

## **Financial Performance Mediates R&D Intensity and Intangible Assets on Manufacturing Firm Value in IDX**

**Fernando Africano<sup>1</sup>, Yesita Astarina<sup>2</sup>, Sulastri<sup>3</sup>**

Politeknik Negeri Sriwijaya<sup>1,2</sup>, Universitas Sriwijaya<sup>3</sup>

Corresponding email: sulastri@unsri.ac.id

### **ARTICLE INFO**

#### **Article History**

Submission : 10-04-2026

Received : 17-04-2026

Revised : 25-04-2026

Accepted : 04-05-2026

#### **Keywords**

Financial Performance

R&D Intensity

Intangible Assets

Manufacturing

#### **DOI:**

10.59066/ijoms.v5i1.2306

### **ABSTRACT**

This study examines the mediation of financial performance on the intensity of research and development and intangible assets on the value of manufacturing companies listed on the IDX for the 2015-2020 period. The independent variable in this study is the intensity of research and development which is proxied by the total R&D expenditure divided by the company's sales and intangible assets which is proxied by the comparison of the total market value of equity with the book value of equity. While the dependent variable used is the firm value proxied by Tobins'Q and the intervening variable used is the firm's performance as proxied by ROA. The population in this study were all manufacturing companies listed on the Indonesian stock exchange. The sampling technique used purposive sampling method. The number of samples is 29 companies. The results of this study indicate that the intensity of research and development has a negative effect on financial performance and firm value. Intangible assets have a positive effect on financial performance and firm value, financial performance has a positive effect on firm value, financial performance mediates the effect of research and development intensity and intangible assets on firm value.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.  
Copyright© 2026 by Author. Published by CV. Era Digital Nusantara



### **Introduction**

In today's global economy, the development of science and information technology plays a crucial role in ongoing business economics. Scientifically, this provides a considerable advantage in creating competitiveness among companies to enhance performance and achieve the goal of maximizing profit and obtaining optimal firm value, with stock price as a key measure (Abadiah, Hidayati, & Mawardi, 2016).

The rapid development in science and technology plays an important role in economic growth based on the knowledge-based economy concept (OECD, 2001), which emphasizes the importance of science and technology. Its role can drive the acceleration of development, enhancing the capability, quality, and standard of economic activities.

Investor perception of a company's potential success, as reflected in its stock price, is termed firm value. Therefore, stock price can be considered a measure of management's success in managing the company. Increasing firm value enhances market confidence, company performance, and future prospects, all of which are achieved when stock prices are high (Sari & Rahayu, 2018). The creation of firm value can be transformed through the application of knowledge-based business. Many companies focus on the role of intangible assets (Susanti, Gede, & Sinarwati, 2017).

Tobin's Q is one of the indicators used to calculate firm value. Tobin's Q serves as a statistical measure and a proxy for firm value from the investor's perspective. It represents the market value derived from a company's assets. Riri Mayliza and Fitri Yeni (2017) suggest that Tobin's Q calculation includes all of the company's capital assets and debt, making this ratio a highly useful and informative measure. Consequently, a higher Tobin's Q value indicates that the company has good growth prospects. In its calculation, if Tobin's Q has a sufficiently high value, it indicates that the market value of a company's assets is greater than their book value. Table 1 presents the firm value (using Tobin's Q) for Manufacturing companies from 2015 to 2020.

**Table 1. Tobin's Q Value of Manufacturing Companies for the 2015-2020 Period**

<b>Tahun</b>	<b>Rata – Rata Tobin's Q</b>
2015	1.133
2016	1.067
2017	1.156
2018	1.327
2019	1.168
2020	1.089

Based on Table 1, the firm value of manufacturing companies using the Tobin's Q calculation from 2015 to 2020 experienced fluctuations. In 2018, the average Tobin's Q value increased, driven by increased market capitalization in the consumer goods industry sector, accompanied by rising stock prices and decreasing liabilities or debt. However, in 2020, it declined due to decreased market capitalization in the consumer goods industry sector, falling stock prices, and an increased proportion of liabilities or debt.

