

THE STUDY OF FACTORS AFFECTING ON COSO ERM SUCCESS AND ITS CONSEQUENCES: AN EMPIRICAL RESEARCH OF THAI-LISTED COMPANIES

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Abstract. The goal of this study was to look at the causes and effects of the COSO ERM success of the companies listed on the Thai Stock Exchange. The internal resources and capabilities including effective AIS design, top management support, and internal auditor competency are assumed to become the antecedents of COSO ERM success. Moreover, the consequences of COSO ERM success are sustainable value creation, achieve strategy and goal, promote efficiency and effectiveness, financial reporting quality, and compliance with law. Thai-listed firms were used as research subjects, and data from the chief internal control was collected via a mail survey process and a questionnaire. The overall findings show that successful COSO ERM is influenced positively and significantly by effective AIS design, top management support, and internal auditor competency. Additionally, the achievement of strategy and goals, promotion of efficiency and effectiveness, quality of financial reporting, and legal compliance are all positively impacted by COSO ERM success. Moreover, achieve strategy and goal, promote efficiency and effectiveness, financial reporting quality, compliance with law all have a positive, significant impact on the creation of sustainable value. Overall, the results demonstrate that excellent AIS design, top management backing, and internal auditor expertise are required for a company to develop both COSO ERM success and long-term sustainable value generation.

Keywords: COSO ERM success, sustainable value creation, internal resources and capabilities.

JEL Classification: G34, M41.

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1. Introduction

In 2020, it was evident that a brand-new coronavirus (COVID-19) had made it to every nation's coastlines. Various governments also imposed travel bans to many countries, temporarily shuttered many unnecessary firms, and many of the businesses that were remaining open saw weak levels of revenue activity. These days, the COVID-19 pandemic has forced both business owners and leaders to act rapidly and make decisions that could have long-term effects that their firms don't completely grasp yet (KPMG International, 2020). The COVID-19 epidemic significantly affects industry sectors and the nation's economy as a whole (Ryu & Chae, 2022). Due to the ongoing disruption during the crisis, businesses need to stay agile and adapt their business strategy to survive and turn this crisis into an opportunity, thus, business needs to ensure a good governance structure that will help adapt in this peculiar era (Pecina et al., 2022; Donthu & Gustafsson, 2020). Every organization needs to practice good corporate governance (CG) in order to recover from COVID-19 (Le & Nguyen, 2020;

Donthu & Gustafsson, 2020).

Early in this decade, companies like Enron, WorldCom, Lehman Brothers, Tyco, Qwest, HealthSouth, MicroStrategy, and Global Crossing all had extraordinary commercial collapses amid accusations of false financial reporting (Williams et al., 2019; Okike, 2011; Rezaee, 2005). Corruption in business management is currently on the rise in places like the FTX Cryptocurrency Company and Luckin-coffee, among others (Maha Putri et al., 2023). Therefore, one characteristic of fraud is that the company where the fraud happened had poor corporate governance, making CG essential for any firm (Posch, 2020; Forker & Green, 2000).

CG entails corporate structures and process for overseeing the business's affairs, including oversight by CEO to ensure that the companies are being managed with the best interests of stakeholder in mind (Wayne, 2009; Forker & Green, 2000). Additionally, businesses use the COSO framework to reasonably ensure that they create accurate financial reporting, adhere to applicable rules and regulations, and carry out their operations in an efficient and

effective manner (Ching et al., 2020; Williams et al., 2019). In order to effectively manage risks in a business environment that is becoming more turbulent and unpredictable, firms frequently employ the COSO ERM framework (Ching et al., 2020; Posch, 2020).

However, despite this conflicting findings in the empirical literature, the accounting research perspective discovered that there was limited empirical evidence of examining both antecedents and consequences of COSO ERM success (Gonzalez et al., 2020; Ching et al., 2020; Posch, 2020; Wisuttee Wong & Rompho, 2015; Zhao et al., 2014; Schneider et al., 2009; Jokipii, 2010). By examining the causes and effects of COSO ERM success for the listed companies on the Stock Exchange of Thailand, this study seeks to close this research gap. Additionally, the main inquiry in this study is "Does successful AIS design, top management support, and internal auditor competency have an impact on COSO ERM success?". Does COSO ERM success affect the sustainable value creation, asks another study topic. Thus, both theoretical and managerial contributions are produced by this research.

2. Theoretical background and research model

2.1. History of COSO and COSO framework

The Committee of Sponsoring Organization of the Treadway Commission (COSO), a voluntary private organization founded in the United States in 1985, aims to enhance the caliber of financial reporting by CG of firms and internal control systems (The Committee of Sponsoring Organizations, 1994). The American Accounting Association (AAA), the American Institute of Certified Public Accountants (AICPA), Financial Executives International (FEI), The Institute of Internal Auditors (IIA), and Institute of Management Accountants (IMA), all collaborated to jointly sponsor The COSO Pyramid, which outlined the five tenets of COSO control components including (1) the control environment, (2) risk assessment, (3) control activity, (4) information and communication, and (5) monitoring, was first used by the COSO framework in 1992 (The Committee of Sponsoring Organizations [COSO], 2017; Louwers et al., 2015; English et al., 2004).

In 2004, to address the evolution of enterprise risk management and the corporation's ability to improve risk in a more business-friendly environment, COSO produced Enterprise Risk Management-Integrated Framework (COSO-ERM) (COSO, 2017; Ashbaugh-Skaife et al., 2007). In 2013, COSO announced new recommendations known as the 2013 COSO Framework, which revised the previous COSO pyramid to become "The COSO Cube" and included new tools to assist businesses in designing and implementing a risk management framework. The 17 various internal control principles that come under the COSO pyramid's five original categories formed the basis of the updated framework and cube. The 77 points of focus among the 17 new principles are designed to help in the design, implementation, and execution of internal controls

by offering useful guidance on how to determine whether the pertinent principles are present and operating (COSO, 2017; Louwers et al., 2015).

In 2017, COSO updated the new framework, Enterprise Risk Management (ERM) – Integrated Framework, to reflect the evolving landscape and challenges that businesses now handle – highlighting, as they put it, "Importance of considering risk in both the strategy-setting process and in driving performance" (Jayantha, 2018; COSO, 2017). COSO defines ERM as "a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risks to be line with its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives" (COSO, 2017). As a result, there are eight components that make up the COSO ERM framework: (1) internal environment, (2) objective setting, (3) event identification, (4) risk assessment, (5) risk response, (6) control activities, (7) information and communication, and (8) monitoring (COSO, 2017).

