THE EFFECT OF *RESEARCH AND DEVELOPMENT* (R&D) COSTS AND *GOOD CORPORATE GOVERNANCE* (GCG) ON COMPANY VALUE

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Abstract

This study aims to analyze the effect of research and development (R&D) costs and governance on firm value. This topic is still being debated because research and innovation in Indonesia lags far behind other countries. Quality research and superior innovation are key factors in driving economic growth. In addition to the R&D factor, effective corporate management through a good governance system is also an important element in increasing firm value. In this study, the governance aspects studied include the structure of the board of directors, the existence of an independent board of commissioners, management share ownership, and institutional share ownership. The data analysis process was carried out using SPSS software version 24, with data from companies in the consumer cyclicals and technology sectors listed on the Indonesia Stock Exchange (IDX) during the period 2018 to 2023. The research sample consisted of 452 companies selected using the purposive sampling method with the criteria of companies that published annual reports and included information on R&D activities during that period. The results of the study indicate that R&D costs, management share ownership, and institutional share ownership have a positive effect on firm value. On the other hand, the structure of the board of directors and the presence of independent commissioners have a negative impact on company value.

Keywords: *Research And Development; Board Of Director; Share Ownership; Company Value*

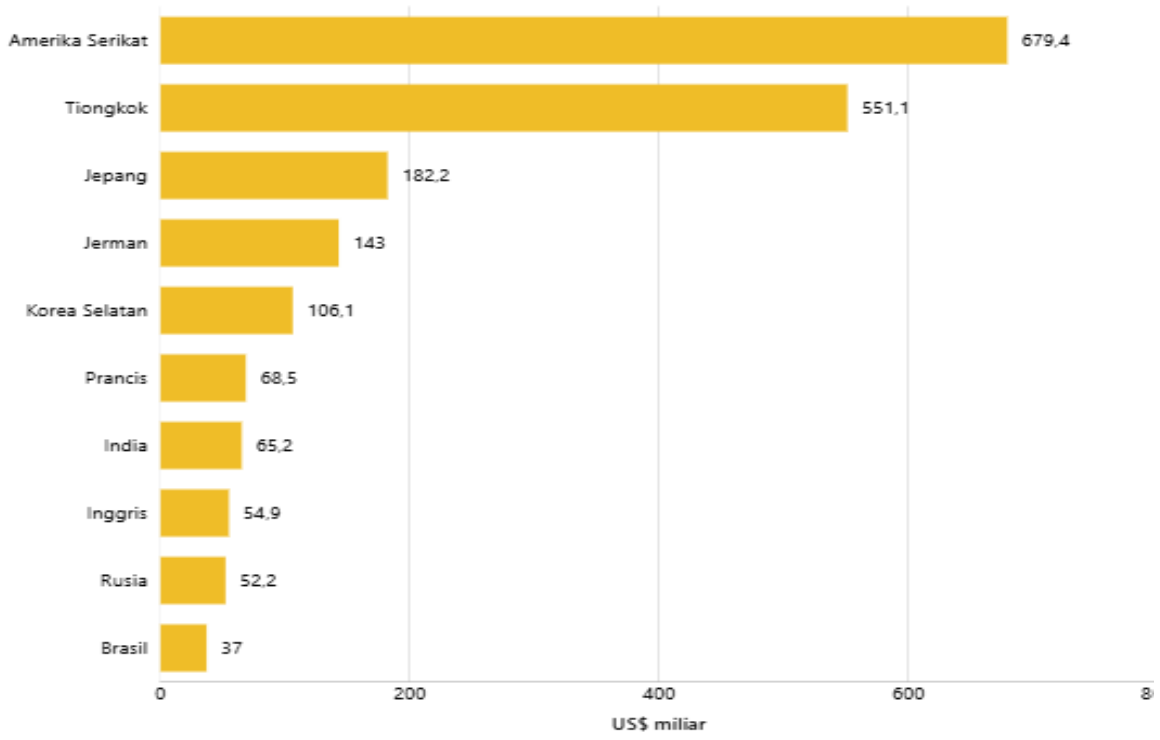
INTRODUCTION

The development of a nation can be assessed and observed based on the growth of its economic sector (Rahmawati, et al., 2022). Rapid economic growth drives businesses to compete to achieve their targets. The primary goal of business is to achieve profit, and one of its priorities is to optimize the increase in company value (Adhi & Cahyonowati, 2023). Maximizing company value can be achieved through the implementation of financial management strategies, where every financial decision made will influence other decisions and contribute to the company's value (Purnama, 2016). Investor and shareholder perceptions of company value continue to transform. In the era of the Industrial Revolution 4.0, the use of digital technology has become a crucial factor needed by business actors to expand and develop their businesses. The presence of Industry 4.0 also proves that industrial development is currently inseparable from technological developments (Kumala, 2022).

