultural products	37	16.4
	Agro-industry products	78	34.7
	Industrial products	95	42.2
	Mineral and fuel products	15	6.7
The period of business	Not over 5 years	7	3.1
	6 – 10 years	20	8.9
	11 – 15 years	25	11.1
	More than 15 years	173	76.9
Registered capital	Not over 200,000,000 baht	93	41.3
	200,000,001 – 500,000,000 baht	29	12.9
	500,000,001 – 1,000,000,000 baht	38	16.9
	More than 1,000,000,000 baht	65	28.9
Number of employees	Not over 200	29	12.9
	201 - 400	35	15.6
	401 – 600	53	23.5
	More than 600	108	48.0
Average annual income	50,000,001 – 100,000,000 Baht	6	2.7
	100,000,001 – 150,000,000 Baht	45	20.0
	More than 150,000,000 Baht	174	77.3

Table 17 Profile of Exporting Business (Continued)

Variable	Scale	Total	Percent
ISO certified	No	1	0.3
	ISO 9001	188	48.7
	ISO 14001	158	40.9
	ISO 26001	14	6.5
	Other	25	11.1

Structural Equation Modeling Analysis (SEM)

Structural equation modeling analysis (SEM) was employed to investigate the hypothesized relationships in this research. Using a statistical package, the causal relationships were examined between ambidextrous of top management, technological innovation, market competition pressures, disruptive technology, Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system), proactive culture, business innovation effectiveness, modern product creativity, organizational trust, stakeholder awareness, and firm sustainability. The results also were tested for reliability and validity and the fit of the measurement model was completed.

The criteria for determining the goodness of fit of the model were the Chi-square test, CFI, IFI, NFI, RFI, and RMSEA. The p-values of the Chi-square test should be more than .05 to not reject the null hypothesis (Byrne, 2001). $\chi 2/df$ should be lower than 2.00 for the goodness of fit result (Bollen, 1989) or between 2.00 to 5.00 is the available goodness of fit (Byrne, 2001). The explanation is that the observed and estimated covariance matrixes are not different. Fornell & Larcker (1981) suggested that in such a study other fit indices should be considered rather than merely a p-value to evaluate the goodness of fit between the observed and estimated model when the sample size is large. Figure 9 shows the structural model of main effect.

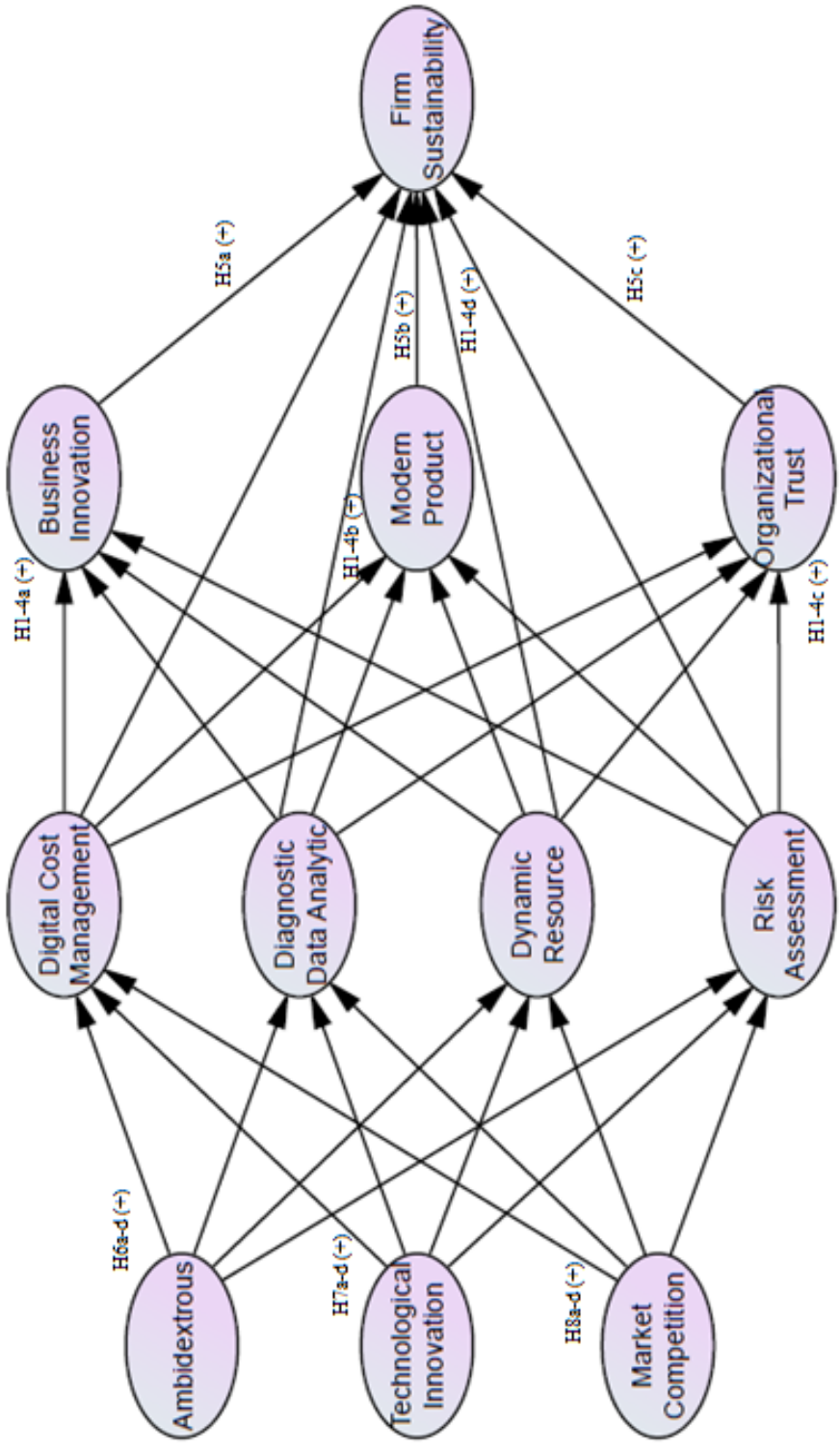
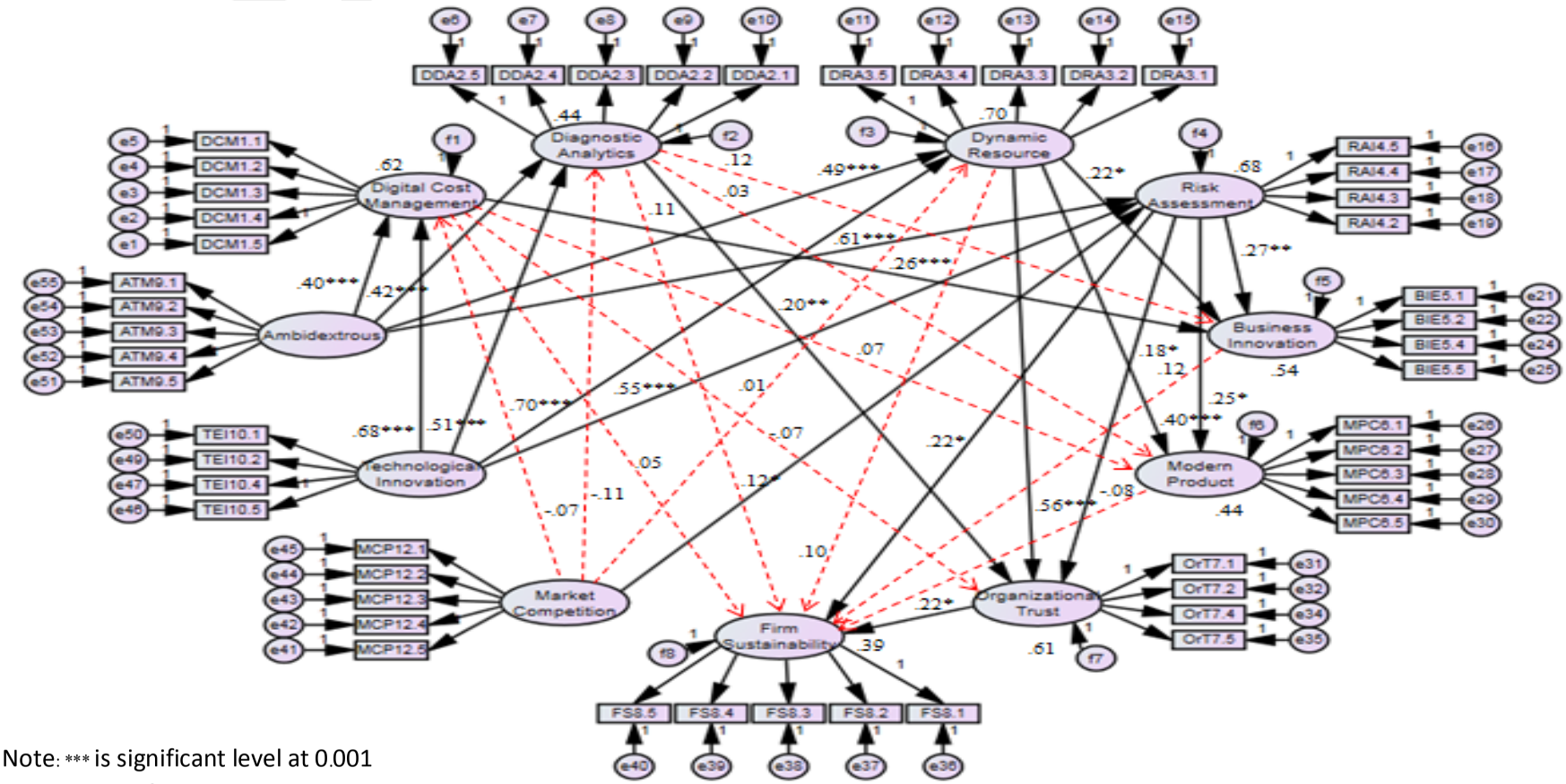


Figure 9 Structural Model of Main Effect

Main hypotheses testing

The result of the model assessment and parameter estimation is illustrated in Figure 10. To easily observe the model fitting results, the fit indices from the results of the proposed model are compared to the threshold/cutoff points as recommended by researchers. The results of the model fit evaluation of ambidextrous of top management, technological innovation, market competition pressures, digital cost management, diagnostic data analytics, dynamic resource allocation, risk assessment information system, business innovation effectiveness, modern product creativity, and organizational trust based on the firm sustainability framework are displayed the testing goodness-of-fit indices for the structural model as in Table 18.



Note: *** is significant level at 0.001
** is significant level at 0.01
* is significant level at 0.05
→ is supported
- - -→ is not supported

$\chi 2 = 1817.753$, df = 942, $\chi 2/df = 1.930$, IFI = 0.908,

CFI = 0.905, RMSEA = 0.064

Figure 10 The Structural Model for Main Hypotheses Testing (see Table 19)

Table 18 Comparison of Goodness-of-Fit Index of Proposed Model and the Recommended Points

Goodness-of-fit indices	The cutoff point	Proposed model
CMIN/DF ($\chi 2/df$)	< 3.00	1.930
IFI	> 0.90	0.908
CFI	> 0.90	0.905
RMSEA	< 0.08	0.064

Table 18 reports the model fit statistics results of Figure 10 because the CMIN/DF is less than 3.00 (Hair et al., 2010). The Incremental Fit Index (IFI) and comparative fit index (CFI) are more than 0.90 (Bollen, 1989; Byrne, 2001). Root mean square error of approximation (RMSEA) values is less than .08 (Steiger, 2000).

Hypotheses Testing and Results

The results of the structural equation modeling analysis are shown in this section. The causal relationships were investigated among ambidextrous of top management, technological innovation, market competition pressures, disruptive technology, digital cost management, diagnostic data analytics, dynamic resource allocation, risk assessment information system, proactive culture, business innovation effectiveness, modern product creativity, organizational trust, stakeholder awareness, and firm sustainability by using a statistical package. The results were verified for reliability and validity, including the fit of the measurement model was finished. Simultaneously, the structural model of this research was modified to fit with the analyzed data and displayed the fit index in the previous section. Thus, hypotheses testing and results are presented in this section.

As previously discussed, the proposed model Figure 10 shows the structural relationships among all main constructs. Whereas, parameter estimation and the significance test are shown in Table 19.

Table 19 Main Effect: Parameter Estimation and the Significance Test

Hypotheses	Estimated relationship coefficients		S.E.	t-value	p-value
	Unstandardized	Standardized			
H1a: DCM → BIE	0.204	0.257	0.060	3.411	0.000***
H1b: DCM → MPC	0.066	0.068	0.064	1.030	0.303
H1c: DCM → ORT	-0.067	-0.065	0.072	-0.921	0.357
H1d: DCM → FSU	0.039	0.045	0.058	0.668	0.504
H2a: DDA → BIE	0.126	0.124	0.072	1.749	0.080
H2b: DDA → MPC	0.039	0.031	0.091	0.427	0.669
H2c: DDA → ORT	0.259	0.198	0.083	3.128	0.002**
H2d: DDA → FSU	0.122	0.111	0.087	1.397	0.163
H3a: DRA → BIE	0.184	0.220	0.077	2.387	0.017*
H3b: DRA → MPC	0.404	0.397	0.098	4.107	0.000***
H3c: DRA → ORT	0.607	0.559	0.106	5.750	0.000***
H3d: DRA → FSU	0.094	0.104	0.113	0.838	0.402
H4a: RAI → BIE	0.337	0.268	0.114	2.961	0.003**
H4b: RAI → MPC	0.375	0.246	0.147	2.553	0.011*
H4c: RAI → ORT	0.295	0.182	0.129	2.297	0.022*
H4d: RAI → FSU	0.298	0.219	0.140	2.131	0.033*
H5a: BIE → FSU	0.124	0.115	0.093	1.326	0.185
H5b: MPC → FSU	-0.071	-0.079	0.069	-1.030	0.303
H5c: ORT → FSU	0.183	0.219	0.086	2.143	0.032*
H6a: ATM → DCM	0.373	0.396	0.048	7.731	0.000***
H6b: ATM → DDA	0.310	0.421	0.050	6.171	0.000***
H6c: ATM → DRA	0.432	0.485	0.054	8.056	0.000***
H6d: ATM → RAI	0.363	0.609	0.046	7.920	0.000***

Table 19 Main Effect: Parameter Estimation and the Significance Test (Continued)

Hypotheses	Estimated relationship coefficients		S.E.	t-value	p-value
	Unstandardized	Standardized			
H7a: TEI → DCM	0.903	0.679	0.096	9.441	0.000***
H7b: TEI → DDA	0.524	0.505	0.085	6.154	0.000***
H7c: TEI → DRA	0.883	0.704	0.104	8.465	0.000***
H7d: TEI → RAI	0.459	0.546	0.067	6.800	0.000***
H8a: MCP → DCM	-0.066	-0.070	0.047	-1.413	0.158
H8b: MCP → DDA	-0.081	-0.110	0.045	-1.793	0.073
H8c: MCP → DRA	0.013	0.014	0.045	0.286	0.775
H8d: MCP → RAI	0.070	0.116	0.034	2.057	0.040*

Note: *** significance level at .001, ** significance level at .01, * significance level at .05

Table 19 can conclude of structure model as follow: Firstly, the result indicates that digital cost management of the Proactive Digital Accounting Support (PDAS) is positively and significance related to business innovation effectiveness (t-value = 3.411, p-value = 0.000), while modern product creativity (t-value = 1.03, p-value = 0.303), organizational trust (t-value = -0.921, p-value = 0.357), and firm sustainability (t-value = 0.668, p-value = 0.504) are not significant in the structural relationship. ***Thus, hypothesis 1a is supported***. And ***hypothesis 1b, 1c, and 1d are not supported***.

Secondly, it is found that diagnostic data analytics of the Proactive Digital Accounting Support (PDAS) is positively and significantly related to organizational trust (t-value = 3.128, p-value = 0.002), while business innovation effectiveness (t-value = 1.749, p-value = 0.080), modern product creativity (t-value = 0.427, p-value = 0.669), and firm sustainability (t-value = 1.397, p-value = 0.163) are not significant in the structural

relationship. ***Thus, hypothesis 2c is supported. And hypothesis 2a, 2b, and 2d are not supported.***

Thirdly, the result of this test reveals that dynamic resource allocation of the Proactive Digital Accounting Support (PDAS) is significant and positive in the structural relationship to business innovation effectiveness (t-value = 2.387, p-value = 0.017), modern product creativity (t-value = 4.107, p-value = 0.000), and organizational trust (t-value = 5.750, p-value = 0.000), while firm sustainability (t-value = 0.838, p-value = 0.402) is not significant in the structural relationship. ***Thus, hypothesis 3a, 3b, and 3c are supported. And hypothesis 3d is not supported.***

Fourthly, the result of this test reveals a positive and significant relationship between risk assessment information system of the Proactive Digital Accounting Support (PDAS) and business innovation effectiveness (t-value = 2.961, p-value = 0.003), modern product creativity (t-value = 2.553, p-value = 0.011), organizational trust (t-value = 2.297, p-value = 0.022), and firm sustainability (t-value = 2.131, p-value = 0.033). ***Thus, hypothesis 4a, 4b, 4c, and 4d are supported.***

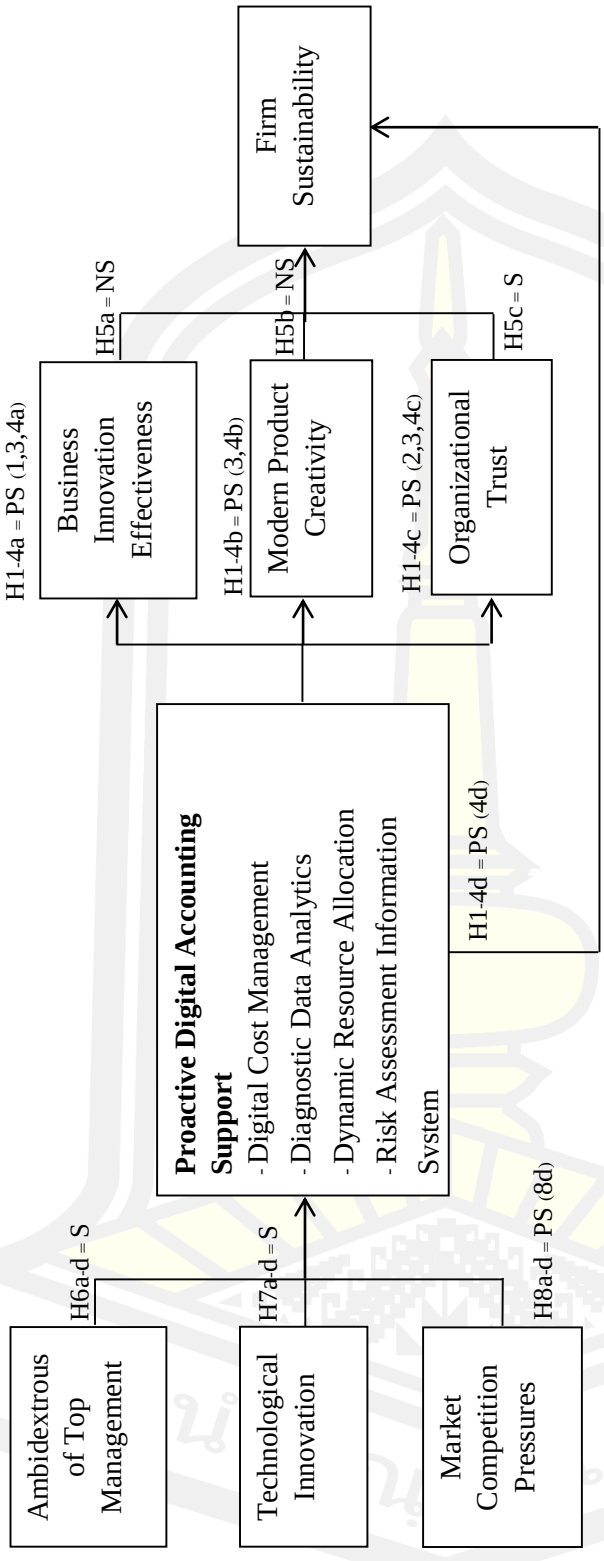
Fifthly, the finding indicates that there is significance and positively in the structural relationship between organizational trust and firm sustainability (t-value = 2.143, p-value = 0.032), while business innovation effectiveness has no significant related to firm sustainability (t-value = 1.326, p-value = 0.185), likewise modern product creativity (t-value = -1.030, p-value = 0.303). ***Thus, hypothesis 5c is supported. And hypothesis 5a, 5b are not supported.***

Sixthly, the results show that there is significance positive in the structural relationship between ambidextrous of top management and all dimensions of the Proactive Digital Accounting Support (PDAS): digital cost management (t-value = 7.731, p-value = 0.000), diagnostic data analytics (t-value = 6.171, p-value = 0.000), dynamic resource allocation (t-value = 8.056, p-value = 0.000), and risk assessment information system (t-value = 7.920, p-value = 0.000) at p-value < 0.001. ***Thus, hypothesis 6a, 6b, 6c, and 6d are supported***.

Seventhly, the results also show that technological innovation has significant positive in the structural related to all dimensions of the Proactive Digital Accounting Support (PDAS): digital cost management (t-value = 9.441, p-value = 0.000), diagnostic data analytics (t-value = 6.154, p-value = 0.000), dynamic resource allocation (t-value = 8.465, p-value = 0.000), and risk assessment information system (t-value = 6.800, p-value = 0.000) at p-value < 0.001. ***Thus, hypothesis 7a, 7b, 7c, and 7d are supported***.

Finally, the result of this test reveals that market competition pressures is significantly and positively in the structural relationship to risk assessment information system (t-value = 2.057, p-value = 0.040), while digital cost management (t-value = -1.413, p-value = 0.158), diagnostic data analytics (t-value = -1.793, p-value = 0.073), and dynamic resource allocation (t-value = 0.286, p-value = 0.775) are not significant in the structural relationship. ***Thus, hypothesis 8d is supported. And hypothesis 8a, 8b, and 8c are not supported***.

In addition, this research control for ISO type and industry type in the proposed model. The results found that ISO and industry type are not significant predictors of firm sustainability.



Note: S = Supported, NS = Not Supported, PS = Partially Supported

Figure 11 Summary of the Results of Hypotheses Testing_Main Effect

Test mediating role of business innovation effectiveness, modern product creativity, and organizational trust

Going beyond hypothesis testing, this research proposes business innovation effectiveness, modern product creativity, and organizational trust as mediators.