In the end 2017, COSO framework includes strategy setting in its definition of ERM, the reality is that update the Sarbanes-Oxley Act (SOX) and its requirements for public companies to test and certify financial reporting controls was a strong motivating factor in developing the standard (COSO, 2017). The updated COSO-ERM versions emphasize how crucial it is to take risk into account while developing strategies and motivating performance (COSO, 2020). Twenty principles are now dispersed over each of the five components or categories of COSO's new ERM framework. These include: (1) **Governance and Culture** – Forms the basis of the other components by providing guidance on board oversight responsibilities, operating structures, leadership's tone, and attracting, developing, and retaining the right individuals. (2) **Strategy and Objective-Setting** – This component focuses on strategic planning and how the corporation can understand the effect of internal and external factors on risk. (3) **Performance (Risk Management Process)** – After corporation develops its strategy, it then moves on to identify and assess risks that could affect its ability to achieve these goals. This section not only helps guide the corporation risk identification assessment but also how to prioritize and respond to risks. After all, an organization is only as good as its performance, which is bigger than just risk management. (4) **Review and Revision** – At some point after risks have been prioritized and a course of action been chosen, the corporation moves into the review and revision phase where it assesses any changes that have taken place. This is also the opportunity to understand how the ERM process in the corporation can be improved upon. (5) **Information, Communication, and Reporting** – The last component of the COSO ERM framework involves sharing information from internal and external sources throughout the corporation. Systems are used to capture, process, manage, and report on the corporation's risk, culture, and performance (Damkam & Tan, 2020; COSO, 2017).

The COSO always released a subset of the COSO framework after that, such as the 2020 publication of “Compliance Risk Management: Applying the COSO ERM Framework” to complement the COSO ERM 2017 (COSO, 2020). Today, it still has COSO ERM2017 application, as displayed in <https://www.coso.org/>. As a result, this research’s model was based on COSO ERM2017. The five COSO 2017 framework dimensions are also used by Pecina et al. (2022) to describe the phenomenon of enterprise risk management system adoption in the biggest European Electric Power Companies.

2.2. Resource-Based View (RBV) of the firm: internal resource and capability

A group of interrelated theories known as the Resource-Based View of the Firm (RBV) share the assumptions of resource heterogeneity and resource immobility among companies. According to this perspective, a firm is a collection of assets, competencies, organizational processes, firm traits, or routines that generate value and are protected from rivals by isolating mechanisms (Miller, 2019). Internal resources are therefore defined as company assets and capabilities, procedures, information, expertise, know-how, etc. that are under the control of a firm and allow an organization to develop and put into practice plans that increase its effectiveness and efficiency (Barney, 1991). Additionally, capabilities are defined as a particular kind of resource, more particularly, an organizationally entrenched, non-transferable, company-specific resource, with the aim of enhancing the performance of the firm (Barney, 1991).

Understanding the links among internal resources, capabilities, competitive advantage, and performance is crucial for resource-based approach plan design (Preuthippan, 2000). The firm’s RBV concentrates managerial attention on its internal resources in an effort to identify those skills

and abilities that have the potential to produce superior competitive advantages and improve performance (Henri, 2006; Russo & Fouts, 1997). This research employ the RBV of the firm to explain internal resources and capability including effective AIS design, top management support, and internal auditor competency which are set as the antecedents of COSO ERM success in the research model.

2.3. Contingency theory

According to the contingency theory, corporate structure is a result of context, which is simultaneously influenced by both the internal and external environment (Anderson & Lanen, 1999). Organizational structure has been considered by researchers to include managerial procedures or strategies that can improve business performance (Ginzberge, 1980; Hayes, 1977). Similarly, organizational structure consists of both a variety of endogenous and exogenous contextual factors. Competition and environmental unpredictability are examples of exogenous factors, whereas internal organizational elements including internal resources, technology, and organizational culture are examples of endogenous factors (Anderson & Lanen, 1999; Kren, 1992).

In addition, the contingency theory postulates that for an organization to succeed, its strategy, structure, and managerial process must all work together (Chenhall, 2003). The heritage of exploring how organizational and environmental factors affect the use and success of control systems forms the foundation of contingency-based research (Reid & Smith, 2000; Chenhall, 2003). The success of the COSO ERM after implementation is used in this study to describe a phenomenon that has an effect on sustainable value creation. As a result, the research model and hypotheses, which are represented in Figure 1, have been established. They are based on the following relevant literature as well as the RBV of the firm and contingency theory.

