Journal of Applied Business, Taxation and Economics Research (JABTER)
Vol. 4, No. 2, December 2024 (Page: 193-210) P-ISSN 2828-4976
DOI: 10.54408/jabter. v4i2.355 E-ISSN 2808-263X

The Impact of Intellectual Capital on Financial Performance Before, During, and After The Covid-19 Pandemic Crisis

Tsania Rahmawati[1*] , Endang Sri Andayani[2] , Nurika Restuningdiah[3]
[1*,2,3] Universitas Negeri Malang, Indonesia

Corresponding Author: tsaniar98@gmail.com [1*)]

Keywords **:** *Intellectual Capital, Financial Performance, Covid-19.*

Abstract: This study aims to investigate the impact of intellectual capital components, namely human capital, structural capital, relational capital, and capital employed on financial performance before, during, and after the COVID-19 pandemic crisis. This study analyzed 829 observation units from 168 non-financial Indonesian companies from 2018-2022. The data were analyzed using panel data regression with the help of EViews 13. The findings showed that in a 5-year period, only RC and CE significantly improve financial performance. However, only CE significantly improve financial performance before, during, and after the COVID-19 pandemic crisis. This indicates that non-financial Indonesian companies rely heavily on physical and financial capital investment in improving financial performance, both in non-crisis and crisis conditions. The findings offer implications for management and investors regarding the importance of optimizing IC investment, especially RC and CE efficiently to achieve high financial performance under uncertain conditions.

P-ISSN 2828-4976
E-ISSN 2808-263X

Introduction

Financial performance is an indicator of the company's success that can be seen from how the company managing its resources into profits (Gitman & Zutter, 2014). Company's financial performance assessment is very important because companies want to continue to seek effective, efficient results and increase company value for stakeholders (Ferriswara et al., 2022). Nowadays where market competition has become highly competitive, companies and stakeholders are starting to pay more attention to financial performance (Anwar & Shah, 2021). Companies with good financial performance indicate that the company is in good health and far from the threat of bankruptcy (Liang et al., 2016).

During the COVID-19 pandemic, eighty-eight percent of Indonesian businesses suffered losses, with the most affected industries were food and beverage, construction, and real estate (Kementerian Ketenagakerjaan, 2020). Among the developing countries impacted by the COVID-19 pandemic crisis is Indonesia. To overcome the financial impact of the COVID-19 pandemic, Indonesia, which is the host of the 2022 G20 Presidency, invites the whole world to work together toward recovery, growing stronger and more sustainable after the COVID-19 pandemic (G20, 2022). One of Indonesia's economic plans to overcome this is to strengthen the economy by increasing human capital and competition in the global market (World Bank, 2020).

The knowledge-based economy is currently growing rapidly, making the strategy to improve company performance shift from managing tangible assets to intangible assets (Edvinsson & Malone, 1997; Shahdadi et al., 2020). This makes Intellectual Capital (IC), which consists of human capital (HC), structural capital (SC), relational capital (RC), and capital employed (CE), the focus of attention by researchers (Z. Wang et al., 2021). IC as a resource in the form of assets, knowledge, capabilities, information, organizational processes, attributes, and others that are managed by companies with strategies to improve performance and effectiveness (Barney, 1991).

IC has an important role in building superior competitiveness and improving company performance in today's competitive business environment (Nimtrakoon, 2015; Xu & Liu, 2020) and in the future (Matos et al., 2019). This is in accordance with the resource-based theory (RBT) developed by Barney (1991). IC consist of: 1) Human Capital (HC) refers to the productive capabilities of humans to produce ideas, goods, and services (Sisodia et al., 2021); 2) Structural Capital (SC) includes the company's internal culture and processes that help employee effectiveness and productivity (Hatane et al., 2022); 3) Relational Capital (RC) is the company's ability to establish relationships with stakeholders (Boso et al., 2023); and 4) Capital Employed (CE) includes all monetary funds and physical capital that play an important role in providing goods and services (Gupta et al., 2020). Thus, companies that are able to manage the four components of IC well can improve financial performance in increasingly competitive market conditions (Dameri & Ferrando, 2021).

So it can be expected that companies that have superior IC are able to maintain their competitive advantage and company performance under any circumstances, even in crisis conditions. However, some studies show the influence of IC on firm performance isn't

consistent during unstable economic conditions (Kehelwalatenna, 2016; Lestari & Adhariani, 2022; Mohapatra et al., 2019; Nadeem et al., 2017). Previous research revealed that the effect of IC on company performance wasn't consistent during crisis, because human capital (HC) as the main component of IC was unable to create value for companies during the 2008 financial crisis (Kehelwalatenna, 2016). In ASEAN countries, it was found that IC had a positive influence on financial performance (ROA) during normal financial conditions, but there was no significant effect during the COVID-19 pandemic (Lestari & Adhariani, 2022). These findings indicate that the resource-based theory can only be applied when financial conditions are stable, or company awareness still low in managing IC to improve company performance and protect against the threat of crisis (Lestari & Adhariani, 2022).

Several previous studies using RBT found that overall IC significantly improves financial performance (Bayraktaroglu et al., 2019; Chowdhury et al., 2019; Sisodia et al., 2021; Tran et al., 2022; Xu et al., 2023; Yousaf, 2021; Zhang et al., 2021). In Indonesia, several studies have examined the impact of IC on financial performance (Cindiyasari et al., 2023; Lestari & Adhariani, 2022; Soetanto & Liem, 2019; Soewarno & Tjahjadi, 2020; Ulum et al., 2016), but still show mixed results. Soetanto & Liem (2019) and Soewarno & Tjahjadi (2020) found SC and CE significantly improve ROA and market value, while HC significantly improves price-to-book value (PBV) and asset turnover. Cindiyasari et al., (2023) found that HC, SC, RC, and CE significantly improves ROA and ROE, but no significant effect on market value. Lestari & Adhariani (2022) uses five ASEAN countries and the COVID-19 pandemic as moderating variables, but no specific testing is done based on each country. Furthermore, there is still limited research done on how IC affected Indonesian companies financial performance during the COVID-19 pandemic.