In order to better understand the strong mediating effect of business innovation effectiveness, modern product creativity, and organizational trust, the research elaborates and provides further testing for manifest discussion.

The mediating testing effect of business innovation effectiveness, modern product creativity, and organizational trust mediates the relationship between digital cost management and firm sustainability, diagnostic data analytics and firm sustainability, dynamic resource allocation and firm sustainability, and risk assessment information system and firm sustainability.

According to testing mediating effect, this research is based on Baron & Kenny (1986) criteria, which are divided into three parts.

Firstly, to testing business innovation effectiveness as a mediator, the following criteria;(1) the digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system need to significantly affect the business innovation effectiveness, (2) digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system need to significantly affect firm sustainability in the absence of business innovation effectiveness, (3) business innovation effectiveness has a significant unique effect on firm sustainability, and (4) the effect of digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system on firm sustainability shrinks upon the addition of business innovation effectiveness to the model.

Secondly, testing modern product creativity as a mediator, the following criteria;(1) the digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system need to significantly affect the modern product creativity, (2) digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system need to

significantly affect firm sustainability in the absence of modern product creativity, (3) modern product creativity has a significant unique effect on firm sustainability, and (4) the effect of digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system on firm sustainability shrinks upon the addition of modern product creativity to the model.

Thirdly, testing organizational trust as a mediator, the following criteria;(1) the digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system need to significantly affect the organizational trust, (2) digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system need to significantly affect firm sustainability in the absence of organizational trust, (3) organizational trust has a significant unique effect on firm sustainability, and (4) the effect of digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system on firm sustainability shrinks upon the addition of organizational trust to the model.

These criteria are able to use to informally judge whether or not mediation is occurring.

The test for mediation can be performed using two steps. The first, using SEM analyses direct, indirect, and total effects in. This step provides coefficients of all exogenous and mediating factors together with the predictive indicator such as R^2 of each variable.

Thus, to evaluate mediation effect testing, the research run SEM to new paths digital cost management, diagnostic data analytics, dynamic resource allocation, risk assessment information system, business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability variables were estimated the assessment of model fitting as Table 20 show the results of parameter estimation for testing mediating effect.

Table 20 Parameter Estimation for Testing Mediating Effect

Relationship parts	Unstandardized			Standardized			z-value
	Direct	Indirect	Total	Direct	Indirect	Total	
H1a: DCM→BIE	0.204	-	0.204	0.257	-	0.257	-
H1b: DCM→MPC	0.066	-	0.066	0.068	-	0.068	-
H1c: DCM→ORT	-0.067	-	-0.067	-0.065	-	-0.065	-
DCM→BIE→FSU	0.039	0.025	0.064	0.045	0.030	0.075	0.214
DCM→MPC→FSU	0.039	-0.005	0.034	0.045	-0.005	0.040	1.534
DCM→ORT→FSU	0.039	-0.012	0.027	0.045	-0.014	0.031	1.606
H2a: DDA→BIE	0.126	-	0.126	0.124	-	0.124	-
H2b: DDA→MPC	0.039	-	0.039	0.031	-	0.031	-
H2c: DDA→ORT	0.259	-	0.259	0.198	-	0.198	-
DDA→BIE→FSU	0.122	0.016	0.138	0.111	0.014	0.125	0.289
DDA→MPC→FSU	0.122	-0.003	0.119	0.111	-0.002	0.109	1.308
DDA→ORT→FSU	0.122	0.047	0.169	0.111	0.043	0.154	0.079
H3a: DRA→BIE	0.184	-	0.184	0.22	-	0.220	-
H3b: DRA→MPC	0.404	-	0.404	0.397	-	0.397	-
H3c: DRA→ORT	0.607	-	0.607	0.559	-	0.559	-
DRA→BIE→FSU	0.094	0.023	0.117	0.104	0.025	0.129	0.244
DRA→MPC→FSU	0.094	-0.029	0.065	0.104	-0.031	0.073	1.682
DRA→ORT→FSU	0.094	0.111	0.205	0.104	0.122	0.226	0.046*
H4a: RAI→BIE	0.337	-	0.337	0.268	-	0.268	-
H4b: RAI→MPC	0.375	-	0.375	0.246	-	0.246	-
H4c: RAI→ORT	0.295	-	0.295	0.182	-	0.182	-
RAI→BIE→FSU	0.298	0.042	0.340	0.219	0.031	0.250	0.224
RAI→MPC→FSU	0.298	-0.027	0.271	0.219	-0.019	0.200	1.660
RAI→ORT→FSU	0.298	0.054	0.352	0.219	0.040	0.259	0.119
H5a: BIE→FSU	0.124	-	0.124	0.115	-	0.115	-
H5b: MPC→FSU	-0.071	-	-0.071	-0.079	-	-0.079	-
H5c: ORT→FSU	0.183	-	0.183	0.219	-	0.219	-

Note: *** significance level at .001, ** significance level at .01, * significance level at .05

The results of Table 20 demonstrate the effects of mediating; direct effects, indirect effects, and a total of business innovation effectiveness, modern product creativity, and organizational trust as mediators between all dimensions of the Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, risk assessment information system), and firm sustainability. With organizational trust as a mediator, the dynamic resource allocation can influence firm sustainability through organizational trust by the regression coefficients for the indirect relationship is estimated at 0.111. The research results show that the mediating effect of organizational trust is significant at a p-value < 0.05 (z-value=0.046). These results indicate that dynamic resource allocation influences firm sustainability through organizational trust. However, the results demonstrate that all dimensions of Proactive Digital Accounting Support cannot influence firm sustainability through any mediator.

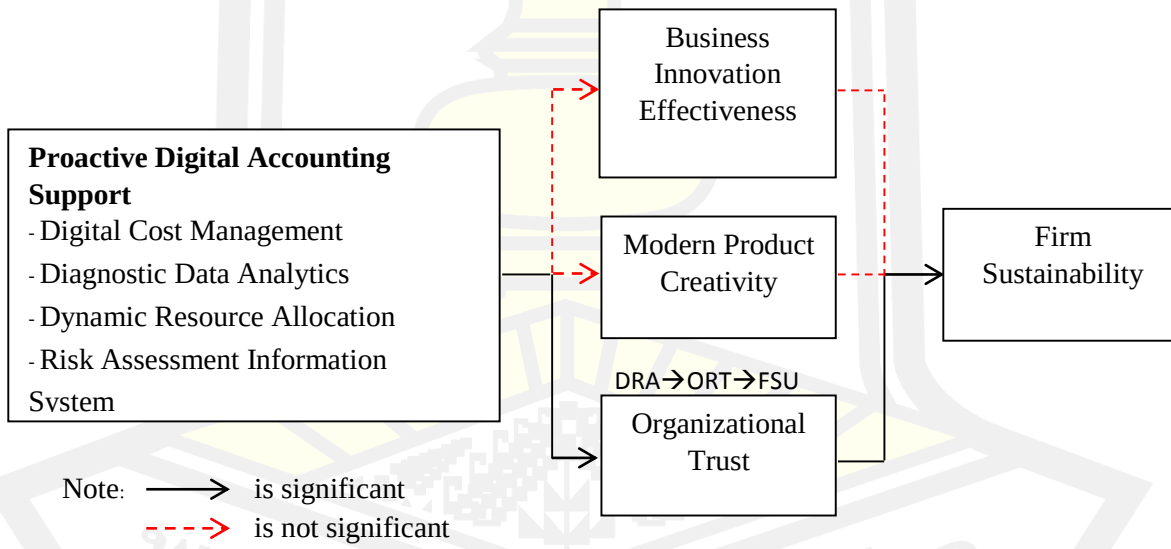


Figure 12 Summary of the Results of Testing Mediating Effect

Moderating Effect Testing

In the previous section, the hypotheses of the main effect and the moderating effect were tested and demonstrated their result. However, this research has also proposed the investigation of the moderating role of proactive culture, stakeholder awareness, and disruptive technology, as shown in Figure 13.

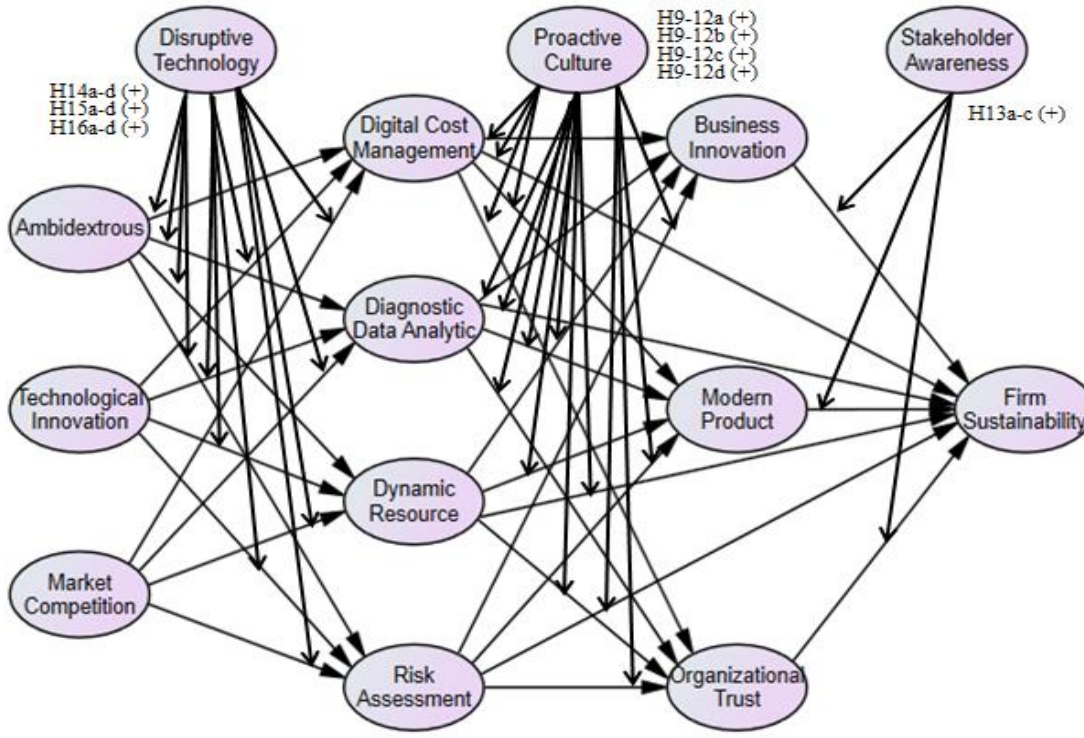


Figure 13 The Structural Model for Moderating Effect Testing

From the analyzed results obtained in this study, it can be concluded as (1) a structural model of the digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system moderated by proactive culture to influence business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability, (2) a structural model of business innovation effectiveness, modern product creativity, organizational trust moderated by stakeholder awareness to influence firm sustainability, and (3) a structural model of ambidextrous of top management, technological innovation, market competition pressures moderated by disruptive technology to influence digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system, which consistent fits with the empirical data as shown in Figure 14-16. Besides, the parameter estimation and the significance test for the moderating effect are presented in Table 21-23.

Table 21 Standardized Structural Equation Parameter Estimates and t-value of the Moderating Effect of Proactive Culture

Relationship Path	Standardized Coefficients (β)	S.E.	t-value	p-value
Endogenous Constructs				
DCM→BIE	0.466	0.096	5.328	0.000***
PAC→BIE	0.373	0.105	4.542	0.000***
H9a: DCM*PAC→BIE	0.019	0.047	0.381	0.703
DCM→MPC	0.363	0.105	4.878	0.000***
PAC→MPC	0.453	0.106	5.831	0.000***
H9b: DCM*PAC→MPC	-0.01	0.052	-0.189	0.850
DCM→ORT	0.281	0.09	3.4	0.000***
PAC→ORT	0.556	0.109	6.404	0.000***
H9c: DCM*PAC→ORT	0.06	0.048	1.108	0.268
DCM→FSU	-0.048	0.061	-0.841	0.400
PAC→FSU	0.819	0.097	8.787	0.000***
H9d: DCM*PAC→FSU	0.113	0.03	2.736	0.006**
DDA→BIE	0.325	0.083	4.403	0.000***
PAC→BIE	0.503	0.094	6.182	0.000***
H10a: DDA*PAC→BIE	0.008	0.05	0.143	0.886
DDA→MPC	0.18	0.082	2.53	0.011*
PAC→MPC	0.568	0.11	7.01	0.000***
H10b: DDA*PAC→MPC	-0.03	0.051	-0.529	0.597
DDA→ORT	0.331	0.089	4.462	0.000***
PAC→ORT	0.563	0.095	7.345	0.000***
H10c: DDA*PAC→ORT	0.001	0.041	0.02	0.984
DDA→FSU	0.139	0.055	2.27	0.023*
PAC→FSU	0.782	0.085	8.988	0.000***
H10d: DDA*PAC→FSU	0.102	0.033	2.11	0.035*
DRA→BIE	0.496	0.073	4.958	0.000***
PAC→BIE	0.301	0.102	3.449	0.000***
H11a: DRA*PAC→BIE	0.104	0.034	2.292	0.022*

Table 21 Standardized Structural Equation Parameter Estimates and t-value of the Moderating Effect of Proactive Culture (Continued)

Relationship Path	Standardized Coefficients (β)	S.E.	t-value	p-value
DRA→MPC	0.47	0.096	4.954	0.000***
PAC→MPC	0.304	0.125	3.369	0.000***
H11b: DRA*PAC→MPC	-0.017	0.035	-0.401	0.689
DRA→ORT	0.625	0.082	6.899	0.000***
PAC→ORT	0.292	0.095	3.545	0.000***
H11c: DRA*PAC→ORT	0.095	0.031	2.126	0.034*
DRA→FSU	0.044	0.064	0.537	0.591
PAC→FSU	0.838	0.108	7.962	0.000***
H11d: DRA*PAC→FSU	0.212	0.036	4.036	0.000***
RAI→BIE	0.334	0.082	4.003	0.000***
PAC→BIE	0.454	0.091	5.231	0.000***
H12a: RAI*PAC→BIE	-0.028	0.057	-0.574	0.566
RAI→MPC	0.311	0.163	2.813	0.005**
PAC→MPC	0.515	0.162	4.836	0.000***
H12b: RAI*PAC→MPC	-0.052	0.058	-1.018	0.309
RAI→ORT	0.371	0.124	3.791	0.000***
PAC→ORT	0.524	0.112	5.824	0.000***
H12c: RAI*PAC→ORT	0.068	0.059	1.198	0.231
RAI→FSU	-0.019	0.073	-0.269	0.788
PAC→FSU	0.918	0.101	9.173	0.000***
H12d: RAI*PAC→FSU	0.192	0.048	3.368	0.000***

Note: *** significance level at .001, ** significance level at .01, * significance level at .05

Table 21 shows the investigation of the moderating role of proactive culture as follows: Firstly, the proactive culture is examined as a moderator of the relationship between digital cost management and business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. For hypothesis 9a, the results reveal that proactive culture was not a moderator in the relationship between digital cost management and business innovation effectiveness (β = 0.019, t-value = 0.381, p-value = 0.703). **Therefore, hypothesis 9a is not supported**. Hypothesis 9b, the results reveal that proactive culture was not a moderator in the relationship between digital cost management and modern product creativity (β = -0.010, t-value = -0.189, p-value = 0.850). ***Therefore, hypothesis 9b is not supported***. Hypothesis 9c, the results reveal that proactive culture was not a moderator in the relationship between digital cost management and organizational trust (β = 0.060, t-value = 1.108, p-value = 0.268). ***Therefore, hypothesis 9c is not supported***. However, in hypothesis 9d, the results demonstrate that digital cost management and proactive culture are significantly and positively related to firm sustainability (β = 0.113, t-value = 2.736, p-value = 0.006). ***Thus, hypothesis 9d is supported***.

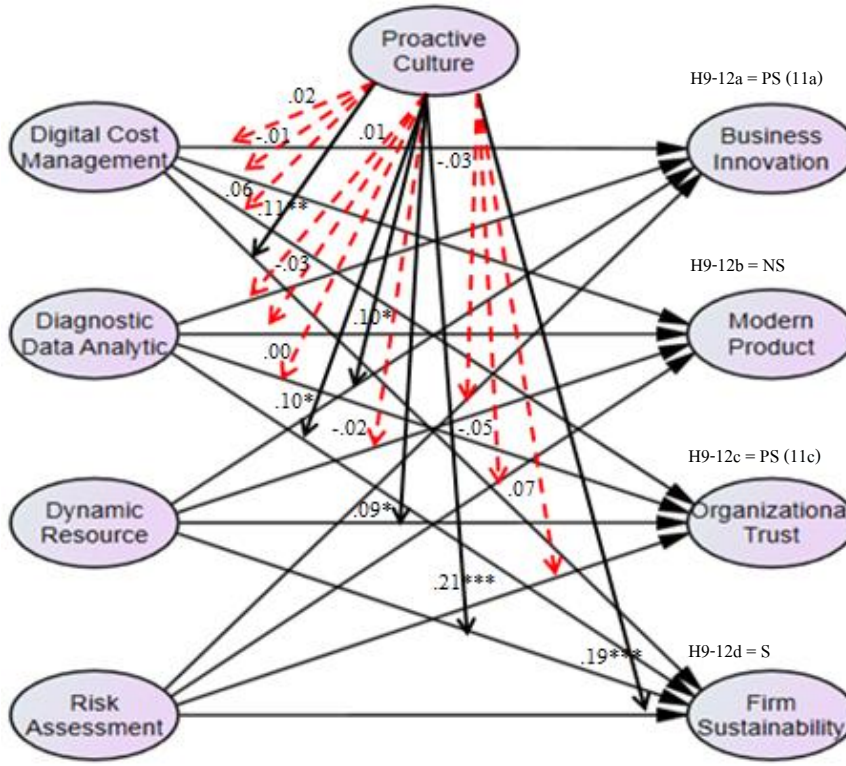
Secondly, the proactive culture is examined as a moderator of the relationship between diagnostic data analytics and business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. For hypothesis 10a, the results reveal that proactive culture was not a moderator in the relationship between diagnostic data analytics and business innovation effectiveness (β = 0.008, t-value = 0.143, p-value = 0.886). ***Therefore, hypothesis 10a is not supported***. Hypothesis 10b, the results reveal that proactive culture was not a moderator in the relationship between diagnostic data analytics and modern product creativity (β = -0.030, t-value = -0.529, p-value = 0.597). ***Therefore, hypothesis 10b is not supported***. Hypothesis 10c, the results reveal that proactive culture was not a moderator in the relationship between diagnostic data analytics and organizational trust (β = 0.001, t-value = 0.020, p-value = 0.984). ***Therefore, hypothesis 10c is not supported***. However, in hypothesis 10d, the results also demonstrate that diagnostic data analytics and proactive culture are significantly

and positively related to firm sustainability (β = 0.102, t-value = 2.110, p-value = 0.035). ***Thus, hypothesis 10d is supported***.

Thirdly, the proactive culture is investigated as a moderator of the relationship between dynamic resource allocation and business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. For hypothesis 11a, the results demonstrate that dynamic resource allocation and proactive culture are significantly and positively related to business innovation effectiveness (β = 0.104, t-value = 2.292, p-value = 0.022). ***Thus, hypothesis 11a is supported***. Hypothesis 11b, the results reveal that proactive culture was not a moderator in the relationship between dynamic resource allocation and modern product creativity (β = -0.017, t-value = -0.401, p-value = 0.689). ***Therefore, hypothesis 11b is not supported***. Hypothesis 11c, the results demonstrate that dynamic resource allocation and proactive culture are significantly and positively related to organizational trust (β= 0.095, t-value = 2.126, p-value = 0.034). ***Thus, hypothesis 11c is supported***. While hypothesis 11d, the results also demonstrate that dynamic resource allocation and proactive culture are significantly and positively related to firm sustainability (β = 0.212, t-value = 4.036, p-value = .000). ***Thus, hypothesis 11d is supported***.

Finally, the proactive culture is examined as a moderator of the relationship between risk assessment information system and business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability. For hypothesis 12a, the results reveal that proactive culture was not a moderator in the relationship between risk assessment information system and business innovation effectiveness (β = -0.028, t-value = -0.574, p-value = 0.566). ***Therefore, hypothesis 12a is not supported***. Hypothesis 12b, the results reveal that proactive culture was not a moderator in the relationship between risk assessment information system and modern product creativity (β = -0.052, t-value = -1.018, p-value = 0.309). ***Therefore, hypothesis 12b is not supported***. Hypothesis 12c, the results reveal that proactive culture was not a moderator in the relationship between risk assessment information system and organizational trust (β = 0.068, t-value = 1.198, p-value = 0.231). ***Therefore, hypothesis 12c is not supported***.

However, in hypothesis 12d, the results also demonstrate that risk assessment information system and proactive culture are significantly and positively related to firm sustainability (β = 0.192, t-value = 3.368, p-value = 0.000). ***Thus, hypothesis 12d is supported***.



Note: S = Supported, NS = Not Supported, PS = Partially Supported,

*** is significant level at 0.001

** is significant level at 0.01

* is significant level at 0.05

→ is supported.

- - - → is not supported

Figure 14 The Structural Model for Moderating Effect Testing Set 1

Table 22 Standardized Structural Equation Parameter Estimates and t-value of the Moderating Effect of Stakeholder Awareness

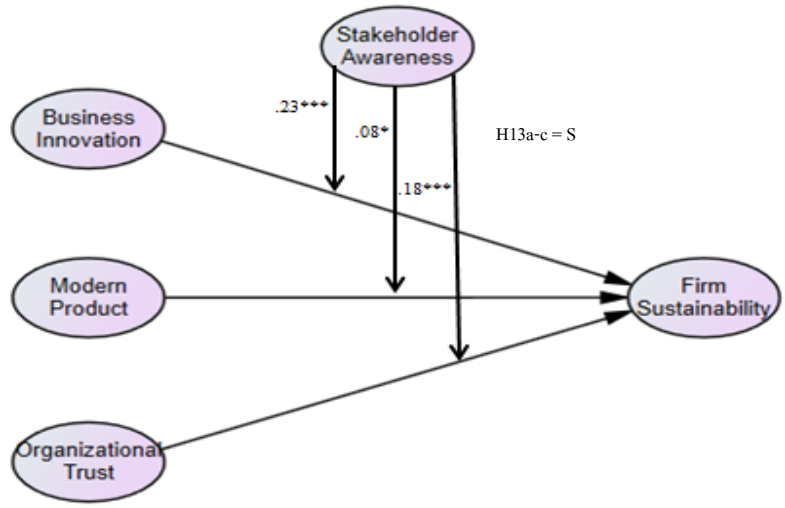
Relationship Path	Standardized Coefficients (β)	S.E.	t-value	p-value
Exogenous Constructs				
BIE→FSU	0.295	0.071	3.867	0.000***
STA→FSU	0.649	0.095	7.109	0.000***
H13a: BIE*STA→FSU	0.226	0.044	3.652	0.000***
MPC→FSU	0.106	0.047	2.071	0.038*
STA→FSU	0.576	0.117	7.175	0.000***
H13b: MPC*STA→FSU	0.078	0.041	2.022	0.043*
ORT→FSU	0.375	0.07	5.084	0.000***
STA→FSU	0.59	0.091	6.955	0.000***
H13c: ORT*STA→FSU	0.184	0.024	4.836	0.000***

Note: *** significance level at .001, ** significance level at .01, * significance level at .05

Table 22 shows the investigation of the moderating role of stakeholder awareness. For hypothesis 13a, stakeholder awareness is examined as a moderator of the relationship between business innovation effectiveness and firm sustainability. The results demonstrate that business innovation effectiveness and stakeholder awareness are significantly and positively related to firm sustainability (β = 0.226, t-value = 3.652, p-value = 0.000). ***Thus, hypothesis 13a is supported***.