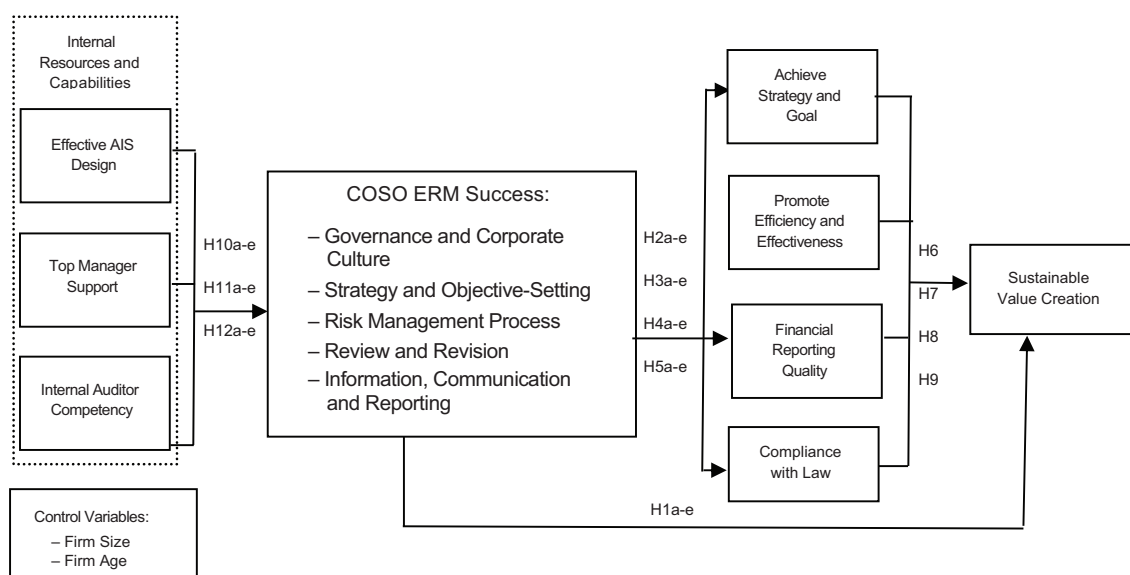


Figure 1. Research model of the antecedents and consequences of COSO ERM success

3. Literature review and hypothesis development

3.1. COSO ERM success and sustainable value creation

COSO ERM Success refers to effective internal control system or process, effected by an entity's board of directors, management, and other personnel, conjoint designed to provide reasonable assurance regarding the achievement of objectives relating to effective operations, reporting, and compliance with law (Posch, 2020; COSO, 2017). For this research focus on COSO ERM success in five dimensions that based on COSO ERM framework 2017 including (1) governance and culture, (2) strategy and objective-setting, (3) risk management process, (4) review and revision, and (5) information, communication, and reporting (Pecina et al., 2022; Damkam & Tan, 2020; COSO, 2017; Zhao et al., 2014). For this research, sustainable value creation refers to the assessment of the firm performance in long term which is successful in several aspects both financial and non-financial performance including revenue growth and market share, return on investment, customer satisfaction, and employee welfare (Institute for Family Business, 2012; Cadez & Guilding, 2008; Ainnuddin et al., 2007).

In order to enhance corporate performance and governance, COSO ERM's mission is to "offer thought leadership through the creation of comprehensive frameworks and guidance on enterprise risk management, internal control, and fraud deterrence" (Geary & Ricketts, 1992). Management frequently employs COSO ERM to improve an organization's capacity for managing business uncertainty and to decide how much risk to take in its quest to raise firm value (COSO, 2017; Zhao et al., 2014). Success with COSO ERM has a considerable impact on sustainable value creation, according to earlier studies (Gonzalez et al., 2020; Damkam & Tan, 2020; Quon et al., 2012; Schneider et al., 2009; Mafiana, 2013). According to research by Gordon et al. (2009) and Farhan Malik et al. (2020), the effectiveness of COSO ERM has a considerable, beneficial impact on corporate performance. Thus, the hypothesis is proposed as follows:

Hypothesis 1: *The higher the COSO ERM success: a) governance and culture, b) strategy and objective-setting, c) risk management process d) review and revision, and e) information, communication, and reporting is, the more likely that the firms will gain greater sustainable value creation.*

3.2. COSO ERM success and achieve strategy and goal

Achieve strategy and goal refers to the assessing the successful business in accordance with the strategy or business plan that the corporations continually meet the objective (COSO, 2017; Zhao et al., 2014). Previous studies discovered that the achievement of strategy and aim is significantly impacted by COSO ERM success (Wisuttee-wong & Rompho, 2015; Zhao et al., 2014). Thus, the hypothesis is proposed as follows:

Hypothesis 2: *The higher the COSO ERM success: a) governance and culture, b) strategy and objective-setting, c) risk management process, d) review and revision, and e) information, communication, and reporting is, the more likely that the firms will gain greater achieve strategy and goal.*

3.3. COSO ERM success and promote efficiency and effectiveness

Promote efficiency and effectiveness refers to a business that prioritizes budgeting and follow-up planning in order to reach performance goals and focuses on cost-effectiveness (Cheng et al., 2013; Jokipii, 2010; Tanki & Steinberg, 1993). Prior studies found that COSO ERM success has a significant effect on promote efficiency and effectiveness (Cheng et al., 2013; Sawalqa & Qtish, 2012; Jokipii, 2010). Thus, the hypothesis is proposed as follows:

Hypothesis 3: *The higher the COSO ERM success: a) governance and culture, b) strategy and objective-setting, c) risk management process, d) review and revision, and e) information, communication, and reporting is, the more likely that the firms will gain greater promote efficiency and effectiveness.*

3.4. COSO ERM success and financial reporting quality

Financial reporting quality refer to the attributes of accounting information that make information provided useful to users in making economic decision (The International Federation of Accountants [IFAC], 2012; Socea, 2012; Berger, 2011). Prior studies revealed that the effectiveness of COSO ERM is related to the caliber of financial reporting (Ogundana et al., 2017; Spatacean, 2012; Okike, 2011). Thus, the hypothesis is proposed as follows:

Hypothesis 4: *The higher the COSO ERM success: a) governance and culture, b) strategy and objective-setting, c) risk management process, d) review and revision, and e) information, communication, and reporting is, the more likely that the firms will gain greater financial reporting quality.*

3.5. COSO ERM success and compliance with law

Compliance with law refer to corporation can be always applicable laws and regulation such as the Stock Exchange Commission of Thailand (SEC) regulation or governmental law and the Federation of Accounting Profession (Moeller, 2011; Jokipii, 2010; Gupta, 2008). Prior studies revealed that adherence to the legislation is related to COSO ERM success (Wisuttee-wong & Rompho, 2015; Jokipii, 2010; Geary & Ricketts, 1992). Thus, the hypothesis is proposed as follows:

Hypothesis 5: *The higher the COSO ERM success: a) governance and culture, b) strategy and objective-setting, c) risk management process, d) review and revision, and e) information, communication, and reporting is, the more likely that the firms will gain greater compliance with law.*

3.6. The association among achieve strategy and goal, promote efficiency and effectiveness, financial reporting quality, compliance with law, and sustainable value creation

3.6.1. Achieve strategy and goal, and sustainable value creation

Prior studies discovered that achieving strategy and goals is related to the sustainable value creation. For instance, Hart and Milstein (2003) discovered that attaining strategy and aim has an impact on the production of sustainable value. According to Wonters (2013), achieving strategy and goals aided in the performance of the firm and the production of long-term value. Hence, the hypothesis is proposed as below:

***Hypothesis 6:** The higher the achieve strategy and goal is, the more likely that the firms will gain greater sustainable value creation.*

3.6.2. Promote efficiency and effectiveness, and sustainable value creation

Prior studies discovered that promoting efficiency and effectiveness is linked to the production of sustainable value (Mafiana, 2013; Schneider et al., 2009). Additionally, Wonters (2013), Hahn (2007) revealed that promoting efficiency and effectiveness is linked to the production of sustainable value. Additionally, it was indicated by Tanki and Steinberg (1993) that increasing efficiency and effectiveness is primarily employed to improve business sustainability. Thus, the hypothesis is proposed as below.

