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THE EFFECT OF INTELLECTUAL CAPITAL, PRODUCTION COSTS, AND OPERATING COSTS ON PROFITABILITY
(CASE STUDY ON PHARMACEUTICAL SUB-SECTOR COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE IN 2017-2021)

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Abstract. A company's ability to maximize revenue while making the best use of its resources is referred to as profitability. It is stated that good profitability can improve a company's performance and draw in stakeholders. Technology limitations and a lack of human resource potential have led to a heavy reliance on imported pharmaceutical raw materials, which can result in high production costs and operating expenses that have an impact on a company's profitability. This demonstrates that the firm must efficiently manage its production costs, operational costs, and intellectual capital in to maximize the firm 's potential and enhance profitability. Therefore, the goal of this study is to ascertain the impact of intellectual capital, production costs, and operating costs on profitability in the Pharmaceutical Sub-Sector listed on the Indonesia Stock Exchange (IDX) for the years 2017 through 2021. A corporation in the pharmaceutical industry that is listed on the IDX between 2017 and 2021 is the object of this research. In this study, 44 observation data were collected over 5 years from 9 corporations after issuing outlier data using the purposive sampling method. Panel data regression analysis with the EViews 12 program is the data analysis technique employed. The results of this study show that intellectual capital as measured by VAIC has a positive and significant effect on profitability. Meanwhile, production costs and operational costs partially do not affect profitability. Companies in the pharmaceutical sub-sector are expected to maintain profitability by utilizing their assets to obtain maximum profit. Additionally, risks that impact the loss in profitability in terms of the company's internal and external operations are cautioned against by advisors to businesses.

Keywords: profitability; intellectual capital; production costs; operating costs

I. INTRODUCTION

Every business wants to succeed in producing a profit. With this goal, the company must have the ability to run its business as well as possible by managing internal and external activities to achieve the maximum profit. The profitability ratio of the business can be used to gauge its capacity to generate maximum profit. If the business can use its resources to make a profit, it will provide positive value to its stakeholders, especially investors in order to have a reciprocal relationship that can be profitable and maintain the goals achieved in the company. Therefore, the theories that underlie this research are signal theory and stakeholder theory. However, the more developed a company is, the more it can influence the high production costs and operating expenses that will be incurred, which in turn can affect the company's earnings. Therefore, the company needs to carry out good management of employees (Human Capital), supporting infrastructure (Structural Capital), and physical assets (Customer Capital), so that effective management of all this potency can add value to the business and boost its financial success.

Currently, most companies engaged in the pharmaceutical sector industry in Indonesia supply pharmaceuticals on basic raw materials 90-95% still dependent on imports **[1]**. Meanwhile, the development of medicinal raw materials in Indonesia is still hampered by technology and limited human resource potential because it requires considerable costs, and the high technology used, and is hindered by government regulations. This problem needs to be considered by the government in the pharmaceutical industry in supporting the demand for innovation to compete and develop business skills in entities, because the pharmaceutical industry realizes that the competitiveness of entities in technological advances has increased, so that profits can depend on the management of intellectual capital on intangible resources in order to regulate costs incurred such as production costs and operational costs **[2]**. Based on research conducted by Akbar & Ardiyanto **[3]** which suggests the profitability of VAIC is significantly and favorably affected. A company's profitability will increase if its intellectual capital is valued higher, meaning that in improving company performance, a strategy is needed in a company by controlling good intellectual capital, it can provide value added which is beneficial for increasing company profitability. This can be done by developing knowledge and optimizing human resources, so that it will produce optimal company performance and bring a positive influence in increasing company profits **[4]**. However, according to research by Wardani **[5]**, VAIC has a negative and considerable impact on the company's profitability.

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According to research by Yuda & Sanjaya **[6]**, the cost of production positively affects profitability. This is because the increase in production costs is less than the growth in sales volume, the company's earnings have increased. However, according to research by Ramadita & Suzan **[7]**, the cost of production negatively affects profitability. According to research by Widodo et al. **[8]**, the cost of operating a favorable impact on profitability. Operating costs affect the activities of a company, so that an increase in operating costs indicates an increase in company activity which can result in an increase in profitability if the company can reduce or minimize operational costs. Without operational activities, the resulting product will not have benefits for the company. However, according to research by Perkasa & Suzan **[9]**, the cost of operating negatively affect profitability. Therefore, the goal of this study is to ascertain the impact of intellectual capital, production costs, and operating costs on profitability in the Pharmaceutical Sub-Sector listed on the Indonesia Stock Exchange (IDX) for the years 2017 through 2021.

