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Evaluation-Value Added Intellectual Coefficient (Ev-VAIC) Model Expansion: The New Measurement Model for Intellectual Capital

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Abstract

This conceptual paper provides a theoretical discussion to design a new measurement model of intellectual capital by using the organization's Input and Output, which have been categorized into the organization value-added element to produce a more stringent and comprehensive intellectual capital component. This paper proposes a model with each domain have been defined as a set of indicators used for the next quantitative evaluation. This expansion of intellectual capital model enables organizations to pay more attention to the organization assets, which being as value-added category (capital employed and intellectual capital), that have not been well-connected in the literature previously. In addition, this paper attempt to understand the intellectual capital components and evaluate its developing tendency periodically in the future (the finance management field) as the long-term and sustainable competitive advantages.

Keywords: Value-Added, Intellectual Capital, Capital Employed, Value Added Intellectual Coefficient.

Introduction

The worldwide growth showed that intellectual capitals had more contribution to intangible assets than tangible assets. Information technology has grown up into a new economic system in which information processing, searching for scientific knowledge and technology have become the primary sources of productivity. Intellectual capital is being an essential factor in gaining a business position. Additionally, intellectual capital also plays it roles as the strategic assets that was contributing to the growth and sustainability of the national economy (Khalique, Shaari, & Isa, 2018).

The knowledge and innovation play a crucial role in the economic and social development of the corporate, and driving force of competitiveness of the Information and Communication Technology (ICT) acceleration. The company must strive for a dominant position for surviving and develop itself in an increase in market competition (Sahari and Santy, 2019)

Bontis et al. (2000) stated that intellectual capital is useful for countries with a lower workforce proportion, especially in the service sector. The organization should espouse and develop human resources through organizational and technology management. The

development of human resources and technology management are the primaries of the company's assets. However, the problem in defining the intellectual capital mainly due to the financial report system is not able to capture the new economy knowledge and innovation in which the value is created by intangible assets.

Gogan and Draghici (2013) indicated that intellectual capital definitions differ from each expert, but it does not disqualify each other. Intellectual capital exists as a knowledge capital. The focus is given to academics' intellectual capital, and business people are increasing continuously. Thus, the utilization of intellectual capital as the organization's measurement tools' performance will also increase. It has caused difficulties in finding appropriate models and methods.

One of the most well-known intellectual capital models is Value Added Intellectual Coefficient (VAIC™) by Pulic (1998). VAIC™ has been used to measure intellectual capital performance. This model has been frequently used in the various study for academicians, practitioners, and researchers. However, the VAIC™ intellectual capital model is just used to measures intellectual capital management's impact. That means the organization should possess good and well-maintained of intellectual capital for positive effects. The limitation of VAIC™ intellectual capital models had prompted academics, practitioners, and researchers to upgrade or create new models for measurement and reporting of intellectual capital.

In this context, the new intellectual capital model should be proposed to identify the potential opportunities to improve its value and ability in competition, namely the Evaluation - Value Added Intellectual Coefficient (Ev-VAIC). A new model adopts the combination of finding from three previous studies, i.e., Stewart (1997), Andriessen (2001), and Pulic (2000). This new model consists of physical, financial, human, and structural capital components. This context aims to offer a new model and to explore the components of intellectual capital for the organization.

Intellectual Capital Categorizations

The most eminent definition of intellectual capital is by Stewart (1997), who stated that intellectual capital as "packaged useful knowledge". It means intellectual capital is a total stock of the collective knowledge, information, technologies, skills, expertise, intellectual property, customer loyalty, and team management that can be used to create the value of the products and services in an organization. Thereafter, Intellectual capital into three part, namely human capital, customer capital and structural capital. (Stewart, 1997).

Bontis (1996, and 1998) stated that intellectual capital is regarded as a problematic understanding, but has been found and expanded of utility to business competitive through the science and otherwise (the process in/output). Intellectual capital is also the difference between Book value and Market value, which consisted of two main elements: human capital and structural capital. Intellectual capital is ignoring other aspects, such as external relations with suppliers and customers, (Bontis, 2003).