***Hypothesis 7:** The higher the promote efficiency and effectiveness is, the more likely that the firms will gain greater sustainable value creation.*

3.6.3. Financial reporting quality and sustainable value creation

Prior research reveals that financial reporting quality is associated with sustainable value creation (Haliah, 2018; Berger, 2011; Beyer et al., 2010). Furthermore, according to Biddle et al. (2009), more accurate financial reporting ought to boost investment effectiveness. Additionally, Tontiset (2022a) indicated that a favorable, significant impact on business sustainability is caused by effective preparation of financial statements as a proxy for financial reporting quality. Hence, the hypothesis is proposed as follows:

***Hypothesis 8:** The higher that financial reporting quality is, the more likely that the firms will gain greater sustainable value creation.*

3.6.4. Compliance with law and sustainable value creation

According to earlier studies, following the law is linked to long-term wealth creation (Schneider et al., 2009). According to Mafiana (2013), Jokipii (2010), and Gupta (2008), following the rules and regulations is primarily done to

increase a company's sustainability. Thus, the hypothesis is proposed as below:

***Hypothesis 9:** The higher the compliance with law is, the more likely that the firms will gain greater sustainable value creation.*

3.7. The antecedents of COSO ERM success

3.7.1. Effective AIS design and COSO ERM success

Effective AIS design refers to the latency of accounting information system design that provides accounting information by adopting specific qualifications including accurate and reliable systems, timeliness and flexible program, and effective network link to other systems (Tontiset, 2022a; Altamuro & Beattey, 2010; Peppard & Ward, 2004). Effective AIS systems are set up and created to prevent financial reporting fraud, to prevent the loss of assets, and to carry out effective performance (Altamuro & Beattey, 2010). Prior researches indicated that effective AIS design has a significant impact on COSO ERM success (Zhao et al., 2014; Ahmed Al-Qudah, 2011; Altamuro & Beattey, 2010; Peppard & Ward, 2004; O'Donnell & David, 2000). Thus, the hypothesis is proposed as follows:

***Hypothesis 10:** The higher the Effective AIS design is, the more likely that the firms will gain greater COSO ERM success: a) governance and culture, b) strategy and objective-setting, c) risk management process, d) review and revision, and e) information, communication, and reporting.*

3.7.2. Top management support and COSO ERM Success

Top management support refers to chief financial officer and chief executive officers emphasized on the amount of support given to developing and implementing new technique or innovation and procedure in order to sustainable development (Foster & Swenson, 1997; Krumwiede et al., 2007). Prior studies revealed that the success of COSO ERM is significantly influenced by top management support (Zhao et al., 2014; Jokipii, 2010; Maelah & Ibrahim, 2007; Krumwiede et al., 2007). Consistent with, Saelim (1995) found that the function of top management support is the most crucial aspect of putting COSO ERM into practice. Thus, the hypothesis is proposed as follows:

***Hypothesis 11:** The higher the top management support is, the more likely that the firms will gain greater COSO ERM success: a) governance and culture, b) strategy and objective-setting, c) risk management process, d) review and revision, and e) information, communication, and reporting.*

3.7.3. Internal auditor professional and COSO ERM Success

Internal auditor professional refers to an internal auditor's existing capacities that help foretell competent such as skills of internal audit program, audit knowledge and abilities on internal audit standards (Moeller, 2011; Kennedy

& Dresser, 2005). Previous accounting studies discovered a link between internal auditor expertise and COSO ERM success (Moeller, 2011; Suddaby et al., 2009). Additionally, Bishop III et al. (1992) contend that the internal auditor's job is to assist higher corporate governance by bringing to its attention the advantages and disadvantages of internal control systems. Thus, the hypothesis is proposed as follows:

Hypothesis 12: *The higher the internal auditor professional is, the more likely that the firms will gain greater COSO ERM success: a) governance and culture, b) strategy and objective-setting, c) risk management process, d) review and revision, and e) information, communication, and reporting.*

4. Research methods

4.1. Sample and data collection procedure

The companies listed on the Stock Exchange of Thailand (SET) serve as an example for this research. Because they have a direct impact on establishing the COSO environment in each organization, the chief internal control officer or internal audit manager are considered as significant actors (Haron et al., 2010). Numerous business and company addresses can be found using the SET database, which is accessible as of November 2021 at www.set.or.th. Thus, information was gathered directly through paper-based surveys using a five-point Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree".

The Stock Exchange of Thailand's 580 listed companies were selected as the sample of research. Then, 15 surveys could not be delivered because a company had moved or was no longer in operation. After removing the undeliverable from the database's list, there were 565 legitimate questionnaires, and 110 replies were received. Only 102 of the returned and completed questionnaires, or around 17.93%, were useable. The majority of statisticians concur that a sample size of 100 is necessary to obtain any form of significant results (Cridland, 2022).

4.2. Variable measurement

4.2.1. COSO ERM success

COSO ERM success is defined as an effective internal control system or process that is implemented by a company's board of directors, management, and other staff members and is intended to give reasonable assurance about the accomplishment of goals relating to efficient operations, accurate reporting, and legal compliance (Posch, 2020; COSO, 2017; Zhao et al., 2014). For this research focus on COSO ERM success in five dimensions that based on COSO ERM framework 2017 including (1) governance and culture, (2) strategy and objective-setting, (3) risk management process, (4) review and revision, and (5) information, communication, and reporting (Damkam & Tan, 2020; COSO, 2017; Zhao et al., 2014).

Governance and culture are evaluated using a five-item scale modified from Damkam and Tan (2020), COSO (2017), and Zhao et al. (2014). The scale includes the following items: (1.1) exercises board risk oversight, (1.2) establishes operating structures, (1.3) defines desired culture, (1.4) demonstrates commitment to core values, and (1.5) attracts, develops, and retains capable individuals. (2) Strategy and objective-setting is measured using four-item scale modified from Damkam and Tan (2020), COSO (2017), Zhao et al. (2014) including (2.1) analyzes business context (2.2) defines risk appetite (2.3) evaluate alternative strategies, and (2.4) formulates business objectives. (3) Risk management process is measured using five-item scale modified from Damkam and Tan (2020), COSO (2017), Zhao et al. (2014) including (3.1) identifies risk, (3.2) assesses severity of risk, (3.3) prioritizes risks, (3.4) implements risk responses, and (3.5) develop portfolio view. (4) Review and revision is measured using three-item scale modified from Damkam and Tan (2020), COSO (2017), Zhao et al. (2014) including (4.1) assesses substantial change, (4.2) reviews risk and performance, and (4.3) pursues improvement in enterprise risk management. (5) information, communication, and reporting is measured using three-item scale modified from Damkam and Tan (2020), COSO (2017), Zhao et al. (2014) including (5.1) leverages information and technology, (5.2) communicates risk information, and (5.3) reports on risk, culture, and performance.

