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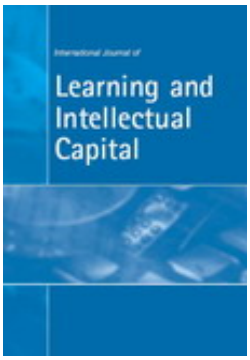

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Is intellectual capital related to telecommunications industry financial performance during COVID-19?

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Abstract: This study aims to examine the influence of intellectual capital on the financial performance of the telecommunications industry during the COVID-19 pandemic. The population includes the telecommunications companies listed on the Indonesia Stock Exchange in 2019–2020. Moreover, the intellectual capital performance was measured by the value-added intellectual capital coefficient (VAIC™) approach while the model was developed and hypotheses tested using linear regression analysis. The results showed that intellectual capital has a positive and significant effect on return on assets and return on equity but has no influence on earning per share. Recommendations are later made for researchers and practitioners.

Keywords: earnings per share; EPS; financial performance; intellectual capital; return on assets; ROA; return on equity; ROE; VAIC™.

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1 Introduction

Companies are changing their strategies to survive in the era of globalisation, innovation, technological developments, and increasingly fierce competition caused by the COVID-19 pandemic. This is observed in the transition from labour-based to knowledge-based businesses, thereby, leading to a strong influence of value creation and knowledge capitalisation on the level of performance and health of companies (Sawarjuwono and Kadir, 2003).

The COVID-19 pandemic affected all aspects of life, including the business world, and this implies business people need to understand the need to compete for both tangible and intangible assets such as namely intellectual capital (IC) to survive and win. This is necessary because a higher level of IC usually leads to a better increase in the confidence of investors and stakeholders in a company. Moreover, the effective application of IC can also increase financial performance.

IC is one of the information needed by investors to assess the corporate capabilities of an organisation and also to create wealth in the future. The development of this concept has attracted the attention of researchers over the last few years (Kurniawan, 2013) and observed to be related to intangible assets, knowledge, and innovation considered to be valuable in developing a knowledge-based economy. Moreover, it is also required in the current accounting profession (Roslender and Fincham in Kurniawan, 2013).

A company with intangible assets such as skilled, knowledgeable, and experienced human resources has the ability to increase its value and usually attract the interest of stakeholders and investors, thereby, increasing its equity. This simply shows that better utilisation of IC normally leads to a higher return on equity (ROE). Moreover, resource-based theory (RBV) explains IC as a unique resource to be used in preparing and implementing a corporate strategy to create competitive advantage and corporate value towards increasing company performance.

IC has become an object of study in different disciplines in line with the growth of the knowledge-based economy [Ståhle et al., (2011), p.541]. Several studies in the accounting sector have tried to examine different methods to identify, measure, and report this concept in a company's report and one of the methods tried and offered is value added intellectual coefficient (VAIC^{TM}). It was constructed by Pulic (2000) to assess IC performance using the usual accounts in company reports.

Previous studies conducted in several countries showed the important contribution of IC to company performance as well as the achievement of corporate financial performance which is easily evident in both the short and long term (Chen et al., 2005; Tan et al., 2007; Ulum et al., 2008; Wang, 2011; Kamal et al., 2011; Salman et al., 2012; Latif et al., 2012). Ulum et al. (2008), Kurniawan (2013), and Tan et al. (2007) also showed its positive relationship with corporate financial performance. Meanwhile, Kuryanto and Syafruddin (2008) reported a contrary finding that a company's financial performance was not influenced by IC.

The present study was motivated by the dissimilarity in findings of previous studies as well as the suggestion to use other performance measures to produce a better R^2. For example, the R^2 obtained by Rismawati and Sanjaya (2012) was less than 10% and this is considered to be relatively small. The authors tried to verify the influence of IC on the corporate financial performance such as return on assets (ROA) and earnings per share (EPS) of public companies in Indonesia and also added the ROE variable in reference to Wijayanti (2012). Their results showed that an increase in ROE, ROA, and EPS due to

the good use of IC ensures more competitiveness and competitive advantage. Therefore, this present study is focused on providing information on the influence of IC on the financial performance of the telecommunications industry measured by ROE, ROA, and EPS during the COVID-19 pandemic.