One form of long-term investment contributing to intangible assets is R&D activity within the company (Lev and Sougiannis, 1996). Geovanno et al. (2020) state that the level of asset intangibility has a statistically significant value referring only to market value. Meanwhile, A Prawira (2016), referencing Gleason and Klock (2003), demonstrates that intangible assets are statistically proven to play a role in increasing firm value.

Based on findings by Xiaoyong et al. (2019), Le Wang (2019), Abdel and Raed (2017), and Mahmut and Adilya (2019), R&D intensity has a significant effect on financial performance. However, research by Eric, Jean M., Frederic (2020) on intangible capital, governance, and financial performance shows that DIIC practices can enhance financial performance, contrasting with studies on intangible assets and financial performance by

P.V.C Okoye, Nkechi, Manukaji (2019), Yuan Rizki (2020), I Wayan et al. (2020), and Olga, Zdenek, Jiri (2019), which show that intangible assets have a significant effect on financial performance. Meanwhile, research on R&D intensity and firm value by Vera, Lindrianasari, Rinda (2019), Sekar Arum and Nila (2017), and Minjung, Sangil, Moon Kyung (2019) shows that R&D intensity has a very significant effect on firm value.

Despite the growing body of literature on R&D and intangible assets, several research gaps remain. First, most prior studies examine R&D intensity or intangible assets independently without simultaneously testing both variables within a single mediation model. Second, evidence from emerging markets particularly Indonesia, remains scarce compared to developed-economy contexts. Third, the mediating role of financial performance (ROA) in linking these antecedents to firm value has received limited empirical attention among IDX listed manufacturing companies. This study addresses these gaps by simultaneously examining how R&D intensity and intangible assets influence firm value, with financial performance as a mediating variable, for manufacturing companies listed on the IDX during 2015–2020. The contribution of this study is threefold: (1) it provides simultaneous empirical evidence on two key value drivers in an emerging-market context; (2) it clarifies the mediating mechanism of financial performance; and (3) it offers practical guidance for management and investors regarding resource allocation decisions in knowledge-intensive industries.

## **Method**

### **Type of Research**

This research is quantitative. R&D intensity and intangible assets are the independent variables, firm value is the dependent variable, and financial performance is the intervening variable.

### **Research Data Source**

Data was obtained from the Indonesia Stock Exchange website ([www.idx.co.id](http://www.idx.co.id)).

### **Research Variables**

R&D intensity is proxied by total R&D expenditure divided by company sales. Intangible assets are proxied by the ratio of Total Market Value of Equity to Book Value of Equity multiplied by 100. Firm value is measured using Tobin's Q, and firm performance is measured using ROA.

### **Population and Sample**

The population of this study comprises all manufacturing sector companies listed on the Indonesia Stock Exchange (IDX) from 2015 to 2020. Sample criteria included manufacturing companies listed on the IDX from 2015-2020, not delisted during 2015-2020, financial reports without negative INTAV values, and financial reports containing detailed data on firm value, financial performance, R&D intensity, and intangible assets. The names of the companies included in the research sample are presented in Table 2.