4.2.2. Consequence variable

Sustainable value creation is defined as the assessment of the firm performance in long term which is successful in several aspects both financial and non-financial performance including revenue growth and market share, return on investment, customer satisfaction, and employee welfare (Cadez & Guilding, 2008; Ainnuddin et al., 2007). Sustainable value creation is measured using four-item scale modified from Institute for Family Business (2012), Cadez and Guilding (2008), Ainnuddin et al. (2007).

Achieve strategy and goal is defined as the assessing the successful business in accordance with the strategy or business plan that the corporations continually meet the objective (COSO, 2017; Zhao et al., 2014). Achieve strategy and goal is measured using three-item scale modified from Wisuttee Wong and Rompho (2015), Zhao et al. (2014).

Promote efficiency and effectiveness is defined as corporation that emphasizes on follow up planning and budgeting in order to meet achievement of performance and also focus on low cost (Cheng et al., 2013; Jokipii, 2010; Tanki & Steinberg, 1993). Promote efficiency and effectiveness is measured using three-item scale modified from Cheng et al. (2013), Jokipii (2010), Tanki and Steinberg (1993).

Financial reporting quality is defined as the attributes of accounting information that make information provided useful to users in making economic decision (IFAC, 2012;

Socea, 2012; Berger, 2011). Financial reporting quality is measured using three-item scale modified from IFAC (2012), Socea (2012), Berger (2011).

Compliance with law is defined as corporation can be always applicable laws and regulation such as the Stock Exchange Commission of Thailand (SEC) regulation or governmental law and the Federation of Accounting Profession (Moeller, 2011; Jokipii, 2010; Gupta, 2008). Compliance with law is measured using three-item scale modified from Moeller (2011), Jokipii (2010), Gupta (2008).

4.2.3. Antecedents variable

Effective AIS design is defined as the latency of accounting information system design that provides accounting information by adopting specific qualifications including accurate and reliable systems, timeliness and flexible program, and effective network link to other systems (Tontiset, 2022a; Altamuro & Beattey, 2010; Peppard & Ward, 2004). Effective AIS design is measured using three-item scale modified from Tontiset (2022b), Altamuro and Beattey (2010), Peppard and Ward (2004).

Top management support is defined as chief financial officer and chief executive officers emphasized on the amount of support given to developing and implementing new technique or innovation and procedure in order to sustainable development (Dabari & Saidin, 2014; Foster & Swenson, 1997; Krumwiede et al., 2007). Top management support is measured using three-item scale modified from development Dabari and Saidin (2014), Foster and Swenson (1997), Krumwiede et al. (2007).

Internal auditor professional is defined as an internal auditor's existing capacities that help foretell competent such as skills of internal audit program, audit knowledge and abilities on internal audit standards (Moeller, 2011; Kennedy & Dresser, 2005). Internal auditor professional is measured using three-item scale modified from development Moeller (2011), Kennedy and Dresser (2005).

4.3. Control variable

Two control variables are included to account for firm characteristics for the fact that they may influence the hypothesized relationships of both firm age and size. Firm age (FA) is measured by number of years that a firm has been in operation, and firm size (FIS) is measured by total assets of the firm. Sustainable value creation be influenced by firm age and firm size because it may be able to achieve superior performance (Hoglund & Sundvik, 2016; Gotti & Mastrolia, 2012).

4.4. Reliability and validity

Factor analysis was firstly utilized to investigate the underlying relationships of a large number of items and to determine whether they can be reduced to a smaller set of factors. Due to the small number of observations, each group of items representing a particular scale un-

derwent a separate factor analysis. According to a higher rule-of-thumb at a cut-off value of 0.40, the confirmatory factor analysis (CFA) has a considerable potential to inflate the component loadings (Hair et al., 2010). All factor loadings are statistically significant and above the cutoff of 0.40 (0.74–0.99). The internal consistency of the measurement items characterizing the construct is assessed using Cronbach's alpha coefficient, which is demonstrated by a coefficient over 0.70. (Hair et al., 2010). For this research, Cronbach alpha coefficients are greater than the 0.70 cut-off (0.83–0.97). The scales of all measures appear to produce internally consistent results. Table 1 presents the results of both factor loadings and Cronbach alpha for multiple-item scales. Thus, this research expresses an accepted validity and reliability as shown in Table 1.

4.5. Statistic test

For this study, correlation analysis were used to examine the data using the SPSS software. Furthermore, the study model's hypotheses are all tested using the Ordinary Least Squares (OLS) regression analysis. The models for the relationships described above are displayed as follows.

$$SVC = \alpha_1 + \beta_1GCC + \beta_2SOS + \beta_3RMP + \beta_4RR + \beta_5ICR + \beta_6FIS + \beta_7FA + \epsilon; \quad (1)$$

$$ASG = \alpha_2 + \beta_8GCC + \beta_9SOS + \beta_{10}RMP + \beta_{11}RR + \beta_{12}ICR + \beta_{13}FIS + \beta_{14}FA + \epsilon; \quad (2)$$

$$PEE = \alpha_3 + \beta_{15}GCC + \beta_{16}SOS + \beta_{17}RMP + \beta_{18}RR + \beta_{19}ICR + \beta_{20}FIS + \beta_{21}FA + \epsilon; \quad (3)$$

$$FRQ = \alpha_4 + \beta_{22}GCC + \beta_{23}SOS + \beta_{24}RMP + \beta_{25}RR + \beta_{26}ICR + \beta_{27}FIS + \beta_{28}FA + \epsilon; \quad (4)$$

$$CL = \alpha_5 + \beta_{29}GCC + \beta_{30}SOS + \beta_{31}RMP + \beta_{32}RR + \beta_{33}ICR + \beta_{34}FIS + \beta_{35}FA + \epsilon; \quad (5)$$

$$SVC = \alpha_6 + \beta_{36}ASG + \beta_{37}PEE + \beta_{38}FRQ + \beta_{39}CL + \beta_{40}FIS + \beta_{41}FA + \epsilon; \quad (6)$$

$$GCC = \alpha_7 + \beta_{42}EAD + \beta_{43}TMS + \beta_{44}IAP + \beta_{45}FIS + \beta_{46}FA + \epsilon; \quad (7)$$

$$SOS = \alpha_8 + \beta_{47}EAD + \beta_{48}TMS + \beta_{49}IAP + \beta_{50}FIS + \beta_{51}FA + \epsilon; \quad (8)$$

$$RMP = \alpha_9 + \beta_{52}EAD + \beta_{53}TMS + \beta_{54}IAP + \beta_{55}FIS + \beta_{56}FA + \epsilon; \quad (9)$$

$$RR = \alpha_{10} + \beta_{57}EAD + \beta_{58}TMS + \beta_{59}IAP + \beta_{60}FIS + \beta_{61}FA + \epsilon; \quad (10)$$

$$ICR = \alpha_{11} + \beta_{62}EAD + \beta_{63}TMS + \beta_{64}IAP + \beta_{65}FIS + \beta_{66}FA + \epsilon. \quad (11)$$

Note: FIS is firm size, FA is firm age.