A. Signaling Theory

According to Sofiatin **[10]**, Signal theory is the strategy used by management to give investors a positive perspective of the company's future possibilities so that the information may determine what actions management has taken to meet the company's goals. This theory aims to make companies get positive signals to external parties by measuring the analysis of financial statements such as profitability ratios to build confidence among external parties in how a company's financial statements are presented, for example the company has a high growth rate in increasing the company's assets so as to obtain maximum profit.

B. Stakeholders Theory

According to Triani **[11]**, Stakeholder theory is an action of company management in maintaining the relationship of its stakeholders by supporting stakeholder needs and reporting back company activities to stakeholders, to help managers increase company value so that they can have a big influence on the company. For example, the company reports information related to all company activities so that stakeholders can control company resources so that they provide satisfaction and have a reciprocal relationship that can be profitable and maintain the goals achieved in the company.

C. Financial Statement Analysis

Financial statement analysis is one way to find out how the company performs in a period **[12]**. The purpose of this analysis is as a tool to convey information as to the financial position, its changes, and the achieved performance of the entity **[12]**.

D. Profitability

Profitability can show an idea of how effective management is in an entity as a whole in obtaining the size of profit as measured by linking the profit obtained from a profit is generated using the company's assets and its primary business operations **[13]**. The high ability of the company to obtain profits will be impacted by this high ratio, which indicates that the corporation can return its assets through a specific number of assets, and share capital, as well as the level of income with profits obtained from the high products that have been sold, so as to be able to overcome the expenses incurred by the company such as cost of goods sold and operating expenses **[14]**. The large number of assets owned, it is able to generate greater profits, so that the positive performance value will improve and investors and business owners would gain as a result (Surmadewi & Saputra **[15]**). In this study to measure the profitability ratio using the Return on Asset proxy (ROA).

E. Intellectual Capital

Intellectual Capital describes intangible assets that can provide information and knowledge owned by the company to be managed properly in order to provide an advantage in competing for its company related to labor management, so as to provide added benefit for the firm (Gunawan **[16]**; Bukh et al. **[17]**; Listianawati & Sampurno **[18]**). In this study to measure Intellectual Capital using the Value-Added Intellectual Coefficient proxy (VAIC). A company's profitability will increase if its intellectual capital is deemed higher, meaning that in improving company performance, a strategy is needed in a company by controlling good intellectual capital, it can provide value added which is beneficial for increasing company profitability. This can be done by developing knowledge and optimizing human resources, so that it will produce optimal company performance and bring a positive influence in increasing company profits (Akbar & Ardiyanto **[3]**).
H1: VAIC partially positively affects profitability

F. Production Costs

Production costs describe about the costs incurred by the entity for the processing process from raw materials into ready-to-sell finished products (Jannah **[19]**; Hariyani **[20]**. In manufacturing companies, production costs are the largest cost expenditure, so management needs to control these costs to optimize their use so that waste does not occur. The high cost of production of an enterprise can affect the level of sales, so the company must adjust the production costs incurred. The quantity of the cost of a good or service dictates how much money is made later on, therefore if production costs are not managed well, it could lead to a loss in firm earnings. Therefore, if the production costs incurred are smaller, the company will get a large profit. Conversely, if production costs are rising, the firm will make a little profit as a result of the high production expenses incurred and the consequent rise in the cost of items sold (Kurniawan et al. **[21]**; Yuda & Sanjaya **[6]**).
H2: Production costs partially positively affect profitability

G. Operating Costs

Operating expenses describe the costs incurred by the company, in addition to the direct costs of merchandise and other costs that are directly related to sales, but are related to