This study will fill the gap from previous studies by proposing several novelties. First, by using resource-based theory and contingency theory, this study will explain the effect of IC on financial performance under conditions of uncertainty. The addition of contingency theory is due to external factors in the form of unstable economic conditions (financial crisis due to the COVID-19 pandemic), companies need different strategies and decision-making to organize company resources in the face of opportunities and threats (Aragon-Correa & Sharma, 2003). Second, by expanding the observation period to three periods, namely before (2018-2019), during (2020), and after the COVID-19 pandemic (new normal 2021-2022). The reason for choosing these years is that the first COVID-19 case in Indonesia occurred at the beginning of the first quarter of 2020, then the economy began to improve in 2021 so that it was called the new normal phase, until the social distance program was revoked at the end of 2022 (CNN Indonesia, 2022).

Third, because there is still little empirical evidence of the effect of HC, SC, RC, and CE on financial performance in Indonesian companies, this study focuses on non-financial companies in Indonesia. Non-financial companies were chosen because research that examines the effect of IC components on company performance in Indonesia has been conducted in the financial and banking sectors (Cindiyasari et al., 2023; Soewarno & Tjahjadi, 2020; Ulum, 2017; Ulum et al., 2014). In addition, the nature of employees, financial structure

P-ISSN 2828-4976
E-ISSN 2808-263X

and operations carried out by financial sector companies are different from business companies in general (Amin et al., 2022; Yamaguchi, 2014). Thus, the selection of non-financial companies as the population of this study is expected to offer new and more comprehensive insights, and be able to provide useful implications for policymakers, company managers, and investors to consider the importance of IC investment to increase firm performance in the face of future financial crises.

IC is a company resource that can foster high competitiveness and long-term business success (Kehelwalatenna, 2016). There are various approaches to measure IC, but one that has been frequently used in earlier research is the financial-based IC measurement method, namely the VAIC (Value-Added Intellectual Capital) model by Pulic (2000). This VAIC model consists of: 1) HC, which is a set of knowledge, abilities, and innovations of employees to accomplish company objectives (Stewart, 1997); 2) SC, which includes company infrastructure that supports employee productivity (Edvinsson, 1997); 3) CE, which is physical capital that contributes to the provision of goods and services and generates income (Pulic, 1998; Gupta et al., 2020). Ulum et al., (2014) then updated the model into the Modified Value-Added IC (MVAIC) by adding relational capital (RC) which includes the company's relationship with internal and external stakeholders.

The company's expertise in obtaining profits and market value is known as financial performance (Kaplan & Norton, 1992). According to Ulum (2017) financial performance is a reflection of organization’s effectiveness based on the achievement of financial aspects which are usually measured using financial ratios. Therefore, it can be concluded that financial performance signifies how well the company manages its resources and makes a profit, showing the company is in good condition and far from the threat of bankruptcy.

According to the resource-based theory, a firm's resources and capabilities, including knowledge, managed information, and management expertise can enhance sustainable competitive advantage (Barney, 2001). In addition, contingency theory states that a company can achieve effectiveness by adjusting organizational characteristics to the existing situation. HC is the most crucial aspect of IC in determining company performance (Hatane et al., 2022). Some prior research finding indicate that HC significantly improves financial performance by ROA (Bayraktaroglu et al., 2019; Nadeem et al., 2017; Nimtrakoon, 2015), ROE (Chen et al., 2005; Dženopoljac et al., 2016; Gupta et al., 2020), and market value (Maditinos et al., 2011; Sardo & Serrasqueiro, 2017). Also, financial crisis conditions can affect IC management strategies and their impact on company performance. Mohapatra et al., (2019) discovered that only HC has significantly improve financial performance in Indian banking during financial crisis. Therefore, it is expected that high quality of HC can increase company’s financial performance, even during unstable economic conditions.

H1: Human capital has a positive effect on financial performance before, during, and after the COVID-19 pandemic crisis.

Based on the resource-based theory, IC is a valuable and unique resource that makes a company can be superior to other companies. In addition, contingency theory states that company will undertake any strategies to survive in uncertainty situations. SC can enhance

work processes or procedures, which enhances the quality of production and services, communication with customers, and solving problems effectively and efficiently (Z. Wang et al., 2021). Previous studies demonstrate that SC significantly improves financial performance as seen from ROA (Chowdhury et al., 2019; Kasoga, 2020; Tran et al., 2022), ROE (Gupta et al., 2020; Nadeem et al., 2017; Yousaf, 2021), and market value (Sardo & Serrasqueiro, 2017; Smriti & Das, 2018). According to Nadeem et al (2017), Russia was able to use SC to survive the 2008 financial crisis. Thus, it can be expected that high quality of SC can improve the company's financial performance during normal or crisis economic conditions.

H2: Structural capital has a positive effect on financial performance before, during, and after the COVID-19 pandemic crisis.

According to the resource-based theory, IC has criteria that cannot be imitated, so the more important these resources are, the more it guarantees competitiveness and high performance. In addition, contingency theory refers to how successful company leaders can adapt according to their environment. RC refers to the company's proficiency in achieving positive communication with external parties to benefit the company (Marti, 2001). Lestari & Adhariani (2022) and C. H. Wang & Juo (2021) discovered that RC significantly improves financial performance as measured by ROA. Gupta et al., (2020) discovered that RC significantly improves financial performance measured by ROE. Kehelwalatenna (2016) found that RC significantly improves financial performance during normal financial conditions, but a negative effect during crisis conditions. Therefore it can be expected that RC can significantly affect financial performance during uncertainty situations.

H3: Relational capital has a positive effect on financial performance before, during, and after the COVID-19 pandemic crisis.

Resource-based theory explains that IC has criteria that cannot be replaced, so the more significant these resources are, the higher the assurance of competitiveness and superior performance. CE refers to all monetary resources and tangible capital that are crucial to IC performance (Pulic, 1998). Some empirical evidence shows that CE significantly improves financial performance using ROA (Gupta et al., 2020; Joshi et al., 2013), ROE (Nadeem et al., 2017; Soewarno & Tjahjadi, 2020; Yousaf, 2021), and market value (Chen et al., 2005; Tsai & Mutuc, 2020). Soetanto & Liem (2019) discovered that CE only significantly improves companies with high-level knowledge industries. Kehelwalatenna (2016) and Nadeem et al (2017) discovered that CE plays an important role in improving financial performance during crisis conditions. So it can be expected that CE significantly improve financial performance in any economic conditions.

