# INFLUENCE OF INTELLECTUAL CAPITAL ON FIRM PERFORMANCE THROUGH COMPETITIVE ADVANTAGE AND EARNINGS QUALITY: EVIDENCE FROM THAI LISTED COMPANIES IN SERVICE INDUSTRY

**PAKCHANYA BOONCHUKHAM**

**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY PROGRAM IN BUSINESS ADMINISTRATION**

**FACULTY OF BUSINESS ADMINISTRATION**
**RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI**

**ACADEMIC YEAR 2023**

# INFLUENCE OF INTELLECTUAL CAPITAL ON FIRM PERFORMANCE THROUGH COMPETITIVE ADVANTAGE AND EARNINGS QUALITY: EVIDENCE FROM THAI LISTED COMPANIES IN SERVICE INDUSTRY

**PAKCHANYA BOONCHUKHAM**

**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY PROGRAM IN BUSINESS ADMINISTRATION**

**FACULTY OF BUSINESS ADMINISTRATION**
**RAJAMANGALA UNIVERSITY OF TECHNOLOGY THANYABURI**

**ACADEMIC YEAR 2023**

| | |
|---|---|
| **Dissertation Title** | Influence of Intellectual Capital on Firm Performance through Competitive Advantage and Earnings Quality: Evidence from Thai listed Companies in Service Industry |
| **Name – Surname** | Miss Pakchanya Boonchukham |
| **Program** | Business Administration |
| **Dissertation Advisor** | Assistant Professor Chaimongkol Pholkaew, Ph.D. |
| **Dissertation Co-advisor** | Assistant Professor Kusuma Dampitakse, Ph.D. |
| **Academic Year** | 2023 |

**DISSERTATION COMMITTEE**

..... Chairman
(Associate Professor Kanibhatti Nitirojntanad, D.B.A.)

..... Committee
(Associate Professor Sungworn Ngudgratoke, Ph.D.)

..... Committee
(Assistant Professor Nartraphee Tancho, Ph.D.)

..... Committee
(Assistant Professor Kusuma Dampitakse, Ph.D.)

..... Committee
(Assistant Professor Chaimongkol Pholkaew, Ph.D.)

Approved by the Faculty of Business Administration, Rajamangala University of Technology Thanyaburi in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

..... Dean of Faculty of Business Administration
(Associate Professor Khahan Na-Nan, Ph.D.)
2 October 2023

| | |
|---|---|
| **Dissertation Title** | Influence of Intellectual Capital on Firm Performance through Competitive Advantage and Earnings Quality: Evidence from Thai listed Companies in Service Industry |
| **Name – Surname** | Miss Pakchanya Boonchukham |
| **Program** | Business Administration |
| **Dissertation Advisor** | Assistant Professor Chaimongkol Pholkaew, Ph.D. |
| **Dissertation Co-advisor** | Assistant Professor Kusuma Dampitakse, Ph.D. |
| **Academic Years** | 2023 |

## ABSTRACT

This research aimed to investigate the influence of intellectual capital on firm performance, the influence of intellectual capital on firm performance through competitive advantage, the influence of intellectual capital on firm performance through earnings quality, and the influence of intellectual capital on firm performance through competitive advantage and earnings quality. Intellectual capital was based on four components, including human capital efficiency, structural capital efficiency, capital employed efficiency, and relational capital efficiency, using the MVAIC model. Firm performance was measured by financial and marketing dimensions, including return on assets, return on equity, and Tobin's Q. Competitive advantage was measured by revenue growth. The samples used in the study consisted of financial report data from 114 listed companies on the Stock Exchange of Thailand in the service industry during the years 2019-2020. Statistical methods employed for analysis included descriptive statistics, correlation analysis, path analysis, and structural equation modeling.

The research results indicate that intellectual capital has a direct and positive influence on firm performance, measured by return on equity and return on assets. This highlights its significant impact on financial performance and the enhancement of operational efficiency. However, intellectual capital does not affect Tobin's Q because investors lack awareness of the signals related to intellectual capital within the company. Therefore, disclosing intellectual capital is essential for investors to accurately assess investment risks. The study found that competitive advantage plays

a mediating role between intellectual capital and firm performance, as measured by return on equity, return on assets, and Tobin's Q. This result aligns with the resource-based view theory, emphasizing the importance of strategic planning and process improvement to enhance competitiveness, thereby impacting intellectual capital efficiency and overall firm performance. Furthermore, earnings quality partially mediates the positive influence of intellectual capital on return on equity and return on assets, while it acts as a full mediating variable between intellectual capital and Tobin's Q, supporting the agency theory. Notably, when examining two mediating variables, competitive advantage and earnings quality, the results indicate that competitive advantage serves as a full mediating variable between intellectual capital and return on assets, whereas it only partially mediates the relationship between intellectual capital and return on equity. In addition, earnings quality acts as a full mediating variable between intellectual capital and Tobin's Q. This implies that investments in intellectual capital, measuring operational efficiency, have implications for the quality of earnings that, in turn, affect the business value in the service industry.

In conclusion, investment in intellectual capital serves as an indicator of business resource utilization efficiency and firm value creation. This emphasizes that intellectual capital is a vital source of value creation in the digital economic era. Intellectual capital acts as a determining factor that influences firm performance and earnings quality, thereby significantly contributing to a business's competitive advantage. Consequently, promoting appropriate investments in intellectual capital should enhance overall firm performance.

**Keywords:** intellectual capital, competitive advantage, earnings quality, firm performance

**Acknowledgements**

First and foremost, I would like to express my appreciation and gratitude to my very kind advisor Assistant Professor Dr. Chaimongkol Pholkaew, who provided a great support and suggestions on my dissertation. A lso, I would like to add many thanks to my co-advisor, Assistant Professor Dr. Kusuma Dampitakse, for her valuable advice during my research. Furthermore, I would like to express my thanks to Associate Professor Dr. Kanibhatti Nitirojntanad, Associate Professor Dr. Sungworn Ngudgratoke, and Assistant Professor Dr. Nartraphee Tancho for their generosity in providing critical comments and valuable recommendation to strengthen this research.

Apart from that, I would like to sincerely thank to Kingmongkut's university of technology north Bangkok, which has provided me with opportunity. Therefore, I would like to thank to Professor Dr. Thanin Silpcharu, Associate Professor Dr. Sunee Wantanakomon, and Assistant Professor Dr. Thitirat Thawornsujarikul, for support in my work and encouragement.

My next thanks must be to my mother and my family for encouragement. Furthermore, I also need to express many thanks to Dr. Surasak Suthongwan, Assistant Professor Dr. Surachai Am-ugsorn, Dr. Janjira deelert, Dr. Chanphen Tonsakun-aree, Mr. Veekit Thumdee, Mr. Paison Dittason, and encouragement.

Lastly, I would like to thank to my friends and everyone who contributed to the completion of this dissertation.

Pakchanya Boonchukham

## Table of Contents

**Page**

## Table of Contents (Continued)

## List of Tables

**Page**

## List of Tables (Continued)

## List of Tables (Continued)

## List of Tables (Continued)

**Page**

## List of Tables (Continued)

**Page**

## List of Figures

## List of Figures (Continued)

**Page**

## List of Figures (Continued)

**Page**

## List of Figures (Continued)

**Page**

## List of Abbreviations

| SYMBOL | MEANING |
|---|---|
| N | Sample size |
| $\bar{X}$ | Arithmetic mean |
| S.D. | Standard deviation |
| $x^2$ | Chi-square |
| df | Degree of freedom |
| GFI, AGFI | The index indicates the harmony and the empirical data with the model set up (GFI) Goodness of fit (AGFI) Adjust goodness of fit Index |
| NFI | Normal fit index |
| CFI | Comparative fit index |
| RMSEA | Root mean square error of approximation |
| RMA | Root mean square residual |
| S.E. | Standard error |
| r | Pearson's correlation coefficient |
| $R^2$ | Square multiple correlation |
| TE | Total effect |
| DE | Direct effect |
| IE | Indirect effect |
| Z | Z test Statistic |
| P | Probability value |

# CHAPTER 1
# INTRODUCTION

## 1.1 Introduction

The purpose of this chapter is to provide a comprehensive overview of the research. It commences by presenting the background and outlining the research problems that are crucial to address, thereby highlighting the significance of the study. Subsequently, the research objectives are clearly stated. Furthermore, both internal and external issues that are beneficial for this study are identified. Additionally, hypotheses and suggested directions are proposed. Lastly, this chapter concludes by defining key terms relevant to the research and providing a concise summary.

## 1.2 Background and Statement of the Problems

The COVID-19 pandemic, which posed a global threat, had a significant impact on several companies listed on the Stock Exchange of Thailand in 2020. It is evident the Thai listed companies were affected more severely by the pandemic compared to any other threats experienced in the past decade (The Stock Exchange of Thailand, 2022). According to the World Trade Organization's Services Trade Barometer published on March 11,2020, there was a notable weakness in global services trade growth towards the end of 2019 and the first quarter of 2020, indicating a below-average growth in global trade in services (Organization, 2020). Consequently, companies have increasingly embraced digitalization, formed business networks, and established trade alliances to create business opportunities, expand their operations, and gain a competitive advantage. In response to changing consumer behavior, relational capital, a component of intellectual capital, has been adopted to meet consumer satisfaction.

The COVID-19 pandemic, a new threat affecting the Thai economy, has emerged as the most significant risk factor, leading to a slowdown in economic growth and causing various business sectors, particularly international trade, manufacturing, and services such as tourism and related industries, to reduce employment or shut down operations (Department of Trade Negotiations, 2022). Measures such as travel restrictions, mall closures, lockdowns, and work-from-home policies have effectively

halted operations in various service sectors, including airports, airlines, hotels, and logistics. Additionally, the impact on the manufacturing and service industry has resulted in a decrease in global investor activity. According to the United Nations, direct investment is projected to decrease by up to 15 percent, with declining investor confidence also affecting stock market indices worldwide (Department of Trade Negotiations, 2022). Current business operations face numerous challenges and difficulties due to the "new normal" lifestyle. The rapid development of digital technology and social media directly influences consumer behavior and necessitates changes in business models. It is inevitable for organizations to incorporate modern digital technologies such as e-marketing, fin-tech, and artificial intelligence into their business operations to enhance competitiveness and ensure stable performance.

Modern technology has played an essential role in medium-sized and large businesses, affecting competitive advantages Businesses need to adapt to keep up with many modern technologies. In addition, the sector needs to be alert to the adoption of technology to meet consumers. Changes in the digital sector focus on sustainable business operations. The adoption of modern technology has forced organizations to adapt and change. For example, planning, managing, publicizing, or creating channels to communicate with third parties. Businesses have made changes in digital transformation and have also used intellectual capital to create a competitive advantage. It has been discovered that intellectual capital is a business term that emerged and was mentioned in business circles considerably during the 20th century (Garanina, Hussinki, & Dumay, 2021). Intellectual capital is intertwined and linked to the person's abilities, it is also possible to learn from the skills of oneself and others (Wang, Jin, & Banister, 2019). In addition, there are various elements, including thework experience of human capital, that can improve with training (Joshi, Cahill, Sidhu, & Kansal, 2013). Several organizations have recruited talented individuals and intellectual capital has become the preeminent resource for wealth and value. Tangible assets such as land, buildings, and equipment remain critical factors in producing goods and services. Moreover, their relative importance decreases over time as the importance of intangible and knowledge-based assets increases. This importance raises essential questions for intellectual capital management (Luthy, 1998). Intellectual capital management allows organizations to

make the most of their existing assets and maximize the overall value and value of their organizations (Kaplan, 2009). However, organizations are aware of managing technology investments to modernize their operations. These include distribution channels, customer relationships, data flow, and a focus on quality assurance system assessment. There are doubts about technological investments, including tangible assets. Moreover, productivity and business value creation have shifted to intangible assets (Edvinsson, 1997; Sveiby, 1997).

In 2019, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) of the United States collaborated to develop a new financial reporting standard for revenue recognition. This initiative aimed to address inconsistencies in revenue recognition criteria between the International Financial Reporting Standards (IFRS) and the Generally Accepted Accounting Principles (GAAP) in the United States. The objective was to mitigate accounting issues related to revenue recognition and enhance the quality of financial statements by rectifying past flaws and conflicts in accounting standards (Hammad, 2019). As a result, a comprehensive and unified framework was established for revenue recognition in all types of contracts. This framework involves five steps in the business, considering revenue recognition through two methods: the Over Time method and the Point of Time method. In addition, the firm has adopted Thai Financial Reporting Standards (TFRS) 15 on revenue in the presentation of the company's annual financial reports.

Poor earnings quality, on the other hand, refers to profits with highbacklogs will cause the profit quality of the company to decrease significantly, and the company will reduce the return on equity or the value of the company (Ardi et al., 2018). In addition, the higher absolute value of discretionary recognition demonstrated the lower earnings quality (Darabi, Rad, & Ghadiri, 2012). Sarea & Alansari (2016) found that the findings concluded that having a high level of intellectual capital caused profit quality to be high in the same direction in the barren listed market, affecting investors' interest in the market.

This research aims to study the influence of intellectual capital on firm performance through competitive advantage and earnings quality. A recent review found that intellectual capital has a positive effect on firm performance (Ardhiani & Nasih, 2019; Bontis, Keow, & Richardson, 2000; Costa, Fernández-Jardon Fernández, & Figueroa Dorrego,

2014; Khalique & bin Md Isa, 2014; Mondal & Ghosh, 2012; Nasih & Iswati, 2020; Pew Tan, Plowman, & Hancock, 2007; Serenko & Bontis, 2013; Soetanto & Liem, 2019). However, the results studied in the past due to several limitations and the lack of disclosureof information on the intellectual capital is the challenge that the accountants have to auditfor the link between intellectual capital and firm performance (Clarke, Seng, & Whiting, 2011). With the environment and business rapidly undergoing changes, the VAIC model proves to be an effective method for measuring intellectual capital. However, this research has expanded upon the model by introducing additional variables to create the MVAIC model, resulting in a more comprehensive and contemporary approach to measuring intellectual capital. This updated model aligns with the dynamic business landscape of the digital age, offering a visualization that is more in tune with current business practices. This study had conducted to address these existing gaps in the literature. Therefore, this research incorporates distribution channels as modified elements of the intellectual capital model. Additionally, it introduces moderation variables to examine the impact of competitive advantage and earnings quality on firm performance outcomes.

### 1.3 Purpose of the Study

The main objective of this research was to investigate the influence of intellectualcapital on firm performance of listed companies on the stock exchange of Thailand in service industry. In addition, the following sub-research objectives had formulated to search for findings to support the primary research objective.

1.3.1 Investigate the influence of intellectual capital on firm performance: return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ).

1.3.2 Investigate the influence of intellectual capital on firm performance through competitive advantage.

1.3.3 Investigate the influence of intellectual capital on firm performance through earnings quality.

1.3.4 Investigate the influence of intellectual capital on firm performance through competitive advantage and earnings quality.

## 1.4 Research Questions and Hypotheses

This research attempts to find whether intellectual capital influences firm performance in the competitive advantage and earnings quality of Thai listed companies in the service industry. Thus, the research questions are as follows:

1.4.1 How does intellectual capital influence firm performance?

1.4.2 How does intellectual capital influence competitiveadvantage?

1.4.3 How does competitive advantage influence firm performance?

1.4.4 How does intellectual capital influence firm performance through competitive advantage?

1.4.5 How does intellectual capital influence earnings quality?

1.4.6 How does earnings quality influence firm performance?

1.4.7 How does intellectual capital influence firm performance through earnings quality?

1.4.8 How does intellectual capital influence firm performance through competitive advantage and earnings quality?

Research involves employing scientific methods to solve problems or discover answers. A literature review offers a fundamental comprehension of the research topic and inquiries at hand. Establishing hypotheses is crucial for researchers to draw conclusions from their findings. This study delved into the literature review in Chapter 2 and addressed the research hypotheses' background in Chapter 3. This section presents a concise overview of the research questions and hypotheses.

**Research Question 1:** How does intellectual capital influence firm performance?

Hypothesis 1: Intellectual capital has a positive influence on firm performance.

H1a: Intellectual capital (MVAIC) has a positive influence on the return on equity (ROE).

H1b: Intellectual capital (MVAIC) has a positive influence on the return on assets (ROA).

H1c: Intellectual capital (MVAIC) has a positive influence on Tobin’s Q (TBQ).

**Research Question 2:** How does influence of intellectual capital on

competitive advantage?

Hypothesis 2: Intellectual capital has a positive influence on the competitive advantage.

H2: Intellectual capital (MVAIC) has a positive influence on competitive advantage.

**Research Question 3:** How does competitive advantage influence firm performance?

Hypothesis 3: Competitive advantage has a positive influence on firm performance.

H3a: Revenue growth (RG) has a positive influence on return on equity (ROE).

H3b: Revenue growth (RG) has a positive influence on return on assets ROA).

H3c: Revenue growth (RG) has a positive influence on Tobin's Q (TBQ).

**Research Question 4:** How does intellectual capital influence firm performance through competitive advantage?

Hypothesis 4: Competitive advantage as a mediating variable indirectly influences intellectual capital towards firm performance.

H4a: Revenue growth (RG) as a mediating variable indirectly influences intellectual capital (MVAIC) towards return on equity (ROE).

H4b: Revenue growth (RG) as a mediating variable indirectly influences intellectual capital (MVAIC) towards return on assets (ROA).

H4c: Revenue growth (RG) as a mediating variable indirectly influences intellectual capital (MVAIC) towards Tobin's Q (TBQ).

**Research Question 5:** How does intellectual capital influence earnings quality?

Hypothesis 5: Intellectual capital has a positive influence on earnings quality.

H5: Intellectual capital (MVAIC) has a positive influence on earnings quality.

**Research Question 6:** How does earnings quality influences firm performance?

Hypothesis 6: Earnings quality has a positive influence on firm performance.

H6a: Earnings quality has a positive influence return on equity (ROE).

H6b: Earnings quality has a positive influence return on assets (ROA).

H6c: Earnings quality has a positive influence Tobin's Q (TBQ).

**Research Question 7:** How does intellectual capital influence firm performance through earnings quality?

Hypothesis 7: Earnings quality as a mediating variable indirectly influences intellectual capital towards firm performance.

H7a: Discretionary accruals (DA) as a mediating variable indirectly influence intellectual capital (MVAIC) towards return on equity (ROE).

H7b: Discretionary accruals (DA) as a mediating variable indirect influences intellectual capital (MVAIC) towards return on assets (ROA).

H7c: Discretionary Accruals (DA) as a mediating variable indirect influence intellectual capital (MVAIC) towards Tobin's Q (TBQ).

**Research Question 8:** How does intellectual capital influence firm performance through competitive advantage and earnings quality?

Hypothesis 8: Competitive advantage and earnings quality are mediating variables indirectly influence intellectual capital towards firm performance.

H8a: Revenue growth (RG) and discretionary accruals (DA) as mediating variables indirectly influence intellectual capital (MVAIC) towards return on equity (ROE).

H8b: Revenue growth (RG) and discretionary accruals (DA) as mediating variables indirectly influence intellectual capital (MVAIC) towards return on assets (ROA).

H8c: Revenue growth (RG) and discretionary accruals (DA) are mediating variables indirectly influence intellectual capital (MVAIC) towards Tobin's Q (TBQ).

### 1.5 Research Framework

The research conceptual framework as shown in Figure 1.1.

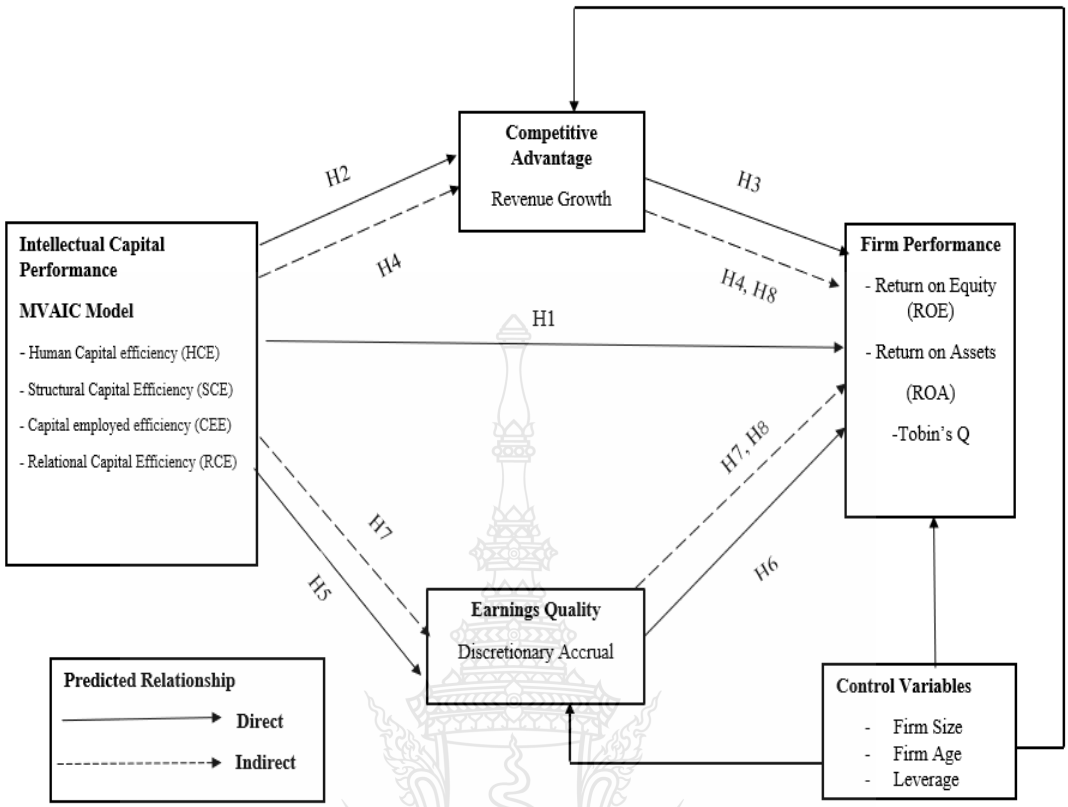



**Figure 1.1** The Conceptual Framework

According to figure 1.1, the research framework incorporates two key perspectives: the financial dimension, encompassing return on assets and return on equity as indicated by (Ardi et al., 2018; Ariff et al., 2016; Bayraktaroglu, Calisir, & Baskak, 2019; Latif et al., 2017; Muhammad Haykal, Maksum, & Muda, 2020; Smriti & Das, 2018; Xu & Wang, 2018), and the market value dimension, measured by Tobin's Q(Antonio et al., 2019). The study places particular emphasis on four independent variables: human capital, structural capital, capital employed and relational capital (Ana et al., 2021; Ulum et al., 2014; Ulum et al., 2017). These variables underwent computation using the MVAIC model before their incorporation into the testing model.

In addition to these variables, the research framework also incorporates mediator variables, namely competitive advantage, measured by revenue growth (Clarke et al., 2011), and earnings quality, measured using discretionary accruals (Dang, Nguyen, & Tran, 2020). To mitigate potential deviations, control variables were

introduced, including size (Ariff et al., 2016; Idris, Adi, Soetjipto, & Supriyanto, 2020), age (Ariff et al., 2016; Idris et al., 2020), and leverage (Ariff et al., 2016; Magnanelli & Izzo, 2017).

## 1. 6 Theoretical Perspective

In this research endeavor, the study will be draw upon three prominent theoretical frameworks to provide a comprehensive understanding of the complex interplay between intellectual capital, firm performance, competitive advantage, and earnings quality. These theories are agency theory, resource-based view theory, and intellectual capital theory, each offering valuable insights into different facets of this investigation.

### 1.6.1. Agency Theory

Agency theory forms the foundational framework for understanding the principal-agent relationship in organization, focusing on how managerial decisions driven by self-interest impact intellectual capital allocation and firm performance. It delves into managerial-shareholder relationships within the organizational context, supported by Chokroborty-Hoque, Alberry, and Singh (2014) as a comprehensive theoretical perspective. This theory has gained prominence in economics literature, as evidenced by academic works like Jenson & Meckling (1976) and Ross (1973).

### 1.6.2. Resource Based View Theory

According to Cheng, Lin, Hsiao, & Lin (2010), resource-based view theory underscores the attainment of competitive advantage through the possession and adept deployment of essential resources and capabilities, enabling an organization to outperform its rivals. The theory posits that competitive advantage arises from the effective integration and utilization of resources, whether they manifest as tangible or intangible assets (Cheng et al., 2010).

### 1.6.3 Intellectual Capital Theory

Intellectual capital has a broad meaning. Edvinsson (1997) argued that intellectual capital encompasses proficiency in customer experiences, technology, and professional knowledge. These elements collectively empower organizations to sustain their competitive edge. Beyond the realm of knowledge management, intellectual capital

underscores the importance of effectively managing human capital and optimizing organizational structure to bolster the overall organization and achieve a competitive advantage. Consequently, intellectual capital emerges as an indispensable resource that propels organization toward the attainment of a lasting and sustainable competitive advantage (Ramírez, 2010).

### 1.7 Definition of Terms

**Intellectual capital** refers to the collective knowledge, skills, information, and relationships within an organization that contribute to its ability to innovate, create value, and gain a competitive advantage. This study defined the intellectual capital as knowledge-based activities and processes that foster company innovation and create value, thereby contributing to competitive advantage and future stakeholder benefits. This is similar to the definition defined by Sardo (2018) that intellectual capital encompasses the wealth of organization knowledge resources related to human assets. This includes the knowledge database system, internal and external relationships, and encompasses various dimensions such as human capital, structural capital, employed capital, and relational capital. In this study, the MVAIC model is employed as a tool for quantifying intellectual capital.

Firm performance is a comprehensive measure of how well an organization is achieving its goals. It encompasses various aspects, including financial indicators, operational efficiency, market share, customer satisfaction, and overall competitiveness. Analyzing firm performance provides valuable insights into an organization's position, its ability to adapt to changing environments, and its capacity to deliver value to stakeholders. It is a critical yardstick for assessing the effectiveness of management strategies and decisions, guiding future planning, and evaluating the success of an enterprise in achieving its mission and vision. In this study, firm performance acts as a surrogate indicator for the firm's profitability, utilizing financial data and information sourced from the SETSMART website. The study employs several dependent variables, including return on equity, return on assets, and Tobin's Q, to assess performance outcomes.

**A competitive advantage** is a unique and sustainable edge that a company possesses over its rivals in the marketplace, enabling it to outperform them, achieve higher profitability and maintain a strong market position. This advantage can result from various factors, such as innovative technology, superior product quality, efficient processes, strategic positioning, or strong customer relationships. In this study, competitive advantage refers to revenue growth, which refers to the increase in a company's total sales or income over a specific period. It is a key performance indicator that indicates a company's ability to expand its customer base, increase sales to existing customers, introduce new products or services, or capture a larger market share, resulting in higher overall revenue. Revenue growth is utilized as a mediating variable in this research to examine competitive advantage.

**Earnings quality** refers to the quality of income derived from standard operations, ensuring sufficient cash flow to replace depreciable assets. It is imperative to ascertain financial data to reduce data asymmetry and stimulate financial market development. As such, discretionary accruals are used as a mediating variable in this study.

**Service industry** comprises companies registered on the Stock Exchange of Thailand, representing various sectors such as commerce, healthcare services, media and publishing, professional and leisure, transportation, and logistics. Financial data from listed companies in these sectors are sampled for analysis.

## 1.8 Conclusion

Presently, there is significant research attention on the correlation between intellectual capital and company performance. Nevertheless, prior studies have inherent constraints, prompting a need for more comprehensive insights. It is noteworthy that the COVID-19 pandemic has compelled companies to adjust a place greater reliance on their intellectual capital for survival. Additionally, the introduction of new accounting standards in 2019 has impacted revenue recognition, consequently shaping business performance.

This study expands upon the initial research and elaborates on Ulum's (2014) concept by incorporating the MVAIC model as a variable to measure intellectual capital.

The model has been further enriched through the inclusion of various online services, encompassing aspects like quality, profitability, and competitive advantage. Moreover, this study integrates theories such as the resource-based view theory, agency theory, and intellectual capital theory to illuminate the interplay between intellectual capital and its associated factors. To gain a more comprehensive understanding, Chapter 2 offers an in-depth review of the relevant literature.

# CHAPTER 2
# REVIEW OF THE LITERATURE

## 2.1 Introduction

A literature review plays a pivotal role in research, offering a comprehensive grasp of prior studies, existing knowledge, and crucial aspects related to a compelling research subject. By conducting a literature review, researchers can pinpoint gaps in existing research and enhance the originality of their study by envisioning anticipated outcomes and research pathways derived from this analysis. This chapter presents a literature review that focuses on the correlation between intellectual capital and firm performance. It commences with an exploration of the various concepts and theories surrounding intellectual capital, followed by an examination of concepts related to firm performance. Furthermore, the chapter concludes by scrutinizing previous and pertinent research to identify any unaddressed research gaps.

## 2.2 Intellectual Capital

### 2.2.1 Definition of Intellectual Capital

The management of intellectual capital has long captivated the attention of scholars and practitioners alike, with a primary focus on firm performance. However, a precise definition for intellectual capital remains a complex undertaking. Initially, intellectual capital emerged as a means to quantify intangible assets within the context of Swedish financial institutions (Edvinsson, 1997; Peppard & Rylander, 2001). From this inception, a set of five key performance measurement indicators emerged: finance, human, customer, process, and renewal. These indicators represent a combination of crucial business factors. Subsequent studies have presented various interpretations of intellectual capital, which are outlined in Table 2.1.

**Table 2.1** Definition of Intellectual Capital

| Definition | Reference |
|---|---|
| Intellectual media is organized and exploited to construct higher-value assets. | Martin (2000) |
| Intellectual capital comprises human capital, structure capital, and customer capital. | Bukh, Larsen, & Mouritsen (2001) |
| The product of competence is people's knowledge, skills, abilities, information, and experiences. Moreover, the willingness to use talent and the opportunities the job system provided intellectual capital. | Burr & Girardi (2002) |
| The sum of knowledge in practical translation consists of brands, trademarks, and processes. | Andriessen (2004) |
| The key competitive advantage measure describes the gap between an organization's market value and book value when it reduces the usefulness of current financial reporting. | Han & Han (2004) |
| Those intangible assets of companies that are not recorded in their financial statements may account for 80% of the organization's market value. | Martínez-Torres (2006) |
| Groups of knowledge assets come from corporate value creation efforts. | Chu, Lin, Hsiung, & Liu (2006) |
| The company uses many resources to accommodate production activities and generate economic rents. | Peng, Pike, & Roos (2007) |
| Assets include employee knowledge, expertise, customer confidence, products, brand, and company business processes. | Bozbura, Beskese, & Kahraman (2007) |
| Knowledge-based equity of the company | Bartholomew, Steele, & Moustaki (2008) |

**Table 2.1** Definition of Intellectual Capital (Cont.)

| Definition | Reference |
|---|---|
| The summation of all knowledge-based factors such as resources, capabilities, and keys create added value for the organization. And long-term and sustainable competitive advantages. | Lytras (2009) |
| Knowledge and cognition capacity of the collective society include organization, intellectual community, or professional practice. | Chen, Shih, & Yang (2009) |
| The intellectual resources have been formalized, captured, and leveraged to create higher-value assets. | Kim, Yoo, & Lee (2011) |
| The resource comes from its staff's knowledge, experience, and transferable competencies. The organization to innovate and manage change. | Lee (2010) |
| Anything an enterprise use to increase its competitive advantage in the marketplace. Including knowledge, information, intellectual property rights, and experience. | Lu, Wang, Tung, & Lin (2010) |
| The sum of knowledge and ability from the total competence existing in the firm helps gain and keep on with the sustainable Competitive advantage. | Akhter (2020); Wang, Wang, & Liang (2014) |

Table 2.1 presents the definition of intellectual capital. During the past 2 decades, many academics have paid attention and studied intellectual capital. It can be seen that intellectual capital has a broad meaning. However, when considering overall, it was found that the definition of intellectual capital covers the following areas: knowledge, experience, capability, resource, intangible assets, information, trademark and market value. Due to the current business context changes with highly developed technology. The research therefore adds to the issue of technology knowledge and

innovation into the meaning to better reflect the characteristics of today's intellectual capital.

### 2.2.2 Intellectual Capital as Intangible Assets

In financial statements, the concept of intellectual capital encompasses the reporting of intangible assets, encompassing the expenditure on intangible assets like patents and copyrights, as well as the potential economic advantages they bring (Elliott & Elliott, 2007). Presently, there exist instances of internal intangible asset recognition, such as capital and customer relationships, in accordance with the recognition criteria, measurement guidelines, and disclosure requirements outlined in International Accounting Standards (IAS) 38 - Intangible Assets.

### 2.2.3 Development of Intellectual Capital

As previously noted, intellectual capital has a substantial influence in shaping the performance of organizations. Consequently, numerous research endeavors have been undertaken to identify suitable metrics for assessing intellectual capital. Notably, Bontis (1996) and Huseman & Goodman (1998) asserted that Skandia was among the pioneering large corporations to make a truly systematic attempt to gauge their knowledge assets. This initiative led to the creation of the intellectual capital reporting framework known as the "Navigator," which places emphasis on five key domains: financial, customer, process, renewal and development, and human capital.

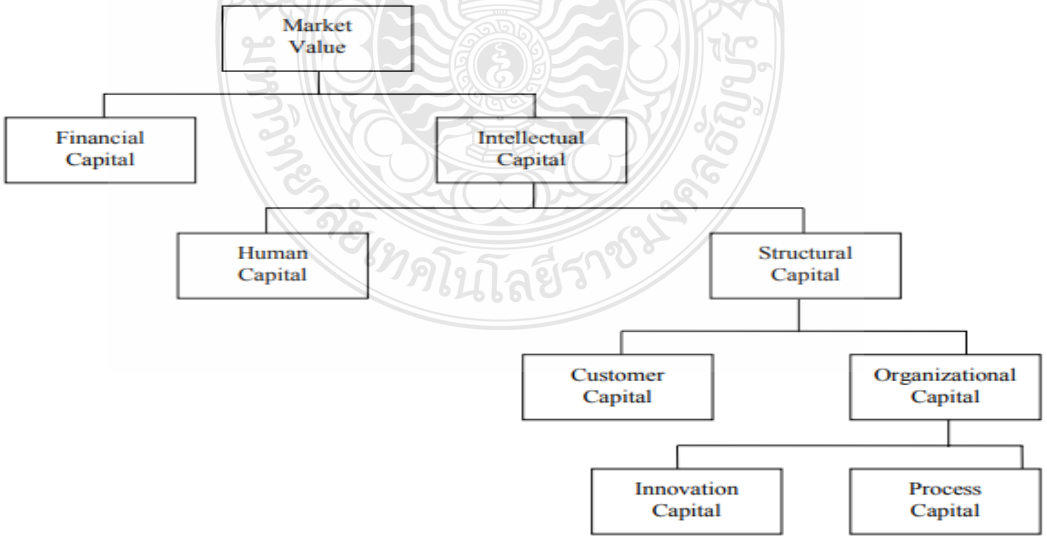



**Figure 2.1** Skandia's Value Scheme

Source: Bontis et al. (2000)

Figure 2.1 illustrates the Skandia's model, which encompasses both financial and intellectual capital. Within this framework, intellectual capital comprises the combined value of human and structural capital. Human capital encompasses the knowledge, skills, innovation, and capabilities of a company's employees. On the other hands, structural capital encompasses tangible assets such as hardware, software, databases, organizational structure, patents, trademarks, and all other elements that bolster the productivity of these employees.

While the Skandia model represents a commendable effort to gauge a company's intangible assets using various criteria, it does exhibit some weaknesses. These drawbacks include the reliance on proxy measurements (Lynn, 1988) and the distinctiveness of each company's attributes (Edvinsson, 1997). Subsequent studies aimed to enhance the measurement of intellectual capital, introducing methods like the Intellectual Capital Index (Roos, Edvinsson, & Dragonetti, 1997), technology brokerage (Brooking, 1996), intangible asset monitoring (Sveiby, 1997), market value-added, and economic value added (Bontis, 1999). Each of these approaches has its unique strengths and weaknesses. Criticisms persist, driving the ongoing pursuit of more effective measurement practices, as outlined in Table 2.2.

**Table 2.2** Some Criticisms on Intellectual Capital Measurement

| Measurement | Strength | Weakness |
|---|---|---|
| Intellectual capital (IC-Indexes) Roos et al. (1997) | Intellectual capital (IC-Indexes) is a very specific context, so there are limits to internationalization among companies, such as defining, strategic prioritizations. Selecting indicators, etc., are all absolute Intellectual capital -index summary comparisons calculated for companies or over time, meaningless companies. The metric does not contain a serial number dimension. Bontis (1999) recommended changes in the Intellectual capital index reflecting changes in the Intellectual capital elemental basis that signal a change in the fundamental driver of future monetization potential. | Like most other tangible asset valuations, the Intellectual capital (IC indexes) has based on valuations for weight selection, indicators, and even the assumption that the Intellectual capital (IC-indexes) exists and is essential in the company's operations. However, this method may be of particular traditions, accounting methods, and assumptions. Roos et al. (1997) argued that at least Intellectual capital measurements are incredibly integrated. Measurements such as Intellectual capital (IC-indexes) make organizations more prominent, visible, and open to assessment since Intellectual capital (IC- indexes) bring past performances to account. However, it strongly influenced the index's movement to a higher or lower-level years after the event. On the other hand, Intellectual capital (IC-Indexes) helps managers understand the impact that a particular strategy has on a company's Intellectual capital and compares two alternatives to understand which alternatives are better from the Intellectual capital's point of view. |

**Table 2.2** Some Criticisms on Intellectual Capital Measurement (Cont.)

| Measurement | Strength | Weakness |
|---|---|---|
| Market value added and economics value added Bontis (1999) | Economics Value Added (EVA) is a financial measurement system that seeks to consider several important factors and related exchanges when creating value correctly. In addition, EVA has positive from the act of creativity that comes from the intangible asset. | Managers do not understand the company's intangible resources or their specific contributions, including limitations. In addition, the other three calculations used to EVA include book value relying on historical costs, which give little indication of current markets or replacement values. Empirical research does not show that EVA is a better predicate for stock prices or changes. A starting point for EVA analysis, presumably for the company, should act specifically for the benefit of shareholders. |
| Intangible asset monitor Sveiby (1997) | Sveiby (1997) developed and initiated an executive training model called TANGO Simulation, which aims to help senior managers understand how to account for Intellectual capital using similar measures developed in the IAM model. | Sveiby (1997) regard financial results as somehow relevant, and by taking advantage in the right manner, the financial results will be proved appropriate. |

**Table 2.2** Some Criticisms on Intellectual Capital Measurement (Cont.)

| Measurement | Strength | Weakness |
|---|---|---|
| Technology broker Brooking (1996) | Brooking (1996) built their Intellectual capital audits. These represent intellectual property for value organizations and can take advantage of the organization's intellectual capital and aggressive marketing strategy. | The main weakness in these lists is the giant leap needed from the qualitative results of questionnaires for these assets. For example, the use of replacement costs means that cost Figures represent real value, and although their value in creating a competitive advantage is not the case. For intangible asset items such as brands, 'Market valuations' are affected by a compelling lack of market capitalization for many components of Intellectual capital. Lastly, Revenue-based models are affected by estimation, and there is uncertainty in cash flow patterns. |

Table 2.2 presents some critiques of the previous studies regarding intellectual capital measurement. Intellectual capital, often quantified through indices (IC-Indexes), poses challenges in terms of internationalization for companies due to factors like strategic prioritization, indicator selection, and the absence of a serial number dimension. Bontis (1999) emphasized the need for evolving IC indices to reflect changes in the foundational drivers of future monetization potential. Much like tangible assets, IC indices rely on weight selection, indicators, and the assumption that IC exists and is integral to a company's operations, but these methods can be influenced by various traditions, accounting practices, and assumptions. Roos et al. (1997) argued that IC measurement, like IC-Indexes, enhance organizational visibility and evaluation, albeit with a tendency to lag in reflecting changes over time. Conversely, IC-Indexes aid managers in assessing the impact of strategies on a company's intellectual capital and facilitate comparisons between alternatives from and intellectual capital perspective. In

addition, a discussion on Brooking's work on intellectual capital audit and raises some valid concerns about the methodology, particularly regarding the use of qualitative data replacement costs, market valuations, and revenue-based models. However, it lacks depth and specificity in its critique, making it difficult for the reader to fully grasp the extent of these weaknesses. Therefore, to provide more understanding, it should have more detailed explanations, examples, and evidence to support its claims.

The several previous studies reveal that the early stages of intellectual capital research typically involve the use of surveys to investigate intellectual capital and its impact on business performance, along with content analysis. Subsequently, Pulic (2000) introduced a novel approach that harnessed intangible assets for more effective measurement of intellectual capital and its contribution to value generation. This approach was rooted in the interplay among three central components: capital employed, human capital, and structural capital, resulting in the development of the VAIC ™ model, illustrated in Figure 2.2.

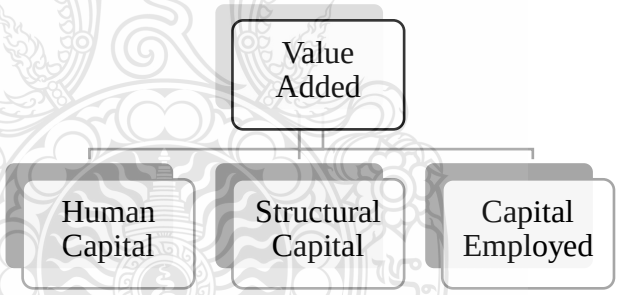



**Figure 2.2** Intellectual Capital Component of VAIC ™ Model
Source: Pulic (2000)

Figure 2.2 portrays the central concept introduced by Pulic (2000), which underscores the utility of an accurately interpreted income statement within knowledge-driven organizations for evaluating the performance of knowledge workers and fostering value creation. Unlike the Skandia Navigator, Pulic's emphasis is not solely on quantifying intellectual capital but rather on measuring the value generated by intellectual capital or human resources. Pulic's research merits recognition for its

capacity to quantify intellectual capital using empirical data. However, Pulic's proposals exhibit both strengths and weaknesses.