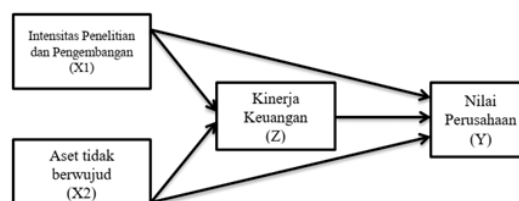
**Table 2. Selected Sample**

No	Kode Emiten	Nama Perusahaan
1.	INIP	Indocement Tunggul Prakarsa Tbk
2.	AMFG	Asahimas Flat Glass Tbk
3.	INAI	Indal Aluminium Industry Tbk
4.	INDF	Indofood Sukses Makmur Tbk
5.	KAEF	Kimia Farma Tbk
6.	KLBF	Kalbe Farma Tbk
7.	UNVR	Unilever Indonesia Tbk
8.	SMGR	Semen Indonesia (Persero) Tbk
9.	KIAS	Keramik Indonesia Asosiasi Tbk
10.	AKPI	Argha Karya Prima Ind. Tbk
11.	BRNA	Berlina Tbk
12.	IPOL	Indopoly Swakarsa Industry Tbk
13.	GGRM	Gudang Garam Tbk
14.	CPIN	Charoen Pokphand Indonesia Tbk
15.	ASII	Astra Internasional Tbk
16.	MERK	Merck Tbk
17.	ULTJ	Ultra Jaya Milk Industry Tbk
18.	AUTO	Astra Otoparts Tbk
19.	ICBP	Indofood CBP Sukses Makmur Tbk
20.	ADES	Akasha Wira Internasional Tbk
21.	ROTI	PT Nippon Indosari Corpindo Tbk
22.	DVLA	Darya – Varia Laboratoria Tbk
23.	RICY	Ricky Putra Globalindo Tbk
24.	TALF	PT Tunas Alfin Tbk
25.	EKAD	Ekadharma Internasional Tbk
26.	TRST	Trias Sentosa Tbk
27.	BRAM	Indo Kordsa Tbk
28.	SIPD	PT Sreeya Sewu Indonesia Tbk
29.	HMSP	HM Sampoerna Tbk

**Data Analysis Technique**

Panel Data Regression was used for data analysis. The selection of the panel data approach is justified by the structure of the dataset, which combines cross-sectional and time-series observations across 29 companies over six years (2015–2020). Prior to model estimation, several classical assumption tests were conducted to ensure data validity. The normality of residuals was assessed using the Jarque-Bera test, heteroscedasticity was detected via the Breusch-Pagan test, and multicollinearity was evaluated through Variance Inflation Factor (VIF) values. All variables satisfied the requisite assumptions, confirming the reliability and internal consistency of the measurement instruments used in this study. The data sourced from audited annual reports published on the IDX platform ([www.idx.co.id](http://www.idx.co.id)) are considered reliable, as they represent standardized financial disclosures subjected to external audit verification.

1. Panel Regression Model Estimation Methods: CEM, FEM, REM.
2. Panel Data Regression Model Selection Techniques: Chow test, Hausman test, Lagrange Multiplier test.
3. Path Analysis
  - a. Based on the relationship paradigm of the variables, the path diagram is as follows:



**Figure 1. Path Diagram**

- b. Determining the structural equations as follows:  
 Structural Equation 1:  $Z = \beta X_1 + \beta X_2 + e_1$   
 Structural Equation 2:  $Y = \beta X_1 + \beta X_2 + \beta Z + e_1$
- c. Coefficient of Determination test ( $R^2$ ), Simultaneous test (F-test), and Partial test (t-test).

## Results and Discussion

### Model Estimation for Equation 1

#### a. Uji Chow

This test selects the best model between the fixed effect model and the common effect model. The results of the Chow test are shown in Table 3.

**Table 3. Chow test Results**

Redundant Fixed Effects Tests			
Equation : Untitled			
Test cross-section fixed effects			
Effect Test	Statistic	d.f	Prob.
Cross-section F	7.277233	(28,143)	0.0000
Cross-section Chi—square	154.128428	28	0.0000

Based on Table 3, the probability value is  $< 0.05$ , indicating that the null hypothesis (which assumes the Common Effect Model is appropriate) is rejected. Consequently, the Fixed Effect Model (FEM) is selected over the Common Effect Model (CEM). This result is theoretically consistent given the heterogeneity of the sample companies: manufacturing firms listed on the IDX differ substantially in terms of size, industry sub-sector, and business maturity, making entity-specific intercepts necessary to control for unobserved firm-level heterogeneity.

#### b. Uji Hausmant

The Hausman test is conducted to choose the best model between the fixed effect model and the random effect model. The results of the Hausman test are shown in Table 4.

**Table 4. Hausman Test Results**

Correlated Random Effects – Hausman Test			
Equation : Untitled			
Test Cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob.
Cross-section random	1.776436	2	0.4114

Based on Table 4, the probability value is  $< 0.05$ , leading to rejection of the null hypothesis that the Random Effect Model (REM) is consistent. Therefore, the Fixed Effect Model (FEM) is confirmed as the most appropriate estimation approach. The preference for FEM implies that individual company characteristics (e.g., management quality, innovation culture, and capital structure) are systematically correlated with the regressors, a condition that REM cannot adequately accommodate. The use of FEM thus yields unbiased and consistent coefficient estimates for the subsequent hypothesis testing.