Hypothesis 13b, stakeholder awareness, is investigated as a moderator of the relationship between modern product creativity and firm sustainability. The results demonstrate that modern product creativity and stakeholder awareness is significantly and positively related to firm sustainability (β = 0.078, t-value = 2.022, p-value = 0.043). ***Thus, hypothesis 13b is supported***. Likewise, hypothesis 13c posited a relationship between the organizational trusts moderated by stakeholder awareness based on firm sustainability. The results also demonstrate that organizational trust and stakeholder

awareness is significantly and positively related to firm sustainability (β = 0.184, t-value = 4.836, p-value = 0.000). ***Thus, hypothesis 13c is supported***.



Note: S = Supported, NS = Not Supported, PS = Partially Supported,
*** is significant level at 0.001
** is significant level at 0.01
* is significant level at 0.05
→ is supported.
- - -→ is not supported

Figure 15 The Structural Model for Moderating Effect Testing Set 2

Table 23 Standardized Structural Equation Parameter Estimates and t-value of the Moderating Effect of Disruptive Technology

Relationship Path	Standardized Coefficients (β)	S.E.	t-value	p-value
Exogenous Constructs				
ATM→DCM	0.267	0.061	2.954	0.003**
DRT→DCM	0.423	0.082	4.144	0.000***
H14a: ATM*DRT→DCM	0.11	0.024	2.076	0.038*
ATM→DDA	0.167	0.105	1.562	0.118
DRT→DDA	0.336	0.118	3.135	0.002**
H14b: ATM*DRT→DDA	-0.037	0.036	-0.693	0.488
ATM→DRA	0.445	0.095	4.134	0.000***
DRT→DRA	0.296	0.106	2.796	0.005**
H14c: ATM*DRT→DRA	0.032	0.035	0.603	0.546

Table 23 Standardized Structural Equation Parameter Estimates and t-value of the Moderating Effect of Disruptive Technology (Continued)

Relationship Path	Standardized Coefficients (β)	S.E.	t-value	p-value
ATM→RAI	0.455	0.114	3.166	0.002**
DRT→RAI	0.238	0.125	1.72	0.085
H14d: ATM*DRT→RAI	-0.067	0.033	-1.134	0.257
TEI→DCM	0.349	0.074	4.08	0.000***
DRT→DCM	0.418	0.082	4.834	0.000***
H15a: TEI*DRT→DCM	-0.01	0.033	-0.201	0.841
TEI→DDA	0.093	0.083	0.905	0.366
DRT→DDA	0.415	0.095	3.952	0.000***
H15b: TEI*DRT→DDA	-0.044	0.032	-0.719	0.472
TEI→DRA	0.549	0.106	5.079	0.000***
DRT→DRA	0.257	0.089	2.856	0.004**
H15c: TEI*DRT→DRA	0.003	0.03	0.057	0.954
TEI→RAI	0.48	0.082	4.599	0.000***
DRT→RAI	0.289	0.083	2.969	0.003**
H15d: TEI*DRT→RAI	-0.078	0.029	-1.33	0.184
MCP→DCM	0.114	0.058	1.502	0.133
DRT→DCM	0.58	0.083	6.376	0.000***
H16a: MCP*DRT→DCM	0.045	0.032	0.769	0.442
MCP→DDA	0.143	0.077	1.717	0.086
DRT→DDA	0.401	0.092	4.901	0.000***
H16b: MCP*DRT→DDA	-0.066	0.038	-1.053	0.292
MCP→DRA	0.245	0.065	3.363	0.000***
DRT→DRA	0.516	0.084	6.446	0.000***
H16c: MCP*DRT→DRA	0.06	0.038	1.021	0.307
MCP→RAI	0.271	0.062	3.358	0.000***
DRT→RAI	0.487	0.078	5.721	0.000***
H16d: MCP*DRT→RAI	-0.027	0.035	-0.433	0.665

Note: *** significance level at .001, ** significance level at .01, * significance level at .05

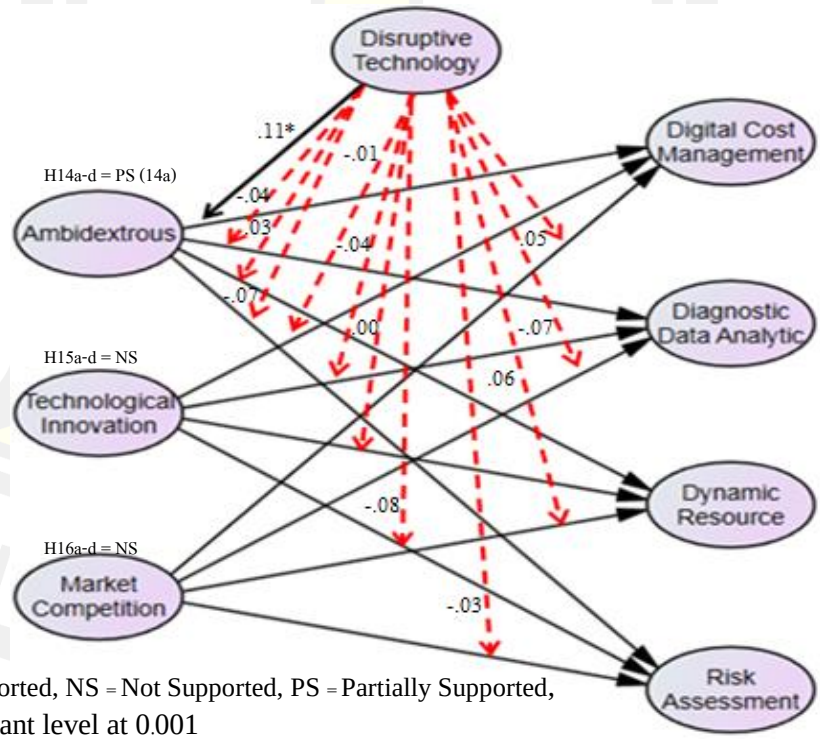
Table 23 shows the investigation of the moderating role of disruptive technology as follows: Firstly, disruptive technology is examined as a moderator of the relationship between ambidextrous of top management and all dimensions of the Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system). For hypothesis 14a, disruptive technology is investigated as a moderator of the relationship between ambidextrous of top management and digital cost management. The results demonstrate that ambidextrous of top management and disruptive technology is significantly and positively related to digital cost management (β = 0.110, t-value = 2.076, p- value = 0. 038). ***Thus, hypothesis 14a is supported***. Hypothesis 14b, disruptive technology, is investigated as a moderator of the relationship between ambidextrous of top management and diagnostic data analytics. The results reveal that disruptive technology was not a moderator in the relationship between ambidextrous of top management and diagnostic data analytics (β = -0.037, t-value = -0.693, p-value = 0.488). ***Therefore, hypothesis 14b is not supported***. Hypothesis 14c posited a relationship between ambidextrous of top management moderated by disruptive technology based on dynamic resource allocation. The results reveal that disruptive technology was not a moderator in the relationship between ambidextrous of top management and dynamic resource allocation (β = 0.032, t-value = 0.603, p-value = 0.546). ***Thus, hypothesis 14c is not supported***. Hypothesis 14d, disruptive technology, is investigated as a moderator of the relationship between ambidextrous of top management and risk assessment information system. The results reveal that disruptive technology was not a moderator in the relationship between ambidextrous of top management and risk assessment information system (β = -0.067, t-value = -1.134, p-value = 0.257). ***Therefore, hypothesis 14d is not supported***.

Secondly, disruptive technology is examined as a moderator of the relationship between technological innovation and all dimensions of the Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system) . Hypothesis 15a,

disruptive technology, is investigated as a moderator of the relationship between technological innovation and digital cost management. The results reveal that disruptive technology was not a moderator in the relationship between technological innovation and digital cost management (β = -0.010, t-value = -0.201, p-value = 0.841). ***Therefore, hypothesis 14b is not supported***. Hypothesis 15b, disruptive technology, is investigated as a moderator of the relationship between technological innovation and diagnostic data analytics. The results reveal that disruptive technology was not a moderator in the relationship between technological innovation and diagnostic data analytics (β = -0.044, t-value = -0.719, p-value = 0.472). ***Therefore, hypothesis 15b is not supported***. Hypothesis 15c posited a relationship between technological innovations moderated by disruptive technology based on dynamic resource allocation. The results reveal that disruptive technology was not a moderator in the relationship between technological innovation and dynamic resource allocation (β = 0.003, t-value = 0.057, p-value = 0.954). ***Thus, hypothesis 15c is not supported***. Hypothesis15d disruptive technology is investigated as a moderator of the relationship between technological innovation and risk assessment information system. The results reveal that disruptive technology was not a moderator in the relationship between technological innovation and risk assessment information system (β = -0.078, t-value = -1.330, p-value = 0.184). ***Therefore, hypothesis 15d is not supported***.

Finally, disruptive technology is examined as a moderator of the relationship between market competition pressures and all dimensions of the Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system). Hypothesis 16a, disruptive technology, is investigated as a moderator of the relationship between market competition pressures and digital cost management. The results reveal that disruptive technology was not a moderator in the relationship between market competition pressures and digital cost management (β = 0.045, t-value = 0.769, p-value = 0.442). ***Therefore, hypothesis 16a is not supported***. Hypothesis 16b, disruptive technology, is investigated as a moderator of the relationship between market competition pressures

and diagnostic data analytics. The results reveal that disruptive technology was not a moderator in the relationship between market competition pressures and diagnostic data analytics (β = -0.066, t-value = -1.053, p-value = 0.292). ***Therefore, hypothesis 16b is not supported***. Hypothesis 16c posited a relationship between market competition pressures moderated by disruptive technology based on dynamic resource allocation. The results reveal that disruptive technology was not a moderator in the relationship between market competition pressures and dynamic resource allocation (β = 0.060, t-value = 1.021, p-value = 0.307). ***Therefore, hypothesis 16c is not supported***. Hypothesis 16d disruptive technology is investigated as a moderator of the relationship between market competition pressures and risk assessment information system. The results reveal that disruptive technology was not a moderator in the relationship between market competition pressures and risk assessment information system (β = -0.027, t-value = -0.433, p-value = 0.665). ***Therefore, hypothesis 16d is not supported***.



Note: S = Supported, NS = Not Supported, PS = Partially Supported,
*** is significant level at 0.001
** is significant level at 0.01 is significant level at 0.05
→ is supported.
- - -→ is not supported

Figure 16 The Structural Model for Moderating Effect Testing Set 3

Table 24 Summary of Hypotheses Testing Results

Hypotheses	The statement	Results
H1a	The higher the digital cost management of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater business innovation effectiveness.	Supported
H1b	The higher the digital cost management of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater modern product creativity.	Not Supported
H1c	The higher the digital cost management of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater organizational trust.	Not Supported
H1d	The higher the digital cost management of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater firm sustainability.	Not Supported
H2a	The higher the diagnostic data analytics of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater business innovation effectiveness.	Not Supported
H2b	The higher the diagnostic data analytics of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater modern product creativity.	Not Supported
H2c	The higher the diagnostic data analytics of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater organizational trust.	Supported
H2d	The higher the diagnostic data analytics of the Proactive Digital Accounting Support is the more likely that the firm will achieve greater firm sustainability.	Not Supported
H3a	The higher the dynamic resource allocation of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater business innovation effectiveness.	Supported

Table 24 Summary of Hypotheses Testing Results (Continued)

Hypotheses	The statement	Results
H3b	The higher the dynamic resource allocation of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater modern product creativity.	Supported
H3c	The higher the dynamic resource allocation of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater organizational trust.	Supported
H3d	The higher the dynamic resource allocation of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater firm sustainability.	Not Supported
H4a	The higher the risk assessment information system of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater business innovation effectiveness.	Supported
H4b	The higher the risk assessment information system of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater modern product creativity.	Supported
H4c	The higher the risk assessment information system of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater organizational trust.	Supported
H4d	The higher the risk assessment information system of the Proactive Digital Accounting Support is, the more likely that the firm will achieve greater firm sustainability.	Supported
H5a	The higher business innovation effectiveness is the more likely that the firm will achieve greater firm sustainability.	Not Supported
H5b	The higher modern product creativity is the more likely that the firm will achieve greater firm sustainability.	Not Supported
H5c	The higher organizational trust is the more likely that the firm will achieve greater firm sustainability.	Supported

Table 24 Summary of Hypotheses Testing Results (Continued)

Hypotheses	The statement	Results
H6a	The higher the ambidextrous of top management is, the more likely that the firm will achieve greater the digital cost management of the Proactive Digital Accounting Support.	Supported
H6b	The higher the ambidextrous of top management is, the more likely that the firm will achieve greater the diagnostic data analytics of the Proactive Digital Accounting Support.	Supported
H6c	The higher the ambidextrous of top management is, the more likely that the firm will achieve greater the dynamic resource allocation of the Proactive Digital Accounting Support.	Supported
H6d	The higher the ambidextrous of top management is, the more likely that the firm will achieve greater the risk assessment information system of the Proactive Digital Accounting Support.	Supported
H7a	The higher the technological innovation is, the more likely that the firm will achieve greater the digital cost management of the Proactive Digital Accounting Support.	Supported
H7b	The higher the technological innovation is, the more likely that the firm will achieve greater the diagnostic data analytics of the Proactive Digital Accounting Support.	Supported
H7c	The higher the technological innovation is, the more likely that the firm will achieve greater the dynamic resource allocation of the Proactive Digital Accounting Support.	Supported
H7d	The higher the technological innovation is the more likely that the firm will achieve greater the risk assessment information system of the Proactive Digital Accounting Support.	Supported

Table 24 Summary of Hypotheses Testing Results (Continued)

Hypotheses	The statement	Results
H8a	The higher the market competition pressure is the more likely that the firm will achieve greater the digital cost management of the Proactive Digital Accounting Support.	Not Supported
H8b	The higher the market competition pressure is the more likely that the firm will achieve greater the diagnostic data analytics of the Proactive Digital Accounting Support.	Not Supported
H8c	The higher the market competition pressure is the more likely that the firm will achieve greater the dynamic resource allocation of the Proactive Digital Accounting Support.	Not Supported
H8d	The higher the market competition pressure is the more likely that the firm will achieve greater the risk assessment information system of the Proactive Digital Accounting Support.	Supported
H9a	Proactive culture will positively moderate the digital cost management of the Proactive Digital Accounting Support to business innovation effectiveness.	Not Supported
H9b	Proactive culture will positively moderate the digital cost management of the Proactive Digital Accounting Support to modern product creativity.	Not Supported
H9c	Proactive culture will positively moderate the digital cost management of the Proactive Digital Accounting Support to organizational trust.	Not Supported
H9d	Proactive culture will positively moderate the digital cost management of the Proactive Digital Accounting Support to firm sustainability.	Supported

Table 24 Summary of Hypotheses Testing Results (Continued)

Hypotheses	The statement	Results
H10a	Proactive culture will positively moderate the diagnostic data analytics of the Proactive Digital Accounting Support to business innovation effectiveness.	Not Supported
H10b	Proactive culture will positively moderate the diagnostic data analytics of the Proactive Digital Accounting Support to modern product creativity.	Not Supported
H10c	Proactive culture will positively moderate the diagnostic data analytics of the Proactive Digital Accounting Support to organizational trust.	Not Supported
H10d	Proactive culture will positively moderate the diagnostic data analytics of the Proactive Digital Accounting Support to firm sustainability.	Supported
H11a	Proactive culture will positively moderate the dynamic resource allocation of the Proactive Digital Accounting Support to business innovation effectiveness.	Supported
H11b	Proactive culture will positively moderate the dynamic resource allocation of the Proactive Digital Accounting Support to modern product creativity.	Not Supported
H11c	Proactive culture will positively moderate the dynamic resource allocation of the Proactive Digital Accounting Support to organizational trust.	Supported
H11d	Proactive culture will positively moderate the dynamic resource allocation of the Proactive Digital Accounting Support to firm sustainability.	Supported

Table 24 Summary of Hypotheses Testing Results (Continued)

Hypotheses	The statement	Results
H12a	Proactive culture will positively moderate the risk assessment information system of the Proactive Digital Accounting Support to business innovation effectiveness.	Not Supported
H12b	Proactive culture will positively moderate the risk assessment information system of the Proactive Digital Accounting Support to modern product creativity.	Not Supported
H12c	Proactive culture will positively moderate the risk assessment information system of the Proactive Digital Accounting Support to organizational trust.	Not Supported
H12d	Proactive culture will positively moderate the risk assessment information system of the Proactive Digital Accounting Support to firm sustainability.	Supported
H13a	Stakeholder Awareness will positively moderate the business innovation effectiveness to firm sustainability.	Supported
H13b	Stakeholder Awareness will positively moderate the modern product creativity to firm sustainability.	Supported
H13c	Stakeholder Awareness will positively moderate the organizational trust to firm sustainability.	Supported
H14a	Disruptive technology will positively moderate the ambidextrous of top management to the digital cost management of the Proactive Digital Accounting Support.	Supported
H14b	Disruptive technology will positively moderate the ambidextrous of top management to the diagnostic data analytics of the Proactive Digital Accounting Support.	Not Supported

Table 24 Summary of Hypotheses Testing Results (Continued)

Hypotheses	The statement	Results
H14c	Disruptive technology will positively moderate the ambidextrous of top management to the dynamic resource allocation of the Proactive Digital Accounting Support.	Not Supported
H14d	Disruptive technology will positively moderate the ambidextrous of top management to the risk assessment information system of the Proactive Digital Accounting Support.	Not Supported
H15a	Disruptive technology will positively moderate the technological innovation to the digital cost management of the Proactive Digital Accounting Support.	Not Supported
H15b	Disruptive technology will positively moderate the technological innovation to the diagnostic data analytics of the Proactive Digital Accounting Support.	Not Supported
H15c	Disruptive technology will positively moderate the technological innovation to the dynamic resource allocation of the Proactive Digital Accounting Support.	Not Supported
H15d	Disruptive technology will positively moderate the technological innovation to the risk assessment information system of the Proactive Digital Accounting Support.	Not Supported
H16a	Disruptive technology will positively moderate the market competition pressure to the digital cost management of the Proactive Digital Accounting Support.	Not Supported
H16b	Disruptive technology will positively moderate the market competition pressure to the diagnostic data analytics of the Proactive Digital Accounting Support.	Not Supported

Table 24 Summary of Hypotheses Testing Results (Continued)

Hypotheses	The statement	Results
H16c	Disruptive technology will positively moderate the market competition pressure to the dynamic resource allocation of the Proactive Digital Accounting Support.	Not Supported
H16d	Disruptive technology will positively moderate the market competition pressure to the risk assessment information system of the Proactive Digital Accounting Support.	Not Supported

CHAPTER V

DISCUSSION AND CONCLUSION

The previous chapter reveals respondent characteristics, the exporting business characteristics, descriptive statistics, tests of the validity of each variable, and hypotheses testing results. Consequently, this chapter provides discussions and the conclusion of this research. The first starts with discussions and theoretical and managerial contributions of this research. Then, the discussions are based on the results of the proposed hypotheses, which were empirically tested through SEM. In addition, this research provides theoretical knowledge and the contribution to practice, limitations, and future research agenda. Finally, the conclusion encompasses the overview of this research.

Discussion

The purpose of this research was to investigate the relationships among each dimension of Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system) and business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability; to examine the impacts of business innovation effectiveness, modern product creativity, and organizational trust on firm sustainability; to investigate the effects of ambidextrous of top management, technological innovation, and market competition pressures on each dimension of Proactive Digital Accounting Support; to examine the moderating effects of proactive culture on the relationships among each dimension of Proactive Digital Accounting Support and business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability; to examine the moderating effects of stakeholder awareness on the relationships among business innovation effectiveness, modern product creativity, and organizational trust and firm sustainability, and; to

examine the moderating effects of disruptive technology on the relationships among ambidextrous of top management, technological innovation, and market competition pressures and each dimension of Proactive Digital Accounting Support.

These findings show that follows the formulated research objectives and consistent with the study as follows.

Digital Cost Management on Its Consequences

The results from the hypothesis testing found that digital cost management has a positive influence on business innovation effectiveness *(H1a)*. Consistent with the study of Morales Cueva (2016) suggests that the companies that use Digital cost management that is more suited to their characteristics will have led to efficiently manage costs for business innovation based on an organizational structure and can create a competitive advantage over companies that cannot do. Similarly, Askarany et al. (2007) found that Digital cost management is associated with implementing business innovation. However, the result from the hypothesis testing found that digital cost management does not have a significant positive impact on modern product creativity *(H1b)*. This is consistent with the study of Chwastyk & Kołosowski (2014) argues that organizations cannot plan for future costs management by relying solely on digital technologies because the accuracy of cost prediction depends on the accuracy of the information, level of knowledge, and the number and quality of information increases with the progress of the project. Therefore, organizations must verify the results of repeating the prediction of costs when more information about the process occurs. In addition, the results from the hypothesis testing have also shown that digital cost management does not have a significant positive impact on organizational trust *(H1c)*, which is consistent with the study of Bendickson et al. (2017) and Kulkarni et al. (2020), argue that start-up new practice operations in the digital era to achieve success are often unclear for several reasons, such as organizations may lack focus on developing skill sets of employees related to innovation or a lack of effective communication for them to understand "what needs to be done" let to goal. Likewise, the result from the

hypothesis testing found that digital cost management does not have a significant positive impact on firm sustainability (*H1d*). These findings are consistent with Marnewick (2017) argument that the organization might lack ambitions regarding sustainability in business, which may be intentional or may be due to not understanding the importance of sustainability. In addition, Erokhin et al. (2019) argue that companies that focus on achieving immediate and direct results on profitability tend to give up on proactive sustainability-oriented cost management tools. Instead, they tend to employ less-sophisticated short-term management accounting instruments.