H4: Capital employed has a positive effect on financial performance before, during, and after the COVID-19 pandemic crisis.

Research Method

This research uses quantitative approach and explanatory method to investigate the impact of IC on financial performance before, during, and after the COVID-19 pandemic crisis.

P-ISSN 2828-4976
E-ISSN 2808-263X

The relationship among those concepts is presented in the conceptual framework in Figure 1 below.

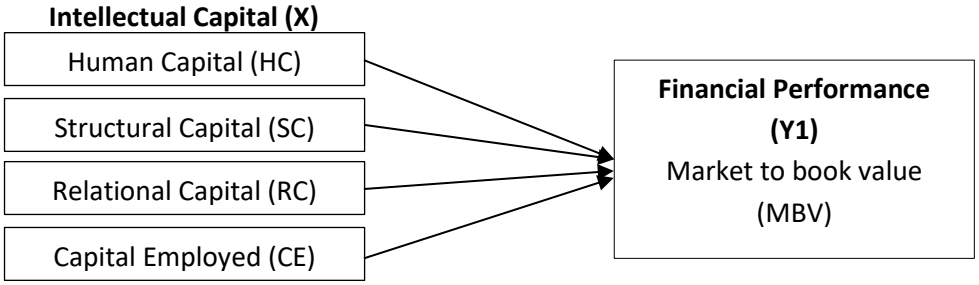

Figure 1. Research Model

The population is all Indonesian non-financial sector companies listed on the IDX. Using purposive sampling technique, this research applies selection criterias: 1) Non-financial companies listed on the IDX during the 2018-2022 period; 2) companies with annual reports during the 2018-2022 period (conducting IPOs before and until 2018, not being suspended or delisted from the IDX) (Lestari & Adhariani, 2022; Soetanto & Liem, 2019); and 3) companies that report the costs required for IC calculation. According to these criteria, a sample of 168 companies was obtained with the selection result in table 1 as follows:

Table 1. Samples Selection Result

No	Criteria	Total
1.	Total of non-financial companies listed on the IDX (as of 2022)	718
2.	Non-financial companies that went IPO after 2018	(488)
3.	Non-financial companies whose websites cannot be accessed (due to suspension or delisting from the IDX)	(50)
4.	Companies that do not report costs required for IC calculations	(12)
	Total Samples	168

Source: Processed Data, 2024

Since not all companies publish annual reports for five years consistently, this research data is unbalanced panel data. Unbalanced panel data is when the number of observations is different for each individual unit or company observed (Ekananda, 2014). Based on these criteria, the final total observations were 829 observations from 168 companies with the following calculation:

Table 2. Final Sample Result

Criteria	2018	2019	2020	2021	2022	Total
The annual report contains information on IC, share price and book value.	166	165	167	165	166	829

Source: Processed Data, 2024

Data is obtained from the company's annual report and collected through secondary data documentation techniques, by collecting 2018-2022 annual report files obtained through the Indonesian Stock Exchange database (www.idx.co.id) and each company's website.

This study uses the independent variable of IC which consists of HC, SC, RC, and CE. The measurement of IC uses the MVAIC model by Ulum et al., (2014) to improve prior limitations and measure value-added efficiency more thoroughly. Each of IC components measured by these formulas:

$$HCE = VA / HC$$
$$SCE = SC / VA$$
$$RCE = RC / VA$$
$$CEE = VA / CE$$

Value-Added (VA) is the added value obtained from total revenue minus total expenses minus employee expenses. HCE shows the value-added generated per labor cost incurred, where HC is total employee expenses. SCE is the ratio of SC expenditure per value-added, where SC is the difference between VA and HC. RCE shows RC expenditure per generate value-added, where RC is total advertising, sales, and marketing expenses. CEE is how much added value is obtained from physical capital, where CE is the book value.

The dependent variable of financial performance is measured by market-to-book value (MBV) as proposed by Nadeem et al., (2017) and Soetanto & Liem (2019) using this formula:

$$MBV = \frac{market\ value}{book\ value}$$

Panel data regression analysis was chosen for its advantages in controlling heterogeneity, having more variability for more efficient estimation, identifying effects that can't be found in pure cross-section and pure time-series data, and improving measurement accuracy (Baltagi, 2021). The test is divided into four periods, namely 5 years (2018-2022), before (2018-2019), during (2020), and after the COVID-19 pandemic (2021-2022). Data analysis was conducted with the help of EViews 13.

Before conducting the panel data regression test, several tests were carried out first to determine the most appropriate regression model. Based on the Chow test and Hausman test, the test results determine the Fixed Effect Model (FEM) as the most appropriate model. The regression model equation can be structured as follows:

P-ISSN 2828-4976
E-ISSN 2808-263X

$$MBV_{it} = \alpha_i + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 RCE_{it} + \beta_4 CEE_{it} + e_{it}$$

Description :

MBV_{it} = Financial Performance (measured by MBV)
α = Constant
β = Coefficients
HCE = Human Capital (HC) Efficiency
SCE = Structural Capital (SC) Efficiency
RCE = Relational Capital (RC) Efficiency
CEE = Capital Employed (CE) Efficiency
e = Error

The panel data regression model does not require that all assumption tests used in the OLS regression model should be met, but only requires multicollinearity and heteroscedasticity tests (Baltagi, 2021; Basuki & Prawoto, 2016). Based on the results of the multicollinearity test and heteroscedasticity test, the correlation coefficient value between independent variables < 0.8 and the p value > 0.05, so there are no multicollinearity and heteroscedasticity problems in the model.

Result and Discussion

Table 3 displays an overview of each variable based on the results of the descriptive statictic here:

Table 3. Descriptive Statistic Result

	N	Mean	Max	Min	Std. Dev.
HCE_X1	835	2,5439	21,3360	-13,7441	2,6113
SCE_X2	835	0,3717	63,2446	-90,1501	4,7013
RCE_X3	835	0,2802	10,9007	-19,0702	1,1394
CEE_X4	835	0,3873	9,3784	-32,0857	1,3028
MBV_Y1	829	2,6628	61,1132	-67,9863	6,8073

Source: Processed Data, 2024

Based on the descriptive statistic results, total observations of independent variables (HCE, SCE, RCE, CEE = 835) are greater than the total observations of the dependent variable (MBV = 829). This research data includes unbalanced panel data, so that excess data will be automatically discarded by EViews 13 when panel data regression analysis is performed. The independent variable is regressed with the MBV variable, so that the total observations of the independent variable are adjusted to 829.

