Audit Data Analytics Capability and Tax Performance: An Empirical Evidence from Tax Departments in Thailand

Soranee Janchai

A Thesis Submitted in Partial Fulfillment of Requirements for
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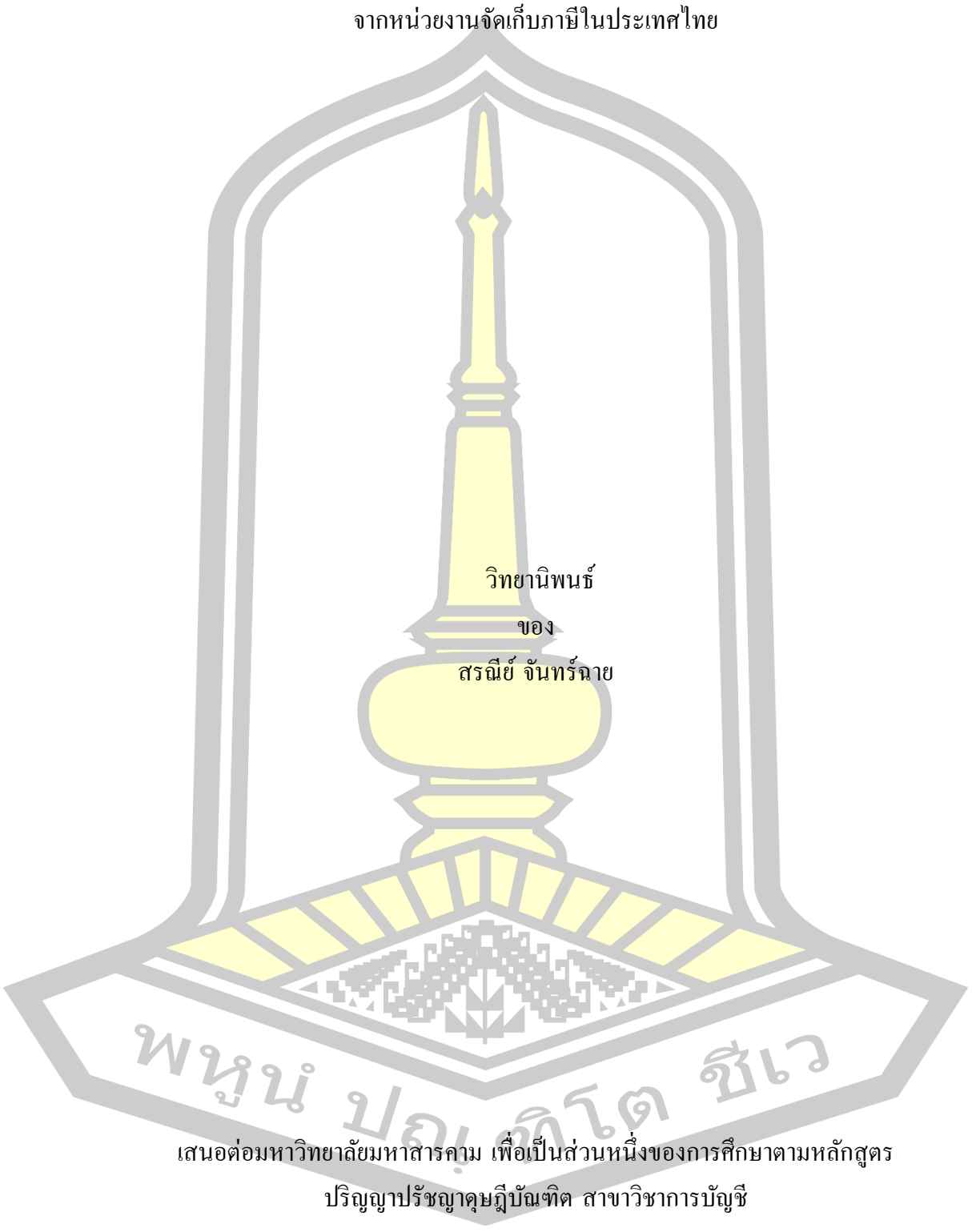
ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี: หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย



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ABSTRACT

This research investigates the key dimensions of audit data analytics capability in a new model. The primary objective of this research is to examine the effects of audit data analytics capability on tax performance. Moreover, the effects of each dimension of the audit data analytics capability on risk management efficiency and good practice are investigated. Finally, this research tests the effects of the accounting information system implementation, organizational culture, and stakeholder pressure on each dimension of audit data analytics capability.

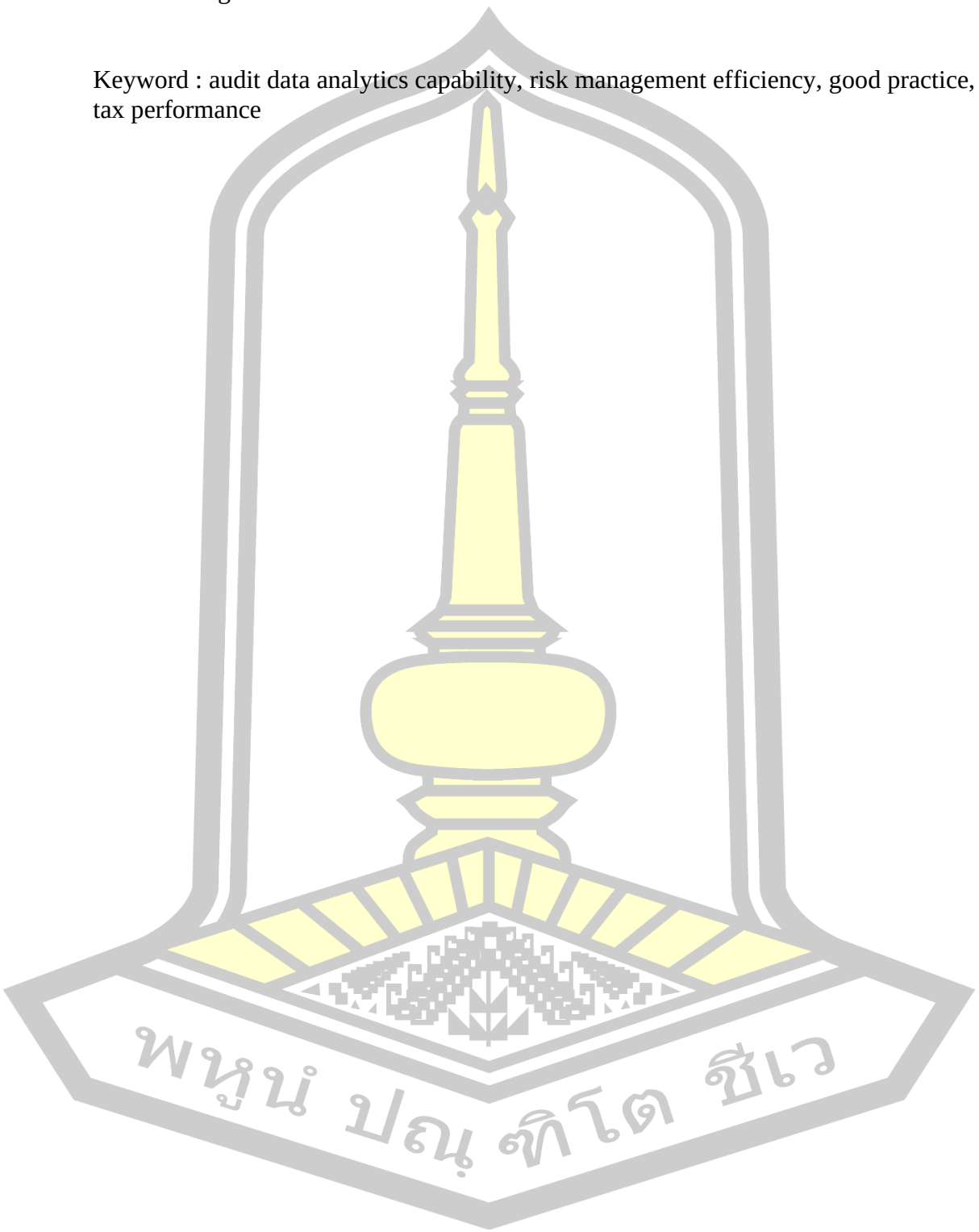
In this research, tax departments in Thailand are selected as the population and sample for investigation. The list of 255 tax audit branches was provided by the Department of Excise, Revenue, and Customs under the Ministry of Finance in Thailand. The unit of analysis is office-level, and the key informant is the chief of the area office of each tax audit branch (e.g., director, (excise/revenue/customs) technical officer, (excise/revenue/customs) officer, tax audit officer). A survey questionnaire is used as the main method of data collection, and the ordinary least squares (OLS) regression analyses are processed to test all postulated hypotheses.

The results indicate that audit data analytics capability plays a significant role in operational outcomes. In particular, management capability, technology competence, and personnel expertise have positive influences on risk management efficiency, good practice, and tax performance. Likewise, the results also show that risk management efficiency and good practice have positively affected tax performance. In addition, the results of the relationships among antecedents and each dimension of audit data analytics capability illustrate that the important factors that contribute to the development of audit data analytics capability are accounting information system implementation, organizational culture, and stakeholder pressure, respectively.

The distinctive findings in this research make a contribution to the better understanding of the relationship between audit data analytics capability and tax performance, as well as provide helpful insights and useful guidelines to practitioners to develop audit data analytics capability in supporting management under rapidly

changing the organizational environment, particularly for tax departments in Thailand and other organizations which have the same context.

Keyword : audit data analytics capability, risk management efficiency, good practice, tax performance



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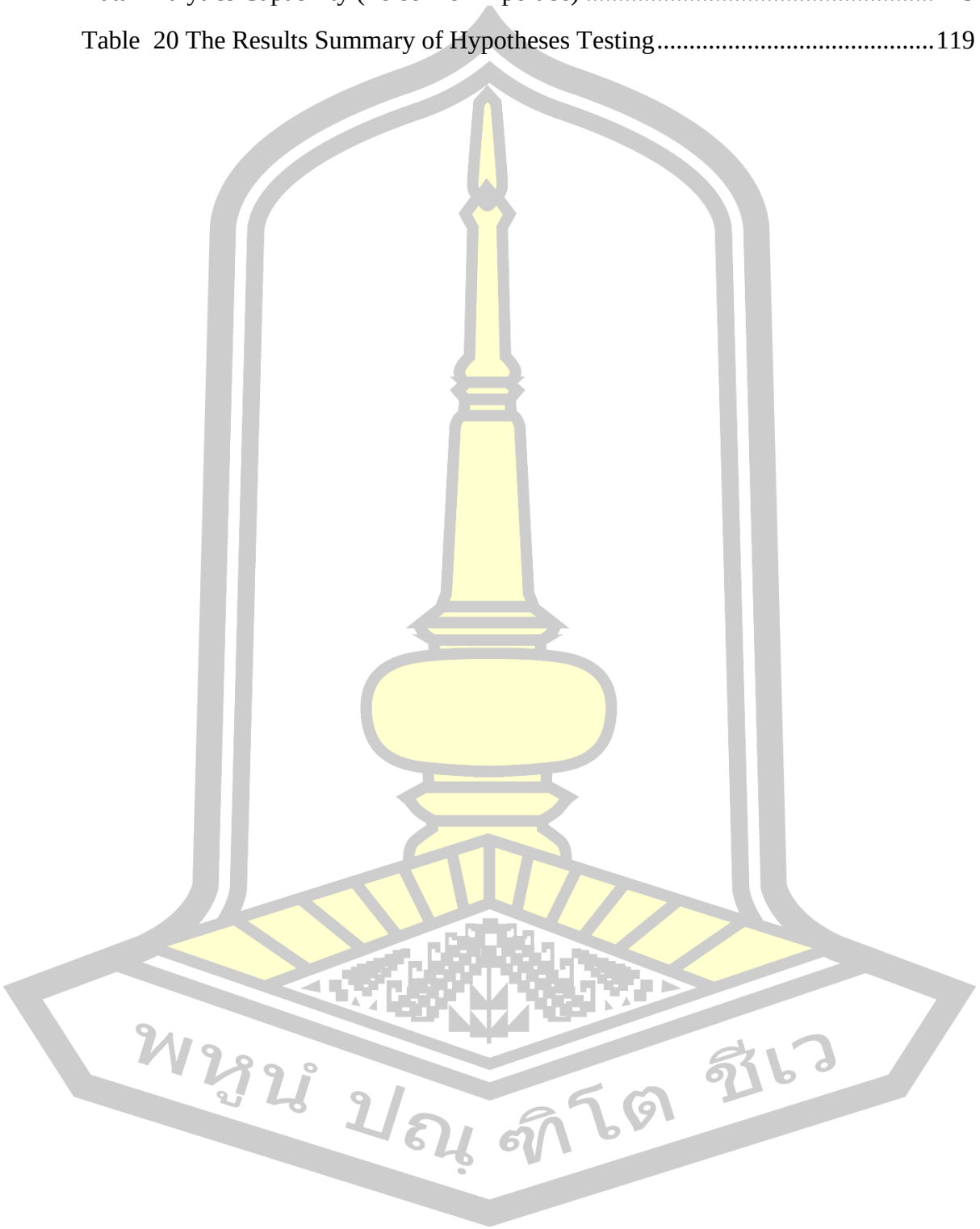

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CHAPTER I

INTRODUCTION

Overview

With globalization and digitization comes the increasing need for tax administrations around the world to collaborate to help each country administer its tax system. In addition, multiple projects such as the Organization for Economic Cooperation and Development (OECD), the Intra-European Organization of Tax Administrations (IOTA), the exchange of tax rulings within the European Union (EU), and taxpayer demand for government tax transparency as well as a simplified taxation system, have all presented additional challenges (Colon & Swagerman, 2015). Interestingly, Tax revenue has been accepted as an important source of revenue to all levels of government (Gbadago & Awunyo-Vitor, 2015; Olaoye, Gunleye & Solanke, 2018). For that reason, taxation is recognized as an important tool for national development. It is a critical input to governance. A function of the tax system is to generate enough revenue to meet the expanding government requirements.

However, most developing countries face difficulties in generating revenue because the unproductive use of public expenditures has limited the critical investments in both human resources and infrastructure technology necessary for sustainable economic growth (Ibrahim, Kargbo & Egwaikhide, 2012). Moreover, weak tax administrations are not able to collect tax revenues efficiently and may suffer from institutionalized corruption and tax evasion (Modica, Laudage & Harding, 2018). Hence, most developing countries attempt to dynamic tax system for success and sustainability. It then is possible to find the balance between simplicity and the aims of a modern tax system in terms of efficiency, equity, as well as taking account of the complex environment in which dynamic tax systems have to operate (Budak, James & Sawyer, 2016). Therefore, the dynamic tax systems are an important part of creating good tax administration. The combination of process automation, data integration, and

innovative analytics capabilities are dramatically reshaping the way tax departments work (Klievink, Bharosa & Tan, 2016).

Tax departments have been trying to implement and establish dynamic tax systems that will not only ensure the tax revenues but also enhance citizens' trust towards governments in terms of fairness in the distribution of tax burdens (Drogalas, Ioannis, Dimitra & Ioannis, 2015). In terms of tax administration based on dynamic capability theory, Thai tax departments attempt to follow the principle of tax administration as OECD suggested (OECD, 2001). In addition, Thailand is a developing country and one of the Association of Southeast Asian Nations (ASEAN) members that will consider the level and structure of taxes in an economy is important in tax policy reform. Thai tax departments are implementing digital transformation initiatives, enabling changes that will have far-reaching effects on every tax function (Svetalekth, 2016).

However, the problems facing Thai tax departments with respect to tax audit and tax collection are similar to those faced in other countries. The literature provides evidence of a relationship between data analytics and performance. For instance, James, Svetalekth & Wright (2007) found that the Thai Excise Office sometime faces problem of tax evasion and fraud, manpower is not always adequate to detect tax evaders and other resources, some staff have insufficient auditing knowledge, some taxpayers providers claim that their prices are lower than they actually are and it is difficult for this to be detected by excise tax collectors, the information system that results in poor billing and collection, and the Ministry of Finance still requires every tax department to increase its revenue target to achieve the revenue goals. Moreover, Svetalekth (2016) found that tax authorities of Thailand attempt to simplify tax in terms of increasing fairness and the efficiency of communication with taxpayers, amending the tax law, creating good tax administration, and decreasing problems of tax evasion and tax avoidance.

Consistent with the findings in the literature, Thai tax departments face difficulties with respect to tax audits. First, the main problem of the collection is tax evasion and fraud. Secondly, tax authorities have insufficient auditing technical and knowledge. Finally, the Ministry of Finance still requires every tax department to

increase its revenue target to achieve revenue goals. Thus, the tax departments continue to look for new possibilities for tax audit goal achievement to suggest raising additional revenue.

Building on the above, the world of taxes is rapidly changing. Taxation faces increasing pressure from stakeholder pressure on tax risks (Colon & Swagerman, 2015), while at the same time balancing the emergence of new technologies with the need to depend increasingly on accounting information system implementation for tax management (Gärtner & Hiebl, 2018; Okello, 2014). Clearly, complex technology change requires a new skillset from tax professionals. Technology also brings significant opportunities to the tax function. Indeed, with the help of data analytics in organizational culture (Dubey, Gunasekaran & Childe, 2019), complex enterprise resource planning landscapes and tax processes. Moreover, tax practice guidelines and administration should focus on the effective use of human resources (Li, Dai, Gershberg & Vasarhelyi, 2018). Thus, the provision of education to tax authorities and the use of modern information technology such as data analytics capability would be a solution to tax functions (Al-moumany & AI Ebbini, 2013).

Effective information technology enables the organization to accomplish its performance goals. It facilitates organizational transparency and efficiency through the storage, processing, and transmission of information (S. Ali & Green, 2012). This research takes the position that audit data analytics capability is information technology. It refers to the competence of the organization to provide tax audit insights using audit data analytics to transform information management capability, technology competence, and personnel expertise into ensuring a goal of tax performance. It is about technologies and techniques that an organization can employ to analyze large scale, report insight, and complex data for various applications intended to augment organizational performance (Kwon, Lee & Shin, 2014). The literature review reveals that most studies of information technology take advantage of the resource-based view (RBV) to define the key elements of data analytics capability as follows: organizational (e.g., relationship infrastructure), physical (i.e., infrastructure), and human (e.g., skill or knowledge) elements (Kim, Shin, Kim & Lee, 2011).

For example, Barton & Court (2012) highlight the following three dimensions of data analytics capability: management ability, information technology infrastructure, and the expertise of employees. In a similar, research Kiron, Prentice & Ferguson (2014) considering the key dimensions of data analytics capability, focus on management culture, data management infrastructure, and skills. Also, Fosso Wamba, Akter, Edwards, Chopin & Gnanzou (2015) identify the critical challenges of data analytics capability as management, technology and techniques, and organizational change and talent. According to Akter, Wamba, Gunasekaran, Dubey & Childe (2016) the notion of data analytics capability, at its core, illuminates the importance of leveraging management, technology, and talent capabilities.

To achieve our research goal, this research views audit data analytics capability from the theoretical lens of sociomaterialism. Sociomaterialism presents a balanced view of human and material perspectives by interlinking three information technology capability dimensions (i.e., management, infrastructure, and personnel capabilities) (Kim, Shin & Kwon, 2012; Orlikowski, 2007; Orlikowski & Scott, 2008). Then, the data analytics capability modal that reflects the sociomaterialism perspective is introduced in order to lay the groundwork for empirical.

In addition, the value of the sociomaterialism perspective in information system research can be further enhanced when it is utilized in conjunction with other established theories as needed (Kim et al., 2012). Thus, based on information technology and the sociomaterialism perspective, this research presents an entanglement conceptualization of three audit data analytics capability dimensions consisting of 1) management capability, 2) technology competence, and 3) personnel expertise that highlights the importance of the complementarities between them for high-level operational efficiency and effectiveness for improved tax performance because the role of data analytics capability can be seen as innovative information technology capability and a strategic resource that can ultimate performance superiority.

The valuable information technology generated by data analytics capability is essential to the tax authorities to track and possible tax infringements and tax offenders (Drogalas et al., 2015). Moreover, the concept of tax audit also includes all

the necessary actions for the collection of information that allow them to properly evaluate a taxpayer's financial statement (Sen & Bala, 2002). Therefore, many tax authorities are starting to think more clearly about how they might leverage their data to improve their ability to assurance service. Thus, many tax authorities are already using an audit analytics approach to quickly and effectively sample taxpayer data, develop risk management, good practice, reduce the potential for fraud, and enhance tax performance.

Audit data analytics capability have enough potential to influence goal achievement such as risk management efficiency and good practice. It is widely acknowledged to play a vital role in increasing performance (Wixom, Yen & Relich, 2013). Tax departments have been trying to implement dynamic tax systems to ensure that satisfactory revenues are submitted by taxpayers from service, so as to minimize tax avoidance and tax evasion from risk management efficiency, to ensure the public revenues from tax performance (James et al., 2007), and also enhance citizens' trust towards governments in terms of fairness in the distribution of income tax burdens, as well as ensuring a high degree of compliance from good tax audit practice (Chalu & Mzee, 2018; Mikalef, Framnes, Danielsen, Krogstie & Olsen, 2017; Okello, 2014). Therefore, tax performance in this research as the effectiveness of ability to increase tax revenue collection to achieve the revenue goals, quality of services from increase of taxpayer satisfaction, efficiency from decrease of tax evasion and tax avoidance, and organizational development relates to the improvement of the tax system and learning in the organization.

From the problems mentioned above, data analytics will enhance measurement processes through new forms of evidence to support management's audit for transactions such as textual information made available via data analytics can provide for improved tax audit, managerial accounting, and financial reporting practices. For instance, Brown-Liburd, Issa & Lombardi (2015) examine the behavioral effects of data analytics on auditor judgment and discuss issues such as information overload, information relevance, pattern recognition, and ambiguity. They conclude that adding audit data techniques to the set of tools used in the audit process would add value. The ability to fully utilize the benefits of audit data lays in more advanced

data analytics techniques, which potentially improve audit effectiveness. They also note that the quantity and diversity of information has increased and as a result data analytics provide tax authorities with tremendous potential to improve the efficiency and effectiveness of tax performance.

Meanwhile, Wixom et al. (2013) found that data analytics capability can improve organizational performance by improving productivity both tangible (i.e., less paper reporting) and intangible (organization reputation) benefits. Similarly, Wamba et al. (2017) confirm that the value of the hierarchical big data analytics capability model has both direct and indirect impacts on organization performance. Thus, the organization that creates superior data analytics capability should be able to maximize performance by facilitating the pervasive use of insights gained from its data analytics (Akter et al., 2016). On the other hand, Tippins & Sohi (2003) reported that information technology competency had no direct bearing on organizational performance. Meanwhile, Bhatt & Grover (2005) showed the effect of information technology expertise and relationship infrastructure on competitive advantage but not information technology quality. Therefore, the result of literature reviews also revealed that the three dimensions of audit data analytics capability had mixed effects base on organizational performance.

To capture the conceptual framework of audit data analytics capability, this research focuses on tax departments under the Ministry of Finance in Thailand as the population include: 1) the Department of Excise collects all excise tax, 2) the Department of Revenue is responsible for individual income tax, corporate income tax, petroleum tax, VAT, special business tax, etc., and 3) the Department of Customs administers import and export duties. Because it plays an important role in enhancing the fiscal sustainability of the country. It takes major responsibilities in tax collecting management, tax auditing, tax assessments and generating revenue to boost liquidity and strengthen the country's fiscal position as well as prevention and suppression of crime related to tax evasion.

In the fiscal year 2017, operating revenue has been revised upwards to 2,350,590 million Baht, in which 7,590 million Baht or 0.3% over the budgeted estimate, mainly due to the revenue collection form state enterprises delivered by

other government agencies and the overestimated revenue collection from the Excise Department respectively. Revenue collections from excise taxes on oil products and motor vehicles, and corporate income tax are higher than the projected estimates (Ministry of Finance, 2017).

This research is expected to contribute to extending the literature in several ways. First, despite the rarity of sociomaterialism-driven information system research, this research empirically demonstrates its value in the conceptualization of three audit data analytics capability dimensions (i.e., management capability, technology competence, and personnel expertise) and subsequently in substantiating the fact that audit data analytics capability is highly germane to strengthening tax performance. Second, the research provides theoretical justification and empirical evidence of the role of audit data analytics capability that influences the valuable addition to the tax audit profession by applied dynamic capability theory and contingency theory, when rigorous analytical procedures are combined with tax audit techniques and expert judgment. Third, the research contributes a better understanding of the sources of audit data analytics capability that would give tax departments the ability to improve their chance of gaining dynamic tax systems on modern information technology. Finally, the research demonstrates the consequence of audit data analytics capability that may be more critical in modern information technology to tax performance in the dynamic tax audit environment.

Purposes of the Research

The primary objective of this research is to examine the effects of audit data analytics capability on tax performance. In addition, the specific objectives addressed in this research are following:

1. To test the effects of each dimension of the audit data analytics capability on risk management efficiency, good practice, and tax performance.

2. To examine the effects of risk management efficiency, and good practice on tax performance.

3. To test the relationships among accounting information system implementation, organizational culture, and stakeholder pressure on each dimension of audit data analytics capability.

Research Questions

The key research question of this research is how audit data analytics capability has an influence on tax performance. In addition, the specific research questions addressed in this research are following:

1. How does each dimension of audit data analytics capability affect risk management efficiency, good practice, and tax performance?

2. How do risk management efficiency and good practice influence tax performance?

3. How do accounting information system implementation, organizational culture, and stakeholder pressure affect each dimension of audit data analytics capability?

Scope of the Research

The main objective of this research is to investigate the relationship between audit data analytics capability and tax performance. From the conceptual framework, the independent variable is audit data analytics capability which refers to the competence of organizations to provide tax audit insights using audit data analytics to transform information management capability, technology competence, and personnel expertise into ensuring a goal of tax performance. It comprises three dimensions, including 1) management capability refers to the ability of audit data analytics to planning, coordination, and control to manage information resources in accordance with organization needs. 2) technology competence refers to the ability of information technology infrastructure to connectivity and compatibility the flexibility of the audit data analytics platform in relation to enabling tax authorities to quickly develop and

support an organization's resources. 3) personnel expertise refers to the ability of analytics professionals to perform assigned tasks in the tax audit environment through technical skill, relational knowledge, and technological management knowledge.

The consequences of audit data analytics capability consist of three constructs: 1) risk management efficiency which refers to the ability of the organization to determining, identification, and assessment of risks for the achievement of auditing objectives across the organization, and criteria for auditing taxpayers by grouping taxpayers at the risk-based audit levels. It will make the tax administration more effective. 2) good practice which refers to the ability of the organization to integrate methods and various techniques that appropriate, cover and accordance with tax policy, align analytics with organizational strategy, and relate to tax audit procedure accurately and transparently. 3) tax performance which refers to the ability of organization to collect tax revenues to achieve the goals set or more effectively than the previous fiscal year, prides itself on receiving awards for performance according to standards or criteria for the development of public sector management quality award, innovations for tax administration to convenient and efficient, as well as the transparent and fair administration for sustainable organization development.

In the part of three antecedents that affect the potential of audit data analytics, including 1) accounting information system implementation which refers to the system proficiency in verifying, reviewing, and tracking all tax auditing activities to generate accounting information system which helps to ensure that auditing data from various processes are accurate, complete, reliable, and transparent. 2) organizational culture which refers to the values of the organization for the staff to have a positive attitude in performing work according to service standards, ethics and accountability in the operation, harmony and work together seamlessly to provide for greater effective tax auditing, and teamwork and mutual support will enable the achievement of the objectives as well. 3) stakeholder pressure which refers to the degree expectations of the taxpayers, people affected by society, government and private agencies with an impetus to demand certain actions from the tax authorities in terms of the necessity of responding to changes in stakeholder demand, the necessity of adopting new technology to better tax audit. The dynamic capability theory and contingency theory

are applied to explain the phenomena and the positive relationship between variables in the conceptual framework.

In this research, the tax departments in Thailand are selected as the population and sample for investigation. The list of 255 tax audit branches was provided by the Department of Excise, Revenue, and Customs under the Ministry of Finance in Thailand (November, 2018). The unit of analysis is office-level, and the key informant is the chief of area office of each tax audit branch (e.g., director, (excise/revenue/ customs) technical officer, (excise/revenue/ customs) officer, tax audit officer). A survey questionnaire is used as the main method of data collection, and the ordinary least squares (OLS) regression analyses are processed to test all postulated hypotheses.

Organization of the Research

This research is divided into five chapters; the structures are as follows. Chapter one presents an overview of the research, the purposes of the research, research questions, the scope of the research, and organization of the dissertation. Chapter two reviews the relevant literature on audit data analytics capability, presents the theories that are applied, the analyzed variables, the expected relation between variables, and develops the research hypotheses. Chapter three describes the research method, including the sample selection and the data collection procedure, the variable measurements of each construct, the instrumental verification, the statistics equations to test the hypotheses, and the table of constructs and the measurement items. Chapter four exhibits empirical results and discussions. Finally, chapter five summarizes the research findings covers the theoretical and managerial contributions, the limitations, and gives some suggestions for future research. A summary of constructs and definitions explanation are given in Table 1.

Table 1 Summary of Construct Definitions and Literature Basis

Construct	Definition	Literature
	Independent variables	
Audit Data Analytics Capability (AD)	The competence of the organization to provide tax audit insights using audit data analytics to transform information management capability, technology competence, and personnel expertise into ensuring a goal of tax performance.	Akter et al. (2016); Fosso Wamba et al. (2017); Kim et al. (2012); Kiron et al. (2014); Mikalef et al. (2017)
Management Capability (MC)	The ability of audit data analytics to planning, coordination, and control to manage information resources in accordance with organization needs.	Akter et al. (2016); Kim et al. (2012)
Technology Competence (TC)	The ability of information technology infrastructure to connectivity and compatibility the flexibility of the audit data analytics platform in relation to enabling tax authorities to quickly develop and support an organization's resources.	Akter et al. (2016); Kim et al. (2012)
Personnel Expertise (PE)	The ability of analytics professionals to perform assigned tasks in the tax audit environment through technical skills, relational knowledge, and technological management knowledge.	Akter et al. (2016); Kim et al. (2012)

Table 1 Summary of Construct Definitions and Literature Basis (Continued)

Construct	Definition	Literature
	Dependent variable	
Tax Performance (TP)	The ability of organization to collect tax revenues to achieve the goals set or more effectively than the previous fiscal year prides itself on receiving awards for performance according to standards or criteria for the development of public sector management quality award, innovations for tax administration to convenient and efficient, as well as the transparent and fair administration for sustainable organization development.	James et al. (2007)
	Mediating variables	
Risk Management Efficiency (RM)	The ability of the organization to determining, identification, and assessment of risks for the achievement of auditing objectives across the organization, and criteria for auditing taxpayers by grouping taxpayers at the risk-based audit levels. It will make the tax administration more effective.	Koutoupis & Pappa (2018)
Good Practice (GP)	The ability of the organization to integrate methods and various techniques that appropriate, cover and accordance with tax policy, align analytics with organizational strategy, and relate to tax audit procedure accurate and transparent.	Mikalef et al. (2017)

Table 1 Summary of Construct Definitions and Literature Basis (Continued)

Construct	Definition	Literature
	Antecedent variables	
Accounting Information System Implementation (AI)	The system proficiency in verifying, reviewing, and tracking all tax auditing activities to generate accounting information systems that help to ensure that auditing data from various processes are accurate, complete, reliable, and transparent.	Ismail (2009); Tian, Wang, Chen & Johansson (2010)
Organizational Culture (OC)	The values of the organization for the staff to have a positive attitude in performing work according to service standards, ethics and accountability in the operation, harmony and work together seamlessly to provide for greater effective tax auditing, and teamwork and mutual support will enable the achievement of the objectives as well.	Mansor & Tayib (2010); Thirathon, Wieder, Matolcsy & Ossimitz (2017)
Stakeholder Pressure (SP)	The degree expectations of the taxpayers, people affected by society, government and private agencies with the impetus to demand certain actions from the tax authorities in terms of the necessity of responding to changes in stakeholder demand, the necessity of adopting new technology to tax audit better.	Gualandris, Klassen, Vachon & Kalchschmidt (2015); Huq, Chowdhury & Klassen (2016)

CHAPTER II

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

The previous chapter provides the overview of audit data analytics capability and states the purposes of the research, research questions, and the scope of the research. This chapter demonstrates more precisely the understanding of audit data analytics capability by presenting the theoretical foundation, the literature review and conceptual framework, and the hypotheses development. Therefore, this chapter is divided into three sections. The first section discusses principal theoretical perspectives employed to explain the research phenomenon including the dynamic capability theory and the contingency theory. The second section reviews the research literature on audit data analytics capability and tax performance. Also, a conceptual model is presented with the definition of all constructs and relevant previous literature. Finally, the third section illustrates the summary of hypotheses relationships among audit data analytics, its consequences, and antecedents that are represented in this chapter.

Theoretical Background

Internal auditing research has used a variety of theoretical perspectives to explain the development of audit data analytics capability in dynamic environments such as contingency theory, agency theory, resource-based view theory, and dynamic capability theory. Most research regarding information systems and organizational change use contingency theory to explain a need for a good fit between the information system, external environment, and organizational aspects, to improve performance (Baines & Langfield-Smith, 2003). In other words, the contingency theory perspective is a fundamental theory for identifying factors that influence the development of an information system to be consistent with circumstances. Whereas, the agency theory involves the manager introduces internal control mechanisms to

signal to shareholders that management is properly discharging its responsibility to maximize shareholders' wealth (Jensen & Meckling, 1976).

Whereas the resource-based view theory is one of the most used theories for understanding how organizations achieve and sustain their competitive advantage. It conceptualizes organizations as a bundle of resources and capabilities that are distributed in a heterogeneous manner across the organizations and these differences continue to hold over time (J. B. Barney, Ketchen & Wright, 2011). As such, organizations having valuable, rare, inimitable, and non-substitutable resources and capabilities can achieve sustainable competitive advantage by applying value-creating strategies (Cheng & Shiu, 2015). However, studies on the agility of organizations are consistently derived from theoretical concepts in the dynamic capability perspective. The foundation idea of the dynamic capability theory emphasizes in order to obtain the competitive advantage, organizations should also able to integrate and develop their internal and external competencies as capabilities in an inimitable way (Teece, Pisano & Shuen, 1997).

As mentioned above, this research uses two theoretical perspectives, comprising 1) dynamic capability theory and 2) contingency theory to support and explain how audit data analytics capability develops within organizations and determine the influential factors that influence the development of the information auditing. Each of the applied theories is detailed as follows.

Dynamic Capability Theory

The dynamic capability of the organization has emerged as one of the most influential theoretical perspectives in the study of strategic management (Schilke, 2014) that there is a direct positive link between dynamic capability and organizational performance (Teece, 2007). This theory is basically an extension of the resource-based view of organizations (Teece et al., 1997). The resource-based view suggests that the organization's capabilities and heterogeneous resources determine its sustainable competitive advantages (Barney, 1991; Barney et al., 2011). However, in today's dynamic environments, this theory is challenged, it attempts to explain how an organization maintains a sustainable value in changing environments, which encourages

scholars to extend the resource-based view to the dynamic capability view (Gutierrez-Gutierrez & Barrales-Molina, 2018; Hitt, Xu & Carnes, 2016; Priem & Butler, 2001). Therefore, the dynamic capability approach extends understanding of how resources can contribute to the competitive advantage over time. Essentially, this approach suggests that chiefs build their capability to change other capabilities in the organization as needed to achieve and maintain the competitive advantage (Makadok, 2001; Teece et al., 1997).

The dynamic capability enables the organization to integrate, build, and reconfigure the competency required to respond to rapidly changing business environments (Pisano, 2017). This theory emphasizes the development of data analytics capability and of difficult-to-imitate combinations of technological, organizational, and environmental (Teece et al., 1997). The resource-based view guides the use of managerial practices to create new capability (Wernerfelt, 1984), while the dynamic capability theory suggests the use of management strategies to renew competency according to changes in the business environment (Shamim, Zeng, Shariq & Khan, 2019; Teece & Pisano, 1994), which enunciates the role of routines, path dependencies, and organizational learning (Barreto, 2010).

Despite considerable variation in defining dynamic capabilities, a growing consensus in the literature describes them as a set of identifiable and specific routines that have often been the subject of extensive empirical research (Eisenhardt & Martin, 2000). This theory seems to be gaining momentum in empirical studies since it is feasible to identify and prescribe a set of operating routines that jointly constitute organization-level dynamic capabilities (Pavlou & El Sawy, 2011; Zollo & Winter, 2002). These routines are commonly recognized as learned, highly patterned, and repetitious, directed towards independent corporate actions (Winter, 2003). Consequently, to better understand dynamic capabilities it is feasible to emphasize the set of routines that underpin them, commonly referred to as capabilities.

In the context of information system literature, several studies have examined how information technology infused in organizational capabilities can help organizations renew or reconfigure their existing mode of operating (Mikalef et al., 2017; Mikalef, Pappas, Giannakos, Krogstie & Lekakos, 2016; Mikalef, Pateli & Van De

Wetering, 2016; Pavlou & El Sawy, 2006; Wang, Liang, Zhong, Xue & Xiao, 2012). This perspective follows the logic proposed by Henderson & Venkatraman (1993), who stressed that alignment as a dynamic capability is not an ad-hoc event, but rather a process of continuous adaption and change. As such, they confirm that no single information technology application-however sophisticated and state of the art it maybe could deliver a sustained advantage.

Rather, what is important is to infuse information technology investments into the organizational fabric (Kim et al., 2011; Kohli & Grover, 2008). Information technology is a key enabler of the development of higher-order management capability (Benitez-Amado & Walczuch, 2012). Particularly, Tanriverdi (2005) found that information technology, if properly leveraged, could facilitate the development of dynamic capabilities such as functional technology competencies, personnel expertise, and firm agility.

Nowadays, it is found that dynamic capability theory is one of the most influential and cited theories in management to explain how organizations accumulate their sustained advantage in proceeding dynamic business environments. In changing organizational environments, organizations strive to become more data-oriented and consider big data and data analytics crucial for their performance (McAfee & Brynjolfsson, 2012). The dynamic capability view is also used in the existing literature to discuss data analytics capability (Fosso Wamba et al., 2017). Furthermore, this theory is a proficient way to explain how some organizations achieve organizational performances, business returns, and profits (Drnevich & Kriauciunas, 2011; Moustaghfir, 2008; Zollo & Winter, 2002).

The literature on dynamic capability theory has addressed the fundamental question of how organizations develop the competencies and skills that allow them to gain an enduring competitive advantage (Zahra, Sapienza & Davidsson, 2006). In addition, dynamic capability regards to the organizational processes to utilize their existing resources or capabilities to create growth and adaptation within changing environments. Organization resources include all assets, capabilities, organizational processes, organization attributes, information, and knowledge that are available and

useful to help organizations perform their operations and responding to market opportunities or threats (Wade & Hulland, 2004).

Previous researches indicated that dynamic capability could be best conceptualized as tools that enhance existing resource configurations to strengthen long-term sustainable value for the organization, especially in directed towards strategic change and aligning the organization with a dynamic environment (Eisenhardt & Martin, 2000). For instance, Barreto (2010) concluded that the value of dynamic capabilities is context-dependent. This is consistent with Wilden, Gudergan, Nielsen & Lings (2013), who found support that the dynamic capability theory is considered to managerial processes that enable organizations to sustain performance. Similarly, the relationship between strategy and structure must also be maintained to achieve superior performance through the deployment and development of dynamic capabilities (Venkatraman, 1989).

Following the dynamic capability, this research proposes that the dynamic capability theory enables organizations to pursue opportunities in new and potentially effective ways. Consequently, this research address theoretically how the audit data analytics capability would be related to sustained advantage capability (namely, risk management efficiency and good practice) and enhances the higher levels of tax performance. Finally, this research applies the dynamic capability to explain the effects of antecedent (namely, accounting information system implementation, organizational culture, and stakeholder pressure) as the Technology-Organization-Environment (TOE) framework suited to influence audit data analytics capability.

Contingency Theory

This research also considers the consequence of audit data analytics capability in the context of the contingency theory because it has well-established approaches in organizational research (Sauser, Reilly & Shenhar, 2009). The theory is been employ as the underpinning theory for the research due to the fact that the theory is one of those theories that are recently been employed in the research area of management accounting and auditing (Abushaiba & Zainuddin, 2012; Badara, 2015; Valanciene & Gimzauskiene, 2009). Even though the application of the theory may

have different effects, the effectiveness of the theory may equally be dependent upon the field that is been proposed area (Chenhall, 2003). In addition, this theory enables the researcher to systematically introduce factors to predict or explain expected phenomena (Umanath, 2003) because it does depend on an interpretation of the theory, and this theory has the capability of producing accurate hypotheses and consistent functions (Schoonhoven, 1981).

Previous researches indicated that the contingency perspective of performance measurement relies on the substantiation that there is no common organizational performance, which is applicable in the same manner to all organization under the same circumstances (Ong, Teh & Lee, 2019). This theory enables hypothesize a conditional relationship between independent variables with the dependent variable and subject it to empirical test (Drazin & Van de Ven, 1985). For instance, Woods (2009) study reveals research work on contingency theory on risk management efficiency, this study found that risk management efficiency is contingent upon four variables include: technology, external environment, organization, and strategy. Similarly, Gordon, Loeb & Tseng (2009) confirm that the relationship between risk management efficiency and firm performance is significantly contingent upon five variables; environmental uncertainty, competition in the industry, organizational complexity, organizational size, and monitoring by board of directors.

Following the contingency approach, this research proposes that the contingency theory can differ, in explaining some of the research variables such as tax audit effectiveness (Jokipii, 2010; Woods, 2009). Consequently, this research address theoretically how the tax audit effectiveness or tax performance is contingent upon the contingency variables of, risk management efficiency and good practice as hypothesized. Finally, this research applies the contingency theory to explain the relationships among risk management efficiency, good practice, and tax performance.

In summary, the dynamic capability theory is applied to explain the dynamic capability of audit data analytics capability which relates to sustained advantage capability from risk management efficiency and good practice and leads to the growth of the tax performance. Moreover, it is used to identify the antecedent influence on

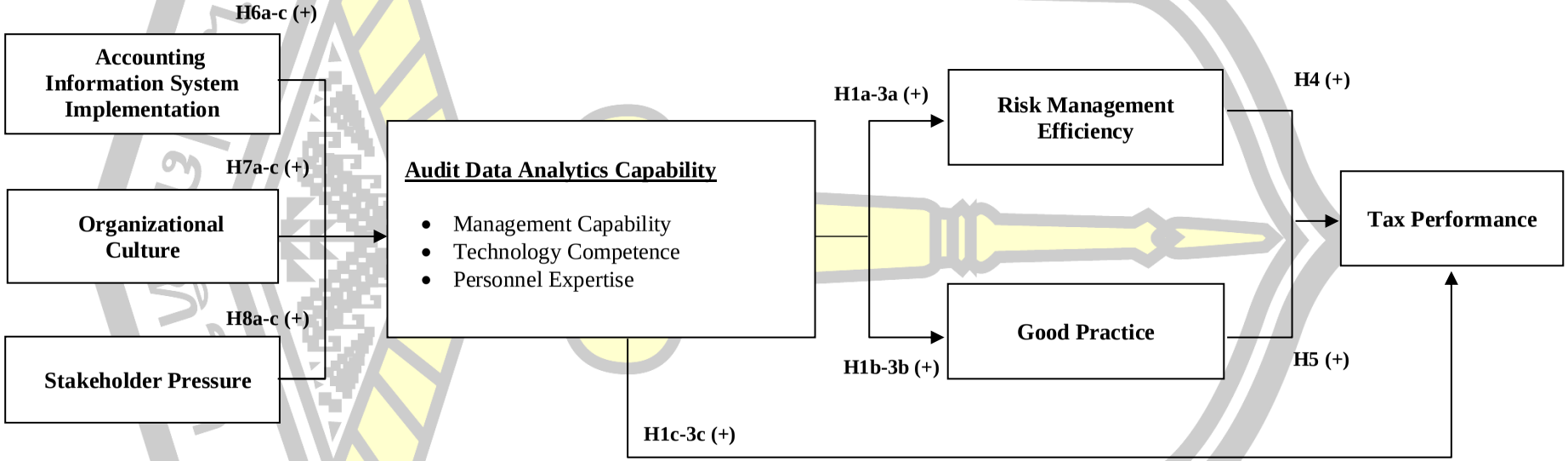
audit data analytics. In addition, the contingency theory is used to explain the relationships among risk management efficiency, good practice, and tax performance. These theories demonstrate the relationship among audit data analytics capability to its antecedents and consequences as shown in Figure 1.

Hypotheses Development

The theoretical foundations of dynamic capability theory and contingency theory are a valuable guide to develop the conceptual model of the relationship between audit data analytics capability and tax performance. In order to comprehend the conceptual model, all variables in this study are consistent with theoretical concepts. Audit data analytics capability is the main variable and the center of this research. As described earlier, this research purposes that audit data analytics capability is positively associated with risk management efficiency, good practice, and tax performance. Risk management efficiency and good practice are supposed to have a positive relationship with tax performance.

Lastly, the three antecedents of audit data analytics capability (accounting information system implementation, organizational culture, and stakeholder pressure) are investigated and expected to have positive relationships with audit data analytics capability. The relationships among audit data analytics capability, antecedents, and consequences variables are shown in Figure 1.

Figure 1 Conceptual Model of the Relationships between Audit Data Analytics Capability and Tax Performance



Internal Auditing

The Institute of Internal Auditors (IIA) defines internal auditing as “an independent, objective assurance and consulting activity designed to add value and improve an organization’s operations. It helps an organization accomplish its objective by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes” (IIA, 2010). The IIA emphasizes, in its definition of internal auditing, that the internal auditor’s role involves risk management efficiency, management controls, and governance processes within organizations (Greg Burton, Emett, Simon & Wood, 2012). Internal auditors have unique insight on which risks might lead to calamity: how to improve processes, practices, risk management, and performance; and ways to reduce costs, increase profits, and enhance revenues (Eze, 2016; IIA, 2010). As a result of their broad scope of involvement, internal auditors bring to their organizations a broad range of backgrounds that might include professional, experience and education from outside of the finance and accounting fields.