Diagnostic Data Analytics on Its Consequences

The results from the hypothesis testing found that diagnostic data analytics does not have a significant positive impact on business innovation effectiveness (*H2a*). These findings are consistent with Mikalef & Krogstie (2018) suggest that diagnostic data analytics' significance varies under different contextual factors, such as organizational goals, since goals directly influence the business process management practices and resources that are most suitable. Therefore, the organization should focus on technical excellence regarding human skills and tangible resources. Technical skills, in particular, should be supported through targeted seminars and training for incremental process innovations emerging.

The results from the hypothesis testing have also shown that diagnostic data analytics does not have a significant positive impact on modern product creativity (*H2b*), which is consistent with the study of Sun & Liu (2021) argue that organizations that lack appropriate diagnostic data analytic technology capability may fail in identifying and utilizing new knowledge embedded on the connectivity and compatibility of big data to increase the knowledge benefits of product novelty design and provides flexible platform development.

However, the results from the hypothesis testing found that diagnostic data analytics has a positive influence on organizational trust (*H2c*), which is consistent with the study of AbRahman et al. (2016) revealed that diagnostic data analytics is usefulness

for management accounting practices in the company, that improved accountability, and productivity of employees which will lead to trust in the organization, ultimately.

In addition, the results from the hypothesis testing found that diagnostic data analytics does not have a significant positive impact on firm sustainability *(H2d)*, which is consistent with the study of Oncioiu et al. (2019) argue that the main reasons why company's diagnostic analytics for sustainability failing is the difficulty of analyzing large volumes of data to achieve timely accurate results because to lack of investment in training and human resource development for extensive data analytics needed as well as the acceptance and use of new technologies within an organization.

Dynamic Resource Allocation on Its Consequences

The results from the hypothesis testing found that dynamic resource allocation has a positive influence on business innovation effectiveness *(H3a)*. Consistent with the study of Sapsanguanboon & Auanguai (2020) found that the resource allocation strategy affects business innovation effectiveness because it is a tool to access and integrate information for the development of the organization's business innovation that helps to improve the ability of operations to produce products is of high. Likewise, Klingebiel & Rammer (2014) argued that dynamic resource allocation to business innovation projects is a diversification of the company's investment that can increase the chances of success.

The results from the hypothesis testing also found that dynamic resource allocation positively influences modern product creativity *(H3b)*, which is consistent with the study of Klingebiel & Rammer (2014) found that dynamic resource allocation is most excellent for firms to create relatively novel products. Likewise, Zhao et al. (2021) argue that dynamic resource allocation is essential to successful modern product development. Because modern product developments must cover the various needs of future customers, companies must invest in new product projects and allocate resources appropriately across all projects to increase sales.

Similarly, the results from the hypothesis testing found that dynamic resource allocation has a positive influence on organizational trust *(H3c)*. Consistent with the study by Al-Aali (2021) suggests that new creative resource allocation practices are important to manufacturing companies. Additionally, Gitau et al. (2020) suggest that dynamic resource allocation could help managers will be able to check the task list of the employees and know who has more than adequate tasks and those who have been undersigned. It will help motivate the employees to improve their productivity because they will not feel overworked.

However, the result from the hypothesis testing found that dynamic resource allocation does not have a significant positive impact on firm sustainability *(H3d)*, which is consistent with the study of Huang et al. (2019) argued that companies must clearly understand their existing resources and have a more robust understanding of dynamic resource allocation, especially, investing in integrated information system tools for resource allocation in a dynamic environment for lead to sustainability. Therefore, the main topic that organizations must act on is assisting personnel in the accounting, finance, and information technology to appropriate training during such a system's implementation process.

Risk Assessment Information System on Its Consequences

The results from the hypothesis testing found that the risk assessment information system positively influences business innovation effectiveness *(H4a)*, which is consistent with the study of Bowers & Khorakian (2014) suggests that risk management information provides a tangible link to the business innovation project. Therefore, more appropriate and transparent risk management information could help succeed in business innovation projects. Especially during economic struggles, business innovation can help turn crisis into opportunity. As well as the findings of Sun et al. (2020) showed that practical risk assessment and risk management could reduce the risk of the business innovation process in the manufacturing industry and ensure the progress of product innovation.

The results from the hypothesis testing also found that risk assessment information system positively influences modern product creativity (*H4b*), which is consistent with the study of Mu et al. (2009) suggests that proper risk assessment information system can greatly increase the likelihood of modern product creativity success. Furthermore, if companies can effectively manage the risks associated with modern product creativity, such as increasing their stock of knowledge about risk management, then risk and uncertainty will be a source not merely of threats but also opportunities.

The results from the hypothesis testing found that the risk assessment information system has a positive influence on organizational trust (*H4c*). This is consistent with the study of Sax & Torp (2015) suggests that the use of a risk assessment information system highlights the importance of combining traditional risk management data (discover, identify, and assess) with finding from advanced technologies to identify and hedge potential risks and exploit potential opportunities rapidly. Furthermore, this makes employees feel trust in the organization with existing rules and systems because enabled systems are considered to facilitate their responsibilities.

Similarly, the results from the hypothesis testing found that the risk assessment information system positively influences firm sustainability (*H4d*), which is consistent with the study of Jagoda & Wojcik (2019) conclude that the risk assessment information system is a dynamic process that thrives on new technological advancements aimed at averting events that can negatively affect an organization. In addition, the companies adopting this practice are not only leaders but also role models for those just beginning to understand the importance of risk avoidance and its repercussions on the economy, society, and environmental.

Business Innovation Effectiveness and Firm Sustainability

The results from the hypothesis testing found that business innovation effectiveness does not have a significant positive impact on firm sustainability *(H5a)*, which is consistent with the study of Fuentes et al. (2018) argues that companies tend to satisfy both the economic constraints posed by their competitive environment and institutional pressure, by implementing process innovation for corporate sustainability engagement at the beginning, after that it fades away because they require to achieve economic growth.

Modern Product Creativity and Firm Sustainability

The results from the hypothesis testing found that modern product creativity does not have a significant positive impact on firm sustainability *(H5b)*. These findings are in harmony with the findings of May et al. (2012) argue that companies still consider sustainability as a limitation rather than an opportunity for eco-friendly products, as fully integrating sustainability in modern product creativity projects costs them higher than the gain they could have achieved (higher costs lead to lower profits). Although some countries have compulsory product liability policies, companies are trying to meet only the minimum requirements asked by legislation because that might give a further competitive advantage.

Organizational Trust and Firm Sustainability

However, the results from the hypothesis testing found that organizational trust has a positive influence on firm sustainability *(H5c)*. This is consistent with the study of Lee (2020) suggests that to achieve firm sustainability, organizations must foster and maintain trust within the organization, especially among its employees, as essential stakeholders in enhancing organizational effectiveness and success in the long run.

Ambidextrous of Top Management and Proactive Digital Accounting Support

The results from the hypothesis testing found that the ambidextrous of top management positively influence digital cost management *(H6a)*. This is consistent with the study of Tamayo-Torres et al. (2017), and Bawono (2022) conclude that the ambidextrous of top management is a basis and enabler for improving digital costing innovation, especially in enhancing firm performance in a dynamic environment. The result from the hypothesis testing has also shown that the ambidextrous of top management positively influence diagnostic data analytics *(H6b)*. This is consistent with the study of Raut et al. (2019) concluded that ambidextrous of top management has a significant influence on diagnostic data analytics as big data analytics tools (descriptive, predictive, prescriptive, and diagnostic analytics) can assist managers for good visualization of the future and effective decision-making. Furthermore, the result from the hypothesis testing has also shown that the ambidextrous of top management positively influence dynamic resource allocation *(H6c)*. This is consistent with the study of Guo et al. (2020) suggested that ambidextrous leaders must conduct performance evaluation and resource allocation in a dynamic environment. Meaning they can provide expanded resources and strong support to employees. Similarly, the results from the hypothesis testing found that the ambidextrous of top management positively influence the risk assessment information system *(H6d)*. This is consistent with the study of Severgnini et al. (2019) suggests that managers in both small and large firms should focus attention on the decision-making process by engaging risk assessment information system in a strategic decision to consider whether its strategic decision-making takes into account the instinctive or rational aspects of the board of directors.

Technological Innovation and Proactive Digital Accounting Support

The results from the hypothesis testing found that technological innovation positively influences digital cost management *(H7a)*, which is consistent with the study of Omorogbe (2014) concluded that the application of digital cost management on the platform of technological innovation applications would increase operational efficiency

if a fit exists between technology capability and cost management system applications of organizations. The result from the hypothesis testing has also shown that technological innovation positively influences diagnostic data analytics *(H7b)*. This is consistent with the study of Bibri & Krogstie (2017) concluded that the availability of core-enabled technologies innovation and diagnostics data analytics complement each other by the varied technical details of the application domains about complexity, scale, requirement, and objective of an organization.

The result from the hypothesis testing has also shown that technological innovation positively influences dynamic resource allocation *(H7c)*, which is consistent with the study of Lutfi et al. (2022) suggested that technological innovation enhances the adoption of dynamic resource allocation in organizations. It means that managers will adopt advanced technology if they believe it can reduce a perceived performance gap, leverage business opportunities, or increase the possibilities of responding to business needs, specifically in a dynamic environment. Similarly, the results from the hypothesis testing found that technological innovation positively influences the risk assessment information system *(H7d)*. This is consistent with the study of (Teymouri & Ashoori, 2011) suggests that technological innovation can facilitate flexibility, compatibility, and integration of risk management processes (identifying, assessing, controlling, and reporting), so technological innovations should be implemented appropriately to make risk management more effective.

Market Competition Pressure and Proactive Digital Accounting Support

The results from the hypothesis testing found that market competition pressure does not have a significant positive impact on digital cost management, diagnostic data analytics, and dynamic resource allocation *(H8a,b,c)*. These findings are in harmony with the study of Nylén & Holmström (2015) that the unique properties of digital technology in accounting practice enable new types of innovation processes that are exceptionally fast and difficult to implement successfully. Therefore, organizations must create mechanisms for arresting the successful outcome of efforts to adopt digital

accounting practices. However, the results from the hypothesis testing found that market competition pressure has a positive influence on the risk assessment information system *(H8d)*. This is consistent with the study of Rodríguez-Espíndola et al. (2022) suggests that the importance of accounting management for market competition pressure (external factor) as critical enablers in the adoption of the risk assessment system, which is aided by digital technology to support resetting and enhancing processes of risk management across the organization.

Proactive Culture to Moderator Proactive Digital Accounting Support and Business Innovation Effectiveness

The results from the hypothesis testing show that proactive culture does not moderate the relationship between digital cost management, diagnostic data analytics, and risk assessment information system and business innovation effectiveness *(H9a,10a,12a)*. These findings are in harmony with the study of Okibo & Shikanda (2011) argues that the company's ability to business innovation is enhanced by new knowledge and capabilities integrated into the organizational culture. In response, some companies may need to take the time to be conversant with their strategies on innovation and build up the required integration by putting in order its internal environment to achieve business innovation competencies.

However, the results from the hypothesis testing found that the relationship between dynamic resource allocation and business innovation effectiveness have positively moderated by proactive culture *(H11a)*. This is consistent with the study of Dezdar & Ainin (2012) that the organization must acknowledge that dynamic resource allocation is the system for the process of assigning and managing resources enterprise-wide, which there may be clashes and disagreements of interests in this process by using of a reengineering. Accordingly, the success of dynamic resource allocation implementation requires an organizational culture that focuses on pursuing new things and tolerates the risks that may arise in adopting a new practice. In addition, research by Ceausu et al. (2017) and Stacho et al. (2016) also indicated that organizational culture

is a booster of companies to adapt to shorter production cycles through manufacturing innovation to enhance the operational capacities of their company.

Proactive Culture to Moderator Proactive Digital Accounting Support and Modern Product Creativity

The results from the hypothesis testing show that proactive culture does not moderate the relationship between all dimensions of Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system) and modern product creativity (*H9b, 10b, 11b, 12b*). These findings are in harmony with the study of Aroyeun et al. (2018) argue that proactive culture indicates a trait that is reflected in its propensity to confront and challenge its competitors directly and intensely and to outperform them in the marketplace. So, a company with a proactive culture therefore necessary to assimilate new sources of technologies, skills, and core competencies to use as a tactic in battle, such as modern product differentiation to satisfy consumer demand which may both have a negative or positive effect on the company's competitive advantage depends on the effective implementation of the strategy.

Proactive Culture to Moderator Proactive Digital Accounting Support and Organizational Trust

The results from the hypothesis testing show that proactive culture does not moderate the relationship between three dimensions of Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, and risk assessment information system) and organizational trust (*H9c,10c,12c*). These findings are in harmony with the study of Wibawa et al. (2014) explained that the proactive culture tends to be externally focused, which means companies with proactive culture are adaptive and flexible (for example, the implementation of new technology or practices) to create an edge over the competitors that are supported by clear organization's objectives. Therefore, this proactive culture cannot moderate influence in building trust with employees as internal stakeholders.

However, the results from the hypothesis testing prove that proactive culture moderates the relationship between dynamic resource allocation and organizational trust *(H11c)*. These findings are in harmony with Dezdar & Ainin (2012) findings that proactive culture encourages employees to participate and are committed to any project to create a competitive advantage. Hence, organizations that perform dynamic resource allocation must conduct additional employee training to learn how to use it effectively and efficiently as users of resource allocation implementation projects. This involvement gives them a sense of possession, and they feel more in control of their jobs, which encourages them to accept this practice and earn employees' trust in the successful implementation of the dynamic resource allocation practice.

Proactive Culture to Moderator Proactive Digital Accounting Support and Firm Sustainability

The results from the hypothesis testing found that the relationship between all dimensions of Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system) and firm sustainability *(H9d,10d,11d,12d)* has positively moderated by proactive culture. These findings are in harmony with the study of Abbett et al. (2010), Baird et al. (2018), and Stępień (2019) that the proactive culture is more likely to accept new ideas and innovative accounting practices. Members of the group are more poised to experiment with and respond positively to new practices. They are willing to invest the necessary time, money, and other resources in their adoption to help achieve organizational goals and objectives. In particular, information from innovative practices will increase the likelihood of providing information to managers about the sustainability impact of providing current and future products.

The moderating role of Stakeholder Awareness

The results from the hypothesis testing found that the relationship between business innovation effectiveness and firm sustainability *(H13a)*, modern product creativity and firm sustainability *(H13b)*, and organizational trust and firm sustainability *(H13c)* have a positively moderated by stakeholder awareness. These findings are in harmony with the findings of Baric (2017), Fuentes et al. (2018), and Verenych et al. (2019) that the resource deployment of the company more efficiently as possible requires to rely on manufacturing process innovation to improve quality, productivity, and competitiveness as a means of achieving sustainability (economic, environmental, and social). Therefore, an organization should provide resources to encourage process innovation among employees, suppliers, and customers to build organizational trust with them as stakeholders because they represent a critical factor that affects the success of firm sustainability (Baric, 2017). So, organizations must find a practical approach to create stakeholder awareness about the innovation process, operating processes, and product projects. When stakeholders understand all project processes and characteristics of the project product correctly and adequately, the implementation is carried out without significant time expenditures (Verenych et al., 2019). Therefore, stakeholder awareness is a critical driver that accelerates companies to develop sustainability capabilities.

Disruptive Technology to Moderator Antecedents and Proactive Digital Accounting Support

The results from the hypothesis testing found that the relationship between ambidextrous of top management and digital cost management is positively moderated by disruptive technology *(H14a)*. These findings are in harmony with the findings of Allahyari & Ramazani (2011) that disruptive technology is a critical tool that responds to the apply new costing practice of production as well as providing relevant and reliable information or reports for the business decision-making process. Hence, there is a need for the organization to recognize the importance and benefits of disruptive

technology that causes creates cost management capabilities which depend on the top management abilities for appropriate technology choices with resources and capabilities present within the organization (D. Singh et al., 2019). However, The results from the hypothesis testing show that disruptive technology does not moderate the relationship between ambidextrous of top management and diagnostic data analytics (*H14b*), ambidextrous of top management and dynamic resource allocation (*H14c*), ambidextrous of top management and risk assessment information system (*H14d*). Moreover, disruptive technology does not moderate the relationship between technological innovation and all dimensions of Proactive Digital Accounting Support (*H15a,b,c,d*). Similarly, disruptive technology does not moderate the relationship between market competition pressure and all dimensions of Proactive Digital Accounting Support (*H16a,b,c,d*). These findings are in harmony with Muharam et al. (2020) that disruptive technology is often valued for its most critical performance significance or value when the organization can acquire and exploit disruptive technology. However, fundamental limitations to suppressing successful disruptive technology begin from the companies are often ignorant of the potential of disruptive technology, personnel lack of capability to learn, poor management of innovation process, failure to develop critical internal or external infrastructure, and low perceived performance mix. Therefore, the organizations seeking to develop disruptive technology have to be receptive to a new context to eliminate the initial inferiority and be highly skilled at translating cues into get-the-job-done objectives coupled with the capability of exploiting disruptive technology. For this reason, it may be why the relationship between ambidextrous top management and diagnostic data analytics, dynamic resource allocation, and risk assessment information system does not have a significant positive impact moderated by disruptive technology. As well as, disruptive technology has no moderating role in the relationship between technological innovation and market competition pressure with all dimensions of Proactive Digital Accounting Support.

Conclusion

This study explored the causal links between the antecedent of Proactive Digital Accounting Support (ambidextrous top management, technological innovation, and market competition pressures), Proactive Digital Accounting Support, business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability, including proactive culture, disruptive technology, and stakeholder awareness as a moderator have been conducted through quantitative research in the exporting businesses. This research was conducted under a conceptual framework based on three theories: dynamic capability, stakeholder, and contingency. The results research completes the objectives of this research and answer research questions. Consequently, this research contributes to the substantial body of Proactive Digital Accounting Support, ambidextrous top management, technological innovation, market competition pressures, disruptive technology, proactive culture, business innovation effectiveness, modern product creativity, organizational trust, stakeholder awareness, and firm sustainability perspective. It also provides implications for exporting businesses in the context of the study.

To test all propositions, so the sample was focused on exporting businesses. The developed questionnaire was distributed to 650 exporter businesses in Thailand, with 225 usable for data analysis. Data analysis was conducted and used for hypothesis testing using the set of questionnaires. This study applies the structural equation modeling technique (SEM) to test the hypotheses based on the responses to the questionnaire. Moreover, Harman's single-factor test has been implemented to confirm the minimal risk of Common Method Variance (CMV). In addition, the data of this study were validated and passed the convergent and discriminant validity tests through various analyses. For example, all the constructs reveal the acceptable value of the Average Variance Extracted (AVE) (Hair et al., 2010), as well as passing the Fornell & Larcker (1981)'s method for discriminant validity.

The results of this testing were supported; namely, 19 main effect hypotheses were accepted, and 12 hypotheses were rejected. In addition, 10 moderating effect hypotheses were accepted, and 21 hypotheses were rejected. The results used the structural model to investigate the main effect hypotheses and moderating effect.

First, the result shows that Proactive Digital Accounting Support (PDAS) significantly positively affects business innovation effectiveness (H1a, H3a, H4a), modern product creativity (H3b, H4b), organizational trust (H2c, H3c, H4c), and firm sustainability (H4d).

Second, organizational trust significantly affects firm sustainability (H5c), while business innovation effectiveness and modern product creativity do not.

Third, the finding supports the relationships among the antecedents, namely ambidextrous top management (H6a, b, c, d), technological innovation (H7a, b, c, d), and market competition pressures (H8d) on four dimensions of Proactive Digital Accounting Support (PDAS).

Fourth, the finding supports the moderating effect of proactive culture in the relationship between Proactive Digital Accounting Support (PDAS) and business innovation effectiveness (H11a), organizational trust (H11c), and especially firm sustainability (H9d, 10d, 11d, and 12d)), while modern product creativity does not.

Fifth, stakeholder awareness moderates the relationship between business innovation effectiveness (H13a), modern product creativity (H13b), organizational trust, and firm sustainability (H13c).

Finally, the finding supports the moderating effect of disruptive technology in the relationship between ambidextrous of top management and Proactive Digital Accounting Support (H14a). In contrast, disruptive technology is not a moderator in the relationship between technological innovation, market competition pressures, and Proactive Digital Accounting Support.

Additional tests, because the main effect findings showed that risk assessment information systems in Proactive Digital Accounting Support practices affect the

antecedents and consequences of Proactive Digital Accounting Support. This research, therefore some additional tests the mediating role of risk assessment information systems in the relationship between the antecedents and the consequences of Proactive Digital Accounting Support to check the robustness of the main findings by the Sobel tests as recommended by MacKinnon et al. (1995).

The results indicate that the risk assessment information system as a mediator the follows; (1) Ambidextrous top management can influence business innovation effectiveness (p-value = 0.000), modern product creativity (p-value = 0.000), organizational trust (p-value = 0.000), and firm sustainability (p-value = 0.049), (2) Technological innovation can influence business innovation effectiveness (p-value = 0.002), modern product creativity (p-value = 0.005), and organizational trust (p-value = 0.002), while firm sustainability does not (p-value = 0.067), (3) Market competition pressures cannot influence business innovation effectiveness (p-value = 0.058), modern product creativity (p-value = 0.065), organizational trust (p-value = 0.057), and firm sustainability (p-value = 0.143). The risk assessment information system is thus just one element of Proactive Digital Accounting Support.

The next section presents the summary of results for research questions in all hypotheses testing in Table 25.

