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In-Text Citation: (Saddam & Jaafar, 2021)
To Cite this Article: Saddam, S. Z., & Jaafar, M. N. (2021). Modified Value-Added Intellectual Capital (MVAIC): Contemporary Improved Measurement Model for Intangible Assets. *International Journal of Academic Research in Accounting Finance and Management Sciences*, *11*(1), 201-210.

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Modified Value-Added Intellectual Capital (MVAIC): Contemporary Improved Measurement Model for Intangible Assets.

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Abstract

The purpose of this study is to explain the new measurement model for intangible asset named Modified Value-Added Intellectual Capital (MVAIC).This measurement model measured intangible asset in a robust way. MVAIC is a broadly measure of Intellectual capital based on previous VAIC model. However, MVAIC included relational capital efficiency (RCE). The value of relational capital is obtained from the amount of expenses incurred for marketing. The advantage of MVAIC is that it can measure intellectual capitals related to the company's relationship with external parties from a broader perspective. In the context of this relationship, it can be measured by means of monetization, that is, introducing the company to the public through marketing and providing economic benefits that can be provided in the form of services or commodities. This study systematically includes all the past literatures on the measurement model for intangibles. The researcher suggested to use MVAIC measurement model for future studies as it provides better results.

Keywords: Intellectual Capital, Firm's Financial performance, Intangible asset, VAIC measurement model, Modified Value-Added Intellectual Capital.

Introduction

Previously, in the traditionally economy, people fixated on the input factor such as land, labour, capital, and entrepreneur for businesses survival. Though, in the era of knowledge economy, knowledge, information technology and intellectual capital are the main resources that organizations need to be effective and to obtain a sustainable competitive advantage. The inclusion of intellectual capital added and increased priority in firm's operations and survival. Thus, in developing economies, Intellectual Capital is considered Leading resources essential to improving company performance (Dzenopoljac, Janosevic, & Bontis, 2016).

At the same time, according to the research of Ozkan, Cakan, and Kayacan (2017), intellectual capital can be clearly defined as intangible assets. These assets are not accurately stated on the company's balance sheet, but completely affect its performance, thus revealing employees' thinking , information, and measure unmeasured content (Edvinsson & Malone 1997). Also, to endure in a competitive business environment, every firm should operate in conditions of strong performance (Saddam, 2021). Furthermore, Martín-de Castro, Díez-Vial, and Delgado-Verde (2019) believed that intellectual capital plays an important role in a knowledge-based economy and is a key driver of a company's sustained competitive advantage.

Knowing the importance of firm's performance, various evaluation tools have been established to evaluate and enhance the company's viability. Financial indicators such as return on equity, return on assets, profitability, sales growth, capital adequacy ratio, liquidity ratio and stock price, as well as other indicators used by analysts and researchers in analysing company performance. Subsequently, financial tools have gradually expanded to more complex performance models, such as balanced scorecards, performance prisms, Malcom Baldrige models, and so on. These measurement models can improve business operation efficiency through better decision-making processes (Pantea, Gligor, & Anis, 2014).

In addition, researchers also expand performance evaluation by studying the relationship between performance and other related factors, especially on missions that can add value to company performance (Barney, 1991; Edvinsson & Malone 1997; Gogan, 2014; Jancenelle, 2015; Manzari, Kazemi, Nazemi, & Pooya, 2012; Mendes, Mario, & Romao, 2016). According to Naz and Ijaz (2016) this is very important, and companies need to make full use of their resources to maximize shareholder wealth and profitability.

So far, economic value and sources of wealth include not only the commodities produced by the enterprise, but also its intangible assets, such as its intellectual capital. Therefore, intellectual capital will be attributed to the further role of creating value. In the era of knowledge-based social economy when knowledge capital has become one of the factors of production, traditional accounting practices may no longer be possible to evaluate company performance (Nuryaman, 2015). Therefore, there is an increasing need to consider intellectual capital to develop new methods, because it is often described as the pinnacle of organizational performance (Asongu & Andres, 2019).

Objective of the Study
The importance of intellectual capital is undisputable in the current economy; therefore, the objective of this study is to:
- To scrutinize the important of intellectual capital measurement models in measuring intangible assets.
- To discuss the significant of MVAIC model on firm's financial performance.
- To analyse the history of intangible assets measurement models based on past literatures.