Internal auditors work for both the private sector and the public sector. However, many researchers suggest that more studies in the area of internal auditing, particularly in the public sector institution in most developing nations are necessary (Ahmad, Othman, Othman & Jusoff, 2009; Ali, Mustafa & Hanefah, 2013; Badara & Saidin, 2014; Mihret, James & Mula, 2010). The underlying objective of internal auditing in the organization is to enhance the operational process efficiency and improve administrative effectiveness by providing constructive criticism (Gurama & Mansor, 2018). Internal auditing is not effective until the organizational weaknesses are detected, the administration is influenced and encourage, risks are apprehended, and organizational objectives are accomplished (Sikka, Filling & Liew, 2009).

In furtherance to this, it is the internal audit task to gather vital information that is adequate, other fraudulent complexities toward the effectiveness of the organizational objectives, and strategically efficient for top management to apply in dealings with the risk inherent from within the organization (Sarens, 2009). In addition, Gurama & Mansor (2018); Lenz & Hahn (2015) concluded that internal

auditing is influencing risk management efficiency, It is disseminating and guide good auditing practice and enhance organizational performance.

Tax Data and Analytics

Nowadays, the major source of government revenue in Thailand is tax revenue. Three main organizations that have direct responsibility for revenue clusters are the Excise Department, the Revenue Department, and the Customs Department (Ministry of Finance, 2017). These are as follows:

The Excise Department takes major responsibility in tax collecting management to generate government revenues as well as prevention and suppression of crime related to the excise law such as petroleum and petroleum products, car, motorcycle, battery, liquor, tobacco, beverage, golf course, nightclub and discotheque, and horseracing course, etc. Furthermore, the excise department places importance on information management in order to have it used as supportive data for increasing its operational effectiveness. The information management has been conducted to accommodate big data and data center arrangements at the Excise Command Center. In addition, the excise department had adhered to the Ministry of Finance's guidelines which include transparency, integrity, and anti-corruption (Excise Department, 2017).

Secondly, the Revenue Department is responsible for collecting taxes according to the Revenue Code such as personal income tax, corporate income tax, and value-added tax (VAT), etc. In addition, the revenue department implements tax policies in order to achieve tax collection targets through fair taxation from managing big data and data analytics with an emphasis on integrating both internal and external data into the analysis. Thus, tax policy design matches the target taxpayers, which will be divided into good groups and bad groups to enhance taxpayers' services (Revenue Department, 2018).

Thirdly, the Customs Department has the responsibility for the administration of customs duties. Customs duty is main imposed on imported and selected exported goods. In addition, the Customs Department has brought various innovations and technologies into an application to facilitate customs procedures for organizational operators such as e-Tracking and Customs Tariff e-Service.

Furthermore, in order to make the Customs Department the organization of good practice, the department has also implemented customs program with the objective to standardize practices of all customs officers of all levels for approval acceptance of stakeholders and society (Customs Department, 2018).

In tax administration, internal auditing is an influential and important activity that can assist in analyzing and evaluating the tax process with the objective of ascertaining the system's weaknesses and to suggest strategies for improvement (Turetken, Jethefer, & Ozkan, 2019). Moreover, in the modern tax administration, audit data is the reliable and significant source of examining the tax organization's operational needs, effective internal control, instituting good corporate governance (Endaya & Hanefah, 2016), and administrative enhancement for the effective tax collection (Bird, 2015). The major objectives of tax administration are to generate adequate revenue for the government. In furtherance to this, the tax audit system is imperative because it assists the government in organizing the degree of tax evasion and tax avoidance, improving the degree of voluntary compliance by taxpayers, and ensuring strict compliance with tax laws by taxpayers (Olaoye et al., 2018).

Reform of the tax administration that includes efficient tax auditing to enable it to keep up with the increasing sophistication of tax evasion. Without a matching increase in the technological capability of the tax department, the existence of tax evasion and increasing the use of electronic financial transactions will continue to pose major challenges in enforcing the tax laws (Adediran, Alade & Oshode, 2013). For this reason, tax auditing plays an important role to increase the capability of revenue generation. Thus, effective internal auditing is one that can evaluate the tax authorities' performance, identify the necessary tax input, assess the efficiency of the tax process, and improve the tax administration outcome for an effective tax audit system. It will be the effective tool for improving tax administration by analyzing and identifying the needs of the operational tax process and suggesting strategies for achieving tax performance (Gurama & Mansor, 2018).

Audit Data Analytics Capability

Customarily, organization decisions were made according to transactional data obtained from various related databases. However, with the development of data analytics at an exponential rate, enormous amounts of less structured data from business enterprise resource planning systems, custom relationship management programs, social media, sensors, and accounting information system that can be made available for data mining (Fanning & Grant, 2013). Yeo & Carter (2017) evaluate the applicability of big data analytics using the internal audit evidence criteria framework and provide a cost-benefit analysis for sufficiency, relevance, and reliability considerations. Critical challenges are numerous, including integration with traditional tax audit evidence, information privacy protection, and information transfer issues. Tax authorities also face an increasing velocity of data, particularly in the context of real-time information (Gepp, Linnenluecke, O'Neill & Smith, 2018) and they will find a financial statement audit useful to update their traditional substantive test, analytical tests, and tests of controls by applying problem-driven data analytic techniques on big data (Titera, 2013). Moreover, they have a large and growing volume of information available to big data, of increasing variety and veracity.

In the current data-driven digital economy, organizations strive to supervise big data power to create value and make better decisions. Big data are rapidly changing the ways in which organizations make decisions as, in the big data ear, different data analytics capability is needed to make quality decisions (Janssen, van der Voort & Wahyudi, 2017). Big data definitions focus on the high volume, velocity, and variety of information assets the demand new, innovative forms of processing for enhanced decision making and business insight (Schildt, 2017; Storey & Song, 2017). The most widely used description of big data analytics emphasizes its 5Vs characteristics i.e. volume, velocity, variety, veracity, and value. Volume refers to massive amounts of data; velocity refers to the speed at which data is generated; variety refers to the diverse types and sources of big data; veracity recognizes that big data can have biases and inaccuracies, and value recognizes that raw data has low value until analytics is applied to gain useful insights (Gandomi & Haider, 2015; Lukoianova & Rubin, 2014).

According to Phillips-Wren, Iyer, Kulkarni & Ariyachandra (2015), “Big data adds new dimensions to analytics. It offers enhanced opportunities for insight but also requires new human and technical resources due to its unique characteristics”. To develop the capabilities required to reap benefits from big data and data analytics, organizations need both tangible resources and intangible resources (e.g., managerial and technology, human resources, and data-driven culture) (Chen, Chiang & Storey, 2012; Gupta & George, 2016; Tame, 2014). Therefore, one notable observation is that some scholars agree with the inclusion of management capability, technology competence, and personnel expertise as key dimensions of data analytics capability.

Audit analytics as a science of “discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modeling, and visualization for the purpose of planning or performing the audit” (AICPA, 2015). Data analytics are being employed in the audit process to enhance assurance and improve audit quality. The usage of audit analytics not only helps quickly identify potential fraud but also increases operational efficiency by reducing costs. Audit analytics create unique opportunities for internal auditors to provide insights, assess potential risks, and identify operational inefficiency (Li et al., 2018).

In this research, audit data analytics capability refers to the competence of the organization to provide tax audit insights using audit data analytics to transform information management capability, technology competence, and personnel expertise into ensuring a goal of tax performance. In the literature, audit data analytics is defined as the application of advanced analytical techniques on big data, when used to obtain audit evidence in a financial statement audit, is the science and art of discovering and analyzing patterns, deviations and inconsistencies, and extracting other useful information in the data underlying or related to the subject matter of an audit through analysis, visualization for the purpose of planning and performing the audit (Sharma, Mithas & Kankanhalli, 2014).

Table 2 summarizes a select group of definitions granted to data analytics capability by several researchers in order to further analyze from the definition standpoint how audit data analytics capability could be.

Table 2 Summary of Definitions of Data analytics

Author(s)	Definitions of data analytics
Wixom et al. (2013)	The ability to transform raw data into usable information and pervasive use which is the ability to use business analytics across the enterprise.
Byrnes, Criste, Stewart & Vasarhelyi (2014)	The science and art of discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modelling, and visualization for the purpose of planning or performing the audit.
Kiron et al. (2014)	The use of data and related business insights developed through applied analytical disciplines (e.g., statistical, contextual, quantitative, predictive, cognitive and other models) to drive fact-based planning, decisions, execution, management, measurement and learning.
Kwon et al. (2014)	Technologies (e.g., database and data mining tools) and techniques (e.g., analytical methods) that an organization can employ to analyze large-scale, complex data for various applications intended to augment organizational performance.
Olszak (2014)	The ability of an organization to integrate, build, and reconfigure the information resources, as well as business processes, to address rapidly changing environments.
Ghasemaghaei, Hassanein & Turel (2015)	The tools and processes often applied to large and disperse datasets for obtaining meaningful insights, has received much attention in information system research given its capacity to improve organizational performance.
Kung, Kung, Jones-farmer & Wang (2015)	An organization's ability to acquire, store, process, analyze large amounts of data in various forms, and deliver information to users that allows organizations to extract value from data.

Table 2 Summary of Definitions of Data analytics (continued)

Author(s)	Definitions of data analytics
Lamba & Dubey (2015)	The application of multiple analytic methods that address the diversity of data to provide actionable descriptive, predictive, and prescriptive results.
Loebbecke & Picot (2015)	A means to analyze and interpret any kind of digital information for the development of sophisticated artificial intelligence, cognitive computing capabilities, and business intelligence.
Akter et al. (2016)	The distinctive capability of organizations in setting the detection of quality problems, deciding the lowest possible level of inventory or, identifying loyal and profitable customers in data environment.
Garmaki, Boughzala & Wamba (2016)	An organization's ability to mobilize and deploy data analytics resources effectively, utilize data analytics resources, and align data analytics planning with organization strategy to gain competitive advantage and enhance organizational performance.
Gupta & George (2016)	An organization's ability to assemble, integrate, and deploy its data-specific resources.
Müller, Junglas, Brocke & Debortoli (2016)	The statistical modeling of large, diverse, and dynamic datasets of user-generated content and digital traces.
Shuradze & Wagner (2016)	An organization's ability to mobilize and deploy data analytics-related resources in combination with resources and capabilities, which constitutes an innovative information technology capability that can improve organizational performance.
Mikalef et al. (2017)	An organization's proficiency in orchestrating and managing its data-related resources, it is important to differentiate between the organizations to utilize its data analytics capability towards insight generation of organizational-level capabilities.

Table 2 Summary of Definitions of Data analytics (continued)

Author(s)	Definitions of data analytics
Wamba et al. (2017)	The competence to provide business insights using data management, infrastructure (technology) and talent (personnel) capability to transform business into a competitive force.
Dubey et al. (2019)	An organizational facility with tools, techniques, and processes that enable the organization to process, visualize, and analyze data, thereby producing insights that enable data-driven operational planning, decision making and execution.
Wang, Kung & Byrd (2018)	The ability to acquire, store, process, and analyze large amount of health data in various forms and deliver meaningful information to users that allows them to discover business values and insights in a timely fashion.

Data analytics capability is broadly defined as the competence to provide organization insights using data management, infrastructure (technology), and talent (personnel) capability to transform the organization into a competitive force (Akter et al., 2016). The literature also focuses on strategy by analytics-led data analytics capability that create sustainable value for organization (Wixom et al., 2013). In addition, the literature in data analytic identifies three key building blocks of data analytics capability as follows: organizational (i.e., data analytics management), physical (i.e., information technology infrastructure), and human (e.g., analytics skill or knowledge). For example, McAfee & Brynjolfsson (2012) identify the critical challenges of data analytics capability as being talent management, information technology infrastructure, and decision-making capability across different functions. As data-driven strategies take hold, organization will become an increasingly important point of competitive differentiation.

Kiron et al. (2014), considering the key dimensions of data analytics capability, focus on creating an analytics climate where strategy and capability (e.g., management culture, technologies, and talent) are well-aligned in order to achieve

sustainable value advantages. In a similar, Barton & Court (2012) highlight three dimensions of the capability to improve performance with advanced analytics: data management ability to predict and optimize models; information technology infrastructure to manage multiple data sources; and the expertise of front-line employees in understanding the tools. Although data analytics capability dimensions differ in their terminology, the taxonomy schemes proposed by the literature are similar as they reflect management capability, infrastructure capability, and talent capability-related aspects. Therefore, key dimensions of audit data analytics capability in this research consist of management capability, technology competence, and personnel expertise.

According to the nature of information technology under a dynamic organizational environment as mentioned above, the dimension of audit data analytics capability in this research has been developed by applying modern information technology and help to add value to the organization. From literature review there are three dimensions associated with these issues, including 1) management capability adapted from Akter et al. (2016) and Kim et al. (2012), which focuses to provide information to planning, coordination, and control capability to manage information resources in accordance with organization needs, 2) technology competence adapted from Akter et al. (2016) and Kim et al. (2012), which focuses to provide information to connectivity and compatibility capability to support an organization's resources, and 3) personnel expertise adapted from Akter et al. (2016) and Kim et al. (2012), which focuses to provide information to technical skills, relational knowledge, and technological management knowledge of the analytics professionals to perform assigned tasks in the audit data environment. Table 3 summarizes the typologies of audit data analytics capability that have been explored in recent data analytics literature.

Table 3 Summary of Typologies of Data Analytics Capability

Author(s)	Typologies		
	Management Capability	**Technology Competence**	**Personnel Expertise**
Davenport et al. (2001)	Management (e.g., strategy, and organizational culture).	Technology and data.	Skills and experience.
Barton & Court (2012)	Management (organizations must be able to identify, combine, and manage multiple source of data).	Data and information technology platform (management must possess the muscle to transform the organization so that the data actually yield better decisions).	Talent (organizations need the capability to build advance analytics models for predicting and optimizing outcomes).
McAfee & Brynjolfsson (2012)	Organizational strategy (e.g., leadership will either embrace this fact or be replaced by others who do, data-driven decisions tend to be better decision making, and organizational culture).	Technology (e.g., information technology infrastructure).	Talent management (e.g., skills and knowledge of data scientists).

Table 3 Summary of Typologies of Data Analytics Capability (continued)

Author(s)	Typologies		
	Management Capability	**Technology Competence**	**Personnel Expertise**
Wixom et al. (2013)	Strategy (e.g., cost, service, price, and productivity).	Data (e.g., data model, standard and control).	People (e.g., capability to use basic reporting and ad-hoc query tools, performance management dashboard applications, customer facing web portal applications).
Kiron et al. (2014)	Analytics planning, coordination and sharing, investment, control on analytics.	Organizational openness, compatibility analytics technology, collaborative use of data (connectivity).	Analytical talent, technical and organizational knowledge, organizatio as a whole effecitve in disseminating insights.
Wamba et al. (2015)	Management (e.g., planning, investment, and control) and data policies (e.g., privacy, security, intellectual property, and liability).	Technology and techniques (e.g., connectivity, compatibility, and modularity).	Organizational change and talent (e.g., management, technical, business relational).

Table 3 Summary of Typologies of Data Analytics Capability (continued)

Author(s)	Typologies		
	Management Capability	**Technology Competence**	**Personnel Expertise**
Akter et al. (2016)	Management capability (planning, investment, coordination, and control).	Infrastructure capability (connectivity, compatibility, and modularity).	Talent capability (technical knowledge, technology management knowledge, business knowledge, and relational knowledge).
Wamba et al. (2017)	Management capabilities (planning, investment, coordination, and control).	Infrastructure flexibility (connectivity, compatibility, and modularity).	Personnel Expertise (technical knowledge, technology management capability, business knowledge, and relational knowledge).
Yeo & Carter (2017)	Big data management skills (e.g., privacy and security).	Big data infrastructure skills (e.g., 4Vs-volume, velocity, variety, and veracity abilities).	Data analytic experience and training..

Data analytics could be a game-changer in internal auditing (Earley, 2015; Moffitt & Vasarhelyi, 2013). The research conducted by Brown-Liburd et al. (2015) and Holton (2009) indicated that tax authorities have been using data analytics for tracking, investigating, and analyzing unstructured data. Additionally, Smith (2015) makes a case for accounting and auditors to 'own' audit data, not just because it provides better information, but because doing so will help move the profession up the value chain to become a true business partner, rather than a transactional service provider. While some researchers have established the linkage between data analytics capability and competitive advantage (Akter et al., 2016; Frisk & Bannister, 2017). Insights derived via data analytics can provide opportunities for operational improvements (Choi, Wallace & Wang, 2018; Lamba & Singh, 2017; Papadopoulos, Gunasekaran, Dubey & Wamba, 2017).

However, organizations must also convert these valuable insights into actions. One specific form of distrust in the value and accuracy of data analytics can be detected at the top management level. While managers may be positive about investing in data analytics capabilities, when it comes to decision making, they may feel that their intuition is more accurate than the analysis performed on datasets (Hodgkinson & Healey, 2011). Therefore, this research can extend the previous attempt to test the influences of audit data analytics capability on tax performance. Below is the summary of the review of the key literature on audit data analytics capability as present in Table 4.

Table 4 Summary of Key Literature Reviews on Audit Data Analytics Capability

Author(s)	Type of Research	Key Issue Examine	Main Finding
Akter et al. (2016)	Quantitative research	This study investigated and determine the impact of big data/data analytics and the current big data state of mind about corporate reporting, what accountant participants' perceptions are of the phenomenon, opportunities and risks are associated with big data and corporate reporting.	The finding shows that big data analytics capability as a hierarchical model, which consists of three primary dimensions (i.e., management, technology, and talent capability) and 11 subdimensions (i.e., planning, investment, coordination, control, connectivity, compatibility, modularity, technology management knowledge, technical knowledge, business knowledge, and relational knowledge). The findings confirm the value of the entanglement conceptualization of the higher-order big data analytics capability model and its impact on firm performance. The results also illuminate the significant moderating impact of analytics capability-business strategy alignment on the data analytics capability-firm performance relationship.

Table 4 Summary of Key Literature Reviews on Audit Data Analytics Capability (continued)

Author(s)	Type of Research	Key Issue Examine	Main Finding
Al-Htaybat & von Alberti-Alhtaybat (2017)	Qualitative research	This study investigated and determine the impact of big data/data analytics and the current big data state of mind about corporate reporting, what accountant participants' perceptions are of the phenomenon, opportunities and risks are associated with big data and corporate reporting.	Results of this study showed that three categories, emerged from the data analytics, which have enough explanatory power to illustrate the phenomenon of big data and corporate reporting, namely the big data state of mind and corporate reporting, accountants' role and perceived opportunities and risks of big data/data analytics.

Table 4 Summary of Key Literature Reviews on Audit Data Analytics Capability (continued)

Author(s)	Type of Research	Key Issue Examine	Main Finding
Gunasekaran et al. (2017)	Quantitative research	This study draws on resource-based view, It conceptualized assimilation as a three-stage process (acceptance, routinization, and assimilation) and identifies the influence of resources: connectivity and compatibility (information sharing) under the mediation effect of top management commitment on big data capability, supply chain performance, and organizational performance.	The findings suggest that the role of information technology: connectivity and compatibility under the mediation effect of top management commitment are positively related to big data and predictive analytics capability, which is positively related to big data and predictive analytics capability assimilation under the mediation effect of big data and predictive analytics routinization, and positively related to supply chain performance and organizational performance.

Table 4 Summary of Key Literature Reviews on Audit Data Analytics Capability (continued)

Author(s)	Type of Research	Key Issue Examine	Main Finding
Wamba et al. (2017)	Quantitative research	The study extends the resource-based view on big data analytics, information system success and the business value of information technology, streams by examining the direct effects of big data analytics capability on firm performance.	The findings confirm the value of the entanglement conceptualization of the hierarchical big data analytics capability model, which has both direct and indirect impacts on firm performance. The results also confirm the strong mediating role of process-oriented dynamic capabilities in improving insights and enhancing firm performance.
Yeo & Carter (2017)	Qualitative research	This study reviews and explore how and why big data and analytics can help to hone Malaysian auditors/accountants' competencies (perceived) in performing their job.	Results of this study showed that four main areas of big data and analytics skills revealed that Malaysian accountants/auditors were perceived to be competent in information technology skills (e.g., SAP and ERPs), big data infrastructure skills (e.g., 4Vs-volume, velocity, variety, and veracity abilities), big data management skills (e.g., use of data analytics), and data analytics experience and training.

Table 4 Summary of Key Literature Reviews on Audit Data Analytics Capability (continued)

Author(s)	Type of Research	Key Issue Examine	Main Finding
Ghasemaghaei, Ebrahimi & Hassanein (2018)	Quantitative research	This study develops and validates the concept of data analytics competency as a five multidimensional formative index (i.e., data quality, bigness of data, analytical skills, domain knowledge, and tools sophistication) and empirically examines its impact on firm decision-making performance (i.e., decision quality and decision efficiency).	The findings suggested that all dimensions of data analytics competency significantly improve decision quality. Furthermore, interestingly, all dimensions, except the bigness of data, significantly increase decision efficiency.

Table 4 Summary of Key Literature Reviews on Audit Data Analytics Capability (continued)

Author(s)	Type of Research	Key Issue Examine	Main Finding
Li et al. (2018)	Quantitative research	The study uses the technology-organization-environment framework to identify and examine factors at the organizational level that influence post-adoption usage of audit analytics, as well as whether using audit analytics improves the performance of the audit process.	The results indicate that application-level usage is influenced by management support, technological competence, and standards, while professional help, technological competence, and application-level usage drive feature-level usage.

Tax Performance

The organization either public or private sector practices different types of performance management. Each organization measures its performance in terms of achieving goals more effectively and efficiently (Zakaria et al., 2011). Nevertheless, the performance evaluation in the private sector has been used by many organizations. It began by using measurements generated from the accounting information system called “profit-based”. A favorite accounting technique is the budget and a key measure are the profitability, financial ratios, and non-financial measures (Brown & McDonnell, 1995). However, performance measures with their lack of neutrality and balance achievements (Kaplan & Norton, 1992). Thus, the modern performance evaluation approach has been developed to encourage a more balanced view includes financial perspective, customer perspective, internal business perspective, and innovation and learning perspective (Kaplan & Norton, 1992). The new approach is being developed to measure the performance of the organization with a balanced scorecard (BSC), management by objectives (MBO), quality control circle(QCC), total quality management (TQM), continuous improvement, benchmarking, and key performance indicator (KPIs) (Zakaria et al., 2011).

In Thailand public sector, the tax departments are classified as a non-profit organization because its focus on the objective of improving people’s lives in a wider sense whereas indicators of private sector performance concentrated on revenue, profitability, market price or share price (Nurcahyo, Wibowo & Putra, 2015). The core issue is the use of performance indicators to improve tax performance. It is one of their performance measurement tools (James et al., 2007). In principle, key performance indicators are measured by outputs or outcomes which mirror the progress towards goals and objectives. It is becoming the best measurement practiced by public sectors because of its effort to improve the public service delivery system (Al-Khouri, 2014). In addition, the key performance indicators can indicate the performance measures of key result area. It is essential for top management to satisfy the needs of all stakeholders (Parida & Kumar, 2006). The use of the key performance indicators has been successful in measuring the tax departments and contributed to several improvements in its tax administration and services (Nurcahyo et al., 2015).

. In the literature, there exists a wide range of definitions of tax performance. Some definitions are based on efficiency, service quality, and effectiveness. For instance, Otley (1999) focuses on the performance management framework for analyzing the operation of management control systems structured around five central issues including objectives, strategies and plans for their attainment, targets, incentive and reward structures, and information feedback loops. Liyanage & Kumar (2003) define the performance measure as a measure equipped with targets to facilitate predict processes and justify associated decisions in the organization to create value in the organizational goals. It can be defined as the process of quantifying the efficiency and effectiveness of action (Neely, Gregory & Platts, 2005).

In similar, James et al. (2007) define performance measurement systems as auditing, improving, and measuring the performance of the organization and establishing how well it is developing towards achieving its goals. It dynamic relevance of the performance measurement and its outcomes (i.e., key performance indicators). Parida, Kumar, Galar & Stenstrom (2015) define the performance as the ability of an organization to implement a suitable strategy. Therefore, with respect to the literature reviews, this research defines tax performance refers to the ability of organization to collect tax revenues to achieve the goals set or more effectively than the previous fiscal year, prides itself on receiving awards for performance according to standards or criteria for the development of public sector management quality award, innovations for tax administration to convenient and efficient, as well as the transparent and fair administration for sustainable organization development.

In the empirical literature, the most common indicators of tax performance which includes input, productivity, quality, output, taxpayer satisfaction, and the outcomes from revenue and compliance. For example, the OECD (2001) evaluated tax performance by focusing on service quality, efficiency, and effectiveness. To set the standard of effective tax performance, organizations should assess tax administration in the whole system. De Bruijn (2002) found that performance evaluation might also positively affects transparency, output, way of shaping accountability. On the other hand, it might also negative effects block innovation and ambitions, professionalism.

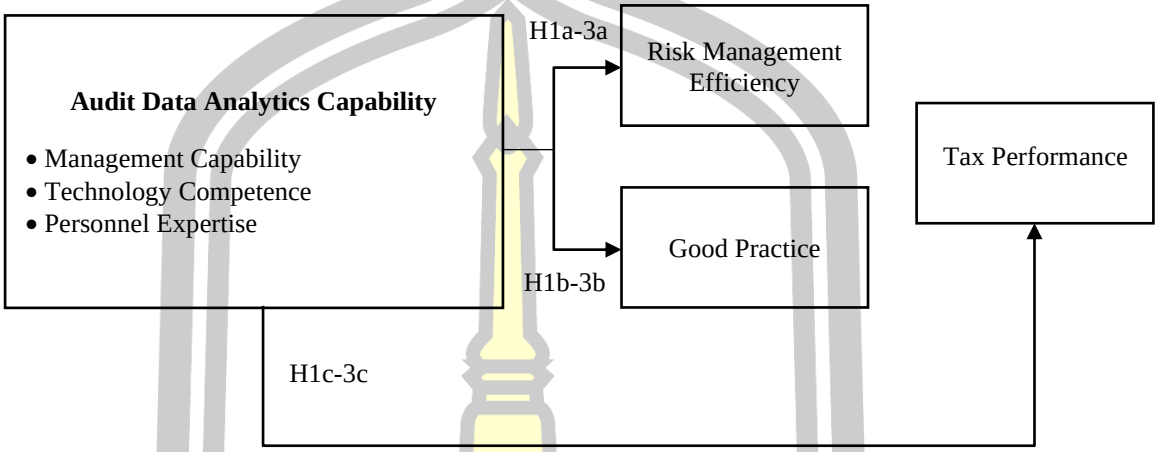
According to the dynamic capability theory, data analytics capability is one of the key organizational capabilities identified as the building blocks of sustainable value in the audit analytics environment, the characteristics of value, rarity, imperfect inimitability, and organization may become a source of superior performance (Davenport, 2006). With pressure mounting on government budgets, many tax authorities around the world are now focused on measures intended to improve their tax revenues by identifying and eliminating gaps between the total tax liability and the reality of collections (KPMG, 2016). James et al. (2007) suggested that performance indicators of tax departments are divided into four dimensions including efficiency, quality of services, effectiveness, and organizational development. Therefore, with respect to the literature reviews, this research evaluates tax performance through the balanced scorecard framework such as financial perspective, customer perspective, internal business perspective, as well as innovation and learning perspective. Moreover, this research uses the key performance indicators includes efficiency, quality of services, effectiveness, and organizational development dimensions for successful in measuring the tax performance.

The following section shows the investigation of the relationships among audit data analytics capability which includes three dimensions and its consequences, and antecedent variables. A more detailed is provided below.

The Relationships among Audit Data Analytics Capability and Its Consequences

This section presents the investigation of the relationships among audit data analytics capability, consisting of three dimensions: management capability, technology competence, and personnel expertise; and three critical consequences which are risk management efficiency, good practice, and tax performance. Regarding the dynamic capability theory, this research purposes of each audit data analytics capability dimensions: management capability, technology capability, and personnel expertise as the significant effects of risk management efficiency, good practice, and tax performance. These relationships are presented below:

Figure 2 The Relationships among Audit Data Analytics Capability, Risk Management Efficiency, Good Practice, and Tax Performance



Management Capability

The first dimension of audit data analytics capability is management capability. Based on Janssen et al. (2017), specifically discussed the factors affecting data decision-making quality. The management capability of data analytics capability requires the organization to build up its data management and analytics capability. The data processing literature also shows that the organizational capability to process data analytics can affect organizational performance and that data analytics capability is likely to influence the organizational capability of risk management efficiency and the potential of advancing the best practice (Chen & Hsieh, 2014). Audit data analytics are of great importance in ensuring that solid organization decisions are made applying proper management framework. The definitions of adaptation from previous research are varied. For example, Akter et al. (2016) found that management capability was identified as a significant dimension indicating that achieving sustainable advantage with analytics relies heavily on decision-makers by improving the quality of planning investment, coordination, and control.

In addition, the need to improve the use of data to grow and protect tax revenues has been highlighted by coordinated activities to improve tax authorities' own understanding and capabilities in data management and analytics (KPMG, 2016).

Therefore, management capability in this research refers to the ability of audit data analytics to planning, coordination, and control to manage information resources in accordance with organization needs. Due to management capability consisting of data analytics planning, coordination, and control, the influence of useful information helps organizations achieve their operational goals. Thus, the tax authorities adopt a management capability based on the capability of audit analytics in order to reach the objectives of tax performance.

Management capability starts with the proper *planning* that identifies the utilization of data analytics in a tax audit plan and determines how the data analytics-based models can improve performance (Barton & Court, 2012). Similarly, *coordination* refers to sending information via social networks to speed up communication and discuss important issues in order to be guidelines for the cross-functional synchronization in the organization (Kiron et al., 2014). Finally, *controlling* functions are performed by ensuring proper commitment and utilization of information systems (Akter et al., 2016). Therefore, management capability became the first component of audit data analytics capability which focuses on enhancing the organizational decisions via linking data analytic with organizational strategies to create sustainable value.

While the published research on data analytics capability is limited, some studies have focused on the resources necessary to develop such capability. Although resources are of very limited value without the underlying ability to orchestrate and leverage them, they are fundamental building blocks in the formation of the organization's overall data analytics capability. It is therefore important to recognize the core resources and examine the most important debate concerning each of these as described by empirical research (Mikalef et al., 2017). By doing so, it is possible to provide a synthesis of findings that can guide practical support in data deployments and identify underexplored areas of research that warrant further examination (Gupta & George, 2016). Organizations need to redefine their understanding of judgment compared to the existing practices. There appears to be a paradigm shift in terms of converting unstructured large data into useful and meaningful data for decision-making (Yeo & Carter, 2017). Organizational change and technology mirror a vision of

the organization and the intentions of decision-makers, developed in best practices (Leclercq-Vandelannoitte, 2011).

Data analytics are also being employed in the internal audit process. The usage of audit analytics not only increases operational efficiency by reducing costs but thereby helps quickly identify potential fraud (Ernst & Young, 2014). Audit data analytics capability plays an important role to respond to the sweeping advance of analytics in organizational practices. Since organizations are implementing data analytics to obtain more valuable insights into their processes. Tax authorities are moving along with this and are using audit data analytics to deliver deeper and faster services. Thus, data analytic is critical to the success of the organization. The agility in data analytics provides superior value as well as overcoming disruption risks and ensuring organization practices (Gligor, Holcomb & Feizabadi, 2016).

According to the dynamic capability theory, the dynamic capability approach focuses on how organizations renew and develop their capabilities to respond to environmental changes. It suggests that the organizational processes and organizational managerial influence the development of its dynamic capability (Teece et al., 1997). Dynamic capability evolves a micro-evolution through upgrading the management capability of the organization. It must be well-targeted and deployed in order to achieve strategic goals. The management capability is also critical for the development of dynamic capability suited to cope with changing environments (Helfat & Peteraf, 2014). Consequently, management capability is critical in gaining organizational performance-related benefits (Zahra et al., 2006). The organizational performance is based on making a number of correct organizational decisions by using the dynamic capability theory. The existing literature suggests that the organization's management capability affects its results of practice and effectiveness of risk management, which ultimately determines its performance (Mithas, Ramasubbu & Sambamurthy, 2011).

The dynamic capability view emphasizes the development of management capability and of difficult-to-imitate combinations of managerial practices to create new capability and renew competency according to changes in the environment (Shamim et al., 2019). Data analytics are expected to become a core capability of tax

authorities (Deloitte, 2016). Since it offers infinite opportunities for the creation of new models to provide deeper insight into taxpayer behavior, optimizing supply chains, and managing risk (Yeo & Carter, 2017). Jans, Alles & Vasarhelyi (2014) demonstrated how tax authorities could use process mining of event logs as a new type of analytical procedure to detect deficient controls.

Accordingly, management capability influences on providing service, risk management, operation, and tax performance. Therefore, management capability is the extended arm of audit data analytics capability and is a particularly important source of useful information for obtaining risk management and best practice, which helps organizations achieve their operational goals and grow continuously. Thus, the hypotheses are proposed as follows:

Hypothesis 1a: The higher the management capability is, the more likely that organizations will gain greater risk management efficiency.

Hypothesis 1b: The higher the management capability is, the more likely that organizations will gain greater good practice.

Hypothesis 1c: The higher the management capability is, the more likely that organizations will gain greater tax performance.

Technology Competence

Technology competence in this research can be defined as the ability of information technology infrastructure to connectivity and compatibility the flexibility of the audit data analytics platform in relation to enabling tax authorities to quickly develop and support an organization's resources. In the literature, technology competence is the flexibility of the data analytics platform in relation to enabling data scientists to quickly develop, deploy, and support the organization's resources. It is important to tackle volatile organization conditions and align resources with organization strategies. With a flexible technology competence, organizations can source and connect various data points from a remote, branch, and mobile offices;

create compatible data-sharing channels across various functions; and develop applications to address changing needs (Akter et al., 2016).

The flexibility of the organization's data analytics depends on two components: connectivity and compatibility. Firstly, *connectivity* refers to linking information technology infrastructure from various units in sourcing and analyzing a variety of data from different functions to connect the information more real-time (Barton & Court, 2012). The second component, *compatibility*, enables continuous flows of information system for easily used, substantial corporate governance, and sharing information across the organization. It also helps clean-up operations to synchronize and merge overlapping data and to fix missing information (Akter et al., 2016).

Since information technology is acknowledged as a critical component of data analytics capability, drawing on the information system literature, As organization largely depend on information technology based on information systems, it is possible for them to have access and be able to manage information to conduct appropriate risk management over the financial reporting that includes controls on the accounting and management processes, as well as on the information technology infrastructures (Stoel & Muhanna, 2011). Piccoli & Ives (2005) found that competence in mobilizing and deploying various data analytics capability resources differentiates performance and creates a sustainable value advantage. Sambamurthy, Bharadwaj & Grover (2003) found that organizations are increasingly investing in information technology capabilities. Organization leaders can address short-term data needs by working with managers to prioritize requirements. This means quickly connecting the most important data analytics for use in practices, followed by a cleanup operation to synchronize and merge overlapping data. Such short-term tactics may lead organizations to vendors that focus on analytics services (Barton & Court, 2012).

Technological innovations have led to a significant increase in the volume and complexity of tax audit transactions, making it more challenging for auditors to analyze transactions. While most individuals will concur that the ability to collect, manage, and analyze data more effectively has the potential to lead to better judgment and decision making, data analytics has the potential to dramatically change the way

tax authorities make decisions (Moffitt & Vasarhelyi, 2013; Vasarhelyi & Halper, 1991). Data analytics were used to extract information from larger volumes of data which could help tax authorities identify high-risk areas such as fraudulent transactions on which they could focus their investigative efforts (Brown-Liburd et al., 2015).

In the context of developing data analytics, perhaps the core resource is the data itself. It is frequently mentioned that information technology strategists and data analysts are particularly concerned with the quality of the data they analyze (Brinkhues, Maçada & Casalinho, 2014). Although traditionally organizations analyzed enterprise-specific structured data, the diversity of data sources that contemporary organizations leverage render the aspect of quality highly important. In a heavily data-oriented economy, data resources that present the previously mentioned characteristics have been argued to be necessary for the organization to build sustain advantage (Kiron et al., 2014). Wamba et al. (2015) stress the importance of having availability and integrating data from various sources, which traditionally may be siloed due to existing information technology architectures.

The literature of information systems, information technology competence and organizational performance has proven that organizations with superior information technology competence generally achieve superior organizational performance (Zhang, Edgar, Geare & O'Kane, 2016). Bierstaker, Janvrin & Lowe (2014) examined factors that influence the use of computer-assisted auditing tools and techniques by auditors. Their study showed that outcome expectations, organizational pressure, and technical infrastructure or technology support influence auditions' willingness to use computer-assisted auditing tools and techniques. Mahzan & Lymer (2008) studied computer-assisted auditing tools and techniques acceptance by UK internal auditors. They developed a theoretical model of successful computer-assisted auditing tools and techniques adoption and claimed that influencing motivation, best practices of implementation, performance measurement criteria, and technical complexity are the main factors in a successful computer-assisted auditing tools and techniques implementation. While data itself is a core resource, it is also important for organizations to possess an infrastructure capable of storing, sharing, and analyzing data.

Data calls for novel technologies that can handle large amounts of diverse and fast-moving data (Gupta & George, 2016). Gunasekaran et al. (2017) suggest that connectivity and information sharing (compatibility) under technology competence, which is a positively related to big data and data analytics capability and organizational performance. Oh, Yang & Kim (2014) confirmed that the information technology has positive significant influence on organizational performance with the involvement of the e-procurement system type. Wang et al. (2012) suggest that the combination of information technology assets and information technology capabilities positively affect organizational performance. Akter et al. (2016) found that technology capability was identified as a key predictor of data analytics capability, emphasizing the need for versatility of the analytics platform so that it connects data from various functions across the organization, ensures information flow, and enhance the performance of the data analytics platform in terms of connectivity, compatibility, and modularity.

In addition, scalability and connectivity are cited as important, since the data accumulated, and processes used fluctuate continuously. Nevertheless, it is noted by many executives that infrastructure is not a major issue for most organizations since the technology itself has extended beyond the requirements of analytics (Mikalef et al., 2017). Tax authorities need transparent methods for using audit analytics in daily work. Additionally, terabytes of data are required to risk management and operations. The key is to separate the statistics experts and software developers from the managers who use the data-driven insights (Barton & Court, 2012). Therefore, technology competence becomes the second component of audit data analytics capability in order to maximize the value of the organization.

In the context of developing the dynamic capability theory, the role played by technology competence is well acknowledged in the existing literature. Technology competence is fundamental in facilitating the use of data analytics (Lawson et al., 2014). It has a strong influence on good practice and can also help to integrate tasks (Shamim et al., 2019). Jin & von Zedtwitz (2008); Zhou & Wu (2010), who have highlighted the importance of technology competence in driving organizational performance. Fosso Wamba et al. (2017); Teece (2007) confirms that

reconfiguration of capability, which refers to dynamic capability theory, is required to maintain evolutionary to maintain efficiency and effectiveness. Similarly, Dutch tax departments used the big data and data analytics capability, including technology competence, to improve the tax administration by detecting the pattern leading to tax evasion. Through data analytics-based decision making, tax authorities managed to enhance risk management efficiency and the effectiveness of good practice (Janssen et al., 2017).

Accordingly, technology competence influences on providing assurance, risk management, fraud detection, and tax performance. Base on the literature reviewed above, organizations with great technology competence tend to accomplish risk management efficiency, good practice, and tax performance. Therefore, the hypotheses are proposed as follows:

Hypothesis 2a: The higher the technology competence is, the more likely that organizations will gain greater risk management efficiency.

Hypothesis 2b: The higher the technology competence is, the more likely that organizations will gain greater good practice.

Hypothesis 2c: The higher the technology competence is, the more likely that organizations will gain greater tax performance.

Personnel Expertise

Personnel expertise in this research refers to the ability of analytics professionals to perform assigned tasks in the tax audit environment through technical skill, relational knowledge, and technological management knowledge. Personnel expertise or talent management, which is emerging as a key organizational challenge, is considered important in a wide spectrum of organizations (Collings, Mellahi & Cascio, 2019). In the literature, personnel expertise as the ability of an analytics professional (e.g., someone with analytics skills or knowledge) to perform assigned tasks in the data analytics environment. This ‘know-how’ is referred to as capabilities

and can create or sustain advantage (Constantiou & Kallinikos, 2015). Developing, recruiting, and retaining highly skilled tax authorities with analytics capability is in fact a key human resource challenge for organizations that seek to transform tax transaction data into knowledge and results (Davenport et al., 2001).

Based on the literature, this research proposes that analysts should be competent in three distinct: technical skills, relational knowledge, and technological management knowledge. Firstly, *technical skills* refer to the abilities of staff needed to perform specific tax audit tasks. The emerging evidence suggests that most data analytics capability requires a unique combination of technical, managerial, and analytical skills. However, audit analytics requires special auditor knowledge and skills, which leads to new challenges (e.g., good practice and risk management efficiency) (Li et al., 2018). Secondly, *relational knowledge* refers to the understanding 'staff on various tax audit functions and knowledge management on tax auditing issues (Akter et al., 2016). Finally, *technological management knowledge* refers to the data resource management knowledge of staff that is necessary to learn, understand, and attend training on modern technology for support organizational goals (Akter et al., 2016).

Information systems literature documents that information technology values come from the organizations' skills to leverage technology, rather than the technology itself (Zhu & Kraemer, 2005). Similarly, when examining information technology used in the auditing domain, Janvrin, Bierstaker & Lowe (2008) also indicated that the tool itself does not improve audit efficiency or effectiveness, but users do. George & Diavastis (2016) found that education, experience, and training, to have significant relationships with tax audit effectiveness. Gupta & George (2016) found that managerial and technical data skills under human skills have positive significant relationships between big data analytics capability and organizational performance.

Data analytics training programs existed and were essential to equip tax authorities with the necessary skills to handle enormous volumes and the variety of data for financial nuances and audits. Skills involved in using data analytics include analytical skills, mathematics and statistics, creativity, organizational skills, organizational learning, computer science, and computer abilities (Yeo & Carter, 2017).

Dubey & Gunasekaran (2015) found that information technology skills, supported by communication and analytical skills are very important. Because operations research and background in statistics are important for success in the data analytics profession.

Additionally, Bonface, Malenya & Musiega (2015) found the statistically significant positive relationship between managerial expertise and organizational performance. Rao (2014) found that hard skills (domain knowledge or technical skills) were equally important, while soft skills represent individuals' attitudes and communication skills, leadership ability and passion for excellence for successful performance. In the context of a financial statement, tax authorities will find it useful to update their tests of controls, traditional substantive tests, and analytical tests by applying problem-driven data analytic techniques on audit data (Titera, 2013).

The capacity to utilize information technology and tools such as those mentioned above, and to make strategic decisions based on outcomes, is highly dependent on the skills, knowledge, and learning of the human resources. The necessary skills for such employees include a good understanding of what each department is doing, as well as the ability to communicate with each and build fused teams (Mikalef et al., 2017). Capabilities are described as high-level routines, with routines consisting of learned behaviors that are highly patterned, repetitious or quasi-repetitious, and founded in part in tacit knowledge (Winter, 2003). Akter et al. (2016) point out that data analytics capability was found to have a positive association with all the primary dimensions with talent capability emerging as the strongest. Talent capability could be upgraded by recruitment and training to achieve better skills and knowledge of the consequents of overall data analytics capability.

In the context of developing dynamic capability, the role played by personnel expertise is well acknowledged in the existing literature. Gutierrez-Gutierrez & Barrales-Molina (2018) suggest that effective personnel expertise enhance the dynamic capability of the organization. McAfee & Brynjolfsson (2012) suggested that the use of data analytics can be enhanced by appropriate personnel expertise. This theory is a learned pattern of collective activity through which the organization systematically modifies and generates its operating routines in pursuit of improved effectiveness (Zollo & Winter, 2002). The dynamic capability view requires resources

and personnel attention (Bingham, Eisenhardt & Furr, 2007). The big data and data analytics capability of the organization, including personnel expertise, can affect the organizational performance for a greater value (Wade & Hulland, 2004).

Accordingly, personnel expertise influences on providing assurance, risk management, fraud detection, and tax performance. Based on the literature reviewed above, personnel expertise has the potential possibility to affect risk management efficiency and good practice on tax performance. Therefore, the hypotheses are proposed as follows:

Hypothesis 3a: The higher the personnel expertise is, the more likely that organizations will gain greater risk management efficiency.

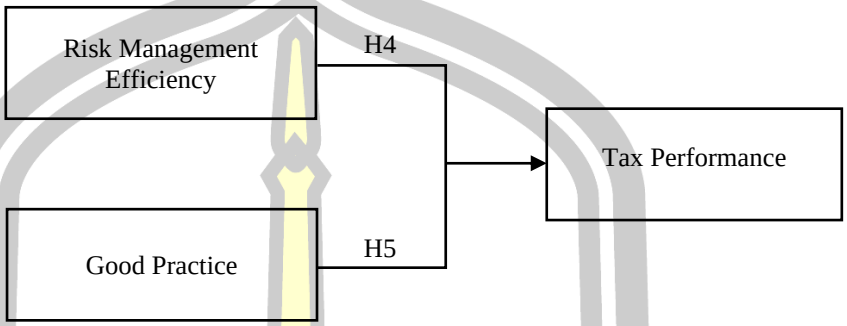
Hypothesis 3b: The higher the personnel expertise is, the more likely that organizations will gain greater good practice.

Hypothesis 3c: The higher the personnel expertise is, the more likely that organizations will gain greater tax performance.

The Relationships among Risk Management Efficiency, Good Practice, and Tax Performance

This section examines the relationships among the consequences of audit data analytics capability consisting of risk management efficiency, good practice, and tax performance. The literature review on the definition of each construct and purposed hypotheses are discussed below.

