

## Effect of intellectual capital and leverage on firm value in pharmaceutical companies listed on Indonesia Stock Exchange

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### ABSTRACT

Technological advances and industrial developments have increased business competition. This forces companies to change their systems into knowledge-based businesses that will improve resource management efficiently and provide the ability to compete so as to create value for the company. Currently, people are paying more and more attention to health, so the pharmaceutical industry has great potential to attract investors to invest. This study uses intellectual capital proxied by VACA, VAHU, STVA, VAIC, and leverage proxied by DER as the independent variable, and firm value proxied by Tobin's Q as the dependent variable. The research method uses a quantitative approach with the 2015-2021 research period. Methods of data analysis using multiple linear regression analysis. The results showed that the capital employed (VACA), human capital (VAHU), structural capital (STVA), and value-added intellectual coefficient (VAIC) hypotheses were supported or accepted, while the leverage hypothesis was rejected. The results of this research are expected to be the basis for evaluating and determining policies. In addition, information regarding research results provides a view that companies need to pay attention to intellectual capital by carrying out good management to increase company value. The results of this research are expected to be used as information for investors before investing. In this study, there are also, limitations where the research period is limited to seven years, and only use pharmaceutical companies as research objects. For further research, the authors provide suggestions in order to expand the research period, use another variable, and object research in order to obtain wider research data and provide more accurate and comprehensive information.

### KEYWORDS

Intellectual Capital;  
Value-Added Human Capital;  
Structural Capital Value-Added;  
Leverage; Firm Value

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### Introduction

The advances in technology make every company required to create innovations with production efficiency by adapting to a knowledge-based business. Companies can focus on their knowledge assets, which will improve resource management efficiently, provide competitive competence and create value for the company (Puspita & Wahyudi, 2021). The company's long-term goal is to optimize the increase in firm value. Stock prices reflect the value of the company which will increase the prosperity of stakeholders (Chandra & Djajadikerta, 2017).

The increasing public awareness of health has increased the market size in the pharmaceutical sector. The market potential can be an opportunity to attract investors. Investors are attracted to companies that consistently maintain and increase the value of their companies because they show the success of leaders and managers in achieving company goals. According to the Ministry of Industry, the pharmaceutical industry is knowledge-based, as evidenced by the enormous expenditure of research and development (R&D) related to efforts to create new medicines, vitamins, supplement, etc.

The approach used to measure and assess how big knowledge assets owned by the company using intellectual capital, which is intangible or non-physical capital, is related knowledge and technology for enterprise use. The Value-Added Intellectual Coefficient (VAIC) was developed by Pulic (1998) to measure the efficiency of added value generated by a company's intellectual capabilities, with the main components of working capital, human capital, and structural capital. A large intellectual capital value indicates that intellectual capital has been used effectively and efficiently so as to create added value for company. Research conducted by Nuryaman (2015), Chandra & Djajadikerta (2017), Ulfa & Prasetyo (2018), Midiantari & Agustia (2020), Nguyen & Doan (2020), and Puspita & Wahyudi (2021) stated that VACA, VAHU, STVA, and VAIC have a positive effect on firm value.

R&D in pharmaceutical companies requires significant funds, so companies need to increase the value of their companies to attract the attention of investors to invest their capital (Wulandari & Purbawati, 2019). One of the sources of funding is obtained from debt. leverage is used to assess how much a company depends on debt Setiawati & Lim (2015), leverage can be measured by the debt-to-equity ratio which shows the company's ability to pay its obligations in the future, if the use of debt is too high it will cause bankruptcy. An increase in the use of debt can be a negative signal for investors because the company is considered unable to distribute returns for investors

which will reduce the value of the company. The results of previous research conducted by Hung *et al.* (2019), Al-Slehat (2020), and Nguyen & Doan (2020) state that the leverage ratio has a negative effect on firm value.

## Literature review

From previous studies, various research results were obtained regarding the factors that affect the value of the company. The theory used in this study is resource-based theory and signaling theory.

### Resource-Based Theory

Resource-based theory (RBT) is a theory that reviews the company in terms of the resources owned by the company. This theory states that a company must be able to utilize and manage its resources effectively by the company's capabilities (Putra & Gantino, 2021). RBT can be used on intellectual capital because it meets the criteria for strategic resources which if managed properly will create a competitive advantage that will create value-added so that the company's performance will increase and have an effect on increasing firm value (Dewi & Dewi, 2020).