Technological developments must be accompanied by research and development to produce derivative products that can adapt to current and future conditions (Suriyanti, et al., 2022). Rapidly evolving technological advancements encourage companies to continuously innovate to maintain competitive advantage. With continuous innovation, companies can maintain value stability and remain viable amidst

increasingly fierce market competition, necessitating effective strategies for survival. Innovation is a concept encompassing elements of change and continued implementation in realizing technological development, which is one of the research and development activities. Based on Dwiyanti, (2022) Research and Development (R&D) refers to a company's total expenditure on research and development related to new products or other innovations. Increased investment in research and development (R&D) has been shown to drive GDP growth, demonstrating the crucial role of innovative technology and research activities in driving economic progress. This can be achieved if the research strategy is clear, the results are measurable, and its implementation is targeted (Gondauri, et al., 2024). Here's a chart of the 10 countries with the largest research and development (R&D) budgets in 2022, based on data from R&D World:

Figure 1. Graph of Countries with the Largest R&D Budgets in 2022



According to the R&D World Institute, issues related to research and development (R&D) indicate that Indonesia has the lowest research budget-to-GDP ratio, at just 0.24% in 2022. This places Indonesia in 34th place with a total budget of US$8.2 billion in the same year. Based on a report by cnbcindonesia.com (2021) Bambang Brodjonegoro, as Minister of Research and Technology and Head of BRIN RI, stated that the allocation of funds for research and innovation (R&D) in Indonesia is still relatively small compared to other countries, such as Singapore, Germany, and South Korea.

The influence of company value beyond R&D also requires attention to governance. Corporate governance defines a system that controls and encourages a company to ensure its survival and maximize shareholder interests (Diriba & Basumatary, 2019). Based on Khoirunnisa, (2022), GCG is a concept developed to address agency problems. The concept of GCG emerged as a response to agency issues that potentially give rise to agency costs. Agency theory explains that disputes between management

and owners can affect company performance, so alignment of interests between the two parties is necessary. The principle of good corporate governance is often used as a reference to improve the performance of certain government institutions or companies (Nugrahani, 2016). One step to reduce agency problems in optimizing a company's financial performance is to implement GCG, which can increase company value. Financial performance is a crucial indicator of the decision-making stage that can be accounted for and has rational reasons. This indicator can be displayed precisely and accurately through in-depth financial analysis (Arofah & Khomsiyah, 2023).

This research contributes by testing internal indicators. research and development costs and external GCG factors in the form of a board of directors, an independent board of commissioners, managerial share ownership, institutional share ownership which impacts the company's value

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Agency Theory

Based on Jensen & Meckling, (1976), agency theory is defined as a contractual relationship between company members, namely between the principal (owner) and the agent as the party carrying out the main task. The relationship between agency theory and this research is because companies must consider good governance with the hope that here managers also receive support and supervision. Agency theory aims to explain how parties in a contractual relationship attempt to reduce costs arising from information asymmetry and uncertainty.

Research and Development (R&D)

Research and development according to Haryati, (2013) is activity research basis which aims to obtain information to be developed. According to Zakariah, et al., (2020) it is important Research and Development is to provide strong knowledge and insights, thus leading to improvements in existing processes where efficiency can be increased.

The studies Dwiyanti (2022); Safitri et al. (2019); Maharani & Puspitasari (2022); Wang et al. (2023) showed that R&D costs have a positive effect on firm value. High levels of research and development will be perceived by investors as a company's development efforts for its staff, both in the form of education and product development, which can drive higher profits, as seen from managers' ability to increase firm value. Therefore, the first hypothesis is:

H1: Cost R&D positive influence to company values

Board of Directors

Based on Law No. 40 of 2007 concerning Limited Liability Companies, Article 1, the Board of Directors is a part of the company that is authorized and responsible for managing the company with the aim of the company's interests. The Board of Directors is an entity or company manager who has full authority to control all business activities (Diaz & Sulfitri, 2024). The Board of Directors in a company acts as an agent or manager who has responsibility for the company's operations (Irawan & Kusuma, 2019).