One primary advantage lies in it establishment of a linkage between intellectual capital research and the study of consistent performance measurement. Conversely, a key limitation of Pulic's (2000) proposal becomes apparent when considering the conventional measures, such as earnings before interest and taxes (EBIT), which Pulic suggests should be entirely replaced with value-added metrics. This assertion rests on the assumption that these measures compete for assessing the same performance aspect, necessitating a choice between them. However, it's worth noting that return on assets and human capital efficiency do not precisely encapsulate the suggested performance dimension, as observed by Iazzolino & Laise (2013) and Khanhossini, Nikoonesbati, KHeire, & Moazez (2013).

Pulic's model is regarded as superior to other methods for assessing intellectual capital for three key reasons:

(1) The VAIC$^{TM}$ model is clear and transparent, serving as the foundation for a standardized measurement approach.

(2) The calculation of intellectual capital is made more accessible because financial statements can be readily obtained, facilitating swift and verifiable computations.

(3) This model centers on performance evaluation and emphasizes the significance of cultivating both tangible and intangible assets within the company to create value.

Drawing from the literature review, the VAIC$^{TM}$ model has undergone thorough examination across diverse contexts, as evidenced by studies conducted by Celenza & Rossi (2014) and Ting & Lean (2009). Alhassan & Asare (2016) leveraged the VAIC$^{TM}$ model and uncovered a positive correlation between structural capital efficiency and substantial improvements in productivity. Moreover, Pulic (1998) expanded upon the VAIC$^{TM}$ model by introducing intellectual capital elements in several investigations centered on the measurement of cognitive capital using the value-added coefficient (VAIC$^{TM}$). This model encompasses human capital efficiency, structural capital efficiency, and capital employed efficiency.

Additionally, Ulum, Ghozali, & Purwanto (2014) introduced the concept of relational capital efficiency (RCE) to assess cognitive capital. However, limited research has delved into the modified value-added intellectual capital (MVAIC) model, with studies like those conducted by Khalique & bin Md Isa (2014) and Nimtrakoon (2015). While various studies incorporate different intellectual capital components, four components are widely accepted among researchers: human capital, structural capital, capital employed, and relational capital (Akhter, 2020; Dženopoljac, Janoševic, & Bontis, 2016; Nimtrakoon, 2015).

Furthermore, Celenza & Rossi, (2014) proposed that the analysis of intellectual capital offers insights into the multifaceted benefits of accounting data and its impact on the performance of publicly listed companies. In the current landscape of information technology advancements, intense competition, and burgeoning innovation, effective business management and competitive strategies are profoundly influenced (Handayani & Karnawati, 2020). Thus, when investigating the relationship between a specific type of intellectual capital and firm performance, it becomes imperative to identify the pivotal components of intellectual capital and incorporate them into model development.

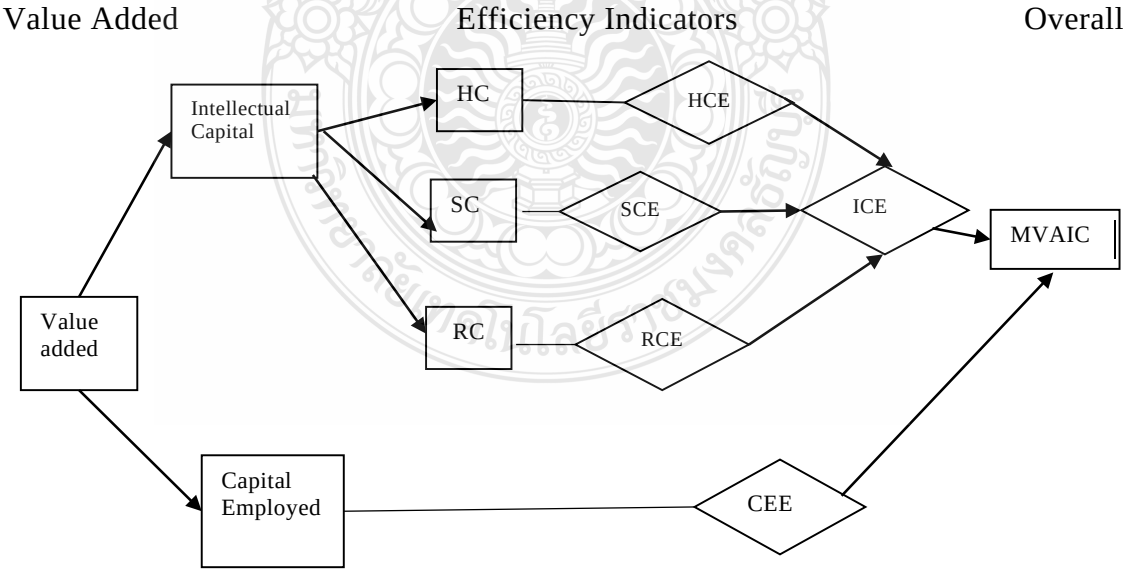



**Figure 2.3** The Formulation of MVAIC Model

Source**:**Ulum et al. (2014)

Figure 2.3 depicts the model proposed by Ulum et al. (2014), which illustrates the components of intellectual capital. This model encompasses the measurement of intellectual capital as a whole, including the assessment of the efficiency of its key components: human capital, structural capital, rational capital, and capital employed.

### 2.2.4 Component of Intellectual Capital

#### 2.2.4.1 Human Capital

Human capital plays a vital role in showcasing the value generated by the firm through the allocation of funds for salaries and wages. It is a critical component of intellectual capital as it encompasses the knowledge, innovative abilities, commitment, and wisdom of employees. Human capital holds strategic importance for organizational success, particularly in competitive environments with rapidly changing dynamics. The skills and knowledge possessed by employees are valuable organizational assets that drive organizational transformations. This includes the creation of new strategies through brainstorming in research laboratories, enhancing engineering and design processes, developing personal skills, and improving sales opportunities. Emphasizing the significance of employees as essential assets in a learning organization, a comprehensive approach allows for the adoption of innovative practices and the exploration of innovative solutions. Numerous studies have shown that the characteristics of both employees and managers are associated with a firm's innovative capabilities (Akhter, 2020; Andes, Nuzula, & Worokinasih, 2020; Bae & Patterson, 2013; Bontis, 1999; Camelo-Ordaz, Hernández-Lara, & Valle-Cabrera, 2005; Costa et al., 2014; Edvinsson, 1997; Hsu & Fang, 2009; Martín-de-Castro, Delgado-Verde, López-Sáez, & Navas-López, 2011; Morris, 2015).

#### 2.2.4.2 Structural Capital

Structure capital encompasses the knowledge embedded within organizations that does not rely on human resources. It includes databases, organizational charts, guidelines, strategies, and valuable activities that contribute to the company's functioning. Structured funds are established based on corporate processes and values, reflecting both internal and external compositions of the company and paving the way for future renewal and development. Structural capital is supported by systematic and explicit internal knowledge, such as values, culture, routines, processes, protocols,

technological innovations, and intellectual property. It encompasses the knowledge generated by organizations that cannot be attributed to individuals, such as inventions resulting from licensing processes, patents, and technology system strategies. The various forms of structural capital, including intellectual property assets, hold significant strategic value for the organization. Fixed data systems and databases are examples of such assets, as they provide the tools and frameworks for storing, packaging, and transferring knowledge along the value chain(Bontis et al., 2000; Costa et al., 2014; Joshi et al., 2013).

2.2.4.3 Capital Employed

Capital employed efficiency demonstrates the value derived from investments in physical capital units (Andes et al., 2020). It represents the unit of work that adds value and the actual value of asset capital (Ulum, Kharismawati, & Syam, 2017). Capital employed refers to the net book value of a company's assets (Akhter, 2020). Within the VAIC ™ approach, capital employed is encompassed in both the physical capital and financial measurement, while the portion of value added to these assets can be measured independently (Ozkan, Cakan, & Kayacan, 2017).

2.2.4.4 Relational Capital

Relational capital pertains to the consistent performance in addressing market intelligence, analysis, and fostering customer loyalty. It serves as an intellectual asset associated with managing and organizing the company's external relationships. Furthermore, relational capital often signifies the commitment and trust of stakeholders (Akhter, 2020; Meles, Porzio, Sampagnaro, & Verdoliva, 2016).

(1) Human Capital Efficiency

Human capital efficiency is also an essential factor in cognitive capital and is considered a knowledge-building factor. Many studies have found significant positive correlations between human capital with its past and future performance.

(2) Structural Capital Efficiency

Structural capital efficiency (SCE) is also an essential component of Intellectual capital. It has been considered an essential correlation with market value, including its past performance.

(3) Relational Capital Efficiency

Relational capital efficiency is seen as an essential factor of cognitive capital but neglected by most researchers who use VAIC ™ tools. Few studies have adopted this element and established an important link between this element and the company's performance.

(4) Capital employed efficiency

Capital employed efficiency is an essential and essential part of Intellectual capital, where measuring Intellectual capital is difficult. Based on numerous past studies, Capital employed has significantly linked performance and market value.

Summary, the MVAIC model had measured as follows:

MVAIC model = Human capital efficiency (HCE) + Structural capital efficiency (SCE)+ Relational capital efficiency (RCE)+ Capital employed efficiency (CEE)

**Table 2.3** Classification of Intellectual Capital (Dzinkowski, 2000)

| **Human Capital** | **Relational Capital** | **Organizational Capital** | **Structural Capital** |
|---|---|---|---|
| Know-how | Brands | Patents | Management philosophy |
| Education | Customers | Copyrights | Corporate culture |
| Vocational qualification | Customer Loyalty | Design rights | Management processes |
| Work-related Knowledge | Company names | Trade secrets | Information system |
| Occupational assessments | Backlog orders | Trademarks | |
| Work-related companies | Distribution Channels | Service marks | |
| Entrepreneurial, innovativeness, proactive and reactive abilities, Changeability | Business Collaboration | | |
| | Licensing agreements | | |
| | Favorable contracts | | |
| | Franchising agreements | | |

Table 2.3 shows intellectual capital classification by the international federation of accountants. This intellectual capital component in accounting includes human capital, relational capital, organizational capital, and structural capital.

Some current models are popular and still used that the modified VAIC ™ model with the introduction of relational capital is more accurate than the original VAIC ™ model to measure intellectual capital in addition (Nimtrakoon, 2015; Xu & Wang, 2019; Yao, Haris, Tariq, Javaid, & Khan, 2019). In conclusion, the four elements of intellectual capital: are human capital, relational capital, capital employed, and structural capital, but this research has a specific: relational capital, which the researchers think that in modern times, the challenges of technology disruptive have forced organizations to adapt to the adoption of the digital era, which is of great importance.

The study focuses on a sample group consisting of businesses in the service sector. The COVID-19 pandemic has had a significant impact on various industries such as tourism, hotels, aviation, and transportation, leading to temporary closures and ongoing liquidation (Department of Trade Negotiations, 2020). In 2019, companies listed on the Stock Exchange of Thailand implemented Thai Financial Reporting Standards (TFRS) 15, which involves adopting accounting guidelines for revenue recognition and presenting annual financial statements that reflect the income generated from operations. Furthermore, the utilization of human resources in the service sector plays a crucial role in delivering impressive service and ensuring customer retention.

The conceptual framework developed by Ulum (2014) called Modified Value-Added Intellectual Efficiency (MVAIC) is utilized in this study. MVAIC was chosen for this study due to several reasons:

(1) MVAIC is a comprehensive measurement approach that considers intangible assets. It comprises four components: human capital, capital employed, structural capital, and relational capital.

(2) MVAIC is a market-based measurement method, aligning with the company's stock price. Consequently, it provides a more accurate assessment of a company's intellectual capital compared to traditional methods.

(3) MVAIC enables performance measurement and comparison across different companies. It helps identify sources of competitive advantage, with higher MVAIC values indicating a robust workforce and well-developed IT systems.

(4) As a relatively complex measurement method, MVAIC allows for testing more intricate hypotheses than simpler measures. This contributes to a deeper understanding of the relationship between intellectual capital and company performance.

(5) MVAIC is a market-based measure, which makes it immune to accounting distortions. This enhances the accuracy of measuring the value of intellectual capital.

**Table 2.4** Previous Research of Intellectual Capital on Firm Performance

| Author | Independent Variables | Dependent Variables | Mediating Variable | The Result Mediation | Sign | Results |
|---|---|---|---|---|---|---|
| Ardhiani & Nasih (2019) | Good Corporate Governance, Financial Capital | Firm Performance | Intellectual Capital (VAIC$^{TM}$) | Full Mediation | + | The result found that intellectual capital becomes a part of the full mediation of the correlation between good corporate governance and firm performance. |
| Xu & Wang (2018) | Intellectual Capital (VAIC$^{TM}$) | Financial Performance: ROA, ROE Sustainable Growth | | | + | The result showed that intellectual capital positively affected financial performance and sustainable growth. |
| Ariff, Islam, & van Zijl (2016) | Intellectual Capital (VAIC$^{TM}$) | market-to-book ratio, Tobin's Q | | | + | The intellectual capital had a positive impact on the marketing performance. |

**Table 2.4** Previous Research of Intellectual Capital on Firm Performance (Cont.)

| **Author** | **Independent Variables** | **Dependent Variables** | **Sign** | **Results** |
|---|---|---|---|---|
| Soetanto & Liem (2019) | Intellectual Capital (MVAIC) | ROA, Market to book value | + | Intellectual capital had a significant and positive impact on return on assets. |
| Celenza, & Rossi (2014) | Intellectual Capital (VAIC™) | ROE, ROI, ROS, Market to book value | + | There was no statistically significant relationship between return on investment and the intellectual Capital. |
| Hoang, Nguyen, Vu, Le, & Quach (2020) | Intellectual Capital (VAIC™) | ROA, ROE | + | Those found a positive effect on the profitability of the intellectual capital model. |
| Cabrita & Bontis (2008) | Intellectual Capital | Business Performance | + | These found that intellectual capital had a significant effect on performance. |
| Smriti & Das (2018) | Intellectual Capital (VAIC™) | ATO, ROA, Tobin's Q, | + | The studies found that effective capital structure and capital utilization efficiency are essential to market capitalization. |

Table 2.4 concludes the results of related research on the relationship between intellectual capital and firm performance. The various research instruments used in the related research represent the intellectual capital (VAIC $^{TM}$) model affected financial performance such as ROA, ROE, and Sustainable Growth (Xu & Wang, 2018); ROA (Soetanto & Liem, 2019); ROA, ROE (Hoang et al., 2020); ROI (Celenza & Rossi, 2014); Tobin's Q (Ariff et al., 2016; Smriti & Das, 2018).

Based on the findings of the literature review, it can be deduced that intellectual capital exerts an impact on financial performance in diverse contexts, spanning different sample groups, economic characteristics, and capital markets within each country.

Consequently, the identified dependent variables from the review, namely Return on Equity (ROE), Return on Assets (ROA), and Tobin's Q were studied to measure performance by utilizing accounting and financial information, along with the company's market value.

Furthermore, in response to the evolving business environment, the business model has undergone changes as organizations seek innovation to enhance their competitiveness in the digital era. Moreover, the global capital markets have been influenced by the economic repercussions of the COVID-19 situation.

This study was conducted within the framework of the Thai capital market, which has been impacted by these circumstances. Additionally, in 2019, it was discovered through the study that companies listed on the Stock Exchange of Thailand implemented Accounting Standard No. 15 on Income for accounting purposes. This implementation brought about a change in how revenue is recognized, which in turn affected the preparation of financial statements and the presentation of operating results for these companies on the Stock Exchange of Thailand. The motivation behind this study becomes apparent considering the COVID situation and the adoption of accounting standards related to revenue recognition, as well as the evaluation of intellectual capital earnings quality and its impact on performance in the service sector of listed companies on the Stock Exchange of Thailand during 2019-2020.

This research investigates the impact of intellectual capital, competitive advantage, and earnings quality on business performance. Empirical evidence from listed

companies in Thailand supports the use of the intellectual coefficient from the modified value add intellectual capital (MVAIC) model, which provides a more accurate measurement of intellectual capital and systematic efficiency across profits, productivity, and market value parameters (Xu & Liu, 2020).

However, the traditional model (VAIC$^{TM}$) has certain limitations. Ståhle, Ståhle, & Aho, 2011 have highlighted its focus on labor performance and firm investment efficiency. Additionally, the measurement of structural capital in the traditional model (VAIC$^{TM}$) is incomplete (Chen & Puttitanun, 2005). Therefore, there is a suggestion to enhance the traditional model (VAIC$^{TM}$) through modification, introducing relational capital as a new component of intellectual capital. Relational capital is measured by considering costs related to marketing, sales, and advertising. It has been confirmed that the MVAIC model, which includes the relational capital variable, provides a more comprehensive business model compared to the traditional model (VAIC$^{TM}$) proposed by (Pulic, 2000).

This study addressed the gap in the traditional model (VAIC$^{TM)}$ by adopting the modified value add intellectual capital (MVAIC) model as a measurement tool for intellectual capital. The MVAIC model encompasses the innovation concept and allows for comparing the organization with its competitors. Additionally, the study focused on exploring the benefits and academic evidence concerning the impact of intellectual capital on firm performance, considering the variables of competitive advantage and earnings quality. Notably, there have been no prior studies conducted in the Thai context on this particular topic.

### 2.3 Firm Performance

Based on the previous analysis of literature, there are three dependent variables that impact intellectual capital, namely, return on equity (ROE), return on assets (ROA), and Tobin's Q. ROE and ROA represent measures of profitability utilizing accounting and financial data, while Tobin's Q is a measure of market value.

Firm performance is an excellent efficiency measuring system required for the organization's achievement since it helps the management better understand any situation and form the proper decision (Inamdar & Kaplan, 2002).

### 2.3.1. Return on Equity: ROE

Return on equity represents the return generated from shareholders' investments, providing significant advantages to the shareholders (Farfan, Barriga, Lizarzaburu, & Noriega Febres, 2017). Higher ratios than the company's value are appealing to investors (Wilson et al., 2020). The calculations in this study were performed based on the SETSMART website.

### 2.3.2. Return on Assets: ROA

Return on assets serves as a measure of managerial efficiency, utilizing all assets to generate profits or returns for the business relative to the factors of funds or cost of funds. A higher percentage signifies superior company performance, indicating effective utilization of assets to drive sales. In this study, the SETSMART website was employed for the calculation, specifically for businesses within the industrial and service sectors.

### 2.3.3. Tobin’s Q

Tobin's Q, introduced by Tobin (1969), Nobel Prize winner in economics, serves as a valuable indicator for integrating knowledge through financial statements and market values. The calculation of Tobin's Q in this study follows the method presented by (Chung & Pruitt, 1994). This concept facilitates an enhanced calculation formula for Tobin's Q, as the approach by Lindenberg & Ross (1981) requires extensive data collection and complex methods. Unlike the asset substitution price in Lindenberg & Ross's concept, the calculation by Chung & Pruitt (1994) utilizes the book value of assets. This research adopts the concept of Chung & Pruitt (1994) in assessing Tobin's Q.

**Table 2.5** Variables of Firm Performance

| Variables | Symbols | Measurement |
|---|---|---|
| *Dependent Variables* | | |
| -Return on Equity | *ROE* | $ROE = \frac{Net\ profit * 100}{Total\ shareholders'\ equity\ of\ the\ parent\ company\ (average)}$ |
| - Return on Assets | *ROA* | $ROA = \frac{Profit\ (Loss)\ before\ Interest\ and\ Income\ Tax\ Expense * 100}{Total\ Assets\ (Average)}$ |
| - Tobin's Q | *TBQ* | $\frac{MVE + PS + DEBT}{TA}$ Where MVE is the product of stable share price and the outstanding number of common shares, PS is the liquidation value of the company's exclusive preference shares, and DEBT is the company's short-term liabilities net of its short-term assets added to the book value of the company's long-term debt, TA is the book value of the company's total assets |

Source**:** Hoang et al. (2020); Smriti & Das (2018); Soetanto & Liem (2019)

## 2.4 Competitive Advantage

### 2.4.1 Definition of Competitive Advantage

Competitive advantage refers to the sustained returns that surpass the industry average (Barney, 1991; Kamukama, Ahiauzu, & Ntayi, 2011; Porter, 1985). According to Barney (1991) and Kamukama et al. (2011), competitive advantage relies on valuable resources that are scarce and difficult to imitate within an organization. Therefore, it encompasses factors that can yield profits, superior returns, cost advantages, and other economic benefits. Moreover, competitive advantage stems from unique human resources and systems that possess value and distinctiveness, contributing to sustainable competitive advantage (Chahal & Bakshi, 2015). Wijayanto, Dzulkirom, & Nuzula (2019) reinforce the idea that competitive advantage exists when companies outperform their competitors through successful strategies and by overcoming imitation challenges. Porter (1985) emphasizes the global efforts made by companies to outperform rivals and capture market share. While managers adapt strategies to their specific company and market conditions, the guidelines for competitive strategy can be categorized into three types: low-cost leadership strategy, differentiation strategy, and focus strategy or niche strategy.

### 2.4.2 Measurement of Competitive Advantage

Previous definitions of competitive advantage have primarily focused on indicators such as profitability, productivity, and market share. However, it is important to recognize that competitive advantage forms the foundation of high performance. It refers to the firm's capacity to enhance product quality, reduce costs, expand market share, or increase profits. Barney & Hesterly (2010) acknowledged the challenge associated with measuring competitive advantage and proposed two approaches. The first method involves evaluating competitive advantage through accounting efficiency audits, while the second method examines its economic performance. These two measurement methods will be discussed in accounting measurement and economic measurement as follows:

2.4.2.1 Accounting Measurement

Accounting performance is a key factor in measuring competitive advantage, as it involves analyzing profit-loss data and the statement of financial position. Barney & Hesterly (2010) emphasize the use of accounting data to calculate financial ratios that help assess competitive advantage. These financial ratios can be categorized into four groups: profitability ratio, liquidity ratio, leverage ratio, and activity ratio. By comparing these financial ratios to established benchmarks, companies can evaluate their operational efficiency. Previous studies have utilized various indicators, such as sales growth rate and employees' growth, to measure competitive advantage (Sidik, 2012).

2.4.2.2 Economic Measurement

For economic measurement of competitive advantage, one approach is to compare the firm's returns with its capital costs, rather than relying on average return levels of the industry (Barney & Hesterly, 2010). Another measure involves using return on invested capital (ROIC) to gauge the return on investment for the business (Damodaran, 2007).

**Table 2.6** Measurement of Competitive Advantage

| **Methods** | **Detail of measurement** |
|---|---|
| Accounting Measurement | 1. Profitability ratio, sale growth<br>2. Liquidity ratio,<br>3. Leverage ratio,<br>4. Activity ratio |
| Economic Measurement | Return on invested capital (ROIC)<br>ROIC = NOPLAT / IC<br>Where: NOPLAT: Net operating income less adjusted tax, IC: invested capital |
| | 1. Economies of scale<br>2. Innovation<br>3. Capital requirements<br>4. Power over suppliers<br>5. Power over customers<br>6. The credibility of the expected threat of retaliation |

Source: Barney & Hesterly (2010); Damodaran (2007); Dickinson & Sommers (2012); Sachitra & Chong (2017); Sidik (2012)

Table 2.6 presents the measurement methods for assessing competitive advantage, which include accounting measurement and economic measurement. However, there are certain limitations related to productivity and profitability. Firstly, competitive advantages may be hindered by factors, such as limited availability and unreliable data. Furthermore, the measurement of competitive advantage fails to capture aspects like quality, innovation, and the challenges involved in comparing different industries (Voulgaris, Papadogonas, & Lemonakis, 2013). Nonetheless, Kadocsa (2006) argues that quantitative and accessible metrics such as revenue, profit, and productivity can be used to assess competitiveness. There are instances where quantification and accessibility pose challenges. For example, profitability can be

ambiguous as it necessitates defining the measurement period, whether short-term or long-term. In this study, the variables of competitive advantage were employed as intermediate variables, with revenue growth serving as a measure of competitive advantage. Additionally, the data collected for this study in 2019 aligns with the adoption of Accounting Standard No. 15 on Revenue from Contracts with Customers. This ensures consistency in measuring the company's revenue growth amidst the impact of the COVID-19 situation. The study investigates how these changes in accounting practices affect the capital market and subsequently impact company performance. Moreover, the study explores whether companies can effectively create a competitive advantage.

**Table 2.7** Previous Research of Competitive Advantage on Firm Performance

| Author | Measurement | Independent Variables | Dependent Variables | Sign | Results |
|---|---|---|---|---|---|
| Wijayanto et al. (2019) | Questionnaire | Competitive Advantage | Firm Performance, Firm Value | + | The results show that competitive advantage has a significantly positive effect on firm performance. |
| Potjanajaruwit (2018) | Questionnaire | Cost Leadership, Differentiation, Financial Measures, Non-Financial Measures | Firm Performance | + | All competitive strategies positively and significantly supplement firm performance. |

Table 2.7 shows the prior research that found that competitive advantage affects firm performance. In addition, most prior research used questionnaires for the instrument studies.

**Table 2.8** Previous Research of Intellectual Capital on Competitive Advantage

| Author | Measurement | Independent Variables | Dependent Variables | Mediation Variable | The result of Mediation | Sign | The results |
|---|---|---|---|---|---|---|---|
| Correia, Dias, & Teixeira (2020) | Questionnaire | Market Orientation | Business Performance | Competitive Advantage, Dynamic Capabilities | Partial Mediation | + | The results found that the hypotheses regarding mediating the competitive advantages in the relationship between dynamic capabilities and company performance. |
| Anwar, Khan, & Khan (2018) | Questionnaire | Intellectual Capital, Entrepreneurial Strategy | Firm Performance: Financial Performance, Non-financial performance | Competitive Advantage | Fully Mediation | + | Competitive advantage fully mediates the relationship between intellectual capital and net present value and plays a partial mediating role between earings per share and net present value. |

**Table 2. 8** Previous Research of Intellectual Capital on Competitive Advantage (Cont.)

| **Author** | **Independent Variables** | **Dependent Variables** | **Mediation Variable** | **The result of Mediation** | **Sign** | **The results** |
|---|---|---|---|---|---|---|
| Rochmadhona, Suganda, & Cahyadi (2018) | Intellectual Capital | Financial Performance | Competitive Advantage | Partial Mediation | + | Intellectual capital positively affects financial performance and competitive advantage. Moreover, Indonesia, Laos, Vietnam, the Philippines, and Thailand have different levels of intellectual capital. |
| Ana, Sulistiyo, & Prasetyo (2021) | Intellectual Capital, Good Corporate | Company Value | Competitive Advantage | Direct Effect | + | Competitive advantage was insignificantly the role of intellectual capital and good corporate governance. Besides, competitive advantage can increase firm value, but unfortunately, it cannot mediate variables. |

**Table 2.8** Previous Research of Intellectual Capital on Competitive Advantage **(**Cont**.)**

| **Author** | **Measurement** | **Independent Variable** | **Dependent Variables** | **Mediating Variables** | **Sign** | **The results** |
|---|---|---|---|---|---|---|
| Chahal & Bakshi (2015) | Questionnaire | Intellectual Capital | Competitive Advantage | | + | The result showed that Intellectual capital has a positive effect on competitive advantage. |
| Kamukama & Sulait (2017) | Questionnaire | Intellectual Capital | Competitive Advantage | | + | Intellectual capital is positive effect competitive advantage. |
| Kamukama et al. (2011) | Questionnaire | Intellectual Capital | Financial Performance | Competitive Advantage | + | Competitive advantage has a partial mediation in the association between intellectual capital and financial performance. |
| Jardon & Martos (2012) | Questionnaire | Intellectual Capital Tangible Resources | Performance | Organizational Capabilities Competitive Advantage | + | Competitive advantage of small and medium enterprises (SMEs) must affect to improve performance. |

Table 2.8 presents prior research indicating the impact of competitive advantage on firm performance. Competitive advantage is examined as a mediating variable, and the results reveal full mediation, direct effects, and partial mediation. Previous studies have employed various research instruments to assess competitive advantage and intellectual capital. In this study, variables and analyses are selected based on a comprehensive literature review, incorporating findings from related research.

## 2.5 Earnings Quality

### 2.5.1 Definition of Earnings Quality

**Table 2.9** Definition of Earnings Quality

| References | Definitions |
|---|---|
| Dechow, Ge, & Schrand (2010) | defined earnings quality, or earnings informativeness, as the financial performance reported by a company, which aids users of financial statements in making decisions. |
| Baker (2017) | stated that earnings quality of the financial accounting standards board (FASB) refers to the profits generated from normal operations with the regular incomes that had sufficiently replaced by cash for the operation and depreciable assets replacement. |

The table presents the definition of earnings quality as discussed by Baker (2017) and Dechow et al. (2010). Earnings quality refers to the financial effectiveness of a company's reported earnings, aiding financial statement users in their decision-making process. It encompasses profits generated from regular operations, ensuring sufficient cash for operational needs and the replacement of depreciable assets. In accounting, earnings quality reflects a company's ability to report profits and helps predict future profitability (Hashim, Ahmed, & Huey, 2019).

Dechow et al. (2010) emphasize that higher earnings quality provides more relevant information about firm performance. They summarize the key characteristics of earnings quality, which depend on users' decision-making and data selection from

financial statements. Earnings quality is derived from the relevance of financial performance and the accounting system's ability to measure firm performance.

Originating in the United States, earnings quality aims to identify overvalued or undervalued securities in the market. It involves a thorough analysis of a company's financial statements to uncover information about securities that may be trading above or below their true market value. Financial statement users carefully consider earnings quality information before making investment decisions, which can lead to either profitable outcomes or subpar profits depending on the quality of earnings information used. The concept also highlights the influence of executive power on earnings quality through earnings management practices.

**2.5.2 Measures of Earnings Quality**

In 1991, Jones (1991) developed the overall perception model, which consisted of an equation incorporating variables such as changes in revenues from land, capital costs of factories and equipment, including assets, buildings, and facilities, and the net price after deducting depreciation. Subsequently, Dechow, Sloan, & Sweeney (1995) made model revisions by adding variables and changes in sales, which they believed were deducted from the change in sales. Dechow & Dichev (2002) suggested that the backlog should reflect the cash flow received from the business, considering past, present, and future perspectives. This simple idea demonstrates an interest in changes in working capital perception.

Building on the concepts proposed by Dechow & Dichev (2002), Jones (1991), and McNichols (2002), it is suggested that incorporating changes in income, capital costs of land and buildings, and cash flow from operational activities in the model would facilitate a clearer explanation of the turnover backlog. Moreover, recognizing the accrual threshold based on discretion involves examining changes in accounting policies and shareholder structure to determine whether there is evidence of executive profit management and higher-than-usual accrual overpayment.

There are two types of accruals:

(1) Non-Discretionary accruals are the outstanding items that occur from the economic conditions and standard business practices beyond our control, such as trade receivables depend on economic conditions.

(2) Discretionary accruals are the backlogs decorated by the management on figures. For example, the selection of accounting policies, revenue recognition, depreciation rate, creation and reduction of net operating assets, outstanding accounting schedules, and those accrual periods are understood to impact both current and future gains. Therefore, as the perception of the current period has increased the income, the income borrowed from future periods.

**Table 2.10** Model for Measurement of Earnings Quality

| **Model** | **Formula** |
|---|---|
| The Healy Model (1985) | The equation for the Healy (1985) is based on total accruals, consisting of both discretionary and non-discretionary accruals. $DA_{it} = \frac{TAC_{it}}{TA_{it-1}}$ |
| The DeAngelo Model (1986) | The equation for the DeAngelo (1986) earnings management model is as follows: $DA_{it} = \frac{TAC\ it - TAC_{it-1}}{TA_{it-1}}$ |
| Sloan (1996) | Accruals exhibit lower stability compared to their cash flow counterparts, and companies with high levels of accruals tend to have lower earnings quality. Accruals component = $\frac{(\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep}{\text{Average total Assets}}$ |
| Jones Model (1991) | The main objective of the Jones model is to control the impact of changes in the company circumstances when calculating non – optional receivables, which can be calculated by the following equation: $NDA_t = \alpha 1\ (1 / A_{t-1}) + \alpha\ 2\ (\Delta\ Rev_t / A_{t-1}) + \alpha\ 3(PPE_t / A_{t-1}) + \varepsilon$ |
| The Industry Model (1991) Dechow &Sloan (1991) | Determine the outstanding items through various calculations, taking into account the industry average. This involves using the average of total outstanding items among companies within the same industry as a benchmark for evaluating business operations. It is important to note that changes in outstanding items should not be correlated with the judgment of management within the industry. $NDA_t = y1 + y1\ median_i\ (TA_t / A_{t-1})$ |
| The Modified Jones Model (1995) Dechow, Sloan, &Sweeney (1995) | The intuitive bias in the Jones model in the measurement of optional entitlements, and to reduce errors in the measurement of optional entitlements more prudently, the model variables were calculated under the following equation: $NDA_t = \alpha_1(1 / A_{t-1}) + \alpha 2\ (\Delta\ Rev_t - \Delta\ Rec_t) / A_{t-1}) + \alpha\ 3(PPE_t / A_{t-1}) + \varepsilon$ |
| Francis et al. (2005) | $TCA_{i,t} = \alpha_1 OCF_{i,t-1} + \alpha\ 2\ OCF_{i,t} + \alpha\ 3\ OCF_{i,t+1} + \alpha\ 4\Delta\ Rev_{i,t} + \alpha\ 5\ PPE_{i,t} + \varepsilon_{i,t}$ Francis et al. (2005) found a correlation between the quality of profit, as indicated by accrual items, and the cost of capital. |

According to table 2.10 show that summary of different in each model such as DeAngelo (1986); Dechow et al. (1995); Francis, LaFond, Olsson, & Schipper (2005); Healy (1985); Jones (1991); Sloan (1996);Dechow & Sloan (1991).

The DeAngelo (1986) model critiqued the Healy model for its significant drawback of lacking a benchmark for normal accruals. In response, the DeAngelo (1986) model calculates normal accruals as the previous period's backlog offset by lagging assets. As the expected balance in year t is the same as year t-1, any changes to the outstanding balance are considered discretionary. Both Healy (1985) and DeAngelo (1986) measures of earnings quality serve as benchmarks for assessing the widely used accrual-based revenue management model known as the Jones (1991) model.

Dechow et al. (2010) note that most discretionary accruals are commonly employed as proxies for earnings quality measures in empirical accounting research focusing on accruals, testing for the presence of earnings management by distinguishing between "abnormal" and "normal" balances (discretionary and non-discretionary).

Normalized outstanding balances reflect adjustments that capture normal operating results, while abnormal accruals reflect distortions arising from the application of accounting principles (Dechow et al., 2010). The use of irregular/discretionary accruals by managers is based on three key assumptions: 1) measurement assumptions related to performance, 2) opportunistic management assumptions, and 3) executive power assumptions (Guay, Kothari, & Watts, 1996).

Assumption 1 suggests that managers exercise their discretion to generate reliable and timely performance-related information (e.g., revenue) that is not communicated through accruals. It further specifies whether discretionary accruals are utilized to mask underperformance or to preserve part of abnormally strong performance for future periods, in line with Hypothesis 3, which asserts management's ability to manipulate accruals at their discretion to influence reported earnings (Guay et al., 1996). Properly reported matters are managed without executive discretion.

In this study, the modified Jones Model by Dechow et al. (1995) was employed to measure earnings quality, particularly suited for a dataset with cross-sectional time series data. Moreover, the analysis of profit management using an accrual item model examined accruals based on management's discretion and accruals unrelated to

management's discretion to measure earnings quality or the quality of profit derived from normal operations, which can be converted into sufficient cash for asset changes and profit generation. This analysis was conducted empirically within the economic context affected by the COVID pandemic, impacting the capital market.

Considering the company's performance during such circumstances, reliable financial reports were expected from management without taking advantage of opportunities to manipulate earnings management. Additionally, the utilization of revenue growth as a measure of competitive advantage reflects a similar relationship as a measure of a company's earnings quality. Hence, it is appropriate to employ the modified Jones Model to measure profit management within the company.

**Relavant of Resaech Earnings Quality and Intellectual Capital**

Prior researchers have examined the relationship between earnings quality and intellectual capital, including Ardi et al. (2018), Darabi, Rad, & Heidaribali (2012), Mojtahedi (2013) and Sarea & Alansari (2016). Earnings quality plays a crucial role in reducing data asymmetry and promoting the development of financial markets (Dang, Nguyen, & Tran, 2020). In their study, Sarea & Alansari (2016) utilized the modified Jones model to assess earnings quality. Previous research commonly employed one of two methods to measure earnings quality. The first method involves monitoring earnings quality through the examination of accounting variables. For instance, Sloan (1996) assessed earnings quality by analyzing the level of perception, while Dechow & Dichev (2002) focused on the estimation errors of perception. The second method involves investigating the relationship between income and stock returns, assuming market performance. Researchers such as Basu, (2009) and Francis & Schipper (1999) used the first method to accurately measure income through discretionary accruals analysis. They employed a modified Jones model (1991) and cross-section data assessment to capture perceived discretionary accruals. The absolute value of discretionary accruals serves as a measure of earnings quality, with higher absolute values indicating lower earnings quality (Darabi, Rad, & Heidaribali, 2012). The findings from previous studies exploring the relationship between intellectual capital and earnings quality vary across different contexts, as detailed in Table 2.11.

**Table 2.11** Previous Research of Intellectual Capital and Earnings Quality

| Author | Statistic | Independent Variables | Dependent Variables | Sign | The results |
|---|---|---|---|---|---|
| Sarea, Alansari, & Capital (2016) | Regression Analysis | Intellectual Capital | Earnings Quality | + | Results have significantly supported the influence of intellectual capital on earnings quality. |
| Muhammad Haykal, Maksum, & Muda (2020) | Regression Analysis | Return on assets, Price-Book value, Earnings per share | Discretionary Accruals | + | Found that the motivation for signal sending, manager remained with influence on the existing discretionary recognition, while return on assets had the significantly and positively impact on discretionary recognition. |

**Table 2.12** Previous Research of Earnings Quality and Market Value

| Author | Independent Variables | Dependent Variables | Sign | The results |
|---|---|---|---|---|
| Ardi & Murwaningsari (2018) | Intellectual Capital (VAIC™), Earnings Quality: Discretionary Accrual, Financial Performance: ROA | Company Value: Tobin's Q | + | The result found that the earnings quality tends not to support Tobin's Q. Instead, the earnings quality with high accrual will cause the company's earnings quality to be low, and the company will decrease the stock return. |
| Darabi, Rad, & Ghadiri (2012) | Intellectual Capital (VAIC™) | Earnings Quality: Discretionary Accruals | + | The result found that the intellectual capital was negatively related to the absolute value of discretionary accruals. These findings indicate a significant intellectual capital positively affects earnings quality. |

Table 2.12 presents the findings of relevant studies examining the association between intellectual capital and earnings quality. These studies utilized diverse research instruments to measure intellectual capital and earnings quality. The variables were selected and analyzed based on a comprehensive literature review, incorporating the findings from related research.

**Table 2.13** Previous Research of Discretionary Accruals

| Author | Independent Variables | Dependent Variables | Mediating Variables | The Result Mediation | Sign | The Results |
|---|---|---|---|---|---|---|
| Latif, Bhatti, & Raheman (2017) | Overall Corporate Governance | ROA, Tobin's Q | Earnings Quality | Partial Mediation | + | Those found that earnings quality partially mediates corporate governance. |
| Antonio, Laela, & Darmawan (2019) | Corporate Governance | Tobin's Q | Earnings Quality | Full Mediation | - | Results showed that corporate governance had no significant impact on market responses. However, indirect corporate governance greatly influenced on the response of markets mediated by the earnings quality. |

Table 2.13 presents the findings regarding the mediating impact of discretionary accruals. Previous research has utilized various research methodologies to investigate the connection between earnings quality and intellectual capital. The selection and analysis of variables in this study were informed by a comprehensive review of the literature, which incorporated pertinent research discoveries.

## 2.6. Conclusion

This study addresses the research gap by examining the effects of intellectual capital, competitive advantage, and earnings quality on the operational performance of companies. It contributes to the existing literature by providing empirical evidence from the service industry and listed companies in Thailand. The study incorporates various variables, including independent variables, mediating variables, and dependent variables, based on conceptual frameworks and research methods discussed in the subsequent chapter.

# CHAPTER 3
# RESEARCH METHODOLOGY

## 3.1 Introduction

The previous chapter provided a comprehensive understanding of the study of intellectual capital, competitive advantage, earnings quality, and firm performance. It also pointed out some research gaps and guidelines for drawing the conceptual framework. This chapter discusses the research methods consisting of the theoretical concept, research design, population and sampling, research variables and measurement, data collection, data processing and analysis, the mediator variable, the conduct of the research and data screen and transformation.

## 3.2 Theoretical Concepts

Intellectual capital assumes varied meanings depending on the context it is applied in. In disciplines such as nursing, engineering, and business administration, it encompasses knowledge, information, intellectual property, and experience that contribute to the stability of organizations. It comprises elements such as human capital, financial resources, relational structures, and invested assets, all of which drive operational efficiency (Edvinsson, 1997). The success of organizations relies on the effective management of people, processes, customers, and the development of intellectual capital-related components, which encompass expenditures on human capital (e.g., staff expenses, training and development, recruitment and retention costs, employee benefits, staff meetings). Structural expenses (e.g., capital investments, new product development, research and development, board remuneration and meetings, intellectual property, organizational databases) also contribute to intellectual capital. Additionally, expenses associated with capital relations (e.g., advertising, consumer compensation, product infringement fines, social community obligations) are relevant in this context.

While intellectual capital is an intangible asset in accounting, there is a lack of specific financial reporting standards for its valuation and disclosure. Therefore, general principles for intangible assets are followed. Several theories, including intellectual

capital theory, agency theory, and resource-based view theory, explain the significance and relationship between intellectual capital and organizational performance.