Figure 3 The Relationships among Risk Management Efficiency, Good Practice, and Tax Performance



Risk Management Efficiency

The most publication regarding internal control systems is the concept of risk management name its enterprise risk management (ERM) (COSO, 2014). Enterprise risk management has become a best practice standard for organizations to manage risks (Hayne & Free, 2014). The Committee of Sponsoring Organizations of the Treadway Commission (COSO) defined enterprise risk management as a process effected by an organization's board of directors, management, and other personnel, applied in strategy setting and across the organization, designed to identify potential events that may affect the organization, and manage risks to be within its risk appetite, to provide reasonable assurance regarding the achievement of organization objectives (COSO, 2004).

Risk management includes a comprehensive determining, identification, assessment, management, and detecting of organizational risks as a means to achieve the organizational objective (Khongmalai & Distanont, 2017). It is an integral part of the organizational culture, operations, and language (Pagach & Warr, 2011). Therefore, risk management efficiency in this research refers to the ability of the organization to determining, identification, and assessment of risks for the achievement of auditing objectives across the organization, and criteria for auditing taxpayers by grouping taxpayers at the risk-based audit levels. It will make the tax administration more effective.

Based on the literature, risk management is important for the organization to anticipate any damage and loss both in terms of financial and operational (Astuti, Muqtadiroh, Darmaningrat & Putri, 2017). Risk management efficiency has been shown to have significant effects, not only on corporate governance compliance but also on protecting and developing positive organizational value (Drogalas, Eleftheriadis, Pazarskis & Anagnostopoulou, 2017; Kendrick, 2004). Regarding the implementation of risk management efficiency in the organization, extensive academic research has been conducted. For example, Hoyt & Liebenberg (2011) conducted a research regarding the extent of implementation of risk management by insurance companies in the United States. The result findings were quite positive regarding the relationship between organizational value and integration of risk management procedures in mainstream organizational management.

In addition, Wonglimpiyarat (2017) discusses the implementation of risk management and auditing to technology incubators/science parks. The suggested audit plan focusses on the risk assessment using the COSO framework. The findings indicate that the suggested audit plan and performance analysis as a result of the COSO framework can be used as a risk management tool to improve the effective operation of the incubator/ science programs. Shin & Park (2017) find that a close relationship between enterprise risk management and management control systems is important to the increase of organizational performance. In regard with risk management, it can be claimed that it is the identification and analysis of relevant risks associated with achieving the organizational objectives, In this context, risk management must determine how much risk is to be prudently accepted, and strive to maintain risk within these levels (Karagiorgos, Drogalas & Giovanis, 2011).

In the context of developing contingency theory, the role played by risk management efficiency is well acknowledged in the existing literature. The finding confirms the contingency theory via the contingency effect of tax performance on the risk management efficiency. Equally, the finding is consistent with Badara & Saidin (2012) which found that risk management efficiency can influence the effectiveness of internal audit at local level. It enables the achievement of organizational objective and improve internal audit effectiveness (Gordon et al., 2009).

In fact, risk management efficiency is one of the essential aspects of good corporate governance that is why in recent years, enterprise risk management has received a wider global concerned (Beasley, Clune & Hermanson, 2006). This is line with the finding of Beasley et al. (2006) that enterprise risk management has positive impact on internal audit's activities in an organization, especially when the organization's enterprise risk management process is more effectively in place. Based on the literature above, risk management efficiency is a potential possibility that affects tax performance. Therefore, the hypotheses are proposed as follows:

Hypothesis 4: The higher the risk management efficiency is, the more likely that organizations will gain greater tax performance.

Good Practice

Good practice or those generally understood as operational characteristics of organizations, humans, and procedures that have proved to be successful in practices. It refers to the methodology, techniques, methods, procedures, and processes combined into practice and improving the organizational results (O'Dell & Grayson, 1998). Francis (2011) defines a good practice as a method and technique leading to tax audit achievement that is in accordance with tax audit professional standards through knowledge, ability, transparency, expertise, and independence to collect enough evidence to achieve audit objectives. Thus, good practice in this research refers to the ability of the organization to integrate methods and various techniques that appropriate, cover and accordance with tax policy, align analytics with organizational strategy, and relate to tax audit procedure accurately and transparently.

Based on the literature, some researchers identify various drivers that pressure organization to adopt good practice such as ethical motivations, governmental regulation, and organizational performance (Montabon, Sroufe & Narasimhan, 2007; Zhu & Sarkis, 2004, 2007). The determining of the process of good practices through knowledge, ability, transparency, expertise, and independence collects enough evidence to clearly show audit opinion under the reporting a higher quality audit and achieving audit objectives in giving confidence to the financial

statements which are accurate and reliable in good practice. Udeh & Clement (2016) confirmed that compliance with internal audit practice could enhance effective organizational performance and increase accountability among the public sector organization.

The successful good practice of tax auditing includes project management techniques to ensure that audit plans are achieved and alternate management techniques to facilitate change. Moreover, top executives also expect tax authorities to support their accountability responsibilities by providing some oversight of operations and to spread the knowledge of managerial good practices throughout the organization (Juillet, 2016). Meanwhile, good practices have become a tax audit management tool for tax authorities who can lead to a decision or choice among alternative good actions (Solomon & Trotman, 2003). This includes tax authorities who have implemented judgment accuracy and performance. However, the good practice is necessary to evaluate the efficiency of audit methodology which can improve tax audit process development (Carnaghan, 2006; Hui & Fatt, 2007). Hence, tax authorities carefully analyze the organization's task environment, considering the characteristics of the organization and adapt good practices accordingly (Ong et al., 2019).

According to the contingency theory, this theory is no "one size fits all" solution to the challenges facing organizations in adopting good practices. This theory suggesting that globalization will affect the organization's resource-allocation strategies (Shahzadi, Khan, Toor & Haq, 2018). Organizations are more likely to invest in good practices that could produce positive superior organizational performance (Betts, Wiengarten & Tadisina, 2015). Contingency perspective assumes that good practice is impacted by the framework in which they are applied to an idea of how the framework affects contingent outcomes and operations in organizational performance (Dropulić, 2013). Based on the literature above, the good practice has the potential possibility to affect tax performance. Hence, the hypothesis is proposed as follows:

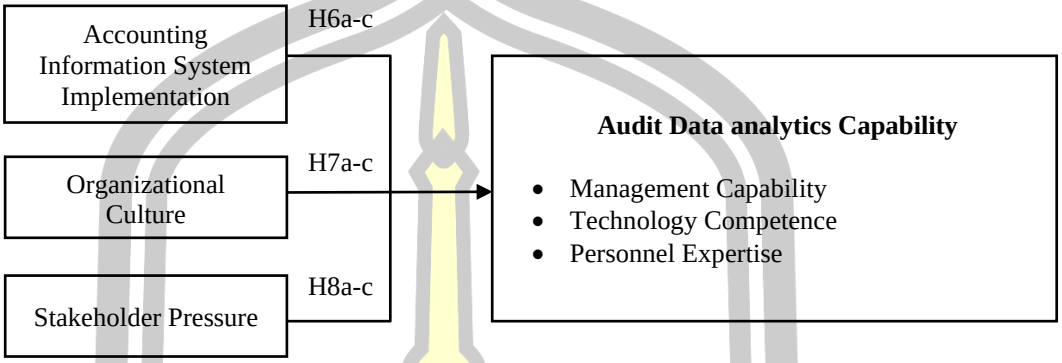
Hypothesis 5: The higher the good practice is, the more likely that organizations will gain greater tax performance.

The Relationships among the Antecedents and Audit Data Analytics Capability

Since this research needs to identify factors that affect the audit data analytics capability, this research uses the Technology-Organization-Environment (TOE) framework. This describes the process when the organization adopts and implements technological innovation, is influenced by the technological context, the organizational context, and the environmental context. These three elements present both constraints and opportunities for technological innovation (Oliveira & Martins, 2011). The technological context includes both the internal and external technology that is relevant to the organization such as accounting information system implementation and strategic information technology flexibility. Organizational context refers to characteristics of the organization such as organizational culture, organizational size, and managerial structure. Environmental context includes the structure of the organization, stakeholder pressure, and dealings with the government (Li et al., 2018). Therefore, this research uses the TOE framework to examine the determinants and extent of audit data analytics capability, as well as whether using audit data analytic improves tax performance.

This section shows the effect of purposed antecedents of audit data analytics capability. Regarding the dynamic capability theory, this research purposes accounting information system implementation, organizational culture, and stakeholder pressure as the significant antecedents of each audit data analytics capability dimensions: management capability, technology capability, and personnel expertise. These relationships are illustrated in Figure 4.

Figure 4 The Relationship among Accounting Information System Implementation, Organizational Culture, Practice Guideline, and Stakeholder Pressure



Accounting Information System Implementation

The globalization of services and competition has increased the need for flexibility, quality, timeliness, and cost-effectiveness. The key resource for attaining these requirements is the accounting information system (de Guinea, Kelley & Hunter, 2011). Because accounting information can help the organization manage short-term problems in the areas by providing information to support monitoring and control. Thus, the accounting information system can help the organization operate in the dynamic environment to integrate operational considerations within long-term strategic plans (Ismail, 2009).

Accounting information system implementation or strategic information technology flexibility as the information system deployment capability where deployment refers to the organizational capability which aids in modifying information systems according to environmental and technology changes (Mishra, Luo, Hazen, Hassini & Foropon, 2018; Tian et al., 2010). Accounting information is a potential consequence of providing internal control quality and it refers to the financial information that can make a difference in the decision making for financial statements users by possessing confirmatory value and predictive value. Its characteristics comprise of relevance, reliability, comparability, and consistency (Frendy & Semba, 2017). The American Sarbanes-Oxley Act (SOX) has increased the importance of accounting information system-related knowledge for auditors (Gelinas,

Schwarzkopf & Thibodeau, 2008). Thus, accounting information system implementation in this research refers to the system proficiency in verifying, reviewing, and tracking all tax auditing activities to generate accounting information systems which help to ensure that auditing data from various processes are accurate, complete, reliable, and transparent.

In this sense, accounting information might usefully be employed to analyze strategic positioning to assist management in securing, and subsequently to sustain advantage. Hunton, Wright & Wright (2004) show that accounting information environments are a challenging environment for auditors. Auditors who lack the necessary information technology skills to audit systems should rely on information systems to carry out successful audits. The usage of data is also currently being discussed for accounting information, especially due to the generally close connection between information systems and accounting information. Furthermore, the use of data analytics may have positive effects on the determination and provision of accounting information, larger quantities of data do necessarily lead to better decision making (Gärtner & Hiebl, 2018).

The accounting information system implementation concerned the collection and processing of information, complied, and summarized to the various administrative level to take advantage of appropriate decisions (Alsalim, Hama-Amin & Sultan, 2016). It influences technology adoption to support the toolsets of instruments to manage all the steps of the accounting information system (DeLone & McLean, 2003). Wongsim & Gao (2010) indicated that the accounting information system solution is designed in stages, giving a planning and design process guide to accounting information system implementation, these resemblances can be classified into the control objectives for information and related technology (COBIT) adoption framework. Yap (1989) found that the managers support accounting information system implementation when they can bring accounting information systems into alignment with the organizational objective.

Drawing from the dynamic capability theory, data analytics capability as the organizational implementing that serves to minimize uncertainties in demands, to build information processing capabilities which assist the organization in

understanding and combining knowledge obtained from different sources and directing this synthesized knowledge toward suitable decision-making process (Schoenherr & Speier-Pero, 2015). Additionally, Eisenhardt & Martin (2000) show that knowledge created from a situation rather than on existing knowledge. George & Diavastis (2016) found that accounting information systems help to improve tax audit effectiveness. However, using modern information technology capabilities, well-trained employees, and accounting information systems would be a solution to tax evasion problem, and rationalize decision-making (Al-moumany & AI Ebbini, 2013). Based on the literature review, this situation implies that accounting information system implementation is essential for developing effective data analytics to be more responsive to changes in the tax audit environment. Thus, the hypotheses are proposed below:

Hypothesis 6a: The higher the accounting information system implementation is, the more likely that organizations will gain greater management capability.

Hypothesis 6b: The higher the accounting information system implementation is, the more likely that organizations will gain greater technology competence.

Hypothesis 6c: The higher the accounting information system implementation is, the more likely that organizations will gain greater personnel expertise.

Organizational Culture

Organizational culture is defined as a complex set of values, beliefs, symbols, and assumptions that define the way in which the organization conducts (Barney, 1986). It can also be broadly understood as the set of basic assumptions about how the world is and ought to be that a group of people determines their perception, feelings, thoughts, and to some degree, their overt behavior (Schein, 1996). Moreover,

the organizational culture defined as the aggregation of values, knowledge, beliefs, tasks, attitudes, habits, morals, norms, and customs which are shared and strongly held by members of the organization. It provides a frame of reference that indicates organizational practices, goals, and behavior (Hofstede, Neuijen, Ohayv & Sanders, 1990).

In addition, Thirathon et al. (2017) defined organizational culture as the extent organizations perceive data analytics as useful. It is shown by how organizations recognize the value of data analytics. In light of this definition, different organizations can be regarded as having their own cultures, which influence the attitudes and the behaviors of their employees (Flamholtz, 2001). Thus, organizational culture in this research refers to the values of the organization for the staff to have a positive attitude in performing work according to service standards, ethics and accountability in the operation, harmony and work together seamlessly to provide for greater effective tax auditing, and teamwork and mutual support will enable the achievement of the objectives as well.

The ere of data analytics is evolving rapidly, most organizations should undertake massive overhauls of organizations and transform the organizational culture such as efforts will play a part in maintaining flexibility, along with the technology for managing and analyzing data, learn the core skills of using audit data, and building superior capabilities may soon become a decisive performance (Barton & Court, 2012). Organizations are service-oriented, and managers organize employees in the pursuit of designated objectives and goals are linked to outcomes (Mansor & Tayib, 2010). By understanding and implementing the critical success factors, organizations can vastly improve their data analytic capabilities consists of three major elements: context (e.g., the strategic, skill-related, technology and data, and organizational culture), transformation (the data is actually analyzed and then used to support the organization decision), and outcomes (a result of the analysis and decision-making) for changes in processes and programs, behaviors, and performance. One aspect of organizational culture is analytic culture such as the attitude towards the usefulness and benefits of data analytics (Davenport et al., 2001).

In a recent literature review, the role of organizational culture has been widely discussed in operations management literature, the organizational culture to deploy resources quickly and efficiently, to respond to the changing data analytic conditions (Swafford, Ghosh & Murthy, 2008). It enables the organization to determine how to make the appropriate changes. To realize the value of data analytics, it is necessary not only to put them into action in the generation of data-driven information for specific organizational culture but also to act to harness the insights. While some studies assume that leveraging data analytics capabilities is enough to provide organization value, it is important to examine the mechanisms of inertia that act in inhibiting their value (Mikalef et al., 2017). Creating the organizational culture that values data-based decision-making is a highly challenging and ongoing task. It is important to maximizing the organization's analytics capability. Because it will certainly succeed somewhere in the process of transforming data into knowledge and outcome (Davenport et al., 2001).

The recent literature acknowledges the critical role played by organizational culture in the achievement of big data and data analytics initiatives (Gupta & George, 2016). Organizational culture binds the intelligence of an individual and the organization's core values in establishing a culture of superiority (Asiaei & Jusoh, 2015). In the context of data analytics capability, McAfee & Brynjolfsson (2012) also confirmed that organizational culture is one of the main challenges for data management capability. Data analytics will be a game-changer for the tax audit profession. Thailand's tax departments are implementing digital transformation initiatives, enabling changes that will have far-reaching effects on every tax function. However, tax departments grapple with such problems, often because of a mismatch between the organization's existing culture and capabilities and the emerging tactics to exploit analytics successfully (Svetalekth, 2016).

According to dynamic capability theory, learning culture and organizational culture in the context of dynamic capability theory, has the potential of influencing the organization's data analytics capability, behavior, and organizational outcomes (Shamim et al., 2019). Schoemaker, Heaton & Teece (2018) have noted that the dynamic capability theory required a strong and change-oriented organizational

culture. It is logical to confirm that the promotion of the culture of knowledge exchange can enhance data analytics capability. Chirico & Nordqvist (2010) suggested that organizational culture influences the management process designed to acquire, exchange, and transform internal and external resources, which leads to the dynamic capability view. Based on the literature reviewed above, organizations with higher organizational culture tend to obtain greater audit data analytics capability management in each dimension. Hence, the hypotheses are proposed as follow:

Hypothesis 7a: The higher the organizational culture is, the more likely that organizations will gain greater management capability.

Hypothesis 7b: The higher the organizational culture is, the more likely that organizations will gain greater technology competence.

Hypothesis 7c: The higher the organizational culture is, the more likely that organizations will gain greater personnel expertise

Stakeholder Pressure

Stakeholders as those groups on which the organization is dependent for it continued survival, limiting its focus to shareholders whose needs were perceived to be the only goals of the organization (Sen & Cowley, 2013). Stakeholder attention has increasingly focused on taxation issues and expectations and pressure have increased on tax departments to identify, develop, and implement higher social sustainability standards. Previous research indicates that stakeholder pressure plays a prominent role in the implementation of social standards (Huq et al., 2016). Thus, stakeholder pressure in this research refers to the degree expectations of the taxpayers, people affected by society, government and private agencies with the impetus to demand certain actions from the tax authorities in terms of the necessity of responding to changes in stakeholder demand, the necessity of adopting new technology to better perform tax audit. It is a key driver of tax authority behaviors because of tax audit effectiveness

depending on the ability to build value for stakeholders by responding to demands and expectations of users.

Based on the literature, Zhu & Sarkis (2007) suggested that governments expect to use audited financial information to evaluate and predict tax revenue. Stakeholders increasingly view public accountability and transparency by organizations as an important quality (Kashmanian, Wells & Keenan, 2011). Hall & Wagner (2012) have further found that stakeholders do influence sustainability integration in organizational activities. This stream of literature focuses on stakeholder engagement in the organizational operations and its influence on the environment, whether it is the social influence, and is called the stakeholder view. Witjes & Lozano (2016) demonstrated that stakeholder pressure positively affects the adoption of a business model and environmental proactivity to generate value according to the organizations' internal audit activity.

In addition, Gualandris, Klassen, Vachon & Kalchschmidt (2015) integrating accounting literature and conceptualized that stakeholders can play four roles including observer, coordinator, counselor, and partner. The stakeholder view is regarded as the importance and is applied mainly to organizational ethics and corporate social responsibility issues. Regarding competitive advantage and organization performance, the stakeholder view supports the dynamic capability theory. Because stakeholders are crucial to organizations as they depend on them for resource choices and utilization to perform organization (Chen & Roberts, 2010). Hence, stakeholder pressures affect tax authorities' judgments by motivating tax auditor officer to look for evidence that supports a stakeholders' preferred outcome (Hatfield, Jackson & Vandervelde, 2011).

All the different expectations of stakeholders put pressure on the tax audit. If the tax authorities attempt to meet the expectations of stakeholders, it could impact the value of the tax audit. Stakeholders have a demand for information that is reliable and beneficial which affects decision-making and which increased the level of quality of the information provided in the financial statements. Thus, tax authorities face the expectations and the need to respond to the concerns of the stakeholders, making the tax authorities to adapt by knowledge development, ability, and increased competency

in a way that enables them to arrive at the desired outcome. Tax authorities react differently to different sets and levels of stakeholder pressure (Perez-Batres, Doh, Miller & Pisani, 2012). Therefore, high levels of stakeholder pressure enforce tax authorities to develop knowledge, abilities, and skills.

According to dynamic capability theory, dynamic capabilities as managerial processes for altering the organization's resource base to develop new strategies such as big data and data analytics capability (Vargas & Mantilla, 2014). This theory is useful in rapidly changing environments (Teece et al., 1997). Consensus exists among scholars that organizations must develop and apply specific management capability to respond to different stakeholder pressure (Gavronski, Klassen, Vachon & Nascimento, 2011; Reuter, Foerstl, Hartmann & Blome, 2010; Sarkis, Gonzalez-Torre & Adenso-Diaz, 2010; Shi, Koh, Baldwin & Cucchiella, 2012). Litz (1996) developed the social responsibility model, in which organizational performance depends on the development of capabilities such as technology, management, and personnel (built from resources owned and controlled by the organization) in response to stakeholder pressure. As a result, stakeholder pressure is hypothesized to have a positive influence on each dimension of audit data analytics capability. Therefore, the hypotheses are proposed as follows:

Hypothesis 8a: The higher the stakeholder pressure is, the more likely that organizations will gain greater management capability.

Hypothesis 8b: The higher the stakeholder pressure is, the more likely that organizations will gain greater technology competence.

Hypothesis 8c: The higher the stakeholder pressure is, the more likely that organizations will gain greater personnel expertise.

Summary

In conclusion, chapter two illustrates the conceptual model of audit data analytics capability and tax performance. The foundation of dynamic capability theory and contingency theory are used to support the relationships in the conceptual model. This chapter also demonstrates the literature review and has proposed a set of 8 testable hypotheses to explain the overall relationships among constructs in the conceptual model. These relationships are categorized into four different groups as follows: the first group constrains the relationship among audit data analytics capability and its consequences, comprised of risk management efficiency, good practice, and tax performance. The next group presents the relationships among two consequences of audit data analytics capability and tax performance. Finally, the third group is relevant to the influences of three antecedents on audit data analytics capability, including accounting information system implementation, organizational culture, and stakeholder pressure. The summary of the proposed hypotheses is presented in Table 5.

Table 5 Summary of Hypothesized Relationships

Hypotheses	Description of Hypothesized Relationships
H1a	The higher the management capability is, the more likely that organizations will gain greater risk management efficiency.
H1b	The higher the management capability is, the more likely that organizations will gain greater good practice.
H1c	The higher the management capability is, the more likely that organizations will gain greater tax performance.
H2a	The higher the technology competence is, the more likely that organizations will gain greater risk management efficiency.
H2b	The higher the technology competence is, the more likely that organizations will gain greater good practice.
H2c	The higher the technology competence is, the more likely that organizations will gain greater tax performance.
H3a	The higher the personnel expertise is, the more likely that organizations will gain greater risk management efficiency.
H3b	The higher the personnel expertise is, the more likely that organizations will gain greater good practice.
H3c	The higher the personnel expertise is, the more likely that organizations will gain greater tax performance.
H4	The higher the risk management efficiency is, the more likely that organizations will gain greater tax performance.
H5	The higher the good practice is, the more likely that organizations will gain greater tax performance.
H6a	The higher the accounting information system implementation is, the more likely that organizations will gain greater management capability.
H6b	The higher the accounting information system implementation is, the more likely that organizations will gain greater technology competence.

Table 5 Summary of Hypothesized Relationships (continued)

Hypotheses	Description of Hypothesized Relationships
H6c	The higher the accounting information system implementation is, the more likely that organizations will gain greater personnel expertise.
H7a	The higher the organizational culture is, the more likely that organizations will gain greater management capability.
H7b	The higher the organizational culture is, the more likely that organizations will gain greater technology competence.
H7c	The higher the organizational culture is, the more likely that organizations will gain greater personnel expertise.
H8a	The higher the stakeholder pressure is, the more likely that organizations will gain greater management capability.
H8b	The higher the stakeholder pressure is, the more likely that organizations will gain greater technology competence.
H8c	The higher the stakeholder pressure is, the more likely that organizations will gain greater personnel expertise.

CHAPTER III

RESEARCH METHODS

The previous chapter reviews the research literature on audit data analytics capability. It provides a conceptual framework and hypotheses development by presenting the theoretical foundations, the variables analyzed, and the relation expected between variables. Consequently, this chapter provides the basis for the design of the research methods that help to clarify the understanding of the hypothesis testing process. It is divided into four sections as follows. The first section discusses sample selection and data collection procedures, including population and sample, data collection, and the test of non-response bias are detailed. The second section discusses the variable measurements. The third section discusses the instrumental verifications, including the test of validity and reliability, and the statistical analysis are presented. Also, the related equations of regression analysis are depicted in this part. Finally, the fourth section provides the summary of constructs and the measurement items.

Sample Selection and Data Collection Procedures

Population and Sample

In order to capture the conceptual framework of audit data analytics capability, Thailand's tax department is selected as the population of this research. The Excise Department, The Revenue Department, and The Customs Department, under the Ministry of Finance in Thailand, is the database for the population. Based on this database, there were 404 tax audit branches on November 9, 2018 (www.customs.go.th; www.excise.go.th; www.rd.go.th). The sample of this research 404 tax audit branches, using the population as a sample. Therefore, the questionnaires were sent directly to all 404 tax audit branches. The key informant who is appointed is the chief of area office (e.g., director, (excise/revenue/customs)

technical officer, (excise/revenue/ customs) officer, tax audit officer) of each tax audit branches, as they have the best knowledge and understanding of the nature and format of tax audit information, the presentation of tax audit information for their administration, and organizational performance.

Based on the rating of the response rate in the literature indicating that the response rate greater than 70 percent is very good, the response rate greater than 60 percent is considered good, and the response rate with at least 50 percent is sufficient for analysis and reporting (Groves, 2006). Therefore, the response rate for a mail survey, with an appropriate follow-up procedure, if greater than 20 percent is deemed adequate (Aaker, Kumar & Day, 2001).

The questionnaires were directly mailed to 404 tax audit branches which are the successful questionnaires 403 and 1 questionnaires were undeliverable because some of these organizations had moved to unknown locations. The questionnaires were returned 185 responses in the first two weeks, and 91, more responses in the next three weeks. So, the total received questionnaires were 276 responses. However, 21 were dropped because there were incomplete, leaving the final sample consisting of 255, which complete and usable questionnaires. Then, this research calculated the response rate for regression analysis which was approximately 63.28 percent. The response rate mail survey, if it is more than 60 percent, is considered to a good level for analysis and reporting (Groves, 2006). Hence, 255 tax audit branches are enough sample size for employing multiple regression analysis. Table 6 shows the detail of the questionnaire mailing.

Table 6 Details of Questionnaire Mailing

Details	Numbers
Questionnaires Mailed	404
Returned Questionnaires	1
Successful Questionnaires Mailed	403
Received Questionnaires	276
Incomplete Questionnaires	21
Complete and Usable Questionnaire	255
Response Rate (255/403)*100	63.28%

Data Collection

A mail questionnaire is used as the main method of data collection in this research. The questionnaire is a widely used method for scale data collection for survey research. Furthermore, the mail questionnaire is the appropriate method to collect information economical way of accumulating information when the sample population is spread over a large territory as a sample population in this research. The advantage of questionnaire mailing is that a representative sample can be collected from the chosen population in a variety of locations at a low cost (Van der Stede, Young & Chen, 2006).

The questionnaires were directly distributed to the chief of each tax audit branches by mail accompanied by a cover letter describing the reason and purpose of this research, and a return envelope. The questionnaires were mailed out to tax audit branches on July 30, 2019 to September 4, 2019. Then, the completed questionnaires were directly sent back to the researcher by the prepared return envelopes in order to ensure confidentiality. The data were collected in two phases: 1) Data were collected from questionnaires that return to the researcher in the first two weeks. 2) In order to increase the response rate, data were collected from a follow-up questionnaire mailing after two weeks by phone to ask the respondent to return the questionnaire. The coded numbers in the top left corner of questionnaires were assigned for the usefulness of a follow-up mailing.

The design of the questionnaire for the study covers major areas within the conceptual model and hypotheses, i.e., three dimensions of audit data analytics capability, its antecedents, and consequences. Reliability and validity of the self-administered questionnaire comprised seven sections. The first section is related to the respondent's personal information, including gender, age, educational level, working experience, and working position. The second section is related to organizational characteristics, including organizational type, forms of organization, location of the organization, number of employees, the average revenue of tax collection per year, and the average revenue of tax collection per year compared to the target. The purposes of the third to the sixth section are to obtain information about perceptions toward audit data analytics capability, its consequences, antecedents, and other influences. All constructs were developed for measuring from the definition of each, as well as from previous literature reviews.

In detail, the third section consists of a set of questions relating to audit data analytics capability dimensions: management capability, technology competence, and personnel expertise. The fourth section is related to the consequences of audit data analytics capability, including risk management efficiency, good practice, and tax performance. The fifth section includes questions regarding the internal factor which affected audit data analytics capability including accounting information system implementation and organizational culture. The sixth section consists of a set of questions relating to the external factor which affected audit data analytics capability, such as stakeholder pressure. Lastly, the seventh section provides an open-ended question to gather key respondents' suggestions and opinions. The questionnaire is attached in Appendix G and H (questionnaire in the Thai version and English version, respectively).

Test of Non-Response Bias

Mail surveys are regarded to be particularly sensitive to bias from non-responses since sample members can decide themselves whether to fill in and return the questionnaire. Sample members who have a greater interest to answer the question may be more inclined to complete and return the questionnaire than those who are less

interested to answer (af Wåhlberg & Poom, 2015). Hence, non-response is considered a source of possible bias, which increases with the size of the non-responding group. It is important to make sure that the data are free from these types of errors to ensure that the analyzed data will produce valid and reliable results.

The test of non-response bias is how to protect from possible response bias problem between respondent and non-respondent. A non-response bias is tested by comparing the pattern of answers received between early and late responses by using a t-test comparison of the demographic information between early and late responses (Armstrong & Overton, 1977). A non-response bias test is used to confirm that non-respondents are not different from all respondents. If the t-test the result shows no significant differences between the two groups of respondents, it indicates that the non-response bias does not cause a major problem. The samples are representative, and respondents' error is not an issue in this research (Lewis, Hardy & Snaith, 2013).

A total of 255 received questionnaires were divided into two groups according to early and late responses. Completed questionnaires received after the initial posting 165 responses are considered as early responses (the first group) and those which received after the second reminder 90, were considered as late responses from a follow-up questionnaire mailing after two weeks (the second group). By employing a t-test statistic, the differences in the demographics of organizational characteristics in terms of the number of employees and average revenue of tax collection per year are compared.

The results show that there is no statistically significant difference between the two groups at a 95% confidence level, details are as follows: the number of employees ($t = -0.034$, $p > 0.05$) and average revenue of tax collection per year ($t = -0.584$, $p > 0.05$). Therefore, it can be stated that the non-response bias is not problem in this research (Armstrong & Overton, 1977). The results of non-response bias are demonstrated in Appendix E.

Measurements

All constructs in this research are the abstract that cannot be directly observed or measured. The measurement of each construct in the conceptual model requires that the conceptual definitions are translated into an operational definition. The operational definition of a construct links the conceptual definition to more concrete indicators. The role of the operational definition is to precisely describe how to measure the characteristics of the construct. Therefore, in this research, all constructs are transformed into the operational variables by using multiple items to provide a wider range of the content of conceptual definition and improvement of reliability (Neuman, 2014). Then, the third to the sixth section is related to measure each construct in the conceptual model. The questionnaire is designed on a five-point Likert scale that details as 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree, excluding the dependent variable (tax performance) measured ranging from 5 = always, 4 = often, 3 = sometime, 2 = rarely, 1 = never. All operational definitions of each construct which are comprised of the dependent variable, the independent variables, the mediating variable, and the antecedent variables, are described below.

Dependent Variable

Tax Performance

Tax performance is the continuous increase in the operational efficiency outcome. The new approach is being developed to measure the performance of the organization with a balanced scorecard (BSC), management by objectives (MBO), total quality management (TQM), continuous improvement, benchmarking, and key performance indicator (KPIs) (Zakaria et al., 2011). This research evaluates tax performance through the balanced scorecard framework such as financial perspective, customer perspective, internal business perspective, as well as innovation and learning perspective.

Moreover, this research uses the key performance indicators includes efficiency, quality of services, effectiveness, and organizational development

dimensions for successful in measuring the tax performance. Therefore, this construct is measured by the ability of organization to collect tax revenues to achieve the goals set or more effectively than the previous fiscal year, prides itself on receiving awards for performance according to standards or criteria for the development of public sector management quality award, innovations for tax administration to convenient and efficient, as well as the transparent and fair administration for sustainable organization development. Four-item scales are used to measure tax performance which adapts from the instrument of James et al. (2007) and Kaplan & Norton (1992). The instrument asks respondents to rate the extent of their tax performance relative to their past performance.

Independent Variables

The core construct of this research was the audit data analytics capability. This variable was measured in three dimensions: management capability, technology competence, and personnel expertise. The measurement of each dimension on its definition is detailed below.

Management capability

Management capability is the importance of audit data analytics capability ensuring that solid organization decisions are made applying proper management framework. It is measured by the ability of audit data analytics to planning, coordination, and control to manage information resources in accordance with organization needs, including the use of account information to determine the best practices and allocate resources efficiently that will help to achieve its goals and lead to long-term profitability. Four-item scales are used to measure management capability which adapts from the instrument of Akter et al. (2016) and Kim et al. (2012).

Technology competence

Technology competence is the ability of information technology infrastructure to connectivity and compatibility the flexibility of the audit data analytics platform in relation to enabling tax authorities to quickly develop and

support an organization's resources. It is measured by the ability of analytics infrastructure to connectivity and compatibility the flexibility of the audit data analytics platform in relation to enabling tax authorities to quickly develop and support an organization's resources. Four-item scales are used to measure technology competence which adapts from the instrument of Akter et al. (2016) and Kim et al. (2012).

Personnel expertise

Personnel expertise as the ability of an analytics professional (e.g., someone with analytics skills or knowledge) to perform assigned tasks in the data analytics environment. It is measured by the ability of analytics professionals to perform assigned tasks in the tax audit environment through technical skill, relational knowledge, and technological management knowledge. Four-item scales are used to measure personnel expertise which adapts from the instrument of Akter et al. (2016) and Kim et al. (2012).

Mediating Variables

Risk management efficiency

Risk management efficiency is the process of a systematic and continuing help for organizations to reduce the chance of damage may occur in the near future for acceptable levels of the organization to assess, control and check with the system, the identification reflects the performance of the taxpayer's financial report accurately and reliably, and the situation that is certain and has the potential for decreasing risk at the acceptable level. It is measured by the determining, identification, and assessment of risks for the achievement of auditing objectives across the organization, the situation that is certain and has criteria for auditing taxpayers by grouping taxpayers at the risk-based audit levels. It will make the tax administration more effective. Based on the literature above, risk management efficiency is a potential possibility that affects tax performance. Four-item scales are used to measure risk management efficiency which adapts from the instrument of Koutoupis & Pappa (2018).

Good practice

Good practice or those generally understood as operational characteristics of organizations, humans, and procedures that have proved to be successful in practices. It refers to the methodology, techniques, methods, procedures, and processes combined into practice and improving the organizational results. It is measured by the ability to integrate methods and various techniques that appropriate, cover and accordance with tax policy, align analytics with organizational strategy, and relate to tax audit procedure accurately and transparently. Three-item scales are used to measure good practice which adapts from the instrument of Francis (2011).

Antecedent Variables

For this research, accounting information system implementation, organizational culture, and stakeholder pressure increase were antecedents of audit data analytics capability. The measurement of each variable was in its definition discussed below.

Accounting information system implementation

Accounting information system implementation as the information system deployment capability where deployment refers to the organizational capability which aids in modifying information systems according to environmental and technology changes. It is evaluated by the organizational capability which aids in modifying information systems by either combining new information technology components with the existing information technology infrastructure or by re-building the existing information systems. Four-item scales are used to measure accounting information system implementation which adapts from the instrument of Ismail (2009) and Tian et al. (2010).

Organizational culture

Organizational culture is analytic culture such as the attitude towards the usefulness and benefits of data analytics. It is measured by the values of the organization for the staff to have a positive attitude in performing work according to

service standards, ethics and accountability in the operation, harmony and work together seamlessly to provide for greater effective tax auditing, and teamwork and mutual support will enable the achievement of the objectives as well. Four-item scales are used to measure organizational culture which adapts from the instrument of Mansor & Tayib (2010) and (Thirathon et al., 2017).

Stakeholder pressure

Stakeholder pressure is a key driver of tax authority behaviors because of tax audit effectiveness depending on the ability to build value for stakeholders by responding to demands and expectations of users. It is measured by the degree expectations of the taxpayers, people affected by society, government and private agencies with the impetus to demand certain actions from the tax authorities in terms of the necessity of responding to changes in stakeholder demand, the necessity of adopting new technology to better perform tax audit. Three-item scales are used to measure stakeholder pressure which adapts from the instrument of Gualandris et al. (2015) and Huq et al. (2016).

Methods

In this research, data is collected by using a questionnaire that is adapted from a literature review to gain truthfulness and credibility. To improve the quality of the questionnaire, it should always be conducted to assert the validity and reliability of the questionnaire before sending it to the respondents (Van der Stede et al., 2006). Therefore, the questionnaire was improved by first confirming the content validity. It was sent to five academic experts to review and revise the questionnaire so that the respondents could understand it correctly and clearly. And more importantly, the question covers the content that needs to be measured. Then, the pre-test method was conducted to ensure that all constructs are enough valid, functional, and reliability of the survey instrument to check for clear and accurate understanding of the questionnaire before using real data collection.

Validity and Reliability

Validity

Validity is defined as the degree to which measurement accurately evinces the concept of consideration (Hair, Black, Babin & Anderson, 2014). In order to verify the quality of this research instrument, content validity and constructs validity are two ways to evaluate the absoluteness and accuracy of the questionnaire.

Content validity

Content validity refers to the extent to which the elements within a measurement procedure are relevant and representative of the construct that they will be used to measure (Haynes, Richard & Kubany, 1995). Content validity requires the use of recognized subject matter experts to evaluate whether all items in the questionnaire correspond and cover the topics and operational definition that has been defined in the research (Cooper & Schindler, 2014). Therefore, the content validity of the prototype of the questionnaire as well as the appropriateness of Likert scale endpoints were assessed (Podsakoff, MacKenzie, Lee & Podsakoff, 2003).

This research improved content validity by an extensive review of the literature questionnaires (Hair et al., 2014). Five professionals in academic research (including: 1) Dr. Muttanachai Suttipun, 2) Asst. Prof.Nitiphong Songsrirote, 3) Assoc. Prof. Suwan Wangcharoendate, 4) Asst. Prof. Yanin Tangpinyoputtikhun, and 5) Asst. Prof. Ingorn Nachairit) were invited to evaluate the draft questionnaire to ensure that all constructs are enough valid and functional to cover the contents of the variables (see also Appendix I). When they had suggested; and then revised these suggestions to refine the design and content of the survey to attain a quality measurement. After that, the updated version of the questionnaire was then delivered to a small sample group of experts to ensure the reliability of the survey instrument.

Construct validity

Construct validity refers to the measurement method that confirms whether or not the item is an accurate scale as to the logical theory in the conceptual framework (Hair et al., 2014). It is assessing congruence between a theoretical

concept and a specifically identify measurement for the audit data analytics capability context. Construct validity can be achieved through pre-testing procedures. In this research, the first thirty sets of questionnaires were returned and used in the pre-test, in order to verify the validity and reliability of each of the measures used in the questionnaire. The pre-test of thirty representative informants is the power of the test with enough to identify problems with a questionnaire (Perneger, Courvoisier, Hudelson & Gayet-Ageron, 2015).

Construct validity is utilized to assess the underlying relationships of many items and to determine whether they can be reduced to a smaller set of factors. A confirmatory factor analysis (CFA) is used to determine the construct validity of the survey item. The factor loading of the items is significantly correlated to the specified construct that will contribute to the construct validity comprehension. As a rule-of-thumb, the factor loadings should be above 0.40 (Nunnally & Bernstein, 1994). Table 7shows the results of factor ladings of multi-item scales. It indicates that each item of all variables is loaded on a single factor and the range of factor loading is between 0.603 – 0.951. The lowest factor loading is technology competence and the highest factor loading is personnel expertise. All factor loadings are greater than 0.40, which demonstrate the acceptable construct validity. Thus, the construct validity of this research is tapped by the items in the measure as theorized (see also Appendix B).

Reliability

Reliability is an assessment of the degree of consistency between multiple measurements of a variable. Reliability estimates are used to evaluate the equivalence of sets of items from the same test (internal consistency) or of different observers scoring a behavior or event using the same instrument (Sekaran & Bougie, 2016). In this research, the Cronbach's alpha coefficient was adopted to determine the overall reliability of the measurement scale for each construct because the Cronbach's alpha coefficient is used as the measure of the internal consistency or reliability of constructs.

The Cronbach's alpha coefficients range from 0.00 to 1.00, with higher coefficients indicating higher levels of reliability. The Cronbach's alpha coefficient is recommended in that its value should be equal to or greater than 0.70, as widely

accepted (Hair et al., 2014; Nunnally & Bernstein, 1994). The first thirty returned questionnaires in this research have been used for testing the reliability. Table 7 shows the results of the reliability. The results of Cronbach's alpha coefficient are between 0.729 – 0.947, which greater than 0.70. The lowest coefficient is technology competence and the highest coefficient is stakeholder pressure. As the result, the questionnaire was accepted and admissible (see also Appendix B).

Moreover, item-total correlation is the approach assesses the consistency between multi-item measurements in the same construct, where its high value points out a more reliable scale (Hair et al., 2014). Generally, the scale of item-total correlation should exceed 0.30 to indicate acceptance of item reliability (Thoumrungroje, 2013). As shown in Table 7, the item-total correlations were scaled from 0.406 to 0.908 in that all scales exceed 0.30; this result demonstrates that item reliability is acceptable (see also Appendix B).

Table 7 Results of Validity and Reliability Testing

Variables	**Validity (Factor Loadings)**	**Item total correlation**	**Reliability (Cronbach's Alpha)**
Management Capability (MC)	0.769 – 0.876	0.649 – 0.754	0.850
Technology Competence (TC)	0.627 – 0.829	0.535 – 0.702	0.808
Personnel Expertise (PE)	0.603 – 0.903	0.566 – 0.867	0.891
Risk Management Efficiency (RM)	0.715 – 0.877	0.546 – 0.809	0.829
Good Practice (GP)	0.633 – 0.905	0.406 – 0.726	0.729
Tax Performance (TP)	0.634 – 0.922	0.468 – 0.829	0.823
Accounting Information System Implementation (AI)	0.843– 0.945	0.827 – 0.874	0.936
Organizational Culture (OC)	0.849 – 0.921	0.838 – 0.908	0.947
Stakeholder Pressure (SP)	0.745 – 0.927	0.575 – 0.808	0.821

Note: n = 30

Statistical Techniques

Before the hypotheses were tested, all the raw data were checked, encoded, and recorded in a data file. Then the basic assumption of regression analysis was tested. This process involved checking the normality, heteroscedasticity, and linearity. Moreover, the outlier problem was also addressed. This research employed both descriptive and inferential statistical techniques variance inflation factors (VIF's) which were applied to test multicollinearity among independent variables. Correlation analysis was used to determine primary correlations between two variables, and the ordinary least squared method (OLS) was operated to statistically estimate the coefficient of hypotheses testing, each of these methods is discussed below.

Descriptive statistics

Descriptive statistics: mean, percentage, and standard deviation, are used to describe the basic features of key informants' characteristics and characteristics of tax departments in Thailand. Moreover, they are used to describe the basic features of the data of each construct in this research.

Variance inflation factor (VIF)

Variance inflation factor (VIF) was an approach for the detection of high correlations between multiple independents in the regression equation model that is known as a multicollinearity problem. In order to check multicollinearity, the VIF score could indicate them. Large VIF values indicate the high degree of multicollinearity among independent variables. Accordingly, considering this problem, the VIF value should be less than 10 to be assumed that the multicollinearity problem is not concerned in the regression analysis (Hair et al., 2014). In this research, results showed that the VIF value for all variables is between 1.000 and 1.699. Therefore, it can claim that there is not the multicollinearity problem as shown in Appendix F.

Correlation analysis

Pearson correlation analysis was used to examine the relationship between the independent variable on the independent variable which should be low, and the independent variable on the dependent variable which should be high. The values of the correlation coefficient can range from -1 (perfectly related in the negative linear sense) to +1 (perfectly related in the positive linear sense). In multiple regressions, the problem of correlation occurred when any single independent variable was highly correlated with other independent variables (Hoyt, Leierer & Millington, 2006).

In other words, a variable could be explained by the other variables in the analysis of multicollinearity shown when the intercorrelation between explanatory variables exceeded 0.80 and shows significance, it indicates that no multicollinearity problem (Hair et al., 2014). In this research, correlation values are between 0.301 and 0.712, which are less than 0.80. Therefore, multicollinearity problems are not problematic in this research. However, factor analysis was used to group highly correlated variables together, and the factor score of all variables was prepared to avoid the multicollinearity problem. Then they were evaluated by regression analysis.

Multiple regression analysis

The ordinary least squares (OLS) regression analysis is used to test the hypotheses in this study because it is appropriate for investigating the relationships among the dependent variables and independent variables using data qualified as interval and categorical scales (Hair et al., 2014). It is often used to test the theory about causal influences on the outcome measure (Jaccard, Guilamo-Ramos, Johansson & Bouris, 2006). Moreover, it can be used to test the hypothesis of linear associations among variables, to examine associations among pairs of variables while controlling for potential confounds, and to test complex associations among multiple variables (Hoyt et al., 2006). In order to avoid error in the result of regression analysis, the basic assumptions are employed to verify, such as multicollinearity, normality, heteroscedasticity, linearity, and outlier. As a result, all proposed hypotheses in this research are transformed into 7 statistical equations. Each equation

conforms to the hypothesis development described in the previous chapter. The detail of each equation is presented as follow.

