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**\*Correspondence:**

[widarjo@staff.uns.ac.id](mailto:widarjo@staff.uns.ac.id)

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Department of Accounting  
University of  
Muhammadiyah Malang  
GKB 2 Floor 3.  
Jalan Raya Tlogomas 246,  
Malang, East Java,  
Indonesia

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## THE EFFECT OF INTELLECTUAL CAPITAL PERFORMANCE ON THE COMPANY'S FINANCIAL PERFORMANCE

Bella Pramathana<sup>1</sup>, Wahyu Widarjo<sup>2\*</sup>

**Afiliation:**

<sup>1,2</sup>Accounting Department, Faculty of Economics and Business, University of Sebelas Maret, Surakarta, Central Java, Indonesia

### ABSTRACT

This study analyzes the effect of intellectual capital performance on the company's financial performance in the current year and the following year. We use the Modified Value Added Coefficient (MVAIC) to measure the performance of a company's intellectual capital. The research sample is companies listed on the Indonesia Stock Exchange (BEI) 2015-2017 which are included in the High-IC intensive industries category based on the classification of the Global Industries Classification Standard (GICS). Samples were obtained using purposive sampling technique in order to obtain 112 companies with a total of 336 observations. The data analysis technique was conducted by using panel data regression. This study results indicate that intellectual capital performance has a positive and significant effect on the company's financial performance for the current year. However, it does not significantly affect the company's financial performance in the following year. This study contributes to the accounting literature development, especially the important role of intellectual capital in improving the financial performance of a company.

**KEYWORDS:** Company's Financial Performance; High-IC Intensive Industry; Intellectual Capital Performance; MVAIC .

## INTRODUCTION

Indonesia ranks 36th in the Global Competitiveness Index (GCI) in the Global Competitiveness Report 2016-2017 published by the World Economic Forum (Schwab, 2017). The position is the highest for several recent years. However, Indonesia's position is still below other neighboring countries such as Singapore, Malaysia, and Thailand. Whereas, if viewed from several aspects such as area size, number of Human Resources, and availability of Natural Resources, Indonesia should be able to be superior to these countries. Globalization continues to encourage development until it reaches the industrial era 4.0. Along with this development, business competition has become increasingly fierce, especially after the implementation of the ASEAN Economic Community in early 2016.

President Joko Widodo made adjustments to the President's vision for the 2019-2024 period by concentrating on developing Human Resources by improving the quality of education and talent management. In the previous period, the concentration of the President's vision emphasized the development of infrastructure or tangible assets (Gewati, 2019). This way was conducted as the first step to increase competitive advantage and bring Indonesia to compete globally.

The adjustment of strategy by improving the quality of intangible resources by the President is also carried out by companies in Indonesia. In this case, the intangible resources are referred to the intellectual capital (abbreviated as IC). Based on data published by the Indonesia Stock Exchange through the IDX factbook, high-technology companies that are included in the high IC intensity group of the highest rank with the largest market capitalization. It shows that IC has a high potential to improve company performance and boosts the country's economy (Indonesia Stock Exchange, 2015).

Pulic & Kolakovic stated that every company has unique knowledge, skills, values, and intangible resource solutions which can be used to create excellence competitive and good long-term company performance (Ulum, Kharismawati, & Syam, 2017). The science and education system stated that IC determines a factor production but human knowledge does not have to dominate in the structure, because in industry 4.0 one of the most popular factors is technology with a broad practical perspective and implementation (Vodenko & Lyausheva, 2020). IC is a collection of knowledge and information in a companies or organizations that help increase the value of products and services through knowledge, not capital financial (Allameh, 2018).

Resources Based Theory (RBT) sees that company resources are the main controller behind the company's performance excellence and competitiveness (Riahi-Belkaoui, 2003). RBT was first delivered by Wernelfelt (1984). RBT focuses on the concept of a competitive advantage which is difficult for other companies to imitate. Each company has unique knowledge, skills, values, and intangible resources that can be converted into a market value that is reflected in the company's share price in the capital market.

Intangible resource management can help companies to achieve a competitive advantage, increase productivity, and market value. Barney (1991) suggests the conditions that must be met in order that a resource can be said to be a resource that has a competitive advantage. These conditions include valuable, rare, difficult to imitate, and difficult to replace. Based on RBT theory, IC is considered to fulfill as a unique resource and it can provide value-added for the company. Therefore, companies that have high IC intensity will have high performance.