### Signaling Theory

The signal theory developed by Spence (1973) explains that the owner gives signals in the form of information that reflects the company's condition which is profitable for investors. This theory illustrates the importance of information transparency from internal companies to external. The information provided will give a positive signal or a negative signal for investors to make investment decisions (Ulfa & Prasetyo, 2018). A positive signal will be well received by the market which will influence investors to be interested in investing so that it will increase the value of the company.

### Firm value

The company's stock price can reflect the overall investor's assessment of any equity held by the company. The high stock price indicates the higher value of the company (Putra & Gantino, 2021). High firm value is considered to be able to increase shareholder prosperity so that investors believe there is potential for the company in the future (Chandra & Djajadikerta, 2017). Tobin's Q is used to assess the Tobin's Q proxy is used by researchers. After all, it is considered to provide the most useful information because it shows that the company is not only focused on investors but also on its creditors. Tobin's Q measurement by comparing the market value of equity plus liabilities and then dividing by the company's total assets. Tobin's Q ratio can be calculated using the following formula:

$$Tobin's\ Q = \frac{\text{Market Value of Equity} + \text{Debt}}{\text{Total Asset}}$$

### Intellectual Capital

Intellectual capital is all the company's intangible assets, it can be in the form of knowledge, information, and experience possessed by human resources and company organizations. Pulic (2000) states that intellectual capital is an organization with its ability to create added value. Value added is an indicator that is considered the most objective in assessing business success and shows the company's ability to create value (Nainggolan & Mahrina, 2019).

Pulic (1998) developed a measurement model of intellectual capital with a Value-Added Intellectual Capital (VAIC) coefficient that reflects the company's ability to use capital employed efficiently, intellectual skills of human resources, and structural capital that describes the company's infrastructure and relationship capabilities and describes the company's intellectual ability as a whole.

Intellectual capital is divided into customer capital, human capital, and structural capital related to science and technology so that it can provide value to the company.

- *Value Added Capital Employed* (VACA)

The capital employed owned by the company such as being able to establish good relations with internal and external, providing service and loyalty to customers, and choosing reliable distributors will have a competitive advantage over its competitors. According to Nuryaman (2015), the advantages of the company will increase the value of capital employed it will increase the value of the company.

- *Value Added Human Capital* (VAHU)

Human Capital shows the ability of employees or workers to generate value added for the company with the funds spent on the workforce (Ulum *et al.*, 2014). Companies that have good quality human resources can easily generate added value so, that able to generate added value for every rupiah spent on human capital.

- *Structural Capital Value Added* (STVA)

Structural capital includes all non-human storage of company knowledge, such as strategies, routines, company databases, manual processes, and other things that make more improvements to the company's value. The greater the contribution of human capital in creating value for a company, the smaller the contribution made by structural capital in this case (Ulum *et al.*, 2014).

According to Pulic (2000) and Ulum *et al.* (2014), VAIC can be calculated using the following formula:

- 1) Value Added = Output - Input
- 2) Value Added Capital Employed = **VACA** =  $\frac{\text{Value Added}}{\text{Capital Employed}}$
- 3) Value Added Human Capital = **VAHU** =  $\frac{\text{Value Added}}{\text{Human Capital}}$
- 4) Structural Capital Value Added = **STVA** =  $\frac{\text{Structural Capital}}{\text{Value Added}}$
- 5) Value Added Intellectual Coefficient = **VACA** + **VAHU** + **STVA**

### Leverage

Leverage is the ratio of debt to equity. Excessive use of debt in the company will cause financial difficulties and reduce business value and even cause bankruptcy Hung *et al.* (2019). An increase in the use of debt is considered a negative signal for investors because if the company is unable to distribute returns it will reduce the value of the company. Leverage in this study is measured by the debt-to-equity ratio (DER) which can be calculated by the following formula:

$$\text{DER} = \frac{\text{Total Debt}}{\text{Total Equity}}$$

### Size

Company size is a scale of classification of the size of the company to achieve the goal (Ulfa & Prasetyo, 2018). For companies with significant total assets, if they can use all their assets and manage them well to maximize profits, then the company can provide a high rate of return for shareholders and it is easier to obtain funding (Harmaini, 2021). Companies that have large amounts of assets will find it easier to obtain funding sources because the number and value of assets that can be pledged as collateral are greater. According to Anggraini & Hidayat (2021) size can be calculated using the following formula:

$$\text{Size} = \text{Ln} \times \text{Total Assets}$$

### Methods

This study uses quantitative data with data sources from the annual report and financial statements of pharmaceutical companies that can be obtained from the IDX website, the company's official website, and Yahoo Finance which provides the information needed in the research. This study uses pharmaceutical companies as research objects. Public awareness of health causes the demand for consumption of medicines, supplements and vitamins to increase, so that the market size in the sector pharmacy has increased. This market potential can become an opportunity to attract investors to invest in pharmaceutical companies. Pharmaceutical companies listed on the IDX during the 2015-2021 period are the samples used in this study. This study uses multiple linear regression analysis as a hypothetical tool. The data was collected by using the documentation method using a purpose sampling with the following criteria:

- a. Companies in the pharmaceutical that listed on the Indonesia Stock Exchange during 2015-2021.
- b. Pharmaceutical companies that publish annual reports and reports financial statements that have been comprehensively audited as of December 31 during research period 2015-2021.
- c. Pharmaceutical companies presenting data availability and completeness according to the information needed during the 2015-2021 period.
- d. Pharmaceutical companies that did not delist during the study period and have conducted an IPO during the research period so that they can present the necessary information during 2015-2021.

### Results

#### Statistic Descriptive

**Table 1.** Statistic Descriptive Results

	N	Minimum	Maximum	Mean	Std. Deviation
VACA	63	0,2654	0,7499	0,4517	0,1364
VAHU	63	1,0273	3,2250	1,7976	0,5916
STVA	63	0,0148	0,7069	0,3416	0,1798
VAIC	63	1,3715	4,3775	2,5924	0,7042
DER	63	0,0761	1,8591	0,7059	0,5118
SIZE	63	25,7957	30,8762	28,5352	1,2857
TOBINSQ	63	1,5353	5,7570	3,1561	0,9884

Source: Output SPSS 25 (2022)

Based on the results of the descriptive statistical in Table 1, show that the average capital employed (VACA) in of the company is 0,4517 or 45%. In this study, the highest VACA owned by PT Prydam Farma Tbk, which is

0.7499 and the lowest VACA is owned by PT Kalbe Farma Tbk. The amount of capital used (VACA) shows how much the company builds good relations with internal and external parties, so that the company has a competitive advantage compared to its competitors.

The human capital variable (VAHU) shows that the average of the company is 1.7976. The highest VAHU owned by PT Industri Jamu and Pharmacy Sido Muncul Tbk with a value of 3.2250 and the lowest VAHU owned by PT Indofarma Tbk with value of 1.0273. Higher the value of human capital indicates that the company has good quality human resources so that it can increase value-added for the company.

Based on the results of the descriptive statistical, show that the average structural capital (STVA) is 0.3416. The lowest value of STVA in this study is owned by PT Indofarma Tbk with value of 0.0148. The highest value of 0.7069 is owned by PT Industri Jamu and Pharmacy Sido Muncul Tbk. The STVA variable has a standard deviation value of 0.1798. The greater the structural capital indicates that the company has large non-human knowledge so that the company can run its business to compete and increase the value of the company.

Intellectual capital (VAIC) has a minimum value of 1.3715 which indicates that the lowest VAIC value is owned by PT Indofarma Tbk. Meanwhile, the maximum value of VAIC is 4.3775 which is owned by PT Industri Jamu and Pharmacy Sido Muncul Tbk. The VAIC variable in this study has an average value of 2.5924. Increasing intellectual capital will create competitive advantage and increase competitiveness company in the stock market, thereby increasing the value company. This is a good signal for investors to invest in the company.

Based on the results of the descriptive statistical, show that the average leverage (DER) is 0.7059. The lowest value in this study is owned by PT Industri Jamu and Pharmacy Sido Muncul Tbk with 0.0761, and the maximum DER value is 1.8591 which is owned by PT Millennium Pharmacon International Tbk. Too high leverage has a negative impact on company performance, because the use of large debt indicates that the company's interest expense will be even greater reduce profits, thereby reducing the value of the company.