The contribution of this study is to ensure companies understand the IC needed to improve performance and create value. The findings can also be applied to the enhance resource management strategy of a company towards gaining a competitive advantage.

2 Literature review and hypothesis development

2.1 Resources based theory

Resources based theory states that the resources owned by a company can be used as the strength to create a competitive advantage and achieve superior performance. It was first introduced by Wernerfelt (1984) in an article entitled "A resources-based view of the firm". It is focused on ensuring companies make use of their resources to create added value to explore available opportunities and face threats towards establishing the competitive advantage needed to dominate the market.

Barney (2001) classified resources into three categories which include the physical such as factories, technology, and equipment, humans such as training, experience, and knowledge, and organisations such as the formal structure. This simply shows that IC is one of the unique resources needed by companies to create a competitive advantage and improve company performance. It is also strongly believed by resource-based theory that the possession of superior resources can be used by a company to achieve excellence. This is expected to be conducted by developing these resources that can generate value, cannot be easily imitated or replaced, and serve as a differentiator in relation to competing companies. This means IC is the key to creating added value for a company.

2.2 Intellectual capital

IC is an undetectable resource which is a blend of human, process, and clients factors required to provide a competitive advantage to an organisation and is also perceived as one of the main theoretical resources in the data and information era. According to Nahapiet and Goshal (1998) in Sugeng (2002), IC alludes to the information and capacities moved by friendly collectivities such as an association or expert practice. The concept is also believed to be a significant asset equipped to follow up on information.

Several studies have focused on IC in different countries using VAIC as the proxy such as its application in ranking the IC performance of banks in Japan by Mavridis (2004), banking in India by Kamath (2007), and banks listed on the Indonesia Stock Trade by Ulum (2009). The concept was also applied to examine the relationship between IC and firm performance in South Africa by Firer and Williams (2003) while VAIC™ was used by Chen et al. (2005) to analyse the connection of IC to market value and monetary execution using public organisations in Taiwan as the case study. Moreover, Tan et al. (2007) utilised an exploration test of 150 organisations listed on the Singapore Stock Trade to examine the impact of IC on financial performance.

2.3 Financial performance

Financial performance is normally used to describe the financial condition of a company through financial ratios (Sukhemi, 2007) and its reflection on work performance. The appraisal of financial performance is one of the ways to fulfil obligations to funders and also to achieve company goals. It is usually conducted through certain measures or benchmarks with the most common being the ratio or index connecting two financial data such as the comparison of past, current, and future ratios for the same company. It is important to note that financial ratios are the most frequently used data analysis tools in the financial world and are also observed to be related to different estimates of financial statements.

2.4 IC and firm financial performance (ROA)

The resource-based theory states that the company owns, controls, and uses both its tangible and intangible strategic resources to achieve superior business performance including those related to finance. IC is a type of human resource with the ability to increase the competitiveness of the company such that an efficient utilisation and better capacity of human resources is expected to ensure better performance for a company. One of the parameters normally used to measure corporate performance is ROA, and a study by Zuliyati and Ngurah (2011) showed that IC has a positive impact on the profitability of companies. This indicates the effective development and management of IC can increase financial performance. It is important to note IC can be measured using the VAIC™ and this was observed in its application by Ulum et al. (2008) to determine the importance of IC in increasing the value and financial performance of a company. Moreover, Fajarini and Firmansyah (2012) and Kurniawan (2013) also showed that IC has a positive influence on the corporate financial performance measured by the ROA. A similar finding was reported by Yateno (2019) and these led to the formulation of the following hypothesis:

H1 IC has a positive and significant influence on ROA.