According to Prasetyaningsih & Purwaningsih, (2023); Siagian, et al., (2023) proving that the board of directors has a positive impact on company performance. This arises from the crucial role of the board of directors in a company, namely creating effective communication among board members to reduce undesirable management actions. As the number of directors increases, communication between management becomes more efficient. Based on the above description, the second hypothesis is:

H2: Board of directors influential positive towards company values

Independent Board of Commissioners.

Based on KNKG, (2021), the commissioner committee consists of individuals who have no connection with management, other commissioner members, or majority shareholders, and do not have any business relationships or other ties that could influence their objectivity in carrying out their duties in the interests of the company.

The studies of Prasetyaningsih & Purwaningsih, (2023); Purbopangestu & Subowo, (2014); Rahmawati, (2021) show that the presence of independent commissioners has a positive impact on company value. This indicator occurs because the increasing number of independent commissioners contributes to increasing company value. Thus, hypothesis 3 is as follows:

H3: Independent board of commissioner positive influence to company values

Managerial Share Ownership

Managerial ownership is the proportion of shares owned by management who are directly involved in decision-making (Deswarti, et al., 2023). The high percentage of shares owned by management can increase effectiveness in monitoring every company activity (Permanasari, 2010).

The results of research conducted by Lestari & Juliarto, (2017); Nuryono, et al., (2019); and Purnama, (2016) indicate that management share ownership has a positive impact on company value. This ownership plays a role in helping the company achieve its primary goal, which is to maximize company value, through management control. Therefore, the fourth hypothesis is:

H4: Managerial share ownership has an effect positive towards company values

Institutional Share Ownership

Institutional ownership helps mitigate agency conflicts between shareholders and management. According to Abaharis & Gusanda, (2018), this ownership refers to the percentage of shares held by external institutions, such as banks, insurance companies, investment funds, and pension funds, based on the total shares outstanding at the end of the year.

Research by Dwicahyani, et al., (2022); Gusriandari, et al., (2022); Jullia & Finatariani, (2024); Rahmi, et al., (2023); and Tambalean, et al., (2018) show that institutional ownership variables have an impact on company value. The increase/decrease in company value is greater mark ownership institutional so the more strong control on the company allows the company owners to control management behavior to ensure that it acts in accordance with the company's goals, which will ultimately increase the company's value. Therefore, hypothesis 5 can be outlined as follows:

H5: Managerial share ownership has an effect to company values

RESEARCH METHODE

This study uses a sample of 1,260 companies in the consumer cyclicals and technology sectors listed on the IDX. through the website www.idx.co.id in 2018-2023. The research approach applies purposive sampling, requiring companies to release annual reports and include R&D activities in 2018-2023. Data were obtained by observing companies in the consumer cyclicals and technology sectors.

The sample determination is shown in Table 1.

Table 1. Sample Determination

No	Information	Amount
1	*Consumer cyclicals* and *technology sector* companies listed on the IDX and published *annual reports* 2018-2023, namely 210 x 6 years	1,260
2	*Consumer cyclicals* and *technology sector* companies listed on the IDX and reporting *research and development* activities are 103 x 6 years.	618
3	Company data is incomplete	190
4	Number of company data that meets the research sample requirements	452

Operational Definition and Measurement of Variables

Company Values

Company value is generally used as a benchmark by potential investors to assess the success of an entity and the extent to which the company is able to manage its resources effectively (Adyaksana, et al., 2023) Company value is measured using a formula developed by Mollu et al. (2024). These include:

$$Tobin's\ Q = \frac{MVE + Debt}{TA}$$

Information:

Tobin's Q : Company values
MVE : Closing stock price x number of shares outstanding
Debt : Total value of the company's liabilities
TA : Total assets of the company