Whilst other researchers, such as Johanson (1999) stated that intellectual capital is a new reporting mechanism, whereby intellectual capital can be built, measured through qualitative, and quantifiable or traditions and financial data. Further, intellectual capital is a multidisciplinary and interdisciplinary concept, and an emerging and fast-evolving concept, (Ilyin, 2014; and Mehralian, Rasekh, Akhavan, & Sadeh, 2012). Intellectual capital comprises of,

a. The fields of finance, such as Bose & Thomas, (2007); Sydler, Haefliger, & Pruksa, (2014); Scafarto, Ricci, & Scafarto, (2016), etc.

- b. The fields of accounting, such as Henriques & Bontis, (2011); Liao, Chan, & Seng, (2013); Cleary, (2015), etc.
- c. The fields of economics, such as Bontis, (2004); Stahle & Lin, (2015), etc.
- d. The fields of marketing, such as Baxter & Matear, (2004); FitzPatrick et al. (2013), etc.
- e. The fields of human resources, such as Olander, Hurmelinna-Laukkanen & Heilmann, (2015); Donasi, Pena, & Sanchez de Pablo, (2016), etc., any other fields which related to intellectual capital.

Several contributions in the literature review have identify and classify the intellectual capital inversely as summarized in the table below:

Table I. Identify and classify of intellectual capital by researchers		
Authors	Indication	Categorization
Bontis (1996)	Intellectual capital may provide a new resource-base for an organization to compete and win	Human capital, Structural capital, and Relational capital
Stewart (1997)	Intellectual capital as a collective brainpower or useful knowledge, which consists of knowledge, information, intellectual property and experience	Human capital, Structural capital, and Customer capital
Edvinsson, and Malone (1997)	Intellectual capital is a relationship issue and a debt item and is not an objective	Human capital, Organizational capital, and Customer capital
Sveiby (1998)	Intellectual capital is knowledge that can be converted into value	Personnel competence, Internal, and External structure
Harrison and Sullivan (2000)	Intellectual capital as “knowledge” that can be converted to profit	Human capital, Intellectual assets (intellectual property)
Danish Guideline (2000 and 2003)	Intellectual capital is an integral part of ‘knowledge management.’ However, it does not explicitly describe a knowledge management model in the organization and the knowledge management’ regards as equivalent to ‘intangibles management’	Human capital, Organizational capital (processes and technology), and Relational capital
Andriessen (2001 and 2004)	Intellectual capital refers to intangible assets are assets for resource or means of production in a company's	Skills and tacit knowledge, collective values and norms, Technology and explicit knowledge, Primary and management processes, and Endowments

MERITUM (2001 and 2002)	Intellectual Capital or intangible assets correlate with value and value creation, which implies the dynamic aspects of intellectual capital and the causal relationships it maintains (or creates) with other firm assets	Human capital, Structural capital, and Relational capital
Pablos (2003)	Intellectual capital as knowledge based resources that contributed to the sustained competitive advantage in a company's	Human capital, Organizational capital and Relational capital
Pulic (1998 and 2000)	This intellectual capital is better known as "Intellectual ability", which indicates how successfully value added was created. It is measured by Value Added Intellectual Coefficient (VAIC™)	Human capital, Structural capital and Customer capital

There are various definitions of intellectual capital by researchers in the field of economy. In general, most definitions identified that intellectual capital is a non-monetary asset that has a value and can generate benefits in the future. Ideally, the researchers' have been including of statement the information of intellectual capital necessary to classify it's into the indicators or elements, such as Bontis (1998); Edvinsson (1997); Holton and Yamkovenko (2008); Mavridis and Kyrmizoglou (2005); Ruta (2009); Tayles et al. (2007); Yang and Lin (2009); Zerenler and Gozlu (2008); Wall, (2007); Walsh et al., (2008), etc.

Intellectual capital from different perspectives (three previous studies)

- **Thomas A. Stewart**

According to Stewart (1997), Intellectual capital is the intellectual knowledge that has been formalized, captured, and leveraged to produce a higher-valued asset to create an organization's wealth, which includes the talents and skills of individuals or groups; technological and social networks, software and culture, intellectual property (patents, copyrights, methods, procedures, archives, etc.). It means that should not include information or data in the production for wealth creation, such as raw materials might not be the asset. For example, the data or miscellaneous facts could not be the same as the knowledge assets.