2.5 IC and firm financial performance (EPS)

IC is a long-term corporate resource which includes human, structural, and client capital. Human capital (HC) is the quality of human resources owned by the company in relation to the knowledge, experience, skills, commitment, good working relationships inside and outside the company environment, and others. Structural capital (SC) includes organisational structure, strategy, a series of processes, a good work culture, as well as the ability to perform all required routines. Meanwhile, the customer capital (CC) is a good and sustainable relationship between the company and its partners such as distributors, suppliers, customers, employees, community, government, and others (Ifada and Hapsari, 2012).

This means IC is a long-term capital for a company due to its ability to attract public trust which subsequently leads to the acceptance of products and/or services by customers in the future and causes an increment in profit. It also has the ability to increase the profit of each share (EPS) as empirically proven by several studies such as Wijayanti (2012) which found a positive influence of IC on EPS such that an increase in IC led to an

increment in the EPS and a similar finding was also reported by Rismawati and Sanjaya (2012). This was further corroborated by Tan et al. (2007) through the empirical evidence provided using 150 companies listed on the Singapore Stock Exchange. Therefore, these findings serve as the foundation for the development of the following hypothesis:

H2 IC has a positive and significant influence on EPS.

2.6 IC and firm financial performance (ROE)

IC is an important intangible asset while one of the key figures to measure the profitability of a company based on the capital employed is the return on capital (ROE). This ROE measures the efficiency of a company based on the profits generated by each shareholding unit (Wijayanti, 2012) also indicates the level of goodness using mutual funds or IC to generate revenue growth.

Fajarini and Firmansyah (2012) showed the positive impact of IC on ROE such that a higher IC was observed to have caused better ROE and a similar result was also reported by Yateno (2019). This was further corroborated by Tan et al. (2007) through the empirical evidence presented by studying 150 companies listed on the Singapore Stock Exchange.

The background information provided by these previous studies was used to formulate the following hypothesis:

H3 IC has a positive and significant influence on ROE.

2.7 Telecommunications company listed on the Indonesian Stock Exchange

The issuers listed on the Indonesian Stock Exchange (IDX) are divided into 9 sectors based on a classification system designed to ensure an easy investment decision-making process for investors. An example of this is the infrastructure sector which involves telecommunications companies and nine of these companies were discovered to be listed on the Indonesian Stock Trade in the 2019–2020 periods. The earliest is Telkom Indonesia (Persero) Tbk listed on November 14, 1995 while the latest is Gihon Telekomunikasi Indonesia which was started on April 9, 2018. It is also important to note that the only state-owned enterprise is Telkom Indonesia (Persero) Tbk.

3 Research method

This study was conducted quantitatively using secondary data sourced from audited financial statements of telecommunications companies listed on the IDX between 2019 and 2020. Moreover, VAIC™ data processed from the standard accounts in the audited financial statements including the balance sheet as well as profit and loss were used as the instrument to measure the IC (Tan et al. 2007; Ulum, 2009). The ratios used in the analysis were obtained from the standard financial figures generally found in the company's financial statements.

3.1 Population and research sample

The population consists of Indonesian telecommunications companies listed on the IDX in 2019–2020 while the samples were selected using purposive sampling method with the following criteria:

a Listed as a Telecommunications company on the Indonesian Stock Exchange in 2019–2020 and has never experienced a temporary suspension of stock trading (suspension).

b Publish financial statements in IDR.

c Publish financial reports continuously during the research period of 2019–2020.

d Have complete data for research.

These criteria led to the selection of the companies listed in the following Table 1.