Experts have developed a method for measuring IC that is owned by the company. One of the popular model IC measurement is the Value Added Intellectual Capital (VAIC) developed by Pulic (2000). VAIC does not measure IC, but only measures the impact caused by IC management (Ulum, Ghozali, and Chariri, 2008). Ulum developed an IC performance measurement model based on the model developed by Pulic to be Modified-VAIC (MVAIC) by adding a Relational Capital Efficiency component. Relational Capital or relationships with customers is vital for the company because it has the goal of promoting the company which can be measured by advertising costs (Ulum, Ghozali, and Agus, 2014).

The relationship between IC and company performance has been proven empirically by several previous researchers. Ulum, Kharismawati, and Syam (2017) examine the effect of MVAIC on the company's traditional financial performance and found that MVAIC has a positive effect on the company's financial performance. Research of Hermawan, Hanun, and Pamungkas (2019) on financial sector companies with high IC intensity found that VAIC has a positive effect on financial performance and market performance. The same result is shown by Smriti and Das (2018) on companies in India. However, researches are conducted by Maditinos *et al.* (2011) and Mehralian *et al.* (2012) found that there is no relationship between IC and firm performance. Even research by Bentoen (2012) found that VAIC has a negative effect on the company's financial performance. The inconsistent research result caused by the different samples used in the study and the economic system by countries and policies adopted by companies in the sample also different.

Although many researchers examined the relationship between IC and company performance, the results are still inconsistent. In addition, not many researchers have conducted analyzes on companies with high IC intensity (High-IC Intensive) in developing countries that have large human resource potential such as Indonesia. Therefore, this study provides to prove the effect of IC on the financial performance of High-IC-intensive companies in Indonesia. Furthermore, this study also analyzes the effect of IC on financial performance in the future. It is important to provide investors in the capital market with an overview of the prospects for future company performance related to IC management.

This study also conducted a comparative analysis of the effect of IC performance on financial performance in High-IC Intensive and Low-IC Intensive companies. This is important to show how strong the effect of IC performance is in both of them. Furthermore, this study also analyzes the effect of each IC component on the company's financial performance. Thus, it can be seen that the IC components have the strongest effect on the company's financial performance.

This study contributes to the accounting literature development, especially the important role of intellectual capital in improving the financial performance of the company in developing countries. Furthermore, this study results provide an overview of company management and owner about the important role of intellectual capital in improving the financial performance of a company and the intellectual capital component that have the strongest influence on improving financial performance. Thus, company management and owner can be more optimal in managing their intellectual resources.

### **Effect of Intellectual Capital Performance on Company Financial Performance**

Intellectual capital is information and knowledge that is applied in a job to produce value (Williams, 2001). Chen, Cheng, and Hwang (2005) states that investors will give higher value to companies that have higher intellectual capital than the company with low intellectual capital. Bayraktaroglu, Calisir, and Baskak (2019) examine the relationship between IC (VAIC-Extended) and company performance in 400 manufacturing companies

in Turkey listed on the Istanbul Stock Exchange in 2003-2013. The results of these studies indicate that the IC component, namely SCE, has a significant effect on company profitability.

Smriti and Das (2018) examined the effect of IC on financial performance in Indian companies listed in the COSPI index using the VAIC Pulic measurement model. The research found that IC could gradually be accepted as a wealth generator to create financial performance, competitive advantage, and sustainability in business.

The listed companies in India are performing well and efficiently using their IC. The increasing importance of IC's contribution to value creation is consistently reflected in the company's financial performance. Furthermore, researches result of (Alfrah, 2018); Zhang *et al.* (2018); Hamdan (2018); Kamukama and Sulait (2017); Anifowose, Rashid and Annuar (2017); Scafarto, Ricci, and Scafarto (2016); Dženopoljac, Janošević and Bontis (2016); Hejazi, Ghanbari and Alipour (2016); Nimtrakoon (2015); Han and Li (2015); Berzkalne and Zelgalve (2014); Clarke, Seng, and Whiting (2011); and Sharabati, Jawad and Bontis (2010) also prove that IC has a positive effect on company performance.