Recognizing and categorizing specific types of intellectual capital can be complex. Management, at its discretion, may choose to recognize inappropriate items or utilize intellectual capital as a means to enhance financial statements, potentially distorting the assessment of performance. These theories aid in understanding events and relationships between intellectual capital and business performance. Intellectual capital is a vital resource for fostering competitiveness and gaining a competitive advantage. The resource-based view theory was also employed in this research to elucidate the relationship between intellectual capital, profitability, and business performance.

### 3.2.1 Agency Theory

Agency theory, introduced by Jenson & Meckling (1976), has emerged as a prominent paradigm in the field of economics. This theory explores the concerns and relationships between managers and shareholders within the organizational context. However, it has also influenced disciplines such as corporate behavior, organizational theory, strategic management (Hall, 1992), stakeholder theory, and agent theory, which are based on assumptions related to market processes that differ from those in the agency financial model theory. Pedersen & Thomsen (2003) introduced the concept of owner identity, which explores the relationship between the extent of ownership and a company's value. Furthermore, the underlying insight derived from the agency theoretical framework is the presence of trade-offs between risks and incentives, with compensation being a potential motivating factor for agents. Chokroborty-Hoque, Alberry, & Singh (2014) suggest that agency theory provides comprehensive theoretical evidence for understanding corporate processes and designs from a principal-agent perspective. Practical marketing assumptions suggest that employers and agents have the freedom to enter and exit contractual relationships (Hill & Jones, 1992). Darabi, Rad, & Heidaribali (2012) found that managers have better control and management of intellectual capital, and the mechanism of intellectual capital impacts earnings quality. This is because it serves as an indicator of trends in human capital, structural capital,

and wealth, all of which are related to earnings quality. There are several reasons as follows:

(1) Financial statements are considered crucial in assessing the quality of financial reporting and shaping top management's external reputation,

(2) External reputation significantly influences financial reporting, and

(3) High-profile managers resort to revenue management to safeguard their reputation.

Agency theory proposed by Jenson & Meckling (1976) clearly explains the relationship between owners and management (agents) by highlighting the conflicting interests between the two parties. As a result, earnings management is employed to align the agent's interests and temporarily enhance firm value. In this study, agency theory is applied to evaluate intellectual capital under the management of the company. Management holds the decision-making power and efficiently utilizes available resources through policies and strategies to generate earnings. However, certain firms engage in earnings management. Therefore, the evaluation of earnings from intellectual capital management is conducted to reveal earnings quality. Hence, this theory focuses on examining the relationship between intellectual capital and earnings quality.

**3.2.2 Resource-Based View Theory**

The resource-based view theory posits that companies are composed of unique resources that cannot be easily replicated (Conner, 1991). Consequently, variations in firm size and competitive ability arise from their distinctive capabilities (Amit & Schoemaker, 1993). Peppard & Rylander (2001) further emphasized that the resource-based view theory concentrates on leveraging resources and organizational development to foster competitive advantage, value creation, and strategic management discipline. According to the theory, competitive advantage stems from the effective combination and utilization of resources, whether tangible or intangible, to support organizational objectives (Cheng et al., 2010). This perspective highlights the significance of production factors exceeding their capacity and performance, while continuously acquiring additional resources to enhance such capabilities. As a result, competitors find it challenging to comprehend and replicate these abilities (Meso & Smith, 2000). Barney

(1991) asserted that resource-based view theory underscores the role of firm-specific assets and strategic control in this context.

The development of intellectual capital leads to a competitive advantage, particularly as all competitors adapt to the digital era. By utilizing technology, companies can enhance their organizational resources in the form of skills, training, experiences, information technology systems, research, and development processes. The knowledge gained from such development can then be leveraged to improve products, services, and distribution channels in line with customer demands. Consistent with Barney's concept (1991), the resource-based view theory places emphasis on creating competitive advantages based on the skills and capabilities of organizational members. Barney (1991) also proposed that competitive advantage is contingent on effective resource management, which hinders competitors from successfully challenging the firm. Therefore, this theory focuses on understanding the relationship between intellectual capital and competitive advantage, aiming to address key questions surrounding this connection.

**3.2.3 Intellectual Capital Theory**

According to Edvinsson (1997), they are essential elements of intellectual capital theory. In addition to knowledge management, intellectual capital also encompasses the management of human capital and organizational structure to enhance the organization's strength and achieve a competitive advantage. Edvinsson (1997) emphasized that intellectual capital represents the knowledge possessed by the organization, encompassing customer experiences, technology, and professional expertise, which contribute to its competitiveness. In essence, the generation of new intellectual capital occurs through the combination and exchange of intellectual resources, which can take the form of explicit or tacit knowledge. Furthermore, four factors influencing the utilization of intellectual resources include participation, knowledge, and activities related to integration and exchange. Through a review of the literature, it becomes evident that there is substantial evidence supporting the significance of knowledge integration, exchange, and social processes.

### 3.2.4 Theoretical Framework

Based on the theoretical concepts discussed in the previous section, this study employed a cross-sectional analysis to examine the relationship between factors of intellectual capital and firm performance.

## 3.3 Research Design

### 3.3.1 Research Approach

Research is widely acknowledged as a systematic process for acquiring knowledge and comprehension of the world (Ryan, Scapens, & Theobald, 2002). The research approach can be categorized into three main types: qualitative research, quantitative research, and mixed methods research. Qualitative research aims to explain social phenomena and is often associated with the social constructivist paradigm, which emphasizes the socially constructed nature of reality. On the other hand, quantitative research employs a systematic process to gain a deeper understanding of human [1]behavior from the perspective of informants. It investigates the relationships among two or more variables, enabling researchers to predict or explain the connections and influences among these variables. However, it is important to note that there is no absolute perfection in research approaches. Each approach has its own strengths and weaknesses. In certain situations, the mixed research methods approach can be beneficial as it combines and leverages the strengths of different approaches to address specific research questions or challenges.

### 3.3.2 Quantitative Methodology

Creswell (2009) provides a definition of a viewpoint as a "general orientation about the world and research characteristics held by the researchers" (p. 6). He argues that personal beliefs or worldviews are shaped by the subject area of the research program and influence the selection of a particular methodology based on the research problems. Under a post-positivist worldview [1], knowledge is seen as something that "absolute truth can never be found" (Creswell, 2009, p.7).

1 This worldview is sometimes called the scientific method, positivist research, or empirical science.

In quantitative research, researchers are required to make claims and test theories. Therefore, it typically begins with research problems, literature, variables from previous studies, and existing theories. This differs from a social constructivist worldview, where knowledge is seen as individuals seeking to understand the world they live and work in (Creswell, 2009, p.8). Knowledge is based on individual experiences and attitudes. Qualitative researchers, in contrast, believe in the perspectives of the participants in the studied situation. The nature of the qualitative approach is different from the quantitative approach. For example, qualitative research is an exploratory process where variables are unknown, and context is crucial for generating theory. While the first two worldviews contribute to new knowledge in society, some scholars believe in another perspective that addresses marginalization. The advocacy and participatory worldview often involve politics and a political agenda.

Researchers under this worldview focus on empowerment, inequality, oppression, domination, suppression, or alienation. Both quantitative and qualitative methods can be applied within these worldviews. In this study, due to the research question regarding societal problems and the need for an accounting system and professional development, the selection of research methods is influenced by the advocacy and participatory worldview.

Qualitative research aims to explain and understand the implications of social problems (Creswell, 2009). It answers the "how" question. On the other hand, quantitative analysis focuses on examining the relationship among variables to answer questions such as how many? Who? and what is happening? In this study, the research questions seek to explore how intellectual capital influences firm performance in Thai listed companies in the service industry. Therefore, the structural equation model (SEM) technique is used to provide valuable information for explaining this phenomenon.

According to Ryan, Scapens, and Theobald (2002, p.23), the concept of a model as an abstraction of reality holds greater significance than the concept of theory. Models play a central role in advancing research programs across different disciplines. Researchers develop primary or core models, which then branch out into schools that explore specific assumptions and their variations.

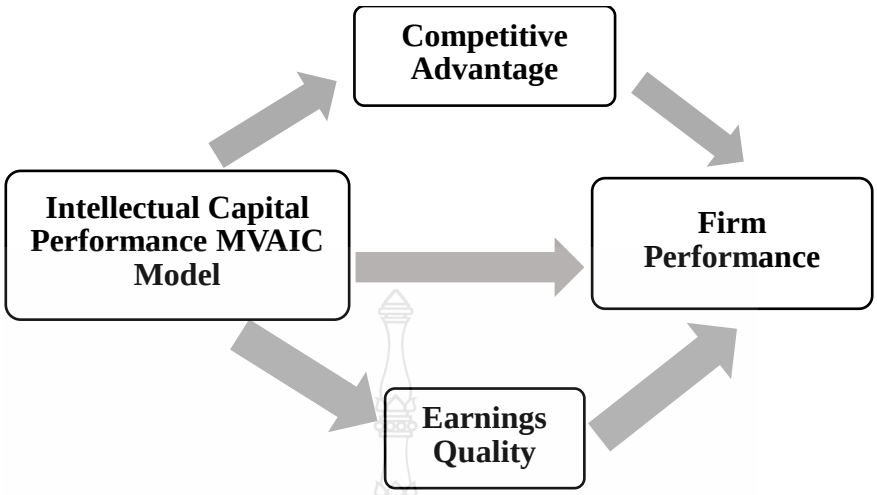



**Figure 3.1** Conceptual Model

According Figure 3.1 show that the conceptual model of intellectual capital influence on Firm performance through competitive advantage and earnings quality. The dependent variable: Firm performance such as ROE, ROA, and Tobin's Q. The study focused on independent variable: Intellectual capital, these variables were computed using the MVAIC model before being utilized in the testing model. The mediator variables included competitive advantage, and earnings quality. To reduce deviation, control variables were added, including size, age, and leverage. The conceptual Model is depicted in Figure 3.1.

**3.3.3 Population**

The research framework highlights the examination of intellectual capital, competitive advantage, earnings quality, and firm performance. This study offers valuable insights for business management and relevant stakeholders. The obtained data were publicly available on the SET website and SET database, providing accessibility to investors and interested individuals. The research primarily focused on service-based listed companies in Thailand.

**Table 3.1** Classification of Service Sector

| Type of Sector | Explanation |
|---|---|
| Commerce | Two considered factors consist of<br>- Service providers selling products in the form of retails and wholesale to consumers. It includes offline stores, such as department stores, discount store, superstore, and convenience store, and also online stores.<br>- Products must be final products for end users. |
| Health Care Services | Medical service providers, dentists, cosmetic surgery, rehabilitation, and other physical fitness. |
| Media & Publishing | Media producers and distributors:<br>• Medias including<br>- Entertainment, such as music, movies, dramas, entertainment programs, including cinemas, and theatres.<br>- Broadcasters, radio and television station<br>- Advertisement producer<br>• Publishing, such as printing houses, publishers and producers of journals, newspapers, and other publications. |
| Professional Services | Specialized service providers that are unlisted in any sector, such as education, business consulting, waste treatment provider, including ad hoc service providers that are not classified in any sector. |
| Tourism & Leisure | It consists of<br>• Hotel and temporary residence operators, and travel service providers, such as travel agencies.<br>• Business operators of places for relaxation, recreation, excursions, such as zoos, entertainment venues, exercise facilities, and sports fields. |
| Transportation & Logistics | It consists of • Transportations, such as air freight (airports, airlines), sea freight (ports, shipping companies), rail and other land transport, and complete consignees.<br>• warehousing services, and other relevant services. |

Source: SET (2021)

Table 3.1 presents the population of listed companies between 2019 and 2020. All sectors under the services industry were included in the research except the companies in the process of rehabilitation and companies with unavailable information not complete, were also excluded in this research. Therefore, research sampling for this study remained only 114 firms. The company in this study is presented in table 3.2 as follows:

**Table 3.2** Sample in Financial Statement Research in 2019-2020

| Description | Number of firms |
|---|---|
| The companies listed in service industry on the Stock Exchange of Thailand (2019-2020) | 229 |
| Excluded companies: | |
| - Companies under rehabilitation | 2 |
| - Companies with unavailable information | 49 |
| - Outlier data | 64 |
| Final samples | 114 |

### 3.4 Research Variables and Measurement

This research employed four groups of research variables such as intellectual capital, competitive advantage, earnings quality, and firm performance.

#### 3.4.1 Intellectual Capital Variable

Accurate and reliable research tools are crucial for gathering, measuring, and analyzing information effectively. They also contribute to drawing appropriate conclusions and enhancing the research's overall impact. In this study, secondary data was collected from the SET database (SETSMART database), which provides access to financial information of listed companies in Thailand. As mentioned in Chapter 2, the measurement used in this research was based on (Ulum et al., 2014). Therefore, the MVAIC model was also applied in this study.

According to the MVAIC model, it consists of four components: human capital efficiency (HCE), structural capital efficiency (SCE), relational capital efficiency

(RCE), and capital employed efficiency (CEE). Each component is calculated separately before being added together. (As the formula, MVAIC = HCE + SCE + RCE + CEE)

**Table 3.3** MVAIC Variables and Measurement

| Variables | Symbol | Measurement |
|---|---|---|
| *Independent Variable* | | |
| -Human Capital Efficiency | *HCE* | VA/HC |
| -Structural Capital Efficiency | *SCE* | SC/VA |
| -Relational Capital Efficiency | *RCE* | RC/VA |
| -Capital Employed Efficiency | *CEE* | VA/CE |
| MVAIC model | *MVAIC* | Total intellectual capital efficiency |

Where:

$VA$= Value-Added (operating profit + employee expenditures + depreciation + amortization)

$HC$ = Human Capital (total salaries and wages)

$SC$ = Structural Capital (VA - HC)

$RC$ = Rational Capital (marketing cost, and costs distribution channel and network

$CE$ = Capital Employed (book value of total assets)

### 3.4.2 Competitive Advantage

According to the concepts of competitive advantage (CA) developed by (Porter, 1985), competitive advantage encompasses several characteristics, such as being continuous, sustainable, and offering long-term stability. It relies on differentiation and excellence, along with future prospects. It is suggested that governments and businesses should implement policies to create high-quality products and sell them at premium prices in the market. By leveraging their resources, they can maintain an international competitive advantage. Furthermore, competitive advantage serves as a vital source for knowledge and skills development, leading to enhanced organizational efficiency and effectiveness.

The foundation of an organization's competitive advantage lies in knowledge, driven by a learning organization that fosters innovation. This advantage can manifest in various ways. Cost leadership entails producing goods at lower costs than competitors, while differentiation focuses on offering unique products or services. Another factor is

quick response, which involves rapid development, decision-making, and direct customer responsiveness (Hill & Jones, 1992). Additionally, Porter (1985) identifies three primary sources for competitive advantage strategies: cost leadership strategy, differentiation strategy, and focus strategy. These sources form the core themes for designing competitive strategies within business organizations, taking into account the surrounding environmental conditions.

The concept of competitive advantage encompasses various strategies aimed at cost reduction or sales increase, which are crucial variables in calculating business profits. A business with high competitiveness experiences enhanced revenue growth (Clarke et al., 2011). Revenue growth rate has been identified as a measure of competitive advantage, and it is influenced significantly by intellectual capital, as demonstrated by the VAIC ™ (Value Added Intellectual Coefficient) framework. Revenue growth serves as an essential indicator for effectively measuring a business's competitive advantage. Consequently, revenue growth was included as a variable, calculable using the following formula in this study.

**Table 3.4** Competitive Advantage Variable and Measurement

| Variables | Symbol | Measurement |
|---|---|---|
| *Mediator Variable* | | |
| -Revenues Growth | *RG* | $\frac{Total\ Net\ Sales_t - Total\ Net\ Sales_{t-1}}{Total\ Net\ Sales_{t-1}}$ |

### 3.4.3 Earnings Quality

The concepts of earnings quality (EQ) were introduced by Dechow et al. (2010) to describe a company's reported financial performance, providing valuable information for decision-making by users of financial statements. Earnings quality is a significant and critical aspect that garners attention throughout the financial reporting process (Menicucci, 2019). Previous studies have extensively explored the evaluation of EQ in financial reporting, considering factors such as changes over time and various elements like corporate governance schedules, enforcement systems, and accounting standards within or across

countries. Numerous studies have focused on examining the impact of adopting IAS/IFRSs, as they are believed to enhance the representation of accounting quality conceptually. This, in turn, instills stakeholders' confidence in the agency theory, ensuring internal due diligence within the entity to safeguard shareholders' interests. It is important to note that direct observation of earnings management is not feasible. Consequently, the study focused on exploring two approaches to earnings management: Alternative Accounting Methods and Accrual Management (Alareeni & Aljuaidi, 2014). According to DuCharme, Malatesta, & Sefcik (2001), the accrual model is widely employed as it encompasses revenue management techniques aimed at evading detection by financial statement users. Accrual management not only encompasses the selection of accounting methods but also considers the timing of revenue and expense recognition, asset write-offs, and adjustments in accounting estimates.

Based on the literature review in Chapter 2, multiple approaches to measure earnings quality and earnings management were identified, including the approaches developed by Healy (1985), DeAngelo (1986), Sloan (1996), Jones (1991), Dechow et al. (1995), Dechow & Sloan (1991), and Francis et al. (2005). However, the Modified Jones Model is the chosen method in this study. This model is widely utilized to assess open items in earnings management. It examines how open items originating from normal operations can better reflect performance in financial statements and identifies accrual items influenced by management's discretion, thus enabling the evaluation of earnings quality and conservatism in financial reporting disclosures. Previous research indicates that the Modified Jones Model provides the most robust examination of earnings management compared to the models proposed by Healy (1985), Deangelo (1986), and Jones (1991) (Alareeni & Aljuaidi, 2014). This research explores the growth of corporate revenues by examining the increase in revenue derived from normal operations and accounting policies based on revenue recognition principles aligned with the adopted accounting standards in 2019. Furthermore, the researcher investigates the impact of outstanding items resulting from management discretion on the company's earnings quality.

The following formula can be used to calculate earnings quality.

**Table 3.5** Earnings Quality Variable and Measurement

| Variables | Symbol | Measurement |
|---|---|---|
| *Mediator Variable* | | |
| - Discretionary Accruals | *DA* | $DA_{it} = \frac{TA_{it} - NDA_{it}}{A_{it}}$ |

Where:

$DA_{it}$ = Firm i's Discretionary Accruals from in year t.

$TA_{it}$ = Firm I's total accruals in year t;

$NDA_{it}$ = Firm i's non-Discretionary Accruals in year t;

$A_{it}$ = Firm i's total asset in year t

Source: Mojtahedi (2013); Sarea & Alansari (2016)

### 3.4.4 Firm Performance Variable

The dependent variables in this study were firm performance. Several measures were used to explain firm performance as mentioned in Chapter 2, for example, market share, reputation and image, customer satisfaction, cost reduction, net profit, earning per share, return on investment, return on assets, return on equity and Tobin's Q. These measures vary from an implementation point of view. This research decided to use return on assets and return on equity to be the representative of financial perspective. These two variables reflect the financial performance of the companies. While Tobin's Q was used for marketing perspective.

**Table 3.6** Firm Performance Variables and Measurement

| Variables | Symbol | Measurement |
|---|---|---|
| ***Dependent Variable*** | | |
| - Return on Assets | ***ROA*** | $\frac{\text{Profit (Loss) before Interest and Income Tax Expense)}}{Total\ Assets\ (average)}\ x\ 100$ (Aras, Aybars, & Kutlu, *2010*;SET, 2021) |
| - Return on Equity 0 | ***ROE*** | $\frac{Net\ Profit\ (Loss)}{Total\ Shareholder's\ Equity\ of\ the\ parent\ company\ (average)}\ x\ 100$ (Aras et al., 2010; Ashley, De Brine, Lehr, & Wilde, 2007;SET, 2021) |
| -Tobin's Q | ***TBQ*** | $\frac{MVE + PS + DEBT}{TA}$ Where MVE is the product of stable share price and the outstanding number of common shares, PS is the liquidation value of the company's exclusive preference shares, and DEBT is the company's short-term liabilities net of its short-term assets added to the book value of the company's long-term debt, TA is the book value of the company's total assets (Antonio et al., 2019;SET, 2021) |

### 3.4.5 Control Variable

Literature reviews have indicated that earnings quality, specifically discretionary accrual, is influenced by various factors (Alareeni & Aljuaidi, 2014). To provide a clearer understanding of the impact of discretionary accrual on firm performance, this study incorporates control variables. The control variables include firm size, firm age, and leverage. Similarly, these control variables are also considered in the examination of competitive advantage, specifically revenue growth, due to the influence of several factors on revenue growth.

**Table 3.7** Control Variables and Measurement

| Variables | Symbol | Measurement |
|---|---|---|
| *Control Variable* | | |
| - Firm Size | *LnSIZE* | Logarithm of total assets of the firm (Beekes & Brown, 2006; Brown & Caylor, 2009; Idris et al., 2020) |
| - Firm Age | *AGE* | The number of years the firm has been listed on the SET (year) (Ariff et al., 2016; Idris et al., 2020) |
| - Leverage | *LEV* | $\frac{\text{Total Debt}}{\text{Total Assets}} * 100$ (Ariff et al., 2016; Idris et al., 2020;Magnanelli & Izzo, 2017) |

### 3.5 Data Collection

The data for this research were collected from secondary source. SET Market Analysis and Reporting Tools (SETSMART) is the main source of data collection. The SETSMART provides basic financial information including financial reporting of Thai listed company. The data on firm performance (such as ROA and ROE), revenue, and intellectual capital expenditure were available in financial reports of listed company in Thailand. Some variables (such as MVAIC, Tobin's Q, and Discretionary Accrual) are not disclosed on the SETSMART. Therefore, basic information (such as operating profit, employee costs, depreciation, amortization, costs distribution channel and network, salary and wages) collected form financial reporting will be calculated by the researcher, using the formula as mentioned in the research variables and measurement section.

#### 3.5.1 Descriptive Statistics

Descriptive statistics serve the purpose of capturing key characteristics of quantitative data collection. They differ from inferential statistics, as descriptive statistics aim to summarize a quantitative data set without relying on probability formulas, while inferential statistics utilize data to draw inferences about the represented

population. In this research, specific descriptive statistics used to analyze data included mean, median, standard deviation, skewness and kurtosis. These analyzed were can data using Statistical Package for the Social Sciences (SPSS) Version 26.

**3.5.2 Inferential Statistics**

Inferential statistics involves the utilization of statistical analysis on a representative sample data to make references to the population. It relies on inferential probability theory, which encompasses estimation and hypothesis testing, enabling the application of analysis outcomes to infer population characteristics.

3.5.2.1 Correlation Analysis

The statistical analysis utilized in this study to examine the relationship between multiple variables, with one dependent variable, is analytic statistics specifically related to SEM analysis. To ensure the validity of the data, several checks were conducted. Firstly, outlier data were examined to assess the data's suitability for analysis, regardless of whether the variables exhibited linear relationships or not. Scatter plots, which graphically depict the relationship between two variables, were employed as a common method for data validation. Additionally, the researchers examined the normality of the dependent variable and its deviation. Skewness and kurtosis were used to derive the settings for the dependent variable and its deviation based on the normality variable.

Correlation analysis was performed to evaluate the presence of multicollinearity among all variables. According to (Hair, 2009), multicollinearity becomes evident when the correlation between explanatory variables exceeds 0.80. In such cases of high multicollinearity, the interpretation of individual variables becomes complex due to their interdependence. Nevertheless, in the analysis, it can still be described (Hair, 2009). Furthermore, Pearson correlation was employed to measure the relationships among the variables.

3.5.2.2 Structure Equation Modeling (SEM)

According to Makki & Lodhi (2014), path analysis involves intricate models with multiple endogenous and exogenous indicators. This study aims to measure the direct or indirect influence of intellectual capital on firm performance through revenue growth and discretionary accruals. The fit of the model, which determines whether the sample data

support the specified model, will be assessed. Various goodness-of-fit statistics will be utilized to evaluate and compare different path models. To ensure comprehensive evaluation, (Kline, 2015) recommended employing at least four tests: Goodness of Fit Index (GFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), Adjusted Goodness of Fit Index (AGFI), and Root Mean Square of Error Approximation (SRMR).

Statistical analysis pertaining to multiple regression analysis is employed in the study to examine the relationship between two or more variables, with one variable acting as the dependent variable. In assessing the suitability of the data for the analysis of multiple relationships, the tests were conducted as follows:

(1) Relative chi-square ratio is the ratio between chi-square value and degree of freedom (df) (Hair et al., 2010). If relative chi-square values are not more than 2, theoretical models are consistent with empirical data (Hair et al., 2010).

(2) Chi-square statistics measure the difference between variance matrixes and covariance matrixes between empirical data and models created by researchers. If the square value is statistically significant, models created from theory and empirical data are inconsistent. On the other hand, case models created from theory and empirical data are inconsistent. Therefore, square values must be statistically insignificant ($p > 0.05$). Thus, structural equation models were identified to be consistent with empirical data (Hu & Bentler, 1999).

(3) The Fit index uses chi-squared values to measure the consistency of empirical data with research hypotheses:

- Goodness of Fit Index (GFI) represents the amount of variance and covariance described by the model. Goodness of fit index (GFI) values should be greater than 0.90 to confirm that theoretical models are consistent with empirical data (Diamantopoulos, Siguaw, & Cadogan, 2000).

- Adjusted Goodness of Fit Index (AGFI) represents the variance and covariance by adjusting it with degrees of freedom (df). The adjusted goodness of fit index (AGFI) value should be greater than 0.90 to confirm that the theoretical model is consistent with (Diamantopoulos, Siguaw, & Cadogan, 2000).

- Comparative Fit Index (CFI) compares the consistency of research models with empirical models. The comparative fit index (CFI) value is between 0 and 1. However, comparative Fit Index (CFI) should be greater than 0.90 ( Hair et al., 2010).

- Normed Fit Index (NFI) compares subjects with a route estimate between observable variables and phantom variables that are more consistent than subjects without estimating observable variables, phantom variables, and empirical data. The normed fit Index (NFI) should be greater than 0.90 (Diamantopoulos, Siguaw, & Cadogan, 2000).

(4) Root Mean Square of Error Approximation (RMSEA) represents the average differences in degrees of freedom. Thus, the root mean square of error approximation (RMSEA) value of a consistent model should be closer to zero. In 27 addition, root mean square of error approximation (RMSEA) should be set below 0 to confirm that theoretical models are consistent with the empirical data (Diamantopoulos, Siguaw, & Cadogan, 2000).

(5) Root Mean Square Residual (RMR) is the mean of errors resulting from comparing matrices of variance and covariance between research hypotheses models as expected. Browne & Cudeck (1993) suggested that the accepted value should not be more than 0.08.

**3.6 Data Processing and Analysis**

**3.6.1 Normality Testing**

The purpose of normality testing is to determine the distribution of the dataset. Skewness and kurtosis are two common indicators used to assess normality. According to Curran, West, & Finch (1996), if the skewness exceeds three, the data is asymmetric or skewed. A kurtosis greater than 10 indicates a problem with the data's normal distribution, while a kurtosis exceeding 20 suggests a more severe issue. In this study, the normality of the sample was examined using skewness and kurtosis values. The skewness ranged from 0.91 to -0.28, while the kurtosis ranged from 0.92 to -0.96, as shown in Table 4.1. These values indicate normality in the data. Additionally, Vanichbuncha (2013) suggested that a skewness value between -1 and +1 is indicative of a normal distribution. Based on this criterion, the data were

found to be normally distributed and subsequently analyzed using a structural equation model.

### 3.6.2 Data Transformations

Data transformations were employed to modify variables in accordance with the analysis requirements. For instance, log conversion was utilized for adjusting the size of the company to achieve an approximately normal distribution and to mitigate the size disparity among companies of vastly different sizes (Hair et al., 2017). These transformations were performed using the "Compute Variable" function in the Statistical Package for the Social Sciences (SPSS), applying the base logarithm to numeric variables that are greater than 0 and numeric in nature. Additionally, in this study, the absolute value of discretionary accruals was transformed, serving an inverse measure of earnings quality. The "Compute Variable" function was utilized with the "abs" function, considering that the numeric values must be numeric in nature. Consequently, discretionary accruals were employed as a measure of earnings quality, and the findings indicate that a higher absolute value of discretionary accruals indicates lower earnings quality (Fakhfakh & Jarboui, 2020; Raman & Shahrur, 2008).

**Table 3.8** Goodness-of-Fit Indices

| **Goodness-of-fit** | | **Acceptable Level Value** | **Reference** |
|---|---|---|---|
| Chi-square/ df | CMIN/df | < 3 | (Hair et al., 2010) |
| P-value of Chi-square | p-value | >0.05 | (Hu & Bentler, 1999) |
| Root Mean Square Residual | RMR | < 0.05 | (Browne & Cudeck, 1993) |
| Goodness of Fit Index | GFI | >0.90 | (Diamantopoulos et al., 2000) |
| Adjust Goodness of Fit Index | AGFI | >0.90 | (Diamantopoulos et al., 2000) |
| Comparative Fit Index | CFI | >0.90 | (Hair et al., 2010) |
| Norm Fit Index | NFI | >0.90 | (Diamantopoulos et al., 2000) |
| Root Mean Square Error Of Approximation | RMSEA | <0.05 | (Diamantopoulos et al., 2000) |

### 3.6.3 Hypothesis and Model

This study examines the influence of Intellectual Capital on firm performance through competitive advantage and earnings quality using SEM analysis.

**1) Model Test: Influence of Intellectual Capital on Firm Performance**

The first hypothesis is to examine the relationship between intellectual capital and firm performance:

H1a: Intellectual capital (MVAIC) has a positive influence on return on equity (ROE).

H1b: Intellectual capital (MVAIC) has a positive influence on return on assets (ROA).

H1c: Intellectual capital (MVAIC) has a positive influence on Tobin's Q (TBQ).

**2) Model Test: Influence of Intellectual Capital on Competitive Advantage**

The second hypothesis is to examine the relationship between influence of intellectual capital and the competitive advantage:

H2: Intellectual capital (MVAIC) has a positive influence on competitive advantage.

**3) Model Test: Influence of Competitive Advantage on Firm Performance**

The third hypothesis is to examine the relationship between the influence of competitive advantage and firm performance:

H3a: Revenue growth (RG) has a positive influence on return on equity (ROE).

H3b: Revenue growth (RG) has a positive influence on return on assets (ROA).

H3c: Revenue growth (RG) has a positive influence on Tobin's Q (TBQ).

**4) Model Test: Competitive Advantage as a Mediating Variable Indirectly Influences Intellectual Capital Towards Firm Performance**

The fourth hypothesis is to examine the competitive advantage as a mediating variable that indirectly influences intellectual capital towards firm performance:

H4a: Revenue growth (RG) as a mediating variable indirectly influences intellectual capital (MVAIC) towards return on equity (ROE).

H4b: Revenue growth (RG) as a mediating variable indirectly influences intellectual capital (MVAIC) towards return on assets (ROA).

H4c: Revenue growth (RG) as mediating variable indirect influences intellectual capital (MVAIC) towards Tobin's Q (TBQ).

**5) Model Test: Influence of Intellectual Capital on Earnings Quality**

The fifth hypothesis is to examine the relationship between intellectual capital and earnings quality:

H5: Intellectual capital (MVAIC) positively influences earnings quality.

**6) Model Test: Influence of Earnings Quality on Firm Performance**

The sixth hypothesis is to examine the relationship between earnings quality and firm performance:

H6a: Earnings quality positively influence return on equity (ROE).

H6b: Earning quality positively influence return on assets (ROA).

H6c: Earnings quality positively influence Tobin's Q (TBQ).

**7) Model Test: Earnings Quality as a Mediating Variable Indirectly Influences Intellectual Capital Towards Firm Performance**

The seventh hypothesis is to examine the earnings quality as a mediating variable that indirectly influences intellectual capital towards firm performance.

H7a: Discretionary accruals (DA) as a mediating variable indirectly influences intellectual capital (MVAIC) towards Return on Equity (ROE).

H7b: Discretionary accruals (DA) as a mediating variable indirectly influences intellectual capital (MVAIC) towards Return on Assets (ROA).

H7c: Discretionary accruals (DA) as a mediating variable indirectly influences intellectual capital (MVAIC) towards Tobin's Q (TBQ).

**8) Model Test: Competitive Advantage and Earnings Quality as Mediating Variables Indirectly Influence Intellectual Capital (MVAIC) Towards Firm Performance**

The eighth hypothesis is to examine the competitive advantage and earnings quality as mediating variables that indirectly influence intellectual capital (MVAIC) towards firm performance.

H8a: Revenue growth (RG) and discretionary accruals (DA) are mediating variables that indirectly influence intellectual capital (MVAIC) towards return on equity (ROE).

H8b: Revenue growth (RG) and discretionary accruals (DA) are mediating variables that indirectly influence intellectual capital (MVAIC) towards return on assets (ROA).

H8c: Revenue growth (RG) and discretionary accruals (DA) are mediating variables that indirectly influence intellectual capital (MVAIC) towards Tobin's Q (TBQ).

### 3.7 The Mediator Variables

A mediator variable serves as a conduit through which the effects of an independent variable are transmitted to the dependent variable. It plays a crucial role in comprehending the intricate relationship between the independent and dependent variables. Exploring the mediator variable in this study proves highly valuable as it facilitates a clear explanation of the causal relationship from the independent variable to the dependent variable.

Investigating the mediating influence through regression analysis provides a framework for examining the mediation effect. The mediator variables must satisfy the three conditions depicted in Figure 3.2.

The examination of the mediation effect of competitive advantage and earnings quality on intellectual capital and firm performance was conducted. Three main types of simple mediation were considered: 1. full mediation, 2. partial mediation, and 3. direct effect.

The Baron & Kenny (1986) method provides a framework for testing mediation and outlines specific conditions that must be met:

Step 1: Assess the association between X and Y.

There must be a significant causal relationship between X and Y.

Step 2: Examine the relationship between X and M.

There must be a significant causal relationship between X and M.

Step 3: Investigate the relationship between M and Y.

There must be a significant causal relationship between M and Y.

If any of these conditions are not met, mediation cannot be established. If all three conditions are met, the next step involves controlling for the mediator and examining the causal impact of X on Y.

Step 4: Test the mediator by including it in the analysis and re-running the tests.

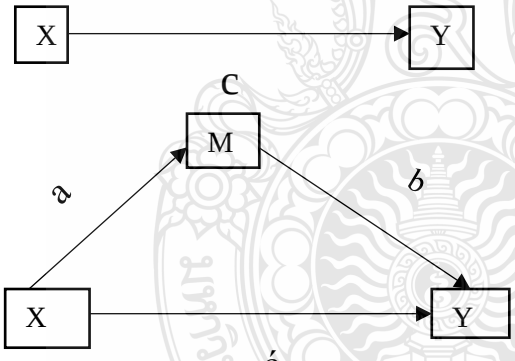
The determination of the mediation variable was based on the following conditions depicted in Figure 3.2.

The mediation paths are expressed as follows:

(1) Total effect (C) = c’ +ab

(2) Indirect effect (ab) = c – c’

(3) Direct effect (c’) = c – ab




**Where:** a = Indirect Effect X ⟶ M

b = Indirect Effect M ⟶ Y

ć = Direct Effect X ⟶ Y

**Figure 3.2** Direct and Indirect Effect of X on Y

Source: Baron & Kenny (1986); Hayes (2009)

In the statistical mediation analysis, the model was tested using the procedure outlined by Baron & Kenny (1986). Full mediation occurs when the direct effect is not significant upon adding the mediator, while the indirect effect is significant. Partial

mediation occurs when both the direct and indirect effects of the independent and dependent variables are significant. Lastly, the direct effect is observed when the indirect effect is not significant, but the direct effect is significant (Hair, 2009).

### 3.8 Conclusion

This chapter outlines the research methodologies employed in this study. Firstly, the conceptual framework is presented, along with the identified population and samples. The population for this study consisted of listed companies in the service industry on the stock exchange in Thailand. Data collection involved gathering information on independent variables such as intellectual capital, as well as mediating variables like competitive advantage and earnings quality, while firm performance served as the dependent variable. This quantitative research utilized data obtained from financial statements within the annual reports available on SETSMART online websites. The methodology employed in this study provides support for the findings and research results discussed in the subsequent chapters.

# CHAPTER 4
# RESEARCH RESULTS

## 4.1 Introduction

This chapter presents the results of the study, including descriptive and inferential statistics. Descriptive statistics encompassed measures such as minimum, mean, median, standard deviation, skewness, and kurtosis. Inferential statistics involved correlation and path analysis, employing structural equation modeling. A total of fourteen models were examined and reported in this chapter, namely: Model 1, which focused on the influence of intellectual capital on firm performance; Model 2, which explored the influence of intellectual capital on competitive advantage; Model 3, which examined the influence of competitive advantage on firm performance; Model 4, which investigated the mediating role of revenue growth (RG) in the indirect influence of intellectual capital (MVAIC) on return on equity (ROE); Model 5, which explored the mediating role of revenue growth (RG) in the indirect influence of intellectual capital (MVAIC) on return on assets (ROA); Model 6, which studied the mediating role of revenue growth (RG) in the indirect influence of intellectual capital (MVAIC) on Tobin's Q (TBQ); Model 7, which focused on the influence of intellectual capital on earnings quality; Model 8, which examined the influence of earnings quality on firm performance; Model 9, which explored the mediating role of earnings quality in the indirect influence of intellectual capital on firm performance; Model 10, which investigated the mediating role of discretionary accruals (DA) in the indirect influence of intellectual capital (MVAIC) on return on assets (ROA); Model 11, which explored the mediating role of discretionary accruals (DA) in the indirect influence of intellectual capital (MVAIC) on Tobin's Q (TBQ); Model 12, which examined the mediating role of revenue growth (RG) and discretionary accruals (DA) in the indirect influence of intellectual capital (MVAIC) on return on equity (ROE); Model 13, which studied the mediating role of revenue growth (RG) and discretionary accruals (DA) in the indirect influence of intellectual capital (MVAIC) on return on assets (ROA); and finally, Model 14, which explored the mediating role of revenue growth (RG) and discretionary accruals (DA) in the indirect influence of intellectual capital (MVAIC) on Tobin's Q (TBQ).

**4.2 Descriptive Statistics**

Descriptive statistics are briefly presented a summary of dataset, which represent overview of a sample of a population. Table 4.1 reported the descriptive statistics of data consisting of minimum, maximum, mean, standard deviation, skewness and kurtosis for all variables between 2019 and 2020.

Regarding the independent variable, intellectual capital (MVAIC) had an average value of 4.97, with a minimum of 0.15 and a maximum of 11.37. The standard deviation (S.D.) was 2.72. Skewness was 0.63, and kurtosis was -0.49.

Regarding the moderating variables, we can summarize competitive advantage and earnings quality as follows. Competitive advantage was assessed through Revenue Growth (RG), with an average value of -0.04. The minimum and maximum values were -0.49 and 0.39, respectively. The standard deviation (S.D.) for revenue growth (RG) was 0.17. Skewness was -0.26, and kurtosis was -0.22. Earnings quality was measured using discretionary accruals (DA), with an average absolute value of 0.48. The minimum and maximum values were 0.01 and 1.43, respectively. The standard deviation (S.D.) for DA was 0.30. Skewness was 0.38, and kurtosis was -0.39.

In terms of the dependent variables, we can summarize firm performance measured by return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) as follows. Firstly, the average value for Return on Equity (ROE) was 7.92, with a minimum of -24.68 and a maximum of 32.05. The standard deviation (S.D.) for Return on Equity (ROE) was 10.88. Skewness was -0.28, and kurtosis was 0.92. Secondly, return on assets (ROA) had an average value of 6.67, ranging from -10.79 to 28.06. The standard deviation (S.D.) for return on assets (ROA) was 7.01. Skewness was 0.44, and kurtosis was 0.52. Finally, Tobin's Q (TBQ) had an average value of 1.8, with a minimum of 0.29 and a maximum of 4.66. The standard deviation (S.D.) for Tobin's Q (TBQ) was 1.07. Skewness was 1.00, and kurtosis was -0.02.

Regarding the controllable variables, we can summarize firm size, age, and leverage as follows. Firstly, the average value of firm size (LnSize) was 26891882.10, ranging from a minimum of 533898.97 to a maximum of 52334329.70. The standard deviation (S.D.) for firm size (LnSize) was 73802853.94. Skewness was 4.68, and kurtosis was 24.27econdly, firm age (AGE) had an average value of 30.28, with a

minimum of 1.00 and a maximum of 65.00. The standard deviation (S.D.) for firm age (AGE) was 14.24. Skewness was -0.04, and kurtosis was -0.17. Finally, leverage (LEV) had an average value of 0.40, with a minimum of 0.03 and a maximum of 0.80. The standard deviation (S.D.) for LEV was 0.19. Skewness was 0.08, and kurtosis was -0.96.

Based on a descriptive statistical analysis, it was observed that the control variable's size exhibited a non-normal distribution. Consequently, it was converted through the application of the logarithm transformation to SIZE, resulting in a normal distribution of the size variable in Table 4.2 as shown below:

**Table 4.1** Descriptive Statistics (114 firms)

| | N | Min | Max | Mean | Std. Deviation | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|
| *MVAIC* | 114 | 0.15 | 11.37 | 4.97 | 2.72 | 0.63 | -0.49 |
| *RG* | 114 | -0.49 | 0.39 | -0.04 | 0.17 | -0.26 | -0.22 |
| *DA* | 114 | 0.01 | 1.43 | 0.48 | 0.30 | 0.38 | -0.39 |
| *ROE* | 114 | -24.68 | 32.05 | 7.92 | 10.88 | -0.28 | 0.92 |
| *ROA* | 114 | -10.79 | 28.06 | 6.67 | 7.01 | 0.44 | 0.52 |
| *TBQ* | 114 | 0.29 | 4.66 | 1.80 | 1.07 | 1.00 | -0.02 |
| *SIZE* | 114 | 533898.97 | 52334329.70 | 26891882.10 | 73802853.94 | 4.68 | 24.27 |
| *AGE* | 114 | 1.00 | 65.00 | 30.28 | 14.24 | -0.04 | -0.17 |
| *LEV* | 114 | 0.03 | 0.80 | 0.40 | 0.19 | 0.08 | -0.96 |

**Where:** MVAIC= Intellectual capital, DA = Absolute of value in discretionary accruals, RG= Revenue growth, ROE = Return on equity, ROA= Return on assets, TBQ = Tobin’s Q, Size= firm size, AGE= the number of year companies, LEV= Leverage.