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the operation of daily activities in the company (Harrison et al. **[22]**; Perkasa & Suzan **[9]**). The company's size will have an impact on how much business activity there is, which will boost costs for business operations. In this problem, in order not to increase the costs incurred such as waste and misappropriation, the use of operational costs can be carried out by screening everything related to operational activities effectively and efficiently, thereby minimizing the prevention of the use of unnecessary costs **[23]**. Therefore, operational costs affect the company's success in achieving its goals (Widodo et al. **[8]**; Asriyanti & Syafiruddin **[24]**).
H3: Operating costs partially positively affect profitability

II. RESEARCH METHODS

This review employs a quantitative research technique using strategies used in case studies and analysis units employed by groups in pharmaceutical businesses listed on the IDX. The technique utilized to acquire data is observation through documentation and literature studies. This research aims to test the correctness of the hypothesis that the researcher wants to develop by explaining the phenomenon that exists in the company under study. The timing of the implementation of this study used panel data by collecting data during the 2017-2021 period. The population for this research used 12 pharmaceutical businesses that were listed on the IDX from 2017 to 2021. The purposive sample approach was employed in this study with the following criteria: (a) Pharmaceutical Sub-Sector Companies listed on the IDX for the 2017-2021 period. (b) Pharmaceutical Sub-Sector Companies delisted on the IDX for the 2017-2021 period. (c) Pharmaceutical Sub-Sector Companies that do not publish complete and consistent financial statements during the 2017-2021 period. Based on these criteria, there are 9 companies that meet the criteria. However, there was 1 outlier data, so this study data was reduced to 44 observation data from 45 observation data. Data testing using descriptive statistical analysis, classical assumption testing, model selection and panel data regression analysis, then simultaneous coefficient of determination testing and hypothesis testing are carried out (f test) and partial hypothesis testing (t test). To find out the test results, a tool in the form of Eviews software is used 12.

In this study, the dependent variables used profitability as determined by ROA in the following ways **[13]**:

$$ROA = \frac{Net\ Income}{Total\ Asset}\ x\ 100\%$$

The first independent variable in this study utilized VAIC to quantify intellectual capital in the following ways [2]:

$$VA = OUT - IN$$

Information:
VA = *Value Added*
OUT = Output
IN = Input

The VAIC is calculated using the following formula after the value added (VA) calculation [2]:

$$\mathbf{VAIC = VACA + VAHU + STVA}$$

a) VACA

$$VACA = \frac{Value\ Added\ (VA)}{Capital\ Employed\ (CE)}$$

Information:
VACA = Value Added Capital Employed
VA = Value Added
CE = Capital Employed

b) VAHU

$$VAHU = \frac{Value\ Added\ (VA)}{Human\ Capital\ (HC)}$$

Information:
VAHU = Value Added *Human Capital*
VA = Value Added
HC = *Human Capital*

c) STVA

$$STVA = \frac{Structural\ Capital\ (SC)}{Value\ Added\ (VA)}$$

Information:
STVA = Structural Capital Value Added
VA = Value Added
SC = Structural Capital (VA-HC)

Production costs are used in this study's second independent variable in the following ways **[25]**:

Production Cost =

Raw Material Costs + Direct Labor Costs + Fixed Plant Overhead Costs + Variable Plant Overhead Costs

Operational costs are used in this study's third independent variable in the following ways [26]:

Operating Costs =

Sales Costs + General Administration Fees

The panel data equation used in this study can be formulated as follows:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Information:
Y : Profitability
a : Constant
$\beta_1, \beta_2, \beta_3$: Variable Regression Coefficient
X_1 : Intellectual Capital
X_2 : Production Costs
X_3 : Operating Costs
ε : Error term

III. RESULTS AND DISCUSSION

A. Statistical Descriptive Analysis

Table 1. Descriptive Statistical Test Results

Information	N	Minimum	Maximum	Mean	Std. Deviation
VAIC	44	2.1465	15.3473	8.4342	2.8638
PRODUCTION COSTS	44	75.847	7.346.831	1.652.498	1.982.160
OPERATING COSTS	44	123.160	6.971.651	1.743.634	2.152.872
ROA	44	-0.03025	0.30988	0.08435	0.07372

Source: Data that has been processed by researchers, 2022

Table 1 shows the results of a descriptive analysis of research variables on Profitability. The description of each of the variables can be described in several paragraphs as follows: Profitability as measured using ROA in pharmaceutical sub-sector companies listed on the IDX for the 2017-2021 period has an average value of 0.08435 greater than the standard deviation value of 0.07372 which indicates that this data is non-variable or homogeneous. Intellectual capital as measured using VAIC in pharmaceutical sub-sector companies listed on the IDX for the 2017-2021 period has an average value of 8.4342 greater than the standard deviation value of 2.8638 which indicates that this data is non-variable or homogeneous.