Table 1 The sample of telecommunication companies used in this study

No.	*Exchange code*	*Company name*	*IPO date*	*Recording board*
1	TLKM	Telkom Indonesia (Persero) Tbk	14 November 1995	Main
2	EXCL	XL Axiata Tbk	29 September 2005	Main
3	ISAT	Indosat Tbk	19 October 1994	Main
4	FREN	Smartfren Telecom Tbk	29 November 2006	Main
5	KBLV	First Media Tbk	25 February 2000	Development
6	GHON	Gihon Telekomunikasi Indonesia	09 April 2018	Main
7	LINK	Link Net Tbk	02 June 2014	Main
8	GOLD	Visi Telekomunikasi Infrastruktur	07 July 2010	Development

3.2 Operational definition and measurement of variables

3.2.1 Intellectual capital (X)

IC performance was measured using the value-added generated from the value-added capital coefficient (VACA), value added human capital coefficient (VAHU), and value-added structural coefficient (STVA). These values were combined and symbolised as VAIC by Pulic (2000). This was followed by the initial processing of data from the accounts needed for calculation and analysis. The steps used to formulate and calculate the VAIC™ (Pulic, 2000; Tan et al., 2007; Rismawati and Sanjaya, 2012; Subaida et al., 2018; Yateno, 2019) are stated as follows:

1 The first stage: Calculating the Value Added (VA) using the difference between output and input.

VA = Out – In

Information:

Out = output which is the total sales and other income.

In = input which includes selling expenses and other costs (other than employee expenses).

2 The second stage: Calculating the Value-Added Capital Coefficient (VACA).

VACA is an indicator of the company's intellectual ability to utilise each unit of physical capital. It was assumed by Pulic that better CA utilisation is part of a company's IC.

VACA = VA/CA

Information:

VACA = value added capital coefficient

VA = value added.

CA = capital employed such as the available funds (equity, net income).

3 The third stage: Calculating the Value-Added Human Capital Coefficient (VAHU).

VAHU is an indicator of the quality of a company's human resources and its ability to leverage every dollar spent on HC to generate VA.

VAHU = VA/HC

Information:

VAHU is the value-added human capital coefficient.

VA is value-added.

HC is human capital including employee expenses.

4 The fourth stage: Calculating the Structural Coefficient (STVA).

STVA shows the contribution of structural capital (SC) in value creation.

STVA = SC/VA

Information:

STVA is the structural capital coefficient.

SC is the structural capital calculated through VA – HC.

VA is the value-added

5 The fifth stage: Calculating the value-added intellectual capital coefficient (VAIC™).

VAIC™ indicates the intellectual ability of the organisation determine through the summation of all the previously calculated coefficients:

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

3.2.2 ROA (Y1)

ROA indicates the ability of an organisation to generate benefits from all of its assets. The companies listed on the IDX are required to show ROA in their annual reports and it is normally determined by examining the ratio between net income and total assets (Riyanto, 2008) as follows:

$$ROA = \frac{Net\ profit}{Total\ Assets} \times 100\%$$

3.2.3 Earnings per share (Y2)

EPS is a common measure usually used by analysts to evaluate the companies in financial markets and this is also one of the variables required by those in the IDX to include in their annual reports. It is normally calculated by comparing after-tax income with the number of shares outstanding (Riyanto, 2008).

The EPS formula is:

$$EPS = \frac{Profit\ after\ tax}{Number\ of\ outstanding\ shares} \times 100\%$$

3.2.4 ROE (Y3)

ROE indicates the profit-generating ability of a company from each capital invested and is observed to be required to be included in the annual reports of the companies listed on the IDX. It is normally measured through the percentage of the ratio of net income to owner's capital (Riyanto, 2008) as stated in the following formula:

$$ROE = \frac{Net\ profit}{Owner's\ equity} \times 100\%$$

3.3 Data analysis technique

3.3.1 Descriptive statistics

Mean, maximum, minimum, and standard deviation were used to describe and interpret the distribution of the variables.

Classic assumption test

The classical assumption tests stated as follows were first conducted before the hypotheses were tested:

Normality test

The normality of the data was evaluated to show that the data obtained to represent the dependent and independent variables in the regression model were normally distributed. This was achieved using the Shapiro-Wilk Test which is considered the most powerful normality method for a sample size lesser than 50 (Razali and Wah, 2011). The criterion is that the data are declared to be normally distributed when the probability is > 0.05 and not normally distributed at ≤ 0.05 (Ghozali, 2011).