The terms Intellectual capital (IC) is referred to as a collective "brainpower," which is the knowledge capital, knowledge organization, information technology, intangible assets, intangible management, hidden value, and individual or group of experience. Those can increase assets or create wealth in organizations that can create value-added. Intellectual capital is a higher-valued asset because it becomes an important source of profits to create wealth.

There are three forms of intellectual capital a company or organization possesses, namely:

1. Human capital.

It is ability, competences (includes constructive ideas), skills of the individual, groups or membership communities which is managed by the organized development with the goals to

innovate. It also refers to specific technical skills, individual talent and aptitudes of a workforce which possesses by a corporation.

2. Structural capital.

Structural capital is the management process of intellectual assets in the companies or the attempts to contain individuals' knowledge to use for the others in the organizations. Structure capital also can be called to effort the convert of human capital into structural capital. For example, the patents, copyrights, and trademarks; processes, methodologies, models; documents, and other knowledge artifacts; computer networks and software; administrative systems, growth reports of intranets; databases, practices, and others are related to organizational structure. Thus, it should possess more strategic value than assets available of competitors in the markets.

3. Customer capital.

Customer capital is all of business transactions or activities have related to customers, clients, partners in the organizations.

• **Daniel Andriessen**

According to Andriessen (2001), Intellectual capital is the intellectual-knowledge, information, ownership of knowledge, and experiences, which can create the wealth. In another paragraph, intellectual capital is the managing intellectual in forms of assets, resources, perspective, explicit competence, hidden, data, information, knowledge, and right decision. Intellectual capital is called the personal, organizational wealth, which is being managed together.

Andriessen stated that "assets" word refers to intangibles because it is identifiable, controlled, and distinguishable, ("assets" as described in accountancy term). The term "asset" is used because as the resource of production in the firms. That covers three types of assets, as follow:

1. Tangible assets

Tangible assets have played a role in core competencies, such as the buildings that have contributed to corporate assets, (an office network).

2. Financial assets

3. Intangible assets

It consists of human, structural, and customer capital. Intellectual capital is distinguished into five categories, as follow (Andriessen et al., (1999), and (Andriessen and Tissen, 2000):

- Skills and implicit knowledge. It includes talent, competencies, and know-how.
- Collective values and norms. It includes the organization's culture.
- Technology and explicit knowledge. It includes manuals, procedures, and intellectual property, such as patents and trade secrets.
- Primary and management processes. It is the organization's knowledge, and the techniques are used for control.
- Assets and endowments. It is a legacy of the corporate from the past, including brand and image, the installed base of customer, networks of suppliers, the installed base of customers, the network of talent and the ownership of standards.

The core competence above has strength depends on five criteria that should add value to customers, give a competitive edge, offer the potential for the future, sustainable for several years, and firmly anchor in the organization.

- **Ante Pulic**

According to Pulic (1998), Intellectual capital term is more well-known for “Intellectual ability.” Intellectual ability shows how efficiently physical capital and intellectual potential have been used in the corporate. It has been considered as the universal indicator showing intellectual capital in the organization. Intellectual ability is the result of employed physical capital and intellectual potential in the company. Its objective is to create value-added through the physical and intellectual capital and represent a measure for business efficiency in a knowledge-based economy.

Physical capital includes all necessary financial funds, which is calculated of total the balance sheet (such as equity, open reserves, funds for general banking risks, supplement capital, participation capital, lower-ranking capital), and then to add the after-tax profits. The value-added and physical capital (CA) relation is called the Value Added Capital Coefficient (VACA). VACA is an indicator of the value-added created by one unit of physical capital and indicates how efficiently physical capital has been employed.

While, Intellectual potential (IP) is the employees' ability to do their daily routine, creating value, which includes abilities in creating value by efficiently using the company's infrastructure and intensive relation with their environment or market. The relation between value-added and intellectual potential is expressed as the Value Added Intellectual Potential (VAIP). VAIP is showing how successfully intellectual potential creates value through accumulated expenditures for labor.