Literature Review
Realizing that intellectual capital affects value creation and improves the financial performance of companies among researchers, several effective methods for measuring intellectual capital have

been established (Edvinsson & Malone 1997; Kaplan & Norton, 1996; Roos & Roos, 1997; Sveiby, 1997).The following table, summarizes of the progress IC valuation model:

Valuation Method	Inventor	Year
Balanced Scorecard	Robert S.Kaplan and David P.Norton	1992
Intellectual Capital Audit	Annie Brooking	1996
Calculated Tangible Value	Thomas A.Stewart	1997
Holistic Value Approach	Goran Roos, J.Roos, Nicola C.Dragonetti and Leif Edvinsson	1997
Intellectual Capital-Index	Goran Roos	1997
Intangible Asset Monitor	Karl Erick Sveiby	1997
Market-to-Book Ratio	Thomas A.Stewart	1997
Skandia Navigator	Leif Edvinsson and Michael S.Malone	1997
Value Added Intellectual Coefficient (VAIC)	Ante Pulic	1997
Sullivan's Work	Patrick H. Sullivan	1998
Intangibles Scoreboard	Baruch Lev	1999
Intellectual Capital Statements	Jan Mouritsen	2001
iValuing Factor	Ken Standfield	2001
Inclusive Value Methodology	Philip K.M. Pherson and Stephen Pike	2001
Citation-Weighted Patent	Bronwyn H.Hall, Adam B.Jaffe and Manual Trajtenberg	2001
Intellectual Capital Benchmarking System	Jose Maria Viedma	2001
Value Chain Scoreboard	Baruch Lev	2001
Extended VAIC (eVAIC)	Jamal A.Nazari and Irene M.Herremas	2014

Table 1: Intellectual Capital and Valuation Model
Source: Ulum, Ghozali and Purwanto (2014). Intellectual capital Performance of Indonesian Banking Sector: A modified VAIC (MVAIC) perspective. Asian Journal of Finance and Accounting, 6(2), 103-123.

According to the table above, many models are proposed because scholars still lack consensus on which model can provide the best intellectual capital assessment. Each model has some advantages and disadvantages (Sydler, Haefliger, & Pruksa, 2014; Ulum, Kharismawati, & Syam, 2017; Ulum, Rizkiyah, & Jati, 2016). However, according to (Goh, 2005; joshi, Cahill, & Sidhu, 2010; Joshi, Cahill, Sidhu, & Kansal, 2013).

Researchers have not reached a general agreement on the classification or measurement of intellectual capital (IC). The earliest model of IC is Skandia Navigator (Edvinsson & Malone 1997) or navigator. The model encourages other scholars to create an Organizational value. This model has changed the nature of the relationship between enterprises. Customers also recognize their role in value creation (Bontis, 2001). Another well-known method. The method of measuring IC is the intangible asset monitor.

Next, value-added intellectual capital (VAIC) measurement model has been widely accepted and widely used to measure the performance of intellectual capital among researchers. The VAIC model has been used to correlate company performance. Researchers emphasize the positive relationship between intellectual capital and corporate performance (Sumedrea, 2013; Zulkifli, Abdul-Shukor, & Ridhuan, 2017).

However, according to (Agostini & Nosella, 2017; Bayraktaroglu, Calisir, & Baskak, 2019), VAIC has several limitations that may precisely affect the valuation of intellectual capital. According to reports, VAIC lacks the ability to measure relational capital, which is considered a significant impact. Relational capital is one of the pillars of intellectual capital, and it can also mediate the relationship between human capital (Agostini & Nosella, 2017).Therefore, Maji and Goswani (2017) recommend the use of modified VAIC (MVAIC) to better capture structural capital efficiency (SCE) and relational capital efficiency (RCE) to a certain extent. Therefore, this study also adopted a new and improved VAIC to better reflect the results on SCE and RCE. Another criticism of VAIC is the model cannot measure companies with negative book value (BV) Net assets or negative operating profits lead to negative value added (VA) scores. Therefore, these companies must be removed from the sample because they will prevent Achieve meaningful analysis (Chu, Chan, & Wu, 2011).

Consequently, some researchers introduced the MVAIC model, and extended the original VAIC model to overcome limitations and measure value-added efficiency more comprehensively the way. MVAIC contains the three components (Human capital, Structural capital and Relational capital) and physical components of the IC Capital (Capital employed)(Nimtrakoon, 2015).