In Table 3, the statistical description of the independent variables shows that the average value of HCE is 2,5439 which is the highest average value of the IC component than the other components. This means that the average non-financial sector company in Indonesia is able to create a relatively high value-added of IDR 2,5439 from IDR 1,00 HC spent, while every IDR 1,00 SC, RC, and CE spent by the company is only able to create value-added less than IDR 1,00. This indicates that HC is the most superior IC component in the creation of

value-added of non-financial sector companies in Indonesia. The standard deviation of HC, SC, RC, and CE variables is greater than the average value, meaning that data from these variables has a wide value variation. This can be confirmed from the distribution of the maximum and minimum values, the difference of which is quite large.

The statistical description of the dependent variable, financial performance (MBV) has an average value greater than 1, which is 2,6628. This shows that the market value exceeds the book value, which means that the stock market values non-financial sector companies in Indonesia higher than the company's book value. The standard deviation of the MBV is greater than its mean value, which is 6,8073, meaning that the data from these variables has a wide value variation. This can be confirmed from the distribution of the maximum and minimum values which difference is quite large, with a maximum value of 61,1132 and a minimum value of -67,9863.

The results of panel data regression analysis is presented in Table 4.

Table 4. Panel Data Regression Analysis Result

Variables	Model 1 5 years (2018-2022) FEM		Model 2 Before crisis (2018-2019) FEM		Model 3 During crisis (2020) OLS		Model 4 After crisis (2021-2022) FEM	
	B	Prob	B	Prob	B	Prob	B	Prob
(Constant)	2.0703	0.0000	2.2787	0.0000	1.1755	0.1233	2.2576	0.0000
HCE_X1	0.0934	0.1480	-0.1322	0.4270	0.0340	0.8852	-0.0437	0.7810
SCE_X2	-0.0180	0.6694	0.1156	0.1724	0.2026	0.4999	-0.0036	0.9689
RCE_X3	0.4717	0.0117	0.8841	0.1761	1.1749	0.1817	0.0488	0.8703
CEE_X4	0.5944	0.0000	1.7117	0.0144	2.7701	0.0020	0.6389	0.0000
R^2		0.8466		0.9599		0.0767		0.8978
Adj R^2		0.8067		0.9173		0.0539		0.7904
Prob. F		0.0000		0.0000		0.0113		0.0000
N		829		331		167		331

Source: Processed Data, 2024

Table 4 presents the impact of HCE, SCE, RCE, and CEE on financial performance (MBV) in the 5-year period, before the crisis, during the crisis, and after the crisis. Based on the summary of the analysis results, four regression equation models can be found as follows:

1. $MBV_1 = 2{,}0703 + 0{,}0934X_1 - 0{,}0180X_2 + 0{,}4717X_3 + 0{,}5944X_4$
2. $MBV_2 = 2{,}2787 - 0{,}1322X_1 + 0{,}1156X_2 + 0{,}8841X_3 + 1{,}7117X_4$
3. $MBV_3 = 1{,}1755 + 0{,}0340X_1 + 0{,}2026X_2 + 1{,}1749X_3 + 2{,}7701X_4$
4. $MBV_4 = 2{,}2576 - 0{,}0437X_1 - 0{,}0036X_2 + 0{,}0488X_3 + 0{,}6389X_4$

According to the four models, the prob. F statistic < 0.05, meaning significant. This explains that models 1, 2, 3, and 4 above are feasible to explain the effect of HC, SC, RC, and CE on financial performance in the 5-year period, before the crisis, during the crisis, and after the crisis. The highest Adjusted R^2 value occurred in the pre-crisis period of 92%, followed by a 5-year period of 81%, a period after the crisis of 79% and then the lowest in the crisis period of 5.4%. This shows that the HC, SC, RC, and CE variables contribute highly to the formation

P-ISSN 2828-4976
E-ISSN 2808-263X

of MBV in the 5-year period, the period before the crisis, and the period after the crisis, except in the crisis period these variables have a low contribution to the formation of MBV.

Furthermore, the t-test results show different findings on the effect of each variable in each model. The significance value of HC in the four models shows a value of p > 0.05, meaning that HC has no impact on financial performance in the 5-year period, before the crisis, during the crisis, and after the crisis. The beta coefficient value of HC is positive in models 1 and 3, but negative in models 2 and 4. This means that HC has a positive but insignificant effect in the 5-year period and crisis period, while a negative and insignificant effect in the period before and after the crisis. Thus, it can be concluded that these findings state that H1 is rejected.

The finding of an insignificant negative effect on financial performance in the before and after the crisis indicates that there is a possibility that the costs incurred for employees can reduce the market value of the company in the non-crisis period, but the evidence is not sufficient to justify the effect is true or due to unintentional factors. This is not in accordance with the findings of Kehelwalatenna (2016) which states that HC has a small role in value creation during unstable economic conditions, and tends to decrease in the post-crisis period.

During the crisis, HC had a positive but insignificant effect on financial performance. This indicates that it is possible that the costs incurred for employees can increase the market value of the company during a crisis, but there is not enough evidence to justify this effect. The COVID-19 pandemic crisis hasn't been able to increase company awareness to utilize their HC to improve financial performance. This finding supports the research results of Lestari & Adhariani (2022), that the COVID-19 pandemic hasn't encouraged companies to manage IC to improve financial performance, which is characterized by a lack of training for employees and other efforts.

The reason of no significant positive effect of HC on MBV in each period may be because IC disclosure is not yet mandatory, so investors lack information on IC investments made by companies (Soetanto & Liem, 2019). The absence of international accounting standards governing IC disclosure obligations also makes it difficult to measure IC accurately with financial data (Jardon & Martinez-Cobas, 2021). This is also likely to make investors in Indonesia unaware of the importance of HC in assessing company performance. In addition, the occurrence of COVID-19 has an impact on workers in the form of reduced working hours, temporary layoffs, and termination of employment (Asian Development Bank, 2020). These changes can affect the HC costs incurred by companies, thus adding to the complexity of measuring HC quality. The results of this study don't support prior findings that good HC management can increase investor expectations of stock prices, thereby increasing the company's market value (Bayraktaroglu et al., 2019; Sardo & Serrasqueiro, 2017; Soewarno & Tjahjadi, 2020).