The statistical equations examining the effects of the three dimensions of audit data analytics capability on risk management efficiency, good practice, and tax performance are presented in Equation 1-3 as shown:

Equation 1: RM $= \alpha_{01} + \beta_1 MC + \beta_2 TC + \beta_3 PE + \varepsilon$

Equation 2: GP $= \alpha_{02} + \beta_4 MC + \beta_5 TC + \beta_6 PE + \varepsilon$

Equation 3: TP $= \alpha_{03} + \beta_7 MC + \beta_8 TC + \beta_9 PE + \varepsilon$

The statistical equation investigating the impact of risk management efficiency and good practice on tax performance is presented in equation 4 as shown:

Equation 4: TP $= \alpha_{04} + \beta_{10} RM + \beta_{11} GP + \varepsilon$

The statistical equations examining the effects of three antecedents namely, accounting information system implementation, organizational culture, and stakeholder pressure on three dimensions of audit data analytics capability are presented in equation 5-7 as shown:

Equation 5: MC $= \alpha_{05} + \beta_{12} AI + \beta_{13} OC + \beta_{14} SP + \varepsilon$

Equation 6: TC $= \alpha_{06} + \beta_{15} AI + \beta_{16} OC + \beta_{17} SP + \varepsilon$

Equation 7: PE $= \alpha_{07} + \beta_{18} AI + \beta_{19} OC + \beta_{20} SP + \varepsilon$

Where;

MC	=	Management Capability
TC	=	Technology Competence
PE	=	Personnel Expertise
RM	=	Risk Management Efficiency
GP	=	Good Practice
TP	=	Tax Performance
AI	=	Accounting Information System Implementation

OC	=	Organization Culture
SP	=	Stakeholder Pressure
α	=	Constant
β	=	Regression Coefficient
ε	=	Error Term

Summary

The aspect of this empirical study is based on a review of information system literature. A survey is used as the method for data collection in order to investigate the relationship among audit data analytics capability, its antecedents, and consequences variable in Thailand's tax department. A total list of 255 tax departments was provided by the Department of Excise, Revenue, and Customs under the Ministry of Finance in Thailand. The key informants completing questionnaires are director, (excise/revenue/ customs) technical officer, (excise/revenue /customs) officer, tax audit officer.

A structured survey questionnaire was designed to cover all areas of the conceptual model and developed hypotheses. In order to ensure a high quality of the survey design, this research uses a framework that includes questionnaire design, the use of pre-testing, follow-up procedures and non-response bias analysis (Van der Stede et al., 2006). Moreover, a valid and reliable questionnaire is the primary instrument of data collection. This chapter also provides the measurements of each construct in the model, which are based on the existing literature. For multiple regression analysis, testable seven statistical equations are formulated. Finally, the summary of the constructs and the measurement items explanation is given in Table 8.

Table 8 Construct and Measurement Items

Constructs	Measurement Items	Keyword	Scale Source
Management Capability (MC)	MC1. Our organization focus on data analytics of the tax audit plan to ensure that the audit is covered by the assigned mission.	Planning	Adapted from Akter et al. (2016); Kim et al. (2012)
	MC2. Our organization believes that the data analytics planning processes in systematic and formalized ways will help make more effective in tax auditing.	Planning	
	MC3. Our organization encourages the coordination by sending information via social networks in order to speed up communication and can use the information to prevent and suppress tax offenders.	Coordination	
	MC4. Our organization believes that properly management and control of information system can be used as a database to support tax administration.	Control	

Table 8 Construct and Measurement Items (continued)

Constructs	Measurement Items	Keyword	Scale Source
Technology Competence (TC)	TC1. Our organization is confident that its information technology infrastructure. It allows the organization to connect various tax data analytics effectively.	Connectivity	Adapted from Akter et al. (2016); Kim et al. (2012)
	TC2. Our organization recognizes the potential of modern information technology. It will help to connect the tax information more real-time.	Connectivity	
	TC3. Our organization believes that information technology system can be easily used. This will allow sharing tax information across the organization.	Compatibility	
	TC4. Our organization focus on the application of compatible technology to manage tax audit as concrete.	Compatibility	

Table 8 Construct and Measurement Items (continued)

Constructs	Measurement Items	Keyword	Scale Source
Personnel Expertise (PE)	PE1. Our organization encourages ongoing staff development, in order to reinforce tax audit skill efficiency even more. PE2. Our organization focus on knowledge management on various issues. Related to tax auditing will help the staff to develop consistently. PE3. Our organization encourages employees to learn and understand technology that is constantly changing. It will allow for more efficient operation. PE4. Our organization supports staff to regularly attend training on modern technology. It will make the tax administration more effective.	Technical skills Relational knowledge Technological management knowledge Technological management knowledge	Adapted from Akter et al. (2016); Kim et al. (2012)

Table 8 Construct and Measurement Items (continued)

Constructs	Measurement Items	Keyword	Scale Source
Risk Management Efficiency (RM)	RM1. Our organization analyzes risks as a basis for determining how risks should be managed by identifies risks to the achievement of auditing objectives across the organization. RM2. Our organization specifies auditing objectives with enough clarity to enable the identification of risks relating to auditing objectives. RM3. Our organization assesses for change that could significantly impact the risk management in tax auditing effectively. RM4. Our organization has criteria for auditing taxpayers by grouping taxpayers at the risk-based audit levels. It will make the tax administration more effective.	Determining of risks Identification of risks Assessment of risks Detecting tax evasion	Adapted from Koutoupis & Pappa (2018)

Table 8 Construct and Measurement Items (continued)

Constructs	Measurement Items	Keyword	Scale Source
Good Practice (GP)	GP1. Our organization has tax auditing practices to adhere in accordance with tax policy and organizational strategy.	Accordance	Adapted from Francis (2011)
	GP2. Our organization has guidelines and procedures for tax auditing to be accurately and transparently, which can be systematic used and more concrete.	Accuracy	
	GP3. Our organization has tax audit technic that is appropriate and covers altogether audit process.	Appropriateness	
Tax Performance (TP)	TP1. Our organization can collect tax revenues to achieve the goals set or more effectively than the previous fiscal year.	Effectiveness	Adapted from James et al. (2007); Kaplan & Norton (1992)
	TP2. Our organization prides itself on receiving awards for performance according to standards or criteria for the development of public sector management quality award.	Quality of services	
	TP3. Our organization has innovations for tax administration to convenient, fast and efficient.	Efficiency	
	TP4. Our organization has the transparent and fair administration for sustainable organization development.	Organizational development	

Table 8 Construct and Measurement Items (continued)

Constructs	Measurement Items	Keyword	Scale Source
Accounting Information System Implementation (AI)	AI1. Accounting information system supports the organization to verify the accuracy of the tax data analytics as well.	Accuracy	Adapted from Ismail (2009); Tian et al. (2010)
	AI2. Accounting information system allows the organization to fully review the completeness of its tax auditing practices.	Completeness	
	AI3. Accounting information system helps the organization track the source of their tax data to make tax data more reliable.	Reliability	
	AI4. Accounting information system allows the organization to have transparent tax data and verify that the source is clear.	Transparency	

Table 8 Construct and Measurement Items (continued)

Constructs	Measurement Items	Keyword	Scale Source
Organizational Culture (OC)	OC1. Our organization believes in creating the values of the organization for the staff to have a positive attitude in performing work according to service standards.	Attitude	Adapted from Mansor & Tayib (2010); Thirathon et al. (2017)
	OC2. Our organization focus on ethics, honesty, and accountability in the operation.	Ethics	
	OC3. Our organization is confident that harmony and work together seamlessly to provide for greater effective tax auditing.	Harmony	
	OC4. Our organization focus on teamwork and mutual support will enable the achievement of the objectives as well.	Teamwork	

Table 8 Construct and Measurement Items (continued)

Constructs	Measurement Items	Keyword	Scale Source
Stakeholder Pressure (SP)	SP1. Society needs the benefit of tax information from government agencies more leading to our organization who must develop the potential in tax auditing always.	Society	Adapted from Gualandris et al. (2015); Huq et al. (2016)
	SP2. Regulators have expectations in increase tax collection leading to our organization who must develop innovation for maximum efficiency tax administration.	Regulators	
	SP3. Taxpayers expect to service quality leading to the organization must develop the operating system to facilitate fast and fair.	Taxpayers	

CHAPTER IV

RESULTS

The previous chapter presented the research methods comprising population and sample selection, data collection, and the test of non-response bias. Moreover, data analysis and hypotheses testing are described. Consequently, this chapter demonstrates the findings of data analysis and results of hypotheses testing. This chapter is organized as follows. The first section presents the analysis of respondent characteristics and sample characteristics using the descriptive statistics. The second section is related to describe the correlation matrix among the hypothesized variables and hypotheses testing are discussed in section. The final section presents a summary of all hypotheses testing is given in Table 20.

Respondent Characteristics and Descriptive Statistics

Respondent Characteristics

The respondents are the chief of area office (e.g., director, (excise/revenue/ customs) technical officer, (excise/revenue/customs) officer, tax audit officer) of each tax audit branches in Thailand have the best knowledge and understanding of the nature and format of tax audit information, the presentation of tax audit information for their administration, and organizational performance. This is because they can give the data according to the objective of this research. The characteristics of respondents are described by their demographic characteristics, including gender, age, education level, working experience, and working position.

The results from the demographic characteristics of 255 key respondents are as follows. The 51.76 percent of respondents are female, and 48.24 percent are male. Most of respondents are more than 50 years of age (61.18 percent). Their educational level, 50.20 percent have a bachelor’s degree. In addition, most respondents' experience is more than 20 years (71.37 percent). Lastly, the working position of the

respondents at present is (excise/revenue/customs) technical officer of equal 68.63 percent (see also Appendix C).

Firm Characteristics

The characteristics of organizations are also presented by organizational type, forms of organization, location of organization, number of employees, the average revenue of tax collection per year, and the average revenue of tax collection per year compared to the target.

The results from the demographic characteristics of the 255 tax audit branches indicate that most of the organizational type is in the category of The Excise Department (48.63 percent). Forms of organization are the majority of area branch office/customs house (67.06 percent), and the location of the organization is the northeastern region (23.92 percent). Most of them employ less than 30 employees (59.22 percent). The average revenue of tax collection per year more than 15,000,000 baht is 55.29 percent, and the average revenue of tax collection per year more than the target (77.25 percent) (see Appendix D).

Correlation Analysis

One of the purposes of bivariate correlation analysis of Pearson's Correlation is to explore the relationships among variables. Another purpose is to detect multicollinearity in multiple regression assumptions. According to Hair et al. (2014), multicollinearity might exist when the intercorrelation of each predictor variable is more than 0.80, which assumes a high relationship. In this research, the bivariate correlation analysis is scaled to a two-tailed test with statistical significance at $p < 0.01$ and $p < 0.05$. This research employs a bivariate correlation analysis of Pearson correlation with all variables for two purposes: exploring the relationships among variables and examining multicollinearity problems. Table 9 shows the results of the correlation analyses of all variables. The results indicate that none of correlations exceed 0.80, which may not be concerned about multicollinearity problems. The details are as follows.

The result of the Pearson Correlation Coefficient of three dimensions of audit data analytics capability (management capability, technology competence, and personnel expertise) is between r = 0.440 – 0.586, p < 0.01. The Pearson correlation coefficient of three antecedents of audit data analytics capability (accounting information system implementation, organizational culture, and stakeholder pressure) is between 0.442 – 0.537, p < 0.01. The results indicate that none of correlations exceed 0.80. Thus, the multicollinearity problem is not concerned.

In parts of the correlation among independent variables and dependent variables, it is found that there was a significant and positive relationship as follows. Dimensions of audit data analytics capability and its consequences (risk management efficiency, good practice, and tax performance) have a significant and positive relationship (r = 0.301 – 0.618, p < 0.01). Finally, the correlations among three antecedents and three dimensions of audit data analytics capability are significant and positive relationship (r = 0.354 – 0.555, p < 0.01).

Table 9 Descriptive Statistics and Correlation Matrix of Audit Data Analytics Capability and all Constructs

Variables	**MC**	**TC**	**PE**	**RM**	**GP**	**TP**	**AI**	**OC**	**SP**
Mean	4.455	4.555	4.398	4.185	4.451	4.385	4.319	4.587	4.404
S.D.	0.511	0.468	0.575	0.555	0.553	0.557	0.586	0.518	0.546
MC	1.000								
TC	.586**	1.000							
PE	.508**	.440**	1.000						
RM	.582**	.497**	.618**	1.000					
GP	.600**	.465**	.563**	.662**	1.000				
TP	.435**	.301**	.406**	.512**	.523**	1.000			
AI	.427**	.354**	.492**	.557**	.442**	.428**	1.000		
OC	.555**	.449**	.538**	.578**	.562**	.458**	.537**	1.000	
SP	.515**	.377**	.399**	.530**	.430**	.499**	.442**	.518**	1.000

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

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

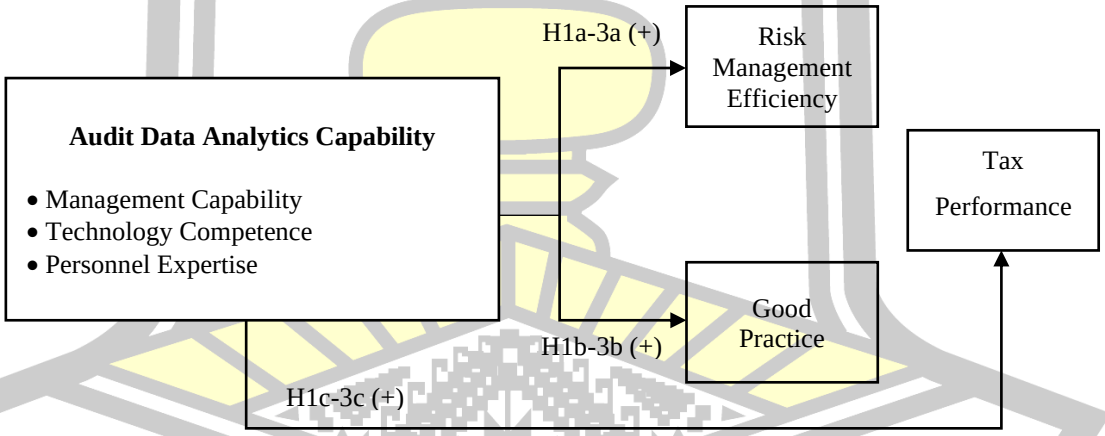
Hypotheses Testing and Results

This research uses multiple regressions by ordinary least squares (OLS) regression to investigate the hypotheses. All hypotheses in this research are transformed into 7 equations. The results of both descriptive statistics and hypotheses tests are reported as follows.

The Relationship among Each Dimension of Audit Data Analytics Capability, and Its Consequence

Figure 5 illustrates the effect of audit data analytics capability which consists of management capability, technology competence, and personnel expertise on its consequences as proposed in Hypotheses 1 (a-c) to Hypotheses 3 (a-c).

Figure 5 The Relationships between Each Dimension of Audit Data Analytics Capability and Its Consequences



This research proposes that the three dimensions of audit data analytics capability have positive relationships on risk management efficiency, good practice, and tax performance. These hypotheses are transformed into the regression equation in Equation 1-3 which are presented in Chapter 3. Moreover, the correlation among each dimension of audit data analytics capability and its consequences were demonstrated in Table 10.

Table 10 Descriptive Statistics and Correlation Matrix of Audit Data Analytics Capability and all Constructs

Variables	**MC**	**TC**	**PE**	**RM**	**GP**	**TP**
Mean	4.455	4.555	4.398	4.185	4.451	4.385
S.D.	0.511	0.468	0.575	0.555	0.553	0.557
MC	1.000					
TC	.586**	1.000				
PE	.508**	.440**	1.000			
RM	.582**	.497**	.618**	1.000		
GP	.600**	.465**	.563**	.662**	1.000	
TP	.435**	.301**	.406**	.512**	.523**	1.000

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

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

Table 10 presents the correlation coefficients among each dimension of the audit data analytics capability and its consequences. Firstly, the relationship of the management capability is positively and significantly correlated to risk management efficiency ($r = 0.582$, $p < 0.01$), good practice ($r = 0.600$, $p < 0.01$), and tax performance ($r = 0.435$, $p < 0.01$). Secondly, technology competence has a positive correlation to risk management efficiency ($r = 0.497$, $p < 0.01$), good practice ($r = 0.465$, $p < 0.01$), and tax performance ($r = 0.301$, $p < 0.01$). Finally, personnel expertise is positively and significantly correlated to risk management efficiency ($r = 0.618$, $p < 0.01$), good practice ($r = 0.563$, $p < 0.01$), and tax performance ($r = 0.406$, $p < 0.01$).

Regarding possible problems concerning multicollinearity, variance inflation factors (VIFs) are used to test inter-correlation coefficients among three dimensions of audit data analytics capability which are independent variables. As the results, Table 10 also shows that all correlations are less than 0.80. Additionally, Table 11 - 13 point out the maximum values of VIF (Equation 1-3) is 1.001, which is below the cutoff value of 10 (Hair et al., 2014). This case defines that all dimensions of audit

data analytics capability are not seriously complementary to the other. In conclusion, the results of VIF and correlations certification indicate that the multicollinearity problems do not occur for this analysis.

Table 11 Results of Regression Analysis for the Effects of Audit Data Analytics Capability on Risk Management Efficiency

Equation	**Independent Variables**	**Dependent Variables:** Risk Management Efficiency				
		Unstandardized Coefficients		Standardized Coefficients	t-stat	p-value
		B	Std. Error	Beta		
1	(Constant)	.000	.045		.000	1.000
	Management Capability (H1a)	.485	.045	.485	10.803	.000**
	Technology Competence (H2a)	.302	.045	.302	6.736	.000**
	Personnel Expertise (H3a)	.410	.045	.410	9.137	.000**
	Adjusted R^2	**.488**				
	Prob.	**0.000**				
	F-test	**81.851**				
	Maximum VIF	**1.000**				

** p < 0.01, * p < 0.05

Table 12 Results of Regression Analysis for the Effects of Audit Data Analytics Capability on Good Practice

Equation	**Independent Variables**	**Dependent Variables:** Good Practice				
		Unstandardized Coefficients		Standardized Coefficients	t-stat	p-value
		B	Std. Error	Beta		
2	(Constant)	-.135	.062		-2.164	.031
	Management Capability (H1b)	.431	.047	.425	9.222	.000**
	Technology Competence (H2b)	.303	.047	.298	6.459	.000**
	Personnel Expertise (H3b)	.440	.045	.454	9.856	.000**
	Adjusted R^2	**.462**				
	Prob.	**0.000**				
	F-test	**73.568**				
	Maximum VIF	**1.001**				

** p < 0.01, * p < 0.05

Table 13 Results of Regression Analysis for the Effects of Audit Data Analytics Capability on Tax Performance

Equation	**Independent Variables**	**Dependent Variables:** Tax Performance				
		Unstandardized Coefficients		Standardized Coefficients	t-stat	p-value
		B	Std. Error	Beta		
3	(Constant)	.141	.072		1.971	.050
	Management Capability (H1c)	.333	.054	.338	6.188	.000**
	Technology Competence (H2c)	.171	.054	.173	3.172	.002**
	Personnel Expertise (H3c)	.313	.051	.333	6.091	.000**
	Adjusted R^2	**.243**				
	Prob.	**0.000**				
	F-test	**28.169**				
	Maximum VIF	**1.001**				

** p < 0.01, * p < 0.05

The results of OLS regression analysis of the effects of each dimension of audit data analytics capability on its consequences are shown in Table 11 -13. Firstly, the result indicates that management capability (the first dimension) positively and significantly affects all three outcomes: risk management efficiency (β_1 = 0.485, p < .01), good practice (β_4 = 0.425, p < .01), and tax performance (β_7 = 0.338, p < .01). In the context of developing dynamic capability, the role played by management capability is well acknowledged in the existing literature. A positive relationship between management capability and its consequences indicated that management capability enables the organization to gain greater risk management efficiency, good practice, and tax performance.

Consistent with prior research, management capability which is supported by relevant data analytics can provide necessary information for improving the quality of data analytics planning, coordination, investment, and control to achieving operational goals and sustainable advantage (Akter et al., 2016). It provides useful information for planning to assist directors to increase operational efficiency by reducing costs, help quickly identify potential fraud by risk management efficiency and protect tax revenues by tax evasion (Ernst & Young, 2014; KPMG, 2016).

The data processing literature also shows that the organizational capability to process data analytics can affect organizational performance and that data analytics capability is likely to influence the organizational capability of risk management efficiency and the potential of advancing the best practice (Chen & Hsieh, 2014). Data analytics are expected to become the core management capability of tax authorities (Deloitte, 2016). Since it offers infinite opportunities for the creation of new models to provide deeper insight into taxpayer behavior, optimizing supply chain, detect deficient controls, and managing risk (Jans et al., 2014; Yeo & Carter, 2017). The agility management capability in data analytics provides superior value as well as overcoming disruption risks and ensuring organization practices (Gligor et al., 2016).

In addition, the management capability of audit data analytics capability appears to be a paradigm shift in terms of converting unstructured large data into useful and meaningful data for decision-making (Yeo & Carter, 2017). Data analytics capability literature found that management capability can help the organization to recognize the core resources (Mikalef et al., 2017). It provides a synthesis of findings that can guide practical support in data deployments for organizations that need to redefine their understanding of judgment compared to the existing practices (Gupta & George, 2016). Organizational change developed in discursive and non-discursive practices (Leclercq-Vandelannoitte, 2011).

Furthermore, the existing literature suggests that the organization's management capability affects its results of practice and effectiveness of risk management, which ultimately determines its performance (Mithas, Ramasubbu & Sambamurthy, 2011). Barton & Court (2012) confirm the positive relationship between management capability and organizational performance. Similarly, Akter et al. (2016) and Fosso Wamba et al. (2017) confirm the positive relationship between big data analytics management capability and organizational performance.

According to the dynamic capability theory, this theory focuses on how organizations renew and develop their capabilities to respond to environmental changes. It suggests that the organizational processes and organizational managerial influence the development of its dynamic capability (Teece et al., 1997). This theory emphasizes the development of management capability and of difficult-to-imitate

combinations of managerial practices to create new capability and renew competency according to changes in the environment (Shamim et al., 2019).

Previous researches indicated that dynamic capability theory could be best conceptualized as tools that enhance existing resource configurations to strengthen long-term sustainable value for the organization, especially in the dynamic environment (Eisenhardt & Martin, 2000). It is one of the most influential and cited theories in management capability to explain how organizations achieve in organizational performances, business returns, and profits (Drnevich & Kriauciunas, 2011; Moustaghfir, 2008; Zollo & Winter, 2002).

In the context of tax departments, the management capability is also critical for the development of dynamic capability suited to cope with changing environments (Helfat & Peteraf, 2014). The organizational performance is based on making a number of correct organizational decisions by using the dynamic capability theory. This theory evolves a micro-evolution through upgrading the management capability of the organization. It must be well-targeted and deployed in order to achieve strategic goals. Consequently, management capability is critical in gaining organizational performance-related benefits (Zahra et al., 2006). **Thus, Hypotheses 1a, 1b, and 1c are also supported by the results.**

Secondly, it is found that technology competence (the second dimension) also shows significant and positive effects on all three outcomes: risk management efficiency (β_2 = 0.302, p < .01), good practice (β_5 = 0.298, p < .01), and tax performance (β_8 = 0.173, p < .01). This means that technology competence has the potential to help organization gain greater risk management efficiency, good practice, and tax performance. Consistent with previous research, Akter et al. (2016) found that technology capability was identified as a key predictor of data analytics capability, emphasizing the need for versatility of the analytics platform so that it connects data from various functions across the organization, ensures information flow, and enhance the performance of the data analytics platform in terms of connectivity, compatibility, and modularity. Technology competence of data analytics was used to extract information from larger volumes of data which could help tax authorities identify

high-risk areas such as fraudulent transactions on which they could focus their investigative efforts (Brown-Liburd et al., 2015).

In addition, in the context of developing data analytics, perhaps the core resource is the data itself. It is frequently mentioned that information technology strategists and data analysts are particularly concerned with the data quality from organizational practices (Brinkhues et al., 2014). Sambamurthy, Bharadwaj & Grover (2003) found that organizations are increasingly investing in information technology capabilities. Then, organization leaders can address short-term data needs by working with managers to prioritize requirements. This means quickly connecting the most important data analytics for use in organizational practices, followed by a cleanup operation to synchronize and merge overlapping data. Such short-term tactics may lead organizations to vendors that focus on analytics services (Barton & Court, 2012).

Furthermore, Gunasekaran et al. (2017) confirmed that connectivity and compatibility under technology competence, which is positively related to big data and data analytics capability and organizational performance. Akter et al. (2016) and Fosso Wamba et al. (2017) confirm the positive relationship between big data analytics technology capability and organizational performance. The information technology has positively and significantly influences on organizational performance with the involvement of the e-procurement system type (Oh et al., 2014). Moreover, research related to the complementarity of resources points out that the combination of information technology assets and capabilities positively affect organizational performance (Wang et al., 2012). Then, information technology capabilities and organizational performance have proven that organizations with superior information technology capability generally achieve superior organizational performance (Zhang et al., 2016). Piccoli & Ives (2005) found that competence in mobilizing and deploying various data analytics capability resources differentiates performance and creates the sustainable value advantage.

In the context of developing the dynamic capability theory, several studies have examined how information technology infused in organizational capabilities can help organizations renew or reconfigure their existing mode of operating (Mikalef et al., 2017; Mikalef et al., 2016; Pavlou & El Sawy, 2006; Wang et al., 2012). The role

played by technology competence is well acknowledged in the existing literature. Technology competence is fundamental in facilitating the use of data analytics (Lawson et al., 2014). It has a strong influence on good practice and can also help to integrate tasks (Shamim et al., 2019). Similarly, Jin & von Zedtwitz (2008); Zhou & Wu (2010), who have highlighted the importance of technology competence in driving organizational performance.

Fosso Wamba et al. (2017); Teece (2007) confirms that reconfiguration of capability, which refers to dynamic capability theory, is required to maintain evolutionary to maintain efficiency and effectiveness. Similarly, Dutch tax departments used the big data and data analytics capability, including technology competence, to improve the tax administration by detecting the pattern leading to tax evasion. Through data analytics-based decision making, tax authorities managed to enhance risk management efficiency and the effectiveness of good practice (Janssen et al., 2017). **Thus, Hypotheses 2a, 2b, and 2c are also supported by the results.**

Finally, the finding indicates that personnel expertise (the third dimension) shows significant positive effects on all its outcomes: risk management efficiency (β_3 = 0.410, p < .01), good practice (β_6 = 0.454, p < .01), and tax performance (β_9 = 0.333, p < .01). The positive relationships between personnel expertise and three consequences indicated that organizations with more extensive personnel expertise would have higher risk management efficiency, good practice, and tax performance. In term of personnel expertise is consistent with human resource literature, which suggests that know-how of personnel expertise is referred to as capabilities and can create or sustain advantage (Constantiou & Kallinikos, 2015). The findings mentioned above support prior research, which found that personnel expertise such as technical skills, relational knowledge, and technological management knowledge provide new challenges (e.g., good practice and risk management efficiency) (Li et al., 2018).

Furthermore, the capacity to utilize information technology and tools is highly dependent on the skills, knowledge, and learning of human resources. The necessary skills for such employees include a good understanding of what each department is doing, as well as the ability to communicate with each and build fused teams (Mikalef et al., 2017). Since more data means more knowledge, organizations are

increasingly making use of analytic tools to achieve and sustain organizational performance (Fosso Wamba et al., 2017). George & Diavastis (2016) found that education, experience, and training, to have significant relationships with tax audit effectiveness. Bonface, Malenya & Musiega (2015) found the statistically significant positive relationship between managerial expertise and organizational performance. Similarly, Akter et al. (2016) confirm the positive relationship between personnel expertise and organizational performance. Consequently, Gupta & George (2016) confirmed that managerial and technical data skills under human skills, which is positively related to big data and data analytics capability and organizational performance.

In the context of developing dynamic capability, the role played by personnel expertise is well acknowledged in the existing literature. For instance, Gutierrez-Gutierrez & Barrales-Molina (2018) suggest that effective personnel expertise enhance the dynamic capability of the organization. This theory is a learned pattern of collective activity through which the organization systematically modifies and generates its operating routines in pursuit of improved effectiveness (Zollo & Winter, 2002).

The development of dynamic capabilities view requires resources and personnel attention (Bingham et al., 2007). The data analytics capability of the organization, including personnel expertise, can affect the organizational performance for a greater value (Wade & Hulland, 2004). Similarly, Akter et al. (2016) point out that data analytics capability was found to have a positive association with all the primary dimensions with talent capability emerging as the strongest. Talent capability could be upgraded by recruitment and training to achieve better skills and knowledge of the consequents of overall data analytics capability. **Thus, Hypotheses 3a, 3b, and 3c are also supported the results.**

The Relationships among Risk Management Efficiency, Good Practice, and Tax Performance

As mentioned in Chapter 2, audit data analytics capability consists of (1) risk management efficiency, (2) good practice, and (3) tax performance. This research proposes that risk management efficiency and good practice influence tax performance in a positive direction as proposed in Hypotheses 4 and 5. These hypotheses are transformed into the regression equation in Equation 4 as shown in Figure 6.

Figure 6 The Relationships among Risk Management Efficiency, Good Practice, and Tax Performance

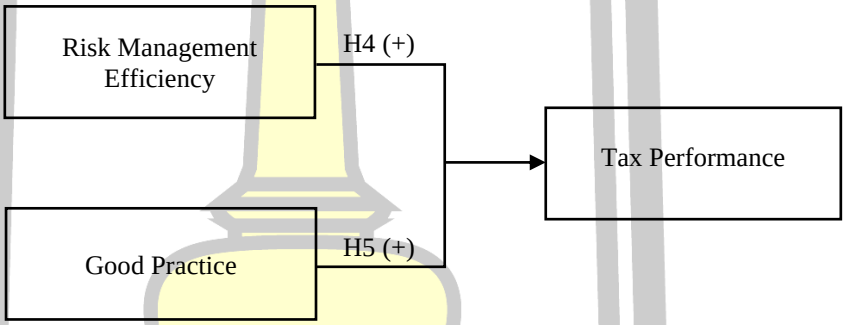


Table 14 Descriptive Statistics and Correlation Matrix of Risk Management Efficiency, Good Practice, and Tax Performance

Variables	RM	GP	TP
Mean	4.185	4.451	4.385
S.D.	0.555	0.553	0.557
RM	1.000		
GP	.662**	1.000	
TP	.512**	.523**	1.000

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

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

Table 14 shows the correlation coefficient between risk management efficiency, good practice, and tax performance. The results indicated that risk management efficiency and good practice have the positive significant correlation with tax performance (r = 0.512, p < .01; r = 0.523, p < .01, respectively). All these correlation coefficients are less than 0.80. In addition, the maximum VIF values of Equation 4 shown in Table 15 is 1.699, which is below the cutoff value of 10 (Hair et al., 2014). Consequently, overall, the multicollinearity problems are not a concern for this analysis.

Table 15 Result of Regression Analysis for the Effects among Risk Management Efficiency and Good Practice on Tax Performance

Equation	**Independent Variables**	**Dependent Variables:** Tax Performance				
		Unstandardized Coefficients		Standardized Coefficients	t-stat	p-value
		B	Std. Error	Beta		
4	(Constant)	.301	.042		7.199	.000
	Risk Management Efficiency (H4)	.256	.062	.274	4.099	.000**
	Good Practice (H5)	.354	.065	.365	5.463	.000**
	Adjusted R^2	**.332**				
	Prob.	**0.000**				
	F-test	**64.038**				
	Maximum VIF	**1.699**				

** p < 0.01, * p < 0.05

Table 15 above presents the empirical evidence on the relationship between risk management efficiency and tax performance, the regression analysis reveals the significance of hypothesis 4 that risk management efficiency has positively and significantly affect tax performance in Thailand (β_{10} = 0.274, p < .01). The finding demonstrates that higher risk management efficiency helps the organization to gain greater tax performance. Risk management efficiency helps to achieve organizational objectives by assessing and detecting organizational risks (Khongmalai & Distanont, 2017).

Consistent with previous research, Beasley et al. (2006) found that enterprise risk management has the positive impact on internal audit activities in the organization, especially when the organization's enterprise risk management process is more effectively in place. Drogalas et al. (2017) and Kendrick (2004) confirm the positive relationship between risk management efficiency and organizational value. Similarly, Hoyt & Liebenberg (2011) found that the statistically significant positive relationship between the integration of risk management procedures in mainstream organizational management and organizational value. Moreover, Shin & Park (2017) found that the relationship between enterprise risk management and management control systems in important to the increase of organizational performance.

According to contingency theory, the role played by risk management efficiency is well acknowledged in the existing literature. The finding confirms the contingency theory via the contingency effect of tax performance on risk management efficiency. Equally, the finding is consistent with Badara & Saidin (2012) which found that risk management efficiency can influence the effectiveness of internal audits. It enables the achievement of the organizational objective and improves internal audit effectiveness (Gordon et al., 2009). Thus, risk management efficiency can thus be regarded as achieving the organizational objectives for tax performance. **Therefore, Hypotheses H4 is supported.**

In addition, the finding indicates that the relationship between good practice and tax performance has shown the significant positive relationship (β_{11} = 0.365, $p < .01$). The result implies that the organization's ability to operate successfully in line with the targets that have been planned to achieve its objectives can help organizations to increase organizational performance. Consistent with prior studies, good practice is the methodology, techniques, methods, procedures, and processes combined into practice and improving organizational performance (O'Dell & Grayson, 1998). Udeh & Clement (2016) confirmed that compliance with internal audit practice could enhance effective organizational performance. Good practice may increasingly integrate operations, and enhance performance (Francis, 2011).

Organizations are more likely to invest in good practices that could produce positive superior organizational performance (Betts et al., 2015). The good practice is necessary to evaluate the efficiency of audit methodology which can improve tax audit process development (Carnaghan, 2006; Hui & Fatt, 2007). Meanwhile, it has become a tax audit management tool for tax authorities who can lead to the decision or choice among alternative good actions. This includes tax authorities who have implemented judgment accuracy and performance (Solomon & Trotman, 2003). The successful good practice of tax auditing includes project management techniques to ensure that audit plans are achieved and alternate management techniques to facilitate change. Moreover, top executives also expect tax authorities to support their accountability responsibilities by providing some oversight of operations and to spread the knowledge of managerial good practices throughout the organization (Juillet, 2016). Hence, tax authorities carefully analyze the organization's task environment, considering the characteristics of the organization and adapt good practices accordingly (Ong et al., 2019).

According to the contingency theory, this theory is no "one size fits all" solution to the challenges facing organizations in adopting good practices. This theory suggesting that globalization will affect the organization's resource-allocation strategies (Shahzadi et al., 2018). Contingency perspective assumes that good practice is impacted by the framework in which they are applied to an idea of how the framework affects contingent outcomes and operations in organizational performance (Dropulić, 2013). Then, good practice is necessary to evaluate the audit methodology efficiency which can improve tax audit process development (Carnaghan, 2006). **Thus, Hypothesis H5 is supported.**

The Relationships among the Antecedents and Each Dimension of Audit Data Analytics Capability

Figure 7 illustrates the relationships among three antecedents include: accounting information system implementation, organizational culture, and stakeholder pressure with three dimensions of audit data analytics capability as proposed in Hypotheses 6(a-c) to Hypotheses 8(a-c). The relationship of each hypothesis is proposed in the positive direction. These hypotheses are transformed into the regression equation in Equation 5-7.

Figure 7 The Relationships among the Antecedents and Each Dimension of Audit Data Analytics Capability

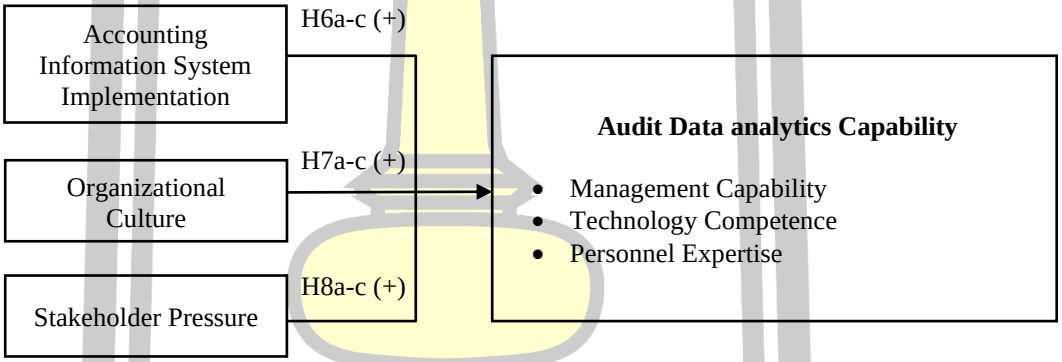


Table 16 Descriptive Statistics and Correlation Matrix of Antecedences and Dimension of Audit Data Analytics Capability

Variables	MC	TC	PE	AI	OC	SP
Mean	4.455	4.555	4.398	4.319	4.587	4.404
S.D.	0.511	0.468	0.575	0.586	0.518	0.546
MC	1.000					
TC	.586**	1.000				
PE	.508**	.440**	1.000			
AI	.427**	.354**	.492**	1.000		
OC	.555**	.449**	.538**	.537**	1.000	
SP	.515**	.377**	.399**	.442**	.518**	1.000

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

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

Table 16 shows the correlation coefficients among three antecedents and each dimension of the audit data analytics capability. The results indicate that all antecedents are positively correlated with all audit data analytics capability. For the first antecedent, accounting information system implementation is positively and significantly correlated with management capability, technology competence, and personnel expertise ($r = 0.427$, $p < .01$; $r = 0.354$, $p < .01$; $r = 0.492$, $p < .01$, respectively). Secondly, organizational culture is positively and significantly correlated with management capability, technology competence, and personnel expertise ($r = 0.555$, $p < .01$; $r = 0.449$, $p < .01$; $r = 0.538$, $p < .01$, respectively). Finally, stakeholder pressure is positively and significantly correlated with management capability, technology competence, and personnel expertise ($r = 0.515$, $p < .01$; $r = 0.377$, $p < .01$; $r = 0.399$, $p < .01$, respectively).

In the part of the correlation coefficients among three antecedences of audit data analytics capability, the results from Table 16 also show that all correlations are less than 0.80. Furthermore, the maximum VIF values of Equation 5 to 8 show in Table 17 - 19 is 1.002, which is below the cutoff value of 10 (Hair et al., 2014).

Consequently, there are no significant multicollinearity problems appearing in this analysis.

Table 17 Result of Regression Analysis for the Effects of the Antecedent on Audit Data Analytics Capability (Management Capability)

Equation	**Independent Variables**	**Dependent Variables:** Management Capability				
		Unstandardized Coefficients		Standardized Coefficients	t-stat	p-value
		B	Std. Error	Beta		
5	(Constant)	.191	.076		2.508	.013
	AIS Implementation (H6a)	.295	.054	.308	5.438	.000**
	Organizational Culture (H7a)	.293	.057	.290	5.130	.000**
	Stakeholder Pressure (H8a)	.165	.055	.169	2.982	.003**
	Adjusted R^2	**.188**				
	Prob.	**0.000**				
	F-test	**20.629**				
	Maximum VIF	**1.002**				

** p < 0.01, * p < 0.05

Table 18 Result of Regression Analysis for the Effects of the Antecedent on Audit Data Analytics Capability (Technology Competence)

Equation	**Independent Variables**	**Dependent Variables:** Technology Competence				
		Unstandardized Coefficients		Standardized Coefficients	t-stat	p-value
		B	Std. Error	Beta		
6	(Constant)	.316	.068		4.614	.000
	AIS Implementation (H6b)	.159	.049	.190	3.208	.002
	Organizational Culture (H7b)	.265	.052	.303	5.131	.000
	Stakeholder Pressure (H8b)	.158	.050	.185	3.135	.002
	Adjusted R^2	**.149**				
	Prob.	**0.000**				
	F-test	**15.198**				
	Maximum VIF	**1.001**				

** p < 0.01, * p < 0.05

Table 19 Result of Regression Analysis for the Effects of the Antecedent on Audit Data Analytics Capability (Personnel Expertise)

Equation	**Independent Variables**	**Dependent Variables:** Personnel Expertise				
		Unstandardized Coefficients		Standardized Coefficients	t-stat	p-value
		B	Std. Error	Beta		
7	(Constant)	.089	.075		1.185	.237
	AIS Implementation (H6c)	.224	.054	.228	4.173	.000
	Organizational Culture (H7c)	.322	.056	.313	5.722	.000
	Stakeholder Pressure (H8c)	.339	.055	.340	6.209	.000
	Adjusted R^2	**.247**				
	Prob.	**0.000**				
	F-test	**28.561**				
	Maximum VIF	**1.001**				

** p < 0.01, * p < 0.05

The results of the OLS regression analysis are described in table 17 - 19 as follows. Firstly, the results also show that accounting information system implementation (the first antecedent) has significant positive effects on all dimensions of audit data analytics capability: management capability (β_{12}= 0.308, p < .01), technology competence (β_{15}= 0.190, p < .01), and personnel expertise (β_{18}= 0.228, p < .01). It can be seen that organizations with more accounting information system implementation will be increasingly management capability, technology competence, and personnel expertise.

The finding of this research was in line with prior research which stated that accounting information system implementation could enhance the capability of audit data analytics in the dynamic environment to integrate operational considerations within long-term strategic plans (Ismail, 2009). It is a potential consequence of providing internal control quality and it can make the difference in the decision making for financial statements users by possessing confirmatory value and predictive value (Frendy & Semba, 2017).

In addition, accounting information usefully is employed to analyze strategic positioning to assist management in securing, and subsequently to sustain advantage. Hunton, Wright & Wright (2004) found that accounting information environments are

the challenging environment for auditors who lack the necessary information technology skills to audit systems should rely on information systems to carry out successful audits. The usage of data is also currently being discussed for accounting information, especially due to the generally close connection between information systems and accounting information. Furthermore, the use of data analytics have positive effects on the determination and provision of accounting information, larger quantities of data do necessarily lead to better decision making (Gärtner & Hiebl, 2018).

Drawing from the dynamic capability theory, data analytics capability as the organizational implementing that serves to minimize uncertainties in demands, to build information processing capabilities which assist the organization in understanding and combining knowledge obtained from different sources and directing this synthesized knowledge toward suitable decision-making process (Schoenherr & Speier-Pero, 2015). Additionally, Eisenhardt & Martin (2000) show that knowledge created from a situation rather than on existing knowledge. George & Diavastis (2016) found that accounting information systems help to improve tax audit effectiveness. However, using modern information technology capabilities, well-trained employees, and accounting information systems would be a solution to tax evasion problem, and rationalize decision-making (Al-moumany & AI Ebbini, 2013). **Therefore, hypotheses 6a, 6b, and 6c are supported.**

Secondly, the findings demonstrate that organizational culture (the second antecedent) has significant positive effects on all dimensions of audit data analytics capability: management capability (β_{13}= 0.290, p < .01), technology competence (β_{16}= 0.303, p < .01), and personnel expertise (β_{19}= 0.313, p < .01). As predicted in hypothesis H7a to H7c, the findings reveal that higher organizational culture will be increasingly management capability, technology competence, and personnel expertise. This is consistent with the evidence from previous studies of data analytics capability, which indicated that organizational culture, strategic, skill-related, can vastly improve their data analytics capability for changes in processes, behaviors, and performance. (Davenport et al., 2001).

In addition, the role of organizational culture has been widely discussed in operations management literature, the culture of the organization to deploy resources quickly and efficiently, to respond to the changing data analytic conditions (Swafford et al., 2008). The era of data analytics is evolving rapidly, most organizations should undertake massive overhauls of organizations and transform the organizational culture such as efforts will play a part in maintaining flexibility, along with the technology for managing and analyzing data, learn the core skills of using audit data (Barton & Court, 2012). Similarly, McAfee & Brynjolfsson (2012) also confirmed that organizational culture is one of the main challenges for data management capability. It is very important to reap the benefits linked to the use of data analytics capability-including management capability, availability of technology, and professionals skilled-in decision making.

According to dynamic capability theory, learning culture and organizational culture in the context of dynamic capability theory, has the potential of influencing the organization's data analytics capability, behavior, and organizational outcomes (Shamim et al., 2019). Schoemaker, Heaton & Teece (2018) have noted that the dynamic capability theory required a strong and change-oriented organizational culture to enhance data analytics capability. Chirico & Nordqvist (2010) suggested that organizational culture influences the management process designed to acquire, exchange, and transform internal and external resources, which leads to the dynamic capability view. **Therefore, hypotheses 7a, 7b, and 7c are supported.**

Finally, the finding shows that stakeholder pressure (the third antecedent) has significant positive effects on all dimension of audit data analytics capability: management capability (β_{14}= 0.169, p < .01), technology competence (β_{17}= 0.185, p < .01), and personnel expertise (β_{20}= 0.340, p < .01). These results mean that higher stakeholder pressure has affected more management capability, technology competence, and personnel expertise.

The finding is in line with previous studies, which indicated that stakeholder pressure plays a prominent role in the implementation of social standards (Huq et al., 2016). Zhu & Sarkis (2007) suggested that governments expect to use audited financial information to evaluate and predict tax revenue. Then, stakeholders pressure

the organization to reduce negative externalities. Stakeholders increasingly view public accountability and transparency by organizations as an important quality (Kashmanian, Wells & Keenan, 2011). Similarly, Hall & Wagner (2012) found that stakeholders do influence sustainability integration in organizational activities.

According to the dynamic capability theory, dynamic capabilities as managerial processes for altering the organization's resource base to develop new strategies such as big data and data analytics capability (Vargas & Mantilla, 2014). This theory is useful in rapidly changing environments (Teece et al., 1997). Consensus exists among scholars that organizations must develop and apply specific management capability to respond to different stakeholder pressure (Gavronski et al., 2011; Reuter et al., 2010; Sarkis et al., 2010; Shi et al., 2012). **Therefore, hypotheses 8a, 8b, and 8c are supported.**

Summary

In this chapter, descriptive statistics for respondent characteristics and sample characteristics were reported. The multiple regression analysis and specific correlation analysis were used to test the hypotheses developed in the study, as well as to investigate the relationships among the variables. The results revealed that three dimensions of audit data analytics capability include: management capability, technology competence, and personnel expertise have a strong positive impact on its all consequences (risk management efficiency, good practice, and tax performance). Likewise, risk management efficiency and good practice have a strong positive impact on tax performance. In addition, the results of three antecedent factors: accounting information system implementation, organizational culture, and stakeholder pressure have positive significant and the majority influential determinants of three dimensions of audit data analytics capability. In conclusion, all the hypotheses are supported. The summary of the hypotheses testing results is shown in Table 20 and Figure 8.