The company size as the control variable shows, the highest value of 30.8762 which is owned by PT Kalbe Farma Tbk and the lowest value of company size in this study is owned by PT Pyridam Farma Tbk. Size in this study has an average of 28.5352 which mean companies with large assets can afford to use all assets owned to maximize profits so that the company can provide a high rate of return for shareholders shares and easier to obtain funding.

### Classical Assumption Test

Classical assumption test aims to provide an assessment that the regression results are unbiased and consistent. Classical assumption testing includes several tests: normality, multicollinearity, heteroscedasticity, and autocorrelation (Ghozali, 2016).

**Table 2.** Normality Test Results

<i>One-Sample Kolmogorov-Smirnov Test</i>		
Model	Sig.	Results
1	0,200	Normal Distributed Data
2	0,200	Normal Distributed Data

Source: Output SPSS 25 (2022)

The results of the Kolmogorov-Smirnov test on table 2, show that the data in the study are normally distributed, which is indicated by the signification Kolmogorov-Smirnov value in both models of the regression research equation is 0.200, which means the value is greater than 0.05. This illustrates that the data in this study has been normally distributed.

**Table 3.** Multicollinearity Test Results

<b>Coefficients</b>			
	Model	Tolerance	VIF
1	VACA	0,5658	1,7673
	VAHU	0,2744	3,6445
	STVA	0,2193	4,5596
	DER	0,5347	1,8701
	SIZE	0,4846	2,0634
2	VAIC	0,5747	1,7399
	DER	0,7156	1,3975
	SIZE	0,7733	1,2932

Source: Output SPSS 25 (2022)

Based on the results on table 3, the tolerance value in both regression models has a tolerance value above 0.10 or the same as VIF below 10. This value indicates that there is no multicollinearity problem in both models and there is no correlation between the dependent and independent variables.

**Table 4.** Heteroscedasticity Test Results

Model	Sig.
1 (Constant)	0,375
VACA	0,724
VAHU	0,607

	STVA	0,316
	DER	0,663
	SIZE	0,432
2	(Constant)	0,110
	VAIC	0,084
	DER	0,605
	SIZE	0,078

Source: Output SPSS 25 (2022)

The results of the heteroscedasticity test using the glejser, show that the significance value between all independent variables and control variable is greater than 0.05. These results prove that all independent variables in this study are homoscedastic and there is no heteroscedasticity problem.

**Table 5.** Autocorrelation Test Results

Model	Durbin-Watson
1	0,726
2	0,556

Source: Output SPSS 25 (2022)

One measure in determining whether there is an autocorrelation problem or not is the Durbin-Watson (DW). According to Sunyoto (2016), the criterion for determining that there is no autocorrelation if the DW value is between -2 to 2. The results showed that the DW value in the first regression model was 0.762 where the DW value was between (-2 < 0.762 < +2) and DW value in the second regression model was 0.556 where the DW value is between (-2 < 0.556 < +2) which indicates there is no autocorrelation in both regression models in this study.

**Table 6.** Multiple Regression Analysis and t Test Results

		Coefficients <sup>a</sup>				
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10,650	3,236		-3,291	0,002
	VACA	2,599	0,959	0,359	2,709	0,009
	VAHU	1,496	0,318	0,895	4,710	0,000
	STVA	-3,056	1,169	-0,556	-2,614	0,011
	DER	-0,036	0,263	-0,019	-0,137	0,891
	SIZE	0,386	0,110	0,502	3,509	0,001
2	(Constant)	-4,780	2,550		-1,874	0,066
	VAIC	0,626	0,197	0,446	3,183	0,002
	DER	0,236	0,243	0,122	0,974	0,334
	SIZE	0,216	0,097	0,270	2,235	0,029

Source: Output SPSS 25 (2022)

Based on the results of the multiple linear regression above, the following regression equations in this study are as follows:

- (1)  $Tobins'Q = -10,650 + 2,599 VACA + 1,496 VAHU - 3,056 STVA - 0,036 DER + 0,386 SIZE$
- (2)  $Tobins'Q = -4,780 + 0,626 VAIC - 0,236 DER + 0,216 SIZE$

The first regression model equation shows a constant value of -10.650 which means that if all independent variables are assumed to be constant or equal to zero, then the firm value is -10.650. The value of capital employed (VACA) shows 2,599, which means that with every increase in VACA by one unit, it will increase the value of the company by 2,599. Human capital (VAHU) has a value of 1.496, which means that with every increase in VAHU by one unit, it will increase the value of the company by 1.496. The value of structural capital (STVA) shows -3.056, which means that with each increase in STVA by one unit, it will decrease the value of the company by 3.056.