Similarly, SC in the four models showed a p value > 0.05, meaning that there was no significant effect of SC on financial performance in the 5-year period, before the crisis, during the crisis, and after the crisis. The beta coefficient value of SC is positive in models 2 and 3, but negative in models 1 and 4. This means that SC has a positive and insignificant effect

before the crisis and crisis periods, while SC has a negative and insignificant effect in the 5-year period and after the crisis. Thus, it can be concluded that these findings state that H2 is rejected.

The absence of a significant positive effect in the before and after the crisis period indicates that there is a possibility that SC costs incurred can improve the market value of the company in these periods, but the evidence is not sufficient to justify this effect. Apart from the fact that IC disclosure is not yet mandatory, each sub-sector company certainly has different assets and capabilities, so each company has a different strategy in managing its SC (Cindiyasari et al., 2023). Singla (2020) discovered that SC significantly improves MBV in infrastructure sector companies, while no significant effect was found in the real estate sector. This indicates that the nature of each company sector has a different system quality, infrastructure, technology, and ownership of other intangible assets, resulting in different effects.

In the after crisis period, SC has an insignificant negative effect on financial performance. This indicates that it is possible that the costs incurred for infrastructure can reduce the market value of the company in the after crisis period, but there is not enough evidence to justify this effect. This finding supports Kehelwalatenna's (2016) research that SC tends to have no significant effect on financial performance, especially in the after crisis period. Likewise, the findings of Lestari & Adhariani (2022) that SC individually has no significant effect on financial performance, both before and during the crisis. According to Nadeem et al (2017), country characteristics influence how successful firms are at managing SC effectively to improve financial performance, as evidenced by their findings that among the BRICS countries, only Russia was able to use SC to survive the 2008 financial crisis. So the possibility of no significant positive effect is due to non-financial sector companies in Indonesia that have not been able to manage their SC effectively to improve financial performance, both in normal and crisis conditions. The results of this study do not support previous findings that high SC is able to produce better financial performance, especially on market value (Habib & Dalwai, 2023; Sardo & Serrasqueiro, 2017; Smriti & Das, 2018; Tsai & Mutuc, 2020).

Then, RC shows a p value < 0.05 in model 1, while the p value > 0.05 in models 2, 3, and 4. The beta coefficient value in the four models shows a positive value. This indicates that RC significantly improves financial performance in the 5-year period, while RC has an insignificant positive effect in periods before, during, and after the crisis. Thus, it can be concluded that these findings state that H3 is rejected.

The finding that RC significantly improves MBV in the 5-year period shows that although the average value of RC is the lowest compared to other IC components, non-financial sector companies in Indonesia are able to manage RC effectively and efficiently so as to improve financial performance in 5 years. By utilizing sales, advertising, and marketing costs efficiently, companies are able to increase positive customer experiences and strong relationships with suppliers that can guarantee high-quality products and services (Yu & Huo, 2019). This findings supports prior research by Anifowose et al. (2018) and Ur Rehman et al. (2022) that

P-ISSN 2828-4976
E-ISSN 2808-263X

investing in high RC can strengthen relationships with markets and communities, thereby increasing profitability.

On the other hand, when the observation period is divided into three periods: before, during, and after the crisis, the analysis results show an insignificant positive effect of RC on MBV. This indicates that there is a possibility that the RC costs incurred can increase the market value before, during, and after the crisis, but there is not enough evidence to justify this effect. This is supported by the fact that each period has a short observation time of between 1 to 2 years, so the 5-year observation has larger data and provide stronger evidence. This finding does not support the findings of Kehelwalatenna (2016) that RC significantly improves financial performance during normal financial conditions, but a negative effect during crisis conditions. Overall, this finding is not in line with prior research by Anifowose et al. (2018), Ni et al. (2020), and Ur Rehman et al. (2022) that RC can improve financial performance as measured by MBV.

Furthermore, the significance value of CE in the four models shows a value of $p < 0.05$ with a positive beta coefficient value. This indicates that CE significantly improves financial performance in the 5-year period, before the crisis, during the crisis, and after the crisis. Thus, it can be concluded that these findings state that H4 is accepted.

The finding of CE significantly improves financial performance in all periods shows that CE or physical assets are the most superior resource among other IC resources to increase the company's financial performance, both in stable and unstable economic conditions. The results also discover that the beta coefficient value of CE is the highest in the crisis period, meaning that during the COVID-19 crisis companies rely heavily on physical capital in improving financial performance. This finding supports the research of Kehelwalatenna (2016) and Nadeem et al (2017) which state that the role of CE as a major contributor to value creation cannot be ignored during crisis conditions, especially in developing country companies. Overall, the results support previous findings that companies in Indonesia have good CE management that can increase market value (Soewarno & Tjahjadi, 2020)

Table 5 provides an overview of the hypotheses testing outcomes based on the panel data regression test that was conducted.

Table 5. Hypotheses Testing Result

Hypotheses	5 years (2018-2022)	Before crisis (2018-2019)	During crisis (2020)	After crisis (2021-2022)	Decision
H1: HCE -> MBV	No (+)	No (-)	No (+)	No (-)	H1 rejected
H2: SCE -> MBV	No (-)	No (+)	No (+)	No (-)	H2 rejected
H3: RCE -> MBV	Yes (+)	No (+)	No (+)	No (+)	H3 rejected
H4: CEE -> MBV	Yes (+)	Yes (+)	Yes (+)	Yes (+)	H4 accepted

Source: Processed Data, 2024

Out of the four hypotheses, only hypothesis 4 is accepted while hypotheses 1, 2, and 3 are rejected. When the model viewed over 5 years, CE is the IC component that makes the greatest contribution to the financial performance of non-financial Indonesian companies, followed by RC. However, when viewed based on the period before, during, and after the

COVID-19 pandemic crisis, CE is the only one proven to be influential in improving financial performance. The findings above are not enough to support the resource-based theory which states that the uniqueness of IC owned by companies is able to create value and improve company performance (Barney, 1991), and contingency theory that financial crisis conditions can affect IC management strategies and their impact on company performance (Huang et al., 2016). This is thought to be due to the short observation time and the possibility of other variables or factors that are more influential but are not included in the research model, so it cannot prove that the HC, SC, and RC variables have a significant positive effect on financial performance (MBV) in the period before, during, and after the COVID-19 pandemic crisis.