Table 25 Summary of Results for Research Questions and Hypothesis Testing

Research Questions	Hypotheses	Results	Conclusions
1. How does each dimension of Proactive Digital Accounting Support (digital cost management, diagnostic data analytics, dynamic resource allocation, and risk assessment information system) relate to business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability?	H1a,H3a,H4a	Digital cost management, dynamic resource allocation, and risk assessment information system have effect on business innovation effectiveness.	Supported
	H2a	Diagnostic data analytics has no effect on business innovation effectiveness.	Not Supported
	H1b, H2b	Digital cost management and diagnostic data analytics have no effect on modern product creativity.	Not Supported
	H3b, H4b	Dynamic resource allocation and risk assessment information systems have effect modern product creativity.	Supported
	H1c	Digital cost management has no significant effect on organizational trust.	Not Supported

Table 25 Summary of Results for Research Questions and Hypothesis Testing (Continued)

Research Questions	Hypotheses	Results	Conclusions
	H2c, H3c, H4c	Diagnostic data analytics, dynamic resource allocation, and risk assessment information systems have effect on organizational trust.	Supported
	H1d, H2d, H3d	Digital cost management, diagnostic data analytics, and dynamic resource allocation have no significant effect on firm sustainability.	Not Supported
	H4d	Risk assessment information systems have effect on firm sustainability.	Supported
2. How do business innovation effectiveness, modern product creativity, and organizational trust have an impact on firm sustainability?	H5a, H5b	Business innovation effectiveness and modern product creativity have no effect on firm sustainability.	Not Supported
	H5c	Organizational trust has effect on firm sustainability.	Supported
3. How do ambidextrous of top management, technological innovation, and market competition pressures influence each dimension of Proactive Digital Accounting Support?	H6a-d	Ambidextrous of top management has effect on all dimensions of PDAS.	Supported
	H7a-d	Technological innovation affects all dimensions of Proactive Digital Accounting Support.	Supported

Table 25 Summary of Results for Research Questions and Hypothesis Testing (Continued)

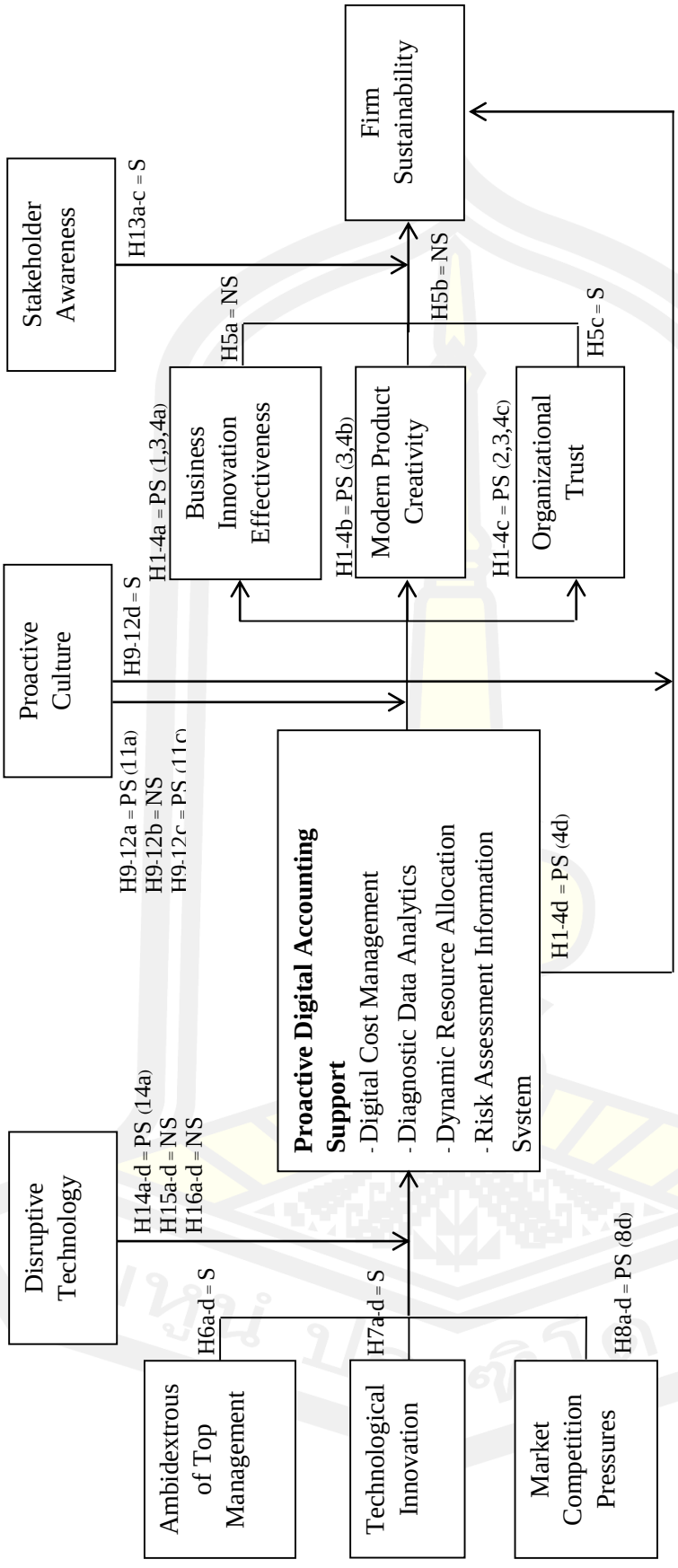
Research Questions	Hypotheses	Results	Conclusions
	H8a-c	Market competition pressures do not affect digital cost management, diagnostic data analytics, and dynamic resource allocation.	Not Supported
	H8d	Market competitions pressures have effect risk assessment information system.	Supported
4. How do proactive culture relationships moderate the influence of each of four dimensions of Proactive Digital Accounting Support on business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability?	H9a,10a,12a	Proactive culture cannot moderate the relationship between three dimensions of PDAS (digital cost management, diagnostic data analytics, and risk assessment information systems) and business innovation effectiveness.	Not Supported
	H11a	Proactive culture moderates the relationship between dynamic resource allocation and business innovation effectiveness.	Supported
	H9-12b	Proactive culture cannot moderate the relationship between all dimensions of PDAS and modern product creativity.	Not Supported

Table 25 Summary of Results for Research Questions and Hypothesis Testing (Continued)

Research Questions	Hypotheses	Results	Conclusions
	H9c,10c,12c	Proactive culture cannot moderate the relationship between three dimensions of PDAS (digital cost management, diagnostic data analytics, and risk assessment information systems) and organizational trust.	Not Supported
	H11c	Proactive culture moderates the relationship between dynamic resource allocation and organizational trust.	Supported
	H9-12d	Proactive culture moderates the relationship between all dimensions of Proactive Digital Accounting Support and firm sustainability.	Supported
5. How do stakeholder awareness relationships moderate the influence of business innovation effectiveness, modern product creativity, organizational trust and firm sustainability?	H13a	Stakeholder awareness moderates the relationship between business innovation effectiveness and firm sustainability.	Supported
	H13b	Stakeholder awareness moderates the relationship between modern product creativity and firm sustainability.	Supported

Table 25 Summary of Results for Research Questions and Hypothesis Testing (Continued)

Research Questions	Hypotheses	Results	Conclusions
	H13c	Stakeholder awareness moderates the relationship between organizational trust and firm sustainability.	Supported
6. How does disruptive technology moderate the relationships among ambidextrous of top management, technological innovation, and market competition pressures on each dimensions of Proactive Digital Accounting Support?	H14a	Disruptive technology moderate the relationship between ambidextrous of top management and digital cost management.	Supported
	H14b,c,d	Disruptive technology cannot moderate the relationship between ambidextrous of top management and three dimensions of PDAS (diagnostic data analytics, dynamic resource allocation, and risk assessment information systems)	Not Supported
	H15a,b,c,d	Disruptive technology cannot moderate the relationship between technological innovation and all dimensions of PDAS	Not Supported
	H16a,b,c,d	Disruptive technology cannot moderate the relationship between market competition pressure and all dimensions of PDAS.	Not Supported



Note: S = Supported, NS = Not Supported, PS = Partially Supported

Figure 17 Summary of the Results of Hypotheses Testing

Theoretical and Managerial Contributions

In the previous, the research results were illustrated and fulfilled the research objectives and questions. Besides, these findings then showed the details of theoretical implications and managerial contribution as follows.

Theoretical Contributions

This research has been inspired by ongoing debates regarding the general agreement in the literature that Proactive Digital Accounting Support (PDAS) offers companies opportunities to operate efficiently, create competitive advantage, and lead to economic, social, and environmental benefits. Scholars generally believe so, but this study is where the digital accounting research consensus sheds light. Additionally, beyond these focuses of agreement, there is considerable ambiguity regarding the nature of digital accounting practices that have not been fully embraced, especially in the context of developing countries, where the literature is still inconclusive regarding the specific effects of the adoption of digital accounting practices. This research aims to understand the relationship between Proactive Digital Accounting Support (PDAS) and firm sustainability to address the gaps in the managerial accounting literature. More specifically, this research has adopted the perspective of the Dynamic capability, Stakeholder, and Contingency theories. This research's theoretical contributions are as follows.

First, use the dynamic capability perspective to pick up a more understanding of the conversion of firm resources into Proactive Digital Accounting Support capabilities and the impact of these capabilities on firm outcomes. By conceptual framework investigates four dimensions of Proactive Digital Accounting Support and its relationship with its consequences. The findings suggest that these dynamic capabilities influence business innovation effectiveness, modern product creativity, organizational trust, and firm sustainability.

Secondly, this research provides empirical evidence that the proactive culture can moderate the relationship between Proactive Digital Accounting Support (PDAS) and its consequences. In particular, it makes Proactive Digital Accounting Support strongly connected to firm sustainability. Moreover, this research contributes to the Institutional theory, which emphasizes that an organization's ability to adopt new practice approaches is driven by economic, environmental, and social factors. Meanwhile, changing organizational practices to be accepted by society contributes to success and sustainability (Nurunnabi, 2015). Overall, Proactive Digital Accounting Support (PDAS) is considered a dynamic capability because the role of dynamic capabilities is the change of existing resources into new functional competencies inside and outside the organization that better match the dynamically changing environment (Gupta et al., 2019).

Third, this study extends the understanding of stakeholder theory by examining the competitive advantage of organizations born of PDAS (through business innovation effectiveness, modern product creativity, and organizational trust) and its relationship with its consequences. The findings suggest that building a competitive advantage in an organization tends to have economic, social, and environmental good practices. The findings provide empirical support that the organization exists not only for the benefit of shareholders or owners but also for the employees, suppliers, customers, and other stakeholders, including for social and environmental benefits.

Fourth, this research provides empirical evidence that stakeholder awareness can moderate the relationship between Proactive Digital Accounting Support (PDAS) consequences and firm sustainability. Accordingly, the findings of this study contribute to the general agreement in the literature on the moderator role of stakeholder awareness as a moderating influence on sustainability outcomes.

Finally, this study also uses contingency theory to explain Proactive Digital Accounting Support in the area of influence factors that affect Proactive Digital Accounting Support. This study provides empirical support for antecedents as internal and external factors important to adopting and facilitating connectivity Proactive

Digital Accounting Support practices in an organization because the Proactive Digital Accounting Support characteristic is dynamic and continuous organizational development. So the optimal course of action is contingent (dependent) upon the internal and external situation. Significantly, the finding suggests that leveraging ambidextrous top management, technological innovation, and market competition pressures are the driver foundation of proactive digital accounting practices in an organization.

Managerial Contributions

The results of this research provide helpful insights and valuable guidelines to develop management accounting practices to improve decision-making and achieve competitive advantage and firm sustainability in the dynamic business environment, which is difficult to predict future events, particularly for managers in exporting businesses. The findings provided critical managerial contributions for exporting businesses as follows.

First, the findings offer essential managerial contributions to inform managers considering that PDAS play an important role in creating competitive advantage through business innovation effectiveness, modern product creativity, and organizational trust, including firm sustainability today. Thus, managers may need to adopt PDAS practice for helps able to provide a method to know that a startup project, development, and monitoring of organizational activities have a precise value, as well as reflects future firm outcomes. Because the critical issue regarding the startup project effectiveness is not how much to spend but how to spend. Organizations should be considered actual project spending based on each type of project effectiveness based on Proactive Digital Accounting Support (PDAS) information that helps organizations to assess the project expenditures against the financial returns on project cost (Martin, 2015). Besides, managers should strengthen the proactive culture in an organization to respond competitively with clear vision and objectives combined with Proactive Digital Accounting Support (PDAS) practices to enhance competitive advantage and firm sustainability (Aroyeun et al., 2018).

Second, the results show that leveraging PDAS provides the foundation to create a competitive advantage through business innovation effectiveness, modern product creativity, and organizational trust. Leveraging competitive advantage increases the potential of the operating process within the firm and the supply chain for economic, social, and environmental benefits. Managers should adopt these to accomplish the organization's strategic goals to maximize the company's wealth, including social and environmental contributions. Therefore managers should be setting resources within the organization to support these employees, suppliers, and customers leading to better economic, social, and environmental outcomes (Fuentes et al., 2018).

Third, this study also proposes that the relationship between the consequences of Proactive Digital Accounting Support and firm sustainability has the stakeholder awareness dependent dimension. Managers should be aware of the advantages of compliance with social norms and create stakeholder awareness to be perceived as a component of public policies that enable the integration of the sustainability dimensions. In addition, stakeholder awareness is a sustainability accelerator, so managers should communicate information related to projects or business activities through various channels such as Facebook, YouTube, Instagram, Twitter, Lines, corporate blogs, Ect, so that they understand policies and the orientation of corporate sustainability.

Fourth, the results of antecedents of Proactive Digital Accounting Support (PDAS) indicate that ambidextrous top management, technological innovation, and market competition pressures are vital for facilitating PDAS setting. Thus, managers should promote, support, and stimulate creativity among the employees to pursue new methods or practices while ensuring that the existing things or traditional practices remain stable. Additionally, organizations should be devoted to technological innovation efficiency investment that continuously increases operations' ability and encourages accountants to develop their skills to keep up with technological advancements, such as technical skills, digital skills, Etc. Moreover, organizations need to clearly understand their market competition situations that lead to the creation of

optimal operations strategies that effectively reflect the competitiveness of organizations in the market through outstanding product design and cost-benefit quality.

Finally, the results reveal that disruptive technology does not significantly affect the relationship between two components antecedent (technological innovation and market competition pressures) and all dimensions of PDAS. In this condition, managers should not excessively worship the decisive role of disruptive technology but instead invest confidently in the development of PDAS as a primary tool that provides relevant information pertinent, precise, and timely to various aspects of an organization's decision-making needs and to meet the changing economic environment challenges in the digital era. However, the result shows that to achieve Proactive Digital Accounting Support (PDAS), ambidextrous managers must be aware of disruptive technology as it is infrastructures to collect, store, process, and analyze big data, so they need to keep pace with advances in technology to ensure that those technology changes are indeed fundamental will be able to process different data flows and formats in any situation.

Limitations and Future Research Directions

The study has several limitations, which are helpful directions for future research.

First, this research uses the survey approach, which may lead to the possibility that respondents' answers are potentially biased. However, the questionnaire was constructed with the utmost care based on prior research. Moreover, the study captures respondents' perceptions of the organization that may not accurately represent actual practice in PDAS. Nevertheless, using perceptual measures is inevitable and reasonable because it is ultimately the user who operates the system.

Second, this study focused on a sample of 225 exporter businesses in Thailand only, while the proposed theory may be varied from country to country, which may cause the general characteristics of the results to be limited. Future studies should attempt to test this conceptual model in other countries in other contexts, as the role of

digital accounting may differ for each entrepreneur in a particular country, which challenges the findings of the present study.

Third, despite the appropriateness of the methodology involved, a quantitative study can overlook questions such as "how" and "why." Therefore, qualitative studies are needed in this regard, as well. In addition, the research might be used qualitative research methods such as in-depth interviews, focus groups, or case studies along with quantitative methods to confirm the results of this study and attain a clearer picture of Proactive Digital Accounting Support in this sector.

Fourth, this study proposes the concept of proactive digital accounting as a way for entrepreneurs to adaption and thrives during the digital transformation toward sustainable outcomes but has not identified the tools and techniques to apply in proactive digital accounting practices such as Cloud, Process robotics, Visualization, Advanced Analytics, Block chain, etc., so the future should study more about the use of tools and techniques that lead to corporate success and provide management accounting practitioners improve their expertise over those tools and techniques.

Finally, the findings are expected to be relevant in other contexts. However, as this study focuses on exporting business, this should be considered before making any conclusions relevant to other businesses.

Summary

This chapter has detailed the conclusion of the results on the effects of Proactive Digital Accounting Support on sustainability that is supported by the theoretical frameworks, consist the dynamic capability, stakeholder, and contingency theories. This research confirms that Proactive Digital Accounting Support has an influential positive impact on firm sustainability, especially the role of proactive culture as the moderator. Given this evidence, it can be seen that the research question is supported. However, there are both fully-supported and partially-supported hypotheses.

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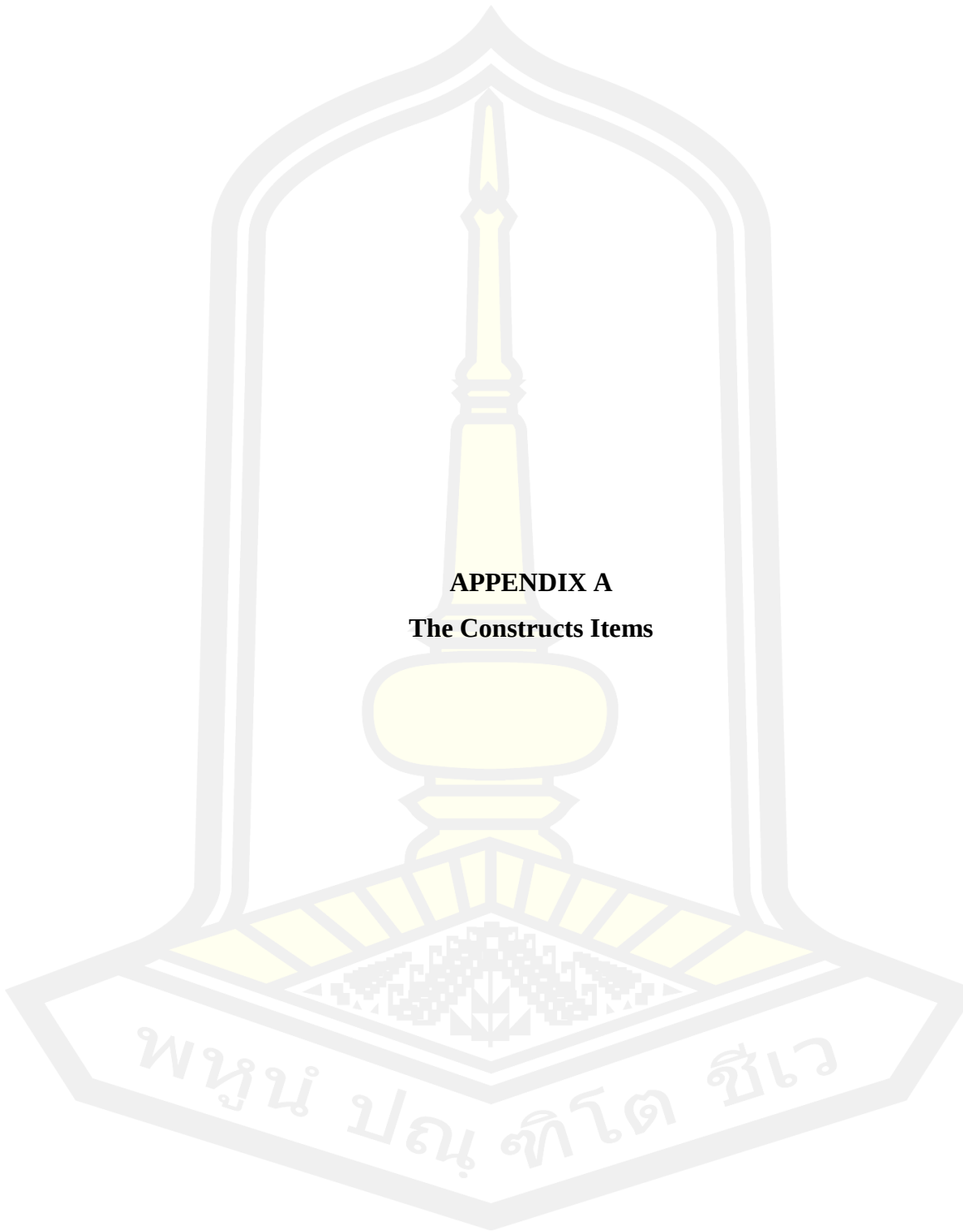
APPENDICES



APPENDIX A

The Constructs Items

Table A1 Items of Fourteen Constructs

Item code	Firm Sustainability
FSU1	Setting a vision and mission for sustainability in the economy and social and environmental development makes the sustainability behavior of the entity more efficient.
FSU2	The entity has a good and efficient practice in developing the organization towards the success of sustainable business operations.
FSU3	The entity's operation outcome achieves the stated goals and objectives with the latest year's net profit equivalent to or higher than competitors in the same industry.
FSU4	The entity creates environmentally friendly products by reducing the negative impact on the environment, such as natural resource use, energy and CO2 emissions, chemical, water consumption, and waste.
FSU5	The entity operates with a responsibility to the community and society by avoiding any operations that may negatively affect the community's quality of life, such as physical resources, biological resources, etc.
Item code	**Digital Cost Management**
DCM1	The entity has appropriate cost management consistent with the internal and external changing environment to achieve the stated operational objectives.
DCM2	The entity applies modern cost management concepts (e.g., activity-based management, value chain analysis, life-cycle costing, target-costing) to make product costing accurate, timely, and realistic.
DCM3	The entity realizes the importance of applying digital technology or adopting new technologies in cost management to support operations for maximum efficiency.

Table A1 Items of Fourteen Constructs (Continued)

Item code	Digital Cost Management
DCM4	The entity seeks digital methods to process and analyze cost data to obtain the information needed to support more efficient cost management.
DCM5	The entity believes that applying digital technology in cost management will provide an excellent operational process and make management accounting practices more efficient and effective.
Item code	**Diagnostic Data Analytics**
DDA1	The entity believes that analyzing current events and forecasting probable future events about market conditions will enable it to effectively plan and produce management accounting information to strengthen its decision-making process.
DDA2	When the market situation changes, the entity believes that using advanced analytics tools can identify market trends and other helpful information to support the rapid, timely, and appropriate adjustment of tactics or methods of action to the situation.
DDA3	The entity believes that analyzing trends in the behavior or conduct of competitors, customers, and suppliers can adjust its strategic or operational plans more efficiently.
DDA4	The entity focuses on developing information-generating methods that will enable accurate forecasting of the competitive environment of the future business for building a strategic plan more effectively.
DDA5	The entity believes that analyzing business competition situations using advanced analytics generates management accounting information to support strategic decision-making, creating an excellent future market competitive advantage.