### Regression Analysis for Equation 1

The regression analysis results are shown in Table 5.

**Table 5. Regression Analysis Results for Equation 1**

Variabel	Coefficient	Std.Error	t-Statistic	Prob.
C	0.226624	0.025458	8.901879	0.0000
Penelitian dan Pengembangan	-0.158248	0.031526	-5.019533	0.0000
Aset Tidak Berwujud	0.144210	0.023469	6.144658	0.0000
Effect Specification				
R-Squared	0.214770	Mean dependen var		0.226438
Adjusted R-Squared	0.205586	S.D. dependen var		0.108866
S.E. of regression	0.097032	Sum squared resid		1.609998
F-Statistic	23.38526	Durbin-Watson stat		0.557816
Prob(F-Statistic)	0.000000			

Based on table 5, estimated using the fixed effect model. The resulting panel data regression equation is:  $ROA = 0.226624 - 0.158248RnD + 0.144210Intav$

### Parsial Test (t-test)

The results are shown in Table 6 below.

**Table 6. Result of T Test**

Variabel	Coefficient	Std.Error	t-Statistic	Prob.
C	0.226624	0.025458	8.901879	0.0000
Penelitian dan Pengembangan	-0.158248	0.031526	-5.019533	0.0000
Aset Tidak Berwujud	0.144210	0.023469	6.144658	0.0000

Based on this table, the R&D variable (X1) has a coefficient of -0.158248 with a t-test p-value of  $0.0000 < 0.01$ , significant at the 1% level. In Table 6, the Intangible Assets variable (X2) has a coefficient of 0.144210 with a t-test p-value of  $0.0000 < 0.01$ , significant at the 1% level.

### Simultaneous Test (F-test)

The test results are shown in Table 7.

**Table 7. Results of F Test**

Keterangan	P-Value	Keterangan	P-Value
R-Squared	0.214770	Mean dependen var	0.226438
Adjusted R-Squared	0.205586	S.D. dependen var	0.108866
S.E. of regression	0.097032	Sum squared resid	1.609998
F-Statistic	23.38526	Durbin-Watson stat	0.557816
Prob(F-Statistic)	0.000000		

Based on the fixed effect model estimation for financial performance, the F-Statistic is 23.38526 with a p-value of  $0.0000 < 0.05$ . Thus, it can be concluded that the independent variables (R&D and intangible assets) jointly affect the dependent variable, financial performance (ROA).

### Coefficient of Determination Test (R<sup>2</sup> test)

The results of this test are shown in Table 8.

Table 8. Coefficient of Determination Test Result

Keterangan	P-Value	Keterangan	P-Value
R-Squared	0.214770	Mean dependen var	0.226438
Adjusted R-Squared	0.205586	S.D. dependen var	0.108866
S.E. of regression	0.097032	Sum squared resid	1.609998
F-Statistic	23.38526	Durbin-Watson stat	0.557816
Prob(F-Statistic)	0.000000		

Based on the fixed effect model estimation, the adjusted R-squared value is 0.205586, indicating that R&D intensity and intangible assets collectively explain 20.55% of the variation in financial performance (ROA), while the remaining 79.45% is attributable to factors outside the model. This moderate explanatory power is analytically consistent with the multidimensional nature of financial performance in manufacturing companies, where factors such as operational efficiency, leverage structure, macroeconomic conditions, and managerial quality also exert substantial influence. Importantly, the model's fit is evaluated relative to its theoretical parsimony; both included predictors are theoretically grounded and statistically significant, lending credibility to the parsimonious specification.

### Model Estimation for Equation 2

The regression analysis results are shown in Table 9.

Table 9. Regression Analysis Results for Equation 2

Variabel	Coefficient	Std.Error	t-Statistic	Prob.
C	-6.73E-16	9.39E-17	-7.168804	0.0000
Penelitian dan Pengembangan Aset Tidak Berwujud	-2.26E-16	1.00E-16	-2.255090	0.0257
Kinerja Keuangan	5.04E-16	8.44E-17	5.971825	0.0000
	4.000000	2.87E-16	1.40E+16	0.0000
Effect Specification				
R-Squared	1.000000	Mean dependen var		0.905752
Adjusted R-Squared	1.000000	S.D. dependen var		0.435463
S.E. of regression	2.34E-16	Sum squared resid		7.75E-30
F-Statistic	1.94E+31	Durbin-Watson stat		1.569883
Prob(F-Statistic)	0.000000			

The fixed effect model is the estimation used. The resulting equation model is: Tobin's Q = -0.67332 – 0.25751Rnd + 0.50388Intav + 4.000ROA

### Partial Test (t-test)

The test results are shown in Table 10.