Conclusion

According to the data analysis and discussion, it is determined that in 5 years, RC and CE improve the company's financial performance, while HC and SC have no impact on financial performance. However, when viewed for each period, namely before, during, and after the COVID-19 pandemic crisis, only CE can improve the company's financial performance. This indicates that non-financial sector companies in Indonesia still rely heavily on RC and CE in improving financial performance in general, and especially CE during non-crisis and crisis conditions. Thus, this study does not sufficiently support the resource-based theory and contingency theory, namely the company has unique and competitive resources (HC, SC, RC, and CE) that can improve the company's financial performance under any conditions, in this study using the period before, during, and after the crisis due to the COVID-19 pandemic. The findings of the study offer implications for management and investors regarding the importance of optimizing IC investment, especially RC and CE efficiently to achieve high financial performance under uncertain conditions. For the government and policymakers, they should make clear rules on IC management by harmonizing national regulations with international standards. In addition, strong enforcement of intellectual property laws can encourage IC investment by ensuring the protection of corporate assets and innovation.

This research is inseparable from any limitations. Measurement of financial performance variables in this study only uses one measure, namely MBV, so that it cannot represent financial performance variables. The research observation time is 5 years which is then divided into three periods, so that the observation year becomes smaller each period which makes the regression strength small. Then, equation models 1, 2, and 4 has a high adjusted r-squared, but is only able to accept 1 to 2 hypotheses. Therefore, future research should improve the limitations of this study by using various measurements of financial performance variables in one study, such as ROE, ROA, net profit margin, ATO, the solvency ratio, the cash flow ratio, the growth ratio, and other measurements. This study uses the period around the crisis due to the COVID-19 pandemic, so the use of the event study method that examines the impact of an event is likely to better capture the effect of IC on financial performance in the period before, during, and after the COVID-19 pandemic. In terms of methodology, we recommend using other panel data regression estimation models, or using various models in one study to be able to see a comparison of data analysis results when using

P-ISSN 2828-4976
E-ISSN 2808-263X

various panel data regression estimation models (FE, CE, RE, dynamic panel GMM, and so on). Furthermore, it is better to add mediator or moderator variables that influence the relationship between IC and financial performance, for example, green innovation, corporate governance, organizational structure or culture, and other variables.

References

Amin, A., Ali, R., Rehman, R. ur, Naseem, M. A., & Ahmad, M. I. (2022). Female presence in corporate governance, firm performance, and the moderating role of family ownership. *Economic Research-Ekonomska Istrazivanja* , *35*(1), 929–948. https://doi.org/10.1080/1331677X.2021.1952086

Anifowose, M., Abdul Rashid, H. M., Annuar, H. A., & Ibrahim, H. (2018). Intellectual capital efficiency and corporate book value: evidence from Nigerian economy. *Journal of Intellectual Capital*, *19*(3), 644–668. https://doi.org/10.1108/JIC-09-2016-0091

Anwar, M., & Shah, S. Z. A. (2021). Entrepreneurial orientation and generic competitive strategies for emerging SMEs: Financial and nonfinancial performance perspective. *Journal of Public Affairs*, *21*(1). https://doi.org/10.1002/pa.2125

Aragon-Correa, J. A., & Sharma, S. (2003). A Contingen Resource-Based View of Proactive Corporate Environmental Strategy. *Academy of Management Review*, *28*(1), 71–88. https://doi.org/10.5465/amr.2003.8925233

Asian Development Bank. (2020). *54461-001: Boosting Productivity through Human Capital Development Program (Subprogram 1)* (Issues 54461–001). https://www.adb.org/sites/default/files/linked-documents/54461-001-ssa.pdf

Baltagi, B. H. (2021). Econometric Analysis of Panel Data (Springer Texts in Business and Economics) - Sixth Edition. In *Springer* (Sixth). Springer Nature Switzerland AG.

Barney, J. B. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120.

Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of Management*, *27*(6), 643–650. https://doi.org/10.1016/S0149-2063(01)00115-5

Basuki, A. T., & Prawoto, N. (2016). *Analisis Regresi dalam Penelitian Ekonomi & Bisnis (dilengkapi Aplikasi SPSS & EVIEWS)*. Rajawali Pers.

Bayraktaroglu, A. E., Calisir, F., & Baskak, M. (2019). Intellectual capital and firm performance: an extended VAIC model. *Journal of Intellectual Capital*, *20*(3), 406–425. https://doi.org/10.1108/JIC-12-2017-0184

Boso, R. K., Adusei, E., & Demah, E. (2023). How does green intellectual capital affect environmental performance? Evidence from manufacturing firms in Ghana. *Social Responsibility Journal*, *19*(7), 1178–1195. https://doi.org/10.1108/SRJ-12-2021-0503

Chen, M. C., Cheng, S. J., & Hwang, Y. (2005). An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of Intellectual Capital*, *6*(2), 159–176. https://doi.org/10.1108/14691930510592771

Chowdhury, L. A. M., Rana, T., & Azim, M. I. (2019). Intellectual capital efficiency and organisational performance: In the context of the pharmaceutical industry in Bangladesh. *Journal of Intellectual Capital*, *20*(6), 784–806. https://doi.org/10.1108/JIC-10-2018-0171

Cindiyasari, S. A., Junarsin, E., Mada, U. G., & Septiani, E. (2023). Does Intellectual Capital Affect Financial Performance? An Empirical Evidence from Financial Companies in

Indonesia. *Proceedings of the 3rd Asia Pacific International Conference on Industrial Engineering and Operations Management*, 1888–1898. https://doi.org/10.46254/ap03.20220322

CNN Indonesia. (2022). *Jokowi Resmi Cabut PPKM, Tak Ada Lagi Pembatasan Kerumunan*. https://www.cnnindonesia.com/nasional/20221230195949-32-894313/jokowi-resmi-cabut-ppkm-tak-ada-lagi-pembatasan-kerumunan

Dameri, R. P., & Ferrando, P. M. (2021). Implementing integrated reporting to disclose intellectual capital in health organisations: a case study. *Journal of Intellectual Capital*, *22*(2), 311–336. https://doi.org/10.1108/JIC-01-2020-0019

Dženopoljac, V., Janoševic, S., & Bontis, N. (2016). Intellectual capital and financial performance in the Serbian ICT industry. *Journal of Intellectual Capital*, *17*(2), 373–396. https://doi.org/10.1108/JIC-07-2015-0068

Edvinsson, L. (1997). Developing intellectual capital at Skandia. *Long Range Planning*, *30*(3), 366–373. https://doi.org/10.1016/s0024-6301(97)90248-x

Edvinsson, L., & Malone, M. S. (1997). *Intellectual Capital: Realizing Your Firm's True Value byFinding Its Hidden Brainpower*. HarperCollins.