The Value Added Intellectual Coefficient represents the relation of Value Added Capital Coefficient and Value Added Intellectual Potential (VAICTM). It is a new and unique indicator of intellectual ability, and the proper tool for measuring intellectual potential performance and open for management intervention.

Intellectual capital is divided into human, structural, and customer capital. Structural or customer capital could not function without the employees as the decisive business factor. Pulic and Bornemann (1999) stated that Intellectual capital is described as the labor expenses in the corporates. The labor expenses are seen as compensation for the invested time and as compensation for knowledge inputs.

In 2000, Pulic explained again about Value Added Intellectual Coefficient (VAICTM). VAICTM is a method of measuring corporate success and providing more detailed information about a company's situation. It is designed to help managers leverage their company's potential based on current business performance. Human capital plays a decisive part in value creation; the periodical data concerning capital employed and structural capital is also entered. VACA increased VAHU and STVA were reduced, which is represented as follow:

$$VACA + VAHU + STVA = VAIC^{TM}$$

Value Added Intellectual Coefficient (VAICTM) indicated corporate value creation efficiency. The higher of VAICTM coefficient means, the better management has utilized the company's potential. VAICTM as a modern accounting tool that companies can apply to measure the current business's value creation activities and processes. It is using the balance sheet form as a base for calculation.

The VAICTM calculates economic income as value-added and the value of three types of intellectual capital: human capital, structural capital, and capital employed. There are criteria should of considers on the VAICTM calculated:

- It does not input all of the labor expenses in the calculation of the value-added of the organization
- Human capital is called labor expenses, and it is expressed as expenditures for employees in an asset of the organization.
- It is computing value-added one unit which spent on organization employees creates. Further, the company has two resources in created value-added, namely capital employed and intellectual capital (IBEC, 2003 as cited in Andriessen, 2004). Capital employed consists of physical and financial capital. Intellectual capital consists of human and structural capital. The value-added is a result of the difference between output and input of an organization. The output is sales revenue, and the input is everything that comes from outside the organization.

Two resources that created value-added in the organization could be seen in figure 1 as follows:

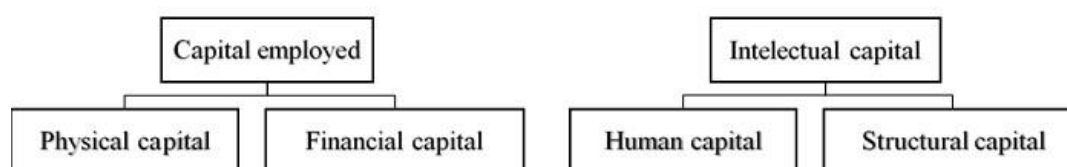


Figure 1: The value-added of the company, (IBEC, 2003 as cited in Andriessen, 2004)

The VAICTM as bases for creating the new measurement model

In 1998, Pulic introduced the “Value Added Intellectual Coefficient” (VAICTM) as a methodology to measure the efficiency correlated to each component of intellectual capital and the capital employed based on the concept of added value. The VAICTM is a universal indicator that shows the intellectual abilities in value creation and represents a measure for business efficiency in a knowledge-based economy (Pulic, 1998). The VAICTM model applies the efficiency concept to measure Intellectual capital and examined its impact on companies' performance.

The VAICTM model applies the efficiency concept to measure Intellectual capital and examined its impact on companies' performance. In the field of research, many studies have utilized VAICTM as a measure of Intellectual capital. There are Williams and Firer (2003), Chen et al. (2005), Appahumi (2007), Tan et al. (2007), Ulum et al. (2008), Gan and Saleh (2008), Puntillo (2009), Zeghal and Maaloul (2010), Maditinos et al. (2011), etc. In general, they have done the research empirically and used data from financial statements.