Autocorrelation test

The autocorrelation test was conducted to determine the existence of a correlation between the confounding errors in period *t* and period *t-1* (previous) in a linear regression model. It is important to note that regression models without autocorrelation are good (Ghozali, 2011) and one of the methods usually applied is the Durbin-Watson statistical test with the criterion for the absence of autocorrelation being dU < DW < 4-dU

(Ghozali, 2011) where DW is the Durbin-Watson statistical value from the data while dU is usually obtained from the Durbin-Watson (DW) table.

Heteroscedasticity test

A heteroscedasticity test was conducted to determine the occurrence of inequality in variance from the residual of one observation to another in the regression. The criterion is that the regression model is free from heteroscedasticity problems when the probability of the independent variable is > 0.05 and has the problem when it is ≤ 0.05.

3.3.1.5 Heteroscedasticity test

Goodness of fit test

F statistic test

The F-statistic test has the ability to show that all independent or independent variables included in the model have an influence on the dependent or dependent variable based on the following criteria:

- the regression model is feasible for the research when the significance of F < 0.05
- the regression model is not feasible when the significance of F > 0.05.

Coefficient of determination (adjusted R^2)

According to Ghozali (2011), the coefficient of determination (R^2) can be used to measure the extent to which the model has the ability to explain the variations in the dependent variables with its value usually found to be between zero and one. A small R^2 value means the ability of the independent variable to explain the variation in the dependent variable is very limited while a value close to one indicates the independent variable provides almost all of the information needed to predict the variation in the dependent variable.

Regression analysis

The research hypotheses developed were tested through linear regression analysis, and the general equation for simple linear regression with one dependent variable is indicated as follows.

$$ROA = \alpha_0 + \beta_1 VAIC_{it} + e$$

$$EPS = \alpha_0 + \beta_1 VAIC_{it} + e$$

$$ROE = \alpha_0 + \beta_1 VAIC_{it} + e$$

Information:

ROA Return on assets

EPS Earning per share

ROA Return on equity

$VAIC_{it}$ Value added intellectual capital coefficient of company *i* in period *t*

α_0 Constant

β_1 Variable coefficient

e error.

The effect of the independent variable (IC) on the dependent variable (ROA, EPS, and ROE) was partially tested at $\alpha = 0.05$ and the hypotheses were accepted or rejected based on the following criteria:

a The independent variable partially affects the dependent variable when the significant number is < 0.05

b The independent variable has no partial effect on the dependent variable when the significant number is > 0.05.

4 Results

4.1 Descriptive statistics

The descriptive statistics of the variables including IC, ROA, EPS, and ROE are presented in the following Table 2.

Table 1 Descriptive statistics of research variables

Variable	*N*	*Minimum*	*Maximum*	*Mean*	*Std. dev.*
VAIC	16	–1.6955	10.6467	3.5215	3.2238
ROA	16	–7.9000	13.4500	3.8438	6.6913
EPS	16	–147.0000	340.0000	89.0588	147.5313
ROE	16	–27.0700	24.5000	4.3431	14.8219
Valid N (Listwise)	16				

Source: SPSS Data Processing v.26

The average VAIC™ value for the sample companies was found to be 3.5215 while the minimum and maximum values are -1.6955 and 10.6467 respectively. The standard deviation value was also recorded to be 3.2238 which is smaller than the mean, thereby, indicating the data for the IC variable are evenly distributed without any significant difference between one data and another.

The mean value of ROA was recorded to be 3.8438 or 384.38% and this means every IDR of assets used by the company can generate a profit of IDR 3.84. Meanwhile, the lowest and highest were –7.9 or –790% and 13.45 or 1,345% respectively. Moreover, the standard deviation was 6.6913 which is greater than the average, thereby, indicating the data for ROA is unevenly distributed and this shows there is a high difference between one data and another.