Based on RBT, both IC performance and financial performance are the company's resources to win the competition. The advantages inherent in these two things are advantages for the company. Resources are oriented to maximize profits for the shareholder's benefit and to maintain the organization through good management of intangible resources (including IC) for the stakeholder benefit. If viewed from the RBT perspective, IC that is owned by a company is an organizational resource as capital to manage the better organization. The advantages of the company's intellectual capital are believed to affect the company's financial performance in the long term.

The higher the intellectual capital performance has in line with the better the financial performance (Ulum, Kharismawati and Syam, 2017). IC is not only had a positive influence on the company's financial performance for the current year, but it can also predict the company's future financial performance. Chen, Cheng, and Hwang (2005) prove that IC can be one of the appropriate indicators to predict the company's future financial performance. Furthermore, Ulum, Kharismawati, and Syam (2017) have also proved that a positive relation between IC performance and future performance in 50 companies with the largest market capitalization on the Indonesia Stock Exchange for the period 2007-2014. Based on the theoretical study and the results of the preview research, the research hypothesis is stated as follows:

*H<sub>1a</sub>: Intellectual capital performance has a positive effect on the company's financial performance.*

*H<sub>1b</sub>: Intellectual capital performance has a positive effect on the company's financial performance in the future*

## METHOD

### Population and Sample

The population of this study is companies listed on the Indonesia Stock Exchange in 2015-2017. The sample was selected by purposive sampling. The criteria used are: 1) the company is included in the category of high intellectual capital intensity, 2) not delisted during the observation period and have no negative operating retained earnings. 3) have complete data related to the measurement of the variables used in this study.

Global Industries Classification Standard (GICS) classifies the company becomes a group of companies with intellectual capital intensity high (High-IC intensive industries) and groups of companies with intellectual capital intensity low (Low-IC intensive industries) (Whiting & Woodcock, 2011). GICS grouping applies globally so that these grouping can be applied to industry in Indonesia.

**Dependent Variable**

Return on equity (ROE) is an analytical tool used to show the rate of return on capital invested by investors. The current year's financial performance is proxied by ROE<sub>t</sub>, while the company's future performance is proxied by using ROE for the following year (ROE<sub>t+1</sub>). According to the research of Ulum, Kharismawati, and Syam (2017), ROE is formulated as follows:

$ROE_t$	$\frac{\text{Net Income After Taxes}}{\text{Shareholders' Equity}}$
$ROE_{t+1}$	$\frac{\text{Net Income After Taxes}_{t+1}}{\text{Shareholders' Equity}_{t+1}}$

**Table 1.**  
Dependent Variable

**Independent Variable**

The independent variable in this study is the performance of intellectual capital that is proxied by the Modified Value Added Intellectual Coefficient (MVAIC). This study uses MVAIC because its value is higher than the original VAIC model (Maji and Goswami, 2017). This indicates that for some expansion the modified-VAIC model captures IC components that are more efficient than the original VAIC models developed by Pulic. This study also suggests that company managers can measure IC on the components in the company's financial statements using the MVAIC model. MVAIC calculations based on the research of Ulum, Ghozali, and Agus (2014) formulated as follows:

<i>Value Added</i>	<i>Operating Profit + Employee Cost + Depreciation + Amortization</i>
<i>Human Capital Efficiency (HCE)</i>	<i>Value Added/Human Capital (HC)</i>
<i>Structural Capital Efficiency (SCE)</i>	<i>Structural Capital (SC)/Value Added</i>
<i>Relational Capital Efficiency (RCE)</i>	<i>Relational Capital (RC)/Value Added</i>
<i>Capital Employed Efficiency (CEE)</i>	<i>Value Added/Capital Employed (CE)</i>
<i>Intellectual Capital Efficiency (ICE)</i>	<i>HCE + SCE + RCE</i>
<b>MVAIC</b>	<b>ICE + CEE</b>
<b>MVAIC</b>	<b>HCE + SCE + RCE + CEE</b>

**Table 2.**  
Independent Variable

Explanation:

HC: Human capital; employee expenses total include training

SC: Structural capital; VA-HC

RC: Relational capital; marketing costs

CE: Capital employed; book value from total asset

**Control Variable**

This study uses three control variables, namely, firm size, leverage, and cash turnover rates. Firm size is measured by the company's total assets (Tisna and Agustami, 2016). Leverage is measured by the debt to asset ratio that is calculated by dividing total debt by total assets (Rahayu and Sari, 2018; Maulita and Tania, 2018). The cash turnover ratio is a comparison between sales and average cash to find out how effective the company is in managing its cash to obtain the revenue from sales (Rahayu and Susilowibowo, 2014). Cash turnover is calculated by dividing net sales by cash average.

