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Benchmarking Intangible Assets in the Water Sector: an Evidence from Indonesia

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ABSTRACT

This article aims to provide an empirical evidence of the value of intellectual capital, as a proxy of intangible assets, in the water sector. It is very interesting considering there are only a few researches that explore the value of the intellectual capital in this sector and is expected to fill the gap of the literature review. This study presumed that the value of intellectual capital in the water sector is low in view of the fact that it is a capital-intensive sector. It adopted the value added intellectual coefficient (VAIC™) as the instrument to measure the value of intellectual capital. The data were collected during the year of 2013-2015 from 253 municipal water utilities (MWUs) in Indonesia consisting of 83 MWUs in 2013, 79 MWUs in 2014, and 91 MWUs in 2015. It was found that the average VAIC™ value was 2.082 and the range values were between 1.157 and 4.298. This wide range indicates a gap between MWUs. Even another result performs that half of the MWUs have sustainable criteria. Finally, this research recommends MWUs management to re-evaluate human capital policies due to the low value of intellectual capital, so that the bigger amount of investment in human capital would not be wasted.

INTRODUCTION

In the current economy, the tasks of physical assets, such as factories and machineries, are taken over by intangible assets. Intangible assets are non-physical assets that generate value-added to the company in the future. They are dynamic by nature and built on knowledge and competence, such as organisational structure, skills, R&D innovation, and intellectual capital (Tsai et al., 2012; Dženopoljac et al., 2016; Maji and Goswami, 2016; Deep and Narwal, 2013).

Until recently, many concepts about intellectual capital have been revealed. Intellectual capital is an intangible asset that accomplishes the company's success yet cannot be accurately measured and represented on the company's balance sheet (Chan, 2009; Chen et al., 2005; Kujansivu and Lönnqvist, 2007; Berzkalne and Zelgalve, 2014; Mondal and Ghosh, 2012). It is also defined as a knowledge-based achievement of value-added creation for the company.

Intellectual capital in the water sector is rarely observed. Interesting findings were revealed from the study of Kujansivu and Lönnqvist (2007). They demonstrated no difference in the average of total efficiency and in the average of intellectual capital efficiency among industries. Moreover, the intellectual capital efficiency in the electricity, gas, and water sector performed better and at the same time, the intellectual capital value experienced lower than the other sectors. The reason was the fact that the sector was based on tangible assets and considered less oriented to the utilization of knowledge than other sectors, i.e. financial and banking industry, pharmaceuticals, and information technology (Kujansivu and Lönnqvist, 2007; Dženopoljac et al., 2016).

This study aims to examine the status of intellectual capital, as a proxy of intangible assets, in the water sector. It utilizes value added intellectual coefficient (VAIC™) as the approach to achieve intellectual capital measurement. This article is expected to fill the gap in the academic literature on research of intellectual capital in the water sector. The results will provide a basis for taking and evaluating policies related to intellectual capital by municipal water utilities (MWUs) management in developing the strategy for sustainable operations.

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1. LITERATURE REVIEW

Intellectual capital is an intangible asset that cannot be accurately measured and has an impact on the company's success and performance, yet this factor is not represented on the company's balance sheet (Kujansivu and Lönnqvist, 2007; Berzkalne and Zelgalve, 2014; Mondal and Ghosh, 2012).

The issues occurred in intellectual capital are the measurement and recording because of its nature. Furthermore, Pulic (1998) created an intellectual capital measurement method called value added intellectual coefficient (VAIC™). It points out the decent system for monitoring the efficiency of the business activities. It is also an alternative method to measure intellectual capital to the private company.

The VAIC™ assumes that the use of physical and intellectual capital forms the basis for the creation of value-added that is linked to the overall efficiency of the enterprise (Ståhle et al., 2011). The measurement of VAIC™ is constructed of three components, namely human capital (HC), structural capital (SC), and capital employed (CE) (Pulic, 1998, 2000, 2004, and 2008). The creation of value added by the company (value added or VA) which is the difference between income or output and expenditure or input, is the ground of VAIC™ calculation. This formula excludes employee expenses which are considered an investment.

Human capital (HC) is all expenses incurred for employee expenses. The creation of value added from every investment in the human capital is called human capital efficiency (HCE). Structural capital (SC) is the difference between VA and employee expenses (HC). The higher the HC value, the lower the SC value. Meanwhile, the amount of SC used to reach the VA is called

structural capital efficiency (SCE). Capital employed (CE) is the physical and financial capital that shapes the company. The relationship that shows how the company's physical and financial capital creates value added is called capital employed efficiency (CEE).

2. METHODS

Based on the available data, the sample taken in this study during the year of 2013-2015 was 253 MWUs in Indonesia consisting of 83 MWUs in 2013, 79 MWUs in 2014, and 91 MWUs in 2015. The data were collected from MWUs performance reports issued by the Implementation and Improvement National Agency for Water Supply System.