The average value for the EPS was observed to be 89.0588 or IDR 89.0588 and this means profit per share is IDR 89.0588 while the lowest and highest values were –147 or IDR –147 and 340 or IDR 340 respectively. Moreover, the standard deviation was 147.5315 which is also greater than the average, thereby, indicating the data obtained for

the EPS are spread unevenly and this shows there is a high difference between one data and another.

The mean value for the ROE was found to be 4.3431 or 434% and this indicates every rupiah of equity used by the companies can generate a profit of IDR 434 while the lowest and highest values were –27.70 or –2,770% and 24.50 or 2,450% respectively. Furthermore, the standard deviation was 14.8219 which is higher than the mean, thereby, indicating the data for ROE are unevenly distributed and this means there is a high difference between one data and another.

4.2 Normality test results

The normality test showed a significance value of 0.163 > 0.05 for VAIC, 0.284 > 0.05 for ROA, 0.421 > 0.05 for EPS, and 0.618 > 0.05 for ROE. This implies sample data are normally distributed and satisfy the normality assumption.

4.3 Heteroscedasticity test results

The results for the heteroscedasticity test obtained a significance value of VAIC on ROA 0.053 > 0.05, VAIC on EPS 0.645 > 0.05, and VAIC on ROE 0.229 > 0.05. This can be interpreted as the fact that the regression model of the study meets the heteroscedasticity assumption.

4.4 Autocorrelation test results

The DW value obtained for VAIC on ROA was 2.175, the value for VAIC on EPS was 2.279, and VAIC on ROE had 1.609, thereby, indicating they are all after du (1.3709) and before 4-du (2.6291) and this means the proposed regression equation models do not have autocorrelation

Table 3 Hypothesis test results VAIC-ROA

Model	*Unstandardised coefficient*		*Standardised coefficient*	*t*	*Sig.*
	B	*Std. error*	*Beta*		
(Constant)	–1.708	1.698		–1.006	0.331
VAIC	1.577	0.361	0.760	4.370	0.001
Dependent variable: ROA					
Sig. F (ANOVA) = 0.001					
R Square = 0.577					

Note: Predictors: (Constant), VAIC

Source: SPSS v.26

4.5 Regression analysis [influence of IC (VAIC) on ROA]

The results presented in Table 3 showed that IC has a positive and significant impact on ROA as evidenced by a positive regression coefficient value of 1.577 and a significance value of 0.001 <0.05. The coefficient of determination (R-Square value) was also

recorded to be 0.577 or 57.7% and this means the IC variable has the ability to explain 57.7% of the ROA. This simply shows the first hypothesis (H1) that IC has a positive and significant influence on ROA is accepted.

4.6 Regression analysis [influence of IC (VAIC) on EPS]

The results presented in Table 4 prove statistically that IC does not influence EPS as evidenced by a significance value of 0.076 > 0.05 and this led to the rejection of the second hypothesis (H2) that IC has a positive and significant influence on EPS is rejected.

Table 4 Hypothesis Test Results VAIC-EPS

Model	*Unstandardised coefficient*		*Standardised coefficient*	*t*	*Sig.*
	B	*Std. error*	*Beta*		
(Constant)	15.550	51.218		0.304	0.766
VAIC	20.874	10.884	0.456	1.918	0.076
Dependent variable: EPS					
Sig. F (ANOVA) = 0.076					
R Square = 0.208					

Note: Predictors: (Constant), VAIC

Source: SPSS v.26

Table 5 Hypothesis test results VAIC-ROE

Model	*Unstandardised coefficient*		*Standardised coefficient*	*t*	*Sig.*
	B	*Std. error*	*Beta*		
(Constant)	–5.843	4.495		–1.300	0.215
VAIC	2.893	0.995	0.629	3.028	0.009
Dependent variable: ROE					
Sig. F (ANOVA) = 0.009					
R square = 0.396					

Note: Predictors: (Constant), VAIC

Source: SPSS v.26

4.7 Regression analysis [influence of IC (VAIC) on ROE]

The results presented in Table 5 prove statistically that IC has a positive and significant influence on ROE as evidenced by a positive regression coefficient value of 2.893 and a significance value of 0.009 <0.05. Moreover, the coefficient of determination (R-square) value was 0.396 or 39.6% and this means the IC variable has the ability to explain 39.6% of the ROE. Therefore, the third hypothesis (H3) that IC has a positive and significant influence on ROA is accepted.