The second regression model equation shows a constant value of -4.780 which means that if all independent variables are assumed to be constant or equal to zero, then the firm value is -4.780. The value of intellectual capital (VAIC) ( $X_4$ ) shows 0.626, which means that each increase in VAIC by one unit, will increase the value of the company by 0.626. Leverage (DER) has a value of -0.236, which means that with every increase in DER by one unit, it will decrease the firm value by 0.236.

Based on the statistical t-test above, in the first model regression it can be seen that the capital employed (VACA) variable has a significance value of 0.009 or less than 0.05, so H1 is stated to be **supported**. The human value (VAHU) has a significance value of 0.000, so H2 is also stated to be **supported**. Variable structural capital (STVA) has a significance value of 0.011 or less than 0.05, so H3 is stated to be **supported**. The second model regression based on table 2, shows that the intellectual capital (VAIC) variable has an effect on the firm value with a significance value of 0.002, which means that H4 is stated to be **supported**. While the leverage with the Debt to Equity Ratio proxy has a significance value of 0.334, which is greater than 0.05, so H5 is declared **not supported**.

**Table 7.** Coefficient of Determination Test Results

Model Summary			
Model	R	R Square	Adjusted R Square
1	0,659 <sup>a</sup>	0,435	0,385
2	0,577 <sup>a</sup>	0,333	0,299

Source: Output SPSS 25 (2022)

The result of the coefficient of determination test shows the value of Adjusted R Square ( $R^2$ ) in the first regression model is 0.385 where this value shows the effect of the variables VACA, VAHU, STVA, DER, and SIZE on the dependent variable firm value can be explained by 38.5% and that 61.5% is explained by other factors.

The result of the coefficient of determination test shows the value of Adjusted R Square ( $R^2$ ) in the second regression model is 0.299 where this value shows the effect of the VAIC and DER, and SIZE on the dependent variable firm value can be explained by 29.9% and that 70.1% is explained by other factors.

**Table 8.** F Test Results

ANOVA <sup>a</sup>			
	Model	F	Sig.
1	Regression	8,768	,000 <sup>b</sup>
2	Regression	9,817	,000 <sup>c</sup>

Based on the F test results of the significance test above, the calculated F of 8,768 can be obtained that the independent variable in both model regressions is feasible to be used in the test with value of sig. F of 0.00. These results can be concluded that the model meets the eligibility requirements of Sig. F < 0.05 or 0.000 < 0.05. In this case the variable of value-added capital employed, value-added human capital, structural capital value-added, value-added intellectual coefficient, leverage, and size as control variable affect the dependent variable of firm value.

## Discussion

The test results show that the capital employed (VACA) variable has a positive coefficient value of 2.599 with a significance level of 0.009 0.05. This shows that Value Added Capital Employed has a positive effect on firm value. Companies that can establish good relationships with internal and external parties by providing service and loyalty to customers, can choose reliable and quality distributors, and other things from capital employed will have a competitive advantage over competitors. According to Nuryaman (2015), the advantages of the company will increase the value of capital employed so that it will increase the value of the firm. Investors will appreciate the advantages of capital employed owned the investing in the company. The results of this study are in line with research conducted by Puspita & Wahyudi (2021) and Nuryaman (2015) which state that value-added capital employed has a positive effect on firm value.

The test results show that the human capital (VAHU) variable has a positive coefficient value of 1.496 with a significance level of 0.000 0.05. This shows that Value Added Human Capital has a positive effect on firm value. Human capital owned by the company through its employees in the form of knowledge, skills, work experience, innovation, and creativity has been proven to support increasing firm value. The higher quality of human resources through knowledge and training provided to employees can improve the company's operational performance, to increase the value of the firm. The results of this study are in line with research conducted by Arief *et al.* (2014) and which states that value-added human capital has a positive effect on firm value.