Table 1. Results of factor loadings and Cronbach Alpha coefficients

Variables	Factor Loadings	Cronbach Alpha
Sustainable Value Creation (SVC)	0.736–0.866	0.841
Governance and Corporate Culture (GCC)	0.799–0.945	0.910
Strategy and Objective-Setting (SOS)	0.737–0.986	0.934
Risk Management Process (RMP)	0.843–0.949	0.936
Review and Revision (RR)	0.947–0.986	0.947
Information Communication and Reporting (ICR)	0.894–0.952	0.903
Achieve Strategy and Goal (ASG)	0.911–0.981	0.953
Promote Efficiency and Effectiveness (PEE)	0.817–0.934	0.842
Financial Reporting Quality (FRQ)	0.832–0.971	0.895
Compliance with Law (CL)	0.778–0.991	0.881
Effective AIS Design (EAD)	0.850–0.973	0.967
Top Management Support (TMS)	0.934–0.986	0.920
Internal Auditor Professional (IAP)	0.783–0.977	0.832

5. Results and discussion

Table 2 displays the descriptive statistics and correlation matrix for each variable. The variance inflation factor (VIF)

technique is used to determine whether the correlations between each independent variable are significant. The results demonstrate that the independent variables are not connected with one another because the VIFs range from 1.77 to 4.51, which is significantly below the cut-off value of 10 suggested by Neter et al. (1985). Thus, there are no substantial multicollinearity problems encountered for this research.

Table 3 shows the results of OLS regression analysis of the antecedents of COSO ERM success (effective AIS design, top management support, and internal auditor competency) in Hypotheses 10a–e to Hypotheses 12a–e. The findings demonstrate that effective AIS design has significant positive effects on dimensions of COSO ERM success including strategy and objective-setting (H10b, $b_{47} = 0.136$, $p < 0.05$), risk management process (H10c, $b_{52} = 0.351$, $p < 0.01$), review and revision (H10d, $b_{57} = 0.233$, $p < 0.01$) and information communication and reporting (H10e, $b_{63} = 0.400$, $p < 0.05$). However, the results show that effective AIS design has an insignificant effect on COSO ERM success in dimensions of governance and corporate culture (H10a, $b_{42} = 0.105$, $p > 0.05$). Overall, the results imply that successful AIS design may have an impact on COSO ERM success (Zhao et al., 2014; Ahmed Al-Qudah, 2011; Altamuro & Beattey, 2010; Peppard & Ward, 2004; O'Donnell & David, 2000). Thus, Hypotheses 10b–10d are supported while Hypothesis 10a is not supported (Table 5).

Additionally, the findings demonstrate that top management support positively and significantly influences COSO ERM success factors, including governance and

Table 2. Descriptive statistics and correlation matrix

Variable	SVC	ASG	PEE	FRQ	CL	GCC	SOS	RMP	RR	ICR	EAD	TMS	IAP	FIS	FA
Mean	4.67	4.38	4.23	4.84	4.87	4.51	4.38	4.38	4.43	4.10	4.54	4.51	4.43	3.33	3.43
SD	0.70	0.63	0.86	0.36	0.34	0.64	0.63	0.63	0.75	0.82	0.72	0.64	0.75	0.49	0.49
VIF	2.24	2.71	4.51	1.51	1.78	2.40	2.40	2.20	2.38	2.18	2.01	3.39	2.27	1.98	1.77
SVC															
ASG	.801**														
PEE	.875**	.567**													
FRQ	.419*	.682**	.790**												
CL	.861**	.535**	.678**	.647**											
GCC	.808**	.608**	.567**	.882**	.735**										
SOS	.839**	.816**	.865**	.790**	.378**	.602**									
RMP	.891**	.905**	.825**	.697*	.247*	.655*	.962**								
RR	.840**	.918**	.791**	.733**	.382**	.575**	.964**	.992**							
ICR	.910**	.889**	.871**	.686**	.323**	.667**	.962**	.991**	.980**						
EAD	.420**	.535**	.476**	.555**	.443**	.643**	.672**	.528**	.592**	.531**					
TMS	.723**	.688**	.856**	.804**	.407**	.355**	.927**	.832**	.857**	.844**	.810*				
IAP	.793**	.974**	.562**	.803**	.448**	.554**	.721**	.836**	.845**	.824**	.832**	.481**			
FIS	.591**	-.411**	-.639*	-.513*	.373**	-.596*	-.674*	-.630*	-.587*	-.620*	-.498*	-.567*	-.321*		
FA	-.490*	-.386*	-.488*	-.529*	.498**	-.336*	-.465*	-.454*	-.454*	-.409*	-.597*	-.556*	-.340*	-.474*	

Note: **Correlation is significant at the 0.01 level (2-tailed), * Correlation is significant at the 0.05 level (2-tailed).

corporate culture (H11a, $b_{43} = 0.497$, $p < 0.01$), strategy and objective-setting (H11b, $b_{48} = 0.690$, $p < 0.01$), risk management process (H11c, $b_{53} = 0.593$, $p < 0.01$), review and revision (H11d, $b_{58} = 0.593$, $p < 0.01$) and information communication and reporting (H11e, $b_{63} = 0.700$, $p < 0.01$). Overall, the results found that top management support has significant influence on COSO ERM success (Zhao et al., 2014; Jokipii, 2010; Maelah & Ibrahim, 2007; Krumwiede et al., 2007; Saelim, 1995). Thus, Hypotheses 11a–11e are supported (Table 5).