5 Discussion

The telecommunications industry is a dynamic and competitive industry mainly driven by rapidly changing technology. This means the participating companies are required to always adapt to existing changes in order to maintain superior business performance. Therefore, this study was conducted to analyse the relationship between IC represented through the VAIC™ approach on the financial performance of the telecommunications industry during the COVID-19 period. The results showed that IC has a positive and significant effect on ROA and ROE, and this provides evidence that IC is a significant determinant to ensure good company performance as stated by the HC theory. Moreover, a previous study showed that HC is expected to create efficient processes and new products or services in the knowledge economy (Ge and Xu, 2021).

The positive and significant effect of IC on ROA observed from the findings is related to the ability of human resources to increase the company's competitiveness. This is due to the fact that an increase in the capability and competitiveness of human resources usually leads to better company performance. Moreover, resource-based theory states that companies need to own, control, and utilise their strategic resources, both tangible and intangible, to obtain superior performance, including their finances. This means IC is a human-based resource that can increase the competitiveness of a company to subsequently improve its performance.

These results are in line with the findings of Zuliyati and Ngurah (2011) that IC has a positive effect on company profitability. This means the ability of a company to develop and manage its IC usually leads to improvement in its financial performance. This was supported by Fajarini and Firmansyah (2012) and Kurniawan (2013) as well as Yateno (2019) that there is a positive influence of IC on the company's financial performance represented ROA. A similar trend was reported by Nawaz (2019) and Ousama and Fatima (2015) by showing the positive contribution of IC to the financial performance of Islamic banks in the UK and Malaysia. Sharabati et al. (2016) also indicated a strong relationship between IC and business performance of Kuwaiti telecommunications companies while Sharabati et al. (2013) found a similar result with Jordanian telecommunications companies. However, Lee and Mohammed (2014) presented a slightly contrary finding that IC has a negative but not significant impact on the ROA of agricultural companies in Malaysia.

The positive and significant effect of IC on ROE also indicated the importance of IC in increasing the competitive advantage of a company with further impact on the financial performance in terms of ROE. This is due to the ability of ROE to show the level of efficiency of a company to invest funds in IC towards improving revenue growth. This result is in line with the previous findings of Fajarini and Firmansyah (2012) as well as Yateno (2019) which prove the positive influence of IC on ROE such that a higher IC was reported to have caused a higher ROE. It was also corroborated by Tan et al. (2007) through the analysis of 150 companies in Singapore between 2000 and 2002 as well as the study conducted by Nawaz (2019) on Islamic banks in the UK. However, the result is not in line with the findings of Kuryanto and Syafruddin (2008) and Wijayanti (2012) that IC has no significant effect on ROE. Meanwhile, it was also discovered from the results that the EPS of the telecommunications companies listed on the IDX in 2019–2020 was not influenced by IC. This is in line with the previous studies by Kuryanto and Syafruddin (2008), Ritonga and Andriyane (2011), and Hamidah et al.

(2014) but different from Rismawati and Sanjaya (2012) which showed a positive influence of IC on EPS.

The results also established a strong relationship between IC variable and business performance, in this case, financial performance, and this was observed to have agreed with previous studies by Carrington and Tayles (2011), Fathi et al. (2013), Sharabati et al. (2013), Yalama (2013), Lee and Mohammed (2014), Khalique et al. (2015), Ousama and Fatima (2015), Ahmad and Ahmed (2016), Sharabati et al. (2016), Khalique et al. (2018), Nawaz (2019), Ousama et al. (2019), and Vale et al. (2022). These empirical findings indicated that the investment of a company in IC has significant effects on its business performance.