Table A1 Items of Fourteen Constructs (Continued)

Item code	Dynamic Resource Allocation
DRA1	The entity believes that resource allocation of financial, technological, and human resources can support operations under excellent business objectives and goals.
DRA2	The entity analyzes existing resource utilization data to be the management accounting information for considering the value and benefits received in the operations.
DRA3	The entity believes that the capabilities of modern technology will enable the entities to allocate resources more efficiently and enable economical, cost-effective, and timely use of existing resources in a rapidly changing environment.
DRA4	The entity seeks new technologies to create an effective corporate resource planning system to support timely operations, meet the goals and align with the established strategy.
DRA5	The entity believes that adopting new technologies will be able to allocate resources suitable for operations in a rapidly changing environment and enable the business to achieve the highest goals.
Item code	**Risk Assessment Information System**
RAI1	The entity has an information system that can be used to discover, identify, and assess risks related to potential adverse events affecting the achievement of objectives or goals to risk management to an acceptable level for the organization.
RAI2	The entity recognizes the importance of analyzing internal and external environments with analytical technologies such as data analytics and risk management software to anticipate potential adverse events and adjust to managing risks before the actual operation.

Table A1 Items of Fourteen Constructs (Continued)

Item code	Risk Assessment Information System
RAI3	The entity believes that using information systems to identify, assess, and manage risk is a way to support more effective, timely, and can be put into practice for more accurate risk decisions..
RAI4	The entity has improved and developed information systems with new technologies for risk assessment to be efficient and always up-to-date.
RAI5	The entity believes that risk management practices that leverage digital technology will give the entity reasonable assurance about achieving objectives and goals more reliably.
Item code	**Business Innovation Effectiveness**
BIE1	The entity has efficient and effective production processes and operating systems consistent with an organizational strategy.
BIE2	The entity focuses on creating or bringing innovations to improve and develop the production process to be modern and valuable to achieve the organization's goals continuously.
BIE3	The entity can make changes to its production processes to efficiently reduce the steps and time spent on operational activities, making the operation more convenient and fast.
BIE4	The entity can apply innovation to effectively adjust how it operates in its operational activities, which can use resources economically and cost-effectively.
BIE5	The entity can effectively reduce waste from operating activities by adopting innovative ideas and new technologies to promote the quality of the production process.

Table A1 Items of Fourteen Constructs (Continued)

Item code	Modern Product Creativity
MPC1	The entity constantly creates new and modern products to meet customers' needs.
MPC2	The entity can improve and develop existing products to be outstanding and modern to meet customers' needs perfectly.
MPC3	The entity can design products that are unique and distinctive characteristics.
MPC4	Customers have accepted the entity's products from the past to the present.
MPC5	The entity believes that creating modern products will increase market share.
Item code	**Organizational Trust**
ORT1	The entity has policies and operating guidelines that treat employees fairly.
Item code	**Organizational Trust**
ORT2	The entity focuses on developing the knowledge and abilities of employees to empower their potential to cope with business expansion effectively.
ORT3	The entity encourages employees to progress at work and raises their salaries when they are promoted with clear assessment criteria.
ORT4	The entity encourages employees to have a good working environment, convenient, suitable, and safe.
ORT5	The entity allows employees to participate in meetings to receive the company's information, news, situations, guidelines, and policies that will lead to organizational success.

Table A1 Items of Fourteen Constructs (Continued)

Item code	Ambidextrous of Top Management
ATM1	Executives focus on pursuing innovative practices and continually improving existing practices to respond to internal and external changes.
ATM2	Executives encourage personnel to learn and train techniques to create new methods to provide information support to management for decision-making.
ATM3	Executives encourage the development of new practices by allocating adequate budgets and related resources to enable rapid, accurate, and timely production of information to users within the organization.
ATM4	Executives encourage the application of modern technology to improve accounting processes to be more efficient.
ATM5	Executives believe that focusing on innovative practices and optimizing existing practices will drive business success.
Item code	**Technological Innovation**
TEI1	The entity is committed to implementing appropriate technology to help operations continue to be more efficient.
TEI2	The entity promotes the application of modern technology to generate information that can quickly, correctly, and accurately support decision-making.
TEI3	The entity focuses on allocating investment budgets in technology to support the constantly changing operational processes.
TEI4	The entity focuses on adopting cutting-edge technology to make operations agile and successful.
TEI5	The entity believes that increasing technological capabilities will make its operations processes more efficient.

Table A1 Items of Fourteen Constructs (Continued)

Item code	Proactive Culture
PAC1	The entity has an organizational culture that emphasizes presented all members of the organization are involved in giving opinions for building a stable and sustainable business.
PAC2	The entity focuses on changing the methods to improve its market position to outperform competitors.
PAC3	The entity believes that introducing new products to the market first will increase the opportunity to generate revenue and increase profits.
PAC4	The entity believes that predicted future market conditions will be able to create new products to satisfy consumers perfectly.
PAC5	The entity believes that having an organizational culture that emphasizes responding quickly to change will enable successful operations and sustainable growth.
Item code	**Market Competition Pressures**
MCP1	The intense competition in the business has always pushed the entity to adapt to increase market share.
MCP2	The entity must continually improve and develop its marketing strategy to meet customers' rapidly changing needs.
MCP3	The entity must constantly improve and develop the quality of its products to be outstanding in order to be able to meet the needs of customers excellently.
MCP4	Intense market competition results in an entity finding methods to ensure that its product offerings can compete effectively and make a good profit.

Table A1 Items of Fourteen Constructs (Continued)

Item code	Market Competition Pressures
MCP5	Competitors have continually developed their potential, resulting in the entity anticipating competitors' marketing activities to create a superior competitive strategy.
Item code	**Stakeholder Awareness**
STA1	The entity attaches importance to the organization of the information system and continuously communicates with its stakeholders through various channels.
STA2	The entity has the policy to reduce the impact on society and the environment by setting a clear vision and objectives in sustainability management.
STA3	The entity strictly complies with environmental laws, regulations, and regulations and social responsibility as well as the authorities' requirements relating to the conduct of business.
STA4	The entity communicates information to relevant stakeholders to frankly understand the process and nature of product projects.
STA5	The entity believes that transparent disclosure of sustainability information will help the entity gain recognition from its stakeholders.
Item code	**Disruptive technology**
DRT1	Continuously developed and improved technology has dramatically influenced the entity's adjustment and development of management accounting practices.

Table A1 Items of Fourteen Constructs (Continued)

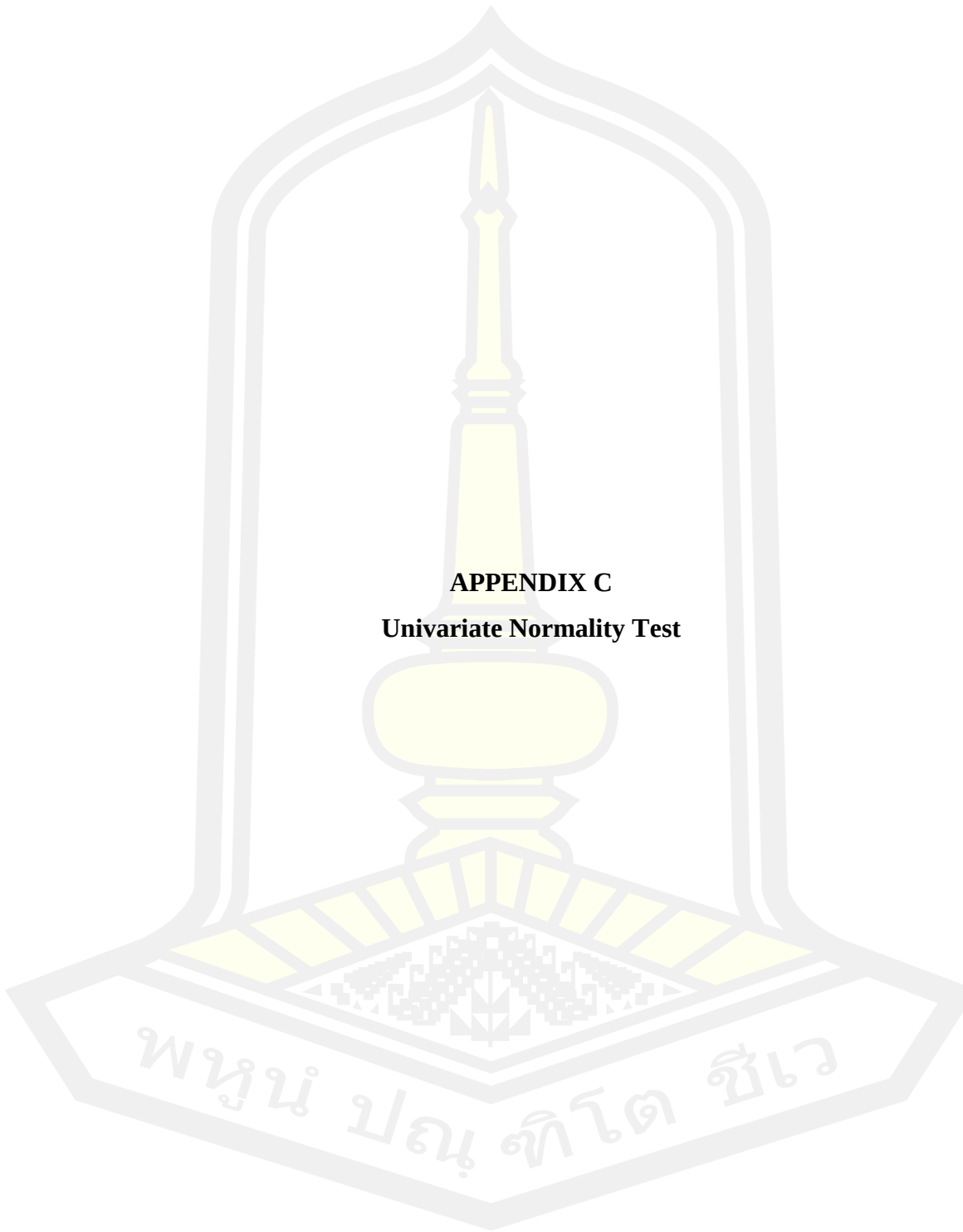
Item code	Market Competition Pressures
DRT2	The growth of communication networks has encouraged business processes to be more efficient.
DRT3	Continuous occurrence of tools, processes, and support systems can significantly enhance business efficiency.
DRT4	Emerging technological diversity, as a result, the entity can choose to use according to the characteristics and conditions of the entity fully.
DRT5	New capabilities of technology are constantly emerging, requiring an entity to continually adapt to improve its capabilities, operational efficiency, and success.

APPENDIX B

Non-Response Bias Tests

Table B1 Non-Response Bias Test

Variable	Comparison	N	Mean	S.D.	t-value	p-value
Digital cost management	Early Respondents	113	4.0195	.54246	-1.008	0.314
	Late Respondents	112	4.0911	.52256	-1.008	
Dynamic Resource Allocation	Early Respondents	113	4.0885	.57504	-0.674	0.501
	Late Respondents	112	4.1393	.55465	-0.674	
Risk Assessment Information System	Early Respondents	113	3.8814	.49687	-1.845	0.066
	Late Respondents	112	3.9982	.45122	-1.846	
Business Innovation Effectiveness	Early Respondents	113	4.0407	.54652	-0.076	0.939
	Late Respondents	112	4.0464	.57703	-0.076	
Modern Product Creativity	Early Respondents	113	4.0708	.61116	-0.147	0.883
	Late Respondents	112	4.0821	.54197	-0.147	
Organizational Trust	Early Respondents	113	4.0850	.61749	-0.560	0.576
	Late Respondents	112	4.1286	.54944	-0.560	
Firm Sustainability	Early Respondents	113	4.1947	.51092	0.885	0.377
	Late Respondents	112	4.1339	.51945	0.884	
Ambidextrous of Top Management	Early Respondents	113	4.0885	.60706	0.680	0.497
	Late Respondents	112	4.0375	.51327	0.681	
Technological Innovation	Early Respondents	113	4.0000	.58064	1.291	0.198
	Late Respondents	112	3.9089	.47106	1.292	
Market Competition Pressures	Early Respondents	113	4.1558	.58354	0.546	0.586
	Late Respondents	112	4.1161	.50414	0.546	
Proactive Culture	Early Respondents	113	4.1381	.54122	0.274	0.785
	Late Respondents	112	4.1179	.56540	0.274	
Stakeholder Awareness	Early Respondents	113	4.1292	.55415	0.778	0.438
	Late Respondents	112	4.0732	.52539	0.778	
Disruptive Technology	Early Respondents	113	4.0619	.54647	0.517	0.606
	Late Respondents	112	4.0250	.52616	0.517	

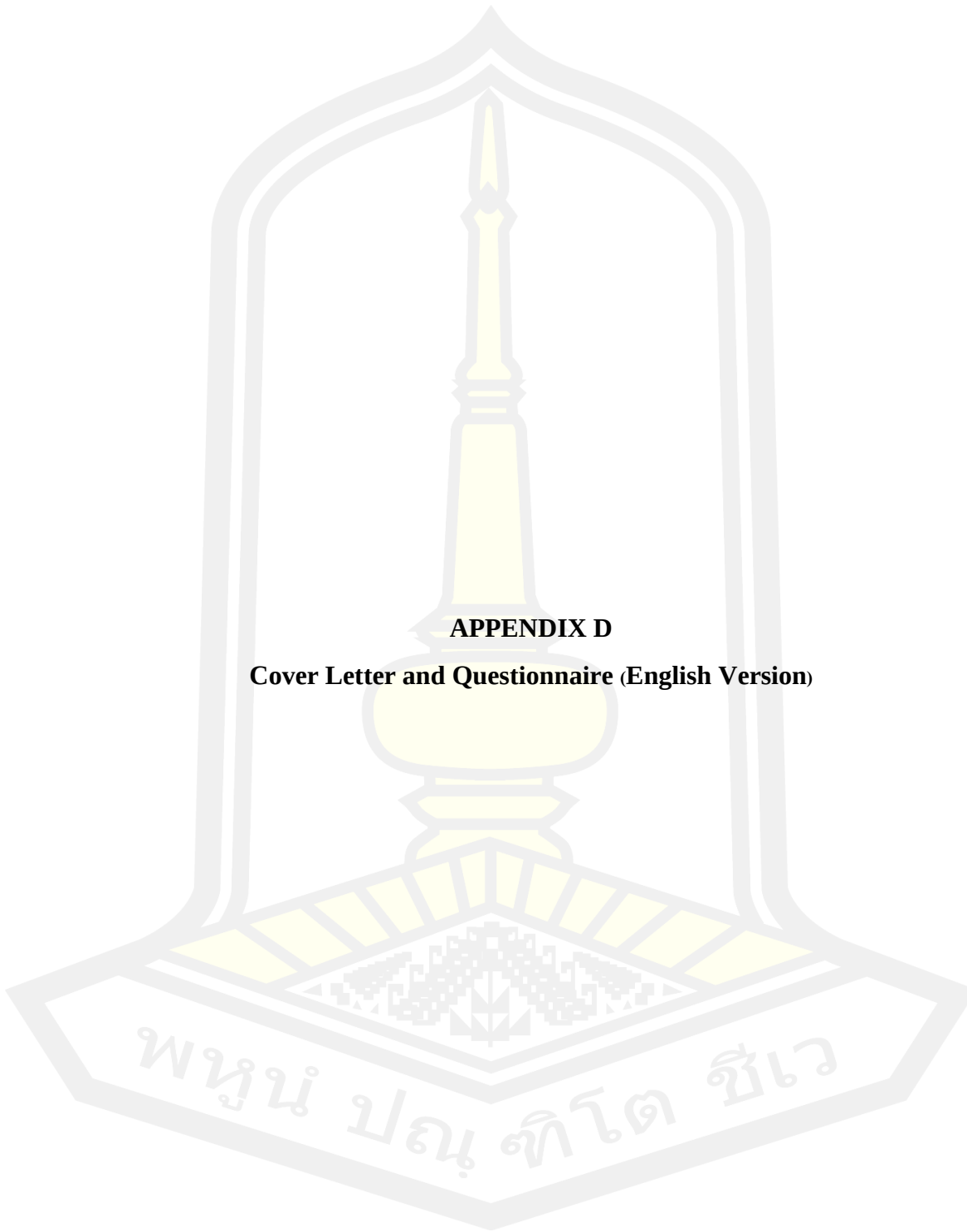


APPENDIX C

Univariate Normality Test

Table C1 Univariate Normality Test

Construct	Skewness	S.E. Skewness	Z score (Skewness)	Kurtosis	S.E. Kurtosis	Z score (Kurtosis)
DCM	-.239	.162	-1.476	-.451	.323	-1.397
DDA	-.079	.162	-0.486	-.266	.323	-0.825
DRA	-.260	.162	-1.601	-.617	.323	-1.911
RAI	.074	.162	0.459	-.360	.323	-1.115
BIE	-.137	.162	-0.846	-.323	.323	-0.999
MPC	-.161	.162	-0.991	-.219	.323	-0.679
ORT	-.051	.162	-0.312	-.931	.323	-2.883
FSU	.074	.162	0.454	-.841	.323	-2.604
ATM	.047	.162	0.293	-.759	.323	-2.348
TEI	-.227	.162	-1.398	-.285	.323	-0.882
PAC	-.196	.162	-1.206	-.676	.323	-2.092
MCP	-.038	.162	-0.231	-.314	.323	-0.973
STA	-.070	.162	-0.432	-.890	.323	-2.756
DRT	.010	.162	0.060	-.212	.323	-0.656



APPENDIX D

Cover Letter and Questionnaire (English Version)

Questionnaire for the Ph.D. Dissertation Research

Entitled "Proactive Digital Accounting Support and Firm Sustainability of Exporting Business in Thailand"

Explanations:

The objective of this research is to investigate "the influence of proactive digital accounting on firm sustainability of exporting businesses in Thailand". This research is a section of doctoral dissertation of Mr. Chalermkiat Ranglek at the Faculty of Accountancy and management, Mahasarakham University.

The questionnaire is divided into 7 parts

Section 1: General information about accounting executive of exporting business in Thailand,

Section 2: General information of exporting business in Thailand,

Section 3: Opinions on Proactive Digital Accounting Support of exporting business in Thailand,

Section 4: Opinions in consequences of Proactive Digital Accounting Support of exporting business in Thailand,

Section 5: Opinions in effect of internal factor on Proactive Digital Accounting Support of exporting business in Thailand,

Section 6: Opinions in effect of external factor on Proactive Digital Accounting Support of exporting business in Thailand, and

Section 7: Recommendation and suggestions in Proactive Digital Accounting Support of exporting business in Thailand.

The results of this research are presented in the form of an overview. Your answer will be kept as confidentiality and your information will not be shared with any outsider 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.

Yes ( ) Your E-mail ..... No ( )

Thank you for your time answering all the questions. Your answer will give the valuable information for my dissertation. If you have any questions with respect to this research, please contact me directly. Cell phone: 081-9102821 E-mail: kenchal_r@hotmail.com.

Sincerely yours,

(Mr. Chalermkiat Ranglek)
Ph.D. Student in Accounting,
Mahasarakham Business School
Mahasarakham University, Thailand

Section 1: General information about accounting executive of exporting business in Thailand

1. Gender

☐ Male ☐ Female

2. Age

☐ Not over 30 years old ☐ 31- 40 years old

☐ 41- 50 years old ☐ More than 50 years old

3. Marital status

☐ Single ☐ Married

☐ Divorced

4. Educational Level

☐ Bachelor's degree or lower ☐ Higher than Bachelor's degree

5. Working experience in your current firm

☐ Not over 10 years old ☐ 11 - 15 years old

☐ 16 - 20 years old ☐ More than 20 years old

6. Average monthly salary

☐ Not over 50,000 Baht ☐ 50,001 - 100,000 Baht

☐ 100,001 - 150,000 Baht ☐ More than 150,000 Baht

7. Current Working position

☐ Chief financial officers ☐ Accounting executives/manager

☐ Managing director ☐ Others (Please specify).....

Section 2: General information of exporting business in Thailand

1. Business Entity

☐ Company limited ☐ Public Company Limited

☐ Limited partnership

2. Industry type

☐ Agricultural products ☐ Agro-industry products

☐ Industrial products ☐ Mineral and fuel products

☐ Other (Please specify).....

3. The period of business

☐ Not over 5 years ☐ 6 – 10 years

☐ 11 – 15 years ☐ More than 15 years

4. Registered capital

☐ Not over 200,000,000 baht ☐ 200,000,001 – 500,000,000 baht

☐ 500,000,001 – 1,000,000,000 baht ☐ More than 1,000,000,000 baht

5. Number of employees

☐ Not over 200 ☐ 201 - 400

☐ 401 – 600 ☐ More than 600

6. Average annual income

☐ Not over 50,000,000 Baht ☐ 50,000,001 – 100,000,000 Baht

☐ 100,000,001 – 150,000,000 Baht ☐ More than 150,000,000 Baht

7. Achieved ISO certified (more than 1 item)

☐ ISO 9001 ☐ ISO 14001

☐ ISO 26001 ☐ No

☐ Other (Please specify).....

Section 3: Opinions on Proactive Digital Accounting Support of Exporting Businesses in Thailand

Proactive Digital Accounting Support	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
Digital Cost Management					
1. The entity has appropriate cost management consistent with the internal and external changing environment to achieve the stated operational objectives.					
2. The entity applies modern cost management concepts (e.g., activity-based management, value chain analysis, life-cycle costing, target-costing) to make product costing accurate, timely, and realistic.					
3. The entity realizes the importance of applying digital technology or adopting new technologies in cost management to support operations for maximum efficiency.					
4. The entity seeks digital methods to process and analyze cost data to obtain the information needed to support more efficient cost management.					
5. The entity believes that applying digital technology in cost management will provide an excellent operational process and make management accounting practices more efficient.					

Section 3 (Continued)

Proactive Digital Accounting Support	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
Diagnostic Data Analytics 1. The entity believes that analyzing current events and forecasting probable future events about market conditions will enable it to effectively plan and produce management accounting information to strengthen its decision-making process.					
2. When the market situation changes, the entity believes that using advanced analytics tools can identify market trends and other helpful information to support the rapid, timely, and appropriate adjustment of tactics or methods of action to the situation.					
3. The entity believes that analyzing trends in the behavior or conduct of competitors, customers, and suppliers can adjust its strategic or operational plans more efficiently.					
4. The entity focuses on developing information-generating methods that will enable accurate forecasting of the competitive environment of the future business for building a strategic plan more effectively.					