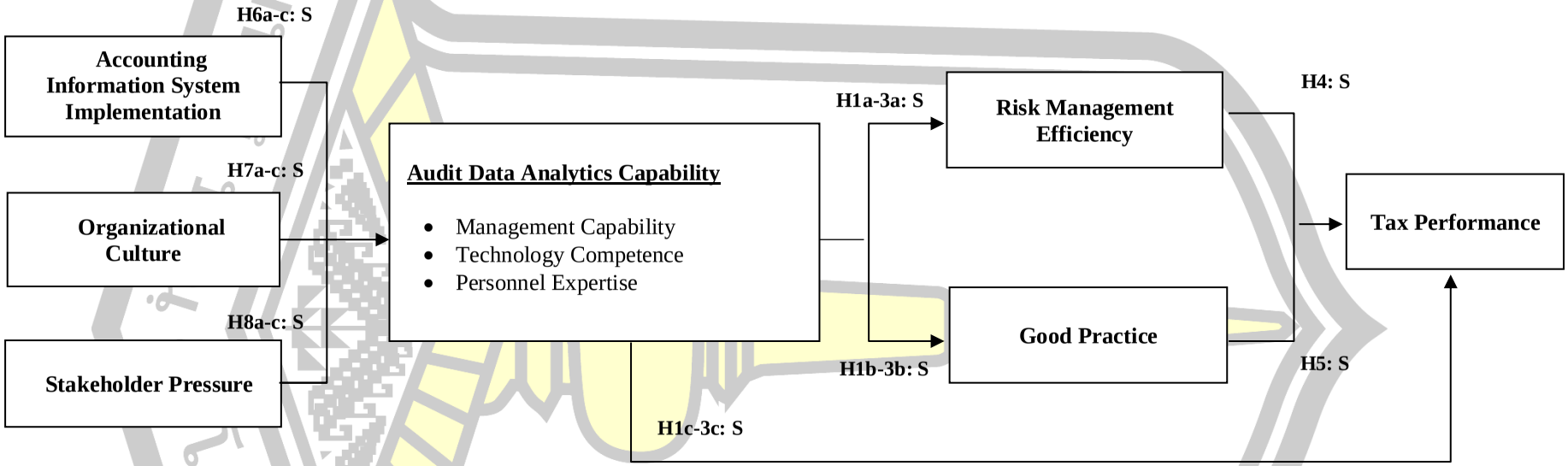
Table 20 The Results Summary of Hypotheses Testing

Hypotheses	Description of Hypothesized Relationships	Results
H1a	The higher the management capability is, the more likely that organizations will gain greater risk management efficiency.	Supported
H1b	The higher the management capability is, the more likely that organizations will gain greater good practice.	Supported
H1c	The higher the management capability is, the more likely that organizations will gain greater tax performance.	Supported
H2a	The higher the management capability is, the more likely that organizations will gain greater risk management efficiency.	Supported
H2b	The higher the management capability is, the more likely that organizations will gain greater good practice.	Supported
H2c	The higher the management capability is, the more likely that organizations will gain greater tax performance.	Supported
H3a	The higher the technology competence is, the more likely that organizations will gain greater risk management efficiency.	Supported
H3b	The higher the technology competence is, the more likely that organizations will gain greater good practice.	Supported
H3c	The higher the technology competence is, the more likely that organizations will gain greater tax performance.	Supported
H4	The higher the risk management efficiency is, the more likely that organizations will gain greater tax performance.	Supported
H5	The higher the good practice is, the more likely that organizations will gain greater tax performance.	Supported
H6a	The higher the accounting information system implementation is, the more likely that organizations will gain greater management capability.	Supported

Table 20 The Results Summary of Hypotheses Testing (continued)

Hypotheses	Description of Hypothesized Relationships	Results
H6b	The higher the accounting information system implementation is, the more likely that organizations will gain greater technology competence.	Supported
H6c	The higher the accounting information system implementation is, the more likely that organizations will gain greater personnel expertise.	Supported
H7a	The higher the organizational culture is, the more likely that organizations will gain greater management capability.	Supported
H7b	The higher the organizational culture is, the more likely that organizations will gain greater technology competence.	Supported
H7c	The higher the organizational culture is, the more likely that organizations will gain greater personnel expertise.	Supported
H8a	The higher the stakeholder pressure is, the more likely that organizations will gain greater management capability.	Supported
H8b	The higher the stakeholder pressure is, the more likely that organizations will gain greater technology competence.	Supported
H8c	The higher the stakeholder pressure is, the more likely that organizations will gain greater personnel expertise.	Supported

Figure 8 A Summary of the Results of Hypotheses Testing



Note:
(S) = Hypotheses Supported (8 Hypotheses)

CHAPTER V

DISCUSSION AND CONCLUSION

The previous chapter has examined the outcome of the data and hypotheses testing. This chapter provides the overview of all findings, including the discussion and summary of the findings, contributions to the theoretical knowledge and the contribution to practice, research limitations, and further research that could be extended.

Discussion and Conclusion

The discussion and conclusion of this research to the existing body of knowledge in the information technology area are discussed below.

Discussion

Following the sociomaterialism perspective related to information technology capability in the dynamic capability theory, this research used the initial work conducted by Akter et al. (2016) and Kim et al. (2012) to develop the construct of audit data analytics capability. This research investigated how dynamic capability development can be affected by each dimension of audit data analytics capability, in the context of risk management efficiency, good practice, and tax performance. As Teece et al. (1997) also suggested that effective management of resources is important to create value from the resources and capabilities. Especially in environmental change, the organization needs to reconfigure the existing resources and capabilities, and this process heavily depends on the organization's audit data analytics capability, which is the main approach of dynamic capability (Priem & Butler, 2001; Schoemaker et al., 2018).

The qualitative exploration conducted by Akter et al. (2016) and Kim et al. (2012) also provided important insights to design the construct of audit data analytics

capability: having management capability, technology competence, and personnel expertise, respectively. Literature suggests that the agility management capability in data analytics capability provides superior performance as well as overcoming disruption risks and ensuring organization practices (Akter et al., 2016; Barton & Court, 2012; Chen & Hsieh, 2014; Fosso Wamba et al., 2017; Gligor et al., 2016; Mithas et al., 2011). The dynamic capability view also suggests that data management capability can help the organization to recognize the core resources (Mikalef et al., 2017).

Consistent with previous research, connectivity and compatibility under technology competence, which is positively related to audit data analytics capability and organizational performance as well as the data quality from organizational practices and create sustainable value advantage (Akter et al., 2016; Brinkhues et al., 2014; Fosso Wamba et al., 2017; Gunasekaran et al., 2017; Oh et al., 2014; Piccoli & Ives, 2005; Shamim et al., 2019; Wang et al., 2012; Zhang et al., 2016; Zhou & Wu (2010). The dynamic capability approach also suggests that technology competence infused in organizational capabilities can help organizations renew or reconfigure their existing mode of operating (Mikalef et al., 2016; Pavlou & El Sawy, 2006; Teece, 2007).

In the empirical literature, personnel expertise such as technical skills, relational knowledge, and technological management knowledge provide new challenges in operational practice and risk management efficiency (Li et al., 2018). Moreover, the managerial and technical data skills under personnel expertise, which is positively related to organizational performance (Akter et al., 2016; Bonface et al., 2015; Fosso Wamba et al., 2017; Gupta & George, 2016). The development of dynamic capability view also requires resources, capabilities, and personnel attention for the greater organizational value (Bingham et al., 2007; Gutierrez-Gutierrez & Barrales-Molina, 2018; Wade & Hulland, 2004).

Our results support the assumption that the construct of audit data analytics capability including management capability, technology competence, and personnel expertise are positively associated with risk management efficiency, good practice, and tax performance. The findings of this research show that each dimension of audit data analytics capability has the significant association with risk management efficiency,

good practice, and tax performance. This finding is consistent with existing literature and with the dynamic capability theory. Even though, this research collected data from Thailand's tax departments, however, the findings can be used in other contexts as well. As the dynamic capability view has the element of reconfiguration of capabilities according to the environmental change (Pisano, 2017; Teece et al., 1997).

Secondly, this research address risk management efficiency and good practice as the mediator of audit data analytics capability and tax performance in the contingency theory. This theory is one of those theories that are recently been employed in the research area of auditing (Abushaiba & Zainuddin, 2012; Badara, 2015; Valanciene & Gimzauskiene, 2009). This research investigated how the development of contingency theory can be affected by risk management efficiency and good practice, in the context of tax performance. As Gordon et al. (2009) confirm that the relationship between risk management efficiency and firm performance is significantly contingent variables. Similarly, contingency perspective assumes that good practice is impacted by the framework in which they are applied to an idea of how the framework affects contingent outcomes and operations in organizational performance (Dropulić, 2013).

Our results support the assumption that risk management efficiency and good practice are positively associated with tax performance. The findings of this research show that risk management efficiency and good practice have the strongest association with tax performance. This finding is consistent with existing literature and with the contingency theory.

Finally, this research expands the Technology-Organization-Environment (TOE) framework related to the technological innovation. This research investigated how the dynamic capability development can be influenced by accounting information system implementation, organizational culture, and stakeholder pressure, as antecedents of the dimension of audit data analytics capability in the same model. As Oliveira & Martins (2011) also provided important insights to design the construct of existing TOE framework literature by including the concept of technological innovation as the potential influencer of accounting information system implementation, organizational culture, and stakeholder pressure-audit data analytics capability relationship.

In the empirical literature, Janssen et al. (2017) study were more relevant to make better decisions and the creation of value from big data and data analytics capability specifically focused on the factors affecting data analytics capability such as Drogalas et al. (2015) found that accounting information systems help to improve tax audit effectiveness. Schoemaker et al. (2018) confirm that the promotion of the culture of knowledge exchange can enhance data analytics capability. Shi et al. (2012) suggest that organizations must develop specific data management capability to respond to different stakeholder pressure.

Our results support the assumption that accounting information system implementation, organizational culture, and stakeholder pressure are positively associated with each dimension of audit data analytics capability. The findings of this research show that accounting information system implementation, organizational culture, and stakeholder pressure have the strongest association with audit data analytics capability. This finding is consistent with existing literature and with the dynamic capability theory.

Conclusion

Despite the recognized importance of audit data analytics capability in various studies, there is little empirical manifestation regarding the dimensions of audit data analytics capability affecting tax performance. Therefore, this research intends to combine the conceptual framework of audit data analytics capability in order to investigate the effects of audit data analytics capability on tax performance of tax departments in Thailand. The relationships among audit data analytics capability consist of three major dimensions such as management capability, technology competence, and personnel expertise; and three critical consequences which are risk management efficiency, good practice, and tax performance are examined. In addition, accounting information system implementation, organizational culture, and stakeholder pressure are assigned as the antecedents of audit data analytics capability.

The conceptual framework of this research was supported by two theories, including dynamic capability theory and contingency theory. Dynamic capability theory is used to describe the phenomena of the relationship of audit data analytics capability

dimensions which affects its consequence and tax performance. Furthermore, it is used to identify the antecedent influence on audit data analytics. In addition, the contingency theory is used to describe relationships among risk management efficiency, good practice, and tax performance.

For research investigation, tax departments in Thailand were selected as the research population due to the concern of audit data analytics capability for the adaptability of the organization. The population of this investigation was selected from the database of the Department of Excise, Revenue, and Customs under the Ministry of Finance in Thailand. Data were collected from 255 chiefs of the area office of each tax audit branch as the key informant. Approximately, the mail survey resulted in 63.28% response rate. The ordinary least square method (OLS) is operated to statistically estimate the coefficient of hypotheses testing.

Theoretical Contributions and Managerial Implications

This research makes a rich theoretical contribution by using the dynamic capability theory and the contingency theory to examine the construct of audit data analytics capability and adds to the research aimed at understanding the process of creating value from data analytics capability. By providing a new theoretical framework grounded in quantitative evidence, this research provides an essential contribution to our knowledge of value creation from big data and data analytics capability in the tax departments in the era of the digitalized world.

From a managerial perspective, this research has provided some interesting insights. In particular, the support for the positive relationship between audit data analytics capability and tax performance could be the relevant finding for executives involved in data analytics capability-related achieve capabilities. Given that most of the big data investments fail to pay off because organizations are neither prepared nor do make decisions based on the intelligence extracted from data, it is highly necessary to create the data analytics capability (Côrte-Real, Oliveira & Ruivo, 2017). The results of this study implicate that although data analytics technologies, call for substantial investment in implementation and maintenance, tax departments are aware of audit data

analytics' potential value and benefits, both in terms of risk management efficiency and operational value. Considering this, executives would benefit from investing time and resources in creating such the capability.

In addition, this research emphasizes the management capability, technology competence, and personnel expertise needed to create the audit data analytics capability. This way, executives become aware of the fact that gaining the sustained advantage from data analytics is not just about investing big amounts of money or having access to sophisticated technology, but also about possessing data analytics-related technical managerial skills, the right organizational culture, and intensity of technological management knowledge. Scholars in both information technology and data analytics capability literature have highlighted the importance of information technology infrastructures like personnel expertise and organizational culture in building capabilities (Akter et al., 2016; Fosso Wamba et al., 2017; Gupta & George, 2016; Kim et al., 2012; Kiron et al., 2014; McAfee & Brynjolfsson, 2012) such as creating good tax administration, increase tax simplification, and decrease problems of tax evasion and tax avoidance (Svetalekth, 2016).

Consequently, the findings generate insights into the concept of risk management efficiency and good practice in relation to audit data analytics capability and tax performance. While the positive significant relationship was found, it is important for executives to be aware of risk management efficiency and good practice. The audit data analytics capability might contribute to organizational ability to find the right balance between exploiting existing resources and exploring new opportunities, to eventually achieve enhanced organizational performance. Thus, this research is suggested that setting up an independent information technology center of tax departments may be a way to develop the tax system.

Limitations and Future Research Directions

When interpreting the outcomes of this research several limitations need to be considered. Firstly, because of its quantitative research design, this research did not explore the phenomenon in-depth; therefore, future research could explore the given

context in more detail through a qualitative mode of inquiry to determine how audit data analytics capability challenges enhance organizational performance. Additionally, experimental design-based studies would provide rich insights into the mechanisms and processes involved in creating value from data analytics capability.

Secondly, data was collected at one point in time rather than longitudinally. The cross-sectional research design limits the extent to which inferences can be made about the causal ordering of variables. Thus, this research could not account for time-lag effects of changes in audit data analytics capability on performance, because changes to these factors may not directly affect the performance of the organization after the change took place. Therefore, further similar studies could adopt a longitudinal case studies to extend and complement this research finding.

Finally, another suggestion would involve ascertaining the generalizability of the findings of our research to different institutions. Our descriptive findings reflect the current situation in Thailand's tax departments; it could, therefore, be interesting to determine whether our hypotheses would be confirmed or rejected in different institutional contexts. Therefore, future research needs to integrate institutions-based view with the dynamic capability theory and examine the value creation through big data and audit data analytics across the different range of other governmental auditors such as the state audit office of the Kingdom of Thailand, the cooperative auditing department, and the comptroller general's department.

REFERENCES

BIBLIOGRAPHY

Aaker, D. A., Kumar, V. & Day, T. X. (2001). *Marketing Research*. New York: John Wiley and Sons.

Abushaiba, I. A. & Zainuddin, Y. (2012). Performance measurement system design, competitive capability, and performance consequences - A conceptual like. *International Journal of Business and Social Science*, *3*(11), 184–193.

Adediran, S. A., Alade, S. O. & Oshode, A. A. (2013). The Impact of Tax Audit and Investigation on Revenue Generation in Nigeria. *European Journal of Business and Management*, *5*(26), 171–177.

af Wåhlberg, A. E. & Poom, L. (2015). An empirical test of nonresponse bias in internet surveys. *Basic and Applied Social Psychology*, *37*(6), 336–347.

Ahmad, N. H., Othman, R., Othman, R. & Jusoff, K. (2009). The Effectiveness of Internal Audit in Malaysian Public Sector. *Journal of Modern Accounting and Auditing*, *5*(9), 53–62.

AICPA. (2015). *Audit Analytics and Continuous Audit: Looking Toward the Future*. *American Institute of Certified Public Accountants*. New York: American Institute of Certified Public Accountants, Inc. New. Retrieved from http://www.aicpa.org/InterestAreas/FRC/AssuranceAdvisoryServices/DownloadableDocuments/AuditAnalytics_LookingTowardFuture.pdf

Akter, S., Fosso Wamba, S., Gunasekaran, A., Dubey, R. & Childe, S. J. (2016). How to improve firm performance using big data analytics capability and business strategy alignment? *International Journal of Production Economics*, *182*, 113–131.

Al-Htaybat, K. & von Alberti-Alhtaybat, L. (2017). Big data and corporate reporting: impacts and paradoxes. *Accounting, Auditing and Accountability Journal*, *30*(4), 850–873.

Al-Khouri, A. M. (2014). Strategy and execution: Lessons learned from the public sector. *International Business Research*, *7*(10), 61–73.

Al-moumany, S. N. & AI Ebbini, Mohammad, M. (2013). The role of accounting information systems (AIS) in combating tax evasion. *Institute of Interdisciplinary Business Research*, *5*(6), 73–91.

Ali, K., Mustafa, E. & Hanefah, M. (2013). Internal Audit Effectiveness: An Approach Proposition to Develop the Theoretical Framework. *Research Journal of Finance and Accounting*, *4*(10), 92–102.

Ali, S. & Green, P. (2012). Effective information technology (IT) governance mechanisms: An IT outsourcing perspective. *Information Systems Frontiers*, *14*(2), 179–193.

Alsalim, M. A. A., Hama-Amin, O. A. Q. & Sultan, A. S. (2016). Adaptation of accounting information system for the requirements of developing accounting measurement and disclosure. *European Journal of Business and Management*, *8*(9), 217–224.

Armstrong, J. S. & Overton, T. S. (1977). Estimating nonresponse bias in mail surveys. *Journal of Marketing Research*, *14*(3), 396–402.

Asiaei, K. & Jusoh, R. (2015). A multidimensional view of intellectual capital: The impact on organizational performance. *Management Decision*, *53*(3), 668–697.

Astuti, H. M., Muqtadiroh, F. A., Darmaningrat, E. W. T. & Putri, C. U. (2017). Risks assessment of information technology processes based on COBIT 5 framework: A case study of ITs service desk. *Procedia Computer Science*, *124*, 569–576.

Badara, Mu'azeu Saidu. (2015). Empirical evidence of performance measurement of internal audit function on its effectiveness. *Academic Journal of Management Science Research*, *1*(1), 1–10.

Badara, Mu'azu Saidu & Saidin, S. Z. (2012). The relationship between risk management and internal audit effectiveness at local government level. *Journal of Social and Development Sciences*, *3*(12), 389–396.

Badara, Mu'azu Saidu & Saidin, S. Z. (2014). Empirical evidence of antecedents of internal audit effectiveness from Nigerian perspective. *Middle - East Journal of Scientific Research*, *19*(4), 460–471.

Baines, A. & Langfield-Smith, K. (2003). Antecedents to management accounting change: A structural equation approach. *Accounting, Organizations and Society*, *28*(7–8), 675–698.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120.

Barney, J. B. (1986). Organizational culture: Can it be a source of sustained competitive advantage? *The Academy of Management Review*, *11*(3), 656–665.

Barney, J. B., Ketchen, D. J. & Wright, M. (2011). The future of resource-based theory: Revitalization or decline? *Journal of Management*, *37*(5), 1299–1315.

Barreto, I. (2010). Dynamic Capabilities: A review of past research and an agenda for the future. *Journal of Management*, *36*(1), 256–280.

Barton, D. & Court, D. (2012). Making advanced analytics work for you. *Harvard Business Review*, (October), 1–7. https://doi.org/10.1007/978-3-642-49298-3

Beasley, M. S., Clune, R. & Hermanson, D. (2006). The impact of enterprise risk management on the internal audit function. *Journal of Forensic Accounting*, 1–20.

Benitez-Amado, J. & Walczuch, R. M. (2012). Information technology, the organizational capability of proactive corporate environmental strategy and firm performance: A resource-based analysis. *European Journal of Information Systems*, *21*(6), 664–679.

Betts, T. K., Wiengarten, F. & Tadisina, S. K. (2015). Exploring the impact of stakeholder pressure on environmental management strategies at the plant level: What does industry have to do with it? *Journal of Cleaner Production*, *92*, 282–294.

Bhatt, G. D. & Grover, V. (2005). Types of information technology capabilities and their role in competitive advantage: An empirical study. *Journal of Management Information Systems*, *22*(2), 253–277.

Bierstaker, J., Janvrin, D. & Lowe, D. J. (2014). What factors influence auditors' use of computer-assisted audit techniques? *Advances in Accounting, Incorporating Advances in International Accounting*, *30*(1), 67–74.

Bingham, C. B., Eisenhardt, K. M. & Furr, N. R. (2007). What makes a process a capability? Heuristics, strategy, and effective capture of opportunities. *Strategic Entrepreneurship Journal*, *1*(1), 24–47.

Bird, R. M. (2015). Improving Tax Administration in Developing Countries. *Improving Tax Administration in Developing Countries*, *1*(1), 23–45.

Bonface, A., Malenya, A. A. & Musiega, D. (2015). Effect of Managerial Expertise on Organizational Performance of Investment Banks in Kenya: A case Study of Old Mutual Acquisition of Faulu Kenya Micro-Enterprise. *International Journal of Business and Management Invention*, *4*(4), 38–54.

Brander Brown, J. & McDonnell, B. (1995). The balanced score-card: Short-term guest or long-term resident? *International Journal of Contemporary Hospitality Management, 7*(2/3), 7–11.

Brinkhues, R. A., Maçada, A. C. G. & Casalinho, G. D. O. (2014). Information management capabilities: Antecedents And consequences. In *Twentieth Americas Conference on Information Systems* (pp. 1–11). Savannah.

Brown-Liburd, H., Issa, H. & Lombardi, D. (2015). Behavioral implications of big data's impact on audit judgment and decision making and future research directions. *Accounting Horizons, 29*(2), 451–468.

Budak, T., James, S. & Sawyer, A. (2016). The Complexity of tax simplification: Experiences from around the world. In *The Complexity of Tax Simplification* (pp. 1–10). Palgrave Macmillan UK.

Byrnes, P., Criste, T., Stewart, T. & Vasarhelyi, M. (2014). *Reimagining auditing in a wired world [White paper]. AiCPA.* Retrieved from https://www.aicpa.org/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/whitepaper_blue_sky_scenario-pinkbook.pdf

Carnaghan, C. (2006). Business process modeling approaches in the context of process level audit risk assessment: An analysis and comparison. *International Journal of Accounting Information Systems, 7*(2), 170–204.

Chalu, H. & Mzee, H. (2018). Determinants of tax audit effectiveness in Tanzania. *Managerial Auditing Journal, 33*(1), 35–63.

Chen, H., Chiang, R. H. L. & Storey, V. C. (2012). Business Intelligence and Analytics: From Big Data to Big Impact. *MIS Quarterly, 36*(4), 1165–1188.

Chen, J. C. & Roberts, R. W. (2010). Toward a more coherent understanding of the organization-society relationship: A theoretical consideration for social and environmental accounting research. *Journal of Business Ethics, 97*(4), 651–665.

Chen, Y. & Hsieh, T. (2014). Big data for digital government: Opportunities, challenges, and strategies. *International Journal of Public Administration in the Digital Age, 1*(1), 1–14.

Cheng, C. C. J. & Shiu, E. C. (2015). The inconvenient truth of the relationship between open innovation activities and innovation performance. *Management Decision, 53*(3), 625–647.

Chenhall, R. H. (2003). Management control systems design within its organizational context: findings from contingency-based research and directions for the future. *Accounting Organizations and Society*, *28*(2–3), 127–168.

Chirico, F. & Nordqvist, M. (2010). Dynamic capabilities and trans-generational value creation in family firms: The role of organizational culture. *International Small Business Journal*, *28*(5), 487–504.

Choi, T., Wallace, S. W. & Wang, Y. (2018). Big data analytics in operations management. *Production and Operations Management*, *27*(10), 1868–1883.

Collings, D. G., Mellahi, K. & Cascio, W. F. (2019). Global talent management and performance in multinational enterprises: A multilevel perspective. *Journal of Management*, *45*(2), 540–566.

Colon, D. W. & Swagerman, D. M. (2015). Enhanced relationship preparedness in a Dutch multinational context: A tax control framework. *Journal of Accounting and Taxation*, *7*(1), 13–18.

Constantiou, I. D. & Kallinikos, J. (2015). New games, new rules: Big data and the changing context of strategy. *Journal of Information Technology*, *30*(1), 44–57.

Cooper, D. R. & Schindler, P. S. (2014). *Business research methods*. (12th ed.). New York: The McGraw-Hill Companies, Inc.

Côrte-Real, N., Oliveira, T. & Ruivo, P. (2017). Assessing business value of Big Data Analytics in European firms. *Journal of Business Research*, *70*, 379–390.

COSO. (2004). *Enterprise risk management — integrated framework executive summary*. *New York* (Vol. 3). New York. Retrieved from https://doi.org/10.1504/IJISM.2007.013372

COSO. (2014). *Improving organizational performance and governance: How the COSO frameworks can help*. *Committee of sponsoring Organization of the Treadway Commission*. Jersey City. Retrieved from https://www.coso.org/Documents/2014-2-10-COSO-Thought-Paper.pdf

Customs Department. (2018). *The Customs Department Annual Report 2018*. *The Customs Department*. Bangkok.

Davenport, T. H. (2006). Competing on analytics. *Harvard Business Review*, *84*(1), 98–134.

Davenport, T. H., Harris, J. G., Long, D. W. De & Jacobson, A. L. (2001). Data to Knowledge to Results: Building an analytic capability. *California Management Review*, *43*(2), 117–138.

De Bruijn, H. (2002). Performance measurement in the public sector: strategies to cope with the risks of performance measurement. *International Journal of Public Sector Management*, *15*(7), 578–594.

de Guinea, A. O., Kelley, H. & Hunter, M. G. (2011). Information systems effectiveness in small businesses. *Journal of Global Information Management*, *13*(3), 55–79.

Deloitte. (2016). *Internal audit analytics: The journey to 2020 insights-driven auditing*. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/us/Documents/risk/us-risk-internal-audit-analytics-pov.pdf

DeLone, W. H. & McLean, E. R. (2003). The DeLone and McLean model of information system success: A ten-year update. *Journal of Management Information Systems*, *19*(4), 9–30.

Drazin, R. & Van de Ven, A. H. (1985). Alternative forms of fit in contingency theory. *Administrative Science Quarterly*, *30*(4), 514–539.

Drnevich, P. L. & Kriauciunas, A. P. (2011). Clarifying the conditions and limits of the contributions of ordinary and dynamic capabilities to relative firm performance. *Strategic Management Journal*, *32*(3), 254–279.

Drogalas, G., Eleftheriadis, I., Pazarskis, M. & Anagnostopoulou, E. (2017). Perceptions about effective risk management. The crucial role of internal audit and management. Evidence from Greece. *Investment Management and Financial Innovations*, *14*(4), 1–11.

Drogalas, G., Ioannis, S., Dimitra, K. & Ioannis, D. (2015). Tax audit effectiveness in Greek firms: Tax auditors' perceptions. *Journal of Accounting and Taxation*, *7*(7), 123–130.

Dropulić, I. (2013). The effect of contingency factors on management control systems: A study of manufacturing companies in Croatia. *Economic Research-Ekonomska Istrazivanja*, *26*(1), 369–382.

Dubey, R. & Gunasekaran, A. (2015). Education and training for successful career in big data and business analytics. *Industrial and Commercial Training*, *47*(4), 174–181.

Dubey, R., Gunasekaran, A. & Childe, S. J. (2019). Big data analytics capability in supply chain agility. *Management Decision*. *57*(8), 2092–2112.

Earley, C. E. (2015). Data analytics in auditing: Opportunities and challenges. *Business Horizons*, *58*(5), 493–500.

Eisenhardt, K. M. & Martin, J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, *21*(10–11), 1105–1121.

Endaya, K. A. & Hanefah, M. M. (2016). Internal auditor characteristics, internal audit effectiveness, and moderating effect of senior management. *Journal of Economic and Administrative Sciences*, *32*(2), 160–176.

Ernst & Young. (2014). *Big risks require big data thinking - Global Forensic Data Analytics Survey 2014*. *Global Forensic Data Analytics Survey 2014*. Retrieved from http://www.gartner.com/it-glossary/?s=big+data

Excise Department. (2017). *The Excise Department Annual Report 2017*. Bangkok. Retrieved from https://www.excise.go.th/cs/groups/public/documents/document/dwnt/mzex/~edisp/uatucm311825.pdf

Eze, N. M. (2016). Changes and Challenges of Auditing in 21st Century: The Nigerian Experience. *International Journal of Finance and Accounting*, *5*(1), 37–45.

Fanning, K. & Grant, R. (2013). Big data: Implications for financial managers. *The Journal of Corporate Accounting & Finance*, *24*(5), 23–30.

Flamholtz, E. (2001). Corporate culture and the bottom line. *European Management Journal*, *19*(3), 268–275.

Fosso Wamba, S., Akter, S., Edwards, A., Chopin, G. & Gnanzou, D. (2015). How “big data” can make big impact: Findings from a systematic review and a longitudinal case study. *International Journal of Production Economics*, *165*, 234–246.

Fosso Wamba, S., Gunasekaran, A., Akter, S., Ren, S. J., Dubey, R. & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research*, *70*, 356–365.

Francis, J. R. (2011). A framework for understanding and researching audit quality. *Auditing: A Journal of Practice & Theory*, *30*(2), 125–152.

Frendy & Semba, H. D. (2017). Does recycling improve information usefulness of income? the case of Japan. *Asian Review of Accounting*, *25*(3), 376–403.

Frisk, J. E. & Bannister, F. (2017). Improving the use of analytics and big data by changing the decision-making culture: A design approach. *Management Decision*, *55*(10), 2074–2088.

Gandomi, A. & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, *35*(2), 137–144.

Garmaki, M., Boughzala, I. & Wamba, S. F. (2016). The effect of big data analytics capability on firm performance. *R Information Systems AIS Electronic Library (AISeL), Summer 6*. Retrieved from http://aisel.aisnet.org/pacis2016/301

Gärtner, B. & Hiebl, M. R. W. (2018). Issues with big data. In Q. Martin & S. Erik (Eds.), *The Routledge Companion to Accounting Information Systems* (1st ed., pp. 1–16). Routledge. https://doi.org/10.4324/9781315647210-13

Gavronski, I., Klassen, R. D., Vachon, S. & Nascimento, L. F. M. do. (2011). A resource-based view of green supply management. *Transportation Research Part E: Logistics and Transportation Review*, *47*(6), 872–885.

Gbadago, F. Y. & Awunyo-Vitor, D. (2015). Determinants of gift tax compliance among employees of the formal sector in Kumasi Metropolis, Ghana. *Journal of Accounting and Taxation*, *7*(2), 29–37.

Gelinas, U. J., Schwarzkopf, D. L. & Thibodeau, J. C. (2008). Introducing students to the integrated audit with "Auditing Alchemy, Inc." *Journal of Information Systems*, *22*(2), 151–170.

Gepp, A., Linnenluecke, M. K., O'Neill, T. J. & Smith, T. (2018). Big data techniques in auditing research and practice: Current trends and future opportunities. *Journal of Accounting Literature*, *40*(May), 102–115.

Ghasemaghaei, M., Ebrahimi, S. & Hassanein, K. (2018). Data analytics competency for improving firm decision making performance. *Journal of Strategic Information Systems*, *27*(1), 101–113.

Ghasemaghaei, M., Hassanein, K. & Turel, O. (2015). Impact of data analytics on organizational performance impacts of big data analytics on organizations: A resource fit perspective. In *Twenty-first Americas Conference on Information Systems, Puerto Rico* (pp. 1–7). Puerto Rico: Americas conference on information systems (AMCIS).

Gligor, D. M., Holcomb, M. C. & Feizabadi, J. (2016). An exploration of the strategic antecedents of firm supply chain agility: The role of a firm's orientations. *Int. J. of Production Economics*, *179*, 24–34.

González-Benito, J. & González-Benito, Ó. (2005). Environmental proactivity and business performance: An empirical analysis. *Omega*, *33*(1), 1–15.

Gordon, L. A., Loeb, M. P. & Tseng, C. Y. (2009). Enterprise risk management and firm performance: A contingency perspective. *Journal of Accounting and Public Policy*, *28*(4), 301–327.

Greg Burton, F., Emett, S. A., Simon, C. A. & Wood, D. A. (2012). Corporate managers' reliance on internal auditor recommendations. *Auditing*, *31*(2), 151–166.

Groves, R. M. (2006). Nonresponse rates and nonresponse bias in household surveys. *Public Opinion Quarterly*, *70*(5), 646–675.

Gualandris, J., Klassen, R. D., Vachon, S. & Kalchschmidt, M. (2015). Sustainable evaluation and verification in supply chains: Aligning and leveraging accountability to stakeholders. *Journal of Operations Management*, *38*, 1–13.

Gunasekaran, A., Papadopoulos, T., Dubey, R., Wamba, S. F., Childe, S. J., Hazen, B. & Akter, S. (2017). Big data and predictive analytics for supply chain and organizational performance. *Journal of Business Research*, *70*, 308–317.

Gupta, M. & George, J. F. (2016). Toward the development of a big data analytics capability. *Information and Management*, *53*(8), 1049–1064.

Gurama, Z. & Mansor, M. (2018). Internal Audit Effectiveness in Tax Administration: A Model Proposition. *Journal of Advanced Research in Business and Management Studies*, *12*(1), 70–78.

Gutierrez-Gutierrez, L. J. & Barrales-Molina, V. (2018). The role of human resource-related quality management practices in new product development. *International Journal of Operations & Production Management*, *38*(1), 43–66.

Hair, J. F., Black, W. C., Babin, B. J. & Anderson, R. E. (2014). *Multivariate data analysis*. *Pearson new international edition* (7th ed.). London: Pearson Education Limited.

Hall, J. & Wagner, M. (2012). Integrating sustainability into firms' processes: Performance effects and the moderating role of business models and innovation. *Business Strategy and the Environment*, *21*(3), 183–196.

Hatfield, R. C., Jackson, S. B. & Vandervelde, S. D. (2011). The effects of prior auditor involvement and client pressure on proposed audit adjustments. *Behavioral Research in Accounting*, *23*(2), 117–130.

Hayne, C. & Free, C. (2014). Hybridized professional groups and institutional work: COSO and the rise of enterprise risk management. *Accounting, Organizations and Society*, *39*(5), 309–330.

Haynes, S. N., Richard, D. C. S. & Kubany, E. S. (1995). Content validity in psychological assessment: A functional approach to concepts and methods. *Psychological Assessment*, *7*(3), 238–247.

Helfat, C. E. & Peteraf, M. A. (2014). Managerial Cognitive Capabilities and The Microfoundations of Dynamic Capabilities. *Strategic Management Journal*, *36*(6), 831–850.

Henderson, J. C. & Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal*, *32*(1), 427–484.

Hitt, M. A., Xu, K. & Carnes, C. M. (2016). Resource based theory in operations management research. *Journal of Operations Management*, *41*, 77–94.

Hodgkinson, G. & Healey, M. P. (2011). Psychological foundations of dynamic capabilities: Reflexion and reflection in strategic management. *Strategic Management Journal*, *32*(13), 1500–1516.

Hofstede, G., Neuijen, B., Ohayv, D. D. & Sanders, G. (1990). Measuring organizational cultures: A qualitative and quantitative study across twenty cases. *Administrative Science Quarterly*, *35*(2). 286–316.

Holton, C. (2009). Identifying disgruntled employee systems fraud risk through text mining: A simple solution for a multi-billion dollar problem. *Decision Support Systems*, *46*(4), 853–864.

Hoyt, R. E. & Liebenberg, A. P. (2011). The value of enterprise risk management. *Journal of Risk and Insurance*, *78*(4), 795–822.

Hoyt, W. T., Leierer, S. & Millington, M. J. (2006). Analysis and interpretation of findings using multiple regression techniques. *Rehabilitation Counseling Bulletin*, *49*(4), 223–233.

Hui, L. T. & Fatt, Q. K. (2007). Strategic organizational conditions for risks reduction and earnings management: A combined strategy and auditing paradigm. *Accounting Forum*, *31*(2), 179–201.

Hunton, J. E., Wright, A. M. & Wright, S. (2004). Are financial auditors overconfident in enterprise resource planning systems? *Journal of Information Systems*, *18*(2), 7–28.

Huq, F. A., Chowdhury, I. N. & Klassen, R. D. (2016). Social management capabilities of multinational buying firms and their emerging market suppliers: An exploratory study of the clothing industry. *Journal of Operations Management*, *46*, 19–37.

Ibrahim, B., Kargbo, B. & Egwaikhide, F. O. (2012). Tax elasticity in Sierra Leone: A time series approach. *International Journal of Economics and Financial Issues*, *2*(4), 432–447.

IIA. (2010). *Internal auditing. Internal Auditing: Assurance, Insight, and Objectivity*. Florida. https://doi.org/10.1201/9781315267555-9

Ismail, N. A. (2009). Factors influencing AIS effectiveness among manufacturing SMEs: Evidence from Malaysia. *The Electronic Journal of Information Systems in Developing Countries*, *38*(1), 1–19.

Jaccard, J., Guilamo-Ramos, V., Johansson, M. & Bouris, A. (2006). Multiple regression analyses in clinical child and adolescent psychology. *Journal of Clinical Child and Adolescent Psychology*, *35*(3), 456–479.

James, S., Svetalekth, T. & Wright, B. (2007). Tax charters, performance indicators and the case for a more strategic approach to tax administration. In *Discussion Papers in Management* (pp. 1–24). Tax Research Network Conference, University of Edinburgh on the 8-9th September.

Jans, M., Alles, M. G. & Vasarhelyi, M. A. (2014). A field study on the use of process mining of event logs as an analytical procedure in auditing. *The Accounting Review*, *89*(5), 1751–1773.

Janssen, M., van der Voort, H. & Wahyudi, A. (2017). Factors influencing big data decision-making quality. *Journal of Business Research*, *70*, 338–345.

Janvrin, D., Bierstaker, J. & Lowe, D. J. (2008). An examination of audit information technology usage and perceived importance. *Accounting Horizons*, *22*(1), 1–21.

Jensen, M. C. & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*, 305–360.

Jin, J. & von Zedtwitz, M. (2008). Technological capability development in China's mobile phone industry. *Technovation*, *28*(6), 327–334.

Jokipii, A. (2010). Determinants and consequences of internal control in firms: A contingency theory based analysis. *Journal of Management and Governance*, *14*(2), 115–144.

Juillet, L. (2016). *Enhancing the value of internal auditing in the public sector*. Canada. Retrieved from https://chapters.theiia.org/quebec-city/Events/Chapter Documents/GIACC_IA_Value_Published_Report.pdf

Kaplan, R. S. & Norton, D. P. (1992). The balanced scorecard: Measures that drive performance. *Harvard Business Review*, *JANUARY–FE*, 71–80.

Karagiorgos, T., Drogalas, G. & Giovanis, N. (2011). Evaluation of the effectiveness of internal audit in Greek hotel business. *International Journal of Economic Sciences and Applied Research*, *4*(1), 19–34.

Kashmanian, R. M., Wells, R. P. & Keenan, C. (2011). Corporate environmental sustainability strategy: Key elements. *Journal of Corporate Citizenship*, *2011*(44), 107–130.

Kendrick, T. (2004). Strategic risk: Am I doing ok? *Corporate Governance: The International Journal of Business in Society*, *4*(4), 69–77.

Khongmalai, O. & Distanont, A. (2017). Corporate governance model in Thai state-owned enterprises: Structural equation modelling approach. *Corporate Governance (Bingley)*, *17*(4), 613–628.

Kim, G., Shin, B., Kim, K. K. & Lee, H. G. (2011). IT capabilities, process-oriented dynamic capabilities, and firm financial performance. *Journal of the Association for Information Systems*, *12*(7), 487–517.

Kim, G., Shin, B. & Kwon, O. (2012). Investigating the Value of Sociomaterialism in Conceptualizing IT Capability of a Firm. *Journal of Management Information Systems*, *29*(3), 327–362.

Kiron, D., Prentice, P. K. & Ferguson, R. B. (2014). The analytics mandate. *MIT Sloan Management Review*, (January 2014), 1–8.

Klievink, B., Bharosa, N. & Tan, Y.-H. (2016). The collaborative realization of public values and business goals: Governance and infrastructure of public-private information platforms. *Government Information Quarterly*, *33*(1), 67–79.

Kohli, R. & Grover, V. (2008). Business value of IT: An essay on expanding research directions to keep up with the times. *Journal of the Association for Information Systems*, *9*(1), 23–39.

Koutoupis, A. G. & Pappa, E. (2018). Corporate governance and internal controls: A case study from Greece. *Journal of Governance and Regulation*, *7*(2), 91–99.

KPMG. (2016). *Going beyond the data – indirect tax*. Retrieved from http://www.bna.com

Kung, L., Kung, H.-J., Jones-farmer, A. & Wang, Y. (2015). Managing big data for firm performance: A configurational approach. In *Twenty-first Americas Conference on Information Systems* (pp. 1–9). Puerto Rico.

Kwon, O., Lee, N. & Shin, B. (2014). Data quality management, data usage experience and acquisition intention of big data analytics. *International Journal of Information Management*, *34*(3), 387–394.

Lamba, H. S. & Dubey, S. K. (2015). Analysis of requirements for big data adoption to maximize IT business value. In *2015 4th International Conference on Reliability, Infocom Technologies and Optimization: Trends and Future Directions, ICRITO 2015* (pp. 1–6). IEEE.

Lamba, K. & Singh, S. P. (2017). Big data in operations and supply chain management: current trends and future perspectives. *Production Planning and Control*, *28*(11–12), 877–890.

Lawson, R. A., Blocher, E. J., Brewer, P. C., Cokins, G., Sorensen, J. E., Stout, D. E., … Wouters, M. J. F. (2014). Focusing accounting curricula on students' long-run careers: Recommendations for an integrated competency-based framework for accounting education. *Issues in Accounting Education*, *29*(2), 295–317.

Leclercq-Vandelannoitte, A. (2011). Organizations as discursive constructions: A Foucauldian approach. *Organization Studies*, *32*(9), 1247–1271.

Lenz, R. & Hahn, U. (2015). A synthesis of empirical internal audit effectiveness literature pointing to new research opportunities. *Managerial Auditing Journal*, *30*(1), 5–33.

Lewis, E. F., Hardy, M. & Snaith, B. (2013). An analysis of survey reporting in the imaging professions: Is the issue of non-response bias being adequately addressed? *Radiography*, *19*(3), 240–245.

Li, H., Dai, J., Gershberg, T. & Vasarhelyi, M. A. (2018). Understanding usage and value of audit analytics for internal auditors: An organizational approach. *International Journal of Accounting Information Systems*, *28*, 59–76.

Litz, R. A. (1996). A resource-based-view of the socially responsible firm: Stakeholder interdependence, ethical awareness, and issue responsiveness as strategic assets. *Journal of Business Ethics*, *15*(12), 1355–1363.

Liyanage, J. P. & Kumar, U. (2003). Towards a value-based view on operations and maintenance performance management. *Journal of Quality in Maintenance Engineering*, *9*(4), 333–350.

Loebbecke, C. & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *Journal of Strategic Information Systems*, *24*(3), 149–157.

Lukoianova, T. & Rubin, V. L. (2014). Veracity roadmap: Is big data objective, truthful and credible? *Advances in Classification Research Online*, *24*(1), 4–15.

Mahzan, N. & Lymer, A. (2008). Adoption of computer assisted audit tools and techniques (CAATTs) by internal auditors: Current issues in the UK (pp. 1–46). Blackpool: BAA Annual Conference.

Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strategic Management Journal*, *22*(5), 387–401.

Mansor, M. & Tayib, M. (2010). An empirical examination of organizational culture, job stress and job satisfaction within the indirect tax administration in Malaysia. *International Journal of Business and Social Science*, *1*(1), 81–95.

McAfee, A. & Brynjolfsson, E. (2012). Big data: The management revolution. *Harvard Business Review*, (October). Retrieved from https://www.academia.edu/2662701/Big_Data_The_Management_Revolution

Mihret, D. G., James, K. & Mula, J. M. (2010). Antecedents and organizational performance implications of internal audit effectiveness: Some propositions and research agenda. *Pacific Accounting Review*, *22*(3), 224–252.

Mikalef, P., Framnes, V. A., Danielsen, F., Krogstie, J. & Olsen, D. H. (2017). Big data analytics capability: Antecedents and business value. In *Pacific Asia Conference on Information Systems* (p. 136). Langkawi: AIS Electronic Library (AISeL).

Mikalef, P., Pappas, I. O., Giannakos, M. N., Krogstie, J. & Lekakos, G. (2016). *Big data and strategy: A research framework* (Competitive Advantage for the Data-Driven Enterprise (CADENT) No. 10). *Mediterranean Conference on Information Systems*. Paphos, Cyprus.

Mikalef, P., Pateli, A. & Van De Wetering, R. (2016). IT flexibility and competitive performance: The mediating role of IT-enabled dynamic capabilities. *Association for Information Systems AIS Electronic Library (AISeL)*, *6*(15), 1–17.

Ministry of Finance. (2017). *Ministry of Finance Annual Report 2017*. Bangkok. Retrieved from http://www.mof.go.th/home/pr/MoFannualReport%0A2017.pdf%0A

Mishra, D., Luo, Z., Hazen, B., Hassini, E. & Foropon, C. (2019). Organizational capabilities that enable big data and predictive analytics diffusion and organizational performance: A resource-based perspective. *Management Decision*, *57*(8), 1734–1755.

Mithas, S., Ramasubbu, N. & Sambamurthy, V. (2011). How information management capability influences firm performance. *MIS Quarterly*, *35*(1), 237–256.