The measurement model of intellectual capital has been started with Tobin's Q in 1950, and the most recent model of Modified Value-added Intellectual Capital in 2014 by Ulum. According to Vaz, Zarelli, Werutsky, Selig, and Morales (2015) there are several measurement model for intellectual capital, it depends on the objective of the researcher based on the different perspective including context of application, like organisation, country, public sector and private sector, assets and capital considered as relational capital, structural capital, human capital, knowledge assets; and, set of measurement indicators as market value, contribution of human assets, risk, patents cost, between others.

According to Gogan (2014) the most common measurement models as well as the most widely used of all nonfinancial measurement methods are: Balanced Scorecard, Skandia Navigator and Intangible Assets Monitor. Research on performance measurement has gone through several stages. In the 1970's, researchers investigated on the usage of management accounting systems particularly as a tool for performance measurement. Later in 1980's the researcher was focusing on the budgeting process and its impact on performance. The extent of the research on performance measurement began to broaden in the beginning of the 1990s after Kaplan and Norton (1996) presented balanced scorecard in 1992.

Kaplan and Norton proposed that the performance of a firm can be improved with the utilization of a balanced scorecard. This model measure represents a set of cause-and-effect

relationships among output measures and performance drivers in the four perspectives namely; financial measures, customer measures, internal process measures and learning and growth measures (Kaplan & Norton, 1996). However, only a few empirical studies were conducted during the 1990s, and they have not really been able to test the extent to which these method are followed by organizations and their impact on the performance (Gosselin & Radnor, 2005). The balanced scorecard however considers employees as unimportant, overlooking the significance of knowledge management as a critical success factor of the new economic entity and as the key to its long-run in measuring intellectual capital long-run survival. The balanced scorecard is merely supplementary in balancing the traditional perspectives by adding non-financial perspectives (Chen, Zhu, & Yuan Xie, 2004).

Second most widely used model is Skandia navigator, this model has been introduced by Leif Edvinsson and Michael S.Malone in 1997 and it reflects four key dimensions of its business including financial focus, customer focus, process focus and renewal and development focus (Edvinsson & Malone 1997). The authors explain the importance of intellectual capital measurement and on the ways to achieve using the Skandia Navigator model. Later in 1998, the author won the award "brain of the year" for the Skandia Navigator model. Skandia Navigator can be used by management as a model that realizes the performance management and the value of the intangibles. The authors claimed that traditional accounting does not always respond to the market value. The Skandia navigator includes intangible asset as a firm's resources and divided intangible assets into human and structural capital (Sulanjaku, 2014). However, the model relies on a balance sheet to reflect the monetary value of a company's intellectual capital. Thus, it ignores many contents of Intellectual capital which plays an important role in creating value added for the firms, such as a company's culture, organizational learning and an employee's creativity. In addition, among the more than 100 indices recommended in the Skandia model, there may be some mistaken assumptions. For example, whenever the employees showing up for work and sitting in front of their computers, it does not necessarily mean the employee are investing knowledge which can be transformed into their company's competitive advantage. Therefore, Skandia's structural capital variables, including the number of possessed computers, can be criticized (Huseman & Goodman, 1999). Consequently, that is the main reason of the model have been readjusted (Gogan, 2014).

Finally, the third regularly used model is Intangible Asset Monitor, it was initiated by Karl Erick sveiby in 1997. According to Sveiby (1997) there are three types of intangible assets that account for the book value-to-market value discrepancy in the valuation of a firm. This model recommended that individuals in organizations create external and internal structures to express themselves. Indicators can be created that monitor External Structure (Customers and Suppliers), Internal Structure (Organization) and People's Competence. The indicators can be incorporated into a management information system. Indicators that monitor renewal, efficiency and stability are favoured. While Skandia Navigator treats culture and the management philosophy of the organization as a part of human capital, Intangible Assets Monitor classifies them under the internal structure. Therefore, this model is based on the principle that human are the only true agents in business and all aspects of structure, internal and external, are surrounded in human actions.

The impediment provision on the measurement of IC recently had made the requirement for new model by experts. One of the most well-known model utilized by many researchers recently (Al-Musali & ku Ismail, 2014; Goh, 2005; joshi et al., 2010; Joshi et al., 2013; Kamath, 2007; Ting & Lean, 2009) is VAIC model for IC measurement. VAIC model has focal points over different models.