Section 3 (Continued)

Proactive Digital Accounting Support	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
5. The entity believes that analyzing business competition situations using advanced analytics generates management accounting information to support strategic decision-making, creating an excellent future market competitive advantage.					
Dynamic Resource Allocation 1. The entity believes that resource allocation of financial, technological, and human resources can support operations under excellent business objectives and goals.					
2. The entity analyzes existing resource utilization data to be the management accounting information for considering the value and benefits received in the operations.					
3. The entity believes that the capabilities of modern technology will enable the entities to allocate resources more efficiently and enable economical, cost-effective, and timely use of existing resources in a rapidly changing environment.					

Section 3 (Continued)

Proactive Digital Accounting Support	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
4. The entity seeks new technologies to create an effective corporate resource planning system to support timely operations, meet the goals and align with the established strategy.					
5. The entity believes that adopting new technologies will be able to allocate resources suitable for operations in a rapidly changing environment and enable the business to achieve the highest goals.					
Risk Assessment Information System					
1. The entity has an information system that can be used to discover, identify, and assess risks related to potential adverse events affecting the achievement of objectives or goals to risk management to an acceptable level for the organization.					
2. The entity recognizes the importance of analyzing internal and external environments with analytical technologies such as data analytics and risk management software to anticipate adverse events and adjust to managing risks before the actual operation.					

Section 3 (Continued)

Proactive Digital Accounting Support	**Level of Opinion**				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
3. The entity believes that using information systems to identify, assess, and manage risk is a way to support more effective, timely, and can be put into practice for more accurate risk decisions.					
4. The entity has improved and developed information systems with new technologies for risk assessment to be efficient and always up-to-date.					
5. The entity believes that risk management practices that leverage digital technology will give the entity reasonable assurance about achieving objectives and goals more reliably.					

Section 4: Opinions in consequences of Proactive Digital Accounting Support of exporting business in Thailand

Business Outcomes	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
Business Innovation Effectiveness					
1. The entity has efficient and effective production processes and operating systems consistent with an organizational strategy.					
2. The entity focuses on creating or bringing innovations to improve and develop the production process to be modern and valuable to achieve the organization's goals continuously.					
3. The entity can make changes to its production processes to efficiently reduce the steps and time spent on operational activities, making the operation more convenient and fast.					
4. The entity can apply innovation to effectively adjust how it operates in its operational activities, which can use resources economically and cost-effectively.					
5. The entity can effectively reduce waste from operating activities by adopting innovative ideas and new technologies to promote the quality of the production process.					

Section 4: (**Continued**)

Business Outcomes	**Level of Opinion**				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
<u>Modern Product Creativity</u> 1. The entity constantly creates new and modern products to meet customers' needs.					
2. The entity can improve and develop existing products to be outstanding and modern to meet customers' needs perfectly.					
3. The entity can design products that are unique and distinctive characteristics.					
4. Customers have accepted the entity's products from the past to the present.					
5. The entity believes that creating modern products will increase market share.					
<u>Organizational Trust</u> 1. The entity has policies and operating guidelines that treat employees fairly.					
2. The entity focuses on developing the knowledge and abilities of employees to empower their potential to cope with business expansion effectively.					

Section 4: (Continued)

Business Outcomes	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
3. The entity encourages employees to progress at work and raises their salaries when they are promoted with clear assessment criteria.					
4. The entity encourages employees to have a good working environment, convenient, suitable, and safe.					
Firm Sustainability					
1. Setting a vision and mission for sustainability in the economy and social and environmental development makes the sustainability behavior of the entity more efficient.					
2. The entity has a good and efficient practice in developing the organization towards the success of sustainable business operations.					
3. The entity's operation outcome achieves the stated goals and objectives with the latest year's net profit equivalent to or higher than competitors in the same industry.					

Section 4: (Continued)

Business Outcomes	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
4. The entity creates environmentally friendly products by reducing the negative impact on the environment, such as natural resource use, energy and CO2 emissions, chemical, water consumption, and waste.					
5. The entity operates with a responsibility to the community and society by avoiding any operations that may negatively affect the community's quality of life, such as physical resources, biological resources, etc.					

Section 5: Opinions in effect of internal factor on Proactive Digital Accounting Support of exporting business in Thailand

Internal Factors Affecting Operations	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
<u>Ambidextrous of Top Management</u> 1. Executives focus on pursuing innovative practices and continually improving existing practices to respond to internal and external changes.					

Section 5 (Continued)

Internal Factors Affecting Operations	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
2. Executives encourage personnel to learn and train techniques to create new methods to provide information support to management for decision-making.					
3. Executives encourage the development of new practices by allocating adequate budgets and related resources to enable rapid, accurate, and timely production of information to users within the organization.					
4. Executives encourage the application of modern technology to improve accounting processes to be more efficient.					
5. Executives believe that focusing on innovative practices and optimizing existing practices will drive business success.					
Technological Innovation					
1. The entity is committed to implementing appropriate technology to help operations continue to be more efficient.					

Section 5 (Continued)

Internal Factors Affecting Operations	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
2. The entity promotes the application of modern technology to generate information that can quickly, correctly, and accurately support decision-making.					
3. The entity focuses on allocating investment budgets in technology to support the constantly changing operational processes.					
4. The entity focuses on adopting cutting-edge technology to make operations agile and successful.					
5. The entity believes that increasing technological capabilities will make its operations processes more efficient.					
Proactive Culture 1. The entity has an organizational culture that emphasizes presented all members of the organization are involved in giving opinions for building a stable and sustainable business.					
2. The entity focuses on changing the methods to improve its market position to outperform competitors.					

Section 5 (Continued)

Internal Factors Affecting Operations	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
3. The entity believes that introducing new products to the market first will increase the opportunity to generate revenue and increase profits.					
4. The entity believes that predicted future market conditions will be able to create new products to satisfy consumers perfectly.					
5. The entity believes that having an organizational culture that emphasizes responding quickly to change will enable successful operations and sustainable growth.					

Section 6: Opinions in effect of external factor on Proactive Digital Accounting Support of exporting business in Thailand

External Factors Affecting Operations	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
Market Competition Pressures 1. The intense competition in the business has always pushed the entity to adapt to increase market share.					
2. The entity must continually improve and develop its marketing strategy to meet customers' rapidly changing needs.					
3. The entity must constantly improve and develop the quality of its products to be outstanding in order to be able to meet the needs of customers excellently.					
4. Intense market competition results in an entity finding methods to ensure that its product offerings can compete effectively and make a good profit.					
5. Competitors have continually developed their potential, resulting in the entity anticipating competitors' marketing activities to create a superior competitive strategy.					

Section 6 (Continued)

External Factors Affecting Operations	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
Stakeholder Awareness					
1. The entity attaches importance to the organization of the information system and continuously communicates with its stakeholders through various channels.					
2. The entity has the policy to reduce the impact on society and the environment by setting a clear vision and objectives in sustainability management.					
3. The entity strictly complies with environmental laws, regulations, and regulations and social responsibility as well as the authorities' requirements relating to the conduct of business.					
4. The entity communicates information to relevant stakeholders to frankly understand the process and nature of product projects.					
5. The entity believes that transparent disclosure of sustainability information will help the entity gain recognition from its stakeholders.					

Section 6 (Continued)

External Factors Affecting Operations	Level of Opinion				
	Strongly Agree 5	**Agree 4**	**Neutral 3**	**Disagree 2**	**Strongly Disagree 1**
Disruptive technology					
1. Continuously developed and improved technology has dramatically influenced the entity's adjustment and development of management accounting practices.					
2. The growth of communication networks has encouraged business processes to be more efficient.					
3. Continuous occurrence of tools, processes, and support systems can significantly enhance business efficiency.					
4. Emerging technological diversity, as a result, the entity can choose to use according to the characteristics and conditions of the entity fully.					
5. Emerging technological diversity, as a result, the entity can choose to use according to the characteristics and conditions of the entity fully.					

Section 7: Recommendation and suggestions in Proactive Digital Accounting Support of exporting business in Thailand

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Thank you for devote your valuable time to answer all of the questions. Please fold and return in provided envelope and return to me.

APPENDIX E

Cover Letter and Questionnaire (Thai Version)

ที่ อว 0605.10/

คณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม
ตำบลขามเรียง อำเภอกันทรวิชัย
จังหวัดมหาสารคาม
44150

21 มีนาคม 2565

เรื่อง ขอความอนุเคราะห์กรอกแบบสอบถาม

เรียน ผู้บริหารฝ่ายบัญชี

ด้วย นายเฉลิมเกียรติ ร่างเล็ก รหัสนิสิต 61010961001 นิสิตระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) สาขาวิชาการบัญชี ระบบในเวลาราชการ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม กำลังศึกษาวิทยานิพนธ์ เรื่อง "ผลกระทบของการสนับสนุนการบัญชีดิจิทัลเชิงรุกต่อความยั่งยืนของธุรกิจส่งออกในประเทศไทย" ซึ่งเป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) ดังนั้น เพื่อให้การดำเนินการเป็นไปด้วยความเรียบร้อยและบรรลุตามวัตถุประสงค์ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จึงขอความอนุเคราะห์ให้ นายเฉลิมเกียรติ ร่างเล็ก ศึกษาและเก็บรวบรวมในรายละเอียดตามแบบสอบถามที่แนบมาพร้อมนี้

คณะฯ หวังเป็นอย่างยิ่งว่า คงจะได้รับความอนุเคราะห์จากท่านด้วยดี และขอขอบคุณมา ณ โอกาสนี้

ขอแสดงความนับถือ

(อาจารย์ ดร.ชลธิชา ธรรมวิญญ)
คณบดีคณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม

คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม
โทรศัพท์ 0-4375-4333 ต่อ 5630 โทรสาร 0-4375-4422

คณะกรรมการจริยธรรมการวิจัยในคน มหาวิทยาลัยมหาสารคาม

เอกสารรับรองโครงการวิจัย

เลขที่การรับรอง : 074-086/2565

ชื่อโครงการวิจัย (ภาษาไทย) ผลกระทบของการสนับสนุนการบัญชีดิจิทัลเชิงรุกต่อความยั่งยืนของธุรกิจส่งออกในประเทศไทย

ชื่อโครงการวิจัย (ภาษาอังกฤษ) EFFECT OF PROACTIVE DIGITAL ACCOUNTING SUPPORT ON FIRM SUSTAINABILITY OF EXPORTING BUSINESS IN THAILAND.

ผู้วิจัย : นายเฉลิมเกียรติ ร่างเล็ก
หน่วยงานที่รับผิดชอบ : คณะการบัญชีและการจัดการ
สถานที่ทำการวิจัย : มหาวิทยาลัยมหาสารคาม

ประเภทการพิจารณาแบบ : แบบยกเว้น

วันที่รับรอง : 3 มีนาคม 2565 **วันหมดอายุ : 2 มีนาคม 2566**

ข้อเสนอการวิจัยนี้ ได้รับการพิจารณาและให้ความเห็นชอบจากคณะกรรมการจริยธรรมการวิจัยในคน มหาวิทยาลัยมหาสารคามแล้ว และอนุมัติในด้านจริยธรรมให้ดำเนินการศึกษาวิจัยเรื่องข้างต้นได้ บนพื้นฐานของโครงร่างงานวิจัยที่คณะกรรมการฯ ได้รับและพิจารณา เมื่อเสร็จสิ้นโครงการแล้วให้ผู้วิจัยส่งแบบฟอร์มการปิดโครงการและรายงานผลการดำเนินงานมายังคณะกรรมการจริยธรรมการวิจัยในคน มหาวิทยาลัยมหาสารคาม หรือหากมีการเปลี่ยนแปลงใดๆ ในโครงการวิจัย ผู้วิจัยจักต้องยื่นขอรับการพิจารณาใหม่

(ผู้ช่วยศาสตราจารย์ เภสัชกรหญิงราตรี สว่างจิตร)
ประธานคณะกรรมการจริยธรรมการวิจัยในคน
มหาวิทยาลัยมหาสารคาม

ทั้งนี้ การรับรองนี้มีเงื่อนไขดังที่ระบุไว้ด้านหลังทุกข้อ (ดูด้านหลังของเอกสารรับรองโครงการวิจัย)

แบบสอบถามเพื่อการวิจัย

เรื่อง “ผลกระทบของการสนับสนุนการบัญชีดิจิทัลเชิงรุกต่อความยั่งยืนของธุรกิจส่งออกในประเทศไทย"

คำชี้แจง:

งานวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาถึงการสนับสนุนบัญชีดิจิทัลเชิงรุกและความยั่งยืนของกิจการของธุรกิจส่งออกในประเทศไทย เพื่อใช้เป็นข้อมูลในการจัดทำวิทยานิพนธ์ในระดับปริญญาเอกของผู้วิจัยในหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาการบัญชี คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม โทรศัพท์ 043-754333

ข้าพเจ้าใคร่ขอความอนุเคราะห์จากท่านผู้ตอบแบบสอบถามได้โปรดตอบแบบสอบถามชุดนี้ซึ่งใช้เวลาประมาณ 35 นาที โดยรายละเอียดของแบบสอบถามประกอบด้วยส่วนคำถาม 7 ตอน ดังนี้

ตอนที่ 1 ข้อมูลทั่วไปเกี่ยวกับผู้บริหารฝ่ายบัญชีของธุรกิจส่งออก

ตอนที่ 2 ข้อมูลทั่วไปเกี่ยวกับธุรกิจส่งออก

ตอนที่ 3 ความคิดเห็นเกี่ยวกับการสนับสนุนบัญชีดิจิทัลเชิงรุกของธุรกิจส่งออก

ตอนที่ 4 ความคิดเห็นเกี่ยวกับผลการดำเนินงานของธุรกิจส่งออก

ตอนที่ 5 ความคิดเห็นเกี่ยวกับปัจจัยภายในที่มีผลต่อการดำเนินงานของธุรกิจส่งออก

ตอนที่ 6 ความคิดเห็นเกี่ยวกับปัจจัยภายนอกที่มีผลต่อการดำเนินงานของธุรกิจส่งออก

ตอนที่ 7 ข้อเสนอแนะ

การนำเสนอผลการวิจัยครั้งนี้จะเป็นการนำเสนอในลักษณะของภาพรวม คำตอบของท่านจะถูกเก็บรักษาไว้เป็นความลับและจะไม่มีการใช้ข้อมูลใด ๆ ที่เปิดเผยเกี่ยวกับตัวท่านในการรายงานข้อมูล รวมทั้งจะไม่มีการให้ข้อมูลดังกล่าวกับบุคคลภายนอกโดยที่ไม่ได้รับอนุญาตจากท่านโดยเด็ดขาด และหากท่านต้องการรายงานสรุปผลการวิจัย โปรดระบุ E-mail ของท่านในแบบสอบถามชุดนี้

( ) ต้องการ e-mail _____ ( ) ไม่ต้องการ

ผู้วิจัยขอขอบพระคุณอย่างสูงที่ท่านได้กรุณาเสียสละเวลาในการตอบแบบสอบถาม ข้อมูลที่ได้รับจากท่านอาจไม่เป็นประโยชน์โดยตรงต่อท่านแต่จะเป็นประโยชน์อย่างยิ่งต่อการวิจัยในครั้งนี้และผลการศึกษาจะเป็นประโยชน์ต่อธุรกิจส่งออกในประเทศไทยเพื่อใช้เป็นแนวทางในการนำไปปฏิบัติและประยุกต์ใช้ในองค์กร หากท่านมีข้อสงสัยประการใดเกี่ยวกับแบบสอบถาม โปรดติดต่อผู้วิจัย นายเฉลิมเกียรติ ร่างเล็ก โทรศัพท์ 081-9102821 หรือ E-mail: Kenchal_r@hotmail.com

OR Code แบบสอบถาม

ขอขอบพระคุณที่ให้ข้อมูลไว้ ณ โอกาสนี้

(นายเฉลิมเกียรติ ร่างเล็ก)

นิสิตระดับปริญญาเอก สาขาวิชาการบัญชี

คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม

ตอนที่ 1 ข้อมูลทั่วไปเกี่ยวกับผู้บริหารฝ่ายบัญชีธุรกิจส่งออกในประเทศไทย

คำชี้แจง กรุณาใส่เครื่องหมาย (✓) ในช่องตัวเลือกสำหรับคำตอบของท่านในแต่ละข้อ

8. เพศ

☐ ชาย ☐ หญิง

9. อายุ

☐ 30 ปี หรือน้อยกว่า ☐ 31- 40 ปี

☐ 41- 50 ปี ☐ มากกว่า 50 ปี

10. สถานภาพ

☐ โสด ☐ สมรส

☐ หม้าย/หย่าร้าง

11. ระดับการศึกษา

☐ ปริญญาตรีหรือต่ำกว่า ☐ สูงกว่าปริญญาตรี

12. ประสบการณ์ในการทำงาน

☐ 10 ปี หรือต่ำกว่า ☐ 11 - 15 ปี

☐ 16 - 20 ปี ☐ มากกว่า 20 ปี

13. รายได้เฉลี่ยต่อเดือน

☐ 50,000 บาท หรือต่ำกว่า ☐ 50,001 - 100,000 บาท

☐ 100,001 - 150,000 บาท ☐ มากกว่า 150,000 บาท

14. ตำแหน่งงานปัจจุบัน

☐ ผู้อำนวยการฝ่ายบัญชีและการเงิน ☐ ผู้บริหารฝ่ายบัญชี

☐ กรรมการผู้จัดการหรือหุ้นส่วนผู้จัดการ ☐ อื่น ๆ (โปรดระบุ).....

ตอนที่ 2 ข้อมูลทั่วไปเกี่ยวกับธุรกิจส่งออกในประเทศไทย

คำชี้แจง กรุณาใส่เครื่องหมาย (✓) ในช่องตัวเลือกสำหรับคำตอบของท่านในแต่ละข้อ

8. รูปแบบธุรกิจ

☐ บริษัทจำกัด ☐ บริษัทมหาชนจำกัด

☐ ห้างหุ้นส่วนจำกัด

9. ประเภทกลุ่มอุตสาหกรรม (ตามโครงสร้างสินค้าการส่งออกกระทรวงพาณิชย์)

☐ กลุ่มสินค้าการเกษตร ☐ กลุ่มสินค้าอุตสาหกรรมการเกษตร

☐ กลุ่มสินค้าอุตสาหกรรม ☐ กลุ่มสินค้าแร่และเชื้อเพลิง

☐ อื่นๆ (ธุรกรรมพิเศษ)

10. ระยะเวลาในการดำเนินธุรกิจ

☐ ไม่เกิน 5 ปี ☐ 6 – 10 ปี

☐ 11 – 15 ปี ☐ มากกว่า 15 ปี

11. ทุนจดทะเบียน

☐ ไม่เกิน 200,000,000 บาท

☐ 200,000,001 – 500,000,000 บาท

☐ 500,000,001 – 1,000,000,000 บาท

☐ มากกว่า 1,000,000,000 บาท

12. จำนวนพนักงาน

☐ ไม่เกิน 200 คน ☐ 201 - 400 คน

☐ 401 – 600 คน ☐ มากกว่า 600 คน

13. รายได้ของธุรกิจเฉลี่ยต่อปี

☐ ไม่เกิน 50,000,000 บาท ☐ 50,000,001 – 100,000,000 บาท

☐ 100,000,001 – 150,000,000 บาท ☐ มากกว่า 150,000,000 บาท

14. ธุรกิจได้รับการรับรองมาตรฐาน ISO (ตอบได้มากกว่า 1 ข้อ)

☐ ไม่มี ☐ ISO 9001 ☐ ISO 14001

☐ ISO 26001 ☐ อื่นๆ โปรดระบุ.....