Modica, E., Laudage, S. & Harding, M. (2018). *Domestic revenue mobilization: A new database on tax levels and structures in 80 countries* (OECD Taxation Working Papers Series No. 36). *OECD Taxation Working Papers* (Vol. 36). Paris.

Moffitt, K. C. & Vasarhelyi, M. A. (2013). AIS in an age of big data. *Journal of Information Systems*, *27*(2), 1–19.

Montabon, F., Sroufe, R. & Narasimhan, R. (2007). An examination of corporate reporting, environmental management practices and firm performance. *Journal of Operations Management*, *25*(5), 998–1014.

Moustaghfir, K. (2008). The dynamics of knowledge assets and their link with firm performance. *Measuring Business Excellence*, *12*(2), 10–24.

Müller, O., Junglas, I., Brocke, J. Vom & Debortoli, S. (2016). Utilizing big data analytics for information systems research: Challenges, promises and guidelines. *European Journal of Information Systems*, *25*(4), 289–302.

Neely, A., Gregory, M. & Platts, K. (2005). Performance measurement system design: A literature review and research agenda. *International Journal of Operations and Production Management*, *25*(12), 1228–1263.

Neuman, W. L. (2014). *Social research methods: Pearson new international edition: Qualitative and quantitative approaches* (7th ed.). London: Pearson Education Limited. Retrieved from https://books.google.com.co/books?id=JBipBwAAQBAJ

Nunnally, J. & Bernstein, I. (1994). *Psychometric theory* (First). New York: McGraw-Hill. Retrieved from https://doi.org/10.1177/014662169501900308

Nurcahyo, R., Wibowo, A. D. & Putra, R. F. E. (2015). Key performance indicators development for government agency. *International Journal of Technology*, *6*(5), 856–863.

O'Dell, C. & Grayson, C. J. (1998). If only we knew what we know: Identification and transfer of internal best practices. *California Management Review*, *40*(3), 154–174.

OECD. (2001). Centre for tax policy and administration principles of good tax administration – practice note. *Risk Management*, (June 1999), 1–9.

Oh, S., Yang, H. & Kim, S. W. (2014). Managerial capabilities of information technology and firm performance: Role of e-procurement system type. *International Journal of Production Research*, *52*(15), 4488–4506.

Okello, A. (2014). Managing income tax compliance through self-assessment. *IMF Working Papers*, *14*(41), 1–37.

Olaoye, C. O., Gunleye, S. A. & Solanke, F. T. (2018). Tax audit and tax productivity in Lagos state, Nigeria. *Asian Journal of Accounting Research*, *3*(2), 202–210.

Oliveira, T. & Martins, M. F. (2011). Literature review of information technology adoption models at firm level. *Electronic Journal Information Systems Evaluation*, *14*(1), 110–121.

Olszak, C. M. (2014). Towards an understanding business intelligence. A dynamic capability-based framework for business intelligence. *Proceedings of the 2014 Federated Conference on Computer Science and Information Systems*, *2*, 1103–1110.

Ong, T. S., Teh, B. H. & Lee, A. S. (2019). Contingent factors and sustainable performance measurement (SPM) practices of Malaysian electronics and electrical companies. *Sustainability (Switzerland)*, *11*(4), 1–33.

Orlikowski, W. J. (2007). Sociomaterial practices: Exploring technology at work. *Organization Studies*, *28*(9), 1435–1448.

Orlikowski, W. J. & Scott, S. V. (2008). 10 sociomateriality: Challenging the separation of technology, work and organization. *Academy of Management Annals*, *2*(1), 433–474.

Otley, D. (1999). Performance management: A framework for management control systems research. *Management Accounting Research*, *10*(4), 363–382.

Pagach, D. & Warr, R. (2011). The characteristics of firms that hire chief risk officers. *Journal of Risk and Insurance*, *78*(1), 185–211.

Papadopoulos, T., Gunasekaran, A., Dubey, R. & Wamba, S. F. (2017). Big data and analytics in operations and supply chain management: Managerial aspects and practical challenges. *Production Planning and Control*, *28*(11–12), 873–876.

Parida, A. & Kumar, U. (2006). Maintenance performance measurement (MPM): Issues and challenges. *Journal of Quality in Maintenance Engineering*, *12*(3), 239–251.

Parida, A., Kumar, U., Galar, D. & Stenstrom, C. (2015). Performance measurement and management for maintenance: A literature review. *Journal of Quality in Maintenance Engineering*, *21*(1), 2–33.

Pavlou, P. A. & El Sawy, O. A. (2006). From IT leveraging competence to competitive advantage in turbulent environments: The case of new product development. *Information Systems Research*, *17*(3), 198–227.

Pavlou, P. A. & El Sawy, O. A. (2011). Understanding the elusive black box of dynamic capabilities. *Decision Sciences*, *42*(1), 239–273.

Perez-Batres, L. A., Doh, J. P., Miller, V. V. & Pisani, M. J. (2012). Stakeholder pressures as determinants of CSR strategic choice: Why do firms choose symbolic versus substantive self-regulatory codes of conduct? *Journal of Business Ethics*, *110*(2), 157–172.

Perneger, T. V., Courvoisier, D. S., Hudelson, P. M. & Gayet-Ageron, A. (2015). Sample size for pre-tests of questionnaires. *Quality of Life Research*, *24*(1), 147–151.

Phillips-Wren, G., Iyer, L. S., Kulkarni, U. & Ariyachandra, T. (2015). Business analytics in the context of big data: A roadmap for research. *Communications of the Association for Information Systems*, *37*, 448–472.

Piccoli, G. & Ives, B. (2005). Review: IT-dependent strategic initiatives and sustained competitive advantage: A review and synthesis of the literature. *MIS Quarterly*, *29*(4), 747–776.

Pisano, G. P. (2017). Toward a prescriptive theory of dynamic capabilities: Connecting strategic choice, learning, and competition. *Industrial and Corporate Change*, *26*(5), 747–762.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903.

Priem, R. L. & Butler, J. E. (2001). Is the resource-based view a useful perspective for strategic management research? *Academy of Management Review*, *26*(1), 22–40.

Rao, M. S. (2014). Enhancing employability in engineering and management students through soft skills. *Industrial and Commercial Training*, *46*(1), 42–48.

Reuter, C., Foerstl, K., Hartmann, E. & Blome, C. (2010). Sustainable global supplier management: The role of dynamic capabilities in achieving competitive advantage. *Journal of Supply Chain Management*, *46*(2), 45–63.

Revenue Department. (2018). *The Revenue Department Annual Report 2018*. Bangkok. Retrieved from http://download.rd.go.th/fileadmin/download/annual_report/annual_report61.pdf

Sambamurthy, V., Bharadwaj, A. & Grover, V. (2003). Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS Quarterly*, *27*(2), 237–263.

Sarens, G. (2009). Internal Auditing Research: Where are we going? Editorial. *International Journal of Auditing*, *13*(1), 1–7.

Sarkis, J., Gonzalez-Torre, P. & Adenso-Diaz, B. (2010). Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. *Journal of Operations Management*, *28*(2), 163–176.

Sauser, B. J., Reilly, R. R. & Shenhar, A. J. (2009). Why projects fail? How contingency theory can provide new insights - A comparative analysis of NASA's Mars Climate Orbiter loss. *International Journal of Project Management*, *27*(7), 665–679.

Schein, E. H. (1996). Three cultures of management: The key to organizational learning. *Sloan Management Review*, *38*(1), 1–16.

Schildt, H. (2017). Big data and organizational design–the brave new world of algorithmic management and computer augmented transparency. *Innovation: Management, Policy and Practice*, *19*(1), 23–30.

Schilke, O. (2014). On the contingent value of dynamic capabilities for competitive advantage: The nonlinear moderating effect of environmental dynamism. *Strategic Management Journal*, *35*(2), 179–203.

Schoemaker, P. J. H., Heaton, S. & Teece, D. (2018). Innovation, dynamic capabilities, and leadership. *California Management Review*, *61*(1), 15–42.

Schoenherr, T. & Speier-Pero, C. (2015). Data science, predictive analytics, and big data in supply chain management: Current state and future potential. *Journal of Business Logistics*, *36*(1), 120–132.

Schoonhoven, C. B. (1981). Problems with contingency theory: Testing assumptions hidden within the language of contingency theory. *Administrative Science Quarterly*, *26*(3), 349–377.

Sekaran, U. & Bougie, R. (2016). *Research methods for managers: a skill-building approach* (7th ed.). Chichester, West Sussex, United Kingdom: John Wiley and Sons Ltd. https://doi.org/http://www.slideshare.net/basheerahmad/research-methods-for-business-entire-ebook-by-uma-sekaran

Sen, D. K. & Bala, S. K. (2002). Tax audit: Bangladesh panorama. *Managerial Auditing Journal*, *17*(8), 464–477.

Sen, S. & Cowley, J. (2013). The relevance of stakeholder theory and social capital theory in the context of CSR in SMEs: An Australian perspective. *Journal of Business Ethics*, *118*(2), 413–427.

Shahzadi, S., Khan, R., Toor, M. & Haq, A. (2018). Impact of external and internal factors on management accounting practices: a study of Pakistan. *Asian Journal of Accounting Research*, *3*(2), 211–223.

Shamim, S., Zeng, J., Shariq, S. M. & Khan, Z. (2019). Role of big data management in enhancing big data decision-making capability and quality among Chinese firms: A dynamic capabilities view. *Information and Management*, *56*(6), 1–12.

Sharma, R., Mithas, S. & Kankanhalli, A. (2014). Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organizations. *European Journal of Information Systems*, *23*(4), 433–441.

Shi, V. G., Koh, S. C. L., Baldwin, J. & Cucchiella, F. (2012). Natural resource based green supply chain management. *Supply Chain Management*, *17*(1), 54–67.

Shin, I. & Park, S. (2017). Integration of enterprise risk management and management control system: Based on a case study. *Investment Management and Financial Innovations*, *14*(1), 19–26.

Shuradze, G. & Wagner, H. T. (2016). Towards a conceptualization of data analytics capabilities. *Proceedings of the Annual Hawaii International Conference on System Sciences*, *2016-March*, 5052–5064.

Sikka, P., Filling, S. & Liew, P. (2009). The audit crunch: Reforming auditing. *Managerial Auditing Journal*, *24*(2), 135–155.

Smith, S. S. (2015). Strategy, analytics, and the role of accountancy. *Strategic Management Review*, *9*(1), 87–93.

Solomon, I. & Trotman, K. T. (2003). Experimental judgement and decision research in auditing: The first 25 years of AOS. *Accounting, Organizations and Society*, *28*(4), 395–412.

Stoel, M. D. & Muhanna, W. A. (2011). IT internal control weaknesses and firm performance: An organizational liability lens. *International Journal of Accounting Information Systems*, *12*(4), 280–304.

Storey, V. C. & Song, I. Y. (2017). Big data technologies and Management: What conceptual modeling can do. *Data and Knowledge Engineering*, *108*, 50–67.

Svetalekth, T. (2016). The complexity of tax simplification: Experiences from Thailand. In *The Complexity of Tax Simplification* (pp. 187–208).

Swafford, P. M., Ghosh, S. & Murthy, N. (2008). Achieving supply chain agility through IT integration and flexibility. *International Journal of Production Economics*, *116*(2), 288–297.

Tame, P. (2014). Big Data Investment, Skills, and Firm Value. *Management Science*, *60*(6), 1452–1469.

Tanriverdi, H. (2005). Information technology relatedness, knowledge management capability, and performance of multibusiness firms. *MIS Quarterly*, *29*(2), 311–334.

Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*, 1–43.

Teece, D. J., Pisano, G. & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(7), 509–533.

Teece, D. & Pisano, G. (1994). The dynamic capabilities of firms: An introduction. *Industrial and Corporate Change*, *3*(3), 537–557.

Thirathon, U., Wieder, B., Matolcsy, Z. & Ossimitz, M. L. (2017). Big data, analytic culture and analytic-based decision making evidence from Australia. In the scientific committee of the CENTERIS (Ed.), *Procedia Computer Science* (Vol. 121, pp. 775–783). Barcelona, Spain: Elsevier B.V.

Thoumrungroje, A. (2013). *Handbook of Research Methodology in International Business*. Bangkok: Triple Education Co., Ltd.

Tian, J., Wang, K., Chen, Y. & Johansson, B. (2010). From IT deployment capabilities to competitive advantage: An exploratory study in China. *Information Systems Frontiers*, *12*(3), 239–255.

Tippins, M. J. & Sohi, R. S. (2003). IT competency and firm performance: Is organizational learning a missing link? *Strategic Management Journal*, *24*(8), 745–761.

Titera, W. R. (2013). Updating audit standard—enabling audit data analysis. *Journal of Information Systems*, *27*(1), 325–331.

Turetken, O., Jethefer, S. & Ozkan, B. (2019). Internal Audit Effectiveness: Operationalization and Influencing Factors. *Managerial Auditing Journal*, *35*(2), 238–271.

Udeh, S. N. & Clement, N. (2016). Role of Effective Internal Audit in Public Accountability: A Model for APC-LED Government in Nigeria. *International Journal of Development Research*, *6*(7), 8780–8795.

Umanath, N. S. (2003). The concept of contingency beyond "It depends": Illustrations from IS research stream. *Information and Management*, *40*(6), 551–562.

Valanciene, L. & Gimzauskiene, E. (2009). Dimensions of performance measurement system in changes research. *Engineering Economics*, *4*(64), 41–48.

Van der Stede, W. A., Young, M. S. & Chen, C. X. (2006). Doing management accounting survey research. *Handbooks of Management Accounting Research*, *1*, 445–478.

Vargas, J. R. C. & Mantilla, C. E. M. (2014). Sustainable supply chain management capabilities: a review from the resource-based view, the dynamic capabilities and stakeholder theories. *Latin American J. of Management for Sustainable Development*, *1*(4), 323.

Vasarhelyi, M. A. & Halper, F. B. (1991). The continuous audit of online systems. *Auditing A Journal of Practice & Theory*, *10*(1), 110–125.

Venkatraman, A. N. (1989). The Concept of Fit in Strategy Research: Toward Verbal and Statistical Correspondence. *The Academy of Management Review*, *14*(3), 423–444.

Wade, M. & Hulland, J. (2004). Review: The resource-based view and information systems research: Review, extension, and suggestions for future research. *MIS Quarterly*, *28*(1), 107–142.

Wang, N., Liang, H., Zhong, W., Xue, Y. & Xiao, J. (2012). Resource structuring or capability building? An empirical study of the business value of information technology. *Journal of Management Information Systems*, *29*(2), 325–367.

Wang, Y., Kung, L. A. & Byrd, T. A. (2018). Big data analytics: Understanding its capabilities and potential benefits for healthcare organizations. *Technological Forecasting and Social Change*, *126*, 3–13.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(2), 171–180.

Wilden, R., Gudergan, S. P., Nielsen, B. B. & Lings, I. (2013). Dynamic Capabilities and Performance: Strategy, Structure and Environment. *Long Range Planning*, *46*(1–2), 72–96.

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, *24*(10), 991–995.

Witjes, S. & Lozano, R. (2016). Towards a more Circular Economy: Proposing a framework linking sustainable public procurement and sustainable business models. *Resources, Conservation and Recycling*, *112*, 37–44.

Wixom, B. H., Yen, B. & Relich, M. (2013). Maximizing value from business analytics. *MIS Quarterly Executive*, *12*(2), 111–123.

Wonglimpiyarat, J. (2017). Technology auditing and risk management of technology incubators/science parks. *World Journal of Entrepreneurship, Management and Sustainable Development*, *13*(1), 44–56.

Wongsim, M. & Gao, J. (2010). Data quality issues in accounting information systems adoption - Theory building. In *Proceeding - 6th International Conference on Networked Computing and Advanced Information Management, NCM 2010* (pp. 224–230). Seoul, Korea: IEEE.

Woods, M. (2009). A contingency theory perspective on the risk management control system within Birmingham City Council. *Management Accounting Research*, *20*(1), 69–81.

www.customs.go.th. (n.d.). Location. Retrieved from http://www.customs.go.th/list_multi_tab.php?link=cont_xsimple.php&ini_menu=menu_about_160421_01&left_menu=menu_about_160421_01_161003_02&ini_tab=menu_about_160421_01_161003_02&ini_content=about_161003_02_161003_02&tab=menu_about_160421_01_161003_02_161003

www.excise.go.th. (n.d.). Nationwide Excise Offices. Retrieved from https://www.excise.go.th/excise2017/CONTACT_US/SERVICE_TAX/index.htm

www.rd.go.th. (n.d.). Tax office of the revenue department. Retrieved from http://www.rd.go.th/publish/337.0.html

Yap, C. S. (1989). Issues in managing information technology. *The Journal of the Operational Research Society*, *40*(7), 649–658.

Yeo, A. C. & Carter, S. (2017). Segregate the wheat from the chaff enabler: Will big data and data analytics enhance the perceived competencies of accountants/ auditors in Malaysia? *Journal of Self-Governance and Management Economics*, *5*(3), 28–51.

Zahra, S. A., Sapienza, H. J. & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. *Journal of Management Studies*, *43*(4), 917–955.

Zakaria, Z., Yaacob, M. A., Yaacob, Z., Noordin, N., Sawal, M. Z. H. M. & Zakaria, Z. (2011). Key performance indicators (KPIs) in the public sector: A study in Malaysia. *Asian Social Science*, *7*(7), 102–107.

Zhang, J. A., Edgar, F., Geare, A. & O'Kane, C. (2016). The interactive effects of entrepreneurial orientation and capability-based HRM on firm performance: The mediating role of innovation ambidexterity. *Industrial Marketing Management*, *59*, 131–143.

Zhou, K. Z. & Wu, F. (2010). Technological capability, strategic flexibility, and product innovation. *Strategic Management Journal*, *31*(5), 547–561.

Zhu, K. & Kraemer, K. L. (2005). Post-adoption variations in usage and value of e-business by organizations: Cross-country evidence from the retail industry. *Information Systems Research*, *16*(1), 61–84.

Zhu, Q. & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of Operations Management*, *22*(3), 265–289.

Zhu, Q. & Sarkis, J. (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. *International Journal of Production Research*, *45*(18–19), 4333–4355.

Zollo, M. & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. *Organization Science*, *13*(3), 339–351.

APPENDICES

APPENDIX A

The Original Items

Table A: Original Items in Scales

Construct	Items
Management Capability (MC)	
MC1	Our organization focus on data analytics of the tax audit plan to ensure that the audit is covered by the assigned mission.
MC2	Our organization believes that the data analytics planning processes in systematic and formalized ways will help make more effective in tax auditing.
MC3	Our organization encourages the coordination by sending information via social networks in order to speed up communication and can use the information to prevent and suppress tax offenders.
MC4	Our organization believes that properly management and control of information system can be used as a database to support tax administration.
Technology Competence (TC)	
TC1	Our organization is confident that its information technology infrastructure. It allows the organization to connect various tax data analytics effectively.
TC2	Our organization recognizes the potential of modern information technology. It will help to connect the tax information more real-time.
TC3	Our organization believes that information technology system can be easily used. This will allow sharing tax information across the organization.
TC4	Our organization focus on the application of compatible technology to manage tax audit as concrete.

Table A: Original Items in Scales (Continued)

Construct	Items
Personnel Expertise (PE)	
PE1	Our organization encourages ongoing staff development, in order to reinforce tax audit skill efficiency even more.
PE2	Our organization focus on knowledge management on various issues. Related to tax auditing will help the staff to develop consistently.
PE3	Our organization encourages employees to learn and understand technology that is constantly changing. It will allow for more efficient operation.
PE4	Our organization supports staff to regularly attend training on modern technology. It will make the tax administration more effective.
Risk Management Efficiency (RM)	
RM1	Our organization analyzes risks as a basis for determining how risks should be managed by identifies risks to the achievement of auditing objectives across the organization.
RM2	Our organization specifies auditing objectives with enough clarity to enable the identification of risks relating to auditing objectives.
RM3	Our organization assesses for change that could significantly impact the risk management in tax auditing effectively.
RM4	Our organization has criteria for auditing taxpayers by grouping taxpayers at the risk-based audit levels. It will make the tax administration more effective.
Good Practice (GP)	
GP1	Our organization has tax auditing practices to adhere in accordance with tax policy and organizational strategy.
GP2	Our organization has guidelines and procedures for tax auditing to be accurately and transparently, which can be systematic used and more concrete.
GP3	Our organization has tax audit technic that is appropriate and covers altogether audit process.

Table A: Original Items in Scales (Continued)

Construct	Items
Tax Performance (TP)	
TP1	Our organization can collect tax revenues to achieve the goals set or more effectively than the previous fiscal year.
TP2	Our organization prides itself on receiving awards for performance according to standards or criteria for the development of public sector management quality award.
TP3	Our organization has innovations for tax administration to convenient, fast and efficient.
TP4	Our organization has the transparent and fair administration for sustainable organization development.
Accounting Information System Implementation (AI)	
AI1	Accounting information system supports the organization to verify the accuracy of the tax data analytics as well.
AI2	Accounting information system allows the organization to fully review the completeness of its tax auditing practices.
AI3	Accounting information system helps the organization track the source of their tax data to make tax data more reliable.
AI4	Accounting information system allows the organization to have transparent tax data and verify that the source is clear.

Table A: Original Items in Scales (Continued)

Construct	Items
Organizational Culture (OC)	
OC1	Our organization believes in creating the values of the organization for the staff to have a positive attitude in performing work according to service standards.
OC2	Our organization focus on ethics, honesty, and accountability in the operation.
OC3	Our organization is confident that harmony and work together seamlessly to provide for greater effective tax auditing.
OC4	Our organization focus on teamwork and mutual support will enable the achievement of the objectives as well.
Stakeholder Pressure (SP)	
SP1	Society needs the benefit of tax information from government agencies more leading to our organization who must develop the potential in tax auditing always.
SP2	Regulators have expectations in increase tax collection leading to our organization who must develop innovation for maximum efficiency tax administration.
SP3	Taxpayers expect to service quality leading to the organization must develop the operating system to facilitate fast and fair.

APPENDIX B

Factor Loading and Reliability Analyses in Pre-Test

Table B: Item Factor Loadings and Reliability Analyses in Pre –Test [a]

Constructs	Items	Factor Loadings	Item total correlation	Cronbach's Alpha
Management Capability (MC)	MC1	.828	.729	729
	MC2	.769	.649	
	MC3	.876	.754	
	MC4	.867	.685	
Technology Competence (TC)	TC1	.829	.535	.808
	TC2	.769	.625	
	TC3	.685	.702	
	TC4	.627	.658	
Personnel Expertise (PE)	PE1	.866	.867	.891
	PE2	.903	.828	
	PE3	.873	.799	
	PE4	.603	.566	
Risk Management Efficiency (RM)	RM1	.766	.654	.829
	RM2	.877	.809	
	RM3	.777	.655	
	RM4	.715	.546	
Good Practice (GP)	GP1	.905	.726	.729
	GP2	.774	.609	
	GP3	.633	.406	
Tax Performance (TP)	TP1	.643	.468	.823
	TP2	.922	.829	
	TP3	.876	.745	
	TP4	.767	.594	

[a] n = 30

Table B: Item Factor Loadings and Reliability Analyses in Pre –Test [a] (Continued)

Constructs	Items	Factor Loadings	Item total correlation	Cronbach's Alpha
Accounting Information System Implementation (AI)	AI1	.843	.855	.936
	AI2	.872	.827	
	AI3	.865	.852	
	AI4	.945	.874	
Organizational Culture (OC)	OC1	.890	.870	.947
	OC2	.920	.908	
	OC3	.921	.891	
	OC4	.849	.838	
Stakeholder Pressure (SP)	SP1	.819	.699	.821
	SP2	.927	.808	
	SP3	.745	.575	

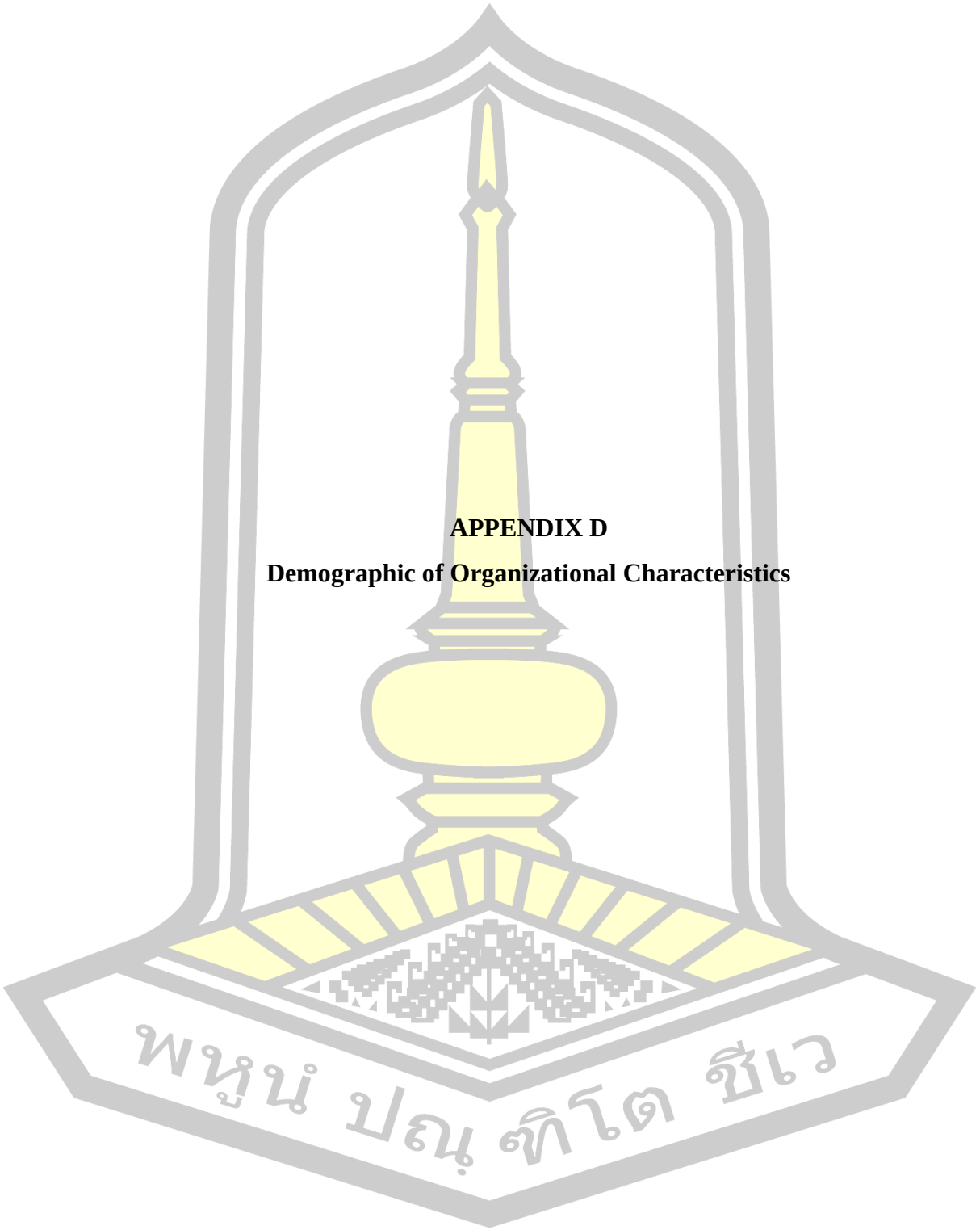
[a]n = 30

APPENDIX C

Key Participant Characteristics

Table C: Key Participant Characteristics

Characteristics		Frequencies	Percentage (%)
1. Gender	Male	123	48.24
	Female	132	51.76
	Total	255	100.00
2. Age	Less than 30 years old	6	2.35
	30 - 40 years old	30	11.76
	41 - 50 years old	63	24.71
	More than 50 years old	156	61.18
	Total	255	100.00
3. Education level	Non-graduates	11	4.31
	Graduates	128	50.20
	Master's degree	113	44.31
	Higher master's degree	3	1.18
	Total	255	100.00
4. Working experience	Less than 10 years	25	9.80
	10-15 years	15	5.88
	16-20 years	33	12.94
	More than 20 years	182	71.37
	Total	255	100.00
5. Working position	Director	30	11.76
	(Excise/Revenue/Customs) Technical Officer	175	68.63
	(Excise/Revenue/Customs) Officer	41	16.08
	Tax Audit Officer	9	3.53
	Total	255	100.00



APPENDIX D

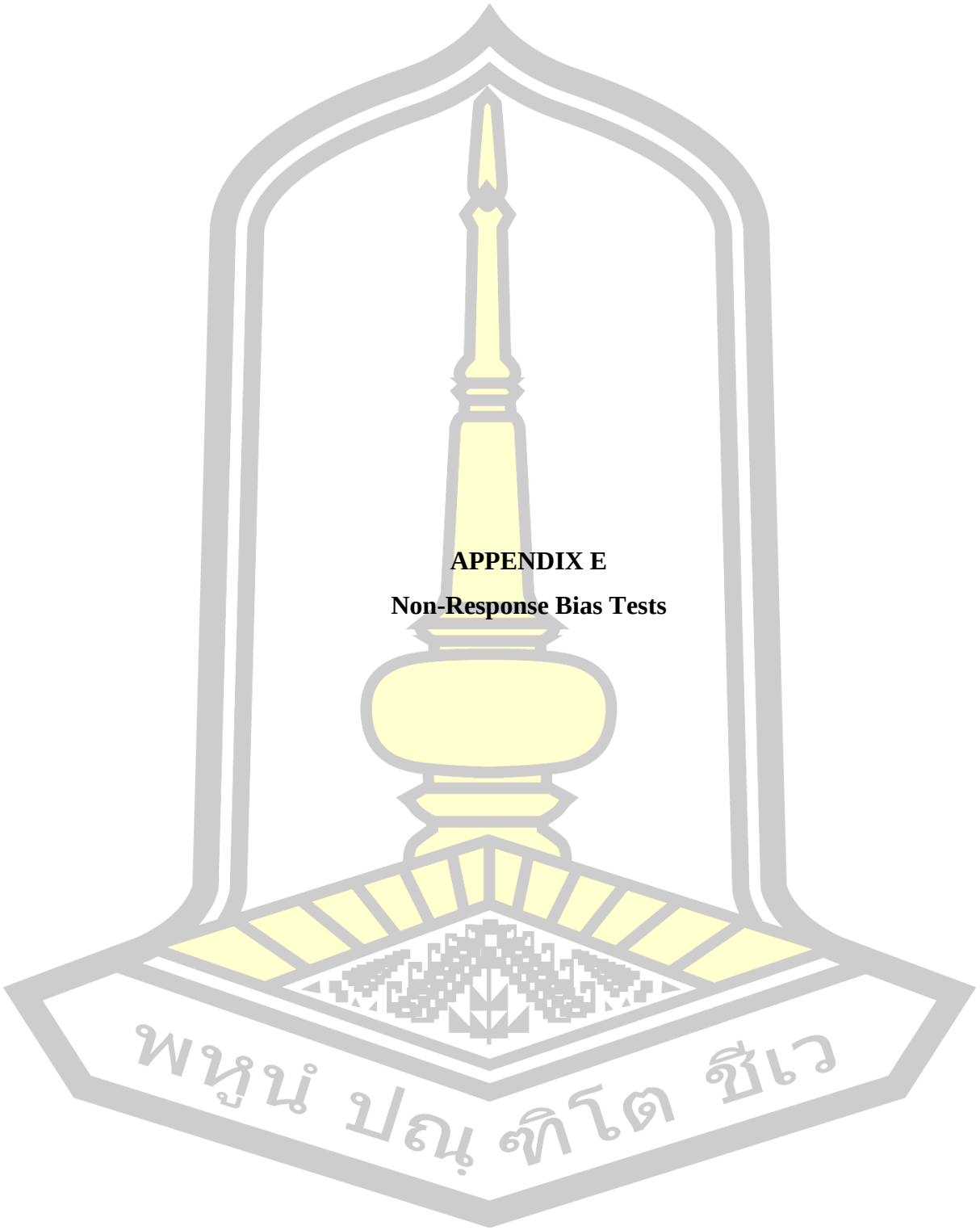
Demographic of Organizational Characteristics

Table D: Organizational Respondent Characteristics

Characteristics		Frequencies	Percentage (%)
1. Organizational type	Excise Department	124	48.63
	Revenue Department	90	35.29
	Customs Department	41	16.08
	Total	255	100.00
2. Forms of organization	Regional office	3	1.18
	Area office	81	31.76
	Area branch office/Customs house	171	67.06
	Total	255	100.00
3. Location of organization	Northern region	48	18.82
	Northeastern region	61	23.92
	Central region	45	17.65
	Eastern region	20	7.84
	Southern region	47	18.43
	Bangkok	34	13.33
	Total	255	100.00
4. Number of employees	Less than 30 persons	151	59.22
	30 – 40 persons	16	6.27
	41 – 50 persons	9	3.53
	More than 50 persons	79	30.98
	Total	255	100.00
5. Average revenue of tax collection per year (last fiscal year)	Less than 5,000,000 Baht	67	26.27
	5,000,000 – 10,000,000 Baht	35	13.73
	10,000,001 – 15,000,000 Baht	12	4.71
	More than 15,000,000 Baht	141	55.29
	Total	255	100.00

Table D: Organizational Respondent Characteristics (Continued)

Characteristics		Frequencies	Percentage (%)
6. Average revenue of tax collection per year compared to the target	Less than target	58	22.75
	More than target	197	77.25
	Total	255	100.00

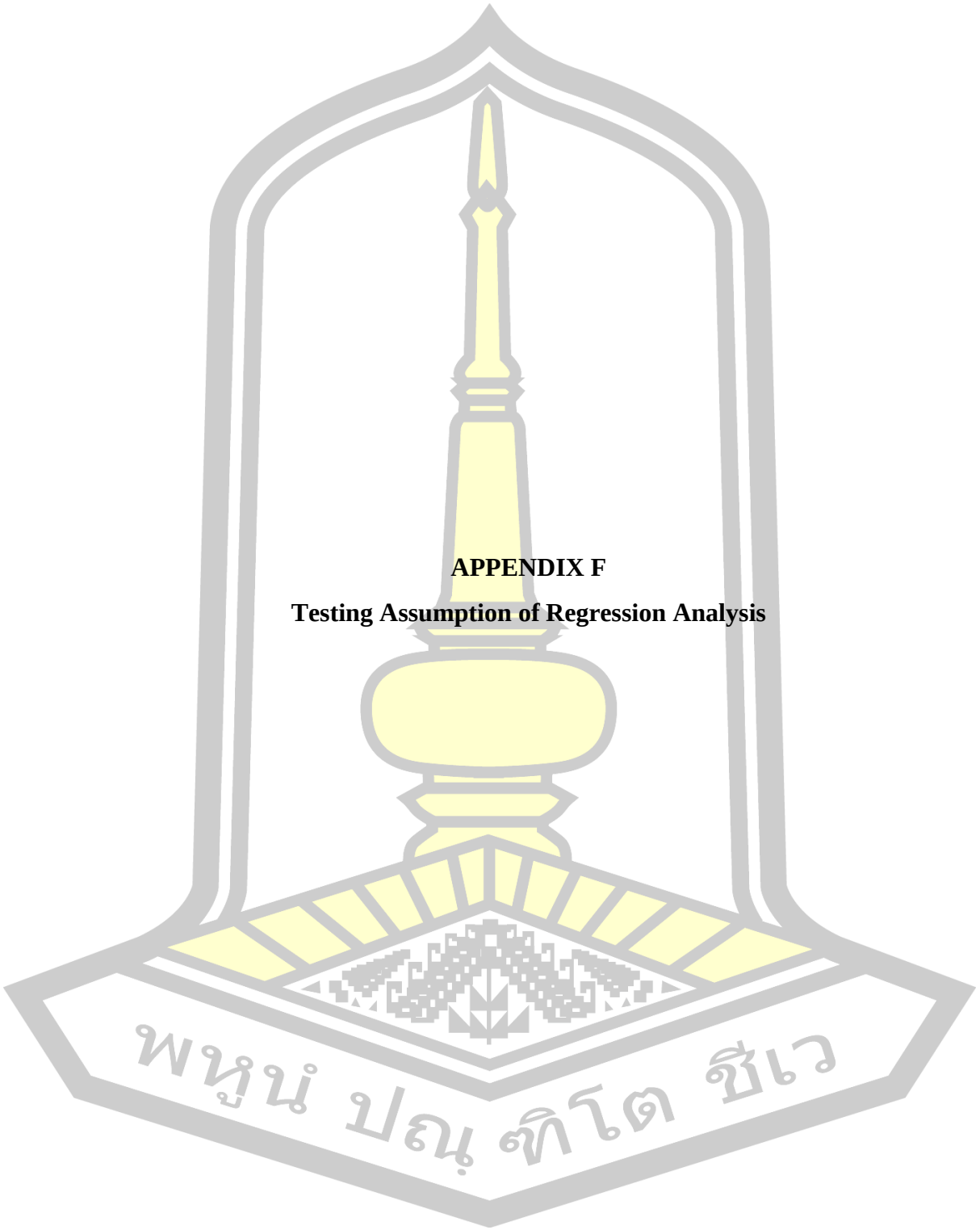


APPENDIX E

Non-Response Bias Tests

Table E: Non-Response Bias Tests

Comparison	N	Mean	S.D.	t	p-value
Number of employees	255				
• Early Group	165	2.06	1.382	-.034	.973
• Late Group	90	2.07	1.347		
Average revenue per year	255				
• Early Group	165	2.85	1.336	-.584	.560
• Late Group	90	2.96	1.289		



APPENDIX F

Testing Assumption of Regression Analysis

Appendix F – Results of testing basic assumption of regression analysis

To obtain reliable results of this research, the basis assumption of regression analysis (multicollinearity, normality of error term, heteroscedasticity, and nonlinearity of regression function) is tested when testing the relationship between dependent variable and independent variable, based on the regression analysis conducted on sample data (Hair et al., 2014).

There must be quality control for all scientific tests. Each statistical test is based on fundamental assumptions. If the assumptions are violated, the results of the relationship described by the model are invalid. In this research, all equations were not indication of any violation of the regression assumptions.

Test of Multicollinearity

Table F1: The results of multicollinearity testing (ADAC and its consequences)

Independent Variables	Dependent Variables					
	RM		GP		TP	
	Equation 1		Equation 2		Equation 3	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
MC	1.000	1.000	1.000	1.000	1.000	1.000
TC	1.000	1.000	.999	1.001	.999	1.001
PE	1.000	1.000	.999	1.001	.999	1.001

Table F2: The results of multicollinearity testing (ADAC consequences and tax performance)

Independent Variables	Dependent Variables	
	TP	
	Equation 4	
	Tolerance	VIF
RM	.589	1.699
GP	.589	1.699

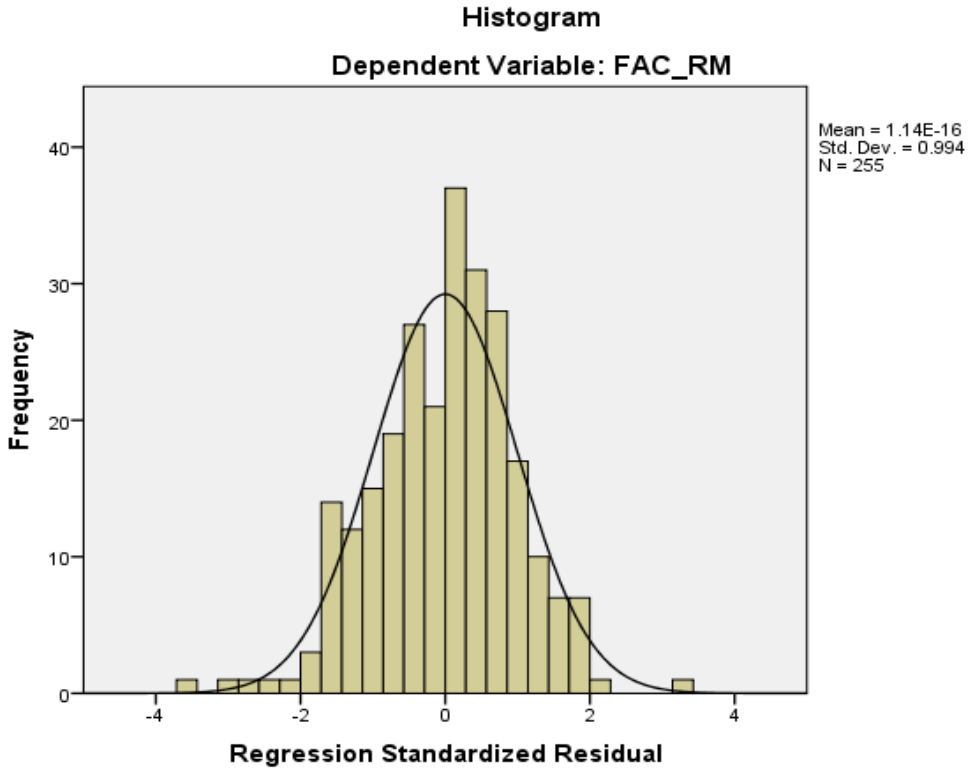
Table F3: The results of multicollinearity testing (ADAC and its antecedences)

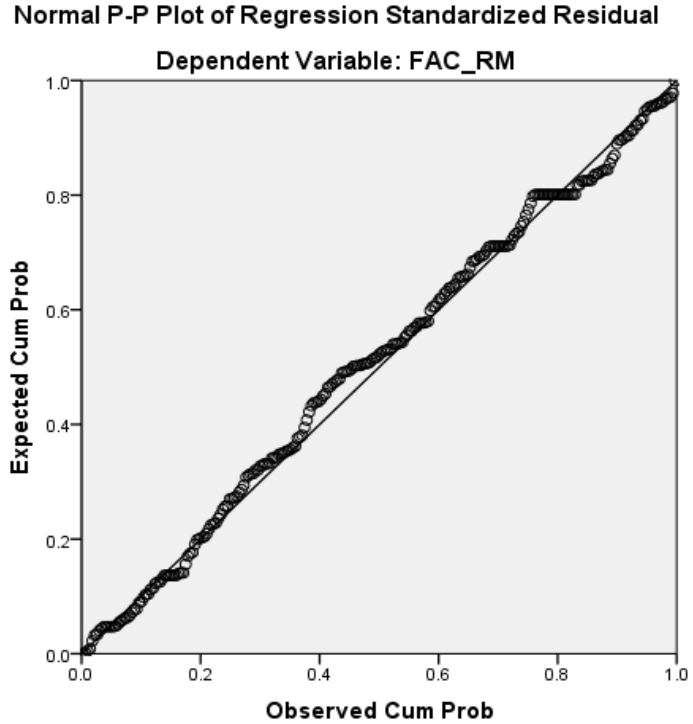
Independent Variables	Dependent Variables					
	MC		TC		PE	
	Equation 5		Equation 6		Equation 7	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
AI	.999	1.001	.999	1.001	.999	1.001
OC	.999	1.002	1.000	1.000	.999	1.001
SP	.999	1.001	1.000	1.000	.999	1.001

Normality of the error term distribution

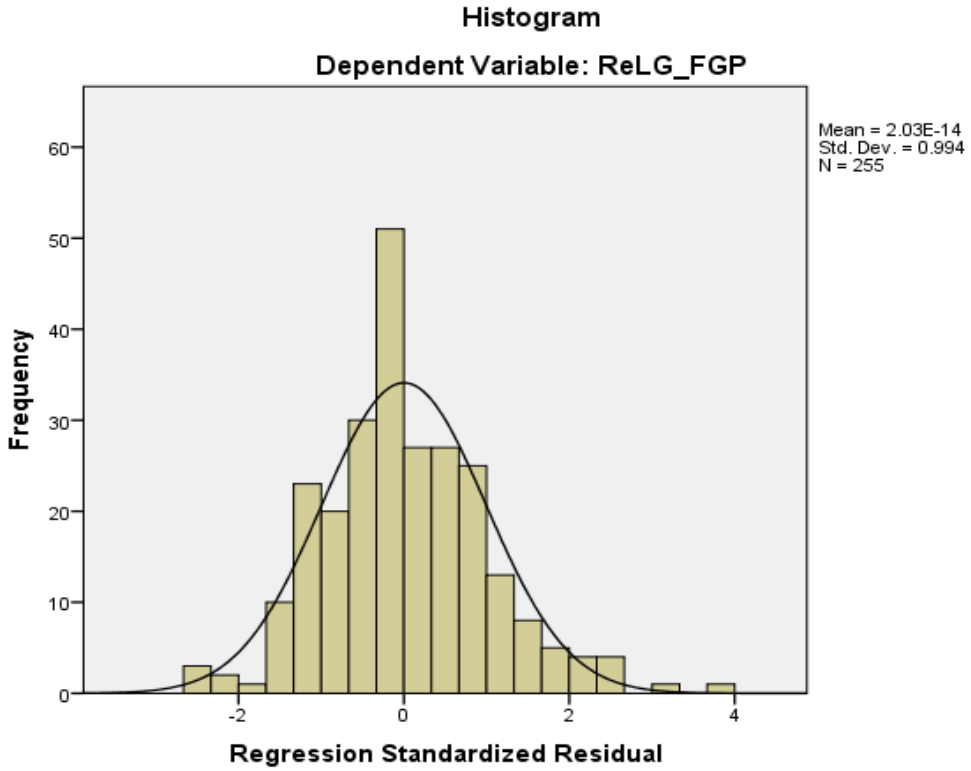
Non normality of error terms can create a distortion of relationships and significant tests. Hence, normal P-P plots provide the statistical value on normality test (Hair et al., 2014). From the results in this section, all P-P plot show normality information. Therefore, normality of error term does not create any serious problems.