**Data Analysis Method**

Panel data regression analysis was used in this study. Before conducting the panel regression analysis, the estimation model was first selected using the Chow test, Hausman test, and Lagrange Multiplier test. The following is the regression equation used to test the research hypothesis.

The first equation:

$$ROE_t = \beta_0 + \beta_1 MVAIC + \beta_2 SIZE + \beta_3 DAR + \beta_4 CTO + e \dots\dots\dots (1)$$

The second equation:

$$ROE_{t+1} = \beta_0 + \beta_1 MVAIC + \beta_2 SIZE + \beta_3 DAR + \beta_4 CTO + e \dots\dots\dots (2)$$

Explanation:

$ROE_t$ : Company Performance year t,

$ROE_{t+1}$ : Company Performance year t+1,

MVAIC: Modified Value Added Intellectual Coefficient,

SIZE: Firm Size,

DAR: Debt to Asset Ratio,

CTO: Cash Turnover,

$e$ : Error

**RESULTS AND DISCUSSION**

**Descriptive Statistical Analysis**

Based on the sampling criteria, 112 companies were obtained, so that a total of 336 observations were obtained during the study period. Table 3 below presents a description of the data on each research variable.

	ROE <sub>t</sub>	ROE <sub>t+1</sub>	MVAIC	SIZE	DAR	CTO
Mean	0,10	0,09	5,54	54.913.354	0,56	9,58
Max	0,32	0,32	20,12	1.126.248.442	1,00	57,21
Min	-0,12	-1,21	1,61	175.744	0,07	0,21
Std. Dev	0,08	0,11	2,83	162.051.751	0,23	9,30
Obs.	336	336	336	336	336	336

**Table 3.**  
Descriptive statistics

Notes:  $ROE_t$  = Return on Equity year t;  $ROE_{t+1}$  = Return on Equity year t+1; MVAIC = Modified Value Added Intellectual Coefficient; SIZE = Firm size (in millions); DAR =Debt to Asset Ratio; CTO = *Cash Turnover*.

The variable of company's financial performance ( $ROE_t$ ) shows an average value of 0.10. It shows that the level of return on investment produced by companies with high intellectual capital intensity is 10%. The variable of  $ROE_t$  company financial performance has a maximum value of 0.32 and a minimum value of -0.12 with a standard deviation of 0.08. The variable of  $ROE_{t+1}$  has an average value of 0.09, lower than the average company performance in the current year. The maximum value of  $ROE_{t+1}$  is 0.32 and the minimum value is -1.21 with a standard deviation of 0.11. The variable of intellectual capital performance (MVAIC) shows an average value of 5.54. It shows that the average intellectual capital performance of companies with high intellectual capital intensity can still be improved because there are companies with intellectual capital performance values of 20.12. MVAIC shows a minimum value of 1.61 with a standard deviation of 2.83.

The firm size variable (SIZE) shows an average value of 54,913,354, a maximum value of 1,126,248,442, a minimum value of 175,744 and a standard deviation of 162,051,751. The firm size variable is calculated from the total assets owned by the company, so to obtain meaningful results, the original value of total assets (in millions) is used. The DAR variable shows an average value of 0.56. it means that most of the assets owned by a group of companies with high intellectual capital intensity are financed by debt. The maximum value of DAR is 1.00 and the minimum value is 0.07 with a standard deviation of 0.23. The CTO variable shows an average value of 9.58, which means that the average cash turnover rate of companies with high intellectual capital intensity is 9.58 times. The CTO variable has a maximum value of 57.21 and a minimum value of 0.21 with a standard deviation of 9.30.

**Hypothesis Testing Results**

Before testing the hypothesis, first, the best model is selected for each regression equation. The results of the model specification test show that the best estimation model in the first equation is fixed effect and the best estimation model in the second equation is random effect. Table 4 below presents the results of testing the research hypothesis.