Production costs in pharmaceutical sub-sector companies listed on the IDX for the 2017-2021 period have an average value of IDR 1.652.498.976.961 less than the standard deviation value of IDR 1.982.160.504.856 which suggests that these data are varied or heterogeneous. Operational costs in pharmaceutical sub-sector companies listed on the IDX for the 2017-2021 period have an average value of IDR 1.743.634.032.011 less than the standard deviation value of IDR 2.152.872.528.951 which indicates that the data is of this nature varied or heterogeneous.

B. Test Classical Assumptions

a) Normality Test

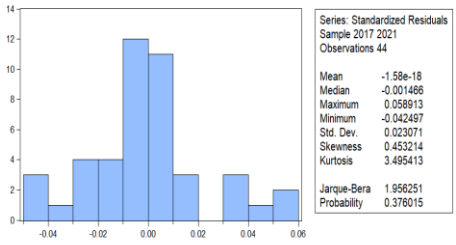

Figure 1. Normality Test Results
Source: Output Eviews version 12, (2022)

According to the normality test shown in Figure 1, the probability value is 0.376015 > 0.05, which denotes that the residual distribution is normal and practicable to use, so that residuals in the regression model affect intellectual capital, production costs, and operating costs on normally distributed profitability.

b) Multicollinearity Test

According to Table 2 multicholinearity testing findings, the value of the centered VIF between intellectual capital (VAIC), production costs, and operational costs has a successive value, which is as much as 1.139033, 9.599462, and 9.370688.

Table 2. Multicollinearity Test Results

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.000657	11.09143	NA
VAIC	8.42E-06	11.24831	1.139033
PRODUCTION COSTS	1.48E-28	16.42656	9.599462
OPERATING COSTS	1.23E-28	15.66039	9.370688

Source: Output Eviews version 12, (2022)

This result indicates that the value of centered VIF < 10, then the data is free from multicholinearity between independent variables.

c) Heteroskedasticity Test

Table 3. Heteroskedasticity Test Results

F-statistic	1.996234	Prob. F (3,40)	0.1300
Obs*R-squared	5.729731	Prob. Chi-Square (3)	0.1255
Scaled explained SS	7.088576	Prob. Chi-Square (3)	0.0691

Source: Output Eviews version 12, (2022)

Based on the outcomes of the Harvey-Godfrey method heteroskedasticity testing, Table 3 displays that the value Obs*R – Squared (Prob. Chi-Square) of 0.1255, meaning probability value > 0.05 so that there is no heteroskedasticity problem in the distribution of data.

C. Hypothesis Test

In this study, independent variables were tested against dependent variables using a panel data regression test with the Fixed Effect Model as the chosen model. The following are the findings of the testing of the hypotheses:

Table 4. Fixed Effect Model Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.036431	0.027479	1.325790	0.1943
VAIC	0.007598	0.002119	3.585389	0.0011
PRODUCTION COSTS	-2.28E-15	1.00E-14	-0.227555	0.8214
OPERATING COSTS	-7.11E-15	9.24E-15	-0.770053	0.4469
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.902049	Mean dependent var		0.084352
Adjusted R-squared	0.868378	S.D. dependent var		0.073718
S.E. of regression	0.026745	Akaike info criterion		-4.177973
Sum squared resid	0.022889	Schwarz criterion		-3.691375
Log likelihood	103.9154	Hannan-Quinn criter.		-3.997519
F-statistic	26.79031	Durbin-Watson stat		1.300955
Prob(F-statistic)	0.000000			

Source: Output Eviews version 12, (2022)