The test results show that the structural capital (STVA) variable has a coefficient value of -3.056 with a significance level of 0.011 0.05. This shows that Structural Capital Value Added has a positive effect on firm value. According to Ulum *et al.* (2014) structural capital consists of organizational culture, strategies, routines, databases, and other infrastructure if properly able to support the overall performance of employees. This is in line with the Resource-Based Theory where companies that use their resources efficiently through the systems and procedures contained in the company, will increase the added value for the firm. The results of this study are in line with research conducted by Midiantari & Agustia (2020) and Nuryaman (2015) which state that value-added human capital has a positive effect on firm value.

The test results show that intellectual capital (VAIC) has a positive coefficient value of 0.626 with a significance level of 0.002 0.05. This shows that the value-added intellectual coefficient has a positive effect on firm value. Intellectual capital can be a tool to determine the value of the firm and is believed to increase the value of the firm. Investors tend to pay higher shares of companies that have higher intellectual resources than other companies. The higher the stock price, the higher the value of the company. So it can be concluded that the higher the quality of human resources within the company, can improve the company's operational performance. The resource-based theory explains that the company's performance will be optimal if the company has a competitive advantage so that it can generate value for the company. The increase in intellectual capital can also increase the company's competitiveness in the stock market which can benefit the company so that the value of the company can also increase for investors and the public. This makes investors interested in investing their shares in the company because an increase in the value of the company can make a positive signal for investors to invest their shares in the company. The results of this study are in line with research conducted by Chandra & Djajadikerta

(2017), Ulfa & Prasetyo (2018), and Nguyen & Doan (2020) which states that value-added intellectual capital has a positive effect on firm value.

The test results show that the leverage variable (DER) has a coefficient value of 0.236 with a significance level of 0.334 0.05. This shows that leverage does not affect on firm value. Leverage needs to be managed because the use of high debt will reduce the value of the company. An increase in debt is viewed negatively by investors as a decrease in the opportunity for the company to develop so investors do not get a return on investment and tend to reduce the proportion of investors' ownership of the company. This means that the debtor company has a low firm value. The high value of leverage owned by a company is a signal for investors not to invest in the company. The results of the study prove that the higher the level of leverage, the lower the value of the company. The results of this study are in line with research conducted by Hung *et al.* (2019), Nguyen & Doan (2020), and Al-Slehat (2020) which state that leverage does not affect on firm value.

The test results show that the firm size variable has a coefficient value of 0.216 with a significance level of 0.029 0.05 which indicates that firm size has a positive effect on firm value. An increasing company size indicates a good company size. The increase that occurs indicates that the company continues to experience business development to generate high profits. In large companies, managers will try to maximize their ability to manage the company to increase its value of the company. This is in line with the theory which explains that the larger the size of the company, the better the value of the company because it will make it easier to obtain funding that can be used to increase the value of the company. The results of this study are in line with research conducted by Al-Slehat (2020) and Oktasari *et al.* (2021) which states that firm size has a significant positive effect on firm value.

## Conclusion

This study aims to provide empirical evidence related to the effect of intellectual capital and leverage on firm value in pharmaceutical companies listed on the Indonesia Stock Exchange in 2015-2021. The results of this study are expected to provide answers to all phenomena and problems on the research topic. Based on the results of testing the hypothesis, the capital employed (VACA) variable has a positive effect on firm value, so the first hypothesis in this study is supported. The human capital (VAHU) variable shows a significant positive effect on firm value, so the second hypothesis in this study is supported. Testing the structural capital (STVA) variable has a positive effect on firm value, so the third hypothesis in this study is supported. Based on the results, the intellectual coefficient (VAIC) variable has a significant positive effect on firm value, so the fourth hypothesis in this study is supported. Leverage variable with Debt to Equity Ratio indicator does not affect on firm value. Testing firm size as a control variable shows an influence on firm value.

The results of this study can be used as an improvement in the management of intellectual capital and leverage owned by the company because it takes effort and support from managers and employees to maximize their performance to increase the firm value. The results can be used by investors as additional information and consideration before investing by taking into account the factors that can affect the value of the company.

In this study, there are also, limitations where the research period is limited to seven years, and only use pharmaceutical companies as research objects. For further research, the authors provide suggestions in order to expand the research period, use another variable, and object research in order to obtain wider research data and provide more accurate and comprehensive information.

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