Table 3. Results of OLS regression analysis*

Independent Variables	Dependent Variable				
	GCC	SOS	RMP	RR	ICR
	7	8	9	10	11
Effective AIS Design (EAD)	.105 (.108)	.136** (.044)	.351*** (.042)	.233*** (.052)	.400** (.044)
Top Management Support (TMS)	.497*** (.136)	.690*** (.056)	.593*** (.053)	.593*** (.066)	.700*** (.056)
Internal Auditor Professional (IAP)	.604*** (.069)	.240*** (.028)	.520*** (.027)	.508*** (.034)	.481*** (.029)
Firm Size (FIS)	.936*** (.158)	.278*** (.065)	.161** (.062)	.112 (.077)	.081 (.065)
Firm Age (FA)	.047*** (.138)	.422*** (.056)	.532*** (.054)	.357*** (.067)	.503*** (.057)
Adjusted R2	.713	.952	.956	.932	.951

Note: * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$, ^aBeta coefficients with standard errors in parenthesis.

Moreover, the findings indicate that internal auditor professionals have a positive significant impact on COSO ERM success dimensions such as governance and corporate culture (H12a, $b_{44} = 0.604$, $p < 0.01$), strategy and objective-setting (H12b, $b_{49} = 0.240$, $p < 0.01$), risk management process (H12c, $b_{54} = 0.520$, $p < 0.01$), review and revision (H12d, $b_{59} = 0.508$, $p < 0.01$) and information communication and reporting (H12e, $b_{64} = 0.481$, $p < 0.01$). Overall, the findings revealed that the success of COSO ERM is influenced by internal auditor professionals (Moeller, 2011; Suddaby et al., 2009; Bishop III et al., 1992). Thus, Hypotheses 12a–12e are supported (Table 5).

Table 4 presents the results of OLS regression analysis of the dimension of COSO ERM success (a) governance and culture, b) strategy and objective-setting, c) risk management process, d) review and revision, and e) information, communication, and reporting) on sustainable value creation (hypotheses 1a–e). The demonstrate that several aspects of COSO ERM success including governance and culture (H1a, $b_1 = 0.100$, $p < 0.05$), risk management process (H1c, $b_3 = 0.647$, $p < 0.01$), review and revision (H1d, $b_4 = 0.879$, $p < 0.01$), and information, communication, and reporting (H1e, $b_5 = 0.516$, $p < 0.01$) have significant positive effects on sustainable value creation. However,

the results show that strategy and objective-setting has an insignificant effect on sustainable value creation (H1b, $b_2 = -0.117$, $p > 0.05$). Overall, the findings show that the implementation of COSO ERM can increase the generation of sustainable value. (Gonzalez et al., 2020; Farhan Malik et al., 2020; Damkam & Tan, 2020; Quon et al., 2012; Schneider et al., 2009; Gordon et al., 2009; Mafiana, 2003). Successful COSO ERM could bring about benefits, such as improved financial reporting, increases management accountability, competitive advantage, and business performance in long term (Damkam & Tan, 2020; Zhao et al., 2014). Hence, Hypotheses 1a, 1c–d are supported while Hypothesis 1b is not supported (Table 5).

Furthermore, the results show that dimension of COSO ERM success including governance and culture (H2a, $b_8 = 0.542$, $p < 0.01$), strategy and objective-setting (H2b, $b_9 = 0.959$, $p < 0.01$), risk management process (H2c, $b_{10} = 0.642$, $p < 0.01$) and, review and revision (H2d, $b_{11} = 0.440$, $p < 0.01$) have significant positive effects on achieve strategy and goal. However, the results show that information, communication, and reporting has an insignificant effect on achieve strategy and goal (H2e, $b_{11} = 0.180$, $p > 0.05$). Overall, the findings show that COSO ERM success helps a firm realize its strategy and goals (Wisuttee Wong & Rompho, 2015; Zhao et al., 2014). Hence, Hypotheses 2a–2d are supported but Hypothesis 2e is not supported (Table 5).

Moreover, the results show that dimension of COSO ERM success including governance and culture (H3a, $b_{15} = 0.552$, $p < 0.01$), strategy and objective-setting (H3b, $b_{16} = 0.191$, $p < 0.01$), risk management process (H3c, $b_{17} = 0.702$, $p < 0.01$), review and revision (H3d, $b_{18} = 0.739$, $p < 0.01$) and information, communication, and reporting (H3e, $b_{19} = 0.119$, $p < 0.01$) have significant positive effects on promote efficiency and effectiveness. Overall, the findings show that the success of COSO ERM has an impact on efficiency and effectiveness promotion. (Cheng et al., 2013; Sawalqa & Qtish, 2012; Jokipii, 2010). Hence, Hypotheses 3a–3e are supported (Table 5).

Besides, the results show that dimension of COSO ERM success including governance and culture (H4a, $b_{22} = 0.895$, $p < 0.01$), strategy and objective-setting (H4b, $b_{23} = 0.359$, $p < 0.01$), risk management process (H4c, $b_{24} = 0.331$, $p < 0.01$) and, review and revision (H4d, $b_{25} = 0.891$, $p < 0.01$) have significant positive effects on financial reporting quality. However, the results show that information, communication, and reporting has an insignificant effect on financial reporting quality (H4e, $b_{25} = -0.336$, $p > 0.05$). Overall, the outcomes show that the effectiveness of COSO ERM can raise the caliber of financial reporting (Ogun-dana et al., 2017; Spatacean, 2012; Okike, 2011). Hence, Hypotheses 4a–4d are supported but Hypothesis 4e is not supported (Table 5).

Additionally, the results show that dimension of COSO ERM success including governance and culture (H5a, $b_{29} = 0.438$, $p < 0.05$), risk management process (H5c, $b_{31} = 0.979$, $p < 0.05$), review and revision (H5d, $b_{32} = 0.143$, p

< 0.05) have significant positive effects on compliance with law. However, the results show that strategy and objective-setting (H5b, $b_{30} = 0.832$, $p > 0.05$) and information, communication, and reporting (H5e, $b_{33} = 0.094$, $p > 0.05$) has an insignificant effect on compliance with law. Overall, the findings show that COSO ERM success is related to legal compliance. (Wisuttee Wong & Rompho, 2015; Jokipii, 2010; Geary & Ricketts, 1992). Hence, Hypotheses 5a, 5c, and 5d are supported but Hypotheses 5b and 5e are not supported (Table 5).