(Nimtrakoon, 2015) had listed five advantages, first the model is straight forward and simple to use in determining the value of IC. Second, the acquisition of data required in the model is feasible because all the data are obtained from corporate financial reports (Secondary data). Third, the data are obtained from audited financial statements, therefore the measurement is objective and verifiable (Goh, 2005). Fourth, the model makes cross-organizational or cross-national comparison possible, unlike other measurement models which require both financial and non-financial measures as often including some subjective judgements. Fifth, the organizations can utilize the model to assess their own intellectual capital and firms' performance.

According to Nimtrakoon (2015) the previous model of VAIC has been extensively used by many developed countries. In any case, this model has a few downsides in measuring IC (Joshi et al., 2013; Ulum et al., 2017). According to (Ulum, Ghozali, & Chariri, 2008) VAIC does not measure the IC, but it measures the impact of IC management. Additionally, VAIC model inadequate to gauge relational capital (Joshi et al., 2013).Relational capital is the mainstay of intellectual capital and it thoroughly intervene the connection between human capital (Agostini & Nosella, 2017). Therefore, in the light of the previous studies on intellectual capital, Ulum (2015) thought of new altered VAIC model for performance measurement, the new model included relational capital and measured with marketing costs. Additionally, the new model of MVAIC in some extent is better in capturing the structural capital efficiency (SCE) of a firm more proficiently than the first model (VAIC) (Maji & Goswani, 2017; Nimtrakoon, 2015).Furthermore, Tiwari and Vidyarthi (2018) found Modified VAIC (MVAIC) is a better measure than VAIC because modified VAIC measure incorporates more informative variables than VAIC measure.

Components of Intellectual Capital in MVAIC Model.

A detailed understanding of the components of the intellectual capital coefficient is essential in an organization, as it may provide the key to obtain the required level of intellectual capital in an organization. Human capital, structural capital, relational capital, and capital employed are the four interdependent structures of intellectual capital.

Human capital is a mixture of knowledge, skills, abilities, experience, and professional knowledge acquired by employees through training and experience. As pointed out by Edvinsson and Malone (1997), human capital includes employees' knowledge and ability to solve business problems, as well as the ability of organizations to make full use of their human resources based on creativity and innovation. Human capital is the tacit knowledge accumulated by individual employees through the academic qualifications, experience, attitudes, and other personal characteristics they bring into the organization (Singh, Sidhu, Joshi, & Kansal, 2016).

Structural capital refers to the internal knowledge accumulated through the processes and procedures adopted by the organization (Singh et al., 2016) such as habits, practices, processes, routines, information systems, and work culture. SCE is also known as the infrastructure to enhance, embody and support human capital.

Relational capital consists of all external relations of the organization. Relationship capital is the combination of relationships with external parties (including customers, suppliers, competitors, governments, and communities) and reputation based on the transactions, products, and services the organization provides to these parties (Curado, Guedes, & Bontis, 2014).

According to Boujelbene and Affes (2013) Capital employed efficiency measures the new value made by one investment unit in the capital used in the firm . This measurement reflects the success to which the firm reached in best investing its capital to create the value added for the firm

Conclusion

Firms' financial performance plays a vital role in the overall performance of organizations, it measures the organization's monetary wellbeing and viability of the company in utilizing the assets to produce income from the business (Fatihudin & Mochklas, 2018). In Knowledge-based economy, knowledge is recognized as the driver of productivity and economic growth which contributed to a new focus on the role of information, technology and learning in economic performance. Therefore, the modification form labour-based business model to knowledge-based model is required to maintain the firm's competitiveness . Perceiving the ascent of "knowledge-based economy" in the twentieth century, it has made attention to concentrate on knowledge. Intellectual capital to turn into the significant generation factors replacing the traditional, and it accountable for the economic and financial prosperity of nations as well as key drivers of companies' to sustain competitive advantages (Martin-de Castro, Diez-Vial, & Delgado-Verde, 2019).This study contributes to the body of knowledge on intellectual capital in many ways, as the modified measurement model of MVAIC benefits in measurement of intangible assets in a robust way. The inclusion of relational capital efficiency in the new model (MVAIC) provide better result than the previous model of VAIC (Ulum et al., 2017).Therefore, the researcher recommend to use the modified VAIC (MVAIC) for future studies to provide resourceful results.

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