Table 4.2 presents the analysis of total assets, which requires a transformation to achieve a smaller value for comparison purposes. To address this, the logarithm method (Vanichbuncha, 2013) was applied to convert the data. After applying the logarithmic transformation log10 (SIZE), the firm size exhibited a normal distribution. The variable (SIZE) displayed a minimum value of 13.19, a maximum value of 20.08, an average value of 15.61, a standard deviation of 1.55, a skewness of 0.76, and a kurtosis of 0.19. These results are presented in Table 4.2 as follows:

**Table 4.2** Descriptive Statistics (Data Screening and Transformation) log *LnSIZE*

| | N | Min | Max | Mean | Std. Deviation | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|
| *MVAIC* | 114 | 0.15 | 11.37 | 4.97 | 2.72 | 0.63 | -0.49 |
| *RG* | 114 | -0.49 | 0.39 | -0.04 | 0.17 | -0.26 | -0.22 |
| *DA* | 114 | 0.01 | 1.43 | 0.48 | 0.30 | 0.38 | -0.39 |
| *ROE* | 114 | -24.68 | 32.05 | 7.92 | 10.88 | -0.28 | 0.92 |
| *ROA* | 114 | -10.79 | 28.06 | 6.67 | 7.01 | 0.44 | 0.52 |
| *TBQ* | 114 | 0.29 | 4.66 | 1.80 | 1.07 | 1.00 | -0.02 |
| *LnSIZE* | 114 | 13.19 | 20.08 | 15.61 | 1.55 | 0.76 | 0.19 |
| *AGE* | 114 | 1.00 | 65.00 | 30.28 | 14.24 | -0.04 | -0.17 |
| *LEV* | 114 | 0.03 | 0.80 | 0.40 | 0.19 | 0.08 | -0.96 |

**Where:** MVAIC= Intellectual capital, DA = Absolute of value in discretionary accruals, RG= Revenue growth, ROE = Return on equity, ROA= Return on assets, TBQ = Tobin's Q, LnSize= Natural log of firm size, AGE= the number of year companies, LEV= Leverage.

### 4.3 Analysis and Correlation Matrix

The Pearson correlation coefficient, as discussed by Devore & Peck (1993), provides insight into the strength of the correlation between variables. When two variables exhibit a high correlation, the correlation values tend to be less than -0.80 or greater than 0.80. In cases of moderate correlation, the values typically fall between -0.50 to -0.80 or 0.50 to 0.80. Conversely, if the correlation between two variables is low, the values should range between -0.50 and 0.50. Thus, it can be concluded that the study variables demonstrate an acceptable level of relationship without encountering issues related to multicollinearity. The information is presented in Table 4.3 as follows:

**Table 4.3** Results of Correlations Matrix

| | ***MVAIC*** | ***RG*** | ***DA*** | ***ROE*** | ***ROA*** | ***TBQ*** | ***LnSize*** | ***AGE*** | ***LEV*** |
|---|---|---|---|---|---|---|---|---|---|
| ***MVAIC*** | 1 | | | | | | | | |
| ***RG*** | 0.225* | 1 | | | | | | | |
| ***DA*** | -0.322** | 0.402** | 1 | | | | | | |
| ***ROE*** | 0.276** | 0.507** | 0.213* | 1 | | | | | |
| ***ROA*** | 0.234* | 0.463** | 0.209* | 0.906** | 1 | | | | |
| ***TBQ*** | 0.062 | 0.186* | 0.238* | 0.602** | 0.533** | 1 | | | |
| ***LnSize*** | 0.114 | 0.061 | -0.066 | 0.118 | -0.015 | 0.129 | 1 | | |
| ***AGE*** | -0.026 | -0.151 | -0.117 | -0.013 | 0.045 | -0.110 | 0.026 | 1 | |
| ***LEV*** | 0.015 | 0.168 | 0.035 | -0.099 | -0.267** | -0.145 | 0.564** | -0.103 | 1 |

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

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

Table 4.3 illustrates the Pearson correlation coefficients, which provide insights into the strength and direction of the relationships among one independent variable, two mediating variables, three dependent variables, and three control variables. Upon examining these coefficients, it was noted that the values varied from -0.322 to 0.906, indicating a weak and mediate level of inter-relationship between each pair of variables. Regarding the statement you provided, it suggests that the relationship between ROA (Return on Assets) and ROE (Return on Equity) has been explored using data obtained from the SETSMART formula used for calculation.

However, it is crucial to consider the presence of other independent variables in the analysis. Thus, the relationships between the variables can be elucidated as follows:

(1) The revenue growth (RG) variable had the relationship in the positive direction as the intellectual capital (MVAIC) variable with a correlation value of 0.225 *. Therefore, this indicated that the relationship between revenue growth (RG) and intellectual capital (MVAIC) variable was low but statistically significant at the 0.05 level.

(2) The discretionary accruals (DA) variable had the relationship in the negative direction with the intellectual capital (MVAIC) variable with the correlation value of -0.322**. Therefore, this indicated that the relationship between discretionary accruals (DA) and intellectual capital (MVAIC) was low but statistically significant at the 0.01 level.

(3) Return on Equity (ROE) variable had the relationship in the positive direction as the intellectual capital (MVAIC) variable with the correlation value of 0.276**. Therefore, this indicated that the relationship between Return on Equity (ROE) and intellectual capital (MVAIC) was low but statistically significant at the 0.01 level.

(4) Return on assets (ROA) variable had the relationship in the positive direction as the intellectual capital (MVAIC) variable with the correlation value of 0.234*. Therefore, this indicated that the relationship between return on assets (ROA) and intellectual capital (MVAIC) was low but statistically significant at the 0.05 level.

(5) Revenue growth (RG) variable had the relationship in the positive direction with the discretionary accruals (DA) variable with the correlation value of 0.402**.

Therefore, this indicated that the relationship between revenue growth (RG) and discretionary accruals (DA) variable was low but statistically significant at the 0.01 level.

(6) Revenue growth (RG) variable had the relationship in the positive direction as the Return on Equity (ROE) variable with the correlation value of 0.507**. Therefore, this indicated that the relationship between revenue growth (RG) and the Return on Equity (ROE) variable were moderately and statistically significant at the 0.01 level.

(7) Revenue growth (RG) variable had the relationship in the positive direction as the return on assets (ROA) variable with the correlation value of 0.463**. Therefore, this indicated that the relationship between revenue growth (RG) and return on assets (ROA) variable was low but statistically significant at the 0.01 level.

(8) Revenue growth (RG) variable had the relationship in the positive direction as Tobin's Q (TBQ) variable with the correlation value of 0.186*. Therefore, this indicated that the relationship between revenue growth (RG) and Tobin's Q (TBQ) variable was low but statistically significant at the 0.05 level.

(9) Discretionary accruals (DA) variable had the relationship in the positive direction as Return on Equity (ROE) variable with a correlation value of 0.213*. Therefore, this indicated that the relationship between discretionary accruals (DA) and return on equity (ROE) was low but statistically significant at the 0.05 level.

(10) Discretionary accruals (DA) variable had the relationship in the positive direction as the return on assets (ROA) variable with a correlation value of 0.209*. Therefore, this indicated that the relationship between discretionary accruals (DA) and return on assets (ROA) was low but statistically significant at the 0.05 level.

(11) Discretionary accruals (DA) variable had the relationship in the positive direction as Tobin's Q (TBQ) variable with the correlation value of 0.238*. Therefore, this indicated that the relationship between discretionary accruals (DA) and Tobin's Q (TBQ) was low but statistically significant at the 0.05 level.

(12) Return on Equity (ROE) variable had the relationship in the positive direction as the return on assets (ROA) variable with the correlation value of 0.906**. Therefore, this indicated that the relationship between Return on Equity (ROE) and return on assets (ROA) was high and statistically significant at the 0.01 level. The result

showed a correlation value of 0.906, meaning a high correlation between Return on Equity (ROE) and return on assets (ROA). However, it was no problem because it is a dependent variable.

(13) Tobin's Q (TBQ) variable had the relationship in the positive direction as the Return on Equity (ROE) variable with the correlation value of 0.533**. Therefore, this indicated that the relationship between Tobin's Q (TBQ) and return on equity (ROE) was moderately and statistically significant at the 0.01 level.

(14) Return on assets (ROA) variable had the relationship in the positive direction as Tobin's Q (TBQ) variable with the correlation value of 0.602**. Therefore, this indicated that the relationship between return on assets (ROA) and Tobin's Q (TBQ) was moderately and statistically significant at the 0.01 level.

(15) Return on assets (ROA) variable had the relationship in the negative direction with the leverage (LEV) variable with a correlation value of -0.267**. Therefore, this indicated that the relationship between return on assets (ROA) and financial leverage (LEV) was low and statistically significant at the 0.01 level.

(16) Leverage (LEV) variable had the relationship in the positive direction as the firm size (LnSize) variable with a correlation value of 0.564**. Therefore, this indicated that the relationship between leverage (LEV) and firm size (LnSize) was moderately and statistically significant at the 0.01 level.

The analysis of the correlation matrix indicated that the variables employed in this study exhibited a minimal level of interdependence. Hence, it was determined that these variables could be subjected to further examination utilizing inferential statistics.

## 4.4 Structural Equation Modeling Analysis

### 4.4.1 Model Classifications

**Table 4.4** Model Classifications

| Hypothesis | Model | Exogenous Variable | Mediator Variable | Endogenous Variable |
|---|---|---|---|---|
| 1 | 1 | Intellectual Capital (MVAIC) | | Firm performance: Return on Equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) |
| 2 | 2 | Intellectual Capital (MVAIC) | Competitive Advantage: Revenue Growth (RG) | |
| 3 | 3 | | Competitive Advantage: Revenue Growth (RG) | Firm performance: Return on Equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) |
| 4 | 4,5,6 | Intellectual Capital (MVAIC) | Competitive Advantage: Revenue Growth (RG) | Firm performance: Return on Equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) |
| 5 | 7 | Intellectual Capital (MVAIC) | Earnings Quality: Discretionary Accruals (DA) | |
| 6 | 8 | | Earnings Quality: Discretionary Accruals (DA) | Firm performance: Return on Equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) |
| 7 | 9,10,11 | Intellectual Capital (MVAIC) | Earnings Quality: Discretionary Accruals (DA) | Firm performance: Return on Equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) |
| 8 | 12,13,14 | Intellectual Capital (MVAIC) | Competitive Advantage: Revenue Growth (RG), Earnings Quality: Discretionary Accruals (DA) | Firm performance: Return on Equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) |

Table 4.4 presents the categorization of all 14 models. In these models, the exogenous variable was the intellectual capital (MVAIC). The mediator variables consisted of revenue growth (RG) and discretionary accruals (DA), while return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) served as the endogenous variables. Additionally, the control variables included firm age (AGE), logarithm of firm size (LnSize), and leverage (LEV).

### 4.5 Hypothesis Testing

This study examined the intermediary variables using Baron and Kenny's methods. As explained in chapter 3, mediating variables must fulfill three conditions. Firstly, the independent variables should exert a statistically significant impact on the dependent variable. Secondly, the independent variables should demonstrate a statistically significant influence on the mediating variable. Lastly, the mediating variable should exhibit a statistically significant influence on the dependent variable. If a mediating variable satisfies all three criteria, it proceeds to step 4 to determine whether it acts as a full or partial mediating variable. The mediator variable assesses whether the independent variable establishes a connection between the dependent variables. This means that the independent variables may not be directly relevant to the dependent variables.

### 4.6 Empirical Assessment of Proposed Models

The objective of this study is to offer insights into the impact of intellectual capital on firm performance by examining competitive advantage and earnings quality. The model employed in this study is subjected to testing in the following manner:

**Model 1**: Model of the Influence of Intellectual Capital on Firm Performance

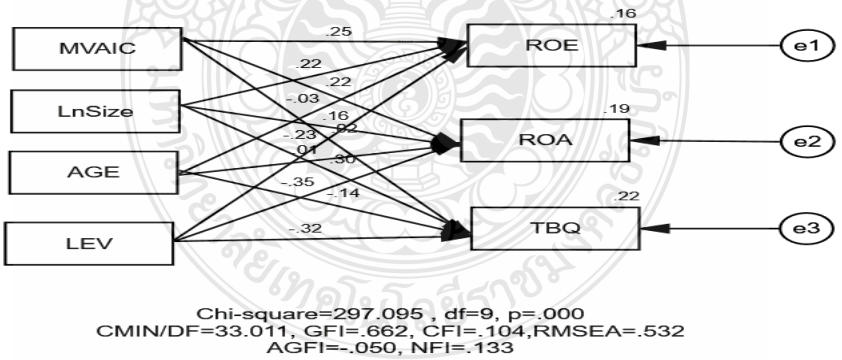



**Figure 4.1** Structural Model of Inspection: Model of the Influence of Intellectual Capital on Firm Performance Before Modification Indices

Figure 4.1 illustrates the model's suitability in capturing the impact of intellectual capital (MVAIC) on firm performance, specifically regarding return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ). However, the empirical data

indicates that these variables do not align well with the model. For instance, with a CMIN/df value of 33.011, a p-value of the Chi-square test at 0.000, GFI at 0.662, AGFI at 0.050, CFI at 0.104, NFI at 0.133, and RMSEA at 0.532, the specific values in Table 4.5 demonstrate that the results are inconsistent as follows:

**Table 4.5** Comparison of Goodness-of-Fit Index of Proposed Model 1

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 33.011 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.662 | No |
| AGFI | >0.90 | 0.050 | No |
| CFI | >0.90 | 0.104 | No |
| NFI | >0.90 | 0.133 | No |
| RMSEA | <0.05 | 0.532 | No |

Based on the findings presented in Table 4.5, modifications were implemented to enhance the alignment between the model and the empirical data. These adjustments were guided by the parameters of model modification indices (MI). The resulting changes are illustrated in Figure 4.2. Specifically, linking lines were incorporated between the variables to reduce the degree of freedom, namely between Ln Size and LEV, e1 and e2, e1 and e3, and e2 and e3.

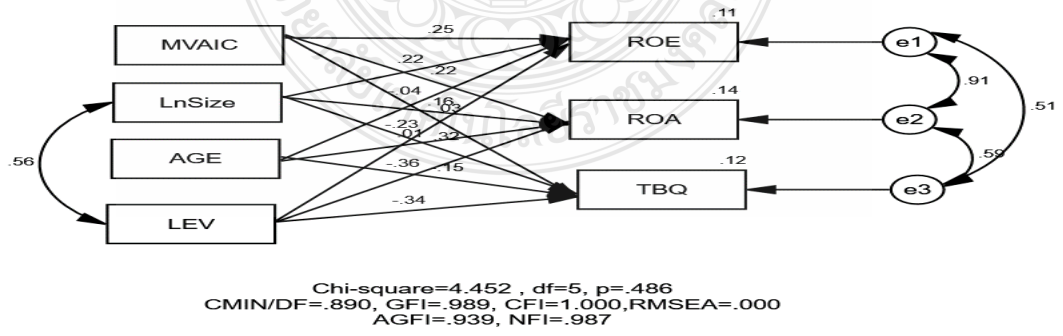



**Figure 4.2** Structural Model of Inspection: Model of Influence of Intellectual Capital on Firm Performance for Hypothesis Testing

Figure 4.2 depicts the model's suitability in capturing the impact of intellectual capital (MVAIC) on firm performance, specifically in relation to return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ). This study successfully integrated the models with empirical data. For instance, with a CMIN/df value of 0.890 and a p-value of the Chi-square test at 0.486, the goodness-of-fit index (GFI) was 0.989, the adjusted goodness-of-fit index (AGFI) was 0.939, the comparative fit index (CFI) was 1.000, and the normed fit index (NFI) was 0.987. Moreover, the root mean square error of approximation (RMSEA) was 0.000. Thus, the model's suitability for Hypothesis Testing is presented in Table 4.6.

**Table 4.6** Comparison of Goodness-of-Fit Index of Proposed Model 1

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.989 | Yes |
| AGFI | >0.90 | 0.939 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.987 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, intellectual capital (MVAIC) is considered an exogenous variable, while return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) serve as endogenous variables. To assess these hypotheses, certain values need to be taken into account. These values encompass the t-test value with a significance level of *p-value < 0.05 and the critical value (C.R.) as shown in Table 4.7.

**Table 4.7** Parameter Estimation and Significant Test for Influence of Intellectual Capital on Firm Performance

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| H1a: | *ROE* | <--- | *MVAIC* | 1.014 | 0.353 | 2.873 | 0.004* | 0.255 |
| | *ROE* | <--- | *LnSize* | 1.544 | 0.750 | 2.058 | 0.040* | 0.221 |
| | *ROE* | <--- | *AGE* | -0.027 | 0.067 | -0.405 | 0.686 | -0.036 |
| | *ROE* | <--- | *LEV* | -12.975 | 6.021 | -2.155 | 0.031* | -0.232 |
| H1b: | *ROA* | <--- | *MVAIC* | 0.571 | 0.224 | 2.547 | 0.011* | 0.222 |
| | *ROA* | <--- | *LnSize* | 0.739 | 0.476 | 1.553 | 0.120 | 0.164 |
| | *ROA* | <--- | *AGE* | 0.004 | 0.043 | 0.105 | 0.916 | 0.009 |
| | *ROA* | <--- | *LEV* | -13.129 | 3.821 | -3.436 | 0.000* | -0.363 |
| H1c: | *TBQ* | <--- | *MVAIC* | 0.010 | 0.035 | 0.291 | 0.771 | 0.026 |
| | *TBQ* | <--- | *AGE* | -0.012 | 0.007 | -1.730 | 0.084 | -0.153 |
| | *TBQ* | <--- | *LnSize* | 0.225 | 0.075 | 3.022 | 0.003* | 0.323 |
| | *TBQ* | <--- | *LEV* | -1.919 | 0.598 | -3.207 | 0.001* | -0.343 |

*=*p*- value < 0.05

Table 4.7 displays the estimation of parameters and the significance test regarding the impact of intellectual capital (MVAIC) on firm performance, specifically in relation to return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ). The findings indicate that the proposed model aligns with the empirical data and exhibits a relationship value, with several significant parameters associated with each variable. Consequently, it is necessary to examine the critical value (C.R.) and standard error (S.E.) values. The outcome is presented in Model 1 as follows:

(1) Intellectual capital (MVAIC) positively influenced return on equity (ROE) with critical ratio (C.R.) of 2.873, and p-value of 0.004 < 0.05. Thus, intellectual capital (MVAIC) was statistically significant at the 0.05 level.

(2) Intellectual capital (MVAIC) positively influenced return on assets (ROA) with critical ratio (C.R.) of 2.547, and p-value of 0.011 < 0.05. Thus, intellectual capital (MVAIC) was statistically significant at the 0.05 level.

**Model 2** Model of the Influence of Intellectual Capital on Competitive Advantage

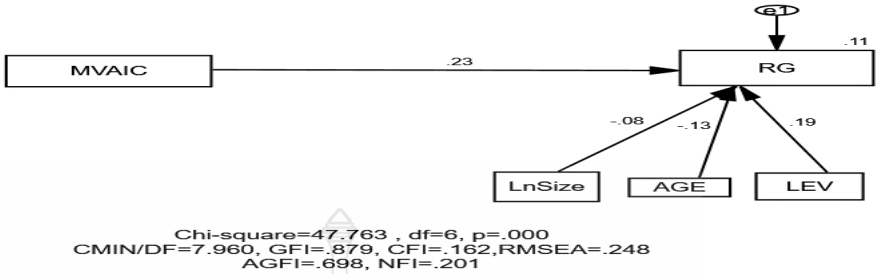



**Figure 4.3** Structural Model of Inspection: Model of Influence of Intellectual Capital (MVAIC) on Revenue Growth (RG) Before Modification Indices.

Figure 4.3 shows the model fit of the influence of intellectual capital (MVAIC) on revenue growth (RG) not fitting with the empirical data. For example, when the CMIN/df was 7.960, a p-value of Chi-square was 0.000, GFI was 0.879, AGFI was 0.698, CFI was 0.162, NFI was 0.201, and RMSEA was 0.248 specific values unsuitable the result was shown in Table 4.8 as follows:

**Table 4.8** Comparison of Goodness-of-Fit Index of Proposed Model 2

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 7.960 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.879 | No |
| AGFI | >0.90 | 0.698 | No |
| CFI | >0.90 | 0.162 | No |
| NFI | >0.90 | 0.201 | No |
| RMSEA | <0.05 | 0.248 | No |

The adjustments made to the model fit with the empirical data were determined by analyzing the findings presented in Table 4.8, specifically focusing on the model modification indices (MI) parameters. The outcome of these adjustments is illustrated in

Figure 4.4, which demonstrates the inclusion of linking lines between the variables LnSize and LEV, aimed at reducing the degree of freedom.

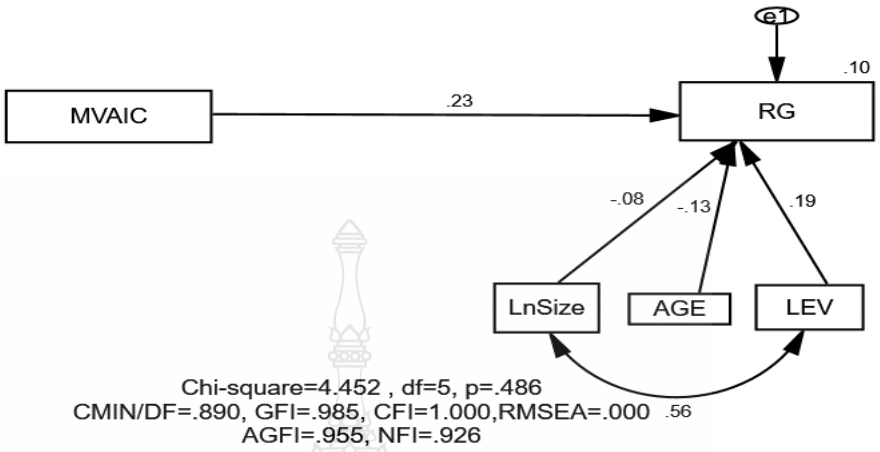



**Figure 4.4** Structural Model of Inspection: Model of Influence of Intellectual Capital (MVAIC) on Revenue Growth (RG) for Hypothesis Testing

Figure 4.4 shows the model fit for examining the impact of intellectual capital (MVAIC) on revenue growth (RG). The study involved combining the models with empirical data. When the CMIN/df ratio was 0.890, the p-value of the Chi-square test was 0.486. Additionally, the GFI was 0.985, AGFI was 0.955, CFI was 1.000, NFI was 0.926, and RMSEA was 0.000. As a result, the model fit for hypothesis testing is detailed in Table 4.9.

**Table 4.9** Comparison of Goodness-of-Fit Index of Proposed Model 2

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.985 | Yes |
| AGFI | >0.90 | 0.955 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.928 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, intellectual capital (MVAIC) is treated as an exogenous variable, while revenue growth (R.G.) is considered an endogenous variable. To evaluate these hypotheses, certain values need to be examined, including the t-test value at a significance level of *p-value < 0.05 and the critical value (C.R.), as indicated in Table 4.9.

**Table 4.10** Parameter Estimation and Significant Test for Influence of Intellectual Capital (MVAIC) on Revenue Growth (RG)

| | | | | **Regression Weight** | | | | **Standardized Regression Weight** |
|---|---|---|---|---|---|---|---|---|
| | | | | **Estimate** | **S.E.** | **C.R.** | **P-value** | |
| H2: | *RG* | <--- | *MVAIC* | 0.014 | 0.006 | 2.541 | 0.011* | 0.228 |
| | *RG* | <--- | *LnSize* | -0.008 | 0.012 | -0.638 | 0.524 | -0.069 |
| | *RG* | <--- | *AGE* | -0.001 | 0.001 | -1.381 | 0.167 | -0.124 |
| | *RG* | <--- | *LEV* | 0.171 | 0.097 | 1.766 | 0.077 | 0.192 |

*=*p*- value < 0.05

Table 4.10 presents the parameter estimation and significance test regarding the impact of intellectual capital (MVAIC) on revenue growth (R.G.). The findings indicate that the proposed model aligns with the empirical data, and each variable exhibits significant parameters, suggesting the need to examine the critical value (C.R.) and standard error (S.E.) values. The result is shown in Model 2 as follows:

The results demonstrate a positive influence of intellectual capital (MVAIC) on revenue growth (R.G.) with a critical ratio (C.R.) of 2.541 and a p-value of 0.011, which is less than 0.05. Hence, intellectual capital (MVAIC) is statistically significant at the 0.05 level.

**Model 3** Model of the Influence of Competitive Advantage on Firm Performance

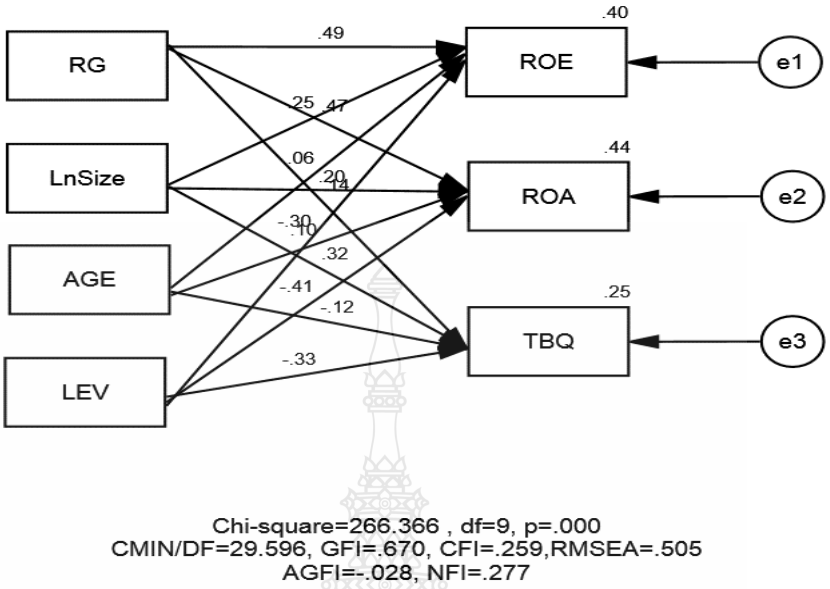



**Figure 4.5** Structural Model of Inspection: Model of Influence of Revenue Growth (RG) on Firm Performance Before Modification Indices.

Figure 4.5 illustrates the model fit for examining the influence of revenue growth (RG) on firm performance, specifically measuring return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ). However, the findings indicate that these variables do not align well with the empirical data. For instance, when analyzing the results, it is observed that the CMIN/df ratio was 29.596, the p-value of the Chi-square test was 0.000, GFI was 0.670, AGFI was 0.028, CFI was 0.259, NFI was 0.277, and RMSEA was 0.505. These specific values demonstrate that the results are unsuitable, as shown in Table 4.11.

**Table 4.11** Comparison of Goodness-of-Fit Index of Proposed Model 3

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 29.596 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.670 | No |
| AGFI | >0.90 | 0.028 | No |
| CFI | >0.90 | 0.259 | No |
| NFI | >0.90 | 0.277 | No |
| RMSEA | <0.05 | 0.505 | No |

Based on the findings presented in Table 4.11, the adjustment was made based on model modification indices (MI) to the model fit with the empirical data. The result had shown in Figure 4.6. The modification was to add the linking lines between the variables to reduce the degree of freedom: RG and Age, LnSize and LEV, e1 and e2, e2 and e3, e1 and e3.

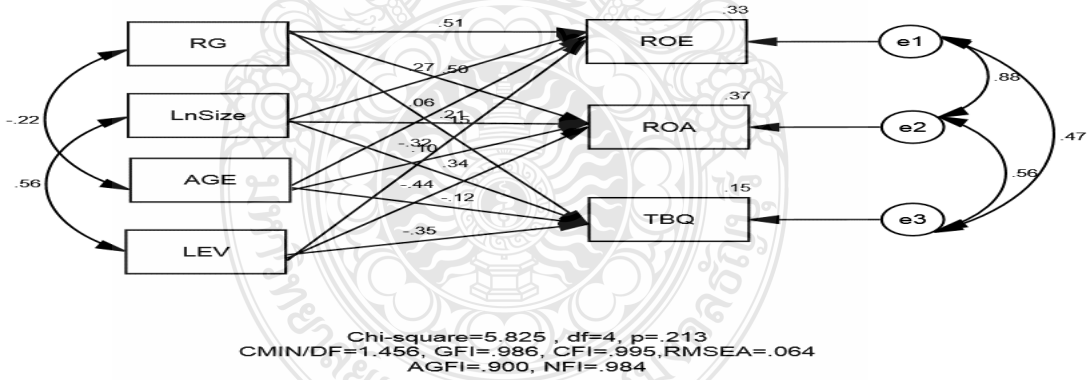



**Figure 4.6** Structural Model of Inspection: Model of Influence of Revenue Growth (RG) on Firm Performance for Hypothesis Testing

Figure 4.6 illustrates the model fit for examining the influence of revenue growth (RG) on firm performance, specifically analyzing ROE, ROA, and Tobin's Q (TBQ). This study involved integrating the models with empirical data. When evaluating the fit of the model, it was observed that the CMIN/df ratio was 1.456, the

p-value of the Chi-square test was 0.213, GFI was 0.986, AGFI was 0.900, CFI was 0.995, NFI was 0.984, and RMSEA was 0.064. Consequently, the model fit for hypothesis testing is detailed in Table 4.12.

**Table 4.12** Comparison of Goodness-of-Fit Index of Proposed Model 3

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 1.456 | Yes |
| p-value | >0.05 | 0.213 | Yes |
| GFI | >0.90 | 0.986 | Yes |
| AGFI | >0.90 | 0.900 | Yes |
| CFI | >0.90 | 0.995 | Yes |
| NFI | >0.90 | 0.984 | Yes |
| RMSEA | <0.05 | 0.064 | Yes |

According to the hypotheses, it is stated that revenue growth (R.G.) is considered an exogenous variable, while firm performance, including ROE, ROA, and Tobin's Q (TBQ), are treated as endogenous variables. However, to evaluate these hypotheses, it is necessary to understand certain values. These values include the t-test value at a significance level of *p-value < 0.05 and the critical value (C.R.), as depicted in Table 4.13.

**Table 4.13** Parameter Estimation and Significant Test for Influence of Revenue Growth (RG) on Firm Performance

| | | | | Regression Weight | | | | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| | | | | **Estimate** | **S.E.** | **C.R.** | **P-value** | |
| H3a: | *ROE* | <--- | *RG* | 35.254 | 4.801 | 7.343 | 0.000* | 0.549 |
| | *ROE* | <--- | *LnSize* | 1.997 | 0.641 | 3.114 | 0.002* | 0.279 |
| | *ROE* | <--- | *AGE* | 0.025 | 0.058 | 0.423 | 0.672 | 0.032 |
| | *ROE* | <--- | *LEV* | -19.553 | 5.148 | -3.798 | 0.000* | -0.340 |
| H3b: | *ROA* | <--- | *RG* | 22.294 | 3.020 | 7.382 | 0.000* | 0.534 |
| | *ROA* | <--- | *LnSize* | 1.006 | 0.403 | 2.494 | 0.013* | 0.216 |
| | *ROA* | <--- | *AGE* | 0.038 | 0.037 | 1.032 | 0.302 | 0.075 |
| | *ROA* | <--- | *LEV* | -17.209 | 3.238 | -5.314 | 0.000* | -0.460 |
| H3c: | *TBQ* | <--- | *RG* | 1.460 | 0.553 | 2.638 | 0.008* | 0.227 |
| | *TBQ* | <--- | *LnSize* | 0.241 | 0.074 | 3.256 | 0.001* | 0.335 |
| | *TBQ* | <--- | *AGE* | -0.011 | 0.007 | -1.565 | 0.118 | -0.135 |
| | *TBQ* | <--- | *LEV* | -2.061 | 0.593 | -3.473 | 0.000* | -0.357 |

*=*p*- value < 0.05

Table 4.13 displays the parameter estimation and significance test regarding the impact of revenue growth (R.G.) on firm performance, specifically measuring return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ). The findings indicate that the proposed model aligns with the empirical data, and each variable exhibits significant parameters, suggesting the need to examine the critical value (C.R.) and standard error (S.E.) values. The result is shown in Model 3 as follows:

(1) Revenue growth (R.G.) positively influenced return on equity (ROE) with a critical ratio (C.R.) of 7.343, and p-value of 0.000 < 0.05. Therefore, revenue growth (R.G.) was statistically significant at the 0.05 level.

(2) Revenue growth (R.G.) positively influenced return on assets (ROA) with a critical ratio (C.R.) of 7.382, and p-value of 0.000 < 0.05. Therefore, revenue growth (R.G.) was statistically significant at the 0.05 level.

(3) Revenue growth (R.G.) had a positive influence on Tobin's Q (TBQ) with a critical ratio (C.R.) of 2.638, and p-value of 0.008 < 0.05. Therefore, revenue growth (R.G.) was statistically significant at the0.05 level.

**Model 4** Model of Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Equity (ROE).

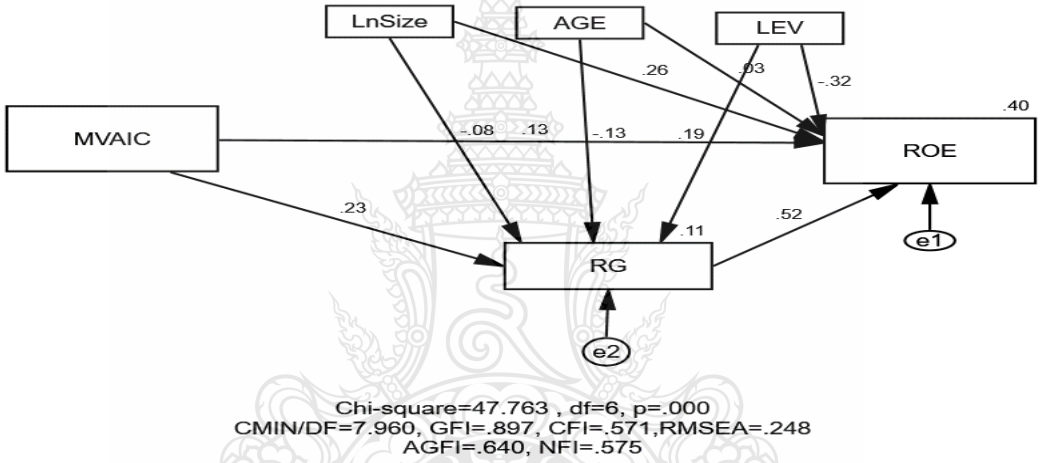



**Figure 4.7** Structural Model of Inspection: Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Equity (ROE) Before Modification Indices.

Figure 4.7 illustrates the model fit for examining the relationship between intellectual capital (MVAIC) and return on equity (ROE) mediated by revenue growth (RG). However, the findings indicate that this model does not align well with the empirical data. For instance, when analyzing the results, it is observed that the CMIN/df ratio was 7.960, the p-value of the Chi-square test was 0.000, GFI was 0.897, AGFI was 0.640, CFI was 0.571, NFI was 0.575, and RMSEA was 0.248.

These specific values demonstrate that the results are unsuitable, as depicted in Table 4.14.

**Table 4.14** Comparison of Goodness-of-Fit Index of Proposed Model 4

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 7.960 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.897 | No |
| AGFI | >0.90 | 0.640 | No |
| CFI | >0.90 | 0.571 | No |
| NFI | >0.90 | 0.575 | No |
| RMSEA | <0.05 | 0.248 | No |

Based on the findings presented in Table 4.14, the adjustment was made based on model modification indices (MI) to the model fit with the empirical data. The result had shown in Figure 4.8. The modification was to add the linking lines between the variables to reduce the degree of freedom: LnSize and LEV.

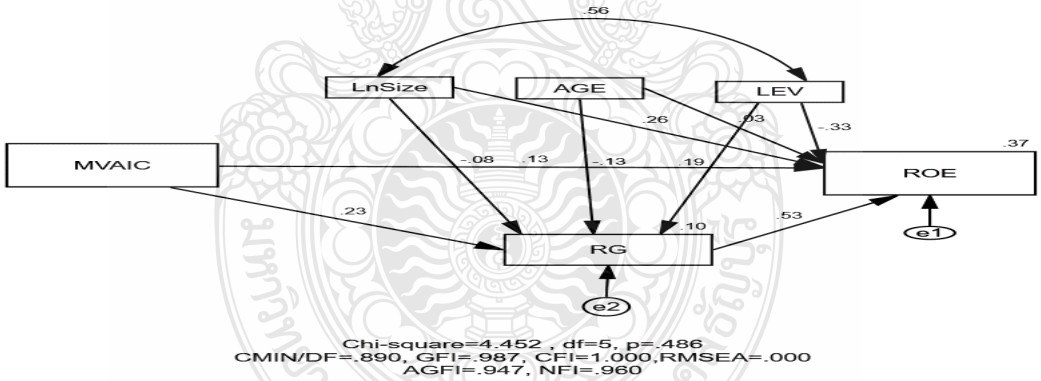



**Figure 4.8** Structural Model of Inspection: Model of Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Equity (ROE) for Hypothesis Testing

Figure 4.8 displays the model fit for investigating the impact of intellectual capital (MVAIC) on ROE through Revenue Growth (RG). This study successfully integrated the models with empirical data. When assessing the fit of the model, it was observed that the CMIN/df ratio was 0.890, the p-value of the Chi-square test was 0.486,

GFI was 0.987, AGFI was 0.947, CFI was 1.000, NFI was 0.960, and RMSEA was 0.000. Consequently, the model fit for hypothesis testing is detailed in Table 4.15.

**Table 4.15** Comparison of Goodness-of-Fit Index of Proposed Model 4

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.987 | Yes |
| AGFI | >0.90 | 0.947 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.960 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, it is stated that intellectual capital (MVAIC) is considered an exogenous variable, while Return on Equity (ROE) is treated as an endogenous variable, and revenue growth (RG) acts as a mediator variable. However, to evaluate these hypotheses, it is necessary to understand certain values. These values include the t-test value at a significance level of *p-value < 0.05 and the critical value (C.R.) as shown in Table 4.16.

**Table 4.16** Parameter Estimation and Significant Test for Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Equity (ROE)

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| *H4a:* | *ROE* | <--- | *MVAIC* | 0.542 | 0.309 | 1.755 | 0.079 | 0.136 |
| | *ROE* | <--- | *RG* | 32.725 | 4.965 | 6.591 | 0.000* | 0.522 |
| | *RG* | <--- | *MVAIC* | 0.015 | 0.006 | 2.618 | 0.009* | 0.228 |
| | *RG* | <--- | *LEV* | 0.171 | 0.097 | 1.766 | 0.077 | 0.191 |
| | *RG* | <--- | *LnSize* | -0.008 | 0.012 | -0.638 | 0.524 | -0.069 |
| | *RG* | <--- | *AGE* | -0.001 | 0.001 | -1.381 | 0.167 | -0.124 |
| | *ROE* | <--- | *LnSize* | 1.796 | 0.639 | 2.812 | 0.005* | 0.257 |
| | *ROE* | <--- | *AGE* | 0.022 | 0.058 | 0.376 | 0.707 | 0.029 |
| | *ROE* | <--- | *LEV* | -18.577 | 5.187 | -3.581 | 0.000* | -0.331 |

*=*p*- value < 0.05

Table 4.16 presents the parameter estimation and significance test for revenue growth (RG) as a mediating variable, indirectly influencing intellectual capital (MVAIC) towards return on equity (ROE). The findings indicate that the proposed model aligns with the empirical data, and each variable exhibits significant parameters, suggesting the need to examine the critical value (C.R.) and standard error (S.E.) values as shown in Model 4 as follows:

(1) Revenue growth (R.G.) positively influenced return on equity (ROE) with critical ratio (C.R.) of 6.591, and p-value of 0.000 < 0.05. Therefore, revenue growth (R.G.) was statistically significant at the 0.05 level.

(2) Intellectual capital (MVAIC) positively influenced revenue growth (RG) with critical ratio (C.R.) of 2.618, and p-value of 0.009< 0.05. Therefore, revenue growth (R.G.) was statistically significant at the 0.05 level.

**Model 5** Model of Revenue Growth (RG) as Mediating Variable Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Assets (ROA)

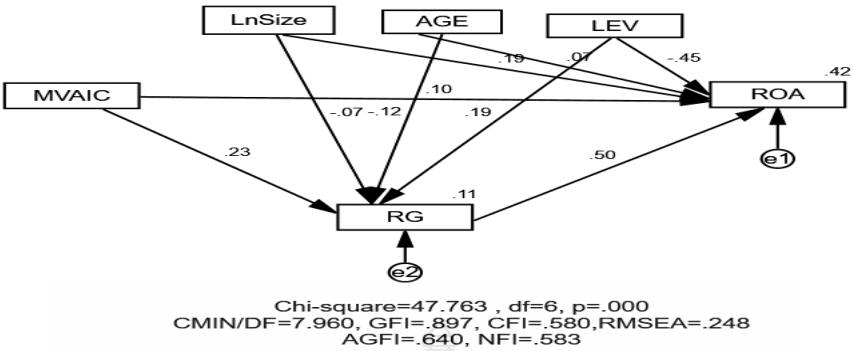



**Figure 4.9** Structural Model of Inspection: Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Assets (ROA) Before Modification Indices

Figure 4.9 depicts that the model fit for the influence of intellectual capital (MVAIC) on return on assets (ROA) through revenue growth (RG) does not align with the empirical data. This is evident from the specific values presented in Table 4.17, including a CMIN/df ratio of 7.960, a p-value of Chi-square of 0.000, GFI of 0.897, AGFI of 0.640, CFI of 0.580, NFI of 0.583, and RMSEA of 0.248. These values indicate an inadequate fit for the model as shown in the Table below.