Finally, the results also show that achieve strategy and goal (H6, $b_{36} = 0.467$, $p < 0.01$), promote efficiency and effectiveness (H7, $b_{37} = 0.701$, $p < 0.01$), financial reporting quality (H8, $b_{38} = 0.404$, $p < 0.05$), and compliance with Law (H9, $b_{39} = 0.083$, $p < 0.01$) are significant positive effects on sustainable value creation. Overall the results consistent with prior research also show that achieve strategy and goal can support sustainable value creation (Hart & Milstein, 2003; Wouters, 2013). Additionally, the findings show that promoting efficiency and effectiveness has impact on long-term value creation (Mafiana, 2013; Schneider et al., 2009; Hahn, 2007). Furthermore, the results indicate that financial reporting quality is to improve long-term wealth creation (Haliah, 2018; Berger, 2011; Beyer et al., 2010). Finally, the findings show a link between legal compliance and long-term value development (Mafiana, 2013; Jokipii, 2010; Schneider et al., 2009; Gupta, 2008). Hence, Hypotheses 6–9 are supported (Table 5).

Table 4. Results of OLS regression analysis*

Variables	Dependent Variable					
	SVC	ASG	PEE	FRQ	CL	SVC
	1	2	3	4	5	6
Governance and Corporate Culture (GCC)	.100*	.542***	.552***	.895***	.438**	
	(.052)	(.032)	(.028)	(.061)	(.163)	
Strategy and Objective-Setting (SOS)	-.117	.959***	.191***	.359***	.832	
	(.162)	(.101)	(.087)	(.189)	(.508)	
Risk Management Process (RMP)	.647***	.642***	.702***	.331**	.979**	
	(.530)	(.331)	(.283)	(.618)	(.660)	
Review and Revision (RR)	.879***	.440***	.739***	.871***	.143**	
	(.438)	(.273)	(.233)	(.510)	(.370)	
Information Communication and Reporting (ICR)	.516***	.180	.119***	-.336	.094	
	(.147)	(.149)	(.127)	(.278)	(.746)	
Achieve Strategy and Goal (ASG)						.456***
						(.010)

End of Table 4

Variables	Dependent Variable					
	SVC	ASG	PEE	FRQ	CL	SVC
	1	2	3	4	5	6
Promote Efficiency and Effectiveness (PEE)						.701***
						(.014)
Financial Reporting Quality (FRQ)						.404*
						(.011)
Compliance with Law (CL)						.083***
						(.009)
Firm Size (FIS)	.185*	.115*	.099*	.215*	.778*	.052*
	(.096)	(.060)	(.051)	(.111)	(.299)	(.022)
Firm Age (FA)	.214	.115*	.098*	.216*	.578*	.451*
	(.096)	(.060)	(.052)	(.112)	(.199)	(.022)
Adjusted R2	.938	.976	.982	.916	.896	.989

Note: * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$, ^aBeta coefficients with standard errors in parenthesis.

Table 5. The results of hypotheses testing

Hypothesis	Results
Hypotheses 1a–e	Hypotheses 1a, 1c–d are supported while Hypothesis 1b is not supported.
Hypotheses 2a–e	Hypotheses 2a–2d are supported while Hypothesis 2e is not supported.
Hypotheses 3a–e	Hypotheses 3a–3e are supported.
Hypotheses 4a–e	Hypotheses 4a–4d are supported while Hypothesis 4e is not supported.
Hypotheses 5a–e	Hypotheses 5a, 5c, and 5d are supported while Hypotheses 5b and 5e are not supported.
Hypotheses 6–9	Hypotheses 6–9 are supported.
Hypotheses 10a–e	Hypotheses 10b–10d are supported while Hypothesis 10a is not supported.
Hypotheses 11a–e	Thus, Hypotheses 11a–11e are supported.
Hypotheses 12a–e	Thus, Hypotheses 12a–12e are supported.

6. Implication of research

6.1. Theoretical implications

This study significantly expands on prior understanding and pertinent literature of the CG and COSO frameworks. Furthermore, this study also focuses on the essential elements of COSO ERM success, such as a) governance and culture, b) strategy and goal-setting, c) legal compliance, d) review and revision, and e) information, communication, and reporting. Moreover, this research focuses RBV of the firm, internal resources and capabilities including effective AIS design, top management support, and internal auditor competency. Overall, the findings show that effective AIS design, top management support, and internal audi-

tor competency have a significant effect on COSO ERM success. This finding suggests that the company's internal assets and competencies can improve COSO ERM success and lead to long-term value development. Finally, contingency theory is used in this study to explain the phenomena of COSO ERM implementation success that results in long-term value generation. Overall, the findings showed that all COSO ERM success factors can improve the development of sustainable value.

6.2. Managerial implications

The chief internal control officer, internal audit manager, and accounting professional can all benefit from this research in identifying and defending the crucial elements of COSO ERM success. The findings also suggested that the corporation's top management team should support effective AIS design, promote internal auditor competency for successful COSO ERM deployment in the organization. Particularly in a flexible business climate, a company should be mindful of both internal and external risks because they all have an impact on long-term performance. In order to reasonably ensure that the corporation produced achieves strategy and goals, financial reporting quality, complies with applicable laws and regulations, and conducts efficient and effective performance over the long term, the firm should emphasize on risk management process planning and also implement COSO ERM.

6.3. Limitation and suggestion for future research

According to the results, constructs of this research are developed and measured by using only previous research. Thus, the future research will be explored the scale by different approaches such as in-depth interview or focus group, in order to fully understand constructs measurement of COSO ERM success. Furthermore, this research uses only questionnaire for collecting data. Since then, future research will be developed mixed methods designed to observe data from sample size. Finally, the results of this research are derived from the listed companies in SET of Thailand. Moreover, future research will be collected data from another population in order to widen the perspective and generalization.

7. Conclusions

The question of COSO ERM success is highly important because of the continued disruption caused by the crisis. However, past research revealed that COSO ERM research was both lacking and unclear. As a result, this study aims to pinpoint COSO ERM success and explore its causes and effects. In this study, a research model and set of hypotheses are put out that are based on the RBV of the firm, the contingency theory, and the literature on the applicability of CG and COSO ERM. The listed companies in Thailand's SET were chosen as the sample, and information was gathered from the internal audit manager and the chief in-

ternal control manager using a questionnaire. Finally, 102 mail questionnaires were usable.

Overall, the findings indicate that successful COSO ERM is significantly related with effective AIS design, top management support, and internal auditor competency. Additionally, the achievement of strategy and goals, promotion of efficiency and effectiveness, quality of financial reporting, and legal compliance are all positively impacted by COSO ERM success. Finally, achieving strategy and goals, fostering efficiency and effectiveness, improving the quality of financial reporting, and complying with the law all have significant impact on the creation of sustainable wealth. The results indicate that the corporations and risk management practices mature, a need was felt to integrate the company's strategy and objective with COSO ERM. According to COSO ERM success, it was created to enhance CG and company long-term performance.

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