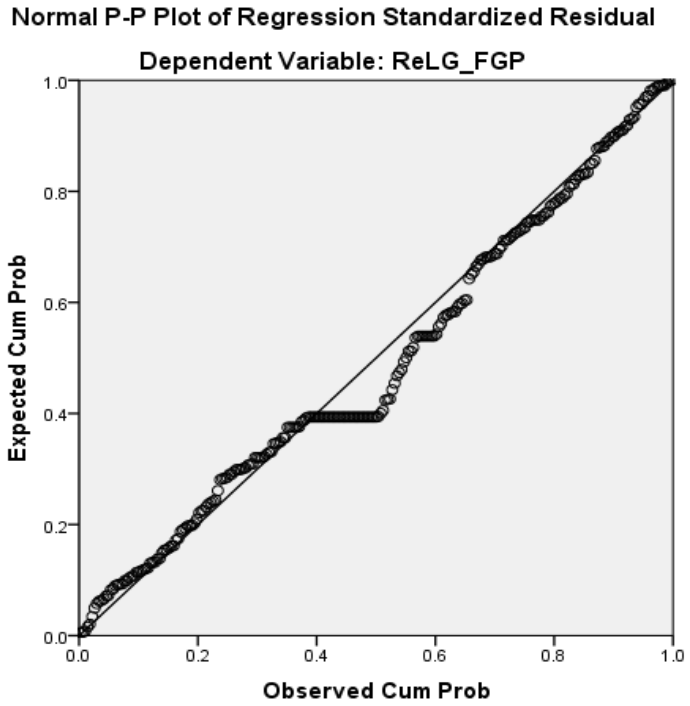
Equation 1: RM = $\alpha_{01} + \beta_1 MC + \beta_2 TC + \beta_3 PE + \varepsilon$



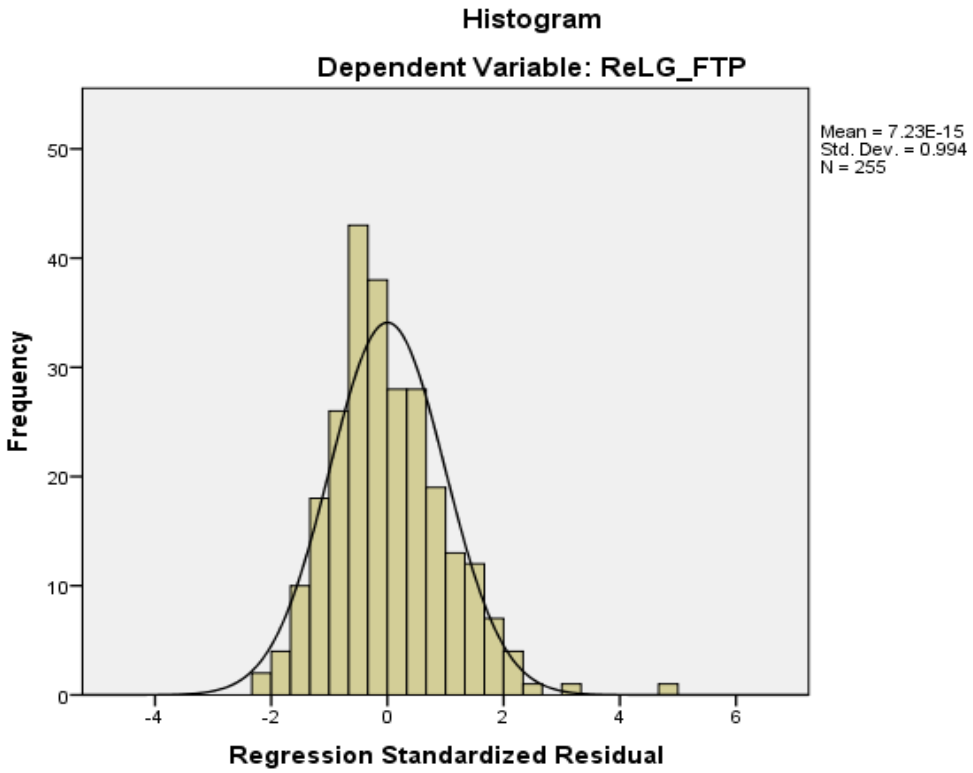


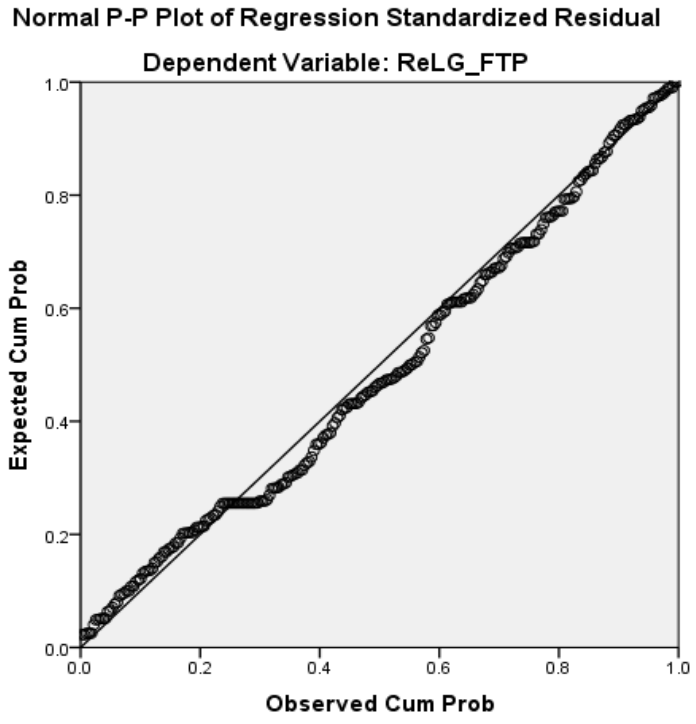
Equation 2: GP = $\alpha_{02} + \beta_7 MC + \beta_8 TC + \beta_9 PE + \varepsilon$



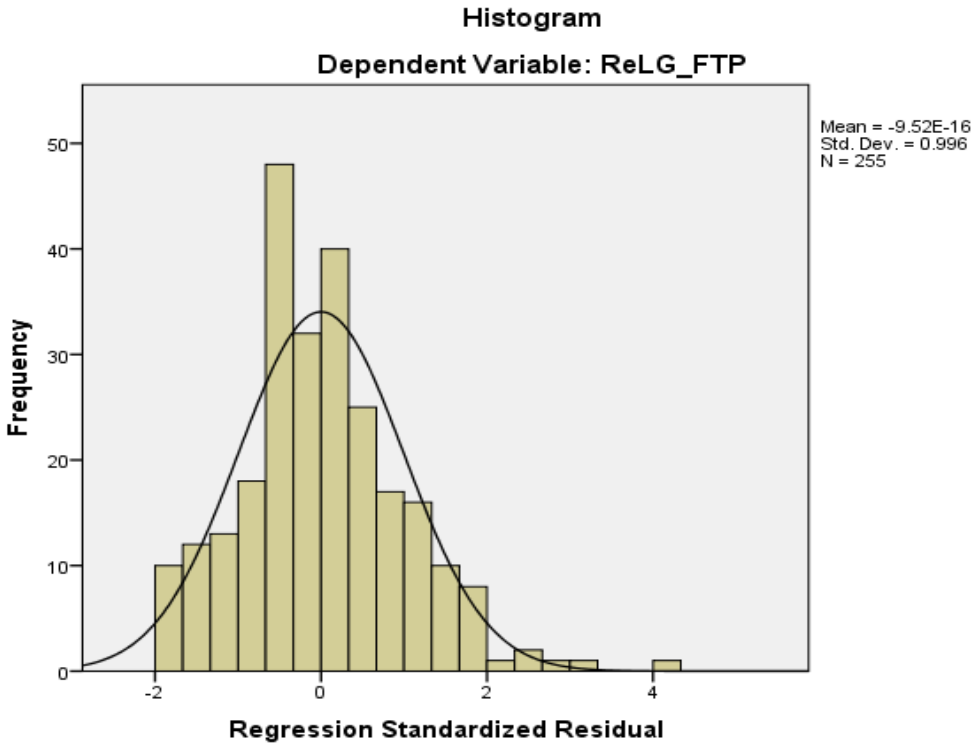


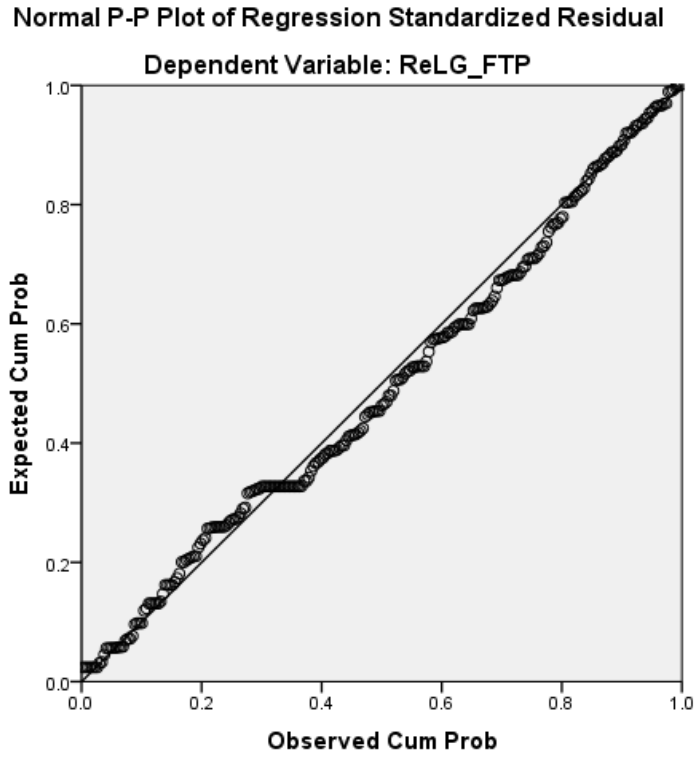
Equation 3: TP = $\alpha_{03} + \beta_{13}MC + \beta_{14}TC + \beta_{15}PE + \varepsilon$



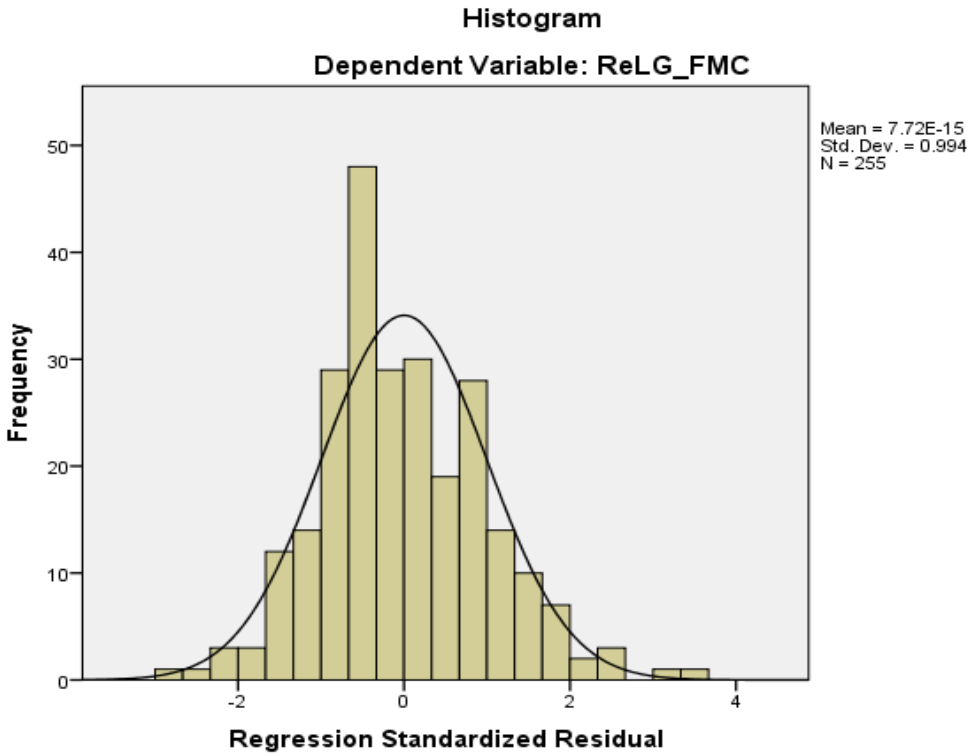


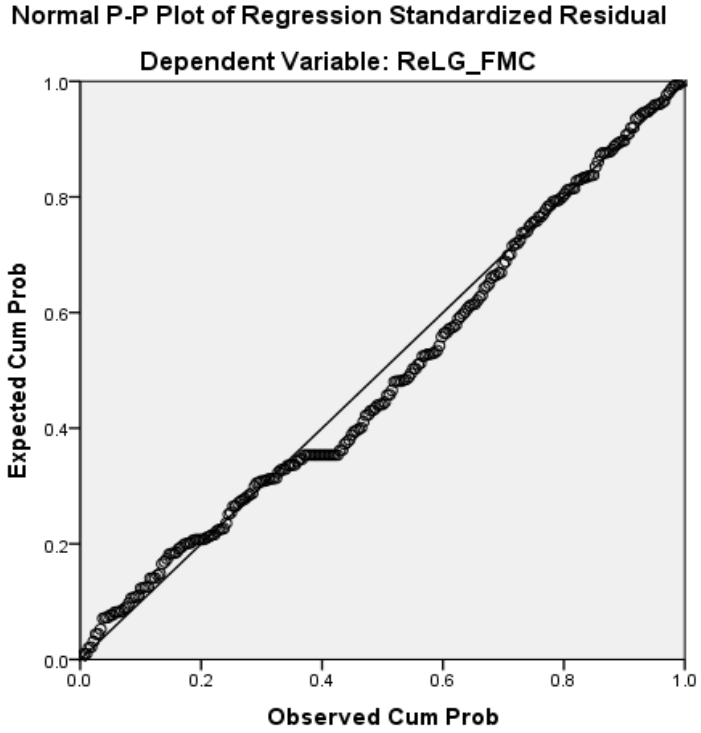
Equation 4: TP = $\alpha_{07} + \beta_{49}RM + \beta_{50}GP + \varepsilon$



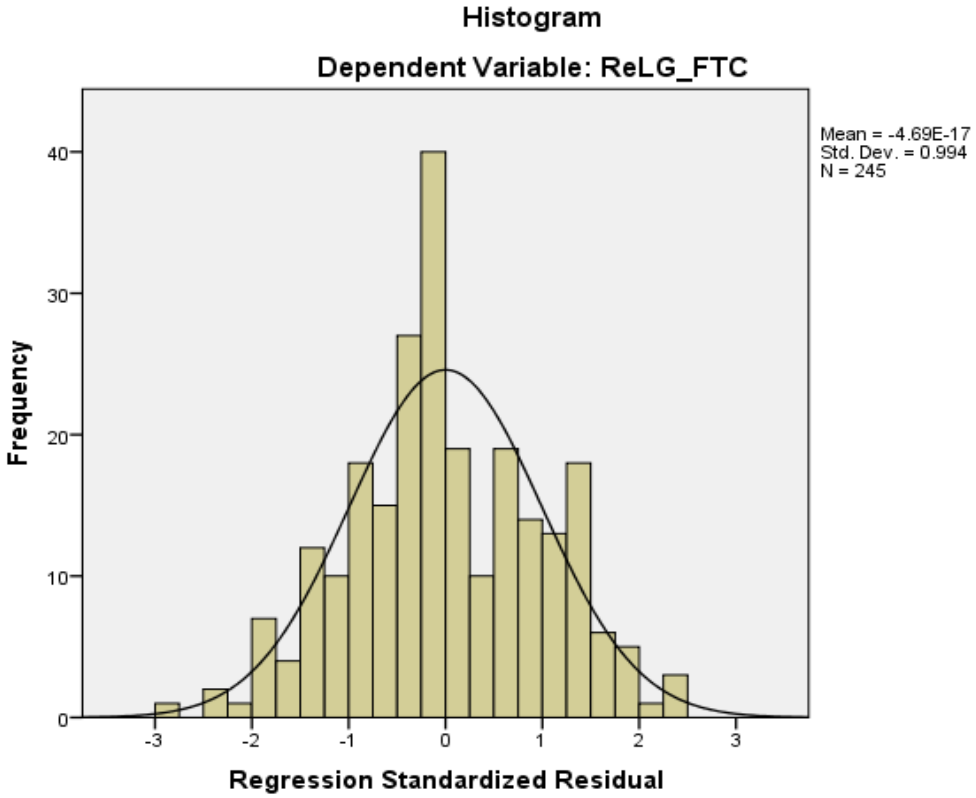


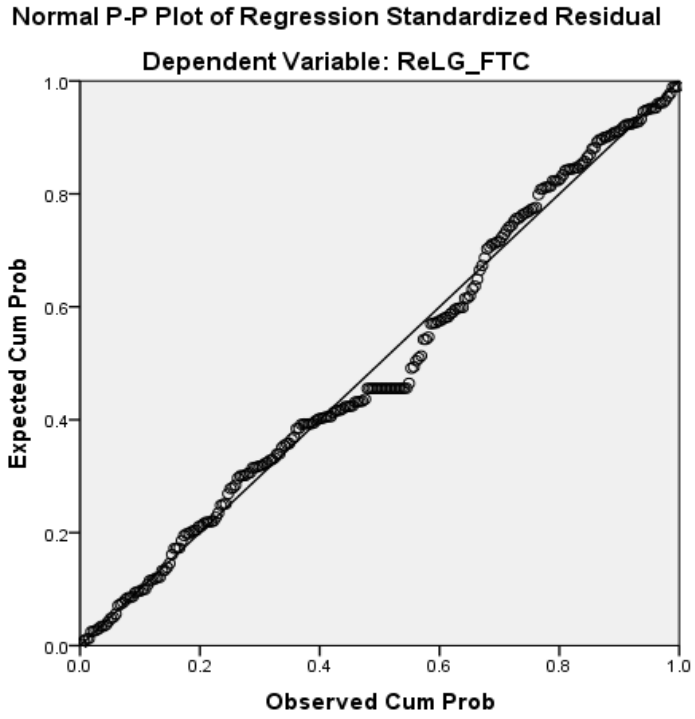
Equation 5: MC = $\alpha_{08} + \beta_{54}AI + \beta_{55}OC + \varepsilon$



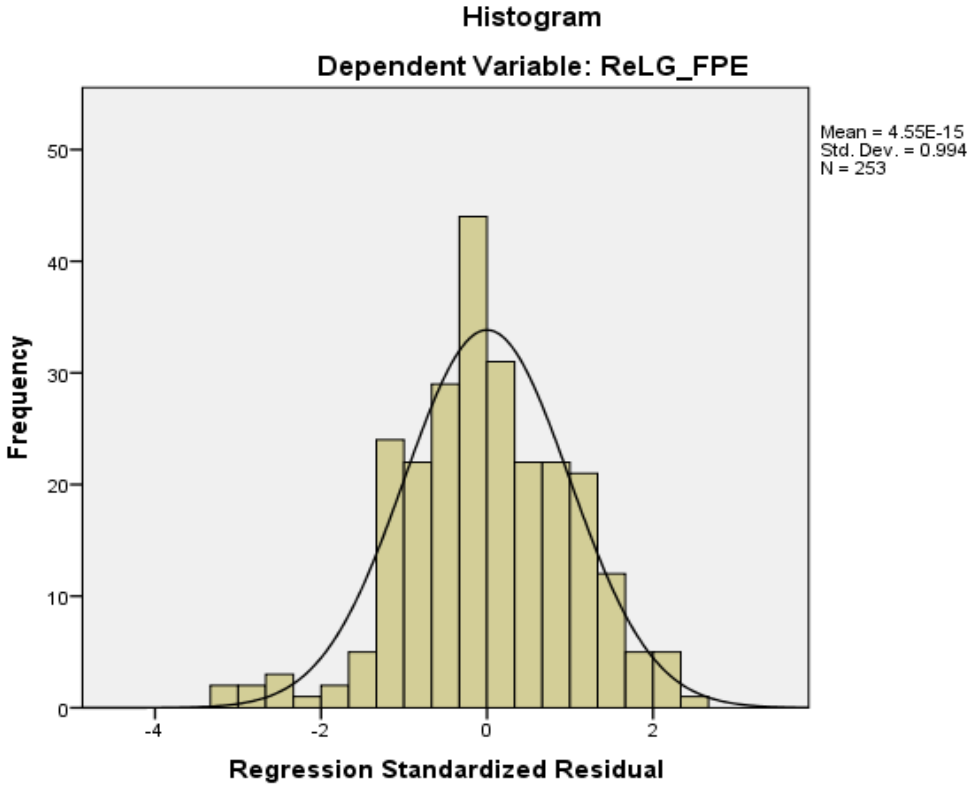


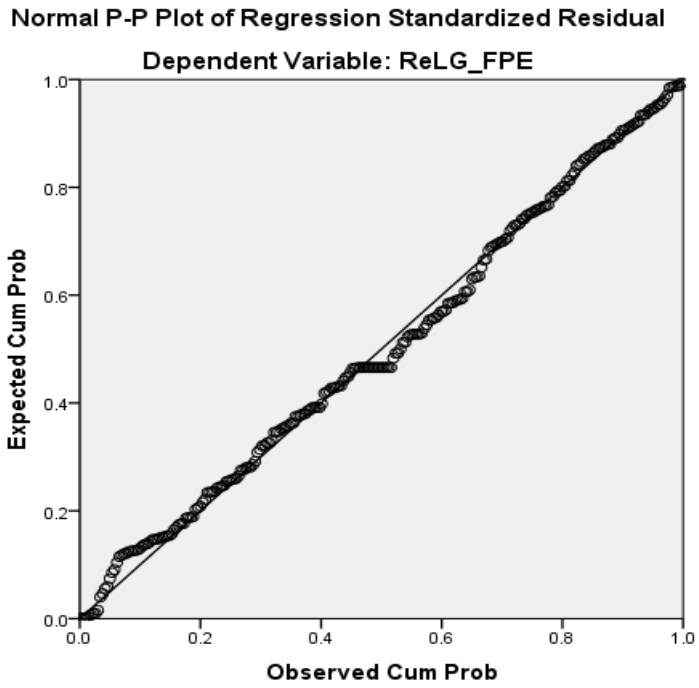
Equation 6: TC = $\alpha_{09} + \beta_{60}AI + \beta_{61}OC + \beta_{62}SP + \varepsilon$





Equation 7: PE = $\alpha_{10} + \beta_{66}AI + \beta_{67}OC + \beta_{68}SP + \varepsilon$





Test of constant variance of the error terms (Homoscedasticity)

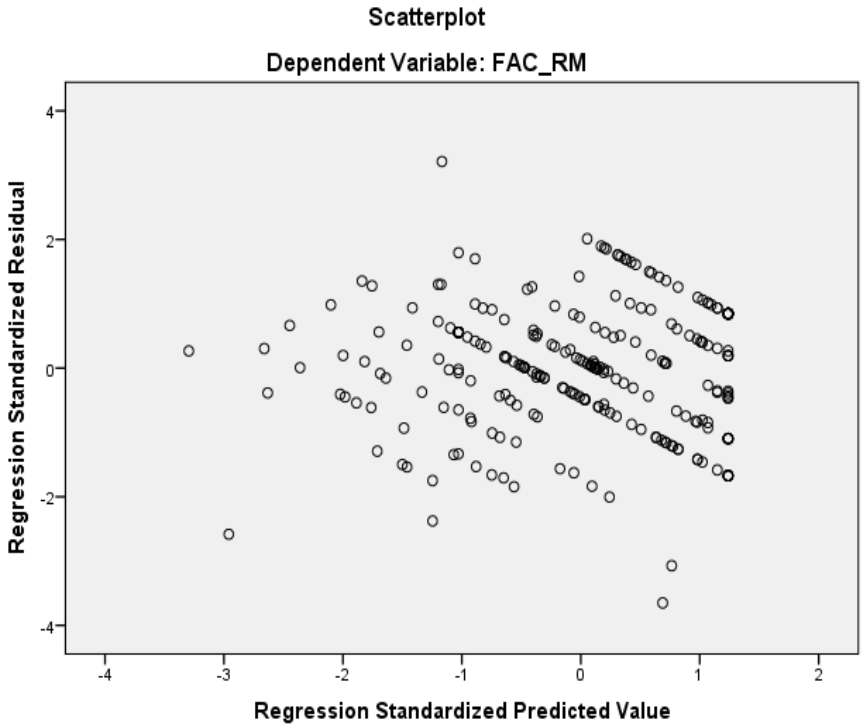
Assumption is the constant variance of the error terms or heteroscedasticity problem which can distort the results by increasing the possibility of a Type I error. The examinations both the Breusch-Pagan test and visual residual plots against the predictor variables are employed to test for heteroscedasticity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

From all equations the demonstrate results of the Breusch-Pagan is not encounter non-constancy variance of the error terms Therefore, heteroscedasticity problem is not the serious problem of this research.

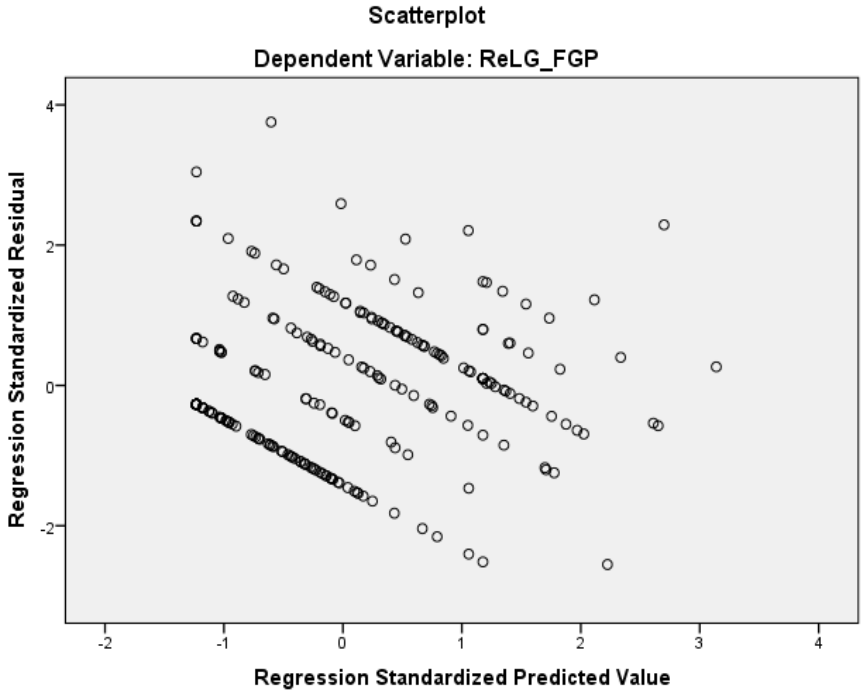
Table F4: The results of heteroscedasticity testing

Equations	Breusch-Pagan	
	Breusch-Pagan test χ^2_{BP}= (SSR*/2)/(SSE/n)^2	Critical value ($\chi^2_{(.05,1)}$=3.84)
1	= (.081*/2)/(128.393/255)^2 = 0.04	Value of Breusch-Pagan test does not exceed critical value
2	= (.000*/2)/(0.657/255)^2 = 0.00	Value of Breusch-Pagan test does not exceed critical value
3	= (.000*/2)/(0.870/255)^2 = 0.00	Value of Breusch-Pagan test does not exceed critical value
4	= (.000*/2)/(0.771/255)^2 = 0.00	Value of Breusch-Pagan test does not exceed critical value
5	= (.000*/2)/(0.961/255)^2 = 0.00	Value of Breusch-Pagan test does not exceed critical value
6	= (.000*/2)/(0.728/245)^2 = 0.00	Value of Breusch-Pagan test does not exceed critical value
7	= (.000*/2)/(0.914/253)^2 = 0.00	Value of Breusch-Pagan test does not exceed critical value

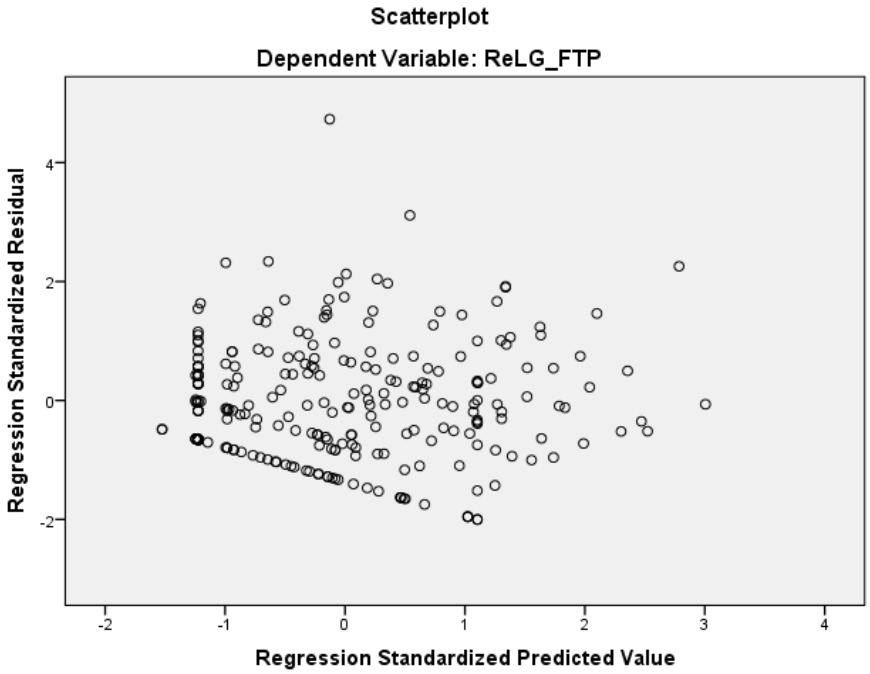
Equation 1: RM = $\alpha_{01} + \beta_1 MC + \beta_2 TC + \beta_3 PE + \varepsilon$



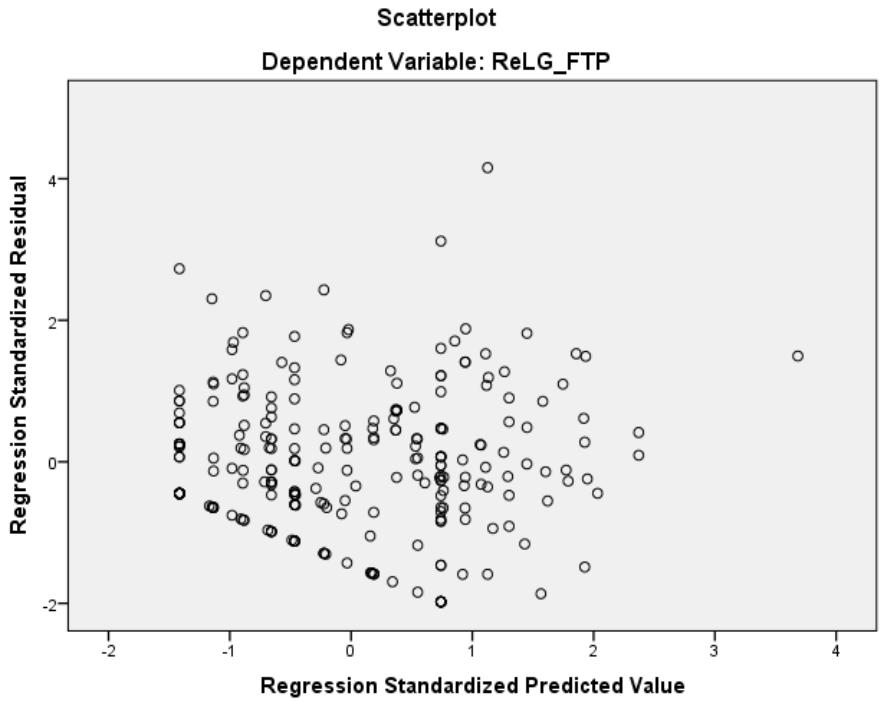
Equation 2: GP = $\alpha_{02} + \beta_7 MC + \beta_8 TC + \beta_9 PE + \varepsilon$



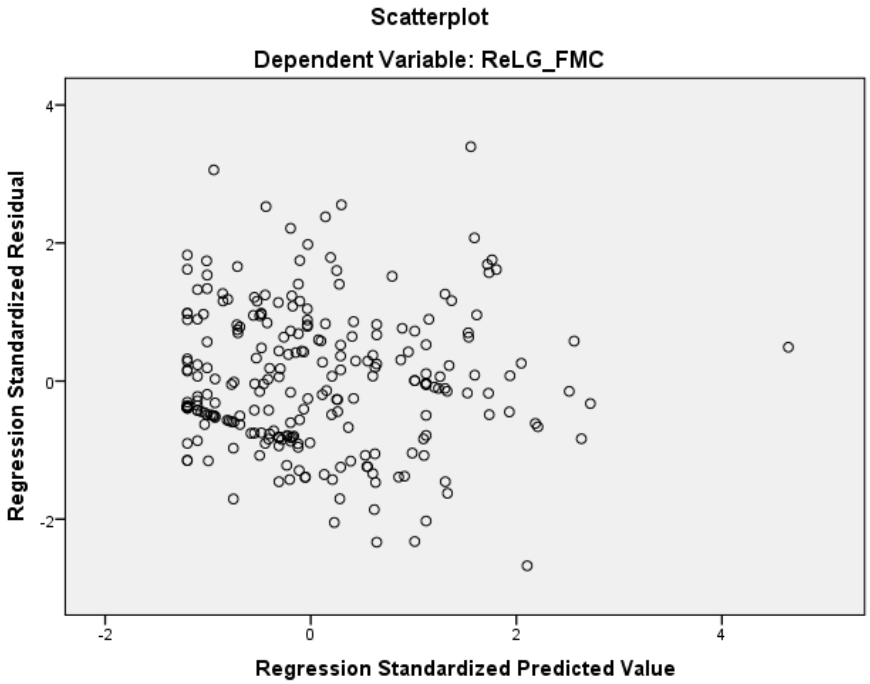
Equation 3: TP = $\alpha_{03} + \beta_{13}MC + \beta_{14}TC + \beta_{15}PE + \varepsilon$



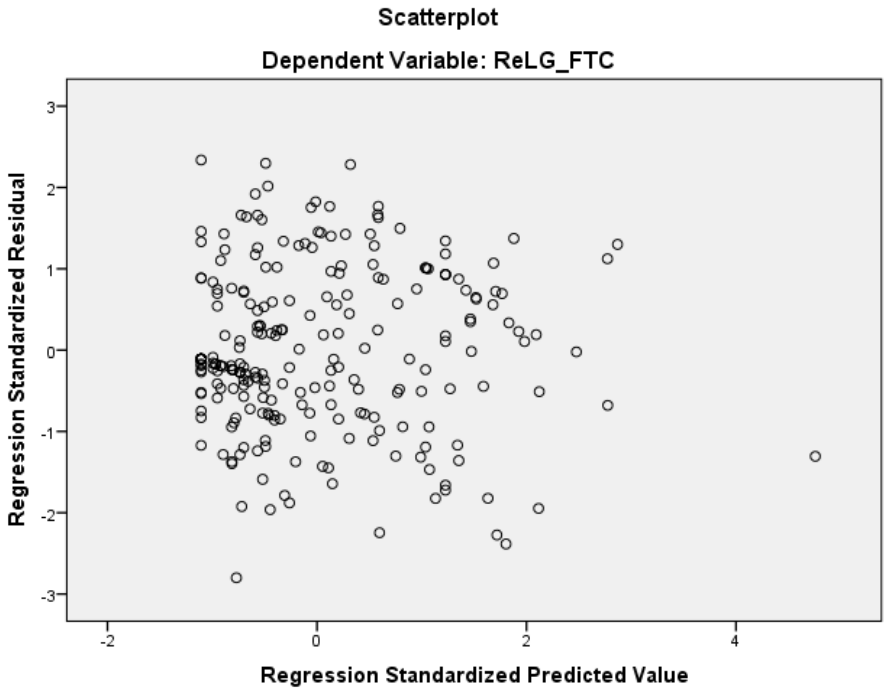
Equation 4: TP = $\alpha_{07} + \beta_{49}RM + \beta_{50}GP + \varepsilon$



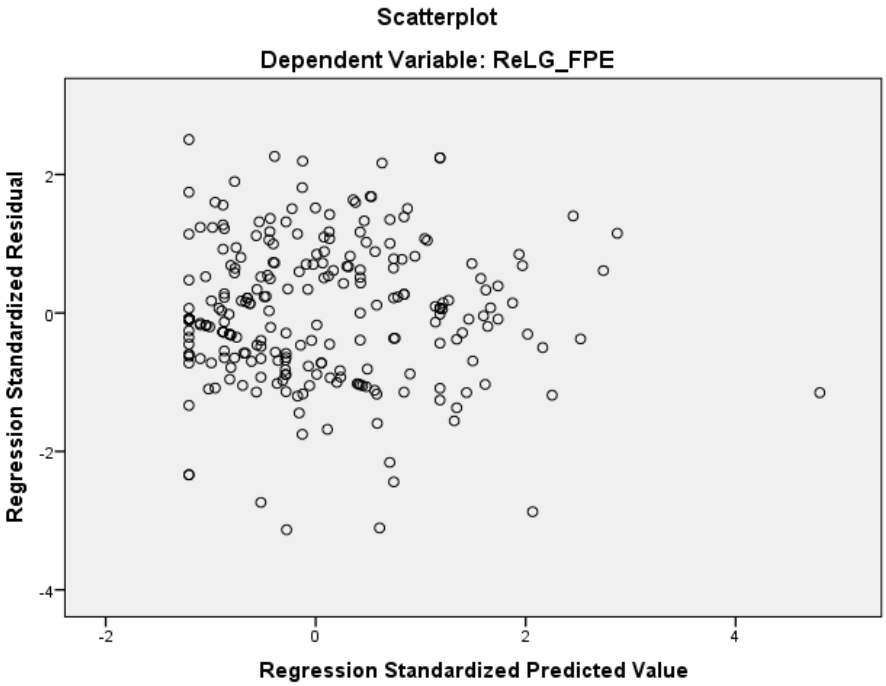
Equation 5: MC $= \alpha_{08} + \beta_{54}AI + \beta_{55}OC + \beta_{56}SP + \varepsilon$



Equation 6: TC $= \alpha_{09} + \beta_{60}AI + \beta_{61}OC + \beta_{62}SP + \varepsilon$



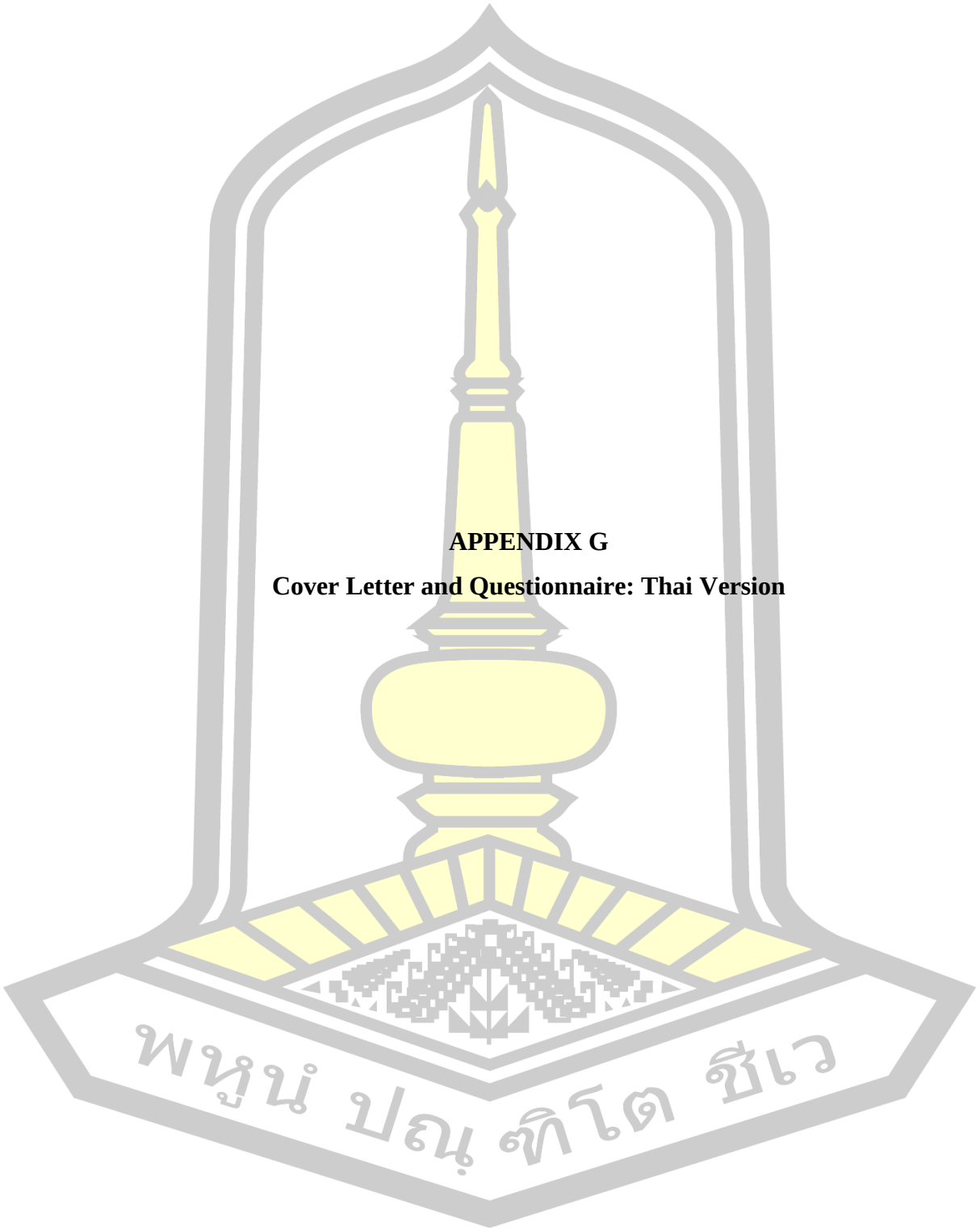
Equation 7: PE = $\alpha_{10} + \beta_{66}AI + \beta_{67}OC + \beta_{68}SP + \varepsilon$



Test independence of the error terms (Test of Autocorrelation)

Table F5: The results of independence of error terms assumption testing

Equations	R	R Square	Adjusted R Square	Durbin-Watson (d Statistic)
1	.703	.495	.488	1.867
2	.684	.468	.462	2.020
3	.502	.252	.243	1.805
4	.580	.337	.332	1.912
5	.445	.198	.188	2.108
6	.399	.159	.149	2.000
7	.506	.256	.247	1.946



APPENDIX G

Cover Letter and Questionnaire: Thai Version

แบบสอบถามเพื่อการวิจัย
เรื่อง ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี: หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย

คำชี้แจง :

โครงการวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาวิจัย เรื่อง “ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี: หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย” เพื่อใช้เป็นข้อมูลในการจัดทำวิทยานิพนธ์ระดับปริญญาเอกของผู้วิจัย ในหลักสูตรปรัชญาดุษฎีบัณฑิต สาขาวิชาการบัญชี คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม

ข้าพเจ้าใคร่ขอความอนุเคราะห์จากท่านผู้ตอบแบบสอบถาม ได้โปรดตอบแบบสอบถามชุดนี้ โดยรายละเอียดของแบบสอบถามประกอบด้วยส่วนคำถาม 7 ตอน ดังนี้

ตอนที่ 1 ข้อมูลทั่วไปเกี่ยวกับผู้บริหารหน่วยงานจัดเก็บภาษีในประเทศไทย

ตอนที่ 2 ข้อมูลทั่วไปเกี่ยวกับหน่วยงานจัดเก็บภาษีในประเทศไทย

ตอนที่ 3 ความคิดเห็นเกี่ยวกับความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบของหน่วยงานจัดเก็บภาษีในประเทศไทย

ตอนที่ 4 ความคิดเห็นเกี่ยวกับผลการดำเนินงานของหน่วยงานจัดเก็บภาษีในประเทศไทย

ตอนที่ 5 ความคิดเห็นเกี่ยวกับปัจจัยภายในที่ส่งผลต่อความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบของหน่วยงานจัดเก็บภาษีในประเทศไทย

ตอนที่ 6 ความคิดเห็นเกี่ยวกับปัจจัยภายนอกที่ส่งผลต่อความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบของหน่วยงานจัดเก็บภาษีในประเทศไทย

ตอนที่ 7 ข้อคิดเห็นและข้อเสนอแนะเกี่ยวข้องกับการปฏิบัติงานตรวจสอบภาษีของหน่วยงานจัดเก็บภาษีในประเทศไทย

คำตอบของท่านจะถูกเก็บรักษาเป็นความลับ และจะไม่มีการใช้ข้อมูลใด ๆ ที่เปิดเผยเกี่ยวกับตัวท่านในการรายงานข้อมูล รวมทั้งจะไม่มีการร่วมใช้ข้อมูลดังกล่าวกับบุคคลภายนอกอื่นใดโดยไม่ได้รับอนุญาตจากท่าน อนึ่ง หากท่านต้องการรายงานสรุปผลการวิจัย โปรดระบุ E-mail Address ของท่านหรือแนบนามบัตรของท่านมากับแบบสอบถามชุดนี้

❑ ต้องการ E - mail _____ ❑ ไม่ต้องการ

ผู้วิจัยขอขอบพระคุณที่ท่านได้กรุณาเสียสละเวลาในการตอบแบบสอบถามชุดนี้อย่างถูกต้องครบถ้วน ทั้งนี้ ผู้วิจัยหวังเป็นอย่างยิ่งว่าข้อมูลที่ได้รับจากท่านจะเป็นประโยชน์ต่อการวิจัยในครั้งนี้ และขอขอบพระคุณอย่างสูงมา ณ โอกาสนี้ หากท่านมีข้อสงสัยประการใดเกี่ยวกับแบบสอบถาม โปรดติดต่อนางสรณีย์ จันทร์ฉาย ซึ่งเป็นผู้วิจัยในครั้งนี้ โทรศัพท์เคลื่อนที่ 08-1708-6479 หรือ E–mail: sorane.j@excise.go.th

(นางสรณีย์ จันทร์ฉาย)
นิสิตระดับปริญญาเอก สาขาวิชาการบัญชี
คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม

ตอนที่ 1 ข้อมูลทั่วไปเกี่ยวกับผู้บริหารหน่วยงานจัดเก็บภาษีในประเทศไทย

1. เพศ

❑ ชาย ❑ หญิง

2. อายุ

❑ น้อยกว่า 30 ปี ❑ 30 - 40 ปี

❑ 41 - 50 ปี ❑ มากกว่า 50 ปี

3. ระดับการศึกษา

❑ ต่ำกว่าปริญญาตรี ❑ ปริญญาตรี

❑ ปริญญาโท ❑ ปริญญาเอก

4. ประสบการณ์ในการทำงาน

❑ น้อยกว่า 10 ปี ❑ 11 - 15 ปี

❑ 16 - 20 ปี ❑ มากกว่า 20 ปี

5. ตำแหน่งงานในปัจจุบัน

❑ ผู้อำนวยการ ระดับ.....