This implies it is very important for companies to utilise their intangible resources and collaborate with others in the same industry in order to explore its synergistic effect on their performance (Molodchik et al., 2019). It is also important to note that the IC situation in an organisation is dynamic and this means the companies in the ever-changing telecommunications industry need to consistently adjust through the evaluation and improvement of the IC accumulated within their system. This means it is possible for companies to design and implement strategies for value creation through the development of their IC portfolio in order to continuously achieve superior business performance.

This study contributes to previous literature on IC by indicating its importance to firm performance in knowledge and technology-based industries such as telecommunications. It supports the previous study of Khalique et al., (2018) which showed the contribution of IC to the organisational performance of knowledge-intensive small and medium enterprises (SMEs).

The current and future sustainable competitive performance of a company is usually associated with its intellectual component. Therefore, companies, especially those in the telecommunication industries of Indonesia, are promoted to improve their performance by investing more resources in IC. This is necessary due to the rapid technological developments, ever-changing customer demands, and the occurrence of a pandemic such as COVID-19 which requires they always adapt and adjust their strategies to suit the rapidly changing business environment (Suddaby et al., 2020). This simply indicates that these companies need to manage and increase their IC resources effectively to be successful in the present global economy. This is important because the sustenance of performance is now rooted in optimal management and use of IC instead of physical assets and financial capital.

6 Conclusions and suggestions

6.1 Conclusions

This study showed the positive and significant influence of IC on ROA and this was associated with the ability of human resources to increase the competitiveness of a company. It was discovered that an increase in the capability and competitiveness of human resources can lead to better company performance. This is in line with the resource-based theory which states that companies need to own, control, and utilise their tangible and intangible strategic resources to achieve superior performance, even in their finances. This means IC is a human-based resource that can increase a company's

competitiveness. It was proven statistically that IC has no effect on EPS but has a positive and significant influence on ROE and this means IC does not affect EPS but has the ability to increase the competitive advantage of a company with subsequent impact on the financial performance, in terms of ROE. It is important to note that ROE is the level of efficiency of a company in investing funds in IC to improve its revenue.

This analysis was able to provide information on the relationship between IC represented by the VAIC™ approach and the financial performance of the telecommunications industry during the COVID-19 period.

6.2 Limitations

This study has two limitations like every other empirical research with the first being the collection of data from only one industry which is the telecommunications industry with a limited number of publicly listed companies. Second, the study was conducted in one country. It is, therefore, suggested that further studies be conducted using data from different industries, countries, and/or cultures.

6.3 Recommendations for further study

There is a need for further investigations to confirm the generalisation of these findings to other sectors, industries, regions, and countries by exploring different sectors, industries such as manufacturing, software development, consulting, unicorn, and several other trending companies operating across countries. This is necessary to enrich the research data.

There is also the need to apply other alternative approaches such as ICBS methodology (Viedma, 2002) to determine the authenticity of the findings. It is also important to attempt other methodologies such as in-depth interviews or case studies to provide insight and in-depth understanding of the interaction between the variables in the organisation in certain contexts.

6.4 Implications for practitioners and researchers

This study provides several implications or benefits for practitioners and researchers. First, it reaffirms the importance of IC on the performance of an innovative and/or superior company and shows that practitioners can concentrate their efforts on all three key components of IC management. It is also important to note that IC can be developed at the individual, group, company, and country levels and this needs to be considered by professionals such as accountants, company managers, regulators, and investors in making strategic decisions.

Second, it provides empirical evidence for managers in companies, especially those related to telecommunications, on the importance of IC in improving financial performance. This means it is very useful in the industrial sector which is changing very fast to keep up with existing developments and to ultimately have a positive impact on performance.

Thirdly, this study presents a multi-dimensional nature and diversity of IC with several opportunities for interdisciplinary and cross-functional learning and research for researchers. It also contributes to the measurement of IC to further encourage other

researchers to use different theoretical approaches, model developments, and refinement of measurement instruments.

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