R&D costs

Research and Development (R&D) is the activity of research and improvement to increase innovation in company practices. The R&D cost measurement developed by (Nugrahani, et al., 2023) uses the following formula:

$$R\&D\ investment = \frac{R\&D\ Cost}{Total\ Asset}$$

Board of Directors

According to Lestari & Mutmainah, (2020), the board of directors is the part of a company that has the authority and full responsibility for managing the company for the benefit of the company. The size of the board of directors is measured as follows:

Board of Directors Size = ∑ Board of Directors Members

Independent Board of Commissioners

In an effort to oversee management performance, the board of commissioners functions as an internal control system tasked with balancing the interests of shareholders and management (Siagian et al., 2023). The formula for determining the proportion of independent commissioners is as follows:

$$DKI = \frac{Number\ of\ independent\ commissioners}{Number\ of\ board\ of\ commissioners}$$

Managerial Share Ownership

Meindarto & Lukiastuti, (2017) define managerial ownership as part of the equity owned by management, including share ownership by directors, commissioners, or employees who meet certain criteria. Measurement developed by (Hermayanti & Sukartha, 2019) with the formula:

$$KM = \frac{Number\ of\ Shares\ Owned\ by\ Management}{Number\ of\ Shares\ Outstanding}\ x\ 100\%$$

Institutional Share Ownership

According to Sintyawati & Dewi, (2018) institutional ownership is the ownership of shares in a company controlled by institutions or agencies, such as insurance companies, banks, investment companies, and other institutions. According to Wulanda & Aziza, (2019) formulated the measurement of institutional ownership as follows:

$$INST = \frac{Number\ of\ Shares\ Owned\ by\ Institutions}{Number\ of\ Shares\ Outstanding}\ x\ 100\%$$

Analysis techniques

Data analysis techniques using SPSS *software version 24.*

Multiple Linear Regression Analysis

This research utilizes multiple linear regression steps to determine whether there is an influence between the independent variables on the dependent variable (Ghozali, 2018b). The regression equation is:

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5}$$

Where:

Y = Company value
α = Constant coefficient
β_1 β_2 β_3 β_4 β_5 = Regression coefficient
X_1 = R&D Cost
X_2 = Board of directors
X_3= Independent board of commissioners
X_4 = Managerial share ownership
X_5 = Institutional share ownership
e = Error

Hypothesis Testing

Hypothesis testing by applying a significance level of 5% ($\alpha < 0.05$).

Stimulus Test (F Test)

Simultaneous testing is carried out to determine whether all independent variables in the regression simultaneously affect the dependent variable. The F test shows a significant impact if the significance level is less than 0.05. If the calculated F is smaller than the F table, then Ho is accepted, indicating there is no impact of the independent variable. Conversely, if the calculated F is greater than the F table, then Ho is rejected and Ha is accepted, which means the independent variable has an effect on the dependent variable.

Individual Parameter Test (t Test)

The t-test is useful for measuring the partial impact of each independent variable on the dependent variable. Decisions are made by comparing the t-statistic value for each coefficient with the t-table at a 5% significance level. If the t-statistic is lower than the t-table, the null hypothesis (Ho) is accepted, indicating that the independent variable has no impact on the dependent variable. Conversely, if the t-statistic is higher than the t-table, the null hypothesis is rejected and the alternative hypothesis (Ha) is accepted, indicating that the independent variable has an impact on the dependent variable(Ghozali, 2018a).

Coefficient of Determination (R^2) *Square*

The coefficient of determination (R^2) is used to assess the extent to which a model is able to illustrate variations in the dependent variable. The R^2 score ranges from 0 to 1 ($0 \leq R^2 \leq 1$). The closer the value is to 1, the more accurate the model is considered in describing the dependent variable. Conversely, if the value is close to 0, then all independent variables do not have a significant contribution in describing the dependent variable.

Classical Assumption Test

Normality Test

Normality testing is useful for evaluating whether data distribution is normal or not. In this study, the method used to test normality is the Central Limit Theorem (CLT) approach. If the sample size is large enough (n>30), then the assumption of normality is not a top priority (Gujarati, 2006).

Multicollinearity Test

According to Ghozali (2016), the aim is to test whether there is a correlation between independent variables in the regression model. A good regression model should not show any correlation between independent variables. To detect the presence of multicollinearity, a tolerance value of >0.1 and a VIF value of <10 are used, which indicates the absence of multicollinearity in the data being tested. Conversely, if the tolerance value is less than 0.1 and the VIF number exceeds 10, the final result can be drawn that there are symptoms of multicollinearity in the analyzed data.