Ekananda, M. (2014). *Analisis Ekonometrika Data Panel*. Mitra Wacana Media.

Ferriswara, D., Sayidah, N., & Agus Buniarto, E. (2022). Do corporate governance, capital structure predict financial performance and firm value?(empirical study of Jakarta Islamic index). *Cogent Business and Management*, *9*(1). https://doi.org/10.1080/23311975.2022.2147123

G20. (2022). *G20 Chair's Summary Fourth G20 Finance Ministers and Central Bank Governors Meeting* (Issue October). https://g20sfwg.org/wp-content/uploads/2022/10/G20-Chairs-Summary-4th-FMCBG-12-13-Oct-2022.pdf

Gitman, L. J., & Zutter, C. J. (2014). *Principles of Managerial Finance* (14th ed.). Pearson Education Limited.

Gupta, K., Goel, S., & Bhatia, P. (2020). Intellectual Capital and Profitability: Evidence from Indian Pharmaceutical Sector. *Vision*, *24*(2), 204–216. https://doi.org/10.1177/0972262920914108

Habib, A. M., & Dalwai, T. (2023). Does the Efficiency of a Firm's Intellectual Capital and Working Capital Management Affect Its Performance? In *Journal of the Knowledge Economy* (Issue 0123456789). https://doi.org/10.1007/s13132-023-01138-7

Hatane, S. E., Tarigan, J., Kuanda, E. S., & Cornelius, E. (2022). The contributing factors of intellectual capital disclosures in agriculture and mining sectors of Indonesia and Thailand. *Accounting Research Journal*, *35*(2), 196–218. https://doi.org/10.1108/ARJ-02-2020-0022

Huang, C. C., Tayles, M., & Luther, R. (2016). Contingency factors influencing the availability of internal intellectual capital information. *Journal of Financial Reporting and Accounting*, *8*(1), 4–21. https://doi.org/10.1108/19852511011055916

Jardon, C. M., & Martinez-Cobas, X. (2021). Measuring intellectual capital with financial data. *PLoS ONE*, *16*(5 May), 1–19. https://doi.org/10.1371/journal.pone.0249989

Joshi, M., Cahill, D., Sidhu, J., & Kansal, M. (2013). Intellectual capital and financial performance: An evaluation of the Australian financial sector. *Journal of Intellectual Capital*, *14*(2), 264–285. https://doi.org/10.1108/14691931311323887

Kaplan, R. S., & Norton, D. P. (1992). The Balanced Scorecard—Measures That Drive Performance. *Harvard Business Review*. https://hbr.org/1992/01/the-balanced-scorecard-measures-that-drive-performance-2

Kasoga, P. S. (2020). Does investing in intellectual capital improve financial performance? Panel evidence from firms listed in Tanzania DSE. *Cogent Economics and Finance*, *8*(1). https://doi.org/10.1080/23322039.2020.1802815

Kehelwalatenna, S. (2016). Intellectual capital performance during financial crises. *Measuring Business Excellence*, *20*(3), 55–78. https://doi.org/10.1108/MBE-08-2015-0043

Kementerian Ketenagakerjaan. (2020). *Survei Kemnaker: 88 Persen Perusahaan Terdampak Pandemi Covid-19*. https://kemnaker.go.id/news/detail/survei-kemnaker-88-persen-perusahaan-terdampak-pandemi-covid-19

Lestari, N. I. G., & Adhariani, D. (2022). Can intellectual capital contribute to financial and non-financial performances during normal and crisis situations? *Business Strategy and Development*, *5*(4), 390–404. https://doi.org/10.1002/bsd2.206

Liang, D., Lu, C. C., Tsai, C. F., & Shih, G. A. (2016). Financial ratios and corporate governance indicators in bankruptcy prediction: A comprehensive study. *European Journal of Operational Research*, *252*(2), 561–572. https://doi.org/10.1016/j.ejor.2016.01.012

Maditinos, D., Chatzoudes, D., Tsairidis, C., & Theriou, G. (2011). The impact of intellectual capital on firms' market value and financial performance. *Journal of Intellectual Capital*, *12*(1), 132–151. https://doi.org/10.1108/14691931111097944

Marti, J. M. V. (2001). ICBS – intellectual capital benchmarking system. *Journal of Intellectual Capital*, *2*(2), 148–165. https://doi.org/10.1108/14691930110385937

Matos, F., Vairinhos, V., Selig, P. M., & Edvinsson, L. (2019). Intellectual capital management as a driver of sustainability: Perspectives for organizations and society. In *Intellectual Capital Management as a Driver of Sustainability: Perspectives for Organizations and Society*. https://doi.org/10.1007/978-3-319-79051-0

Mohapatra, S., Jena, S. K., Mitra, A., & Tiwari, A. K. (2019). Intellectual capital and firm performance: evidence from Indian banking sector. *Applied Economics*, *51*(57), 6054–6067. https://doi.org/10.1080/00036846.2019.1645283

Nadeem, M., Gan, C., & Nguyen, C. (2017). Does intellectual capital efficiency improve firm performance in BRICS economies? A dynamic panel estimation. *Measuring Business Excellence*, *21*(1), 65–85. https://doi.org/10.1108/MBE-12-2015-0055

Ni, Y., Cheng, Y. R., & Huang, P. (2020). Do intellectual capitals matter to firm value enhancement? Evidences from Taiwan. *Journal of Intellectual Capital*, *22*(4), 725–743. https://doi.org/10.1108/JIC-10-2019-0235

Nimtrakoon, S. (2015). Intellectual capital, firms' market The relationship between value and financial performance Empirical evidence from the ASEAN. *Journal of Intellectual Capital*, *Vol. 16*(3), 587–618.