❑ นักวิชาการ (สรรพสามิต/สรรพากร/ศุลกากร) ระดับ.....

❑ เจ้าพนักงาน (สรรพสามิต/สรรพากร/ศุลกากร) ระดับ.....

❑ นักตรวจสอบภาษี ระดับ.....

❑ อื่น ๆ (โปรดระบุ) .....

ตอนที่ 2 ข้อมูลทั่วไปเกี่ยวกับหน่วยงานจัดเก็บภาษีในประเทศไทย

1. หน่วยงานที่สังกัด
   - ❑ กรมสรรพสามิต
   - ❑ กรมสรรพากร
   - ❑ กรมศุลกากร

2. รูปแบบหน่วยงานที่สังกัด
   - ❑ สำนักงานภาค
   - ❑ สำนักงานพื้นที่
   - ❑ สำนักงานพื้นที่สาขา/ด่าน

3. ที่ตั้งของหน่วยงาน
   - ❑ ภาคเหนือ
   - ❑ ภาคตะวันออกเฉียงเหนือ
   - ❑ ภาคกลาง
   - ❑ ภาคตะวันออก
   - ❑ ภาคใต้
   - ❑ กรุงเทพมหานคร

4. จำนวนเจ้าหน้าที่ในหน่วยงาน
   - ❑ น้อยกว่า 30 คน
   - ❑ 30 - 40 คน
   - ❑ 41 - 50 คน
   - ❑ มากกว่า 50 คน

5. ผลการจัดเก็บภาษีของหน่วยงานต่อปี (ปีงบประมาณล่าสุด)
   - ❑ ต่ำกว่า 5,000,000 บาท
   - ❑ 5,000,000 – 10,000,000 บาท
   - ❑ 10,000,001 – 15,000,000 บาท
   - ❑ มากกว่า 15,000,000 บาท

6. ผลการจัดเก็บภาษีของหน่วยงานต่อปีเมื่อเปรียบเทียบกับเป้าหมาย (ปีงบประมาณล่าสุด)
   - ❑ ต่ำกว่าเป้าหมาย
   - ❑ สูงกว่าเป้าหมาย

ตอนที่ 3 ความคิดเห็นเกี่ยวกับความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบของหน่วยงานจัดเก็บภาษีในประเทศไทย

ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบ	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
ความสามารถด้านการบริหารจัดการ (Management Capability) 1. หน่วยงานให้ความสำคัญกับการวิเคราะห์ข้อมูลของแผนงานตรวจสอบภาษี เพื่อให้แน่ใจว่าการตรวจสอบนั้นครอบคลุมตามภารกิจที่ได้รับมอบหมาย					
2. หน่วยงานเชื่อมั่นว่ากระบวนการวางแผนการวิเคราะห์ข้อมูลในรูปแบบที่เป็นระบบและเป็นทางการ ทำให้การตรวจสอบภาษีมีประสิทธิภาพมากยิ่งขึ้น					
3. หน่วยงานส่งเสริมให้มีการประสานงานกัน โดยการส่งข้อมูลผ่านระบบเครือข่ายสังคม เพื่อให้เกิดความรวดเร็วในการติดต่อสื่อสาร สามารถนำข้อมูลไปใช้ในการป้องกันและปราบปรามผู้กระทำผิดกฎหมายภาษี					
4. หน่วยงานเชื่อมั่นว่าการบริหารจัดการและการควบคุมระบบสารสนเทศอย่างเหมาะสม สามารถนำมาใช้เป็นฐานข้อมูลสนับสนุนการบริหารจัดเก็บภาษีได้					
ความสามารถด้านเทคโนโลยี (Technology Competence) 5. หน่วยงานเชื่อมั่นว่าโครงสร้างพื้นฐานด้านระบบเทคโนโลยีสารสนเทศ ทำให้การเชื่อมต่อการวิเคราะห์ข้อมูลทางภาษีมีประสิทธิภาพมากยิ่งขึ้น					
6. หน่วยงานตระหนักถึงศักยภาพของระบบเทคโนโลยีสารสนเทศที่ทันสมัย เพื่อช่วยในการเชื่อมต่อข้อมูลทางภาษีได้อย่างรวดเร็ว					
7. หน่วยงานเชื่อมั่นว่าระบบเทคโนโลยีสารสนเทศที่ใช้งานได้ง่ายช่วยแบ่งปันข้อมูลทางภาษีร่วมกันทั่วทั้งองค์กร					
8. หน่วยงานมุ่งเน้นให้มีการประยุกต์ใช้เทคโนโลยีที่เข้ากันได้ เพื่อให้เกิดการบริหารจัดการงานตรวจสอบภาษีอย่างเป็นรูปธรรม					

ตอนที่ 3 (ต่อ)

ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบ	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
ความเชี่ยวชาญของบุคลากร (Personnel Expertise) 9. หน่วยงานส่งเสริมให้มีการพัฒนาบุคลากรอย่างต่อเนื่อง เพื่อช่วยเสริมสร้างทักษะในการปฏิบัติงานตรวจสอบภาษีให้เกิดประสิทธิภาพมากยิ่งขึ้น					
10. หน่วยงานให้ความสำคัญกับการจัดการความรู้ในประเด็นต่าง ๆ ที่เกี่ยวข้องกับการตรวจสอบภาษี ซึ่งช่วยให้บุคลากรมีการพัฒนาอย่างต่อเนื่อง					
11. หน่วยงานส่งเสริมให้บุคลากรเกิดการเรียนรู้ เพื่อทำความเข้าใจเทคโนโลยีที่มีการเปลี่ยนแปลงอย่างต่อเนื่อง ช่วยให้การปฏิบัติงานมีประสิทธิภาพมากยิ่งขึ้น					
12. หน่วยงานสนับสนุนให้บุคลากรเข้าร่วมการฝึกอบรมด้านเทคโนโลยีที่ทันสมัยอย่างสม่ำเสมอ เพื่อช่วยให้การบริหารงานจัดเก็บภาษีมีประสิทธิผลมากยิ่งขึ้น					

ตอนที่ 4 ความคิดเห็นเกี่ยวกับผลการดำเนินงานของหน่วยงานจัดเก็บภาษีในประเทศไทย

ผลการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
ประสิทธิภาพการบริหารความเสี่ยง (Risk Management Efficiency)					
1. หน่วยงานวิเคราะห์ความเสี่ยงเป็นพื้นฐานในการกำหนดวิธีการบริหารความเสี่ยง โดยกำหนดความเสี่ยงต่อความสำเร็จของวัตถุประสงค์การตรวจสอบทั่วทั้งองค์กร					
2. หน่วยงานระบุวัตถุประสงค์การตรวจสอบที่มีความชัดเจนเพียงพอ เพื่อสามารถระบุความเสี่ยงที่เกี่ยวข้องได้					
3. หน่วยงานประเมินการเปลี่ยนแปลงที่ส่งผลกระทบต่อการบริหารความเสี่ยงในการตรวจสอบภาษีได้อย่างมีประสิทธิภาพ					
4. หน่วยงานมีหลักเกณฑ์ในการตรวจสอบผู้เสียภาษี โดยจัดกลุ่มผู้เสียภาษีตามระดับความเสี่ยง เพื่อช่วยให้การบริหารงานจัดเก็บภาษีมีประสิทธิผลมากยิ่งขึ้น					
แนวปฏิบัติที่ดี (Good Practice)					
5. หน่วยงานมีการปฏิบัติงานตรวจสอบภาษีที่ยึดมั่นตามนโยบายภาษี สอดคล้องกับยุทธศาสตร์ขององค์กร					
6. หน่วยงานมีแนวทางและวิธีการปฏิบัติงานตรวจสอบภาษีอย่างครบถ้วน โปร่งใส สามารถนำไปใช้ได้อย่างเป็นระบบ					
7. หน่วยงานมีเทคนิคในการตรวจสอบภาษีที่เหมาะสม ครอบคลุมในทุกกระบวนการดำเนินงานขององค์กร					
ผลการดำเนินงาน	**ระดับความคิดเห็น**				
	เสมอ 5	มักจะ 4	บางครั้ง 3	ไม่ค่อย 2	ไม่เคย 1
ผลการจัดเก็บภาษี (Tax Performance)					
8. หน่วยงานสามารถจัดเก็บรายได้ภาษีบรรลุเป้าหมายที่กำหนดไว้หรือสูงกว่าปีงบประมาณที่ผ่านมาได้อย่างมีประสิทธิผล					
9. หน่วยงานภาคภูมิใจกับการได้รับรางวัลด้านการปฏิบัติงานตามมาตรฐานหรือเกณฑ์การพัฒนาคุณภาพการบริหารจัดการภาครัฐ					
10. หน่วยงานมีนวัตกรรมทางภาษี เพื่อใช้ในการบริหารงานให้เกิดความสะดวก รวดเร็ว และมีประสิทธิภาพ					
11. หน่วยงานมีการบริหารงานอย่างโปร่งใสและเป็นธรรม เพื่อให้เกิดการพัฒนาองค์กรอย่างยั่งยืน					

ตอนที่ 5 ความคิดเห็นเกี่ยวกับปัจจัยภายในที่มีผลต่อการดำเนินงานของหน่วยงานจัดเก็บภาษีในประเทศไทย

ปัจจัยภายในที่มีผลต่อการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
การประยุกต์ใช้ระบบสารสนเทศทางการบัญชี (Accounting Information System Implementation) 1. ระบบสารสนเทศทางการบัญชีช่วยให้หน่วยงานสามารถตรวจสอบความถูกต้องของการวิเคราะห์ข้อมูลภาษีได้เป็นอย่างดี					
2. ระบบสารสนเทศทางการบัญชีช่วยให้หน่วยงานสามารถสอบทานความถูกต้องของการปฏิบัติงานตรวจสอบภาษีได้อย่างครบถ้วน					
3. ระบบสารสนเทศทางการบัญชีช่วยให้หน่วยงานสามารถติดตามแหล่งที่มาของข้อมูล เพื่อให้ข้อมูลทางภาษีมีความน่าเชื่อถือยิ่งขึ้น					
4. ระบบสารสนเทศทางการบัญชีช่วยให้หน่วยงานมีข้อมูลทางภาษีที่มีความโปร่งใส สามารถตรวจสอบที่มาได้อย่างชัดเจน					
วัฒนธรรมองค์กร (Organizational Culture) 5. หน่วยงานเชื่อมั่นในการสร้างค่านิยมขององค์กร เพื่อให้บุคลากรเกิดทัศนคติที่ดีในการปฏิบัติงานตามมาตรฐานการให้บริการ					
6. หน่วยงานให้ความสำคัญกับการมีจริยธรรม ความซื่อสัตย์ รวมถึงการมีจิตสำนึกความรับผิดชอบในการปฏิบัติงาน					
7. หน่วยงานเชื่อมั่นว่าความสามัคคีของบุคลากร ช่วยให้การปฏิบัติงานตรวจสอบภาษีมีประสิทธิภาพมากยิ่งขึ้น					
8. หน่วยงานให้ความสำคัญกับการทำงานเป็นทีม เพื่อช่วยให้การปฏิบัติงานสำเร็จตามวัตถุประสงค์ได้เป็นอย่างดี					

ตอนที่ 6 ความคิดเห็นเกี่ยวกับปัจจัยภายนอกที่มีผลต่อการดำเนินงานของหน่วยงานจัดเก็บภาษีในประเทศไทย

ปัจจัยภายนอกที่มีผลต่อการดำเนินงาน	ระดับความคิดเห็น				
	มากที่สุด 5	มาก 4	ปานกลาง 3	น้อย 2	น้อยที่สุด 1
แรงกดดันจากผู้มีส่วนได้เสีย (Stakeholder Pressure) 1. สังคมต้องการประโยชน์ของข้อมูลภาษีจากหน่วยงานภาษีมากยิ่งขึ้น ส่งผลให้หน่วยงานต้องพัฒนาศักยภาพในการปฏิบัติงานตรวจสอบภาษีอยู่เสมอ					
2. หน่วยงานกำกับดูแลคาดหวังในผลการจัดเก็บภาษี ส่งผลให้หน่วยงานต้องพัฒนานวัตกรรม เพื่อเพิ่มประสิทธิภาพการบริหารการจัดเก็บภาษี					
3. ผู้เสียภาษีมีความคาดหวังต่อคุณภาพการให้บริการ ส่งผลให้หน่วยงานต้องพัฒนาระบบการปฏิบัติงาน เพื่ออำนวยความสะดวกอย่างรวดเร็วและเป็นธรรม					

ตอนที่ 7 ข้อเสนอแนะและข้อคิดเห็นเกี่ยวกับการบริหารงานของหน่วยงานจัดเก็บภาษีในประเทศไทย

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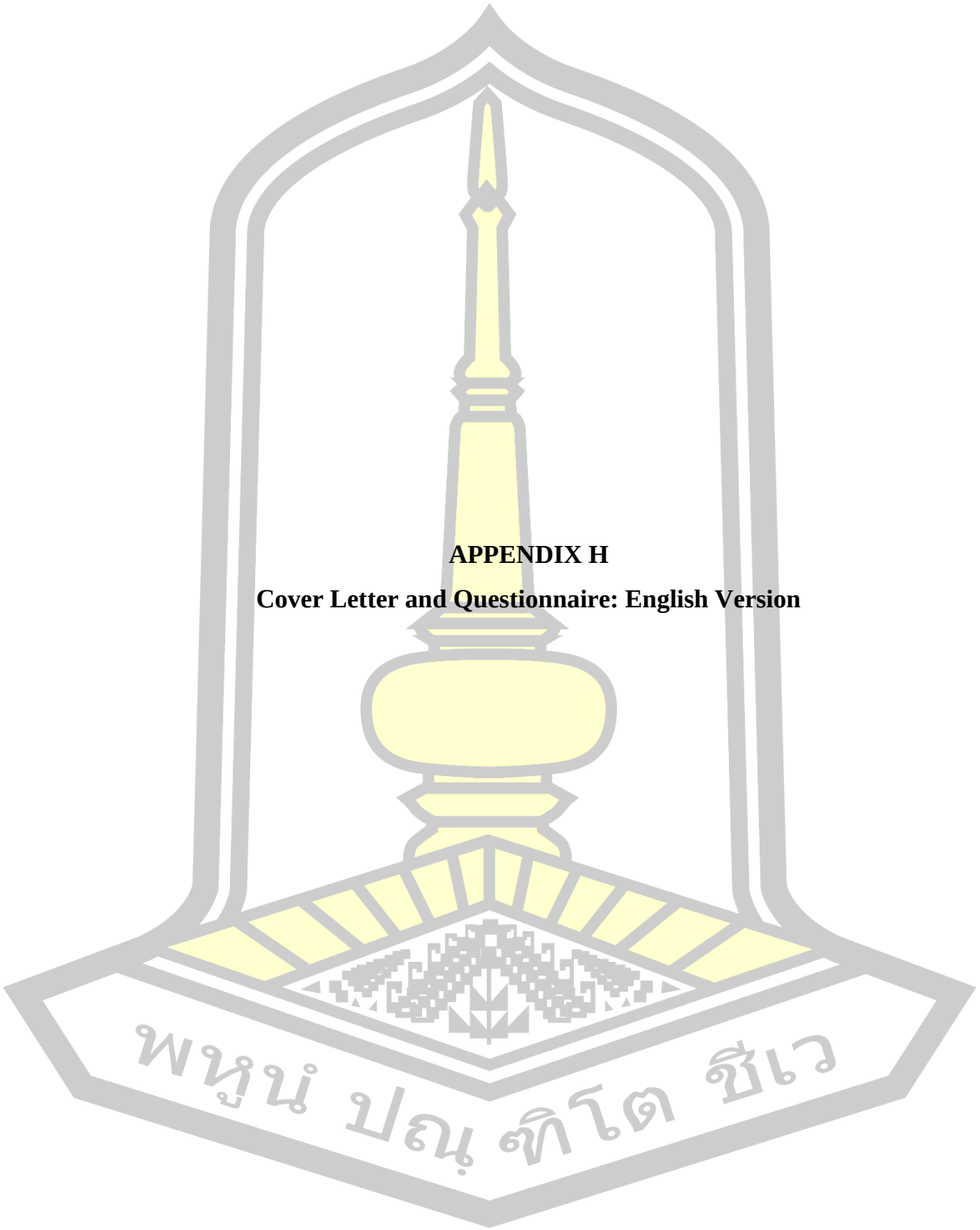
(ขอขอบพระคุณที่ได้สละเวลาตอบแบบสอบถาม)



APPENDIX H

Cover Letter and Questionnaire: English Version

Questionnaire for the Ph. D. Dissertation Research entitled
"Audit Data Analytics Capability and Tax Performance
: An Empirical Evidence from Tax Departments in Thailand"

Dear Sir,

This research is a part of a doctoral dissertation of Mrs. Soranee Janchai at the Mahasarakham Business School, Mahasarakham University, Thailand. The objective of this research is to examine the operation of tax departments in Thailand. The questionnaire is divided into 7 parts

Part 1: Personal information of respondents from tax departments in Thailand,
Part 2: General information of tax departments in Thailand,
Part 3: Opinion in audit data analytics capability of tax departments in Thailand,
Part 4: Opinions about the performance of tax departments in Thailand,
Part 5: Opinions about internal factors that affect audit data analytics capability of tax departments in Thailand,
Part 6: Opinions about external factors that affect audit data analytics capability of tax departments in Thailand, and
Part 7: Additional comments and suggestions about tax audit practice of tax departments in Thailand.

Your answer will be kept as confidentiality and your information will not be shared with any outsider party without your permission.

If you want a summary of this research, please indicate your E-mail address or attach your business card with this questionnaire. The summary will be mailed to you as soon as the analysis is completed.

The researcher would like to thank you for taking time to complete this survey questionnaire and hope that your answer will provide valuable information for academic advancement. If you have any questions with respect to this research, please contact me directly.

Sincerely yours,

(Mrs. Soranee Janchai)
Ph. D. Student, Accounting Program
Faculty of Accounting and Management, Mahasarakham University

Contact Info:
Mobile phone: 08 - 1708 - 6479
E-mail: sorane.j@excise.go.th

Part 1 Personal information of respondents from tax departments in Thailand

1. Gender

❑ Male ❑ Female

2. Age

❑ Less than 30 years old ❑ 30 - 40 years old

❑ 41 - 50 years old ❑ More than 50 years old

3. Educational level

❑ Non-graduates ❑ Graduates

❑ Master's degree ❑ Higher master's degree

4. Working experience

❑ Less than 10 years ❑ 10 - 15 years

❑ 16 - 20 years ❑ More than 20 years

5. Working position

❑ Director

❑ (Excise/Revenue/Customs) Technical Officer

❑ (Excise/Revenue/Customs) Officer

❑ Tax Audit Officer

❑ Other (Please Specify) ……..…

Part 2 General information of tax departments in Thailand

1. Organizational type

❑ Excise Department ❑ Revenue Department

❑ Customs Department

2. Forms of organization

❑ Regional office ❑ Area office

❑ Area branch office/Customs house

3. Location of organization

❑ Northern region ❑ Northeastern region

❑ Central region ❑ Eastern region

❑ Southern region ❑ Bangkok

4. Number of employees

❑ Less than 30 persons ❑ 30 - 40 persons

❑ 41 - 50 persons ❑ More than 50 persons

5. Average revenue of tax collection per year (last fiscal year)

❑ Less than 5,000,000 Baht ❑ 5,000,000 – 10,000,000 Baht

❑ 10,000,001 – 15,000,000 Baht ❑ More than 15,000,000 Baht

6. Average revenue of tax collection per year compared to the target (last fiscal year)

❑ Less than target ❑ More than target

Part 3 Opinion in audit data analytics capability of tax departments in Thailand

Audit Data Analytics Capability	Opinion Levels				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1
Management Capability					
1. Our organization focus on data analytics of the tax audit plan to ensure that the audit is covered by the assigned mission.					
2. Our organization believes that the data analytics planning processes in systematic and formalized ways will help make more effective in tax auditing.					
3. Our organization encourages the coordination by sending information via social networks in order to speed up communication and can use the information to prevent and suppress tax offenders.					
4. Our organization believes that properly management and control of information system can be used as a database to support tax administration.					
Technology Competence					
5. Our organization is confident that its information technology infrastructure. It allows the organization to connect various tax data analytics effectively.					
6. Our organization recognizes the potential of modern information technology. It will help to connect the tax information more real-time.					
7. Our organization believes that information technology system can be easily used. This will allow sharing tax information across the organization.					

Part 3 (Continued)

Audit Data Analytics Capability	Opinion Levels				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
Technology Competence 8. Our organization focus on the application of compatible technology to manage tax audit as concrete.					
Personnel Expertise 11. Our organization encourages ongoing staff development, in order to reinforce tax audit skill efficiency even more.					
12. Our organization focus on knowledge management on various issues. Related to tax auditing will help the staff to develop consistently.					
13. Our organization encourages employees to learn and understand technology that is constantly changing. It will allow for more efficient operation.					
14. Our organization supports staff to regularly attend training on modern technology. It will make the tax administration more effective.					

Part 4 Opinions on the performance of tax departments in Thailand

Organizational Performance	Opinion Levels				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
Risk Management Efficiency 1. Our organization analyzes risks as a basis for determining how the risks should be managed by identifies risks to the achievement of auditing objectives across the organization.					
2. Our organization specifies auditing objectives with enough clarity to enable the identification of risks relating to auditing objectives.					
3. Our organization assesses for change that could significantly impact the risk management in tax auditing effectively.					
4. Our organization has criteria for auditing taxpayers by grouping taxpayers at the risk-based audit levels. It will make the tax administration more effective.					
Good Practice 5. Our organization has tax auditing practices to adhere in accordance with tax policy and organizational strategy.					
6. Our organization has guidelines and procedures for tax auditing to be accurately, clear and transparently, which can be systematic used and more concrete.					
7. Our organization has tax audit technic that appropriate and cover altogether audit process.					

Part 4 (Continued)

Organizational Performance	Opinion Levels				
	Always 5	Often 4	Sometime 3	Rarely 2	Never 1
Tax Performance					
8. Our organization can collect tax revenues to achieve the goals set or more effectively than the previous fiscal year.					
9. Our organization prides itself on receiving awards for performance according to standards or criteria for the development of public sector management quality award.					
10. Our organization has innovations for tax administration to convenient, fast and efficient.					
11. Our organization has the transparent and fair administration for sustainable organization development.					

Part 5 Opinions on internal factors affecting the operation of tax departments in Thailand

Internal Factors	Opinion Levels				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
Accounting Information System Implementation					
1. Accounting information system supports the organization to verify the accuracy of the tax data analytics as well.					
2. Accounting information system allows the organization to fully review the completeness of its tax auditing practices.					
3. Accounting information system helps the organization track the source of their tax data to make tax data more reliable.					
4. Accounting information system allows the organization to have transparent tax data and verify that the source is clear.					
Organizational Culture					
5. Our organization believes in creating the values of the organization for the staff to have a positive attitude in performing work according to service standards.					
6. Our organization focus on ethics, honesty, and accountability in the operation.					
7. Our organization is confident that harmony and work together seamlessly to provide for greater effective tax auditing.					

Part 5 (Continued)

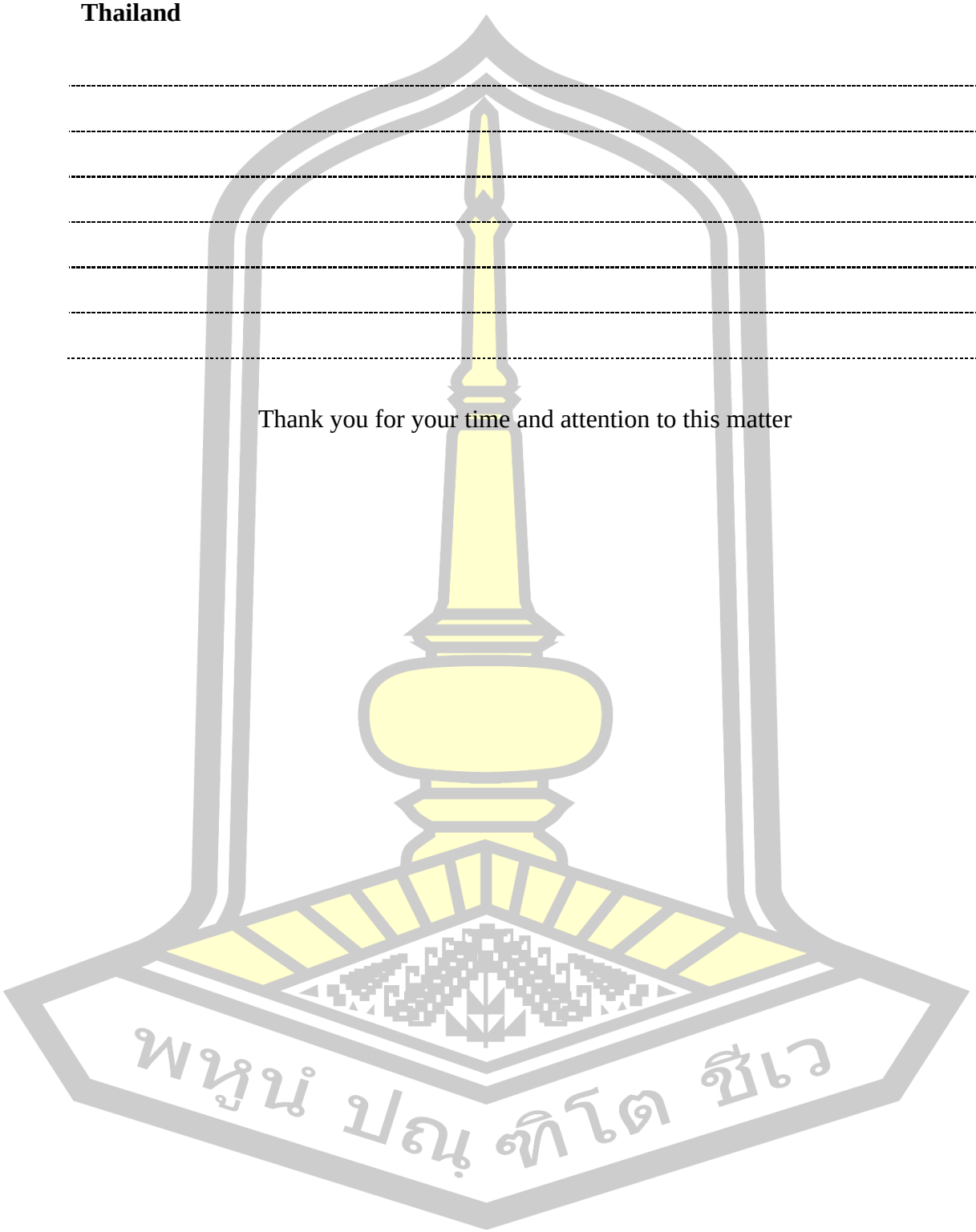
Internal Factors	Opinion Levels				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
Organizational Culture 8. Our organization focus on teamwork and mutual support will enable the achievement of the objectives as well.					

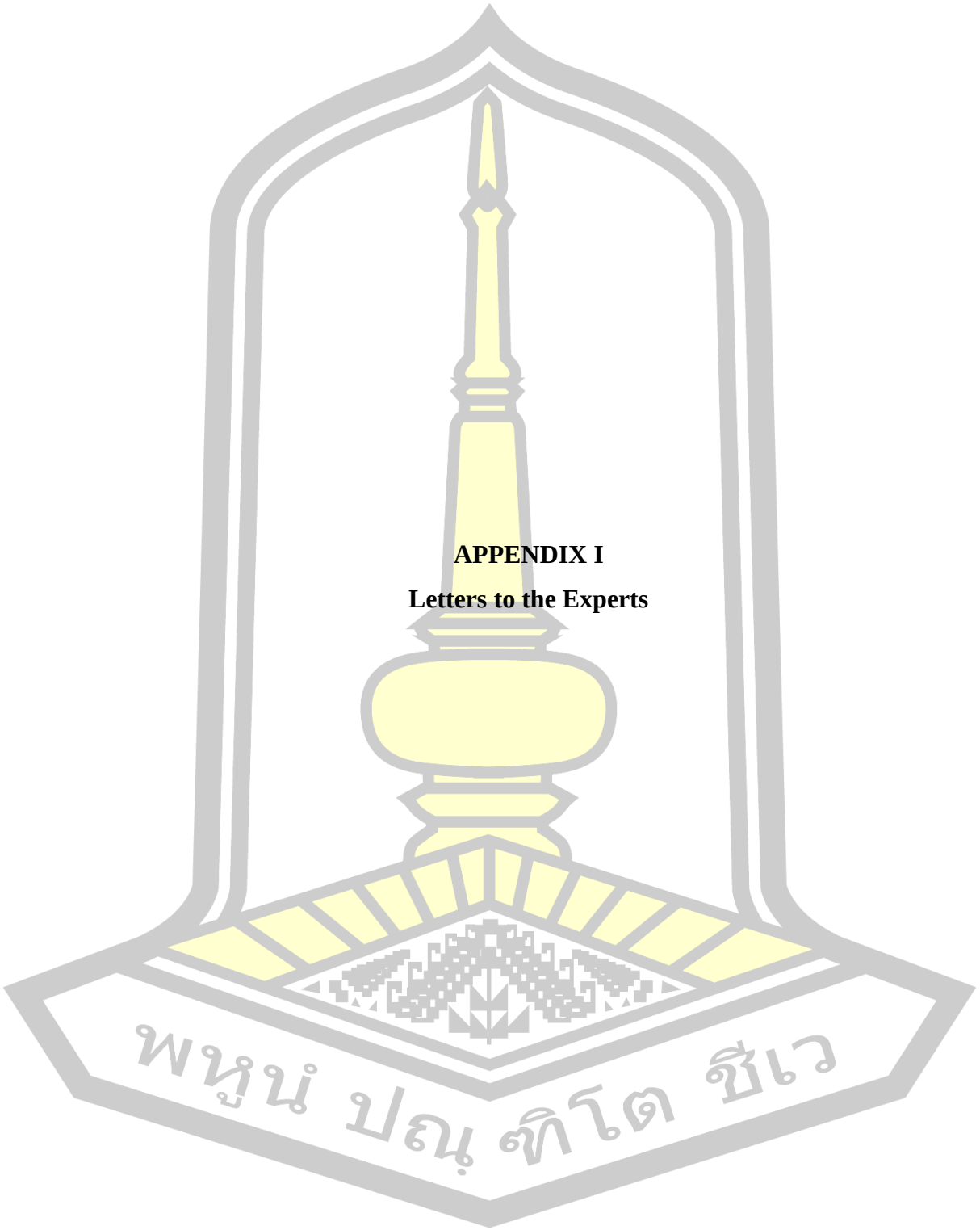
Part 6 Opinions on external factors affecting the operation of tax departments in Thailand

External Factors	Opinion Levels				
	Strongly Agree 5	Agree 4	Neutral 3	Disagree 2	Strongly Disagree 1
Stakeholder Pressure 1. Society needs the benefit of tax information from government agencies more leading to our organization who must develop the potential in tax auditing always.					
2. Regulators have expectations in increase tax collection leading to our organization who must develop innovation for maximum efficiency tax administration.					
3. Taxpayers expect to service quality leading to the organization must develop the operating system to facilitate fast and fair.					

Part 7 Suggestions and Comments in the management of tax departments in Thailand

Thank you for your time and attention to this matter





APPENDIX I

Letters to the Experts

ที่ อว 0605.10/ 182

คณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม
ตำบลขามเรียง อำเภอกันทรวิชัย
จังหวัดมหาสารคาม
44150

28 มิถุนายน 2562

เรื่อง ขอความอนุเคราะห์เป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัย

เรียน อาจารย์ ดร.มัทนชัย สุทธิพันธุ์

ด้วย นางสรณีย์ จันทร์ฉาย รหัสนิสิต 59010960003 นิสิตระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) สาขาวิชาการบัญชี ระบบในเวลาราชการ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม กำลังศึกษาวิทยานิพนธ์ เรื่อง "ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี: หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย" ซึ่งเป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต ดังนั้น เพื่อให้การดำเนินการเป็นไปด้วยความเรียบร้อยและบรรลุตามวัตถุประสงค์ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จึงใคร่ขอความอนุเคราะห์ท่านเป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัยและข้อเสนอแนะเพื่อนำข้อมูลที่ได้ไปดำเนินการทำวิทยานิพนธ์ต่อไป ตามแบบสอบถามที่แนบมาพร้อมนี้

คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม หวังเป็นอย่างยิ่งว่าคงได้รับความอนุเคราะห์จากท่านด้วยดี และขอขอบคุณมา ณ โอกาสนี้ด้วย

ขอแสดงความนับถือ

(อาจารย์วราวุฒิ นาคบุญนำ)
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คณบดีคณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม

งานวิชาการระดับบัณฑิตศึกษา
คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม
โทรศัพท์ 0-4375-4333 ต่อ 3431
โทรสาร 0-4375-4422

บันทึกข้อความ

หน่วยงาน คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม โทรศัพท์ 043-754333-3431 Fax 043- 754422

ที่ อว 0605.10/ **วันที่** 28 มิถุนายน 2562

เรื่อง ขอเรียนเชิญเป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัย

เรียน ผู้ช่วยศาสตราจารย์ ดร.นิติพงษ์ ส่งศรีโรจน์

ด้วย นางสรณีย์ จันทร์ฉาย รหัสนิสิต 59010960003 นิสิตระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) สาขาวิชาการบัญชี ระบบในเวลาราชการ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม กำลังศึกษาวิทยานิพนธ์ เรื่อง "ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี: หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย" ซึ่งเป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต ดังนั้น เพื่อให้การดำเนินการเป็นไปด้วยความเรียบร้อยและบรรลุตามวัตถุประสงค์ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จึงใคร่ขอความอนุเคราะห์ท่านเป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัยและข้อเสนอแนะเพื่อนำข้อมูลที่ได้ไปดำเนินการทำวิทยานิพนธ์ต่อไป ตามแบบสอบถามที่แนบมาพร้อมนี้

จึงเรียนมาเพื่อโปรดพิจารณา

(รองศาสตราจารย์ ดร.สุวรรณ หวังเจริญเดช)
รองคณบดีฝ่ายวิชาการ

คำสั่ง
- ☑ ทราบ
- ☐ ตามเสนอ
- ☐ อนุญาต
- ☐ อนุมัติ
- ☐ ส่งมามแล้ว
- ☑ อื่นๆ.....

① มีแก้ไขในตารางที่ 1 ข้อ 4
② ทำเป็น IOC เพิ่ม ที่ข้อเสนอแนะ

(ผู้ช่วยศาสตราจารย์ ดร.นิติพงษ์ ส่งศรีโรจน์)
คณบดีคณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม
1 กค. 2562

บันทึกข้อความ

หน่วยงาน คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม โทรศัพท์ 043-754333-3431 Fax 043- 754422
ที่ อว 0605.10/ **วันที่** 28 มิถุนายน 2562
เรื่อง ขอเรียนเชิญเป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัย

เรียน รองศาสตราจารย์ ดร.สุวรรณ หวังเจริญเดช

ด้วย นางสรณีย์ จันทร์ฉาย รหัสนิสิต 59010960003 นิสิตระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) สาขาวิชาการบัญชี ระบบในเวลาราชการ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม กำลังศึกษาวิทยานิพนธ์ เรื่อง "ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี: หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย" ซึ่งเป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต ดังนั้น เพื่อให้การดำเนินการเป็นไปด้วยความเรียบร้อยและบรรลุตามวัตถุประสงค์ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จึงใคร่ขอความอนุเคราะห์ท่านเป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัยและข้อเสนอแนะเพื่อนำข้อมูลที่ได้ไปดำเนินการทำวิทยานิพนธ์ต่อไป ตามแบบสอบถามที่แนบมาพร้อมนี้

จึงเรียนมาเพื่อโปรดพิจารณา

(อาจารย์วราวุฒิ นาคบุญนำ)
รองคณบดีฝ่ายกิจการนิสิต รักษาการแทน
คณบดีคณะการบัญชีและการจัดการ

บันทึกข้อความ

หน่วยงาน คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม โทรศัพท์ 043-754333-3431 Fax 043- 754422
ที่ อว 0605.10/ **วันที่** 28 มิถุนายน 2562
เรื่อง ขอเรียนเชิญเป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัย

เรียน ผู้ช่วยศาสตราจารย์ ดร.ญาณินท์ ตั้งภิญโญพุฒิคุณ

ด้วย นางสรณีย์ จันทร์ฉาย รหัสนิสิต 59010960003 นิสิตระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) สาขาวิชาการบัญชี ระบบในเวลาราชการ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม กำลังศึกษาวิทยานิพนธ์ เรื่อง "ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี: หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย" ซึ่งเป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต ดังนั้น เพื่อให้การดำเนินการเป็นไปด้วยความเรียบร้อยและบรรลุตามวัตถุประสงค์ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จึงใคร่ขอความอนุเคราะห์ท่านเป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัยและข้อเสนอแนะ เพื่อนำข้อมูลที่ได้ไปดำเนินการทำวิทยานิพนธ์ต่อไป ตามแบบสอบถามที่แนบมาพร้อมนี้

จึงเรียนมาเพื่อโปรดพิจารณา

(อาจารย์วราวุฒิ นาคบุญนำ)
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บันทึกข้อความ

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ที่ อว 0605.10/ **วันที่** 28 มิถุนายน 2562
เรื่อง ขอเรียนเชิญเป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัย

เรียน ผู้ช่วยศาสตราจารย์ ดร.อิงอร นาชัยฤทธิ์

ด้วย นางสรณีย์ จันทร์ฉาย รหัสนิสิต 59010960003 นิสิตระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) สาขาวิชาการบัญชี ระบบในเวลาราชการ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม กำลังศึกษาวิทยานิพนธ์ เรื่อง "ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี: หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย" ซึ่งเป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปรัชญาดุษฎีบัณฑิต ดังนั้น เพื่อให้การดำเนินการเป็นไปด้วยความเรียบร้อยและบรรลุตามวัตถุประสงค์ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จึงใคร่ขอความอนุเคราะห์ท่านเป็นผู้เชี่ยวชาญตรวจสอบเครื่องมือวิจัยและข้อเสนอแนะเพื่อนำข้อมูลที่ได้ไปดำเนินการทำวิทยานิพนธ์ต่อไป ตามแบบสอบถามที่แนบมาพร้อมนี้

จึงเรียนมาเพื่อโปรดพิจารณา

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คณบดีคณะการบัญชีและการจัดการ

APPENDIX J

Postcard for the Follow up

ที่ อว 0605.10/๒๘๗

คณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม
ตำบลขามเรียง อำเภอกันทรวิชัย
จังหวัดมหาสารคาม
44150

22 กรกฎาคม 2562

เรื่อง ขอความอนุเคราะห์กรอกแบบสอบถาม

เรียน ผู้บริหารส่วนราชการสรรพสามิตพื้นที่/พื้นที่สาขา

ด้วย นางสรณีย์ จันทร์ฉาย รหัสนิสิต 59010960003 นิสิตระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) สาขาวิชาการบัญชี คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม กำลังศึกษาวิทยานิพนธ์ เรื่อง "ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี : หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย" ซึ่งเป็นส่วนหนึ่งของการทำวิทยานิพนธ์หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) และการศึกษาในครั้งนี้ได้เน้นให้นิสิตศึกษาข้อมูลด้วยตนเอง ดังนั้น เพื่อให้การจัดทำวิทยานิพนธ์เป็นไปด้วยความเรียบร้อยและบรรลุวัตถุประสงค์ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จึงใคร่ขอความอนุเคราะห์ให้ นางสรณีย์ จันทร์ฉาย ศึกษาและเก็บรวบรวมในรายละเอียดตามแบบสอบถามที่แนบมาพร้อมนี้

คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม หวังเป็นอย่างยิ่งว่าคงได้รับความอนุเคราะห์จากท่านในการให้ข้อมูลในครั้งนี้เป็นอย่างยิ่ง และขอขอบคุณมา ณ โอกาสนี้

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.นิติพงษ์ ส่งศรีโรจน์)
คณบดีคณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม

ฝ่ายวิชาการระดับบัณฑิตศึกษา
คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม
โทรศัพท์ 0-4375-4333 ต่อ 3431
โทรสาร 0-4375-4422

ที่ อว 0605.10/๒๙๖

คณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม
ตำบลขามเรียง อำเภอกันทรวิชัย
จังหวัดมหาสารคาม
44150

22 กรกฎาคม 2562

เรื่อง ขอความอนุเคราะห์กรอกแบบสอบถาม

เรียน ผู้บริหารส่วนราชการสรรพากรพื้นที่/พื้นที่สาขา

ด้วย นางสรณีย์ จันทร์ฉาย รหัสนิสิต 59010960003 นิสิตระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) สาขาวิชาการบัญชี คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม กำลังศึกษาวิทยานิพนธ์ เรื่อง “ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี : หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย” ซึ่งเป็นส่วนหนึ่งของการทำวิทยานิพนธ์หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) และการศึกษาในครั้งนี้ได้เน้นให้นิสิตศึกษาข้อมูลด้วยตนเอง ดังนั้น เพื่อให้การจัดทำวิทยานิพนธ์เป็นไปด้วยความเรียบร้อยและบรรลุวัตถุประสงค์ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จึงใคร่ขอความอนุเคราะห์ให้ นางสรณีย์ จันทร์ฉาย ศึกษาและเก็บรวบรวมในรายละเอียดตามแบบสอบถามที่แนบมาพร้อมนี้

คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม หวังเป็นอย่างยิ่งว่าคงได้รับความอนุเคราะห์จากท่านในการให้ข้อมูลในครั้งนี้เป็นอย่างยิ่ง และขอขอบคุณมา ณ โอกาสนี้

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.นิติพงษ์ ส่งศรีโรจน์)
คณบดีคณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม

ฝ่ายวิชาการระดับบัณฑิตศึกษา
คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม
โทรศัพท์ 0-4375-4333 ต่อ 3431
โทรสาร 0-4375-4422

ที่ อว 0605.10/ 282

คณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม
ตำบลขามเรียง อำเภอกันทรวิชัย
จังหวัดมหาสารคาม
44150

22 กรกฎาคม 2562

เรื่อง ขอความอนุเคราะห์กรอกแบบสอบถาม

เรียน ผู้บริหารส่วนราชการด่านศุลกากร

ด้วย นางสรณีย์ จันทร์ฉาย รหัสนิสิต 59010960003 นิสิตระดับปริญญาเอก หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) สาขาวิชาการบัญชี คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม กำลังศึกษาวิทยานิพนธ์ เรื่อง "ความสามารถในการวิเคราะห์ข้อมูลการตรวจสอบและผลการจัดเก็บภาษี : หลักฐานเชิงประจักษ์จากหน่วยงานจัดเก็บภาษีในประเทศไทย" ซึ่งเป็นส่วนหนึ่งของการทำวิทยานิพนธ์หลักสูตรปรัชญาดุษฎีบัณฑิต (ปร.ด.) และการศึกษาในครั้งนี้ได้เน้นให้นิสิตศึกษาข้อมูลด้วยตนเอง ดังนั้น เพื่อให้การจัดทำวิทยานิพนธ์เป็นไปด้วยความเรียบร้อยและบรรลุวัตถุประสงค์ คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม จึงใคร่ขอความอนุเคราะห์ให้ นางสรณีย์ จันทร์ฉาย ศึกษาและเก็บรวบรวมในรายละเอียดตามแบบสอบถามที่แนบมาพร้อมนี้

คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม หวังเป็นอย่างยิ่งว่าคงได้รับความอนุเคราะห์จากท่านในการให้ข้อมูลในครั้งนี้เป็นอย่างยิ่ง และขอขอบคุณมา ณ โอกาสนี้

ขอแสดงความนับถือ

(ผู้ช่วยศาสตราจารย์ ดร.นิติพงษ์ ส่งศรีโรจน์)
คณบดีคณะการบัญชีและการจัดการ
มหาวิทยาลัยมหาสารคาม

ฝ่ายวิชาการระดับบัณฑิตศึกษา
คณะการบัญชีและการจัดการ มหาวิทยาลัยมหาสารคาม
โทรศัพท์ 0-4375-4333 ต่อ 3431
โทรสาร 0-4375-4422

BIOGRAPHY

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PLACE OF WORK	The Excise Department
EDUCATION	2009 Bachelor of Accounting Ubon Ratchathani University Ubon Ratchathani, Thailand. 2015 Master of Accountancy (Accounting) Mahasarakham University Mahasarakham, Thailand. 2020 Doctor of Philosophy (Accounting) Mahasarakham University Mahasarakham, Thailand.
Research grants & awards	This dissertation was funded by Mahasarakham Business School, Mahasaraknam University, Academic Year 2019.
Research output	Janchai, S., Wangcharoendate, S. and Yasamorn, N. (2015). Relationships between self-esteem and job enthusiasm of accountants in the Excise department. Journal of Accountancy and Management, Division of Research and International Affairs Mahasarakham Business School, Mahasarakham University, 7(1), 13-22.