ตอนที่ 3 ความคิดเห็นเกี่ยวกับการสนับสนุนการบัญชีดิจิทัลเชิงรุกของธุรกิจส่งออกในประเทศไทย

<u>คำชี้แจง</u> ขอให้ท่านแสดงความคิดเห็นด้วยการใส่เครื่องหมาย (✓) ในช่องตัวเลขที่ตรงกับระดับความคิดเห็นของท่าน

การสนับสนุนการบัญชีดิจิทัลเชิงรุก	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
<u>การบริหารต้นทุนดิจิทัล (Digital Cost Management)</u>					
1. กิจการมีการบริหารต้นทุนที่เหมาะสม สอดคล้องกับสภาพแวดล้อมที่เปลี่ยนแปลงไปทั้งภายในและภายนอก เพื่อให้สามารถบรรลุวัตถุประสงค์การดำเนินงานที่กำหนดไว้					
2. กิจการมุ่งเน้นการใช้แนวคิดสมัยใหม่ในการบริหารต้นทุน (เช่น การบริหารฐานกิจกรรม, การวิเคราะห์ห่วงโซ่คุณค่า, วงจรชีวิตต้นทุน, ต้นทุนเป้าหมาย) เพื่อให้การคำนวณต้นทุนของผลิตภัณฑ์ถูกต้อง รวดเร็ว สะท้อนความเป็นจริง					
3. กิจการตระหนักถึงความสำคัญของการประประยุกต์ใช้เทคโนโลยีดิจิทัลหรือการนำเทคโนโลยีใหม่ๆ มาใช้ในการบริหารต้นทุนเพื่อสนับสนุนการดำเนินงานให้มีประสิทธิภาพสูงสุด					
4. กิจการแสวงหาวิธีการทางดิจิทัลในการประมวลผลและวิเคราะห์ข้อมูลต้นทุนเพื่อให้ได้ข้อมูลที่จำเป็นในการสนับสนุนให้การบริหารต้นทุนมีประสิทธิภาพเพิ่มขึ้น					
5. กิจการเชื่อมั่นว่าการประยุกต์ใช้เทคโนโลยีดิจิทัลที่เหมาะสมในการบริหารต้นทุนจะทำให้กิจการมีกระบวนการปฏิบัติงานที่ดีเยี่ยมและทำให้แนวปฏิบัติทางการบัญชีมีประสิทธิภาพและประสิทธิผลยิ่งขึ้น					

ตอนที่ 3 (ต่อ)

การสนับสนุนการบัญชีดิจิทัลเชิงรุก	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
<u>การวิเคราะห์ข้อมูลเชิงวินิจฉัย (Diagnostic Data Analytics)</u> 1. กิจการเชื่อมั่นว่าการวิเคราะห์เหตุการณ์ปัจจุบันและการคาดการณ์เหตุการณ์ที่น่าจะเป็นไปได้ในอนาคตเกี่ยวกับสภาวะตลาด จะทำให้กิจการมีการวางแผนและจัดทำข้อมูลทางการบัญชีบริหารเพื่อเสริมสร้างกระบวนการตัดสินใจได้อย่างมีประสิทธิภาพ					
2. เมื่อสถานการณ์ทางการตลาดเกิดการเปลี่ยนแปลง กิจการเชื่อว่าการใช้เครื่องมือการวิเคราะห์ขั้นสูงจะสามารถหาแนวโน้มทางการตลาด และข้อมูลอื่นๆที่เป็นประโยชน์เพื่อนำมาสนับสนุนการปรับยุทธวิธีหรือวิธีการดำเนินงานได้อย่างรวดเร็ว ทันเวลาและเหมาะสมกับสถานการณ์					
3. กิจการเชื่อมั่นการวิเคราะห์แนวโน้มเกี่ยวกับพฤติกรรมหรือการปฏิบัติของคู่แข่ง ลูกค้า และซัพพลายเออร์ จะสามารถปรับแผนกลยุทธ์หรือแผนการดำเนินงานได้อย่างมีประสิทธิภาพยิ่งขึ้น					
4. กิจการมุ่งเน้นการพัฒนาวิธีการที่จะสร้างข้อมูลที่จะช่วยให้สามารถพยากรณ์สภาพแวดล้อมการแข่งขันทางธุรกิจในอนาคตได้อย่างถูกต้อง แม่นยำเพื่อใช้ในการวางแผนกลยุทธ์ได้อย่างมีประสิทธิภาพยิ่งขึ้น					
5. กิจการเชื่อมั่นว่าแนวทางปฏิบัติสำหรับการวิเคราะห์สถานการณ์การแข่งขันทางธุรกิจโดยใช้การวิเคราะห์ขั้นสูงจะสร้างข้อมูลทางการบัญชีบริหารเพื่อสนับสนุนการตัดสินใจเชิงกลยุทธ์สร้างความได้เปรียบในการแข่งขันทางการตลาดในอนาคตได้อย่างดีเยี่ยม					

ตอนที่ 3 (ต่อ)

การสนับสนุนการบัญชีดิจิทัลเชิงรุก	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
<u>การจัดสรรทรัพยากรแบบพลวัต (Dynamic Resource Allocation)</u> 1. กิจการเชื่อว่าการจัดสรรทรัพยากรด้านการเงิน โครงสร้างด้านเทคโนโลยี และทรัพยากรบุคคลสามารถสนับสนุนการดำเนินงานให้เป็นไปตามวัตถุประสงค์และเป้าหมายของกิจการได้เป็นอย่างดี					
2. กิจการให้ความสำคัญกับการวิเคราะห์ข้อมูลการใช้ทรัพยากรที่มีอยู่เพื่อเป็นข้อมูลทางบัญชีบริหารสำหรับพิจารณาถึงความคุ้มค่าและประโยชน์ที่จะได้รับในการดำเนินงาน					
3. กิจการเชื่อว่าความสามารถของเทคโนโลยีสมัยใหม่จะช่วยให้กิจการจัดสรรทรัพยากรได้อย่างมีประสิทธิภาพ และทำให้เกิดการใช้ทรัพยากรที่มีอยู่อย่างประหยัด คุ้มค่า และทันเวลา ภายใต้สภาพแวดล้อมที่มีการเปลี่ยนแปลงอย่างรวดเร็ว					
4. กิจการแสวงหาเทคโนโลยีใหม่ๆ ที่สามารถสร้างระบบการวางแผนทรัพยากรขององค์กรที่มีประสิทธิภาพเพื่อสนับสนุนการปฏิบัติงานได้ทันเวลาเป็นไปตามเป้าหมายสอดคล้องกับกลยุทธ์ที่วางไว้					
5. กิจการเชื่อว่าการนำเทคโนโลยีใหม่ ๆ มาใช้จะสามารถจัดสรรทรัพยากรที่เหมาะสมสำหรับการดำเนินงานภายใต้สภาพแวดล้อมที่มีการเปลี่ยนแปลงอย่างรวดเร็วและจะทำให้กิจการสามารถบรรลุผลสำเร็จสูงสุดตามเป้าหมาย					

ตอนที่ 3 (ต่อ)

การสนับสนุนการบัญชีดิจิทัลเชิงรุก	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
<u>การประเมินความเสี่ยงด้วยระบบสารสนเทศ (Risk Assessment Information System)</u> 1. กิจการมีระบบสารสนเทศที่สามารถใช้ในการค้นหา ระบุ และประเมินความเสี่ยงเกี่ยวกับเหตุการณ์เชิงลบที่อาจเกิดขึ้นซึ่งมีผลกระทบต่อการบรรลุวัตถุประสงค์หรือเป้าหมายที่วางไว้เพื่อจัดการกับความเสี่ยงนั้นให้อยู่ในระดับที่องค์กรยอมรับได้					
2. กิจการตระหนักถึงความสำคัญเกี่ยวกับการวิเคราะห์สภาพแวดล้อมทั้งภายในและภายนอกด้วยเทคโนโลยีการวิเคราะห์ เช่น การวิเคราะห์ข้อมูล (Data Analytic) ซอฟต์แวร์การจัดการความเสี่ยง เพื่อคาดการณ์เหตุการณ์เชิงลบที่อาจเกิดขึ้นและปรับตัวเพื่อจัดการกับความเสี่ยงก่อนการดำเนินงานจริง					
3. กิจการเชื่อว่าการนำระบบสารสนเทศมาใช้เพื่อการระบุ ประเมินและบริหารความเสี่ยงเป็นแนวทางในการสนับสนุนข้อมูลที่มีประสิทธิภาพ ทันเวลา และสามารถนำไปปฏิบัติได้จริงเพื่อการตัดสินใจด้านความเสี่ยงที่แม่นยำยิ่งขึ้น					
4. กิจการมีการปรับปรุงและพัฒนาระบบสารสนเทศด้วยเทคโนโลยีใหม่ๆเพื่อใช้ในการประเมินความเสี่ยงภายในองค์กรให้มีประสิทธิภาพและทันสมัยอยู่เสมอ					
5. กิจการเชื่อว่าแนวปฏิบัติในการจัดการความเสี่ยงที่ใช้ประโยชน์จากเทคโนโลยีดิจิทัลจะทำให้กิจการมีความเชื่อมั่นอย่างสมเหตุสมผลเกี่ยวกับการบรรลุวัตถุประสงค์และเป้าหมายได้อย่างน่าเชื่อถือมากยิ่งขึ้น					

ตอนที่ 4 ความคิดเห็นเกี่ยวกับผลการดำเนินงานของธุรกิจส่งออกในประเทศไทย

ผลการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
<u>ประสิทธิผลของนวัตกรรมทางธุรกิจ (Business Innovation Effectiveness)</u> 1. กิจการมีกระบวนการผลิตและระบบการดำเนินงานที่มีประสิทธิภาพและประสิทธิผล สอดคล้องกับกลยุทธ์ขององค์กร					
2. กิจการมุ่งเน้นการสร้างหรือนำนวัตกรรมใหม่ๆ มาใช้เพื่อปรับปรุงและพัฒนากระบวนการผลิตให้ทันสมัยและมีประโยชน์ต่อการบรรลุเป้าหมายขององค์กรอย่างต่อเนื่อง					
3. กิจการสามารถเปลี่ยนแปลงกระบวนการผลิตเพื่อลดขั้นตอนและระยะเวลาในกิจกรรมการดำเนินงานได้อย่างมีประสิทธิภาพทำให้การดำเนินงานมีความสะดวกและรวดเร็ว					
4. กิจการสามารถนำนวัตกรรมมาใช้เพื่อปรับวิธีการปฏิบัติงานในกิจกรรมการดำเนินงานได้อย่างมีประสิทธิภาพ โดยสามารถใช้ทรัพยากรได้อย่างประหยัดและคุ้มค่าสูงสุด					
5. กิจการสามารถลดของเสียจากกิจกรรมการดำเนินงานได้อย่างมีประสิทธิภาพจากการนำแนวคิดด้านนวัตกรรมและเทคโนโลยีใหม่ ๆมาใช้ส่งเสริมคุณภาพกระบวนการผลิต					

ตอนที่ 4 (ต่อ)

ผลการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
<u>การสร้างสรรค์ผลิตภัณฑ์ที่ทันสมัย (Modern Product Creativity)</u> 1. กิจการมีการสร้างสรรค์ผลิตภัณฑ์ใหม่ที่ทันสมัยเพื่อตอบสนองความต้องการของลูกค้าอย่างต่อเนื่อง					
2. กิจการสามารถปรับปรุงและพัฒนาผลิตภัณฑ์ที่มีอยู่เดิมให้มีความโดดเด่น และทันสมัยตรงตามความต้องการของลูกค้าได้อย่างดีเยี่ยม					
3. กิจการออกแบบผลิตภัณฑ์ที่มีเอกลักษณ์และลักษณะเฉพาะที่โดดเด่นอย่างชัดเจน					
4. ผลิตภัณฑ์ของกิจการได้รับการยอมรับจากลูกค้าเป็นอย่างดีตั้งแต่อดีตจนถึงปัจจุบัน					
5. กิจการเชื่อมั่นว่าการสร้างสรรค์ผลิตภัณฑ์ที่ทันสมัยจะทำให้มีส่วนแบ่งทางการตลาดเพิ่มขึ้น					
<u>ความเชื่อมั่นในองค์กร (Organizational Trust)</u> 1. กิจการมีนโยบายและแนวทางการดำเนินงานที่ปฏิบัติต่อพนักงานอย่างเป็นธรรม					
2. กิจการมุ่งเน้นการพัฒนาความรู้และความสามารถของพนักงานเพื่อเสริมสร้างศักยภาพของพนักงานให้สามารถรับมือกับการขยายตัวทางธุรกิจได้อย่างมีประสิทธิภาพ					
3. กิจการมีการผลักดันให้พนักงานมีความก้าวหน้าในการทำงานและการปรับขึ้นเงินเดือนเมื่อพนักงานได้รับการเลื่อนระดับด้วยเกณฑ์การประเมินที่ชัดเจน					
4. กิจการส่งเสริมให้พนักงานมีสภาพแวดล้อมในการทำงานที่ดี มีความสะดวก เหมาะสม และปลอดภัย					

ตอนที่ 4 (ต่อ)

ผลการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
5. กิจการเปิดโอกาสให้พนักงานได้มีส่วนร่วมในการประชุมเพื่อรับรู้ข้อมูล ข่าวสาร และสถานการณ์ของกิจการ ตลอดจนแนวทางและนโยบายที่จะนำไปสู่ความสำเร็จขององค์กร					
<u>ความยั่งยืนของกิจการ (Firm Sustainability)</u> 1 ผลจากการกำหนดวิสัยทัศน์และพันธกิจเพื่อความยั่งยืนในด้านเศรษฐกิจควบคู่ไปกับการพัฒนาสังคมและสิ่งแวดล้อมทำให้พฤติกรรมในการปฏิบัติงานด้านความยั่งยืนของกิจการมีประสิทธิภาพยิ่งขึ้น					
2 กิจการมีแนวปฏิบัติที่ดีและมีประสิทธิภาพในการพัฒนาองค์กรให้ก้าวไปสู่ความสำเร็จของการประกอบธุรกิจอย่างยั่งยืน					
3 กิจการมีผลการดำเนินงานที่บรรลุตามวัตถุประสงค์ที่วางไว้ โดยมีผลกำไรสุทธิปีล่าสุดเทียบเท่าหรือสูงกว่าคู่แข่งในอุตสาหกรรมเดียวกัน					
4 กิจการสร้างสรรค์ผลิตภัณฑ์ที่เป็นมิตรกับสิ่งแวดล้อมโดยการลดผลกระทบเชิงลบต่อสิ่งแวดล้อมในประเด็นต่าง ๆ เช่น การใช้ทรัพยากร พลังงานและการปล่อย CO2 การใช้สารเคมี, ปริมาณการใช้น้ำ, ขยะและของเสีย เป็นต้น					
5 กิจการดำเนินธุรกิจด้วยความรับผิดชอบต่อชุมชนและสังคม โดยหลีกเลี่ยงการดำเนินงานที่อาจสร้างผลกระทบเชิงลบต่อคุณภาพชีวิตของชุมชน (เช่น ทรัพยากรกายภาพ ทรัพยากรชีวภาพ เป็นต้น)					

ตอนที่ 5 ความคิดเห็นเกี่ยวกับปัจจัยภายในที่มีผลต่อการสนับสนุนการบัญชีดิจิทัลเชิงรุกของธุรกิจส่งออกในประเทศไทย

ปัจจัยภายในที่มีผลต่อการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
<u>การมุ่งเน้นทั้งสิ่งใหม่และสิ่งที่มีอยู่เดิมของผู้บริหารระดับสูง (Ambidextrous of Top Management)</u>					
1. ผู้บริหารให้ความสำคัญกับการแสวงหาแนวปฏิบัติที่เป็นนวัตกรรมและปรับปรุงแนวปฏิบัติเดิมให้มีประสิทธิภาพเพื่อตอบสนองต่อการเปลี่ยนแปลงทั้งภายในและภายนอกกิจการอยู่เสมอ					
2. ผู้บริหารสนับสนุนให้บุคลากรมีการเรียนรู้และฝึกอบรมเทคนิคต่างๆ เพื่อหาวิธีการใหม่ ๆ ในการสนับสนุนข้อมูลให้แก่ผู้บริหารเพื่อประกอบการตัดสินใจ					
3. ผู้บริหารส่งเสริมการพัฒนาแนวปฏิบัติใหม่ๆ โดยการจัดสรรงบประมาณและทรัพยากรที่เกี่ยวข้องอย่างเพียงพอเพื่อให้สามารถผลิตข้อมูลให้แก่ผู้ใช้ภายในองค์กรได้อย่างรวดเร็ว ถูกต้อง และทันเวลา					
4. ผู้บริหารส่งเสริมให้มีการประยุกต์ใช้เทคโนโลยีที่ทันสมัยเพื่อปรับปรุงกระบวนการบัญชีให้มีประสิทธิภาพมากขึ้น					
5. ผู้บริหารเชื่อมั่นว่าการมุ่งเน้นแนวปฏิบัติที่เป็นนวัตกรรมควบคู่ไปกับการเพิ่มประสิทธิภาพการดำเนินงานที่มีอยู่เดิมจะนำไปสู่การขับเคลื่อนธุรกิจให้ประสบความสำเร็จ					
<u>นวัตกรรมทางเทคโนโลยี (Technological Innovation)</u>					
1. กิจการมุ่งมั่นในการนำเทคโนโลยีที่มีความเหมาะสมมาใช้เพื่อช่วยให้การดำเนินงานมีประสิทธิภาพดียิ่งขึ้นอย่างต่อเนื่อง					

ตอนที่ 5 (ต่อ)

ปัจจัยภายในที่มีผลต่อการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
2. กิจการส่งเสริมให้มีการประยุกต์ใช้เทคโนโลยีที่ทันสมัยเพื่อสร้างข้อมูลที่สามารถสนับสนุนการตัดสินใจได้อย่างรวดเร็ว ถูกต้อง และแม่นยำยิ่งขึ้น					
3. กิจการมุ่งเน้นให้มีการจัดสรรงบประมาณลงทุนทางเทคโนโลยีเพื่อรองรับกระบวนการปฏิบัติงานที่มีการเปลี่ยนแปลงอย่างต่อเนื่อง					
4. กิจการมุ่งเน้นการนำเทคโนโลยีที่ทันสมัยมาใช้เพื่อให้การดำเนินงานมีความคล่องตัว และประสบความสำเร็จ					
5. กิจการเชื่อว่าการเพิ่มขีดความสามารถทางเทคโนโลยีจะทำให้กระบวนการปฏิบัติงานของกิจการมีประสิทธิภาพมากขึ้น					
<u>วัฒนธรรมเชิงรุก (Proactive Culture)</u> 1. กิจการมีวัฒนธรรมองค์กรที่เน้นให้สมาชิกทุกคนในองค์กรมีส่วนร่วมในการเสนอความคิดเห็นสำหรับการสร้างธุรกิจให้มีความมั่นคงและเจริญเติบโตอย่างยั่งยืน					
2. กิจการมุ่งเน้นการเปลี่ยนแปลงวิธีการต่างๆ เพื่อปรับปรุงตำแหน่งทางการตลาดให้เหนือกว่าคู่แข่ง					
3. กิจการเชื่อว่าการนำเสนอผลิตภัณฑ์/บริการใหม่ออกสู่ตลาดเป็นเจ้าแรกจะทำให้เพิ่มโอกาสในการสร้างรายได้และทำกำไรเพิ่มขึ้น					
4. กิจการเชื่อมั่นว่าการคาดการณ์สภาวะตลาดที่อาจเกิดขึ้นในอนาคตจะสามารถสร้างสรรค์ผลิตภัณฑ์ใหม่เพื่อตอบสนองผู้บริโภคได้อย่างดีเยี่ยม					
5. กิจการเชื่อมั่นว่าการมีวัฒนธรรมองค์กรที่เน้นความสามารถในการตอบสนองการเปลี่ยนแปลงได้อย่างรวดเร็วจะช่วยทำให้การดำเนินงานเติบโตได้อย่างยั่งยืน					

ตอนที่ 6 ความคิดเห็นเกี่ยวกับปัจจัยภายนอกที่ส่งผลต่อการสนับสนุนบัญชีดิจิทัลเชิงรุกของธุรกิจส่งออกในประเทศไทย

ปัจจัยภายนอกที่มีผลต่อการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
<u>แรงกดดันจากการแข่งขันทางการตลาด (Market Competition Pressures)</u> 1. สถานการณ์การแข่งขันที่รุนแรงของธุรกิจ ผลักดันให้กิจการมีการปรับตัวอยู่เสมอเพื่อให้สามารถเพิ่มส่วนแบ่งทางการตลาด					
2. กิจการต้องปรับปรุงและพัฒนากลยุทธ์ทางการตลาดอย่างต่อเนื่องเพื่อให้สามารถตอบสนองความต้องการของลูกค้าที่เปลี่ยนแปลงอย่างรวดเร็ว					
3. กิจการต้องปรับปรุงและพัฒนาคุณภาพของผลิตภัณฑ์ให้มีความโดดเด่นอยู่เสมอเพื่อให้สามารถตอบสนองความต้องการลูกค้าได้เป็นอย่างดี					
4. การแข่งขันทางการตลาดที่รุนแรงทำให้กิจการต้องหาวิธีการต่างๆ เพื่อให้แน่ใจว่าการนำเสนอผลิตภัณฑ์สามารถแข่งขันได้อย่างมีประสิทธิภาพและสามารถทำกำไรได้เป็นอย่างดี					
5. คู่แข่งขันมีการพัฒนาศักยภาพอย่างต่อเนื่องทำให้กิจการต้องคาดการณ์กิจกรรมทางการตลาดของคู่แข่งเพื่อสร้างกลยุทธ์การแข่งขันที่เหนือกว่า					
<u>การสร้างการรับรู้แก่ผู้มีส่วนได้ส่วนเสีย (Stakeholder Awareness)</u> 1. กิจการให้ความสำคัญกับการจัดระบบการให้ข้อมูลและการสื่อสารกับผู้มีส่วนได้เสียของกิจการผ่านช่องทางต่างๆ อย่างต่อเนื่อง					

ตอนที่ 6 (ต่อ)

ปัจจัยภายนอกที่มีผลต่อการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
2. กิจการมีนโยบายที่จะลดผลกระทบต่อสังคมและสิ่งแวดล้อมโดยการกำหนดวิสัยทัศน์และวัตถุประสงค์ที่ชัดเจนในการบริหารจัดการด้านความยั่งยืน					
3. กิจการปฏิบัติตามกฎหมาย ระเบียบ และข้อบังคับด้านสิ่งแวดล้อมและความรับผิดชอบต่อสังคมตลอดจนข้อกำหนดของหน่วยงานทางการที่เกี่ยวข้องกับการดำเนินธุรกิจอย่างเข้มงวด					
4. กิจการมีการสื่อสารข้อมูลแก่ผู้มีส่วนได้เสียที่เกี่ยวข้องเพื่อสร้างความเข้าใจเกี่ยวกับกระบวนการดำเนินงานและลักษณะของโครงการผลิตภัณฑ์ต่างๆ อย่างตรงไปตรงมา					
5. กิจการเชื่อมั่นว่าการเปิดเผยข้อมูลด้านความยั่งยืนอย่างชัดเจนจะช่วยให้กิจการได้รับการยอมรับจากผู้มีส่วนได้เสียที่เกี่ยวข้อง					
<u>การเปลี่ยนแปลงอย่างพลิกผันของเทคโนโลยี (Disruptive technology)</u> 1. เทคโนโลยีที่ได้รับการพัฒนาและปรับปรุงอย่างต่อเนื่องส่งผลต่อการปรับตัวและการพัฒนาแนวปฏิบัติทางการบัญชีบริหารของกิจการได้เป็นอย่างดี					
2. การเติบโตของเครือข่ายการสื่อสารได้สนับสนุนกระบวนการปฏิบัติงานของกิจการให้มีประสิทธิภาพยิ่งขึ้น					
3. เครื่องมือ กระบวนการปฏิบัติงาน และระบบสนับสนุนที่เกิดขึ้นอย่างต่อเนื่องสามารถเสริมสร้างประสิทธิภาพในการดำเนินธุรกิจได้เป็นอย่างดี					

ตอนที่ 6 (ต่อ)

ปัจจัยภายนอกที่มีผลต่อการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
4. ความหลากหลายทางเทคโนโลยีที่เกิดขึ้นใหม่ทำให้กิจการสามารถเลือกใช้ตามความเหมาะสมกับคุณลักษณะและสภาพของกิจการได้อย่างเต็มที่					
5. ความสามารถใหม่ๆ ของเทคโนโลยีที่เกิดขึ้นอย่างต่อเนื่องทำให้กิจการต้องปรับตัวอยู่เสมอเพื่อช่วยเพิ่มความสามารถและประสิทธิภาพการดำเนินงานให้ดียิ่งขึ้นและประสบความสำเร็จ					

ตอนที่ 7 ข้อคิดเห็น ปัญหาและข้อเสนอแนะเกี่ยวกับการสนับสนุนการบัญชีดิจิทัลเชิงรุกของธุรกิจส่งออกในประเทศไทย

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ขอขอบพระคุณท่านเป็นอย่างสูงที่ได้กรุณาสละเวลาตอบแบบสอบถามในครั้งนี้ ได้โปรดส่งคืนแบบสอบถามภายใน 30 หรือสแกนแบบสอบถามเป็นไฟล์ส่งมาที่ E-mail: Kenchal_r@hotmail.com หรือ 61010961001@msu.ac.th

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