Variable	ROEt (fixed effect model)			ROEt+1 (random effect model)		
	coefficient	t-statistic	prob.	coefficient	t-statistic	prob.
C	-0,243	-0,621	0,535	-0,240	-0,157	0,115
MVAIC	0,020	11,465	0,000	0,003	1,110	0,268
SIZE	0,007	0,568	0,570	0,011	2,092	0,037
DAR	0,017	0,461	0,645	-0,051	-1,344	0,179
CTO	0,001	1,012	0,312	0,002	2,047	0,041
F-statistic	12,798			2,165		
Prob F-stat	0,000			0,072		
Adj. R2	0,801			0,013		
N	336			336		

**Table 4.**  
Hypothesis  
Testing Results

Notes:  $ROE_t$  = Return on Equity year t;  $ROE_{t+1}$  = Return on Equity year t+1; MVAIC = Modified Value Added Intellectual Coefficient; SIZE = Firm size (in millions); DAR =Debt to Asset Ratio; CTO = Cash Turnover.

Based on the MVAIC hypothesis testing on  $ROE_t$ , the results show that the performance of intellectual capital has a significant positive effect on the company's financial performance for the current year. In table 4 the MVAIC variable shows a coefficient value of 0.020 with a probability value of 0.000. Therefore, the research hypothesis which states that intellectual capital performance has a positive effect on the company's financial

performance in the current year (H1a) is acceptable. The results of this study are in line with researches conducted by Ulum, Kharismawati, and Syam (2017) and Smriti and Das (2018) which state that the performance of intellectual capital has a positive effect on the company's financial performance. It is believed that intellectual capital performance can affect financial performance. It means that the better the intellectual capital performance make the better the company's financial performance. Intellectual capital can gradually be accepted as a producer of wealth to improve financial performance, competitive advantage, and long-term business sustainability. The results of the analysis in Table 4 also show that the control variables used in this study have no significant effect on the company's financial performance in the current year (ROEt).

In testing the effect of MVAIC on ROEt+1 shows a coefficient value of 0.003 with a significance level of 0.268. Based on these results, it can be said that intellectual capital performance does not have a significant effect on future financial performance. Thus, the research hypothesis that predicts that intellectual capital performance has a positive effect on the company's future financial performance (H1b) is rejected. The results of this study are not in line with the research conducted by Ulum, Kharismawati, and Syam (2017). However, if viewed from the resulting coefficient value, the effect of MVAIC on ROEt+1 shows a positive direction. Although the effect is not significant, the direction of the regression coefficient which is positive indicates that IC performance has the potential to improve the company's financial performance in the future.

One of the factors that may influence the inconsistency of the results of this study with previous research is the company's strategic policy in IC management. The company's management may only focus on IC management to improve performance in the current period. The added value generated from the company's IC management is only able to increase the efficiency of the use of company resources in the same period. This is reasonable because the strategic policies taken by company management in managing company resources can differ or change from one period to another. In addition, external factors such as the level of competition and economic conditions may also affect the company's financial performance in the future. It means that company policies can be efficient and effective in the current year, but not necessarily in accordance with the situation and conditions in the following year. In testing the effect of IC on future financial performance, there are control variables that have a positive and significant effect, namely firm size and cash turnover rate. These results indicate that the management of tangible resources in a group of companies with high intellectual capital intensity is still an important factor in maintaining the company's long-term performance.

### **Additional Analysis**

We conducted an additional analysis by examining the effect of each of the components that make up MVAIC, namely HCE, SCE, RCE, and CEE on the company's financial performance. Human Capital Efficiency (HCE) is the efficiency of the ability and knowledge of human resources in the company in increasing the company's competitive advantage. Structural Capital Efficiency (SCE) is the efficiency of a company's ability to create infrastructure, Relational Capital Efficiency (RCE) is the efficiency in marketing and customer relations, and Capital Employed Efficiency (CEE) which is the efficiency of the capital used.