**Table 4.17** Comparison of Goodness-of-Fit Index of Proposed Model 5

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 7.960 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.897 | No |
| AGFI | >0.90 | 0.640 | No |
| CFI | >0.90 | 0.580 | No |
| NFI | >0.90 | 0.583 | No |
| RMSEA | <0.05 | 0.248 | No |

Based on the findings presented in Table 4.17, the adjustment was made by using model modification indices (MI) in order to improve the fit of the model with the empirical data. The outcome of these modifications is depicted in Figure 4.10. The adjustment involved adding linking lines between the variables LnSize and LEV to reduce the degree of freedom.

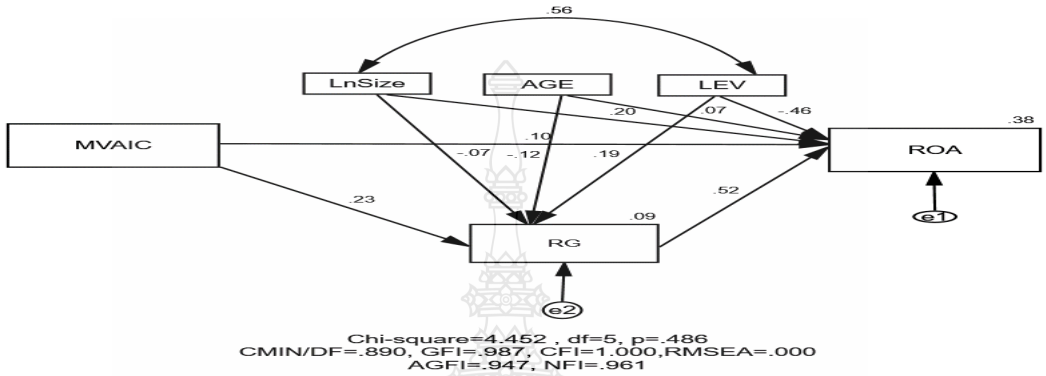



**Figure 4.10** Structural Model of Inspection: Model of Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Assets (ROA) for Hypothesis Testing

Figure 4.10 demonstrates the relationship between revenue growth (RG) as a mediating variable, intellectual capital (MVAIC), and its indirect influence on return on assets (ROA). This study successfully combined the models with empirical data. The model fit statistics indicate that the CMIN/df value was 0.890, the p-value of the Chi-square test was 0.486, GFI was 0.987, AGFI was 0.947, CFI was 1.000, NFI was 0.961, and RMSEA was 0.000. These results suggest a favorable fit for the model, as discussed in detail in Table 4.18, which presents the Hypothesis Testing outcomes.

**Table 4.18** Comparison of Goodness-of-Fit Index of Proposed Model 5

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.987 | Yes |
| AGFI | >0.90 | 0.947 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.961 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

Based on the hypotheses, intellectual capital (MVAIC) is considered an exogenous variable, while return on assets (ROA) operates as an endogenous variable, and revenue growth (RG) serves as a mediator variable. However, to comprehend the hypotheses, it is crucial to consider specific values. These include the t-test value with a significance level of *p-value < 0.05 and the critical value (C.R.), as shown in Table 4.19.

**Table 4.19** Parameter Estimation and Significant Test for Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Assets (ROA)

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| *H4b:* | *ROA* | <--- | *MVAIC* | 0.269 | 0.195 | 1.377 | 0.169 | 0.105 |
| | *ROA* | <--- | *RG* | 20.890 | 3.144 | 6.644 | 0.000* | 0.516 |
| | *RG* | <--- | *MVAIC* | 0.014 | 0.006 | 2.541 | 0.011* | 0.228 |
| | *RG* | <--- | *LEV* | 0.171 | 0.097 | 1.766 | 0.077 | 0.192 |
| | *RG* | <--- | *Ln Size* | -0.009 | 0.012 | -0.743 | 0.457 | -0.069 |
| | *RG* | <--- | *AGE* | -0.001 | 0.001 | -1.381 | 0.167 | -0.124 |
| | *ROA* | <--- | *Ln Size* | 0.900 | 0.404 | 2.226 | 0.026* | 0.200 |
| | *ROA* | <--- | *AGE* | 0.036 | 0.037 | 0.978 | 0.328 | 0.073 |
| | *ROA* | <--- | *LEV* | -16.705 | 3.285 | -5.085 | 0.000* | -0.462 |

*=*p*- value < 0.05

Table 4.19 shows the parameter estimation and the significance test for the revenue growth (RG) as a mediating variable that indirectly influences intellectual capital (MVAIC) towards return on assets (ROA). The result shows that the prospective model corresponds with the empirical data and has a relationship value with each variable having some significant parameters, indicating that the influence of critical value (C.R.) and standard error (S.E.) values needed to be checked. The result is shown in Model 5 as follows:

(1) Revenue Growth (R.G.) positively influenced return on assets (ROA) with critical ratio (C.R.) of 6.644, and p-value of 0.000 < 0.05. Therefore, revenue growth (R.G.) was statistically significant at the 0.05 level.

(2) Intellectual capital (MVAIC) positively influenced revenue growth (RG) with critical ratio (C.R.) of 2.541, and p-value of 0.011 < 0.05. Therefore, revenue growth (R.G.) was statistically significant at the 0.05 level.

**Model 6** Model of Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ)

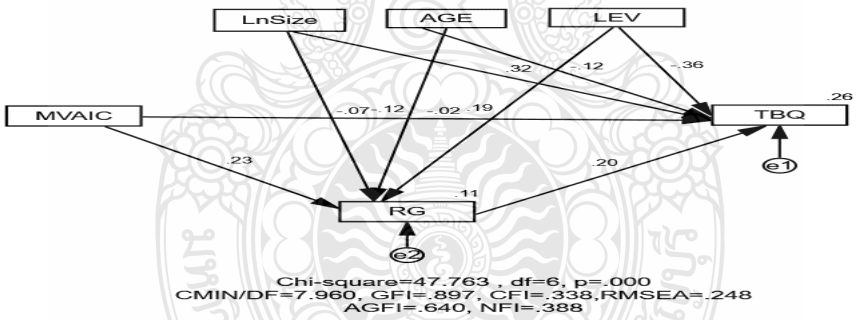



**Figure 4.11** Structural Model of Inspection: Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Tobin' s Q (TBQ) Before Modification Indices

Figure 4.11 illustrates that the model fit of revenue growth (RG) as a mediating variable, indirectly influencing intellectual capital (MVAIC) towards Tobin's Q (TBQ), does not align with the empirical data. The specific values presented in Table 4.20 further highlight this discrepancy. For instance, the CMIN/df value was 7.960, the p-value of the

Chi-square test was 0.000, GFI was 0.897, AGFI was 0.640, CFI was 0.338, NFI was 0.388, and RMSEA was 0.248. These values indicate an unsuitable fit for the model.

**Table 4.20** Comparison of Goodness-of-Fit Index of Proposed Model 6

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 7.960 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.897 | No |
| AGFI | >0.90 | 0.640 | No |
| CFI | >0.90 | 0.338 | No |
| NFI | >0.90 | 0.388 | No |
| RMSEA | <0.05 | 0.248 | No |

Based on the findings presented in Table 4.20, the adjustment was made to the model by using model modification indices (MI) in order to improve the fit of the model with the empirical data. The outcome of these modifications is depicted in Figure 4.12. The adjustment involved adding linking lines between the variables Ln Size and LEV to reduce the degree of freedom.

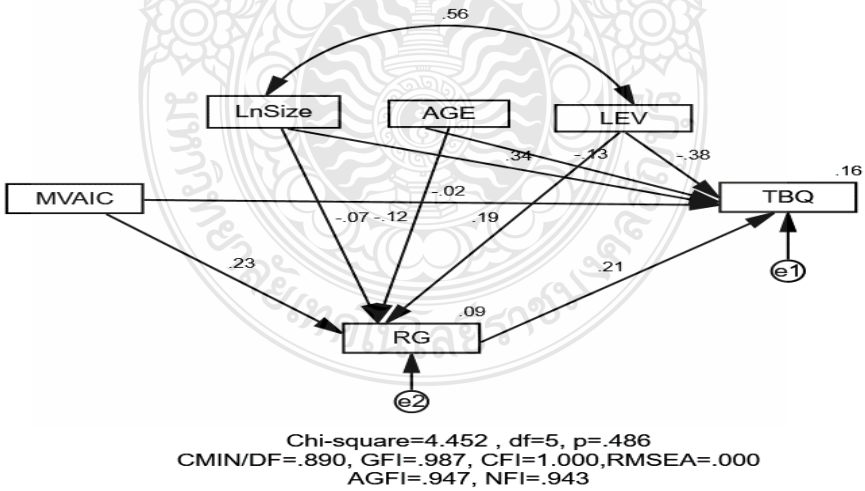



**Figure 4.12** Structural Model of Inspection: Model of Influence of Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ) for Hypothesis Testing

Figure 4.12 illustrates the model fit of revenue growth (RG) as a mediating variable, indirectly influencing intellectual capital (MVAIC) towards Tobin's Q (TBQ). This study successfully combined the models with empirical data. The model fit statistics indicate that the CMIN/df value was 0.890, the p-value of the Chi-square test was 0.486, GFI was 0.987, AGFI was 0.947, CFI was 1.000, NFI was 0.943, and RMSEA was 0.000. These results suggest a favorable fit for the model, as elaborated in Table 4.21, which provides an explanation of the model fit for Hypothesis Testing.

**Table 4.21** Comparison of Goodness-of-Fit Index of Proposed Model 6

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.987 | Yes |
| AGFI | >0.90 | 0.947 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.943 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, it is assumed that intellectual capital serves as an exogenous variable, while Tobin's Q (TBQ) is treated as an endogenous variable, and revenue growth (RG) acts as a mediator variable. However, to evaluate these hypotheses, it is necessary to comprehend certain values. These values include the t-test value at a significance level of *p-value < 0.05 and the critical value (C.R.) as shown in Table 4.22.

**Table 4.22** Parameter Estimation and Significant Test for Revenue Growth (RG) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ)

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| H4c: | *TBQ* | <--- | *MVAIC* | -0.009 | 0.035 | -0.262 | 0.794 | -0.023 |
| | *TBQ* | <--- | *RG* | 1.345 | 0.567 | 2.373 | 0.018* | 0.215 |
| | *RG* | <--- | *MVAIC* | 0.014 | 0.006 | 2.541 | 0.011* | 0.228 |
| | *RG* | <--- | *LEV* | 0.171 | 0.097 | 1.766 | 0.077 | 0.192 |
| | *RG* | <--- | *Ln Size* | -0.008 | 0.012 | -0.638 | 0.524 | -0.069 |
| | *RG* | <--- | *AGE* | -0.001 | 0.001 | -1.381 | 0.167 | -0.124 |
| | *TBQ* | <--- | *Ln Size* | 0.236 | 0.073 | 3.233 | 0.001* | 0.338 |
| | *TBQ* | <--- | *AGE* | -0.010 | 0.007 | -1.452 | 0.147 | -0.126 |
| | *TBQ* | <--- | *LEV* | -2.149 | 0.592 | -3.631 | 0.000* | -0.384 |

*=*p*- value < 0.05

Table 4.22 presents the parameter estimation and significance test for revenue growth (RG) as a mediating variable, indirectly influencing intellectual capital (MVAIC) in relation to Tobin's Q (TBQ). The findings indicate that the proposed model aligns effectively with the empirical data, with each variable exhibiting significant parameters, suggesting a significant relationship between them. Further examination should prioritize the examination of critical value (C.R.) and standard error (S.E.) values, as depicted in Model 6.

(1) Revenue growth (R.G.) positively influenced Tobin's Q with critical ratio (C.R.) of 2.373, and p-value of 0.018 < 0.05. Therefore, revenue growth (R.G.) was statistically significant at the 0.05 level.

(2) Intellectual capital (MVAIC) positively influenced revenue growth (RG) with critical ratio (C.R.) of 2.541, and p-value of 0.011 < 0.05. Therefore, revenue growth (R.G.) was statistically significant at the 0.05 level.

**Table 4.23** Identifying Mediation Effect with Baron and Kenny (1986) Rules

| **Model** | **Relationship** | | | **Direct Effect (C' path)** | | **Result** |
|---|---|---|---|---|---|---|
| | | | | ***Beta*** | ***P-value*** | |
| | **Independent Variable** | **Mediating Variable** | **Dependent Variable** | | | |
| Model 4 | *MVAIC* | *RG* | *ROE* | 0.136 | 0.079 | *Full Mediation* |
| Model 5 | *MVAIC* | *RG* | *ROA* | 0.105 | 0.169 | *Full Mediation* |
| Model 6 | *MVAIC* | *RG* | *Tobin's Q (TBQ)* | -0.023 | 0.794 | *Full Mediation* |

According to the information presented in Table 4.23, specifically in Model 4, it is observed that there is no direct positive influence of intellectual capital (MVAIC) on return on equity (ROE) ($\beta$=0.136, p=0.079 > 0.05). Therefore, based on the mediation analysis using the Baron and Kenny method, it can be concluded that revenue growth (RG) fully mediates this relationship. Similarly, in Model 5, there is no direct positive influence of intellectual capital (MVAIC) on return on assets (ROA) ($\beta$=0.105, p=0.169 > 0.05), and the mediation analysis indicates that revenue growth (RG) fully mediates this relationship as well. Lastly, in Model 6, it is found that there is no direct positive influence of intellectual capital (MVAIC) on Tobin's Q (TBQ) ($\beta$=-0.023, p = 0.794 > 0.05). The mediation analysis suggests that revenue growth fully mediates this relationship.

**Model 7** Model of the Influence of Intellectual Capital on Earnings Quality

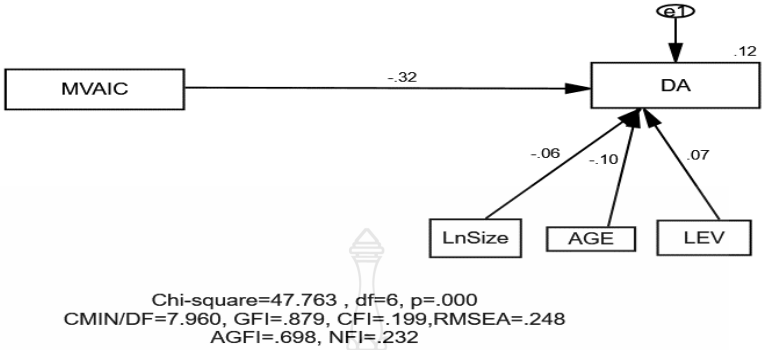



**Figure 4.13** Structural Model of Inspection: Model of Intellectual Capital (MVAIC) Positively influences Earnings Quality Before Modification Indices

Figure 4.13 shows that the model fit of influence of intellectual capital (MVAIC) on discretionary accruals (DA) did not fit with the empirical data. For example, when the CMIN/df was 7.960, *a p*-value of Chi-square was 0.000, GFI was 0.879, AGFI was 0.698, CFI was 0.199, NFI was 0.232, and RMSEA was 0.248 specific values unsuitable the result was shown in Table 4.24 as follows:

**Table 4.24** Comparison of Goodness-of-Fit Index of Proposed Model 7

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 7.960 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.879 | No |
| AGFI | >0.90 | 0.698 | No |
| CFI | >0.90 | 0.199 | No |
| NFI | >0.90 | 0.232 | No |
| RMSEA | <0.05 | 0.248 | No |

Based on the findings presented in Table 4.24, the adjustment was made based on the parameters of model modification indices (MI) to the model fit with the empirical data. The result is shown in Figure 4.14. The modification was to add the linking lines between the variables: LnSize and LEV.

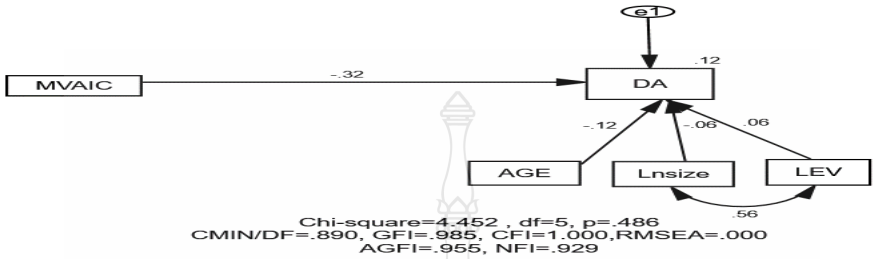



**Figure 4.14** Structural Model of Inspection: Model of Intellectual Capital (MVAIC) Positively Influences Earnings Quality for Hypothesis Testing

Figure 4.14 presents the model fit, indicating that intellectual capital (MVAIC) has a negative influence on Discretionary Accruals (DA). This study successfully integrated the models with empirical data. The evaluation of the model fit includes a CMIN/df value of 0.890, a p-value of 0.486 for the Chi-square test, GFI of 0.985, AGFI of 0.955, CFI of 1.00, NFI of 0.929, and RMSEA of 0.000. These results provide support for the model fit in the context of Hypothesis Testing, as detailed in Table 4.25.

**Table 4.25** Comparison of Goodness-of-Fit Index of Proposed Model 7

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.985 | Yes |
| AGFI | >0.90 | 0.955 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.929 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, intellectual capital (MVAIC) as an exogenous and discretionary accrual (DA) has operated an endogenous variable. However, for the hypotheses, some values must be understood. These are the t-test value at the significance value at *p-value < 0.05 and the critical value (C.R.) as shown in Table 4.26.

**Table 4.26** Parameter Estimation and Significant Test for Intellectual Capital (MVAIC) Positively Influence Earnings Quality

| | | | **Regression Weight Estimate** | **S.E.** | **C.R.** | **P-value** | **Standardized Regression Weight** |
|---|---|---|---|---|---|---|---|
| H5: | *DA* <--- | *MVAIC* | -0.035 | 0.010 | -3.626 | 0.000* | -0.320 |
| | *DA* <--- | *Ln Size* | -0.012 | 0.021 | -0.575 | 0.565 | -0.062 |
| | *DA* <--- | *AGE* | -0.002 | 0.002 | -1.333 | 0.182 | -0.118 |
| | *DA* <--- | *LEV* | 0.097 | 0.166 | 0.583 | 0.560 | 0.062 |

*=*p*- value <0.05

Table 4.26 displays the estimation of parameters and the significance test for the impact of intellectual capital (MVAIC) on discretionary accruals (DA). The findings reveal that the proposed model aligns with the empirical data and exhibits significant parameters for each variable, indicating a meaningful relationship between them. It is important to examine the critical value (C.R.) and standard error (S.E.) values to further analyze the results. The outcome is presented in Model 7 as follows:

Intellectual capital (MVAIC) had a negative influence on Discretionary accruals (DA). This implies that intellectual capital has a positive influence on earnings quality. The statistical analysis reveals a critical ratio (C.R.) of -3.626 and a p-value of 0.000, which is less than 0.05. These results indicate that intellectual capital (MVAIC) is statistically significant at the 0.05 level.

**Model 8** Model of the Influence of Earnings Quality on Firm Performance

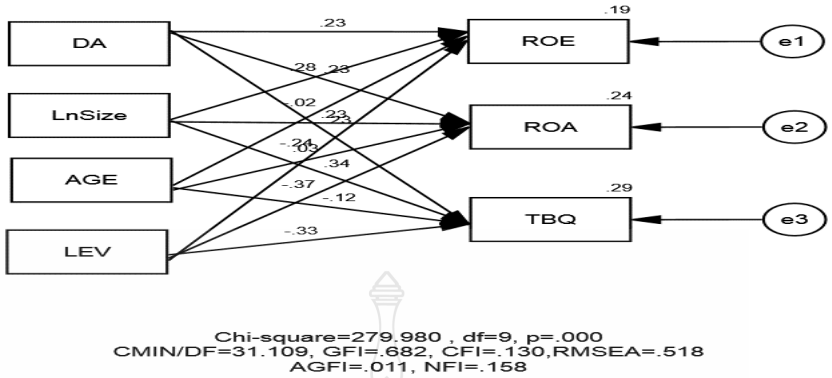



**Figure 4.15** Structural Model of Inspection: Model of Influence of Earnings Quality on Firm Performance Before Modification Indices

Figure 4.15 presented the model fit for the relationship between discretionary accruals (DA) and firm performance, including return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ). However, the empirical data did not align well with the models. For instance, specific values such as a CMIN/df of 31.109, a p-value of Chi-square of 0.000, GFI of 0.682, AGFI of 0.011, CFI of 0.130, NFI of 0.158, and RMSEA of 0.518 indicated an inadequate fit. These unsatisfactory results are further presented in Table 4.27.

**Table 4.27** Comparison of Goodness-of-Fit Index of Proposed Model 8

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 31.109 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.682 | No |
| AGFI | >0.90 | 0.011 | No |
| CFI | >0.90 | 0.130 | No |
| NFI | >0.90 | 0.158 | No |
| RMSEA | <0.05 | 0.518 | No |

Based on the findings presented in Table 4.27, the adjustment was made based on the parameters of model modification indices (MI) to the model fit with the empirical data. The modification was to add the linking lines between the variables to reduce the degree of freedom as follows: Ln Size and LEV, e1 and e2, e1 and e3, e2 and e3. The result is shown in Figure 4.16.

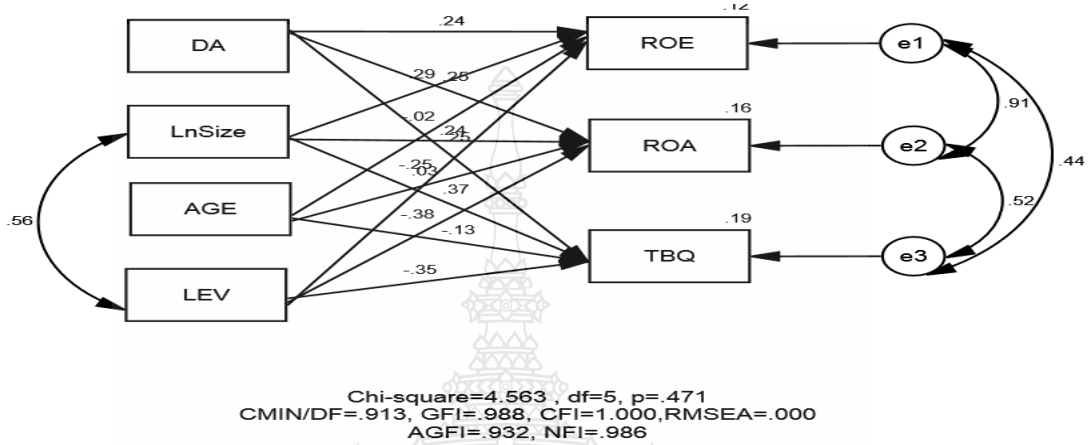



**Figure 4.16** Structural Model of Inspection: Model of the Influence of Earnings Quality on Firm Performance for Hypothesis Testing

Figure 4.16 showed the model fit of the influence of discretionary accruals (DA) on firm performance: ROE, ROA, and Tobin's Q (TBQ). This study showed that the models were combined with empirical data. When the CMIN/df was 0.913, the p-value of Chi-square was 0.471. GFI was 0.988, AGFI was 0.932, CFI was 1.000, and NFI was 0.986. Finally, RMSEA was 0.000. Therefore, the model fit for Hypothesis Testing is explained in Table 4.28.

**Table 4.28** Comparison of Goodness-of-Fit Index of Proposed Model 8

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 0.913 | Yes |
| p-value | >0.05 | 0.471 | Yes |
| GFI | >0.90 | 0.988 | Yes |
| AGFI | >0.90 | 0.932 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.986 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, discretionary accruals (DA) are considered exogenous, while firm performance metrics such as return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ) are treated as endogenous variables. To test these hypotheses, certain values need to be examined, including the t-test value with a significance level of *p-value < 0.05 and the critical value (C.R.). These values are presented in Table 4.29 for further analysis.

**Table 4.29** Parameter Estimation and Significant Test for Influence of Earnings Quality on Firm Performance

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| H6a: | *ROE* | <--- | *DA* | 8.604 | 3.218 | 2.674 | 0.007* | 0.235 |
| | *ROE* | <--- | *LnSize* | 2.013 | 0.753 | 2.672 | 0.008* | 0.285 |
| | *ROE* | <--- | *LEV* | -15.398 | 6.048 | -2.546 | 0.011* | -0.272 |
| | *ROE* | <--- | *AGE* | -0.019 | 0.068 | -0.287 | 0.774 | -0.025 |
| H6b: | *ROA* | <--- | *DA* | 5.663 | 2.022 | 2.801 | 0.005* | 0.240 |
| | *ROA* | <--- | *LEV* | -14.615 | 3.800 | -3.846 | 0.000* | -0.400 |
| | *ROA* | <--- | *LnSize* | 1.021 | 0.473 | 2.157 | 0.031* | 0.224 |
| | *ROA* | <--- | *AGE* | 0.010 | 0.043 | 0.244 | 0.808 | 0.021 |
| H6c: | *TBQ* | <--- | *DA* | 0.882 | 0.315 | 2.804 | 0.005* | 0.238 |
| | *TBQ* | <--- | *LnSize* | 0.253 | 0.074 | 3.431 | 0.000* | 0.353 |
| | *TBQ* | <--- | *AGE* | -0.011 | 0.007 | -1.726 | 0.084 | -0.147 |
| | *TBQ* | <--- | *LEV* | -1.968 | 0.591 | -3.329 | 0.000* | -0.343 |

*=*p*- value < 0.05

Table 4.29 presents the estimation of parameters and the significance test for the impact of discretionary accruals (DA) on firm performance metrics: return on equity (ROE), return on assets (ROA), and Tobin's Q (TBQ). The findings indicate a positive relationship between the absolute value of discretionary accruals and firm performance. This suggests a negative association between earnings quality and firm performance. The results demonstrate that the proposed model aligns well with the empirical data, with each variable exhibiting significant parameters. It is important to examine the critical value (C.R.) and standard error (S.E.) values to further evaluate the results. These outcomes are displayed in Model 8 as follows:

(1) Discretionary accruals (DA) positively influenced return on equity (ROE). The result showed that the value of the t-test revealed the estimated value of 8.604 standard error (S.E.) of 3.218, critical ratio (C.R.) of 2.674, and p-value of 0.007 < 0.05.

Therefore, it indicated that the discretionary accruals (DA) were statistically significant at the0.05 level.

(2) Discretionary accruals (DA) positively influenced return on assets (ROA). The result showed that the value of the t-test revealed the estimated value of 5.663, standard error (S.E.) of 2.022, critical ratio (C.R.) of 2.801, and p-value of 0.005 < 0.05. Moreover, discretionary accruals (DA) were statistically significant at 0.05.

(3) Discretionary accruals (DA) positively influenced Tobin's Q (TBQ). The result showed that the value of the t-test revealed the estimated value of 0.882, standard error (S.E.) of 0.315, critical ratio (C.R.) of 2.804, and p-value of 0.005 < 0.05. Therefore, discretionary accruals (DA) were statistically significant at 0.05.

**Model 9** Model of Influence of Earnings Quality as a Mediating Variable that Indirectly Influences Intellectual Capital Towards Firm Performance

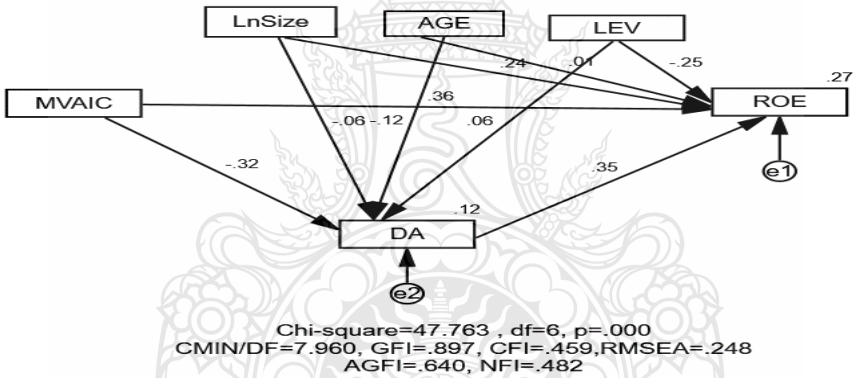



**Figure 4.17** Structural Model of Inspection: Model of Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Equity (ROE) Before Modification Indices

The model fit displayed in Figure 4.17, which examined the influence of discretionary accruals (DA) as a mediating variable on intellectual capital (MVAIC) towards return on equity (ROE), did not align with the empirical data. Specifically, the values obtained for CMIN/df (7.960), the p-value of Chi-square (0.000), GFI (0.897), AGFI (0.640), CFI (0.459), NFI (0.482), and RMSEA (0.248) indicated that the model was not suitable. These unsatisfactory results are further presented in Table 4.30.

**Table 4.30** Comparison of Goodness-of-Fit Index of Proposed Model 9

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 7.960 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.897 | No |
| AGFI | >0.90 | 0.640 | No |
| CFI | >0.90 | 0.459 | No |
| NFI | >0.90 | 0.482 | No |
| RMSEA | <0.05 | 0.248 | No |

Based on the findings presented in Table 4.30, the adjustment was made to the model by considering the parameters of model modification indices (MI) to ensure a better fit with the empirical data. The modification involved introducing linking lines between the variables, specifically LnSize and LEV, in order to reduce the degree of freedom. The outcome of these modifications is depicted in Figure 4.18.

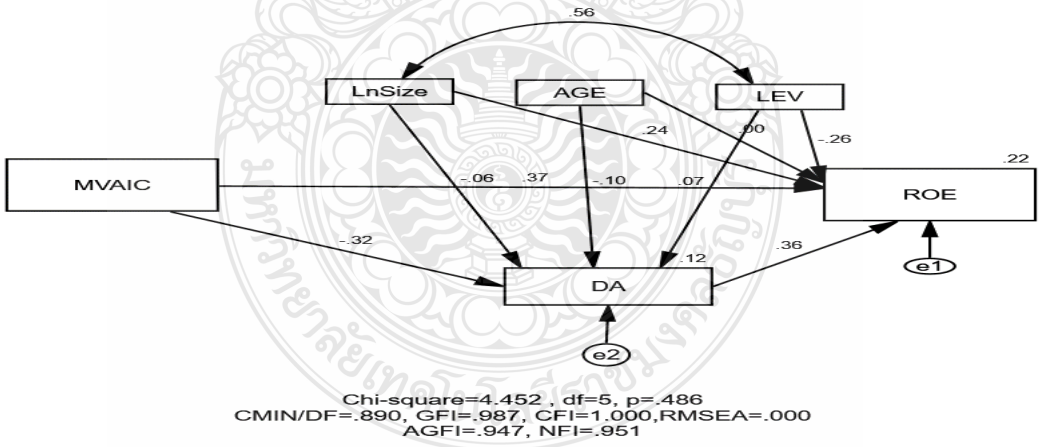



**Figure 4.18** Structural Model of Inspection: Model of Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Equity (ROE) for Hypothesis Testing

Figure 4.18 illustrates the adequacy of the model where discretionary accruals (DA) serves as a mediator, indirectly influencing intellectual capital (MVAIC) with respect to return on equity (ROE). The findings of this study indicate a successful integration of the models with empirical data. The assessment of model fit yielded favorable results, including a CMIN/df value of 0.890, a p-value of 0.486 for the Chi-square test, a GFI of 0.987, AGFI of 0.947, CFI of 1.000, NFI of 0.952, and RMSEA of 0.000. Consequently, the model fulfills the necessary criteria for Hypothesis Testing, as outlined in Table 4.31.

**Table 4.31** Comparison of Goodness-of-Fit Index of Proposed Model 9

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.987 | Yes |
| AGFI | >0.90 | 0.947 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.952 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, intellectual capital (MVAIC) is considered an exogenous variable, while return on equity (ROE) is treated as an endogenous variable. Discretionary accruals (DA) function as a mediator variable. In order to test the hypotheses, it is important to consider certain values. These include the t-test value with a significance level of *p-value < 0.05 and the critical value (C.R.), which are presented in Table 4.32.

**Table 4.32** Parameter Estimation and Significant Test for Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Equity (ROE)

| | | | | **Regression Weight Estimate** | **S.E.** | **C.R.** | **P-value** | **Standardized Regression Weight** |
|---|---|---|---|---|---|---|---|---|
| *H7a:* | *ROE* | <--- | *MVAIC* | 1.470 | 0.349 | 4.217 | 0.000* | 0.369 |
| | *DA* | <--- | *MVAIC* | -0.035 | 0.010 | -3.626 | 0.000* | -0.320 |
| | *ROE* | <--- | *DA* | 12.906 | 3.188 | 4.048 | 0.000* | 0.358 |
| | *DA* | <--- | *LEV* | 0.097 | 0.166 | 0.583 | 0.560 | 0.062 |
| | *DA* | <--- | *Ln Size* | -0.012 | 0.021 | -0.575 | 0.565 | -0.061 |
| | *DA* | <--- | *AGE* | -0.002 | 0.002 | -1.333 | 0.182 | -0.118 |
| | *ROE* | <--- | *AGE* | 0.005 | 0.063 | 0.074 | 0.941 | 0.006 |
| | *ROE* | <--- | *LEV* | -14.225 | 5.635 | -2.524 | 0.012* | -0.251 |
| | *ROE* | <--- | *Ln Size* | 1.697 | 0.702 | 2.418 | 0.016* | 0.243 |

*=*p*- value < 0.05

Table 4.32 presents parameter estimation and significance tests for the impact of discretionary accruals (DA) as a mediating variable indirectly influencing intellectual capital (MVAIC) towards return on equity (ROE). The findings indicate that the proposed model aligns with the empirical data, and each variable exhibits significant parameters, suggesting the need to examine the influence of critical value (C.R.) and standard error (S.E.) values. The result is shown in Model 9 as follows:

(1) Discretionary accruals (DA) had a positive influence on return on equity (ROE), as evidenced by a critical ratio (C.R.) of 4.048 and a p-value of 0.000 < 0.05. Thus, it is evident that discretionary accruals (DA) were statistically significant at the 0.05 significance level.

(2) Intellectual capital (MVAIC) had a positive influence on return on equity (ROE), as indicated by a critical ratio (C.R.) of 4.217 and a p-value of 0.000 < 0.05. This suggests that intellectual capital (MVAIC) demonstrated statistical significance at the 0.05 level.

(3) Intellectual capital (MVAIC) had a negative influence on discretionary accruals (DA). Consequently, it can be inferred that intellectual capital (MVAIC) has a positive impact on earnings quality, supported by a critical ratio (C.R.) of -3.626 and a p-value of 0.000 < 0.05. These results indicate that intellectual capital (MVAIC) exhibited statistical significance at the 0.05 level.

**Model 10** Model of Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Assets (ROA)

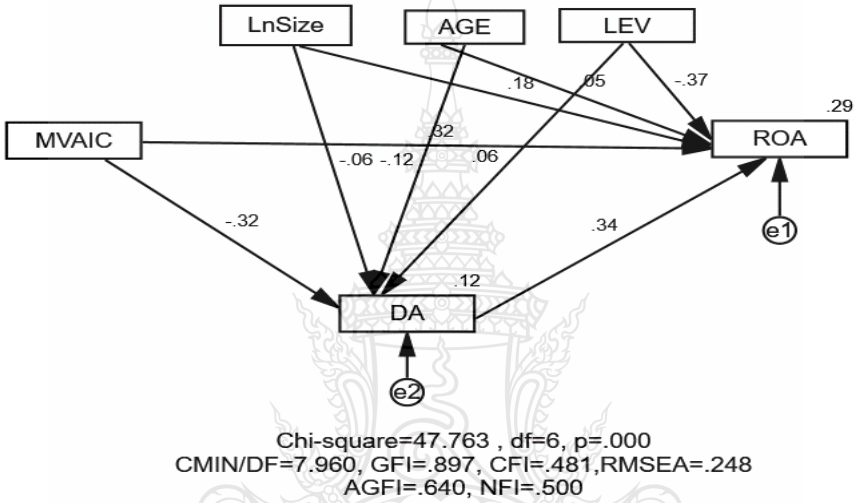



**Figure 4.19** Structural Model of Inspection: Model of Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Assets (ROA) Before Modification Indices

Table 4.33 presents the result of the model fit for the influence of discretionary accruals (DA) as a mediating variable indirectly affecting intellectual capital (MVAIC) on return on assets (ROA). The findings indicate that the model did not align well with the empirical data, as evidenced by several specific values. For instance, when the CMIN/df was 7.960, the p-value of the Chi-square test was 0.000, GFI was 0.897, AGFI was 0.640, CFI was 0.481, NFI was 0.500, and RMSEA was 0.248. These values demonstrate a lack of suitability for the obtained results, as shown in Figure 4.19.

**Table 4.33** Comparison of Goodness-of-Fit Index of Proposed Model 10

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 7.960 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.897 | No |
| AGFI | >0.90 | 0.640 | No |
| CFI | >0.90 | 0.481 | No |
| NFI | >0.90 | 0.500 | No |
| RMSEA | <0.05 | 0.248 | No |

Based on the findings presented in Table 4.33, the adjustment was made based on model modification indices (MI) to the model fit with the empirical data. The modification was adding the linking lines between the variables: LnSize, LEV to reduce the degree of freedom as shown in Figure 4.20.

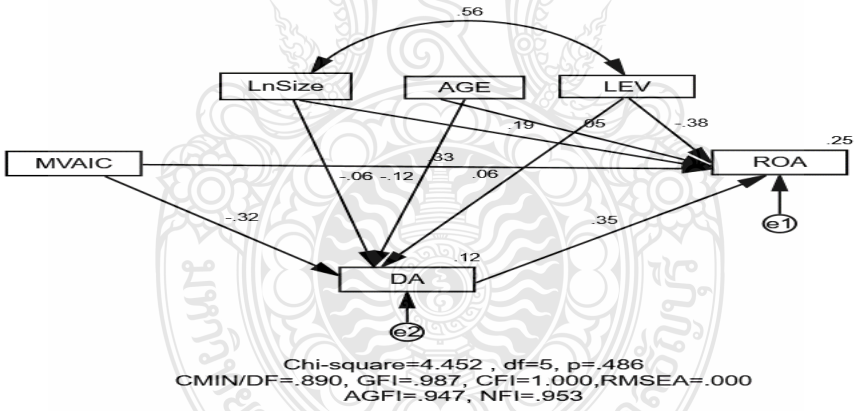



**Figure 4.20** Structural Model of Inspection: Model of Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Assets (ROA) for Hypothesis Testing

Figure 4.20 presents the model fit of discretionary accruals (DA) as a mediating variable indirectly influencing intellectual capital (MVAIC) towards return on assets (ROA). This study demonstrates the integration of the models with empirical data. The evaluation of the model yielded a CMIN/df value of 0.890, a p-value of 0.486 for

Chi-square, GFI of 0.987, AGFI of 0.947, CFI of 1.000, and NFI of 0.953. Additionally, the RMSEA value was 0.000. Consequently, the model exhibited a good fit for Hypothesis Testing, as explained in Table 4.34.

**Table 4.34** Comparison of Goodness-of-Fit Index of Proposed Model 10

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.987 | Yes |
| AGFI | >0.90 | 0.947 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.953 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, intellectual capital (MVAIC) is considered an exogenous variable, while return on assets (ROA) acts as an endogenous variable, and discretionary accruals (DA) serve as a mediator variable. Prior to analyzing the hypotheses, it is important to grasp certain values, such as the t-test value at a significance level of *p-value < 0.05, as well as the critical value (C.R.), as presented in Table 4.35.

**Table 4.35** Parameter Estimation and Significant Test for Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Return on Assets (ROA)

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| *H7b:* | *ROA* | <--- | *MVAIC* | 0.859 | 0.221 | 3.878 | 0.000* | 0.334 |
| | *DA* | <--- | *MVAIC* | -0.035 | 0.010 | -3.626 | 0.000* | -0.320 |
| | *ROA* | <--- | *DA* | 8.166 | 2.029 | 4.024 | 0.000* | 0.348 |
| | *DA* | <--- | *LEV* | 0.111 | 0.166 | 0.668 | 0.504 | 0.062 |
| | *DA* | <--- | *LnSize* | -0.012 | 0.021 | -0.575 | 0.565 | -0.061 |
| | *DA* | <--- | *AGE* | -0.002 | 0.002 | -1.333 | 0.182 | -0.118 |
| | *ROA* | <--- | *AGE* | 0.025 | 0.040 | 0.610 | 0.542 | 0.050 |
| | *ROA* | <--- | *LEV* | -13.915 | 3.581 | -3.885 | 0.000* | -0.385 |
| | *ROA* | <--- | *LnSize* | 0.836 | 0.446 | 1.873 | 0.061 | 0.185 |

*=*p*- value < 0.05

Table 4.35 show the parameter estimation and the significance test for discretionary accruals (DA) as a mediating variable that indirectly influences intellectual capital (MVAIC) towards return on assets (ROA). The result shows that the prospective model corresponds with the empirical data and has a relationship value with each variable having some significant parameters, indicating that the influence of critical value (C.R.) and standard error (S.E.) values needed to be checked. The result is shown in Model 10 as follows:

(1) Discretionary accruals (DA) had a positive influence on return on assets (ROA). Consequently, it can be inferred that earnings quality had a negative impact on ROA, as indicated by a critical ratio (C.R.) of 4.005 and a p-value of 0.000, both below the significance level of 0.05. Thus, the statistical significance of discretionary accruals (DA) at the 0.05 level is evident.

(2) Intellectual capital (MVAIC) had a positive influence on return on assets (ROA) with a critical ratio (C.R.) of 3.869 and a p-value of 0.000, indicating statistical significance at the 0.05 level.

(3) Intellectual capital (MVAIC) had a negative influence on discretionary accruals (DA). Consequently, it can be inferred that intellectual capital (MVAIC) had a positive impact on earnings quality, supported by a critical ratio (C.R.) of -3.626 and a p-value of 0.000, which is less than 0.05. Thus, it indicates that intellectual capital (MVAIC) holds statistical significance at the 0.05 level.