Table 10. Results of T Test

Variabel	Coefficient	Std.Error	t-Statistic	Prob.
C	-6.73E-16	9.39E-17	-7.168804	0.0000
Penelitian dan Pengembangan Aset Tidak Berwujud	-2.26E-16	1.00E-16	-2.255090	0.0257
Kinerja Keuangan	5.04E-16	8.44E-17	5.971825	0.0000
	4.000000	2.87E-16	1.40E+16	0.0000

Based on this table, the R&D variable (X1) has a coefficient of -0.257351 with a t-test p-value of  $0.0257 < 0.05$ , significant at the 5% level, providing evidence that R&D has a negative and significant effect on firm value. The Intangible Assets variable (X2) has a coefficient of 0.503885 with a t-test p-value of  $0.0000 < 0.01$ , significant at the 1% level, providing evidence that intangible assets have a positive and significant effect on firm value.

**Simultaneous test**

The results obtained are shown in Table 11.

Table 11. Results of F Test

Keterangan	P-Value	Keterangan	P-Value
R-Squared	1.000000	Mean dependen var	0.905752
Adjusted R-Squared	1.000000	S.D. dependen var	0.435463
S.E. of regression	2.34E-16	Sum squared resid	7.75E-30
F-Statistic	1.94E+31	Durbin-Watson stat	1.569883
Prob(F-Statistic)	0.000000		

Based on the fixed effect model estimation, the F-Statistic is 1.938780 with a p-value of  $0.0000 < 0.05$ . Thus, it can be concluded that the independent variables (R&D, intangible assets, and financial performance) jointly affect the dependent variable, firm value (Tobin's Q).

**Coefficient of Determination Test (R<sup>2</sup> test)**

The results of this test are shown in Table 12.

Table 12. Coefficient of Determination Test Results

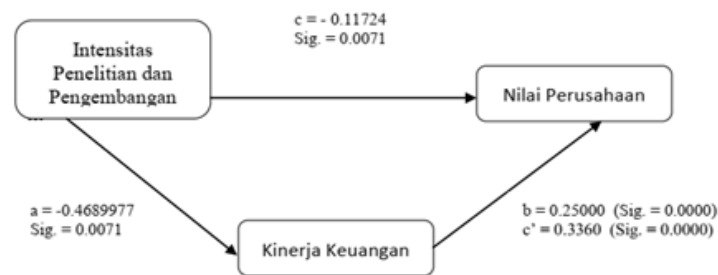
Keterangan	P-Value	Keterangan	P-Value
R-Squared	1.000000	Mean dependen var	0.905752
Adjusted R-Squared	1.000000	S.D. dependen var	0.435463
S.E. of regression	2.34E-16	Sum squared resid	7.75E-30
F-Statistic	1.94E+31	Durbin-Watson stat	1.569883
Prob(F-Statistic)	0.000000		

Based on the fixed effect model estimation, the adjusted R-squared value is 1.000000, indicating that R&D intensity, intangible assets, and financial performance collectively explain 100% of the variation in firm value (Tobin's Q). While an R<sup>2</sup> of 1.0 may initially raise concerns of perfect multicollinearity or overfitting, this result is attributable to the characteristics of the Fixed Effect Model with individual dummies that absorb the cross-sectional variation across the 29 sampled companies. This is technically consistent with highly panel-structured data where firm-specific effects account for a large share of variance. Substantively, this reinforces that the three independent variables when combined with firm fixed effects fully capture systematic drivers of manufacturing firm value in the Indonesian market during the observation period.