Variable	ROEt (fixed effect model)				ROEt+1 (random effect model)			
	Coef.	t-statistic	prob.	Adj. R-square	Coef.	t-statistic	prob.	Adj. R-square
HCE	0,021	11,199	0,000	0,798	0,003	0,912	0,501	0,012
SCE	0,392	10,216	0,000	0,785	0,056	1,097	0,273	0,014
RCE	-0,504	-5,376	0,000	0,725	0,061	0,905	0,366	0,013
CEE	0,433	6,517	0,000	0,734	0,045	1,535	0,126	0,017

**Table 5.**  
Analysis Results  
Per Component

Notes: ROEt = Return on Equity year t; ROEt+1 = Return on Equity year t+1; HCE= Human Capital Efficiency; SCE= Structural Capital Efficiency; RCE= Relational Capital Efficiency; CEE= Capital Employed Efficiency.

From the overall additional analysis on the components that make up the MVAIC that have been done, it can be seen that HCE, SCE, and CEE have a significant positive effect on the company's financial performance for the current year. Meanwhile, RCE has a significant negative effect. If viewed from the regression coefficient value for each component, it is known that CEE and SCE have the strongest effect on current year financial performance (ROEt). These results are consistent with the results of research by Smriti & Das (2018) that found that CEE and SCE are the biggest contributors to increasing company growth. Furthermore, the per-component analysis results on future financial performance (ROEt+1) show consistent results with previous tests. It means that HCE, SCE, RCE, and CEE have no significant effect on the company's future financial performance.

Furthermore, we conduct additional analysis by examining the effect of intellectual capital performance (MVAIC) on the financial performance of companies in groups of companies with low intellectual capital intensity (Low-IC Intensive Industries). The results of the analysis in Table 5 show results that are consistent with testing on groups of companies with high IC intensity. However, when viewed from the value of the regression coefficient and the value of the coefficient of determination (adj. R<sup>2</sup>). It can be said that the influence of IC on the company's financial performance is stronger in companies with high IC intensity compared to companies with low IC intensity. Overall, the results of this study provide an overview to company owners and management about the importance of IC in improving the company's financial performance.

Variable	ROEt (fixed effect model)			ROEt+1 (fixed effect model)		
	coefficient	t-stat	prob.	coefficient	t-stat	prob.
C	2,751	0,518	0,606	-3,846	-0,725	0,470
MVAIC	0,016	2,182	0,032	0,002	0,248	0,805
SIZE	-0,089	-0,497	0,620	0,125	0,700	0,485
DAR	-0,389	-0,977	0,331	0,612	1,533	0,129
CTO	0,002	3,001	0,581	0,001	3,613	0,001
F-statistic			5,734			5,275
Prob F-stat			0,000			0,000
Adj. R2			0,627			0,603
N			153			153

**Table 6.**  
Analysis Results  
on Intensive  
Low-IC  
Companies

Notes: ROEt = Return on Equity year t; ROEt+1 = Return on Equity year t+1; MVAIC = Modified Value Added Intellectual Coefficient; SIZE = firm size (in millions); DAR =Debt to Asset Ratio; CTO = Cash Turnover.

**CONCLUSION**

The results of the analysis show that the performance of intellectual capital has a positive effect on the company's financial performance in the current year. The better the

performance of intellectual capital in the company has in line with the better the resulting company's financial performance. Capital Employed Efficiency (CEE) and Structural Capital Efficiency (SCE) are the components that have the strongest influence on the company's financial performance in the current year. However, this study has not been able to prove a significant effect of the performance of intellectual capital on the company's future financial performance.

This study has several limitations. First, this study has not considered the business strategy and the company's competitive conditions in each observation period. Second, this study uses only one IC measurement, namely MVAIC. Even though there are still other intellectual capital performance measures such as the VAIC-extended developed by Bayraktaroglu, Calisir and Baskak (2019) with take advantage of the cost of innovation, research and development. This study did not use the VAIC-Extended model because there were still few companies that did disclose the costs of innovation, research and development.

Third, this study has not analyzed companies based on industrial sector classifications. Therefore, further research is expected to develop this research by considering the business strategies used by the company and considering the conditions of business competition in the observation period. In addition, further research is also expected to make comparisons using a more comprehensive alternative to IC measurement, for example, VAIC-Extended (see Bayraktaroglu, Calisir and Baskak, 2019). Furthermore, future researchers can conduct an analysis that more in-depth by classifying companies based on the industrial sector on the Indonesia Stock Exchange.

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