**Model 11** Model of the Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ)

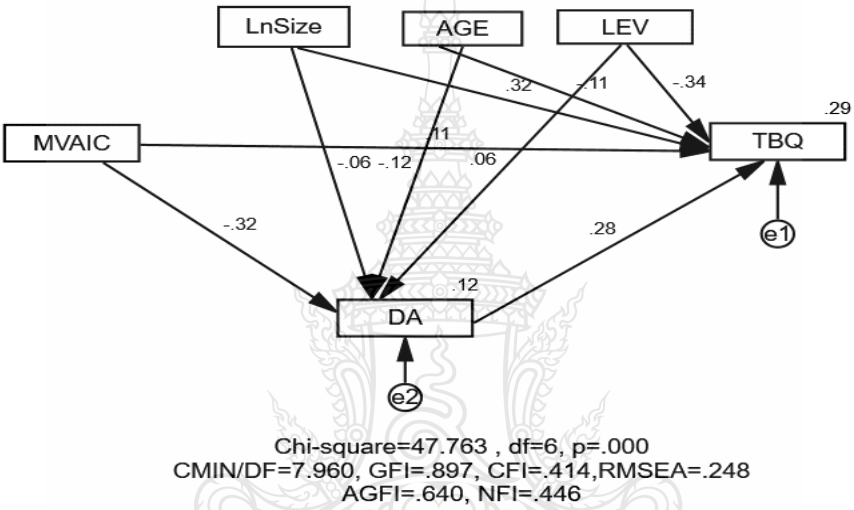



**Figure 4.21** Structural Model of Inspection: Model of Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ) Before Modification Indices

Figure 4.21 showed that the model fit of discretionary accruals (DA) as a mediating variable that indirectly influences intellectual capital (MVAIC) towards Tobin's Q (TBQ) did not fit with the empirical data. For example, when the CMIN/df was 7.960, a p-value of Chi-square was 0.000, GFI was 0.897, AGFI was 0.640, CFI was 0.414, NFI was 0.446, and RMSEA was 0.248, specific values unsuitable the result was shown in Table 4.36 as follows:

**Table 4.36** Comparison of Goodness-of-Fit Index of Proposed Model 11

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 7.960 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.897 | No |
| AGFI | >0.90 | 0.640 | No |
| CFI | >0.90 | 0.414 | No |
| NFI | >0.90 | 0.446 | No |
| RMSEA | <0.05 | 0.248 | No |

Based on the findings presented in Table 4.36, the adjustment was made based on model modification indices (MI) to the model fit with the empirical data. The modification was to add the linking lines between the variables to reduce the degree of freedom: LnSize, LEV as shown in Figure 4.22.

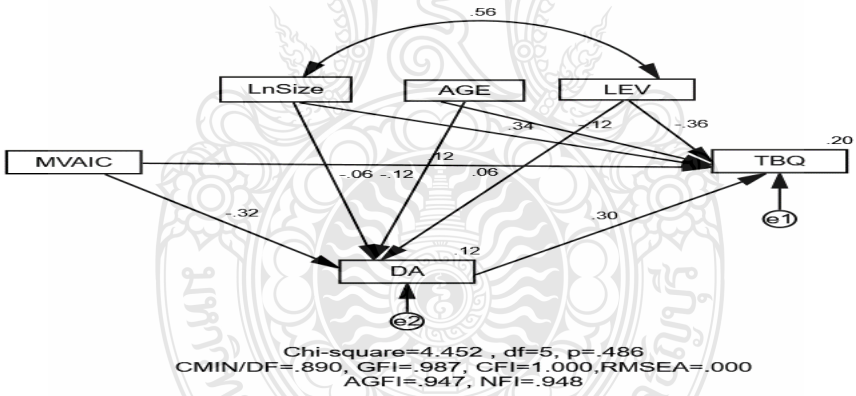



**Figure 4.22** Structural Model of Inspection: Model of Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ) for Hypothesis Testing

Figure 4.22 illustrates the model fit of discretionary accruals (DA) as a mediating variable, indirectly influencing intellectual capital (MVAIC) towards Tobin's Q (TBQ). This study demonstrated that the models were successfully aligned with empirical data. The evaluation of model fit yielded a CMIN/df value of 0.890 and a p-

value of Chi-square equal to 0.486. Additionally, the GFI was 0.987, AGFI was 0.947, CFI was 1.000, NFI was 0.948, and RMSEA was 0.000. Consequently, the model exhibited good fit for hypothesis testing, as presented in Table 4.37.

**Table 4.37** Comparison of Goodness-of-Fit Index of Proposed Model 11

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.987 | Yes |
| AGFI | >0.90 | 0.947 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.948 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, intellectual capital (MVAIC) is considered an exogenous variable, while Tobin's Q (TBQ) functions as an endogenous variable, with discretionary accruals (DA) acting as a mediator variable. However, to assess the hypotheses, it is essential to comprehend certain values. These values encompass the t-test value with a significance level of *p-value < 0.05 and the critical value (C.R.), as depicted in Table 4.38.

**Table 4.38** Parameter Estimation and Significant Test for Discretionary Accruals (DA) as a Mediating Variable that Indirectly Influences Intellectual Capital (MVAIC) Towards Tobin's Q

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| *H7c:* | *TBQ* | <--- | *MVAIC* | 0.047 | 0.036 | 1.309 | 0.190 | 0.120 |
| | *DA* | <--- | *MVAIC* | -0.035 | 0.010 | -3.626 | 0.000* | -0.320 |
| | *TBQ* | <--- | *DA* | 1.030 | 0.326 | 3.162 | 0.002* | 0.296 |
| | *DA* | <--- | *LEV* | 0.111 | 0.166 | 0.668 | 0.504 | 0.062 |
| | *DA* | <--- | *LnSize* | -0.012 | 0.021 | -0.575 | 0.565 | -0.061 |
| | *DA* | <--- | *AGE* | -0.002 | 0.002 | -1.333 | 0.182 | -0.118 |
| | *TBQ* | <--- | *AGE* | -0.009 | 0.006 | -1.386 | 0.166 | -0.118 |
| | *TBQ* | <--- | *LEV* | -2.022 | 0.572 | -3.534 | 0.000* | -0.361 |
| | *TBQ* | <--- | *LnSize* | 0.238 | 0.071 | 3.338 | 0.000* | 0.341 |

*=*p*- value < 0.05

Table 4.38 shows the parameter estimation and the significance test for discretionary accruals (DA) as a mediating variable that indirectly influences intellectual capital (MVAIC) towards Tobin's Q (TBQ). The result shows that the prospective model corresponds with the empirical data and has a relationship value with each variable having some significant parameters, indicating that the influence of critical value (C.R.) and standard error (S.E.) values needed to be checked. The result is shown in Model 11 as follows:

(1) The positive influence of discretionary accruals (DA) on Tobin's Q (TBQ) was evident, indicated by a critical ratio (C.R.) of 3.299 and a p-value of 0.000 < 0.05. Consequently, it can be inferred that earnings quality has a negative effect on Tobin's Q (TBQ). In conclusion, the statistical significance of discretionary accruals (DA) was observed at the 0.05 level.

(2) The negative influence of intellectual capital (MVAIC) on discretionary accruals (DA) was evident, indicated by a critical ratio (C.R.) of -3.626 and a p-value of 0.000 < 0.05. Consequently, it can be concluded that intellectual capital (MVAIC) has a

positive impact on earnings quality. Therefore, the statistical significance of intellectual capital (MVAIC) was observed at the 0.05 level.

**Table 4.39** Identifying Mediation Effect with Baron and Kenny (1986) Rules

| **Model** | **Relationship** | | | **Direct Effect (C' path)** | | **Result** |
|---|---|---|---|---|---|---|
| | | | | **Beta** | **P-value** | |
| | **Independent Variable** | **Mediating Variable** | **Dependent Variable** | | | |
| Model9 | *MVAIC* | *DA* | *ROE* | 0.369 | 0.000* | *Partial Mediation* |
| Model10 | *MVAIC* | *DA* | *ROA* | 0.334 | 0.000* | *Partial Mediation* |
| Model11 | *MVAIC* | *DA* | *Tobin's Q* | 0.120 | 0.190 | *Full Mediation* |

Table 4.39, presented in Model 9, displayed the findings of discretionary accruals (DA) as a mediating variable that indirectly affects intellectual capital (MVAIC) in relation to return on equity (ROE) ($\beta$=0.369, p=0.000 < 0.05). The test revealed that the mediation using the Baron and Kenny method indicated that discretionary accruals (DA) exhibited partial mediation.

In Model 10, the results revealed that discretionary accruals (DA) served as a mediating variable that indirectly influenced intellectual capital (MVAIC) with respect to return on assets (ROA) ($\beta$=0.334, p=0.000<0.05). The mediation test with the Baron and Kenny method indicated that discretionary accruals (DA) exhibited partial mediation.

The results in Model 11 showed that discretionary accruals (DA) functioned as a mediating variable that indirectly impacted intellectual capital (MVAIC) in relation to Tobin's Q (TBQ) ($\beta$=0.120, p=0.190 > 0.05). The mediation test using the Baron and Kenny method revealed that discretionary accruals (DA) exhibited full mediation.

**Model 12** Model of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Equity (ROE)

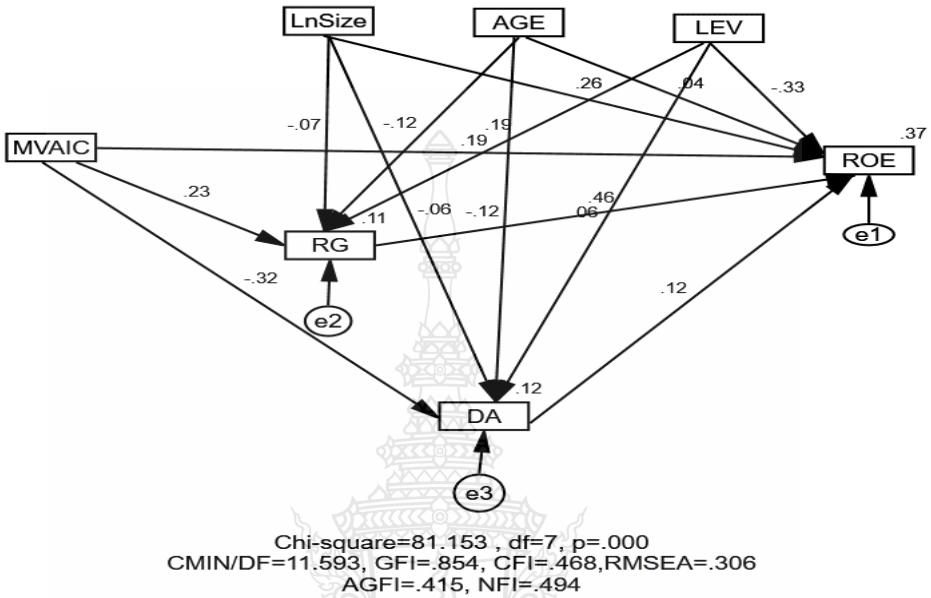



**Figure 4.23** Structural Model of Inspection: Model of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Equity (ROE) Before Modification Indices

Figure 4.23 showed that the model fit of revenue growth (RG) and discretionary accruals (DA) are mediating variables indirect influence intellectual capital (MVAIC) towards return on equity (ROE) did not fit with the empirical data. For example, when the CMIN/df was 11.593, a p-value of Chi-square was 0.000, GFI was 0.854, AGFI was 0.415, CFI was 0.468, NFI was 0.494, and RMSEA was 0.306, specific values unsuitable the result was shown in Table 4.40 as follows:

**Table 4.40** Comparison of Goodness-of-Fit Index of Proposed Model 12

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 11.593 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.854 | No |
| AGFI | >0.90 | 0.415 | No |
| CFI | >0.90 | 0.468 | No |
| NFI | >0.90 | 0.494 | No |
| RMSEA | <0.05 | 0.306 | No |

Based on the findings presented in Table 4.40, the adjustment was made based on model modification indices (MI) to the model fit with the empirical data. The modification was adding the linking lines between the variables to reduce the degree of freedom: LnSize, LEV, and e2 and e3 as shown in Figure 4.24.

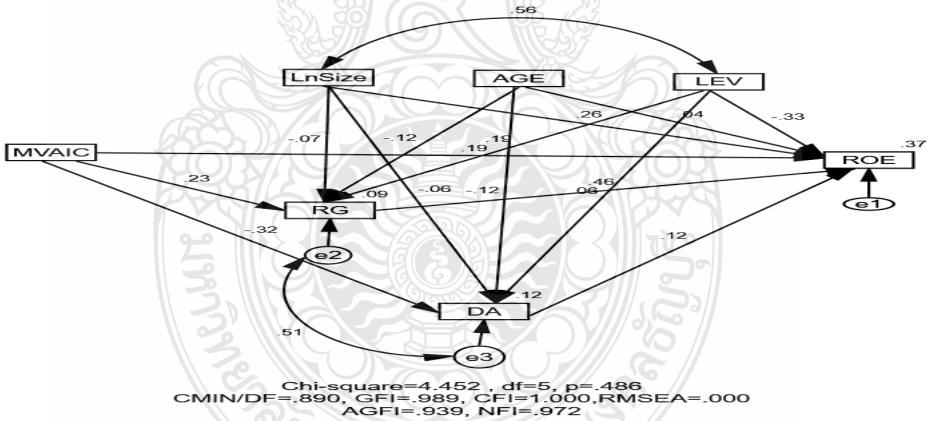



**Figure 4.24** Structural Model of Inspection: Model of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Equity (ROE) for Hypothesis Testing

Figure 4.24 displays how the impact of intellectual capital (MVAIC) on return on equity (ROE) is mediated indirectly by revenue growth (RG) and discretionary accruals (DA). This research combines theoretical models with actual data. The

evaluation of the model fit yielded the following results: CMIN/df was 0.890, the p-value of Chi-square was 0.486, GFI was 0.989, AGFI was 0.939, CFI was 1.000, and NFI was 0.972. Additionally, the RMSEA was 0.000. Consequently, the hypotheses tests in Table 4.41 demonstrate a satisfactory fit for the model.

**Table 4.41** Comparison of Goodness-of-Fit Index of Proposed Model 12

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.989 | Yes |
| AGFI | >0.90 | 0.939 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.972 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, intellectual capital (MVAIC) is considered exogenous, while discretionary accruals (DA) and revenue growth (RG) function as mediators and return on equity (ROE) is treated as an endogenous variable. Before delving into the hypotheses, it is important to comprehend certain values, such as the t-test value with a significance level of *p-value < 0.05, and the critical value (CR) displayed in Table 4.42.

**Table 4.42** Parameter Estimation and Significant Test for of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Equity (ROE)

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| *H8a:* | *ROE* | <--- | *MVAIC* | 0.750 | 0.345 | 2.172 | 0.030* | 0.188 |
| | *ROE* | <--- | *RG* | 28.953 | 5.713 | 5.068 | 0.000* | 0.462 |
| | *RG* | <--- | *MVAIC* | 0.014 | 0.006 | 2.541 | 0.011* | 0.228 |
| | *DA* | <--- | *MVAIC* | -0.035 | 0.010 | -3.626 | 0.000* | -0.320 |
| | *ROE* | <--- | *DA* | 4.355 | 3.336 | 1.305 | 0.192 | 0.121 |
| | *DA* | <--- | *LnSize* | -0.012 | 0.021 | -0.575 | 0.565 | -0.061 |
| | *DA* | <--- | *LEV* | 0.097 | 0.166 | 0.583 | 0.560 | 0.062 |
| | *DA* | <--- | *AGE* | -0.002 | 0.002 | -1.333 | 0.182 | -0.118 |
| | *RG* | <--- | *LEV* | 0.171 | 0.097 | 1.766 | 0.077 | 0.192 |
| | *RG* | <--- | *AGE* | -0.001 | 0.001 | -1.381 | 0.167 | -0.124 |
| | *RG* | <--- | *LnSize* | -0.008 | 0.012 | -0.638 | 0.524 | -0.069 |
| | *ROE* | <--- | *LnSize* | 1.818 | 0.634 | 2.868 | 0.004* | 0.260 |
| | *ROE* | <--- | *AGE* | 0.027 | 0.057 | 0.468 | 0.640 | 0.035 |
| | *ROE* | <--- | *LEV* | -18.353 | 5.151 | -3.563 | 0.000* | -0.327 |

*=*p*- value <0.05

Table 4.42 displays the test for parameter estimation regarding the indirect influence of revenue growth (RG) and discretionary accruals (DA) as mediating variables on intellectual capital (MVAIC), which in turn impacts return on equity (ROE). The findings demonstrate that the proposed model aligns with the empirical data and exhibits a significant relationship, as indicated by several significant parameters for each variable. It is important to examine the critical value (C.R.) and standard error (S.E.) values to assess the influence. The outcome is presented in Model 12 as follows:

(1) The direct effect of intellectual capital (MVAIC) had a significantly positive influence on return on equity (ROE) with critical ratio (C.R.) of 2.172, and p-value of

0.030 < 0.05. Therefore, intellectual capital (MVAIC) was statistically significant at 0.05.

(2) The direct effect of revenue growth (R.G.) had a significantly positive influence on return on equity (ROE) with critical ratio (C.R.) of 5.068, and p-value of 0.000 < 0.05. Thus, revenue growth (R.G.) was statistically significant at 0.05.

(3) The direct effect of intellectual capital (MVAIC) had a significantly positive influence on revenue growth (R.G.) with critical ratio (C.R.) of 2.541, and p-value of 0.011 < 0.05. Thus, intellectual capital (MVAIC) was statistically significant at 0.05.

(4) The direct effect of intellectual capital (MVAIC) negatively influenced discretionary accruals (DA). Therefore, they imply a negatively correlation between the intellectual capital and the absolute value of discretionary accruals. It can be concluded that intellectual capital (MVAIC) has a positive effect on earnings quality with critical ratio (C.R.) of -3.626, and p-value of 0.000 < 0.05. Therefore, it indicated that the intellectual capital (MVAIC) was statistically significant at the0.05 level.

The result of the parameter examination was that the four pairs of variables had a significant influence on each other at a statistical significance level of 0.05. In addition, the direct, indirect, and total effects on the influence of intellectual capital (MVAIC) on ROE through revenue growth (R.G.) and discretionary accruals (DA) could be found in the analysis. The results are shown in Table 4.43.

**Table 4.43** Standardized Direct, Indirect, and Total Effects of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Equity (ROE)

| **Model12** | **Revenue Growth (RG)** | | | **Discretionary Accruals (DA)** | | | **Return on Equity (ROE)** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **DE** | **IE** | **TE** | **DE** | **IE** | **TE** | **DE** | **IE** | **TE** |
| *MVAIC* | 0.228* | 0.000 | 0.228* | -0.320** | 0.000 | -0.320** | 0.188* | 0.066** | 0.255* |
| $R^2$ | | *9.40%* | | | *12.00%* | | | *36.70%* | |

Table 4.43 provides the coefficient of determination ($R^2$), indicating that intellectual capital (MVAIC) exerts a 36.70% accuracy in influencing return on equity (ROE). In contrast, discretionary accruals (DA) demonstrate 12.00% accuracy in

influencing ROE, while revenue growth (RG) displays 9.40% accuracy in influencing ROE. The table represents the standardized direct, indirect, and total effects of variables in this study. The findings reveal that intellectual capital (MVAIC) positively influences ROE, with a direct effect (DE) of 0.188. Additionally, it exerts a positive indirect effect (IE) of 0.066 on ROE. Moreover, the total effect (TE) of intellectual capital (MVAIC) on ROE is 0.255, reflecting a positive impact.

**Table 4.44** Comparison Analysis of Complicated Mediation

| | **Relationship** | | | **Baron and Kenny (1986)** | | |
|---|---|---|---|---|---|---|
| **Ho** | **Independent Variable** | **Mediating Variable** | **Dependent Variable** | **Direct Effect (C' path)** | | **Result** |
| | | | | ***Beta*** | ***P-value*** | |
| H8a: | *MVAIC* | *RG* | *ROE* | 0.188 | 0.030* | *Partial mediation* |
| | *MVAIC* | *DA* | *ROE* | 0.188 | 0.030* | *No mediation* |

Table 4.44 showcases a comparative analysis of complex mediation and examines hypothesis H8a, which suggests that revenue growth (RG) and discretionary accruals (DA) serve as mediating variables in the indirect influence of intellectual capital (MVAIC) on return on equity (ROE). The mediation approach introduced by Baron and Kenny in 1986 indicates that revenue growth (RG) exhibits partial mediation. On the other hand, the same mediation method reveals that discretionary accruals have a no mediation, rather than mediating the relationship.

**Model 13** Model of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Assets (ROA)

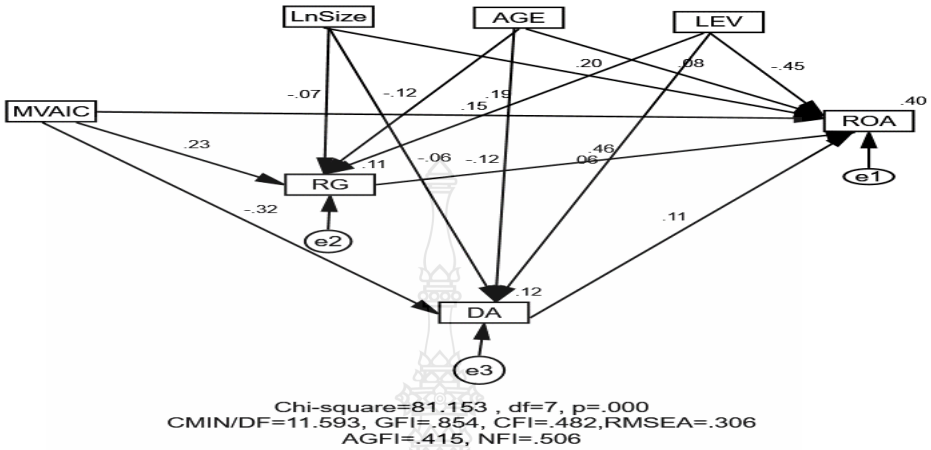



**Figure 4.25** Structural Model of Inspection: Model of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Assets (ROA) Before Modification Indices

Figure 4.25 reveals that the model fit of revenue growth (RG) and discretionary accruals (DA) as mediating variables in the indirect influence of intellectual capital (MVAIC) on return on assets (ROA) does not align well with the empirical data. Notably, certain values in the analysis yielded unsuitable results, such as a CMIN/df of 11.593, a p-value of Chi-square of 0.000, GFI of 0.854, AGFI of 0.415, CFI of 0.482, NFI of 0.506, and RMSEA of 0.303. These specific values, as shown in Table 4.45 as follows:

**Table 4.45** Comparison of Goodness-of-Fit Index of Proposed Model 13

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 11.593 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.854 | No |
| AGFI | >0.90 | 0.415 | No |
| CFI | >0.90 | 0.482 | No |
| NFI | >0.90 | 0.506 | No |
| RMSEA | <0.05 | 0.306 | No |

Considering the findings presented in Table 4.45, adjustments were made to enhance the model's fit with the empirical data. This modification involved incorporating additional links between variables to reduce the degree of freedom. Specifically, in Figure 4.26, the adjustment involved establishing connections between LnSize, LEV, and e2 and e3.

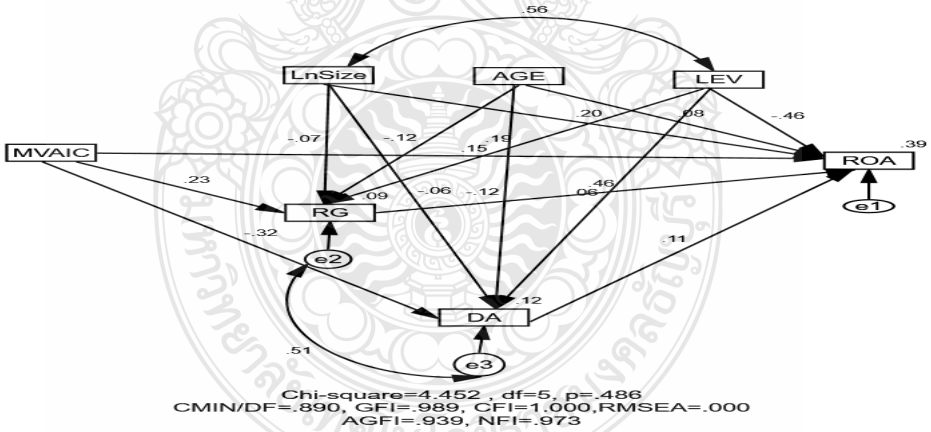



**Figure 4.26** Structural Model of Inspection: Model of Revenue Growth (RG)and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Assets (ROA) for Hypothesis Testing

Figure 4.26 illustrates the model fit of revenue growth (RG) and discretionary accruals (DA) as mediating variables in the indirect influence of intellectual capital

(MVAIC) on return on assets (ROA). This study demonstrates the successful integration of theoretical models with empirical data. For instance, when evaluating the model fit, the CMIN/df was 0.890, the p-value of Chi-square was 0.486, GFI was 0.989, AGFI was 0.939, CFI was 1.000, NFI was 0.973, and RMSEA was 0.000. These results indicate a satisfactory fit for the model, as observed in the hypotheses tests presented in Table 4.46.

**Table 4.46** Comparison of Goodness-of-Fit Index of Proposed Model 13

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.989 | Yes |
| AGFI | >0.90 | 0.939 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.973 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, intellectual capital (MVAIC) is considered exogenous, while discretionary accruals (DA) and revenue growth (RG) function as mediators and return on assets (ROA) is treated as an endogenous variable. However, to fully comprehend the hypotheses, it is necessary to understand certain values. These values consist of the t-test value with a significance level of *p-value < 0.05 and the critical value (C.R.) as shown in Table 4.47.

**Table 4.47** Parameter Estimation and Significant Test for of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Assets (ROA)

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| *H8b:* | *ROA* | <--- | *MVAIC* | 0.394 | 0.219 | 1.800 | 0.072 | 0.153 |
| | *RG* | <--- | *MVAIC* | 0.014 | 0.006 | 2.541 | 0.011* | 0.228 |
| | *ROA* | <--- | *RG* | 18.627 | 3.621 | 5.145 | 0.000* | 0.460 |
| | *DA* | <--- | *MVAIC* | -0.035 | 0.010 | -3.626 | 0.000* | -0.320 |
| | *ROA* | <--- | *DA* | 2.613 | 2.114 | 1.236 | 0.216 | 0.112 |
| | *RG* | <--- | *Ln Size* | -0.008 | 0.012 | -0.638 | 0.524 | -0.069 |
| | *RG* | <--- | *LEV* | 0.171 | 0.097 | 1.766 | 0.077 | 0.192 |
| | *RG* | <--- | *AGE* | -0.001 | 0.001 | -1.381 | 0.167 | -0.124 |
| | *DA* | <--- | *Ln Size* | -0.012 | 0.021 | -0.575 | 0.565 | -0.061 |
| | *DA* | <--- | *LEV* | 0.097 | 0.166 | 0.583 | 0.560 | 0.062 |
| | *DA* | <--- | *AGE* | -0.002 | 0.002 | -1.333 | 0.182 | -0.118 |
| | *ROA* | <--- | *Ln Size* | 0.914 | 0.402 | 2.274 | 0.023* | 0.203 |
| | *ROA* | <--- | *LEV* | -16.570 | 3.265 | -5.076 | 0.000* | -0.458 |
| | *ROA* | <--- | *AGE* | 0.039 | 0.036 | 1.067 | 0.286 | 0.079 |

*=*p*- value <0.05

Table 4.47 presents the test for parameter estimation regarding the indirect influence of revenue growth (RG) and discretionary accruals (DA) as mediating variables on intellectual capital (MVAIC), which in turn impacts return on assets (ROA). The findings indicate that the proposed model aligns with the empirical data and exhibits a significant relationship, as evidenced by several significant parameters for each variable. It is important to examine the influence of critical value (C.R.) and standard error (S.E.) values. The results are presented in Model 13 as follows:

(1) The direct effect of intellectual capital (MVAIC) had a significantly positive influence on revenue growth (RG) with critical ratio (C.R.) of 2.541, and p-value of

0.011 < 0.05. Therefore, intellectual capital (MVAIC) was statistically significant at 0.05.

(2) The direct effect of revenue growth (R.G.) had a significantly positive influence on return on assets (ROA) with critical ratio (C.R.) of 5.145, and p-value of 0.000 < 0.05. Thus, revenue growth (R.G.) was statistically significant at 0.05.

(3) The impact of intellectual capital (MVAIC) on discretionary accruals (DA) exhibits a negative direct effect. This suggests a negative correlation between intellectual capital and the absolute value of discretionary accruals. Consequently, it can be inferred that intellectual capital (MVAIC) has a positive effect on earnings quality, supported by a critical ratio (C.R.) of -3.626 and a p-value of 0.000, which is less than 0.05. These results indicate that intellectual capital (MVAIC) is statistically significant at the 0.05 level.

**Table 4.48** Standardized Direct, Indirect, and Total Effects of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Return on Assets (ROA)

| **Model13** | **Revenue Growth (RG)** | | | **Discretionary Accruals (DA)** | | | **Return on assets (ROA)** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **DE** | **IE** | **TE** | **DE** | **IE** | **TE** | **DE** | **IE** | **TE** |
| *MVAIC* | 0.228* | 0.000 | 0.228* | -0.320** | 0.000 | -0.320** | 0.153 | 0.069* | 0.222 |
| $R^2$ | | *9.40%* | | | *12.00%* | | | *39.00%* | |

According to Table 4.48, the coefficient of the determinant ($R^2$) showed that intellectual capital (MVAIC) influences return on assets (ROA) with an accuracy of 39.00%. In comparison, discretionary accruals (DA) influence return on assets (ROA) with an accuracy of 12.00 %. Moreover, revenue growth (RG) influences return on assets (ROA) with an accuracy of 9.40%. They represented this study as standardized direct, indirect, and total effects of variables. The result revealed that the intellectual capital (MVAIC) positively impacted the return on assets (ROA) direct effect (DE) was 0.153. For the indirect effect, the intellectual capital (MVAIC) had a positive indirect effect on return on assets (ROA) the indirect effect (IE) was 0.069. Besides, it positively affected return on assets (ROA) the total effect (TE) was 0.222.

**Table 4.49** Comparison Analysis of Complicated Mediation

| | Relationship | | | Direct Effect (C' path) | | Result |
|---|---|---|---|---|---|---|
| | **Independent Variable** | **Mediating Variable** | **Dependent Variable** | ***Beta*** | ***p-value*** | |
| *H8b:* | *MVAIC* | *RG* | *ROA* | *0.153* | *0.072* | *Full mediation* |
| | *MVAIC* | *DA* | *ROA* | *0.153* | *0.072* | *No mediation* |

Table 4.49 displays a comparative analysis of complex mediation, examining the hypothesis H8b, which suggests that revenue growth (RG) and discretionary accruals (DA) act as mediating variables in the indirect influence of intellectual capital (MVAIC) on return on assets (ROA). The mediation approach introduced by Baron and Kenny in 1986 indicates that revenue growth (RG) exhibits full mediation. However, according to the same mediation method, discretionary accruals do not serve as a mediating factor.

**Model 14** Model of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ)

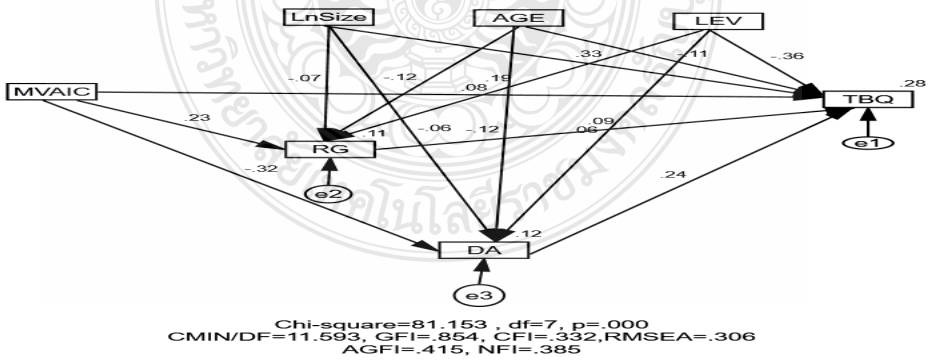



**Figure 4.27** Structural Model of Inspection: Model of Revenue Growth (RG)and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ) Before Modification Indices

Figure 4.27 indicates that the model fit of revenue growth (RG) and discretionary accruals (DA) as mediating variables in the indirect influence of intellectual capital (MVAIC) on Tobin's Q (TBQ) does not align well with the empirical data. Notably, specific values in the analysis yielded unsatisfactory results, such as a CMIN/df of 11.593, a p-value of Chi-square of 0.000, GFI of 0.854, AGFI of 0.415, CFI of 0.332, NFI of 0.385, and RMSEA of 0.306 as presented in Table 4.50.

**Table 4.50** Comparison of Goodness-of-Fit Index of Proposed Model 14

| Acceptable | Level Value | Proposed Model | Accept |
|---|---|---|---|
| CMIN/df | Less than3 | 11.593 | No |
| p-value | >0.05 | 0.000 | No |
| GFI | >0.90 | 0.854 | No |
| AGFI | >0.90 | 0.415 | No |
| CFI | >0.90 | 0.332 | No |
| NFI | >0.90 | 0.385 | No |
| RMSEA | <0.05 | 0.306 | No |

From the result in Table 4.50, the adjustment was made based on model modification indices (MI) to fit the model with the empirical data by adding a link between variables: LnSize, LEV, and e2 and e3 to reduce the degree of freedom as shown in Figure 4.28.

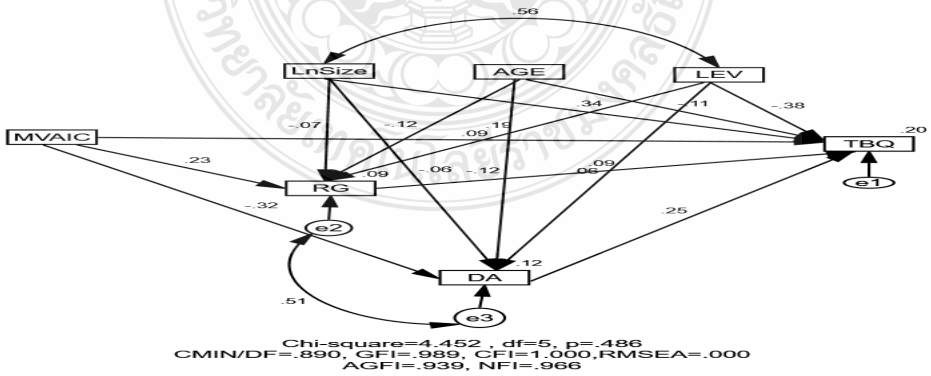



**Figure 4.28** Structural Model of Inspection: Model of Revenue Growth (RG)and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Tobin’s Q (TBQ) for Hypothesis Testing

Figure 4.28 displays the model fit of revenue growth (RG) and discretionary accruals (DA) as mediating variables that indirectly impact intellectual capital (MVAIC) in relation to Tobin's Q (TBQ). Furthermore, this study demonstrates that the models align well with the empirical data. For example, when assessing the fit indices, the CMIN/df ratio was 0.890, the p-value of the Chi-square test was 0.486, GFI was 0.989, AGFI was 0.939, CFI was 1.000, NFI was 0.966, and RMSEA was 0.000. Consequently, the model is suitable for hypothesis testing as presented in Table
4.51.

**Table 4.51** Comparison of Goodness-of-Fit Index of Proposed Model 14

| **Acceptable** | **Level Value** | **Proposed Model** | **Accept** |
|---|---|---|---|
| CMIN/df | Less than3 | 0.890 | Yes |
| p-value | >0.05 | 0.486 | Yes |
| GFI | >0.90 | 0.989 | Yes |
| AGFI | >0.90 | 0.939 | Yes |
| CFI | >0.90 | 1.000 | Yes |
| NFI | >0.90 | 0.966 | Yes |
| RMSEA | <0.05 | 0.000 | Yes |

According to the hypotheses, intellectual capital (MVAIC) is considered an exogenous variable, while discretionary accruals (DA) and revenue growth (R.G.) function as mediators, and Tobin's Q (TBQ) is the endogenous variable. To test the hypotheses, it is necessary to consider certain values. These values include the t-test value at a significance level of *p-value < 0.05 and the critical value (C.R.), which are presented in Table 4.52.

**Table 4.52** Parameter Estimation and the Significant Test for Discretionary Accruals (DA) as Mediating Variable Indirect Influence Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ)

| | | | | Regression Weight Estimate | S.E. | C.R. | P-value | Standardized Regression Weight |
|---|---|---|---|---|---|---|---|---|
| *H8c:* | *TBQ* | <--- | *MVAIC* | 0.029 | 0.039 | 0.742 | 0.458 | 0.072 |
| | *RG* | <--- | *MVAIC* | 0.014 | 0.006 | 2.541 | 0.011* | 0.234 |
| | *TBQ* | <--- | *RG* | 0.708 | 0.638 | 1.110 | 0.267 | 0.113 |
| | *DA* | <--- | *MVAIC* | -0.035 | 0.010 | -3.626 | 0.000* | -0.321 |
| | *TBQ* | <--- | *DA* | 0.901 | 0.374 | 2.410 | 0.016* | 0.228 |
| | *RG* | <--- | *Ln Size* | -0.008 | 0.012 | -0.638 | 0.524 | -0.080 |
| | *RG* | <--- | *LEV* | 0.171 | 0.097 | 1.766 | 0.077 | 0.191 |
| | *RG* | <--- | *AGE* | -0.001 | 0.001 | -1.381 | 0.167 | -0.130 |
| | *DA* | <--- | *AGE* | -0.002 | 0.002 | -1.333 | 0.182 | -0.097 |
| | *DA* | <--- | *LEV* | 0.097 | 0.166 | 0.583 | 0.560 | 0.072 |
| | *DA* | <--- | *Ln Size* | -0.012 | 0.021 | -0.575 | 0.565 | -0.061 |
| | *TBQ* | <--- | *Ln Size* | 0.240 | 0.071 | 3.380 | 0.000* | 0.346 |
| | *TBQ* | <--- | *AGE* | -0.009 | 0.006 | -1.320 | 0.187 | -0.116 |
| | *TBQ* | <--- | *LEV* | -2.102 | 0.578 | -3.640 | 0.000* | -0.381 |

*=*p*- value < 0.05

Table 4.52 presents the test for parameter estimation regarding the indirect influence of revenue growth (RG) and discretionary accruals (DA) as mediating variables on intellectual capital (MVAIC), which in turn impacts Tobin's Q (TBQ). The findings indicate that the proposed model aligns with the empirical data and exhibits a significant relationship, as evidenced by several significant parameters for each variable. It is important to assess the influence of critical value (C.R.) and standard error (S.E.) values. This result is presented in Model 14 as follows.

(1) The direct effect of intellectual capital (MVAIC) had a significantly positive influence on revenue growth (RG) with critical ratio (C.R.) of 2.541, and p-value of 0.011 < 0.05. Thus, intellectual capital (MVAIC) was statistically significant at 0.05.

(2) The direct impact of intellectual capital (MVAIC) on discretionary accruals (DA) was observed to be negative. This suggests a negative correlation between

intellectual capital and the absolute value of discretionary accruals. As a result, it can be inferred that intellectual capital (MVAIC) has a positive influence on earnings quality, supported by a critical ratio (C.R.) of -3.626 and a p-value of 0.000, which is less than 0.05. These findings indicate that intellectual capital (MVAIC) is statistically significant at the 0.05 level.

(3) The direct impact of discretionary accruals (DA) on Tobin's Q (TBQ) was found to be positive. This suggests a positive correlation between the absolute value of discretionary accruals (DA) and Tobin's Q. Consequently, it can be inferred that earnings quality has a negative influence on Tobin's Q, as supported by a critical ratio (C.R.) of 2.410 and a p-value of 0.016, which is less than 0.05. These results indicate that discretionary accruals (DA) are statistically significant at the 0.05 level.

**Table 4.53** Standardized Direct, Indirect, and Total Effects of Revenue Growth (RG) and Discretionary Accruals (DA) are Mediating Variables Indirect Influence Intellectual Capital (MVAIC) Towards Tobin's Q (TBQ)

| **Model14** | **Revenue Growth (RG)** | | | **Discretionary Accruals (DA)** | | | **Tobin's Q (TBQ)** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **DE** | **IE** | **TE** | **DE** | **IE** | **TE** | **DE** | **IE** | **TE** |
| *MVAIC* | 0.228 | 0.000 | 0.228 | -0.320* | 0.000 | -0.320* | 0.085 | -0.060* | 0.026 |
| $R^2$ | | *9.40%* | | | *12.00%* | | | *20.30%* | |

Based on Table 4.53, Model 14 revealed a determinant coefficient ($R^2$) indicating that intellectual capital (MVAIC) influences Tobin's Q (TBQ) with 20.30% accuracy. In comparison, revenue growth (RG) influences Tobin's Q (TBQ) with 12.00% accuracy, while also exerting a 9.40% accuracy on Tobin's Q (TBQ). The study further presented standardized direct, indirect, and total effects of variables. The findings indicated that intellectual capital (MVAIC) had a positive direct effect (DE) of 0.085 on Tobin's Q (TBQ). Conversely, for the indirect effect (IE), intellectual capital (MVAIC) displayed a negative influence of -0.060 on Tobin's Q (TBQ). Moreover, it positively impacted Tobin's Q (TBQ) with a total effect (TE) of 0.026.

**Table 4.54** Comparison Analysis of Complicated Mediation

| Ho | Relationship | | | Direct Effect (C' path) | | Result |
|---|---|---|---|---|---|---|
| | **Independent Variable** | **Mediating Variable** | **Dependent Variable** | ***Beta*** | ***p-value*** | |
| *H8c:* | *MVAIC* | *RG* | *Tobin's Q* | *Path b no sig* | | *No mediation* |
| | *MVAIC* | *DA* | *Tobin's Q* | *0.082* | *0.381* | *Full mediation* |

Table 4.54 showcased the comparative analysis of intricate mediation, examining the hypothesis that revenue growth (RG) and discretionary accruals (DA) act as mediating variables, indirectly influencing the relationship between intellectual capital (MVAIC) and Tobin's Q (TBQ). The results revealed that revenue growth (RG) did not exhibit any mediation. On the other hand, the analysis demonstrated that discretionary accruals (DA) served as a complete mediator in the relationship.