The value of VAIC™ was measured using several stages of calculation (Pulic, 1998, 2000, 2004, and 2008; Chen et al., 2005) as follows:

The first is to calculate the creation of value added by the company (value added or VA) which is the difference between income or output and expenditure or input.

$$VA = Output - Input \quad (1)$$

VA : Value-added of the company

Output : Total revenue of the company

Input : Total expenses of the company

Chen et al. (2005) formulated another VA formula as follows:

$$VA = S - B - DP = W + I + T + NI \quad (2)$$

VA : Value-added of the company

S : Sales revenue

B : Costs of goods sold

DP : Depreciation

W : Wages (employee expenses)

I : Interests

T : Taxes

NI : Net income

The next is to measure the relationship between VA and human capital (HC) which represents how value added is created from every investment in the human capital where the value of HC is all expenses incurred for employee expenses. This relationship is called human capital efficiency (HCE).

$$HCE = \frac{VA}{HC} \quad (3)$$

HCE : Human capital efficiency

VA : Value-added of the company

HC : Employee expenses

The third is to calculate the amount of structural capital (SC) spent to reach the VA, where SC is the difference between the VA and the employee expenses (HC). This variable is called structural capital efficiency (SCE).

$$SCE = \frac{SC}{VA} \quad (4)$$

SCE : Structural capital efficiency

VA : Value-added of the company

SC : The difference between the VA and the employee expenses

The fourth is to assess how the company's physical and financial capital creates added value. The company's physical and financial capital is CE. This variable is known as capital employed efficiency (CEE).

$$CEE = \frac{VA}{CE} \quad (5)$$

CEE : Capital employed efficiency

VA : Value-added of the company

CE : The company's physical and financial capital

The last is to measure the value of VAIC™ coefficient, which is the sum of HCE, SCE, and CEE.

$$VAIC = SCE + HCE + CEE \quad (6)$$

3. RESULTS AND DISCUSSION

The calculation of the intellectual capital value which is the proxy of the intangible assets through the VAIC™ approach shows the average coefficient value of 2.082 with the range of values between 1.157 and 4.298. There are 46 MWUs, or 18.18 percent, which have a coefficient of 2.500 and above. Meanwhile, the MWUs have a coefficient value of less than 1.750 as many as 125 MWUs or nearly half of the samples.

Table 1. Descriptive Statistics of VAIC™ Calculations

	SCE	HCE	CEE	VAIC
Mean	0.277	1.457	0.348	2.082
Median	0.276	1.381	0.298	2.005
Maximum	0.697	3.302	1.202	4.298
Minimum	0.001	1.001	0.036	1.157
Std. Dev.	0.149	0.385	0.192	0.555
Obs.	253	253	253	253

The empirical results perform that half of the MWUs have sustainable criteria according to Pullic (2008). Sustainable criteria are the condition where the company has a VAIC™ coefficient value above 2.000 with which it is considered capable of spending business investment for the development of the company after covering all operational expenses.

In both categories, they are able to move investment in human capital becomes more productive and impact on the company's financial performance. MWUs that are already in these stages generally have a smooth operation. They do not experience an over cost that causes less balanced income. Large revenues have equality between tariffs and large numbers of the customer. It concludes that the MWUs serve and operate mostly in big cities and areas with adequate infrastructure.

Table 2. The Level of Intellectual Capital Efficiency

Efficiency	*Description of efficiency levels*	*Number of MWUs*
2.500	(Or more) is a sign of a very successful business performance.	46
2.000	This is a minimum for efficient business performance in most sectors. Enough is left for intensive investment in development.	82
1.750	Business is in relatively good shape but does not guarantee long term safety. All liabilities are liquidated, however, there is not enough for business investments and therefore future business success is uncertain.	57
1.250	Worrying – survival of company is endangered – not enough value is created to ensure business development.	63
1.000	Much worrying, on the edge of the survival – OUTPUT is insufficient for covering all inputs necessary for operational business	5

At the lowest level, there are five units of observation for the category of companies with VAIC™ coefficient values between 1.000 to 1.249 and 63 units of observation for the category of companies with VAIC™ coefficient values between 1.250 to 1.749. The two bottom categories are considered much worrying and worrying, respectively, because the resulting value added is very small and cannot be used for intensive investment for the company's development.

In order to improve the investment returns on human capital, MWUs must first improve their operational performance. As its nature, the water sector is a physical capital-intensive sector where a disturbance in operations will reduce financial performance. Human capital is a support in generating profits. Appropriate policies in human capital are needed by MWUs in these categories.

CONCLUSION

The average VAIC™ value is 2.082 and the range values are between 1.157 and 4.298. This wide range indicates a gap between MWUs. Even another result performs that half of the MWUs have sustainable criteria. In other words, the overall value of intellectual capital in the water sector in Indonesia is still low. MWUs at a sustainable level are capable to generate advantageous from the human capital investment. For those to become at this stage, it is necessary to make their operations steadily. Factors affecting MWUs performance are tariff rates and a number of customers. The fact is, most MWUs on sustainable level operating in big cities and areas with adequate infrastructure.

The limitation of the method used in this paper, which is VAIC™, is the over-simplification nature in measuring intellectual capital and its incapability to measure the company in the condition of losses or low productivity. Better yet, the advantages of this instrument are the method can be used for comparison between companies in large samples that make it appropriate for the purpose of this research. Further research can observe deeply into the character of MWUs for each level of efficiency. The last, this study recommends MWUs management to re-evaluate human capital policies due to the low value of intellectual capital, so that the bigger amount of investment in human capital would not be wasted. Moreover, the better value of intellectual capital performs better company's performance towards its sustainability.

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