The panel data regression equation can be structured using the test findings of the Fixed Effect model as follows:

$$Y = 0.036431 + 0.007598\ X_1 - 2.28E\text{-}15\ X_2 - 7.11E\text{-}15\ X_3 + \varepsilon$$

Information:

Y : Profitability (ROA)
X_1 : Intellectual Capital (VAIC)
X_2 : Production Costs
X_3 : Operating Costs
ε : Error term

a) Simultaneous Test (F Test)

Based on the findings of the F test, Table 4 displays that the Prob(F-statistic) value of 0.000000 < 0.05, meaning that intellectual capital (VAIC), production costs, and operating costs simultaneously affect profitability (ROA).

b) Coefficient of Determination Test

Based on the results of the coefficient of determination test in Table 4, it shows that the Adjusted R-squared value is 0.868378 or 86.84%. These results show that independent variables including intellectual capital (VAIC), production costs, and operational costs can explain the dependent variable, namely profitability (ROA) of 86.84%, while the rest (100% - 86.84% = 13.16%) is accounted for by factors outside of this research model.

c) Partial Test

The following can be deduced from the partial test (t test) findings in Table 4:

1. The value of the regression coefficient of the intellectual capital variable (VAIC) is 0.007598 and the probability value (p-value) is 0.0011 < 0.05. This shows that intellectual capital (VAIC) has a positive and partially significant effect on profitability (ROA).
2. The value of the variable regression coefficient of production costs is -2.28E-15 and the probability value (p-value) is 0.8214 > 0.05. This shows that the cost of production has no partial effect on profitability (ROA).
3. The value of the variable regression coefficient of operating costs is -7.11E-15 and the probability value (p-value) is 0.4469 > 0.05. This shows that the variable operating costs have no partial effect on profitability (ROA).

D. The Effect of Intellectual Capital on Profitability

The t test findings in Table 4 demonstrate that the value of the regression coefficient of the intellectual capital variable (VAIC) is 0.007598 and the probability value (p-value) is 0.0011 < 0.05. This shows that intellectual capital (VAIC) has a positive and partially significant effect on profitability (ROA) in pharmaceutical sub-sector companies listed on the IDX for the 2017-2021 period. The study's findings support the researcher's theory that the value of a company's intellectual capital (VAIC) has a positive relationship with profitability. Accordingly, any increase in VAIC value can be followed by a rise in revenue. Therefore, in order for the company to obtain a large VAIC value, the company can manage and make good use of its potential resources to obtain added value and efficiency in the company, so that it will produce optimal company performance and bring a positive influence in increasing the company's profit. Therefore, companies need to manage the three components of intellectual capital well, including Human Capital (HC), Structural Capital (SC), and Customer Capital (CC), in order to show that the company is better at managing its assets. The findings of this study are consistent with those of Akbar & Ardiyanto **[3]** research, which found that VAIC has a positive and significant effect on profitability.

E. The Effect of Production Costs on Profitability

The t test findings in Table 4 demonstrate that the value of the regression coefficient of production costs is -2.28E-15 and the probability value (p-value) is 0.8214 > 0.05. This shows that production costs do not partially affect the profitability (ROA) of pharmaceutical sub-sector companies listed on the IDX for the 2017-2021 period. The findings of this study do not support the researchers' hypothesis that production costs have a positive impact on profitability, hence any rise or fall in production costs will not have an impact on profitability, so that production costs at the company are not optimal in providing a good influence to generate profits. This is due to the fact that the majority of the sampled firms have values that are lower than the average production costs, which makes them smaller than the standard deviation. This causes the data to vary or be heterogeneous, which means that the average production costs managed are diverse from the costs incurred during the production process to make a profit for the firm. This is because in the production process there are other factors that can result in a decrease or increase in profits, such as costs, sales volumes, and product selling prices, so that even if the value of production costs increases or decreases, the value cannot affect the firm's profit. For example, what happened to PT Tempo Scan Pacific Tbk in 2017 and 2018 production costs increased by IDR2.074.996.589.223 and IDR2.555.513.124.121, while net profit in 2017 and 2018 decreased by 3% by Rp557.339.581.996 and Rp540.378.145.887. Then at PT Darya Varia Laboratoria Tbk in 2017 and 2018 production costs increased by IDR677.031.110.000 and IDR803.934.314.000, while net profit in 2017 and 2018 increased by 24% by IDR162.249.293.000 and IDR200.651.968.000. The findings of this study are consistent with those of Jannah et al. **[27]** and Istan et al. **[28]** research, which found that the cost of production has no effect on profitability.