## 4.7 Hypothesis Testing and Results

The results of the hypotheses have been discussed as follows:

### 4.7.1 Results

**Hypothesis 1**: Intellectual Capital has a positive influence on firm performance.

H1a: intellectual capital (MVAIC) has a positive influence on return on equity (ROE).

According to the results in Table 4.7, the intellectual capital (MVAIC) positively influenced return on equity (ROE). Furthermore, the value of the t-test revealed that the estimated value was 1.014, standard error (S.E.) was 0.353, critical ratio (C.R.) was 2.873, and p-value was 0.004< 0.05. Intellectual capital was statistically significant at 0.05. Thus, H1a was supported.

H1b: intellectual capital (MVAIC) has a positive influence on the return on assets (ROA).

According to the results in Table 4.7, the intellectual capital (MVAIC) positively influenced return on assets (ROA). Furthermore, the value of the t-test revealed that the estimated value was 0.571, standard error (S.E.) was 0.224, critical ratio (C.R.) was 2.547, and p-value was 0.011 < 0.05. Intellectual capital (MVAIC) was statistically significant at 0.05. Thus, H1b was supported.

H1c: intellectual capital (MVAIC) has a positive influence on Tobin's Q (TBQ).

According to the results in Table 4.7, the intellectual capital (MVAIC) had not affected Tobin's Q (TBQ). Furthermore, the value of the t-test revealed that the estimated value was 0.010, standard error (S.E.) was 0.035, critical ratio (C.R.) was 0.291, and p-value was 0.771 > 0.05. Intellectual capital was not statistically significant at 0.05. Thus, H1c was not supported.

Furthermore, the research revealed that intellectual capital (MVAIC) had a positive influence on return on assets (ROA). These findings are in line with theoretical expectations and confirm the studies conducted by Lotfy Abd El Aal Abied & Badr El Din El-Sharawy (2020), Sardo (2018), and Xu & Li (2020). Sardo (2018) emphasized that competitive intellectual capital in the manufacturing sector of emerging Asian markets provides a strong foundation for sustainable development, as investment in intellectual capital positively impacts a company's financial performance in both the short and long term. This study supports the intellectual capital theory, which suggests that intellectual capital can promote innovation and creativity within an organization, including the adoption of new ideas, products, and services, to enhance competitiveness and improve operational efficiency. However, it was found that intellectual capital did not have a significant effect on Tobin's Q. This contrasts with the studies conducted by Ariff et al. (2016) and Smriti & Das (2018). Smriti & Das (2018) discovered the highest correlation between Tobin's Q and the VAIC ™ model in service and manufacturing firms listed in Indian markets.

**Hypothesis 2**: Intellectual capital has a positive influence on the competitive advantage.

H2: intellectual capital (MVAIC) has a positive influence on competitive advantage.

According to the results in Table 4.10, the intellectual capital (MVAIC) had a positive influence on revenue growth (RG). Furthermore, the value of the t-test revealed that the estimated value was 0.014, standard error (S.E.) was 0.006, critical ratio (C.R.) was 2.541, and p-value was 0.011< 0.05. Intellectual capital (MVAIC) was statistically significant at 0.05. Thus, H2a was supported.

Wijayanto et al. (2019) affirm that competitive advantage lies beyond competitors who possess successful strategies and face challenges of imitation. By enabling efficient allocation of physical and financial capital, competitive advantage contributes to comprehensive value creation.

This study addresses the question of how changes in income growth during the COVID-19 pandemic impact company performance. It is found that the increased income growth is a result of organizations recognizing the importance of investing in intellectual capital. These organizations incur expenses related to distribution channels, transitioning business online, and forming trade partnerships, which positively affect company operations and lead to a competitive advantage.

New business models represent a transformation in the market landscape, creating a competitive advantage. Additionally, the findings confirm the competitive advantage through the analysis of accounting data, aligning with the resource-based view theory. This is consistent with the previous studies conducted by Correia et al. (2020), Anwar et al. (2018), Potjanajaruwit (2018), and Wijayanto et al. (2019), among others.

**Hypothesis 3**: Competitive advantage has a positive influence on firm performance.

H3a: revenue growth (RG) has a positive influence on return on equity (ROE).

According to the results in Table 4.13, revenue growth (R.G.) had a positive influence on return on equity (ROE). Furthermore, the value of the t-test revealed that the estimated value was 35.254, standard error (S.E.) was 4.801, critical ratio (C.R.) was 7.343, and p-value was 0.000 < 0.05. Revenue growth (R.G.) was statistically significant at 0.05. Thus, H3a was supported.

H3b: revenue growth (RG) has a positive influence on return on assets (ROA).

According to the results in Table 4.12, revenue growth (R.G.) had a positive influence on return on assets (ROA). Furthermore, the value of the t-test revealed that the estimated value was 22.294, standard error (S.E.) was 3.020, critical ratio (C.R.) was 7.382, and p-value was 0.000 < 0.05. Revenue growth (R.G.) was statistically significant at 0.05. Thus, H3b was supported.

H3c: revenue growth (RG) has a positive influence on Tobin's Q (TBQ).

According to the results in Table 4.12, revenue growth (R.G.) had a positive influence on Tobin's Q (TBQ). Furthermore, the value of the t-test revealed that the estimated value was 1.460, standard error (S.E.) was 0.553, critical ratio (C.R.) was 2.638, and p-value was 0.008 < 0.05. Revenue growth (R.G.) was statistically significant at 0.05. Thus, H3c was supported. Potjanajaruwit (2018) and Wijayanto et al. (2019) found similar outcomes.

This study supports the resource-based view theory since a competitive advantage enables companies to differentiate themselves from competitors. This leads to a higher market share, increased customer loyalty, and ultimately improved operational performance. With the competitive advantage, companies can offer unique products or services, reduce costs, or provide a better customer experience. All of these factors contribute to increased sales and profitability. Thus, a competitive advantage positively impacts company performance.

**Hypothesis 4**: Competitive advantage as a mediating variable that indirectly influences intellectual capital towards firm performance.

H4: Competitive advantage as a mediating variable that indirectly influences intellectual capital towards firm performance.

H4a: Competitive advantage as a mediating variable that indirectly influences intellectual capital (MVAIC) towards return on equity (ROE).

Based on the findings presented in Table 4.16, it was observed that revenue growth (R.G.) exhibited a direct positive impact on return on equity (ROE) with a critical ratio (C.R.) of 6.591 and a p-value of 0.000 < 0.05. This indicates that revenue growth (R.G.) was statistically significant at the 0.05 level. Additionally, the results revealed that intellectual capital (MVAIC) directly influenced revenue growth (RG)

positively, with a critical ratio (C.R.) of 2.618 and a p-value of 0.009 < 0.05. Therefore, revenue growth (RG) was also statistically significant at the 0.05 level. The mediation analysis conducted using the Baron & Kenny (1986) test demonstrated that revenue growth (RG) fully mediated the relationship. Thus, H4a was supported.

H4b: Competitive advantage as a mediating variable indirectly influences intellectual capital (MVAIC) toward return on assets (ROA).

Based on the findings presented in Table 4.19, it was observed that revenue growth (RG) had a direct positive impact on return on assets (ROA) with a critical ratio (C.R.) of 6.644 and a p-value of 0.000 < 0.05. This indicates that revenue growth (RG) was statistically significant at the 0.05 level. Furthermore, the results revealed that intellectual capital had a direct positive influence on revenue growth (RG) with a critical ratio (C.R.) of 2.541 and a p-value of 0.011 < 0.05. Therefore, revenue growth (RG) was also statistically significant at the 0.05 level. In conclusion, the mediation analysis conducted using the Baron & Kenny (1986) test demonstrated that revenue growth (RG) fully mediated the relationship. Thus, H4b was supported.

H4c: revenue growth (RG) as a mediating variable indirectly influences intellectual capital (MVAIC) toward Tobin’s Q (TBQ).

Based on the data presented in Table 4.22, it was observed that revenue growth (RG) had a direct positive impact on Tobin's Q with a critical ratio (C.R.) of 2.373 and a p-value of 0.018 < 0.05. This suggests that revenue growth (RG) was statistically significant at the 0.05 level. Additionally, the results indicated that intellectual capital (MVAIC) had a direct positive influence on revenue growth (RG) with a critical ratio (C.R.) of 2.541 and a p-value of 0.011 < 0.05. Therefore, revenue growth (RG) was also statistically significant at the 0.05 level. In conclusion, the mediation analysis conducted using the Baron & Kenny test revealed that revenue growth (RG) fully mediated the relationship. Thus, H4c was supported.

According to the mediation variable test (Baron & Kenny, 1986), the hypothesis testing revealed that intellectual capital in Thailand exerted a significant positive influence on return on equity (ROE) through revenue growth (RG). This suggests that revenue growth (RG) plays a supplementary role in enhancing firm performance. These findings align with Ulum's (2014) intellectual capital model.

Furthermore, the Baron & Kenny (1986) mediation test demonstrated that revenue growth (RG) fully mediated the relationship. These results are consistent with the study by Anwar et al. (2018), which found that competitive advantage fully mediates the connection between intellectual capital and new venture performance.

Similarly, the hypothesis testing using the mediation variable test (Baron & Kenny, 1986) indicated that intellectual capital in Thailand had a positive significant influence on return on assets (ROA) through revenue growth (RG). This implies that revenue growth (RG) serves as an additional factor in driving improved firm performance. The mediation test by Baron & Kenny (1986) revealed that revenue growth (RG) fully mediated the relationship. These findings are in line with Kamukama et al. (2011) study, which identified competitive advantage as a true mediator in the association between intellectual capital and financial performance.

Finally, the hypothesis testing using the mediating variable test (Baron & Kenny, 1986) revealed that intellectual capital in Thailand had a positive and significant influence on Tobin's Q (TBQ) through revenue growth (RG). The mediation test by Baron & Kenny (1986) revealed that revenue growth (RG) fully mediated the relationship. These findings align with the study conducted by Wijayanto et al. (2019), which found that competitive advantage had a significant impact on Tobin's Q in Indonesian manufacturing firms.

This study found that intellectual capital refers to intangible assets of a company, such as knowledge, skills, patents, trademarks, and organizational processes. It plays a significant role in enhancing company efficiency through competitive advantage by utilizing innovation, improvement, and leveraging the benefits of intangible assets. Continual investment in intellectual capital helps companies remain agile, adaptable, and maintain long-term competitive advantage.

**Hypothesis 5**: Intellectual capital has a positive influence on earnings quality.

H5: Intellectual capital (MVAIC) has a positive influence on earnings quality.

Table 4.26 shows that the intellectual capital (MVAIC) had a negative influence on discretionary accruals (DA) with a critical ratio (C.R.) of -3.626 and p-value of 0.000 < 0.05. Therefore, intellectual capital (MVAIC) was statistically significant at 0.05. Those imply that the absolute value of discretionary accruals negatively influences

intellectual capital (MVAIC), and intellectual capital positively influences earnings quality. Thus, H5a was supported.

The study by Kalalo & Sofian (2022) further highlights the significantly positive effect of intellectual capital on the earnings quality of manufacturing companies listed in Indonesia. In the current period of research, there is a growing emphasis on investment in intellectual capital, as noted by Sarea & Alansari (2016), who concluded that a high level of intellectual capital is expected to contribute to income quality in companies listed on the Bahrain Stock Exchange, enhancing their global appeal.

This study found that intellectual capital is highly important for the growth and success of companies and also influences the profitability derived from quality operations. It significantly affects decision-making and future capability assessments of the company. Obviously, Intellectual capital plays a crucial role in driving innovation and internal product development within the company. There is a tendency to develop high-quality products or services, leading to increased profitability and improved quality of earnings. This is consistent with the findings of Mutuc (2021), which indicate that intellectual capital significantly affects the earnings quality in Asian countries, including China, the Philippines, Taiwan, and Thailand. The discovery highlights that knowledge-based resources contribute to the generation of high-quality financial reports.

**Hypothesis 6**: Earnings quality has a positive influence on firm performance.

H6a: Earnings quality has a positive influence return on equity (ROE).

Table 4.29 shows that discretionary accruals (DA) positively influenced return on equity (ROE). However, the absolute value of discretionary accruals (DA) was significantly and positively related to return on equity (ROE), so earnings quality negatively affected return on equity (ROE). Furthermore, the value of the t-test revealed the estimated value of 8.604 standard error (S.E.) of 3.218, critical ratio (C.R.) of 2.674, and p-value of $0.007 < 0.05$. Therefore, the discretionary accruals (DA) were statistically significant at 0.05. Thus, H6a was supported.

H6b: Earnings quality has a positive influence return on assets (ROA).

According to Table 4.29, the results showed that the discretionary accruals (DA) have a positive influence on return on assets (ROA). However, the absolute value of discretionary accruals (DA) is significantly and positively related to return on assets

(ROA). So, earnings quality negatively affects return on assets (ROA). The result showed that the value of the t-test revealed the estimated value of 5.663, standard error (S.E.) of 2.022, critical ratio (C.R.) of 2.801, and p-value of 0.005 < 0.05. Moreover, discretionary accruals (DA) were statistically significant at 0.05. Therefore, it could conclude that H6b was supported.

H6c: Earnings quality has a positive influence Tobin's Q (TBQ).

According to Table 4.29, the results showed that the discretionary accruals (DA) have a positive influence on Tobin's Q (TBQ). However, the absolute value of discretionary accruals (DA) is significantly and positively related to Tobin's Q (TBQ). So, earnings quality negatively affects Tobin's Q (TBQ). The result showed that the value of the t-test revealed the estimated value of 0.882, standard error (S.E.) of 0.315, critical ratio (C.R.) of 2.804, and p-value of 0.005 < 0.05. Moreover, it showed that discretionary accruals (DA) were statistically significant at 0.05. Therefore, it could conclude that H6c was supported.

Hutagaol-Martowidjojo et al. (2019) demonstrated a negative correlation between earnings quality and the market value of equity for firms listed in Indonesia. Similarly, Islam et al. (2022) discovered that poor earnings quality significantly decreases the level of corporate financial performance. These findings differ from the results of Muhammad Haykal et al. (2020) and Saleh, Abu Afifa, & Alsufy (2020). Muhammad Haykal et al. (2020) established a positive and significant effect of return on assets (ROA) on discretionary accruals within Indonesian production manager companies. Saleh et al. (2020) found that high earnings quality enhances the performance of Jordanian industrial companies, as reflected in ROA, ROE, and EPS as indicators of firm performance.

**Hypothesis 7**: Earnings quality as a mediating variable indirectly influences intellectual capital towards firm performance.

H7a: Discretionary accruals (DA) as a mediating variable indirectly influence intellectual capital (MVAIC) towards return on equity (ROE).

Based on the data presented in Table 4.32, it was found that intellectual capital (MVAIC) had a positive impact on return on equity (ROE) with a critical ratio (C.R.) of 4.217 and a p-value of 0.000 < 0.05. This indicates that intellectual capital (MVAIC)

was statistically significant at the 0.05 level. Furthermore, discretionary accruals (DA) also had a positive influence on return on equity (ROE) with a critical ratio (C.R.) of 4.048 and a p-value of 0.000 < 0.05. This implies that the absolute value of discretionary accruals positively affects Return on Equity (ROE). Consequently, it can be concluded that earnings quality has a negative impact on return on equity (ROE). Thus, the discretionary accruals (DA) were statistically significant at the 0.05 level. Additionally, intellectual capital (MVAIC) exhibited a negative influence on discretionary accruals (DA) with a critical ratio (C.R.) of -3.626 and a p-value of 0.000 < 0.05. This suggests that intellectual capital negatively affects the absolute value of discretionary accruals. Consequently, it can be inferred that intellectual capital (MVAIC) positively influences earnings quality. In conclusion, intellectual capital (MVAIC) was found to be statistically significant at the 0.05 level. Regarding mediation, the Baron & Kenny 1986 test indicated that discretionary accruals (DA) mediated the relationship partially. Thus, H7a was supported.

H7b: Discretionary accruals (DA) as a mediating variable that indirectly influences intellectual capital (MVAIC) towards return on assets (ROA).

Based on the findings presented in Table 4.35, it was observed that intellectual capital (MVAIC) had a positive impact on return on assets (ROA) with a critical ratio (C.R.) of 3.878 and a p-value of 0.000 < 0.05. This indicates that intellectual capital (MVAIC) was statistically significant at the 0.05 level. Additionally, it was revealed that discretionary accruals (DA) positively influenced return on assets (ROA) with a critical ratio (C.R.) of -3.626 and a p-value of 0.000 < 0.05. This suggests that the absolute value of discretionary accruals (DA) has a positive effect on return on assets (ROA). Consequently, it can be inferred that earnings quality has a negative impact on return on assets (ROA). Moreover, intellectual capital (MVAIC) exhibited a negative influence on discretionary accruals (DA). This implies a negative correlation between intellectual capital and the absolute value of discretionary accruals. It can be concluded that intellectual capital (MVAIC) has a positive influence on earnings quality with a critical ratio (C.R.) of -3.626 and a p-value of 0.000 < 0.05. In conclusion, the statistical analysis indicated that intellectual capital (MVAIC) was significant at the 0.05 level. Regarding

mediation, the Baron & Kenny test revealed that discretionary accruals (DA) had a partial mediation. Thus, H7b was supported.

H7c: Discretionary accruals (DA) as a mediating variable indirectly influence intellectual capital (MVAIC) towards Tobin's Q (TBQ).

Based on the information presented in Table 4.38, it was found that discretionary accruals (DA) had a positive influence on Tobin's Q (TBQ) with a critical ratio (C.R.) of 3.162 and a p-value of 0.002 < 0.05. This suggests that the absolute value of discretionary accruals (DA) positively affected Tobin's Q (TBQ). Consequently, it can be inferred that earnings quality has a negative impact on Tobin's Q (TBQ). In conclusion, the statistical analysis indicated that discretionary accruals (DA) were statistically significant at the 0.05 level. Additionally, intellectual capital (MVAIC) was found to have a negative influence on discretionary accruals (DA) with a critical ratio (C.R.) of -3.626 and a p-value of 0.000 < 0.05. This implies a negative correlation between intellectual capital and the absolute value of discretionary accruals. It can be concluded that intellectual capital (MVAIC) positively influences earnings quality. Hence, it was indicated that intellectual capital (MVAIC) was statistically significant at the 0.05 level. In conclusion, the mediation analysis conducted using the Baron & Kenny method revealed that discretionary accruals (DA) exhibited full mediation. Thus, H7c was supported.

Based on the hypothesis testing utilizing the mediating variable test (Baron & Kenny, 1986), it was revealed that intellectual capital in Thailand had a significant positive impact on return on equity (ROE) through discretionary accruals (DA). This implies that the absolute value of discretionary accruals positively affects return on equity (ROE). Consequently, it can be inferred that earnings quality has a negative influence on return on equity (ROE). Regarding mediation, the Baron & Kenny 1986 test indicated that the mediation by discretionary accruals (DA) is partial in nature. These findings align with the study conducted by Latif et al. (2017), which concluded that earnings quality partially mediates corporate and financial performance. Thus, it further supports the notion of partial mediation by earnings quality.

The hypothesis testing based on mediating variable test (Baron & Kenny, 1986) revealed that intellectual capital in Thailand had a significant positive impact on

return on assets (ROA) through discretionary accruals (DA). This implies that the absolute value of discretionary accruals positively affects return on assets (ROA). Consequently, it can be inferred that earnings quality has a negative influence on return on assets (ROA). Regarding mediation, the Baron & Kenny 1986 test indicated that the mediation by discretionary accruals (DA) is partial in nature. These findings align with the study conducted by Latif et al. (2017), which concluded that earnings quality partially mediates corporate and financial performance. Thus, it further supports the notion of partial mediation by earnings quality.

Finally, based on the hypothesis testing employing the mediating variable test (Baron & Kenny, 1986), it was revealed that intellectual capital in Thailand had a significant positive impact on Tobin's Q (TBQ) through discretionary accrual (DA). This indicates that discretionary accrual (DA) serves as an additional factor in accelerating better firm performance. Furthermore, it suggests that the absolute value of discretionary accruals positively influences Tobin's Q (TBQ). Consequently, it can be concluded that earnings quality negatively affects Tobin's Q (TBQ). In terms of mediation, the Baron & Kenny 1986 test demonstrated that discretionary accruals (DA) exhibit full mediation. These results are consistent with the findings of Duarte, Lisboa, & Carreira (2022) and Hutagaol-Martowidjojo et al. (2019). Hutagaol-Martowidjojo et al. (2019) discovered a negative correlation between earnings quality and Tobin's Q, indicating that the Indonesian capital market perceives earnings management as an efficient practice.

Revenue management is a matter of concern for both investors and regulators due to its impact on the informative nature of discretionary accruals in financial reporting (Jamadar, Ong, Abdullah, & Kamarudin, 2022). Intellectual capital enhances management skills, directly influencing earnings quality. The financial and transactional data of a company can be observed through its earnings quality (Dewi, Gunawan, Firman, Ridwan, & Dambe, 2022). Companies should disclose their financial statements to provide easy access to the necessary information for investors and to minimize potential losses for both investors and the company itself (Dewi et al., 2022).

The study found that investing in intellectual capital positively impacts returns from assets through earnings quality, which has significant negative implications. This supports the agency theory, which explains the earnings quality generated by managerial

discretion to achieve higher profits than normal operations, thereby attracting investor attention. The findings of this study can be applied in the decision-making process of companies. Thus, prioritizing the importance of earnings quality is crucial for sustainable growth and long-term success for investors and shareholders.

**Hypothesis 8**: Competitive advantage and earnings quality as mediating variables indirect influence intellectual capital towards firm performance.

H8a: Revenue growth (RG) and discretionary accruals (DA) as mediating variables indirectly influence intellectual capital (MVAIC) towards return on equity (ROE).

According to Table 4.42, the direct model was examined using the results of the structural equation model to test the influence of intellectual capital (MVAIC) on return on equity (ROE). The analysis revealed a positive influence with a critical ratio (C.R.) of 2.172 and a p-value of 0.030, which is less than 0.05. Therefore, intellectual capital (MVAIC) was found to be statistically significant at the 0.05 level.

Additionally, the direct effect of revenue growth (R.G.) on return on equity (ROE) was significantly positive, with a critical ratio (C.R.) of 5.068 and a p-value of 0.000, which is less than 0.05. Hence, revenue growth (R.G.) was also found to be statistically significant at the 0.05 level.

Furthermore, the direct effect of intellectual capital (MVAIC) on revenue growth (R.G.) was significantly positive, with a critical ratio (C.R.) of 2.541 and a p-value of 0.011, which is less than 0.05. Therefore, intellectual capital (MVAIC) was considered statistically significant at the 0.05 level.

In conclusion, the direct effect of intellectual capital (MVAIC) had a negative influence on discretionary accruals (DA), suggesting a negative correlation between intellectual capital and the absolute value of discretionary accruals. The critical ratio (C.R.) for this effect was -3.626, and the p-value was 0.000, which is less than 0.05. Thus, intellectual capital (MVAIC) was found to be statistically significant at the 0.05 level, indicating a positive effect on earnings quality.

Additionally, the mediation method by Baron and Kenny (1986) demonstrated that revenue growth (RG) partially mediated the relationship. However, the mediation method showed that discretionary accruals had a direct effect. Thus, H8a was supported.

H8b: Revenue growth (RG) and discretionary accruals (DA) as mediating variables indirectly influence intellectual capital (MVAIC) towards return on assets (ROA).

According to Table 4.47, the direct effect of intellectual capital (MVAIC) on revenue growth (RG) was significantly positive, with a critical ratio (C.R.) of 2.541 and a p-value of 0.011, which is less than 0.05. Hence, intellectual capital (MVAIC) was found to be statistically significant at the 0.05 level.

Furthermore, the direct effect of revenue growth (RG) on return on assets (ROA) was significantly positive, with a critical ratio (C.R.) of 5.145 and a p-value of 0.000, which is less than 0.05. Thus, revenue growth (RG) was also considered statistically significant at the 0.05 level.

Additionally, the direct effect of intellectual capital (MVAIC) had a negative influence on discretionary accruals (DA), implying a negative correlation between intellectual capital and the absolute value of discretionary accruals. Therefore, it can be concluded that intellectual capital (MVAIC) has a positive effect on earnings quality. The critical ratio (C.R.) for this effect was -3.626, and the p-value was 0.000, which is less than 0.05. Hence, intellectual capital (MVAIC) was indicated to be statistically significant at the 0.05 level.

Moreover, the mediation method by Baron and Kenny (1986) revealed that revenue growth (RG) fully mediated the relationship. However, the mediation method also showed that discretionary accruals had no mediation effect. Thus, H8b was supported.

H8c: revenue growth (RG) and discretionary accruals (DA) as mediating variables indirectly influence intellectual capital (MVAIC) towards Tobin's Q (TBQ).

According to Table 4.52, the direct effect of intellectual capital (MVAIC) on revenue growth (RG) was found to have a significantly positive influence, with a critical ratio (C.R.) of 2.541 and a p-value of 0.011, which is less than 0.05. Therefore, intellectual capital (MVAIC) was considered statistically significant at the 0.05 level.

Additionally, the direct effect of intellectual capital (MVAIC) had a negative influence on discretionary accruals (DA), indicating a negative correlation between intellectual capital and the absolute value of discretionary accruals (DA). Consequently,

it can be concluded that intellectual capital (MVAIC) has a positive effect on earnings quality. The critical ratio (C.R.) for this effect was -3.626, and the p-value was 0.000, which is less than 0.05. Hence, intellectual capital (MVAIC) was found to be statistically significant at the 0.05 level.

Furthermore, the direct effect of discretionary accruals (DA) positively influenced Tobin's Q (TBQ), suggesting a positive correlation between the absolute value of discretionary accruals (DA) and Tobin's Q (TBQ). Therefore, it can be concluded that earnings quality has a negative effect on Tobin's Q (TBQ). The critical ratio (C.R.) for this effect was 2.410, and the p-value was 0.016, which is less than 0.05. Thus, discretionary accruals (DA) were indicated to be statistically significant at the 0.05 level.

Moreover, the mediation method by Baron and Kenny (1986) demonstrated that revenue growth (RG) had no mediation effect. However, the mediation method also showed that discretionary accruals had a full mediation effect. Thus, H8c was supported.

Additionally, the direct effect of intellectual capital (MVAIC) had a negative influence on discretionary accruals (DA), indicating a negative correlation between intellectual capital and the absolute value of discretionary accruals (DA). Consequently, it can be concluded that intellectual capital (MVAIC) has a positive effect on earnings quality. The critical ratio (C.R.) for this effect was -3.626, and the p-value was 0.000, which is less than 0.05. Hence, intellectual capital (MVAIC) was found to be statistically significant at the 0.05 level.

Furthermore, the direct effect of discretionary accruals (DA) positively influenced Tobin's Q (TBQ), suggesting a positive correlation between the absolute value of discretionary accruals (DA) and Tobin's Q (TBQ). Therefore, it can be concluded that earnings quality has a negative effect on Tobin's Q (TBQ). The critical ratio (C.R.) for this effect was 2.410, and the p-value was 0.016, which is less than 0.05. Thus, discretionary accruals (DA) were indicated to be statistically significant at the 0.05 level.

Moreover, the mediation method by Baron and Kenny (1986) demonstrated that revenue growth (RG) had no mediation effect. However, the mediation method also showed that discretionary accruals had a full mediation effect. Thus, H8c was supported.

The study found that intellectual capital positively impacts returns from assets and shareholder returns through competitive advantage. This is consistent with the intellectual theory and resource-based view theory. Intellectual capital refers to intangible assets of a company, such as knowledge, patents, trademarks, and skilled employees. These intangible assets can create a competitive advantage for the company, which leads to favorable returns on assets (ROA) and returns on equity (ROE) for shareholders as follows:

(1) With intellectual capital, companies can conceive and create differentiated products or services from competitors. This uniqueness can lead to increased sales and market share. Additionally, intellectual capital includes the knowledge and expertise possessed by employees, which, when effectively utilized, can enhance efficiency and productivity within the organization. Conversely, this can also result in cost savings and improved profitability, ultimately benefiting ROA and ROE.

(2) Trademarks and patents can contribute to building a strong brand image. A strong brand enhances customer perception, trust, and loyalty, potentially leading to increased sales, repeat business, and higher profit margins. This positive impact reflects on ROA and ROE.

(3) With intellectual capital, the companies become more attractive to investors and potential partners, showcasing growth potential and profitability in the long term. This leads to increased investment opportunities and collaborations, ultimately benefiting ROA and ROE.

Overall, intellectual capital can create a competitive advantage by fostering innovation, improving efficiency, and building strengths. It enhances brand reputation and attracts investors. Conversely, these factors positively impact company returns on assets and returns on equity for shareholders.

This study revealed that intellectual capital plays a significant role in enhancing Tobin's Q by improving earnings quality, aligning with the principles of agency theory. Effective utilization of intellectual capital investments by businesses yields several advantages that contribute positively to the company's market value. These advantages encompass various aspects such as:

(1) Intellectual capital fosters innovation, enabling companies to develop new products, services, and technologies. This helps increase market positioning, sales, and the market value of the company.

(2) Intellectual capital, such as trademarks and patents, contributes to brand recognition and reputation. A strong brand enhances customer perception, attracts investors, and increases the market value of the company.

(3) Intellectual capital also includes customer relationships, customer databases, loyalty programs, and in-depth customer information. Companies efficiently utilizing this intellectual capital can customize their products and services to meet customer needs, resulting in higher customer satisfaction, increased sales, and an enhanced market value of the company.

In summary, intellectual capital provides benefits by driving innovation, enhancing brand value, leveraging human capital, and maintaining customer relationships. Companies that effectively manage and utilize intellectual capital experience increased market value.

## 4.8 Summary of Hypothesis Testing and Results

**Table 4.55** Summary of Hypothesis Testing Results

| Research questions | Hypothesis | Results |
|---|---|---|
| How does the influence of intellectual capital on firm performance? | H1a: Intellectual capital has a positive influence on the return on equity. | Supported |
| | H1b: Intellectual capital has a positive influence on the return on assets. | Supported |
| | H1c: Intellectual capital has a positive influence on Tobin's Q | Not Supported |
| How does intellectual capital influence firm performance through competitive advantage? | H2: Intellectual capital has a positive influence on revenue growth | Supported |
| How does competitive advantage influence firm performance? | H3a: Revenue growth (RG) has a positive influence on return on equity (ROE). | Supported |
| | H3b: Revenue growth (RG) has a positive influence on return on assets (ROA). | Supported |
| | H3c: Revenue growth (RG) has a positive influence on Tobin's Q (TBQ). | Supported |

**Table 4.55** Summary of Hypothesis Testing Results (Cont.)

| Research questions | Hypothesis | Results |
|---|---|---|
| How does intellectual capital influence firm performance through competitive advantage? | H4a: Revenue growth (RG) as a mediating variable that indirectly influences intellectual capital (MVAIC) towards return on equity (ROE). | Full Mediation |
| | H4b: Revenue growth (RG) as a mediating variable indirectly influences intellectual capital (MVAIC) towards return on assets (ROA). | Full Mediation |
| | H4c: Revenue growth (RG) as a mediating variable indirectly influences intellectual capital (MVAIC) towards Tobin's Q. | Full Mediation |
| How does intellectual capital influence intellectual capital on firm performance through earnings quality? | H5: Intellectual capital (MVAIC) has a positive influence on earnings quality. | Supported |
| How does earnings quality influence firm performance? | H6a: Earnings quality has a positive influence return on equity (ROE) | Supported |
| | H6b: Earnings quality has a positive influence return on assets (ROA). | Supported |
| | H6c: Earnings quality has a positive influence Tobin's Q (TBQ). | Supported |
| How does intellectual capital influence firm performance through earnings quality? | H7a: Discretionary accruals (DA) as a mediating variable that indirectly influences intellectual capital (MVAIC) towards return on equity (ROE). | Partial Mediation |
| | H7b: Discretionary accruals (DA) as a mediating variable that indirectly influences intellectual capital (MVAIC) towards return on assets (ROA) | Partial Mediation |
| | H7c: Discretionary accruals (DA) as a mediating variable that indirectly influences intellectual capital (MVAIC) towards Tobin's Q (TBQ). | Full Mediation |
| How does intellectual capital influence firm performance through competitive advantage and earnings quality? | H8a: Revenue growth (RG) and discretionary accruals (DA) are mediating variables indirect influence intellectual capital (MVAIC) towards return on equity (ROE). | (RG)Partial Mediation |
| | H8b: Revenue growth (RG) and discretionary accruals (DA) are mediating variables indirect influence intellectual capital (MVAIC) towards return on assets (ROA). | (RG)Full Mediation |
| | H8c: Revenue growth (RG) and discretionary accruals (DA) are mediating variables indirect influence intellectual capital (MVAIC) towards Tobin's Q (TBQ). | (DA)Full Mediation |

# CHAPTER 5
# CONCLUSION AND RECOMMENDATIONS

The chapter 5 presents a summary of the study on the influence of intellectual capital on firm performance through competitive advantage and earnings quality. The content is structured in the following order: conclusion of the study, discussion, contributions, limitations, and recommendations for future research.

## 5.1 Conclusion

The objective of this research was to investigate the influence of intellectual capital on firm performance through the competitive advantage and earnings quality of companies listed on the Stock Exchange of Thailand in the service industry. The samples used in this study consisted of financial data from 114 companies listed on the Stock Exchange of Thailand, collected from SETSMART, during the years 2019-2020. The collected data was analyzed and presented using descriptive statistics. Subsequently, correlation analysis, path analysis, and structural equation modeling were employed to examine the influence of intellectual capital on firm performance and to verify the relationship between intellectual capital, competitive advantage, and earnings quality.

The primary aim of this research was to explore various facets of the relationship between intellectual capital and firm performance. Specifically, the study seeks to address the direct influence of intellectual capital on firm performance, the indirect influence of intellectual capital on firm performance mediated through competitive advantage, the indirect influence of intellectual capital on firm performance mediated through earnings quality, and the combined influence of intellectual capital on firm performance through both competitive advantage and earnings quality.

As mentioned in Chapter 1, this study is guided by the following set of research questions:

Research question 1: How does intellectual capital influence firm performance?

Research question 2: How does intellectual capital influence competitive advantage?

Research question 3: How does competitive advantage influence firm performance?

Research question 4: How does intellectual capital influence firm performance through competitive advantage?

Research question 5: How does intellectual capital influence earnings quality?

Research question 6: How does earnings quality influence firm performance?

Research question 7: How does intellectual capital influence firm performance through earnings quality?

Research question 8: How does intellectual capital influence firm performance through competitive advantage and earnings quality?

In this study, intellectual capital was assessed across four key dimensions: human capital efficiency (HCE), structural capital efficiency (SCE), relational capital efficiency (RCE), and capital employed efficiency (CEE). These dimensions, introduced by Ulum et al. (2014), constitute the foundation of this intellectual capital analysis. The study utilizes the MVAIC model to quantify intellectual capital efficiency, which serves as the independent variable.

This study employed three performance indicators, namely return on equity (ROE), return on assets (ROA), and Tobin's Q, to measure firm performance based on previous research (Soetanto & Liem, 2019; Hoang, Nguyen, Vu, Le, & Quach, 2020; Xu & Wang, 2018). ROE and ROA gauge financial performance, while Tobin's Q assesses market performance.

Furthermore, this study examines two mediating variables: competitive advantage, measured by revenue growth according to Kramer & Porter (2011), and earnings quality using the modified Jones (1991) model.

## 5.2 Results and Discussion

### 5.2.1 Influence of Intellectual Capital on firm Performance

This research found that intellectual capital has a positive influence on the return on equity and the return on assets, with the exception of Tobin's Q. In this study, the relational capital efficiency (RCE) variable has been incorporated into the MVAIC model. Financial data, expenses, and distribution channel information were used to calculate the

relational capital efficiency (RCE). The findings indicate that various service businesses have adapted to changing situations, such as consumer preferences, the COVID-19 situation, and the integration of information technology in service delivery to meet customer demands.

Additionally, relational capital efficiency (RCE) includes components such as customer data and establishing trade partnerships. All the aforementioned factors contribute to enhancing the quality of service, thereby impacting the operational performance of businesses. In the case of South Korea, the strength of relational capital is more beneficial for coordinating activities (Xu & Wang, 2018). These findings align with prior studies (Ariff et al., 2016; Serenko & Bontis, 2013; Ulum et al., 2014; Lotfy Abd El Aal Abied & Badr El Din El-Sharawy, 2020; Sardo, 2018; and Xu & Li, 2020).

However, it is evident that intellectual capital does not have a statistically significant impact on Tobin's Q. Due to the limited disclosure of intellectual capital information in the Stock Exchange of Thailand, the identification of intellectual capital does not affect the business value for investors. This situation contrasts with previous research by Ariff et al. (2016) and Smriti & Das (2018). Smriti & Das (2018) discovered the highest correlation between Tobin's Q and the VAIC $^{TM}$ model in companies in the service and manufacturing sectors reporting in the Indian market.

This study supports the intellectual capital theory within the context of COVID-19. In the service industry, businesses have adapted by utilizing existing resources, both physical and financial, to improve internal and external processes within organizations. This adaptation has led to operational outcomes amid the changes taking place. Moreover, the global capital markets have been influenced by the economic repercussions of the COVID-19 situation. Celenza & Rossi (2014) proposed that the analysis of intellectual capital offers insights into the multifaceted benefits of accounting data and its impact on the performance of publicly listed companies.

**5.2.2 Influence of Intellectual Capital on Competitive Advantage**

Competitive advantage, as mentioned in the literature review, is a fundamental concept in business strategy that refers to the unique attributes, resources, or capabilities enabling a company to outperform its rivals in a specific market or industry. This research employed revenue growth as a representative measure of the competitive advantage of service businesses. The results demonstrated that intellectual capital had a

positive influence on competitive advantage during the study period, 2019-2020. This implies that several service businesses listed on the Stock Exchange of Thailand endeavored to enhance their operations by utilizing new technology and distribution channels. They sought to improve both internal and external processes and even created new channels, such as online platforms, to respond to customer demands. The research results are consistent with previous studies (Al-Musali & Ismail, 2014; Astuti, Chariri, & Rohman, 2019; Kamukama & Sulait, 2017). These studies stated that investing in intellectual capital, particularly in terms of relational capital efficiency (RCE), proves beneficial, whether involving expenses related to distribution channels. The adaptation and utilization of relational capital efficiency (RCE) lead to revenue growth, resulting in a competitive advantage. Obeidat et al. (2021) found that intellectual capital has a statistically significant impact on enhancing competitive advantage in the service industry.

**5.2.3 Influence of Competitive Advantage on Firm Performance**

The research confirms the statistically significant positive influence of competitive advantage on firm performance, specifically on ROE, ROA, and Tobin's Q. These results align with previous studies (Chahal & Bakshi, 2015). Revenue growth has been used as a proxy for competitive advantage in this study. The research findings demonstrate revenue growth amid economic uncertainty caused by the COVID-19 pandemic and the adoption of International Financial Reporting Standards (TFRS-15) during 2019-2020. Additionally, it was found that some businesses may be affected both positively and negatively, impacting the accounting practices and marketing strategies of the service industry during changing situations.

Supporting the resource-based view theory, the service industry has undergone internal and external changes to create its identity and uniqueness. Establishing distribution channels as a form of relational capital has become an integral part of intellectual capital. This facilitates quick customer access, leaving a positive impression and, consequently, enhancing operational outcomes. According to Barney (1991) and Kamukama et al. (2011), competitive advantage hinges on valuable resources that are rare and challenging to replicate within an organization.

### 5.2.4 Influence of Intellectual Capital on Firm Performance Through Competitive Advantage

This study employs Baron & Keney's mediation analysis method from 1986, revealing the crucial mediating role of competitive advantage in the relationship between intellectual capital and firm performance. This relationship is assessed through return on equity (ROE), return on assets (ROA), and Tobin’s Q. The results align with previous studies (Anwar et al., 2018; Xu & Li, 2020). Anwar et al. (2018) found that competitive advantage serves as a robust mediating variable in the connection between intellectual capital and new business performance. Additionally, Xu & Liu (2020) expanded the understanding of intellectual capital's role in creating a competitive advantage in the manufacturing industry and highlighted intellectual capital as a robust platform for sustainable development in the growing Asian market.

Overall, investment in intellectual capital in the service industry contributes to revenue growth, leading to enhanced financial and market performance amidst global economic changes and the COVID-19 situation, particularly in the context of Thailand.

### 5.2.5 Influence of Intellectual Capital on Earnings Quality

This research found that intellectual capital has a positive influence on earnings quality. The research results are consistent with previous studies (Kalalo & Sofian, 2022; Sarea & Alansari, 2016; Darabi, Rad, & Heidaribali, 2012). Sarea, Alansari, and Capital (2016) significantly supported the influence of intellectual capital on earnings quality. It is worth noting that the study found that investment in intellectual capital as a whole, including capital employed efficiency (CEE) calculated from total assets, positively influences the revenue quality of the service industry. By considering the variable of discretionary accruals, which measures earnings quality through management's discretionary allowance for outstanding items, calculated using The Modified Jones Model (1995), the study found that when managers exercise less discretion in manipulating earnings, resulting in fewer outstanding items, the quality of earnings improves. Investment in intellectual capital, as assessable through earnings quality measurement, positively impacts expenditure allocation, such as depreciation and amortization expenses of tangible and intangible assets, leading to improved earnings quality.

This study supports the agency theory. When principals delegate tasks or decision-making authority to agents, conflicts of interest often arise. The findings indicate that the service industry invests in intellectual capital and uses managerial discretion in expenditure allocation to enhance earnings quality. This results in reduced earnings manipulation and higher earnings quality. Therefore, there is a positive correlation between the level of intellectual capital investment and the earnings quality of businesses.