In 2000, Pulic explained again about VAICTM as an accounting tool for Intellectual capital management. It started to create value-added (VA). VA is the difference between outputs (OUT) and inputs (IN). Output (OUT) is the revenue that comprises all the products and services sold on the market, and inputs (IN) are the expenses incurred in earning the revenue except manpower costs. The following equation represents it:

$$\text{VA} = \text{OUT} - \text{IN}$$

Value Added (VA) is the result of current business and expresses the newly created wealth of a certain period and related to the resources, capital employed, human and structural capital.

Therefore, the second stage of the relation between value-added (VA) and capital employed (CE). It is including physical and financial capital, which is followed equation:

$$VA/CE = VACA$$

Capital employed (CE) is the result of the subtraction of total assets and intangible assets (CE = Total assets – Intangible assets). Afterward, the comparison of value-added with capital used to get the Value Added Capital Coefficient (VACA). It means that VACA is value has been created from one infested unit and capital employed.

The third stage of the relation between value-added (VA) and human capital (HC) namely Human Capital Coefficient (VAHU). This relation is followed equation:

$$VA/HU = VAHU$$

Human capital (HC) is total expenditures or investment of employees, including salary; wages; etc. Hereby, VAHU shows the ability of human capital to create value in the company.

The fourth stage of the relation between structural capital (SC) and value-added (VA) namely Structural Capital Coefficient (STVA). This relation is followed equation:

$$SC/VA = STVA$$

Structural capital (SC) is the result of the subtraction of value-added and human capital (SC = VA – HC). The less human capital contribution in value creation means the more structural capital contribution. STVA is an indicator of structural capital successful in value creation and measures the amount of structural capital needed to produce a value-added.

The final stage is the calculation of the previously mentioned coefficients, which is followed by an equation:

$$VAIC = VACA + VAHU + STVA$$

The VAICTM is used to determine the success level of each resource participating in the achieved value-added. VACA increased, VAHU and STVA were reduced. Therefore, the higher the VAICTM coefficients, the better management has utilized the organizational potential. VAICTM offers a changed perspective on business analysis through human capital and structural capital, which is correlated with Intellectual capital value and the market value of a company has been established.

Intellectual capital consists of human capital (talent), structural capital (intellectual property, methodologies, software, documents, and other knowledge artifacts), and customer capital (client relationship), and each company have these assets, though emphasize just one more than that the others, (Stewart, 2001 as cited in Pulic, 2003). It could be explaine as figure below:

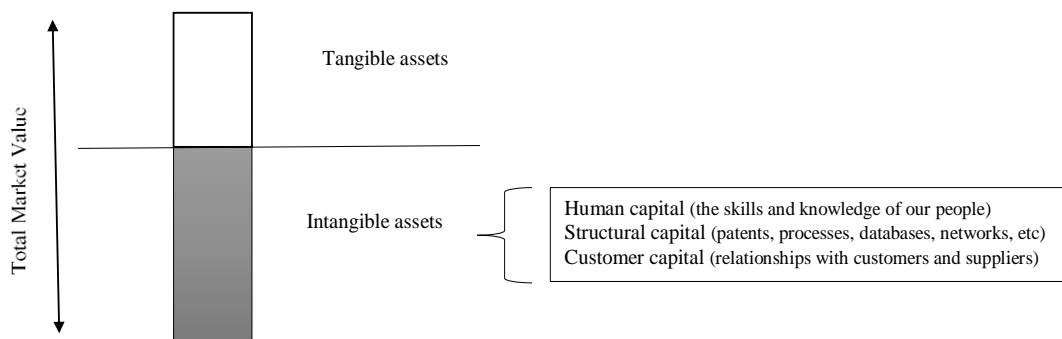


Figure 2: The Intellectual capital model (Stewart, 2001 as cited in Pulic, 2003)

A proposed of the new measurement model

The proposed model is the adoption of finding researchers from Stewart (1997), Pulic (2000), and Andriessen (2001). Stewart (1997) stated that intellectual capital as the “brainpower” of the company. Andriessen (2001) explained that Intellectual capital can distinguished into five categories. The company has two resources in created value-added (Capital employed an Intellectual capital). It is using the Pulic model (2000) as based on measuring corporate value creation efficiency. Through adopting three previous researchers, that means could be create the new measurement model as follow:

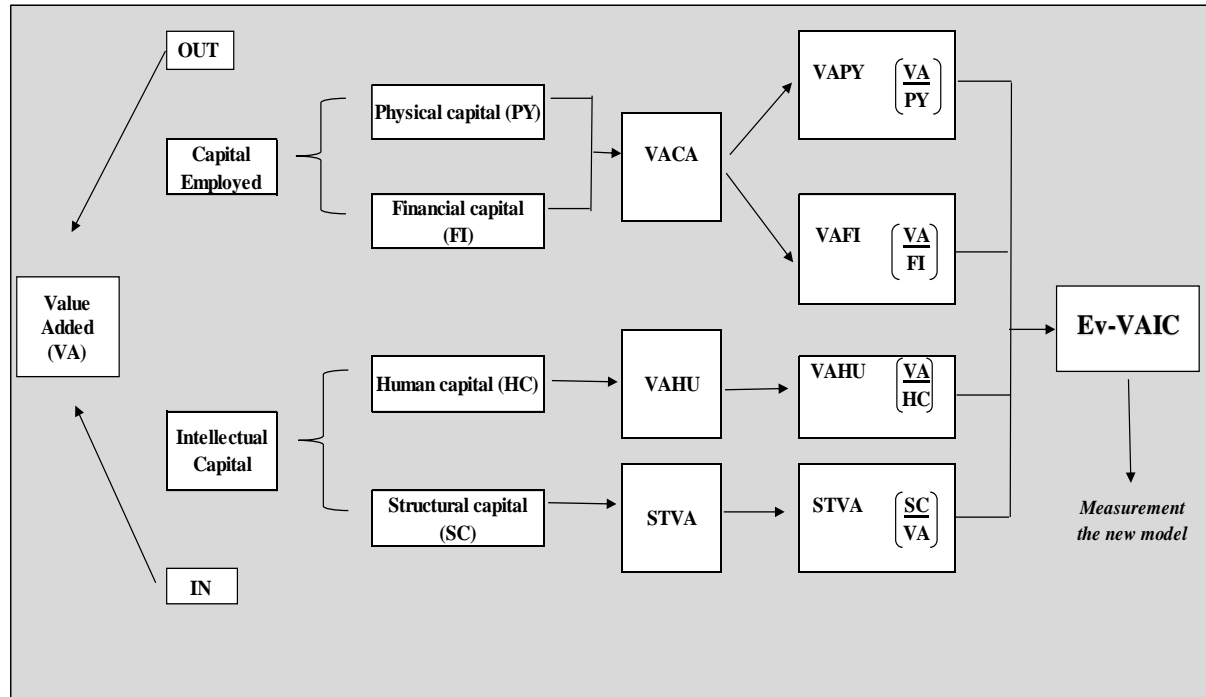


Figure 3: Intellectual capital - The new measurement model with its components

Figure 3 is a measurement of the model with value-added in a corporate. Following the finding research by Pulic, IBEC (2003) that are two resources in created Value Added (VA) of the company: Capital employed and Intellectual capital. Capital employed consists of Physical capital (PY) and Financial capital (FI). Value Added is covering the Output and the Input. The relation between Value Added (VA) and Capital employed is Value Added Capital Coefficient (VACA), (Pulic, 2000). In my study, VACA consists of Physical capital (PY) and Financial capital (FI), which is forming Value Added Physical-Evaluation (VAPY) and Value Added Financial-Evaluation (VAFI).

The aim of this conceptual paper is to identify and use the organization's input and output in order to gain a competitive advantage through the expansion of the intellectual capital model. (VACA, VAHU, STVA). This model proposes four perspectives to evaluate Intellectual Capital according to its structure (PY, FI, HC, SC). For each domain have been defined a set of indicators used for the next quantitative evaluation.