Autocorrelation Test

According to Ghozali, (2018b), autocorrelation testing is useful for detecting whether there is a relationship between the

residuals in period t and the residuals in the previous period (t-1) in a linear regression model. One way to test for autocorrelation is with the Durbin-Watson (d) statistical test. The Durbin-Watson (d) value obtained is then compared with the numbers in the d table at a significance level of α = 0.05. In the table, there are two limits, namely the lower limit (dL) and the upper limit (dU). If the d score is smaller than dL or greater than 4 - dL, this can indicate autocorrelation. Conversely, if dU < d < 4 - dU, then no autocorrelation is found in the model.

Heteroscedasticity Test

testing is performed to evaluate whether there is inconsistency in the residual variance between observations in the regression model. A good regression model should be free from symptoms of heteroscedasticity. One approach that can be used to detect the presence of heteroscedasticity is the Glejser test. Results are determined based on the significance level, where if the value exceeds 0.05, there is no indication of heteroscedasticity (Ghozali, 2018b).

RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive analysis presents a summary of data that includes the lowest, highest, average, and standard deviation values.

Table 2. Results of *Descriptive Statistical Tests*

	n	Min	Max	Mean	Standard Deviation
	BRnD	0.00	0.53	0.02	0.070
	DD	1	10	4.30	1,721
	DKI	0.00	0.75	0.39	0.119
	KSM	0.00	100	6.20	14.00
	KSI	0.00	100	57.42	26.55
	NP	0.80	10.75	1.80	1,526

Source: Processed secondary data, 2025

Hypothesis Testing

Table 3. Results of Multiple Linear Regression Test

Model	Beta	t	Sig.	Results
Constant	2,585	6,796	0,000	
R&D Cost (X1)	4,119	4,259	0,000	H1 = supported
Board of Directors (X2)	- 0.100	-2,430	0.016	H2 = not supported
Independent Board of Commissioners (X3)	-2,263	-3,932	0,000	H3 = not supported
Managerial Share Ownership (X4)	0.014	2,610	0.009	H4 = supported
Institutional Share Ownership (X5)	0.007	2,312	0.021	H5 = supported
F count: 11.970 (0.000); Adj R^2 = 0.108		1 1,970	0, 000	

*Sig < 5%; ** sig<10%, sig ***<1%

In Table 2, the analysis results show that the t-score for R&D costs reached 6.796 with a significance level of 0.000, indicating that R&D costs have an influence on company value. Therefore, the first hypothesis is accepted because p < 0.05. Furthermore, the board of directors variable has a t-value of 4.259 with a significance level of 0.000, which means the board of directors has an impact on company value. However, because the t-result is negative, the second hypothesis is not supported. For the third hypothesis, the independent board of

commissioners variable has a t-value of -3.932 with a significance level of 0.000. Although this variable has an influence on company value, the hypothesis is not supported because the result is negative. Meanwhile, the fourth hypothesis related to managerial share ownership shows a t-value of 2.610 with a significance level of 0.009, so it is stated to have an impact and is supported because $p < 0.05$. Finally, the fifth hypothesis regarding institutional share ownership has a t-value of 2.312 with a significance of 0.021, indicating an influence on firm value and this hypothesis is supported. Based on Table 2, the F-value is 11.970 with a significance of 0.000, which indicates that simultaneously, the variables of R&D costs, board of directors, independent board of commissioners, managerial share ownership, and institutional share ownership have an impact on firm value. In line with the fifth hypothesis that explains R&D costs, board of directors, independent board of commissioners, managerial share ownership, and institutional share ownership have an impact on firm value, the results of the F-value with a significance of 0.001 indicate that this hypothesis is accepted. In addition, in Table 2, the adjusted R-square value shows that the five variables contribute 10.8% to firm value, while the remaining 89.2% is influenced by other factors not analyzed in this research.

Descriptive Statistical Test Results

Data normality testing was conducted using the Central Limit Theorem (CLT) approach, which explains that if the total sample is large enough ($n > 30$), the data distribution is considered close to normal, so that the assumption of normality is not an obstacle in the analysis (Gujarati, 2006). In this research, the sample size reached 452, which far exceeds the minimum limit of 30, so that the results can be drawn that the data used has a distribution close to normal and is classified as a large sample group.