**5.2.6 Influence of Earnings Quality on Firm Performance**

The research results found that earnings quality has a negative impact on performance measured by ROE, ROA, and Tobin's Q. The research results are consistent with previous studies (Hutagaol-Martowidjojo et al., 2019; Islam, Haque, & Moutushi, 2022). Ma & Ma (2017) which suggested that earnings quality is a critical factor for managers and investors as it provides information about the operational and financial status of the company.

This research found that the negative impact on business performance resulted from a decrease in earnings quality due to data collection processes during the COVID-19 crisis. The study found that if management prioritizes earnings quality, it is imperative for them to consistently and continuously manage the business to ensure consistent profitability. The achieved earnings quality also reflects the high-quality earnings presented in financial reports, serving as a warning signal for investors and stakeholders. Additionally, the study revealed that earnings quality demonstrates how businesses can efficiently leverage it for future benefits, impacting both accounting practices and market performance.

**5.2.7 Influence of Intellectual Capital on Firm Performance Through Earnings Quality**

The study also shows that earnings quality partially mediates the positive influence of intellectual capital on return on equity (ROE) and return on assets (ROA). However, earnings quality serves as a full mediating variable in the relationship between intellectual capital and Tobin's Q. There might be other factors influencing operational efficiency during the COVID-19 crisis, such as the global economic slowdown and uncertainty. Organizations have placed a greater emphasis on accumulating cash

reserves to ensure survival and to make investments in opportune moments. The research results are consistent with previous studies (Mahrani & Soewarno, 2018; Duarte, Lisboa, & Carreira, 2022; Hutagaol-Martowidjojo et al., 2019). Antonio, Laela, & Darmawan (2019) found that earnings management can serve as a full mediating variable in the relationship between corporate governance and financial performance.

The study supports the Agency theory, suggesting that managerial discretion in employing discretionary accruals benefits shareholders. This study shows how this influence shapes the relationship between intellectual capital and market value through earnings quality.

**5.2.8 Influence of Intellectual Capital on Firm Performance Through Competitive Advantage and Earnings Quality**

This research reveals that competitive advantage acts as a full mediating variable in the relationship between intellectual capital and return on assets (ROA). Additionally, competitive advantage partially mediates the relationship between intellectual capital and returns on equity (ROE). The study's results indicate that return on assets (ROA) holds more influence than return on equity (ROE). This is because return on assets (ROA) is calculated using total assets, a component similar to intellectual investment's capital employed. Therefore, this contribution of the study also highlights the significant indirect influence of competitive advantage on the relationship between intellectual capital and firm performance. These findings align with prior research (Rochmadhona, Suganda, and Cahyadi, 2018), which also identified competitive advantage as a partial mediating variable. The study demonstrates that intellectual capital impacts company performance through the competitive advantage of service industry companies listed on the Stock Exchange of Thailand.

Moreover, the research reveals that earnings quality acts as a complete mediating variable in the relationship between intellectual capital and Tobin's Q. Therefore, this contribution of the study also highlights the significant indirect influence of earnings quality on the relationship between intellectual capital and market performance. These findings are consistent with previous studies (Duarte et al., 2022; Hutagaol-Martowidjojo et al., 2019).

In conclusion, the study highlights that when businesses invest in intellectual capital, it becomes an indicator of the corporate efficiency in utilizing resources and creating value. This emphasizes that intellectual capital serves as the primary source of value creation in the digital economy era. Investments in intellectual capital enhance efficiency in accounting and marketing, as well as improve income quality, thereby creating a competitive advantage.

## 5.3 Contributions of the Study

### 5.3.1 Academic Contribution

This research has played a crucial role in integrating various theories. The study offers valuable insights to managers when making investment decisions in intellectual capital, aiming to enhance efficiency, establish competitive advantages, and improve earnings quality. The following section provides in-depth information regarding the significance of this study.

Firstly, this study aligns with the Resource-Based View Theory. Barney (1991) asserts that, from the resource-based view theory perspective, resources encompass all its assets, capabilities, organizational processes, company attributes, data, knowledge, and other elements within corporate control. These resources assist the company in gaining insights and formulating strategies to improve its efficiency and effectiveness. The study of service industry sectors in registered companies on the Stock Exchange of Thailand, including businesses such as hospitals, transportation and logistics, and commerce, reveals that they utilize information technology systems to improve customer convenience and streamline access to information. Furthermore, the businesses have established connections with trade partners, expanding distribution channels and increasing market share. This move creates new business opportunities and enhances competitiveness in the market. Consistent with prior research conducted by Handayani & Karnawati (2020), their study discussed the development of information technology, highly competitive lifestyles, and the growth of innovation, all of which have a significant impact on business management and competitive strategies.

Secondly, this study supports the Agency theory. Additionally, Jenson & Meckling (1976) discussed the principal-agent problem concerning the relationship

between company executives and shareholders, specifically focusing on executive compensation and shareholder wealth. The study's findings in the service industry indicate that investments in intellectual capital affect earnings quality. Thus, the quality of earnings is a crucial concern for managers and investors as it conveys information about the operational and financial status of the company. Furthermore, investments in information systems and technology enable the company to efficiently gather and consolidate financial and accounting data, leading to more accurate and high-quality financial reporting. This is crucial in building trust in the company's financial data. Therefore, intellectual capital investments can enhance earnings quality and play a crucial role in assessing investment risks, making investment decisions, and evaluating market value.

In summary, the results suggest that investments in intellectual capital by businesses are effective, whether involving investments in intangible assets or information technology infrastructure. Developing skills through employee training and management, as well as building relationships with customers and the distribution channel network, have a positive impact on the efficient performance of both accounting and marketing. Finally, the findings conclude that intellectual capital, when invested in by businesses, is an indicator of corporate efficiency in utilizing resources and creating value, emphasizing that intellectual capital is a source of value creation in the digital economy era. This study shows that it influences the relationship between intellectual capital and market value through competitive advantage and earnings quality.

**5.3.2 Practical Contribution**

This study provides diverse practical recommendations for managers, regulatory bodies, and investors.

Firstly, for managers in the service industry, it is important to recognize the significance of investing in intellectual capital. This includes investments in intellectual capital components such as information technology systems, building customer relationships, and providing consulting services through information technology. These investments aim to enhance the convenience of accessing information quickly and easily for customers. Additionally, intellectual capital investments in intangible assets like computer programs, customer data, and patents are also crucial. All of the

aforementioned factors can contribute to enhancing service quality, resulting in a distinctive competitive advantage within the industry. Furthermore, it encompasses the critical aspect of being a leader in the service industry by training and developing employees to improve their technological skills, ultimately maximizing customer satisfaction. This strategy is aimed at gaining a competitive edge and achieving long-term growth with favorable returns.

In addition, regulatory authorities can benefit from the research results of this study. The Stock Exchange of Thailand and related regulatory agencies should require the disclosure of information regarding investments in intellectual capital. This disclosure would reflect the ability to conduct business effectively and would benefit investors and shareholders.

Moreover, for investors, the disclosure of intellectual capital information of companies listed on the Stock Exchange of Thailand helps them consider trends for future business competitiveness and performance, enabling them to make informed decisions. This disclosure information is useful for investors.

**5.4 Limitations of the Study**

(1) This study is a sector-specific survey focusing on the service industry. It is based on data collected from a small sample of 114 listed companies on the Stock Exchange of Thailand, categorized into six sectors: commerce, health services, media and publications, professional services, tourism and leisure, and transportation and logistics. These service industry sectors differ in terms of service delivery methods and business models, resulting in a diverse landscape. While some businesses may experience positive impacts, others may face negative consequences, influencing the research outcomes. To obtain clearer insights, further investigation within similar service businesses is necessary. By conducting comparative analyses, the results can be more accurately interpreted, and conclusions can be drawn.

(2) The results of this study represent the revenue growth of businesses and serve as a method for measuring competitive advantage amidst the economic uncertainty caused by the COVID-19 pandemic and the adoption of international financial reporting standards (TFRS-15) during the years 2019-2020. Additionally, financial data collected

in the context of the accounting policies required due to COVID-19 pandemic were taken into account, making the study relevant to the Thai context. This study focuses on examining the competitive advantage variable. While some businesses may experience positive impacts, others may face negative consequences, which can affect the applicability of the research. Therefore, it is essential to address this issue and consider additional data to enhance the analysis of competitive advantage.

(3) The research primarily focused on service-based listed companies in Thailand. Therefore, the results may not be applicable to non-listed companies within the same sector. For example, the disclosure of intellectual capital information in the financial statements of non-listed companies that are not extensively studied, as well as the awareness that investing in intellectual capital and resources requires a substantial investment, which may not be suitable for small-scale businesses.

**5.5 Suggestion for Further Research**

(1) From the results of this study, it is evident that intellectual capital has a positive impact on company performance. This research uses the MVAIC model to measure the effectiveness of intellectual capital because it consists of both tangible and intangible assets. Intellectual capital can enhance work efficiency in the basic information technology system, making various organizational systems more convenient and efficient. Future research should investigate the separate components of intellectual capital because each component has different impacts. Additionally, the measurement of intellectual capital efficiency must be tailored to suit the industry context, considering various methods and approaches.

(2) Based on the results of this study, secondary data were collected from the Stock Exchange of Thailand's database (SETSMART database), which provides access to financial information of listed companies in Thailand. It is recommended that future research should involve in-depth interviews with managers regarding investments in the components of intellectual capital, namely human capital, structural capital, capital employed, and relational capital, to obtain information about how each component affects performance. This work clearly explores the different impacts of managing intellectual capital to create a competitive advantage.

(3) Based on the results of this study, the dependent variables, including performance indicators such as ROA, ROE, and Tobin's Q, were found to influence intellectual capital directly and indirectly in the service industry. However, future research should consider additional variables, such as ROIC and ATO, as there are other factors through which intellectual capital affects firm performance.

## List of Bibliography


Akhter, A. (2020). ***Intellectual capital, firm's performance and market value: An empirical study of South Asian emerging economies***. (Doctoral Dissertation), Capital University of Science and Technology Islamabad,Pakistan.

Al-Musali, M. A. K., & Ismail, K. N. I. K. (2014). Intellectual capital and its effect on financial performance of banks: Evidence from Saudi Arabia. ***Procedia-Social Behavioral Sciences***, *164*, 201-207.

Alareeni, B., & Aljuaidi, O. (2014). The modified Jones and Yoon models in detecting earnings management in Palestine Exchange (PEX). ***International Journal of Innovation Applied Studies, 9***(4), 1472.

Alhassan, A. L., & Asare, N. (2016). Intellectual capital and bank productivity in emerging markets: evidence from Ghana. ***Management Decision, 54***(3), 589-609.

Amit, R., & Schoemaker, P. J. (1993). Strategic assets and organizational rent. ***Strategic management journal, 14***(1), 33-46.

Ana, S. R., Sulistiyo, A. B., & Prasetyo, W. (2021). The effect of intellectual capital and good corporate governance on company value mediated by competitive advantage. ***Journal of Accounting Investment, 22***(2), 276-295.

Andes, S. L., Nuzula, N. F., & Worokinasih, S. (2020). Competitive advantage as mediating factor for creating firm value: A literature review. *BISNIS BIROKRASI:* ***Journal Ilmu Administrasidan Organisasi, 27***(1), 5.

Andriessen, D. (2004). ***Making sense of intellectual capital: designing a method for the valuation of intangibles*****:** Routledge.

Antonio, M. S., Laela, S. F., & Darmawan, R. R. (2019). Corporate governance, earnings quality and market response: comparison of Islamic and non-Islamic stock in the Indonesian Capital Market. ***Academy of Accounting Financial Studies Journal***, *23*, 1-22.

Anwar, M., Khan, S. Z., & Khan, N. U. (2018). Intellectual capital, entrepreneurial strategy and new ventures performance: Mediating role of competitive advantage. ***Business Economic Review, 10***(1), 63-93.

Aras, G., Aybars, A., & Kutlu, O. (2010). Managing corporate performance: Investigating the relationship between corporate social responsibility and financial performance in emerging markets. ***International Journal of productivityPerformance management, 59***(3).

Ardhiani, M. R., & Nasih, M. (2019). Intellectual capital mediation effect in Indonesia's banking industries. ***International Journal of Innovation, Creativity Change,*** *9*(7), 342-354.

Ardi, S., Murwaningsari, E., & Law. (2018). Financial performance determination, earnings quality, intellectual capital and company value. ***South East Asia Journal of Contemporary Business, Economics, 15***(5), 1-16.

Ariff, A. H. M., Islam, A., & van Zijl, T. (2016). Intellectual capital and market performance: The case of multinational R&D firms in the US. ***The Journal of Developing Areas, 50***(5), 487-495.

Ashley, C., De Brine, P., Lehr, A., & Wilde, H. (2007). ***The role of the tourism sector in expanding economic opportunity***: John F. Kennedy School of Government, Harvard University Cambridge, MA.

Astuti, P. D., Chariri, A., & Rohman, A. (2019). Association Between Intellectual capital and competitive advantage: A case study on the hotel industry in Bali province, Indonesia. ***Humanities Social Sciences Reviews, 7***(4), 440-449.

Bae, S.-O., & Patterson, L. (2013). The effect of corporate investment in human capital on employee's performance: Major Korean financial corporation examined. ***Academy of Strategic Management Journal, 12***(2), 55.

Baker, C. R. (2017). The influence of accounting theory on the FASB conceptual framework. ***Accounting Historians Journal, 44***(2), 109-124.

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

Barney, J. B., & Hesterly, W. S. (2010). VRIO framework. ***Strategic management competitive advantage, 3***, 68-86.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. ***Journal of personality social psychology, 51***(6), 1173.

Bartholomew, D. J., Steele, F., & Moustaki, I. (2008). ***Analysis of multivariate social science data***: CRC press.

Basu, S. (2009). Conservatism research: Historical development and future prospects. ***China Journal of Accounting Research, 2***(1), 1-20.

Bayraktaroglu, A. E., Calisir, F., & Baskak, M. (2019). Intellectual capital and firm performance: an extended VAIC model. ***Journal of intellectual capital, 2***(3), 406-425.

Beekes, W., & Brown, P. (2006). Do better-governed Australian firms make more informative disclosures? ***Journal of Business Finance & Accounting***, ***33***(3-4), 422-450.

Bontis, N. (1996). There's a price on your head: managingintellectual capital strategically. ***Business Quarterly***, 41-47.

Bontis, N. (1999). ***Managing an organizational learning system by aligning stocks and flows of knowledge: An empirical examination of intellectual capital***, knowledge management, and business performance.

Bontis, N., Keow, W. C. C., & Richardson, S. (2000). Intellectual capital and business performance in Malaysian industries. ***Journal of intellectual capital, 1***(1), 85-100.

Bozbura, F. T., Beskese, A., & Kahraman, C. (2007). Prioritization of human capital measurement indicators using fuzzy AHP. ***Expert systems with applications, 32***(4), 1100-1112.

Brooking, A. (1996). ***Introduction to Intellectual capital***. Cambridge, England: The Knowledge Broker Ltd.,

Brown, L. D., & Caylor, M. L. (2009). Corporate governance and firm operating performance. ***Review of quantitative finance & accounting, 32***, 129-144.

Browne, M. W., & Cudeck, R. (1993). ***Alternative ways of assessing model fit. Testing structural equation models***. KA Bollen and JS Long. In: Newbury Park, CA, Sage.

Bukh, P. N., Larsen, H. T., & Mouritsen. (2001). Constructing intellectual capital statements. ***Scandinavian journal of management, 17***(1), 87-108.

Burr, R., & Girardi, A. (2002). Intellectual capital: More than the interaction of competence x commitment. ***Australian Journal of Management, 27***, 77-87.

Cabrita, M. d. R., & Bontis, N. (2008). Intellectual capital and business performance in the Portuguese banking industry. ***International Journal of Technology Management, 43***(1-3), 212-237.

Camelo-Ordaz, C., Hernández-Lara, A. B., & Valle-Cabrera, R. (2005). The relationship between top management teams and innovative capacity in companies. ***Journal of Management Development, 24***(8), 683-705.

Celenza, D., & Rossi, F. (2014). Intellectual capital and performance of listed companies: empirical evidence from Italy. ***Measuring business excellence, 18***(1), 22-35.

Chahal, H., & Bakshi, P. (2015). Examining intellectual capital and competitive advantage relationship: Role of innovation and organizational learning. ***International Journal of Bank Marketing, 33***(3), 376-399.

Chen, C.-J., Shih, H.-A., & Yang, S.-Y. (2009). The role of intellectual capital in knowledge transfer. ***IEEE Transactions on Engineering Management, 56***(3), 402-411.

Chen, Y., & Puttitanun, T. (2005). Intellectual property rights and innovation in developing countries. ***Journal of development economics, 78***(2), 474-493.

Cheng, M. Y., Lin, J. Y., Hsiao, T. Y., & Lin, T. W. (2010). Invested resource, competitive intellectual capital, and corporate performance. ***Journal of intellectual capital***.

Chokroborty-Hoque, A., Alberry, B., & Singh, S. M. (2014). Exploring the complexity of intellectual disability in fetal alcohol spectrum disorders. ***Frontiers in pediatrics***, *2*, 90.

Chu, P. Y., Lin, Y. L., Hsiung, H. H., & Liu, T. Y. (2006). Intellectual capital: An empirical study of ITRI. ***Technological ForecastingSocial Change, 73***(7), 886-902.

Chung, K. H., & Pruitt, S. W. (1994). A simple approximation of Tobin's q. ***Financial management,*** 70-74.

Clarke, M., Seng, D., & Whiting, R. H. (2011). Intellectual capital and firm performance in Australia. ***Journal of intellectual capita****l*, *12*(4), 505-530.

Conner, K. R. (1991). A historical comparison of resource-based theory and five schools of thought within industrial organization economics: do we have a new theory of the firm? ***Journal of management, 17***(1), 121-154.

Correia, R. J., Dias, J. G., & Teixeira, M. S. (2020). Dynamic capabilities and competitive advantages as mediator variables between market orientation and business performance. ***Journal of Strategy Management, 14***(2), 187-206.

Costa, R. V., Fernández-Jardon Fernández, C., & Figueroa Dorrego, P. (2014). Critical elements for product innovation at Portuguese innovative SMEs: an intellectual capital perspective. ***Knowledge Management Research Practice, 12***(3), 322-338.

Creswell, J. W. (2009). ***Research design: Qualitative and mixed methods approaches.*** London and Thousand Oaks: Sage Publications.

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. ***Psychological methods, 1***(1), 16.

Damodaran, A. (2007). Return on capital (ROC), return on invested capital (ROIC) and return on equity (ROE): Measurement and implications. ***Return on Invested Capital Return on Equity : Measurement Implications. SSRN Electronic Journal, 1***(1), 1–69.

Dang, H. N., Nguyen, T. T. C., & Tran, D. M. (2020). The impact of earnings quality on firm value: The case of Vietnam. ***The Journal of Asian Finance, Economics Business, 7***(3), 63-72.

Darabi, R., Rad, S. K., & Ghadiri, M. (2012). The relationship between intellectual capital and earnings quality. ***Research Journal of Applied Sciences, EngineeringTechnology, 4***(20), 4192-4199.

DeAngelo, L. E. (1986). Accounting numbers as market valuation substitutes: A study of management buyouts of public stockholders. ***Accounting review***, 400-420.

Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. ***Journal of accountingeconomics, 50***(2-3), 344-401.

Dechow, P. M., & Dichev, I. D. (2002). The quality of accruals and earnings: The role of accrual estimation errors. ***The accounting review, 77***(s-1), 35-59.

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. ***Accounting review, 70***(2), 193-225.

Dechow, P. M., & Sloan, R. G. (1991). Executive incentives and the horizon problem: An empirical investigation. **Journal of accounting and Economics, *14***(1), 51-89.

Department of Trade Negotiations. (2022). ***COVID-19 impact on trade in the service industry***. (November 28, 2022) Retrieved from https://api.dtn.go.th/files/v3/5e69fc06ef4140d27b43da86/download

Dewi, A. R. S., Gunawan, G., Firman, A., Ridwan, R., & Dambe, D. N. (2022). Intellectual Capital On Firm Value Through Financial Performance. ***Atestasi: Jurnal Ilmiah Akuntansi, 5***(2), 634-653.

Diamantopoulos, A., Siguaw, J. A., & Siguaw, J. A. (2000). ***Introducing LISREL: A guide for the uninitiated***: Sage.

Dickinson, V., & Sommers, G. A. (2012). Which competitive efforts lead to future abnormal economic rents? Using accounting ratios to assess competitive advantage. ***Journal of Business Finance& Accounting, 39***(3-4), 360-398.

Duarte, A. F., Lisboa, I., & Carreira, P. (2022). Does earnings quality impact firms' performance? The case of Portuguese SMEs from the mold sector. ***Journal of Financial Reporting Accounting &*(ahead-of-print)**.

DuCharme, L. L., Malatesta, P. H., & Sefcik, S. E. (2001). Earnings management: IPO valuation and subsequent performance. ***Journal of Accounting, Auditing Finance, 16***(4), 369-396.

Dženopoljac, V., Janoševic, S., & Bontis, N. (2016). Intellectual capital and financial performance in the Serbian ICT industry. ***Journal of intellectual capital, 17***(2), 373-396.

Dzinkowski, R. (2000). The measurement and management of intellectual capital. ***Management accounting, 78***(2), 32-36.

Edvinsson, L. (1997). Developing intellectual capital at Skandia. ***Long range planning, 30***(3), 366-373.

Elliott, B., & Elliott, J. (2007). ***Financial accounting and reporting***: Pearson Education.

Fakhfakh, I., & Jarboui, A. (2020). Audit certification, earnings management and risk governance: a moderated-mediation analysis. ***Journal of Financial Reporting Accounting, 18***(2), 277-299.

Farfan, K. B., Barriga, G., Lizarzaburu, E. R., & Noriega Febres, L. E. (2017). Financial ratio method peruvian listed companies. ***Spaces, 38***(38),1-37.

Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2005). The market pricing of accruals quality. ***Journal of accounting economics, 39***(2), 295-327.

Francis, J., & Schipper, K. (1999). Have financial statements lost their relevance? ***Journal of Accounting Research, 37***(2), 319-352.

Garanina, T., Hussinki, H., & Dumay, J. (2021). Accounting for intangibles and intellectual capital: A literature review from 2000 to 2020. ***Accounting & Finance, 61***(4), 5111-5140.

Guay, W. R., Kothari, S., & Watts, R. L. (1996). A market-based evaluation of discretionary accrual models. ***Journal of Accounting Research***, *34*, 83-105.

Hair, J. F. (2009). Multivariate data analysis. 7th, Ed. Vol. 7. Upper Saddle River, NJ: Pearson Prentice Hall.

Hair Jr, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis. In ***Multivariate data analysis***, 785-785.

Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. ***International Journal of Multivariate Data Analysis, 1***(2), 107-123.

Hall, R. (1992). The strategic analysis of intangible resources. ***Strategic management journal, 13***(2), 135-144.

Hammad, A. N. (2019). Affecting Factors on the Timing of the Issuance of Annual Financial Reports" An Empirical Study on the sample of Iraqi Banks Listed in Iraqi Stock Exchange". ***Zanco Journal of Humanity Sciences, 23***(4), 11-34.

Han, D., & Han, I. (2004). Prioritization and selection of intellectual capital measurement indicators using analytic hierarchy process for the mobile telecommunications industry. ***Expert Systems with applications, 26***(4), 519-527.

Handayani, S., & Karnawati, Y. (2020). ***Achieving Competitive Advantage Through Intellectual Capital***. Paper presented at the Annual International Conference on Accounting Research (AICAR 2019), 54-58.

Hashim, F., Ahmed, E. R., & Huey, Y. M. (2019). Board diversity and earnings quality: Examining the role of internal audit as a moderator. ***Australasian Accounting, Business Finance Journal, 13***(4), 73-91.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. ***Communication monographs, 76***(4), 408-420.

Healy, P. M. (1985). The effect of bonus schemes on accounting decisions. ***Journal of accounting and economics, 7***(1-3), 85-107.

Hill, C. W., & Jones, T. M. (1992). Stakeholder-agency theory. ***Journal of management studies, 29***(2), 131-154.

Hoang, H. T., Nguyen, H. T. H., Vu, N. H., Le, A. H., & Quach, H. H. (2020). Intellectual capital and firm performance in Vietnam 2012-2016. ***International Journal of Learning Intellectual Capital, 17***(1), 27-46.

Hsu, Y.-H., & Fang, W. (2009). Intellectual capital and new product development performance: The mediating role of organizational learning capability. ***Technological Forecasting Social Change, 76***(5), 664-677.

Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. ***Structural equation modeling: a multidisciplinary journal, 6***(1), 1-55.

Huseman, R. C., & Goodman, J. P. (1998). ***Leading with knowledge: The nature of competition in the 21st century***: SAGE publications.

Hutagaol-Martowidjojo, Y., Valentincic, A., & Warganegara, D. L. (2019). Earnings quality and market values of Indonesian listed firms. ***Australian Accounting Review, 29***(1), 95-111.

Iazzolino, G., & Laise, D. (2013). Value added intellectual coefficient (VAIC) A methodological and critical review. ***Journal of Intellectual Capital,*** **14**(4), 547-563.

Idris, I., Adi, K. R., Soetjipto, B. E., & Supriyanto, A. S. (2020). The mediating role of job satisfaction on compensation, work environment, and employee performance: Evidence from Indonesia. ***Entrepreneurship Sustainability, 8***(2), 735-750.

Inamdar, N., & Kaplan, R. S. (2002). Applying the balanced scorecard in healthcare provider organizations. ***Journal of healthcare management, 47***(3), 179-195.

Islam, R., Haque, Z., & Moutushi, R. H. (2022). Earnings quality and financial flexibility: A moderating role of corporate governance. ***Cogent Business Management, 9***(1), 2097620.

Jamadar, Y., Ong, T. S., Abdullah, A. A., & Kamarudin, F. (2022). Earnings and discretionary accruals. ***Managerial Decision Economics, 43***(2), 431-439.

Jardon, C. M., & Martos, M. S. (2012). Intellectual capital as competitive advantage in emerging clusters in Latin America. ***Journal of intellectual capital, 13***(4), 365-383.

Jenson, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. ***Journal of financial economics, 3***(4), 305-360.

Jones, J. J. (1991). Earnings management during import relief investigations. ***Journal of Accounting Research, 29***(2), 193-228.

Joshi, M., Cahill, D., Sidhu, J., & Kansal, M. (2013). Intellectual capital and financial performance: an evaluation of the Australian financial sector. ***Journal of intellectual capital, 14***(2), 264-285.

Kadocsa, G. (2006). Research of competitiveness factors of SME. ***Acta Polytechnica Hungarica, 3***(4), 71-84.

Kalalo, A. D., & Sofian, S. (2022). Intellectual Capital Affects Earnings Quality With Earnings Management as Intervening Variables. ***Journal of Accounting Business, 7***(1), 35-50.

Kamukama, N., Ahiauzu, A., & Ntayi, J. M. (2011). Competitive advantage: mediator of intellectual capital and performance. ***Journal of intellectual capital, 12***(1), 152-164.

Kamukama, N., & Sulait, T. (2017). Intellectual capital and competitive advantage in Uganda's microfinance industry. ***African Journal of Economic Management Studies, 8***(4), 498-514.

Kaplan, R. S. (2009). Conceptual foundations of the balanced scorecard. ***Handbooks of management accounting research, 3***, 1253-1269.

Khalique, M., & bin Md Isa, A. H. (2014). Intellectual capital in SMEs operating in boutique sector in Kuching, Malaysia. ***IUP Journal of Management Research, 13***(2), 17.

Khanhossini, D., Nikoonesbati, M., KHeire, H., & Moazez, E. (2013). ***Investigating of relationship between intellectual capital and financial performance in MAPNA group companies***. Working paper from Azad University, 1-14.

Kim, T., Yoo, J. J.-E., & Lee, G. (2011). The HOINCAP scale: measuring intellectual capital in the hotel industry. ***The Service Industries Journal, 31***(13), 2243-2272.

Kline, R. B. (2015). ***Principles and practice of structural equation modeling***: Guilford publications.

Kramer, M. R., & Porter, M. (2011). ***Creating shared value*** (Vol. 17): FSG Boston, MA, USA.

Latif, K., Bhatti, A. A., & Raheman, A. (2017). Earnings quality: A missing link between corporate governance and firm value. ***Business Economic Review, 9***(2), 255-280.

Lee, S.-H. (2010). Using fuzzy AHP to develop intellectual capital evaluation model for assessing their performance contribution in a university. ***Expert systems with applications, 37***(7), 4941-4947.

Lindenberg, E. B., & Ross, S. A. (1981). Tobin's q ratio and industrial organization. ***Journal of business***, 1-32.

Lu, W.-M., Wang, W.-K., Tung, W.-T., & Lin, F. (2010). Capability and efficiency of intellectual capital: The case of fabless companies in Taiwan. ***Expert systems with applications, 37***(1), 546-555.

Luthy, D. H. (1998). ***Intellectual capital and its measurement.*** Paper presented at the Proceedings of the Asian Pacific Interdisciplinary Research in Accounting Conference (APIRA), Osaka, Japan.

Lynn, R. (1988). Multivariate analyses of the sociology of intelligence. ***Handbook of Multivariate Experimental Psychology***, 939-960.

Lytras, M. D. (2009). ***Knowledge Ecology in Global Business: Managing Intellectual Capital: Managing Intellectual Capital.*** Information science reference, Hershey, PA.

Magnanelli, B. S., & Izzo, M. F. (2017). Corporate social performance and cost of debt: The relationship. ***Social Responsibility Journal, 13***(2), 250-265.

Mahrani, M., & Soewarno, N. (2018). The effect of good corporate governance mechanism and corporate social responsibility on financial performance with earnings management as mediating variable. ***Asian Journal of Accounting Research, 3***(1), 41-60.

Makki, M. A. M., & Lodhi, S. A. (2014). Impact of corporate governance on intellectual capital efficiency and financial performance. ***Pakistan Journal of Commerce Social Sciences, 8***(2), 305-330.

Martín-de-Castro, G., Delgado-Verde, M., López-Sáez, P., & Navas-López, J. E. (2011). Towards 'an intellectual capital-based view of the firm': origins and nature. ***Journal of business ethics, 98***, 649-662.

Martin, W. J. (2000). Approaches to the measurement of the impact of knowledge management programmes. ***Journal of Information Science, 26***(1), 21-27.

Martínez-Torres, M. R. (2006). A procedure to design a structural and measurement model of intellectual capital: an exploratory study. ***Information Management Decision, 43***(5), 617-626.

McNichols, M. F. (2002). Discussion of the quality of accruals and earnings: The role of accrual estimation errors. ***The accounting review, 77***(s-1), 61-69.

Meles, A., Porzio, C., Sampagnaro, G., & Verdoliva, V. (2016). The impact of the intellectual capital efficiency on commercial banks performance: Evidence from the US. ***Journal of Multinational Financial Management, 36***, 64-74.

Menicucci, E. (2019). ***Earnings quality: Definitions, measures, and financial reporting***: Springer Nature.

Meso, P., & Smith, R. (2000). A resource-based view of organizational knowledge management systems. ***Journal of Knowledge Management, 4***(3), 224-234.

Mojtahedi, P. (2013). The impact of intellectual capital on earnings quality: Evidence from Malaysian firms. ***Australian Journal of Basic Applied Sciences, 7***(2), 535-540.

Mondal, A., & Ghosh, S. K. (2012). Intellectual capital and financial performance of Indian banks. ***Journal of intellectual capital, 13***(4), 515-530.

Morris, C. (2015). An industry analysis of the power of human capital for corporate performance: Evidence from South Africa. ***South African Journal of EconomicManagement Sciences, 18***(4), 486-499.

Muhammad Haykal, E., Maksum, A., & Muda, I. (2020). Profitability and Discretionary Accrual through Supply Chain Management: Evidence of Manufacturing Firms using GMM Estimates in Indonesia. ***Int. J Sup. Chain, 9***(1), 638.

Mutuc, E. B. (2021). An Integrated Model to Explain How Intellectual Capital Affects Earnings Quality: Some Evidence from Asian Emerging Economies. ***Asia-Pacific Social Science Review, 21***(2).

Nasih, M., & Iswati, S. (2020). The Influence of Intellectual Capital to Financial Performance at Real Estate and Property in Jakarta Stock Exchange (JSE). ***Journal Aplikasi Manajement, 9***(4), 1284-1291.

Nimtrakoon, S. (2015). The relationship between intellectual capital, firms' market value and financial performance: Empirical evidence from the ASEAN. ***Journal of intellectual capital, 16***(3), 587-618.

Obeidat, U., Obeidat, B., Alrowwad, A., Alshurideh, M., Masadeh, R., & Abuhashesh, M. (2021). The effect of intellectual capital on competitive advantage: The mediating role of innovation. ***Management Science Letters, 11***(4), 1331-1344.

Organization, W. T. (2020). S***ervices trade growth weakens as COVID-19 crisis hits global economy***. Retrieved from: https://www.wto.org/english/news_e/news20_e/wtoi_11mar20_e.htm].

Ozkan, N., Cakan, S., & Kayacan, M. (2017). Intellectual capital and financial performance: A study of the Turkish Banking Sector. ***Borsa Istanbul Review, 17***(3), 190-198.

Pedersen, T., & Thomsen, S. (2003). Ownership structure and value of the largest European firms: The importance of owner identity. ***Journal of Management Governance, 7***(1).

Peng, T. J. A., Pike, S., & Roos, G. (2007). Intellectual capital and performance indicators: Taiwanese healthcare sector. ***Journal of intellectual capital, 8***(3), 538-556.

Peppard, J., & Rylander, A. (2001). Using an intellectual capital perspective to design and implement a growth strategy:: the case of APiON. ***European Management Journal, 19***(5), 510-525.

Pew Tan, H., Plowman, D., & Hancock, P. (2007). Intellectual capital and financial returns of companies. ***Journal of Intellectual capital, 8***(1), 76-95.

Porter, M. (1985). The Competitive Advantage: Creating and Sustaining Superior Performance. New York, New York, USA: Free Press.

Potjanajaruwit, P. (2018). Competitive advantage effects on firm performance: A Case study of startups in Thailand. ***Journal of International Studies, 11***(3), 104-111.

Pulic, A. (1998). ***Measuring the performance of intellectual potential in knowledge economy***. Paper presented at the 2nd McMaster word congress on measuring and managing intellectual capital by the Austrian team for intellectual potential.

Pulic, A. (2000). VAIC™–an accounting tool for IC management. ***International journal of technology management, 20***(5-8), 702-714.

Raman, K., & Shahrur, H. (2008). Relationship-specific investments and earnings management: Evidence on corporate suppliers and customers. ***The accounting review, 83***(4), 1041-1081.

Ramírez, Y. (2010). Intellectual capital models in Spanish public sector. ***Journal of intellectual capital***, *11*(2), 248-264.

Ricardianto, P., Lembang, A., Tatiana, Y., Ruminda, M., Kholdun, A., Kusuma, I., Sembiring, H., Sudewo, G., Suryani, D & Endri, E. (2023). Enterprise risk management and business strategy on firm performance: The role of mediating competitive advantage.***Uncertain Supply Chain Management, 11***(1), 249-260.

Rochmadhona, B. N., Suganda, T. R., & Cahyadi, S. (2018). The competitive advantage between intellectual capital and financial performance of banking sector in ASEAN. ***Journal keuangan dan Perbankan, 22***(2), 321-334.

Roos, J., Edvinsson, L., & Dragonetti, N. C. (1997). ***Intellectual capital: Navigating the new business landscape***: Springer.

Ross, S. A. (1973). The economic theory of agency: The principal's problem. ***Journal of business The American economic review, 63***(2), 134-139.

Ryan, B., Scapens, R., & Theobald, M. (2002). ***Research Method & Methodology in Finance & Accounting***, (Thomson, London).

Sachitra, V., & Chong, S.-C. (2017). Relationships between institutional capital, dynamic capabilities and competitive advantage: Empirical examination of the agribusiness sector. ***International Review of Management Marketing, 7***(1), 389-397.

Saleh, I., Abu Afifa, M., & Alsufy, F. (2020). Does earnings quality affect companies' performance? New evidence from the Jordanian market. ***The Journal of Asian Finance, Economics Business, 7***(11), 33-43.

Sardo, F. M. A. (2018). The Impact of Financing Decisions of Intellectual Capital on Firms' Financial Performance And On The Gap Between Firm's Book Value And Market Value. ***Journal of Intellectual Capital***, 201.

Sarea, A. M., & Alansari, S. H. (2016). The relationship between intellectual capital and earnings quality: evidence from listed firms in Bahrain Bourse. ***International Journal of Learning Intellectual Capital, 13***(4), 302-315.

Sarea, A. M., Alansari, S. H. J. I. J. o. L., & Capital, I. (2016). The relationship between intellectual capital and earnings quality: evidence from listed firms in Bahrain Bourse. ***International Journal of Learning and Intellectual Capital, 13***(4), 302-315.

Serenko, A., & Bontis, N. (2013). Global ranking of knowledge management and intellectual capital academic journals: 2013 update. ***International Journal of Knowledge Management, 17***(2), 307-326.

SET. (2021). ***Overall listed companies result by industry group (Year-end-2019)***. Retrieved from https://www.set.or.th/set/commonslookup.do

Sidik, I. G. (2012). Conceptual framework of factors affecting SME development: Mediating factors on the relationship of entrepreneur traits and SME performance. ***Procedia Economics Finance, 4***, 373-383.

Sloan, R. G. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? ***Accounting review,*** 289-315.

Smriti, N., & Das, N. (2018). The impact of intellectual capital on firm performance: a study of Indian firms listed in COSPI. ***Journal of intellectual capital.***

Soetanto, T., & Liem, P. F. (2019). Intellectual capital in Indonesia: Dynamic panel approach. ***Journal of Asia Business Studies, 13***(2), 240-262.

Ståhle, P., Ståhle, S., & Aho, S. (2011). Value added intellectual coefficient (VAIC): a critical analysis. ***Journal of intellectual capital, 12***(4), 531-551.

Sveiby, K. E. (1997). The intangible assets monitor. ***Journal of Human Resource Costing Accounting, 2(***1), 73-97.

The Stock Exchange of Thailand. (2022). ***The stock exchange of Thailand CEO Survey: perspective of CEO on the crisis COVID-19***. (November 30, 2022) Retrieved from: https://classic.set.or.th/dat/vdoArticle/attachFile/AttachFile_1625636948117.pdf

Ting, I. W. K., & Lean, H. H. (2009). Intellectual capital performance of financial institutions in Malaysia. ***Journal of intellectual capital, 10***(4), 588-599.

Tobin, J. (1969). A general equilibrium approach to monetary theory. ***Journal of money, credit banking, 1***(1), 15-29.

Ulum, I., Ghozali, I., & Purwanto, A. (2014). Intellectual capital performance of Indonesian banking sector: a modified VAIC (M-VAIC) perspective. ***International Journal of Finance Accounting, 6***(2), 103-123.

Ulum, I., Kharismawati, N., & Syam, D. (2017). Modified value-added intellectual coefficient (MVAIC) and traditional financial performance of Indonesian biggest companies. ***International Journal of Learning Intellectual Capital, 14***(3), 207-219.

Vanichbuncha, K. (2013). Structural equation modeling (SEM) with AMOS. ***Bangkok: Samlada.***

Voulgaris, F., Papadogonas, P., & Lemonakis, C. (2013). Drivers of competitiveness in the manufacturing industry: The case of technology sectors in Greece. ***Journal of Economics Development Studies, 1***(3), 32-40.

Wang, L., Jin, J. L., & Banister, D. (2019). Resources, state ownership and innovation capability: evidence from Chinese automakers. ***Creativity Innovation Management, 28***(2), 203-217.

Wang, Z., Wang, N., & Liang, H. (2014). Knowledge sharing, intellectual capital and firm performance. ***Management decision, 52***(2), 230-258.

Wijayanto, A., Dzulkirom, M., & Nuzula, N. (2019). The effect of competitive advantage on financial performance and firm value: evidence from Indonesian manufacturing companies. ***Russian Journal of Agricultural Socio-Economic Sciences, 85***(1), 35-44.

Wilson, N. J., Riches, V. C., Riches, T., Durvasula, S., Rodrigues, R., & Pinto, S. (2020). Complex support needs profile of an adult cohort with intellectual disability transitioning from state-based service provision to NDIS-funded residential support. ***Journal of Intellectual Developmental Disability, 45***(4), 355-364.

Xu, J., & Liu, F. (2020). The impact of intellectual capital on firm performance: A modified and extended VAIC model. ***Journal of Competitiveness, 12***(1), 161.

Xu, J., & Wang, B. (2018). Intellectual capital, financial performance and companies' sustainable growth: Evidence from the Korean manufacturing industry. ***Sustainability, 10***(12), 4651.

Xu, J., & Wang, B. (2019). Intellectual capital performance of the textile industry in emerging markets: A comparison with China and South Korea. ***Sustainability, 11***(8), 2354.

Yao, H., Haris, M., Tariq, G., Javaid, H. M., & Khan, M. A. S. (2019). Intellectual capital, profitability, and productivity: evidence from Pakistani financial institutions. ***Sustainability, 11***(14), 3842.

Yasa, N., Giantari, I., Setini, M., & Rahmayanti, P. (2020). The role of competitive advantage in mediating the effect of promotional strategy on marketing performance. ***Management Science Letters, 10***(12), 2845-2848.

## Biography

| | |
|---|---|
| **Name – Surname** | Miss Pakchanya Boonchukham |
| **Date of Birth** | August 3, 1979 |
| **Address** | Faculty of Business Administration,<br>King Mongkut's University of Technology<br>North Bangkok, Campus Rayong, 19 Moo.11,<br>Nong Lalok Subdistrict, Ban Khai District,<br>Rayong 21180 |
| **Education** | Master's Degree in Accounting (M.Acc.) |
| **Experiences Work** | Lecturer, Faculty of Business Administration,<br>King Mongkut's University of Technology<br>North Bangkok, Campus Rayong<br>(2016 – Present) |
| **Telephone Number** | (66) 635399551 |
| **Email Address** | pakchanya_b@mail.rmutt.ac.th |