Physical capital refers to accumulated that used to produce goods or provide services to receive income or achieve capital gains. It comprises physical goods such as machinery equipment, office equipment, and buildings have repeatedly been used over several production periods (Curtiss, 2012). The relation between Value Added (VA) and Physical capital (PY) is Value Added Physical-Evaluation (VAPY), which is followed equation:

$$\frac{VA}{PY} = VAPY$$

Financial capital is the free purchasing power or is considered the saved-up financial wealth medium, in the form of currency, and used by corporate to invest or start developing a business (through purchase or acquiring physical capital). The objectives are to pursue profitable investment opportunities without having to save the necessary funds (Collender and Morehart, 2004; as cited in Curtiss, 2012). The relation between Value Added (VA) and Financial capital (FI) is Value Added Financial-Evaluation (VAFI), which is followed equation:

$$\frac{VA}{FI} = VAFI$$

Intellectual capital consists of Human capital (HC), and Structural capital (SC). The relation between Value Added and human capital is Value Added Human Capital Coefficient (VAHU), (Pulic, 2000). In my study, relation between Value Added (VA) and Human capital (HC) is Value Added Human-Evaluation (VAHU), which is followed equation:

$$\frac{VA}{HC} = VAHU$$

Furthermore, accord of Pulic, (2000) stated that the relation between Value Added and structural capital is Structural Capital Coefficient (STVA). In my study, relation between Value Added (VA) and Structural capital (SC) is Evaluation-Structural Value Added (STVA), which is followed equation:

$$\frac{SC}{VA} = STVA$$

The final calculation of the Intellectual capital of a company is the sum of the previously mentioned coefficients, or it is called of Evaluation-Value Added Intellectual Coefficient (Ev-VAIC), which is followed equation:

$$VAPY + VAFI + VAHU + STVA = Ev - VAIC$$

The relevance of the proposed Intellectual capital by using the new measurement model as the information feedback, which is used to the organization's corrective actions. The goals are strategy redesign for long-term and sustainable competitive advantages through utilizing organizational knowledge. Thus, it can be explain as follow as:

VA = Value Added

VA = OUT – IN (PUT)

OUT : Total of sales + Other income

IN : Total of all operating expenses except the labor cost

OR

VA = Total revenue - Cost of goods sold - Operating expense (excluding staff expense)

Then, it is followed by the equation:

$$Ev - VAIC = VAPY + VAFI + VAHU + STVA$$

$$Ev - VAIC = \left(\frac{VA}{PY} \right) + \left(\frac{VA}{FI} \right) + \left(\frac{VA}{HC} \right) + \left(\frac{SC}{VA} \right)$$

Physical capital (PY) : Fixed assets value

Financial capital (FI) : Fair assets value or financial assets value

Human capital (HC) : Labor cost (salaries, wages, pension costs, profit sharing and incentive compensation, payroll taxes and other employee benefits)

Structural capital (SC) : Licensing agreement + favorable contract + goodwill

VAPY : Value Added Physical-Evaluation

VAFI	: Value Added Financial-Evaluation
VAHU	: Value Added Human-Evaluation
STVA	: Evaluation-Structural Value Added
Ev-VAIC	: Evaluation-Value Added Intellectual Coefficient

Conclusion

The main results of this study are the new model measurement (Ev-VAIC) as an Intellectual capital innovative model is proposed, which consists of four components: Physical capital (PY), Financial capital (FI), Human capital (HC), and Structural capital (SC). The utilization of intellectual capital adoption (Pulic's model) enables organizations to pay more attention to an understanding, and evaluating its developing tendency periodically in terms of intellectual capital.

The proposed model has aimed to understand, find out, and strive for various assets have available, which is categorized as the components of capital employed and intellectual capital of the company. Its contribution is easier to understand how to calculate and interpret the efficiency value-added, including In/Output of organization. All the aspects of an organization have relevant implications for its business practice.

The Ev-VAIC is a method for measuring business performance, which uses a complementary and integrating way for other value-added components. It has functioned as the efficiency consideration and the contribution to the value creation of all the different production process inputs. It means that Ev-VAIC is not to measure the value of Intellectual capital but to measure the created value through assets in a context of knowledge organization.

Finally, the further analysis of this work will develop a methodology based on the Value Added components and calculate the efficiency of other inputs to the production process by using hypotheses of the Ev-VAIC model on a case study is the Indonesia stock exchange. It refers to the study by empirical of the relation between Ev-VAIC towards other performance measures, such as Market value, Ratio probability, etc.

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