F. The Effect of Operating Costs on Profitability

The t test findings in Table 4 demonstrate that the value of the regression coefficient of operational costs is -7.11E-15 and the probability value (p-value) is 0.4469 > 0.05. This shows that operational costs do not partially affect the profitability (ROA) of pharmaceutical sub-sector companies listed on the IDX for the 2017-2021 period. The findings of this study do not support the researchers' hypothesis that operational costs have a positive impact on profitability, meaning that any increase or decrease in operating costs will

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not affect profitability, so that operational costs in the company are not optimal in providing a good influence to generate profits. This is because the majority of companies that are sampled more have a below-average value, meaning that low operating costs, the lower the profitability obtained because operating costs affect the activities of a company, so that a decrease in operating costs indicates a decrease in company activity which can result in a decrease in profitability. However, if operational costs increase and cannot reduce or minimize operational costs, so that the waste of misappropriation of costs incurred will result in a decrease in profitability. Therefore, research data shows that the increase and decrease in operating costs does not affect the high and low profitability, so operating costs have no effect on profitability measured in ROA.

The unrelatedness of operating costs to profitability is also caused because the average value of operating costs is smaller than the standard deviation, so the data varies or is heterogeneous, meaning that the average operating costs managed are relatively different from the costs incurred in operational activities at the company. In addition, each sale is only able to cover operational costs, so to increase profitability, costs are needed outside the company's operational activities, such as income from sales profits, exchange rate differences, service income, and interest income from time deposits. For example, what happened to PT Kimia Farma Tbk in 2017 and 2018 operational costs increased by IDR1.791.957.725.462 and Rp2.206.877.737.030, while net profit in 2017 and 2018 increased by 21% by IDR331.707.917.461 and IDR401.792.808.948. Then at PT Tempo Scan Pacific Tbk in 2017 and 2018 operational costs increased by IDR3.035.729.985.790 and IDR5.829.675.938.550, while net profit in 2017 and 2018 decreased by 3% by IDR557.339.581.996 and IDR540.378.145.887. The findings of this study are consistent with those of Zandra **[29]**, Muhammad & Nurhayati **[30]** which states research, which found that operating costs have no effect on profitability.

IV. CONCLUSION

According to the study's data analysis findings, simultaneously intellectual capital (VAIC), production costs, and operational costs affect variable profitability (ROA). Meanwhile, partially intellectual capital as measured by VAIC has a positive and significant effect on the profitability of pharmaceutical sub-sector companies listed on the IDX for the 2017-2021 period. This is due to the fact that every growth in VAIC's value can be followed by an improvement in the company's profitability by effectively managing and utilizing its valuable potential resources to increase the company's value and efficiency, so that it will produce maximum profitability in bringing a positive influence on its stakeholders. However, production costs and operational costs partially do not affect the profitability of pharmaceutical sub-sector companies listed on the IDX for the 2017-2021 period. This is because any increase or decrease in production costs and operational costs will not affect profitability, so that production costs and operating costs in pharmaceutical sub-sector companies have not been optimal in providing a good influence to generate profits listed on the IDX for the 2017-2021 period. Therefore, companies in the pharmaceutical sub-sector are expected to maintain profitability by utilizing their assets to obtain maximum profit. Additionally, businesses are urged to be aware of hazards that have an impact on their internal and external activities and the company's declining profitability, for example, such as low intellectual capital due to lack of utilizing potential resources, so that if the company can manage well against risks that can reduce the company's profitability, the company will get a positive value to its stakeholders so that many investors interested and can increase the company's profit. However, in this study there are limitations on several independent variables that do not partially affect the profitability variables, namely production costs and operational costs, so it is recommended that subsequent researchers can add this research period to obtain more accurate data. In addition, it is also recommended that further research can look for research objects in companies that have various kinds of innovations that are in line with the increase in intellectual capital variables.

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