Pulic, A. (1998). Measuring the performance of intellectual potential in knowledge economy. *Paper Presented at the 2nd World Congress on Measuring and Managing Intellectual Capital, McMaster University, Hamilton*.

Pulic, A. (2000). VAIC™ – An Accounting Tool for Intellectual Capital Management. *International Journal Technology Management*, *20*(5/6/7/8), 702–714.

Sardo, F., & Serrasqueiro, Z. (2017). A European empirical study of the relationship between firms' intellectual capital, financial performance and market value. *Journal of Intellectual Capital*, *18*(4), 771–788. https://doi.org/10.1108/JIC-10-2016-0105

Shahdadi, K. M., Anvary Rostamy, A. A., Sadeghi Sharif, S. J., & Ranjbar, M. H. (2020). Intellectual capital, liquidity, and bankruptcy likelihood. *Journal of Corporate Accounting and Finance*, *31*(4), 21–32. https://doi.org/10.1002/jcaf.22460

Singla, H. K. (2020). Does VAIC affect the profitability and value of real estate and

infrastructure firms in India? A panel data investigation. *Journal of Intellectual Capital*, *21*(3), 309–331. https://doi.org/10.1108/JIC-03-2019-0053

Sisodia, G., Jadiyappa, N., & Joseph, A. (2021). The relationship between human capital and firm value: Evidence from Indian firms. *Cogent Economics and Finance*, *9*(1). https://doi.org/10.1080/23322039.2021.1954317

Smriti, N., & Das, N. (2018). The impact of intellectual capital on firm performance: a study of Indian firms listed in COSPI. *Journal of Intellectual Capital*, *19*(5), 935–964. https://doi.org/10.1108/JIC-11-2017-0156

Soetanto, T., & Liem, P. F. (2019). Intellectual capital in Indonesia: dynamic panel approach. *Journal of Asia Business Studies*, *13*(2), 240–262. https://doi.org/10.1108/JABS-02-2018-0059

Soewarno, N., & Tjahjadi, B. (2020). Measures that matter: an empirical investigation of intellectual capital and financial performance of banking firms in Indonesia. *Journal of Intellectual Capital*, *21*(6), 1085–1106. https://doi.org/10.1108/JIC-09-2019-0225

Stewart, T. A. (1997). *Intellectual Capital: The New Wealth of Organizations*. Doubleday / Currency.

Tran, Q., Doan, A. T., & Tran, T. (2022). What are the drivers of SMEs' financial performance? The interaction of intellectual capital and ownership. *Australian Economic Papers*, *61*(4), 751–777. https://doi.org/10.1111/1467-8454.12239

Tsai, C. H., & Mutuc, E. B. (2020). Evidence in Asian food industry: Intellectual capital, corporate financial performance, and corporate social responsibility. *International Journal of Environmental Research and Public Health*, *17*(2). https://doi.org/10.3390/ijerph17020663

Ulum, I. (2017). Intellectual Capital : Model Pengukuran, Framework Pengungkapan dan Kinerja Organisasi. In *Akuntansi*.

Ulum, I., Ghozali, I., & Purwanto, A. (2014). Intellectual Capital Performance of Indonesian Banking Sector: A Modified VAIC (M-VAIC) Perspective. *Asian Journal of Finance & Accounting*, *6*(2), 103. https://doi.org/10.5296/ajfa.v6i2.5246

Ulum, I., Rizqiyah, & Jati, A. W. (2016). Intellectual capital performance: A comparative study between financial and non-financial industry of Indonesian biggest companies. *International Journal of Economics and Financial Issues*, *6*(4), 1436–1439.

Ur Rehman, A., Aslam, E., & Iqbal, A. (2022). Intellectual capital efficiency and bank performance: Evidence from islamic banks. *Borsa Istanbul Review*, *22*(1), 113–121. https://doi.org/10.1016/j.bir.2021.02.004

Wang, C. H., & Juo, W. J. (2021). An environmental policy of green intellectual capital: Green innovation strategy for performance sustainability. *Business Strategy and the Environment*, *30*(7), 3241–3254. https://doi.org/10.1002/bse.2800

Wang, Z., Cai, S., Liang, H., Wang, N., & Xiang, E. (2021). Intellectual capital and firm performance: the mediating role of innovation speed and quality. *International Journal of Human Resource Management*, *32*(6), 1222–1250. https://doi.org/10.1080/09585192.2018.1511611

World Bank. (2020). *Overview: The World Bank in Indonesia*. https://www.worldbank.org/en/country/indonesia/overview

Xu, J., Haris, M., & Liu, F. (2023). Intellectual capital efficiency and firms' financial performance based on business life cycle. *Journal of Intellectual Capital*, *24*(3), 653–682. https://doi.org/10.1108/JIC-12-2020-0383

Xu, J., & Liu, F. (2020). The Impact of Intellectual Capital on Firm Performance: A Modified and

Extended VAIC Model. *Journal of Competitiveness*, *12*(1), 161–176. https://doi.org/10.7441/joc.2010.01.10

Yamaguchi, T. (2014). Intangible Asset Valuation Model Using Panel Data. *Asia-Pacific Financial Markets*, *21*(2), 175–191. https://doi.org/10.1007/s10690-014-9181-z

Yousaf, M. (2021). Intellectual capital and firm performance: evidence from certified firms from the EFQM excellence model. *Total Quality Management and Business Excellence*. https://doi.org/10.1080/14783363.2021.1972800

Yu, Y., & Huo, B. (2019). The impact of relational capital on supplier quality integration and operational performance. *Total Quality Management and Business Excellence*, *30*(11–12), 1282–1301. https://doi.org/10.1080/14783363.2017.1366265

Zhang, L., Yu, Q., Jin, Z., & Xu, J. (2021). Do Intellectual Capital Elements Spur Firm Performance? Evidence from the Textile and Apparel Industry in China. *Mathematical Problems in Engineering*, *2021*. https://doi.org/10.1155/2021/7332885