DISCUSSION

The Influence of R&D Costs on Company Value

The findings of the first hypothesis test show a t-score of R&D costs of 4.259 with a *p-value of* $0.000 < 0.05$. These findings show that the first hypothesis is supported, R&D costs have an impact on company value, meaning that R&D expenditure is very important so that it can show economic improvement for a company. This aligns with previous studies Dwiyanti, (2022); Maharani & Puspitasari, (2022); Safitri & Saifudin, (2019); Wang, et al., (2023), which demonstrated that R&D costs have a positive effect on firm value.

The Influence of the Board of Directors on Company Value

The findings for the second hypothesis revealed a t-value of -2.430 and a *p-value* of $0.016 < 0.05$. However, this contradicts the research hypothesis. Although significant, due to the opposite direction, this hypothesis is not supported due to the direction of the relationship being the opposite of what was predicted. This indicates that a larger board of directors does not enhance firm value; instead, the size of the board becomes a burden that diminishes its effectiveness. These results are consistent with the study by Laiya, et al., (2023).

The Influence of the Independent Board of Commissioners on Company Value

The results of the third hypothesis test show a t-score of -3.932 with a p-value of 0.000 (< 0.05). The negative t-value indicates that the result is inconsistent with the research hypothesis; although $p < 0.05$, the hypothesis is not supported. This outcome is attributed to the inability of the independent board of commissioners to optimally perform its supervisory role in monitoring the policies and activities of the board of directors, thereby failing to enhance firm value. These findings are consistent with Hidayat, et al., (2025).

The Influence of Managerial Share Ownership on Company Value

Based on the hypothesis testing results, managerial share ownership yielded a t-value of 2.610 and a p-value of 0.009 (< 0.05); thus, the research hypothesis is supported, as the findings indicate that managerial share ownership influences firm value. The positive t-value implies enhanced managerial control activities, leading to improved and more efficient corporate operations and decision-making. Managerial ownership can also minimize agency problems by aligning the interests of managers and shareholders. These results are consistent with studies conducted by Jimminder & Fahmi, (2019;) Lestari & Juliarto, (2017;) Suciani & Purnama, 2(019).

The Influence of Institutional Share Ownership on Company Value

The results of the fifth hypothesis test indicate that institutional share ownership influences firm value, with a t-value of 2.312 and a p-value of 0.021. This aligns with the research hypothesis suggesting that share ownership can mitigate agency conflicts and strengthen management oversight, thereby enhancing firm value. These findings are consistent with Dwicahyani et al., (2022); Gusriandari et al., (2022); Jullia & Finatariani, (2024).

CONCLUSION

Based on the findings of this research, it can be concluded that the allocation of funds for research and development (R&D) has a positive impact on increasing company value, confirming that investment in innovation is a crucial aspect for business sustainability. Through research activities, companies are expected to be able to increase profitability in the future. However, the implementation of Good Corporate Governance (GCG) principles, represented by the existence of a board of directors and independent commissioners, does not have a significant impact on company value. On the other hand, GCG aspects reflected in share ownership by management and institutions actually have a positive effect on company value. Managerial share ownership encourages them to be more committed to improving company performance, while high institutional share ownership strengthens the investor oversight system, thereby minimizing the potential for irregularities in company management.

LIMITATION AND SUGGESTIONS

This study has several limitations, namely only examining aspects of expenditures for research and development (R&D), leadership structures within the company such as the board of directors and independent commissioners, and share ownership by management and institutions, in relation to company value. Information on *research and development* in this study is limited because it is rarely conducted and only a few studies have discussed it. This study used the CLT (Central Limit Theorem) normality test, which initially used *the Kolmogorov-Smirnov* non-normality test. Future research is expected to include other variables, such as the role of the audit committee, public share ownership, foreign ownership, or include moderating variables as additional factors. Rapid technological advances require companies to innovate to maintain competitiveness and company value amidst tight market competition. The Kolmogorov-Smirnov results show non-normality. The use of CLT is appropriate for large samples, however for small samples it is recommended to use the Shapiro-Wilk Test (Oktaviani & Notobroto, 2014).

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