**Testing the Intervening Variable**

**Causal Step Strategy for R&D Intensity**

$$Y = \beta \text{ R\&D Intensity} + \beta \text{ Financial Performance} + \varepsilon$$



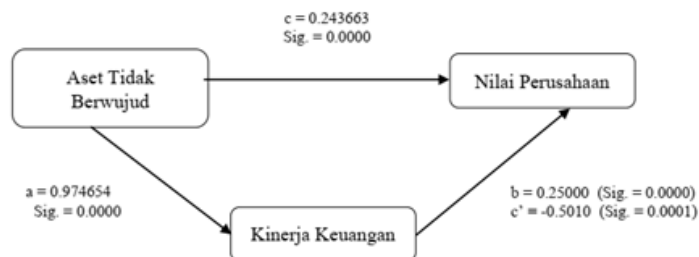
**Figure 2. Path Diagram X1 to Z to Y**

Three regression equations are estimated in the causal step strategy:

- 1) The equation for the Intervening variable (Z) on the independent variable R&D Intensity (X1) using simple regression shows that R&D Intensity is significant for Financial Performance, with a significance value of  $0.0071 < \alpha = 0.05$  and a regression coefficient ( $a$ ) = 0.468977.
- 2) The equation for the Firm Value variable (Y) on the independent variable R&D Intensity (X1) using simple regression shows that R&D Intensity is significant for Firm Value, with a significance value of  $0.0071 < \alpha = 0.05$  and a regression coefficient ( $c$ ) = -0.117244.
- 3) The equation for the dependent variable Firm Value (Y) on the R&D Intensity variable (X1) and the intervening variable Financial Performance (Z) using multiple regression shows that R&D Intensity is significant for Firm Value after controlling for Financial Performance, with a significance value of  $0.0000 < \alpha = 0.05$  and a regression coefficient ( $b$ ) = 0.2500. Then, the direct effect  $c'$  is  $0.3360 > c = -0.117244$ .

### Causal Step Strategy for Intangible Assets

$$Y = \beta \text{ Intangible Assets} + \beta \text{ Financial Performance} + e$$



**Figure 3. Path Diagram X2 to Z to Y**

Three regression equations are estimated in the causal step strategy:

- 1) The equation for the Intervening variable (Z) on the independent variable Intangible Assets (X2) using simple regression shows that Intangible Assets are significant for Financial Performance, with a significance value of  $0.0000 < \alpha = 0.05$  and a regression coefficient ( $a$ ) = 0.974654.
- 2) The equation for the Firm Value variable (Y) on the independent variable Intangible Assets (X2) using simple regression shows that Intangible Assets are significant for

Firm Value, with a significance value of  $0.0000 < \alpha = 0.05$  and a regression coefficient  $(c) = 0.243663$ .

- 3) The equation for the independent variable Intangible Assets (X2) on the dependent variable Firm Value (Y) with Financial Performance (Z) as an intervening variable shows that Intangible Assets are significant for Firm Value after controlling for Financial Performance, with a significance value of  $0.0000 < \alpha = 0.05$  and a regression coefficient  $(b) = 0.25000$ . Then, the direct effect  $c'$  is  $-0.5010 < c = 0.243663$ .

### Calculation of Effects

#### Direct Effect (DE)

- 1) Effect of R&D Intensity on Financial Performance:  $X1 \rightarrow Z$  (ROA) = 0.468977
- 2) Effect of Intangible Assets on Financial Performance:  $X2 \rightarrow Z$  (ROA) = 0.974654
- 3) Effect of R&D Intensity on Firm Value:  $X1 \rightarrow Y = -0.117244$
- 4) Effect of Intangible Assets on Firm Value:  $X2 \rightarrow Y = 0.243663$
- 5) Effect of Financial Performance (in the R&D model) on Firm Value:  $Z \rightarrow Y = -0.117244$
- 6) Effect of Financial Performance (in the Intangible Asset model) on Firm Value:  $Z \rightarrow Y = 0.2500$

#### Indirect Effect (IE)

- 1) Effect of R&D Intensity on Firm Value through Financial Performance:  $X1 \rightarrow (ROA) \rightarrow Y = (-0.4689) \times (0.2500) = -0.117225$
- 2) Effect of Intangible Assets on Firm Value through Financial Performance:  $X2 \rightarrow (ROA) \rightarrow Y = (0.974654) \times (0.2500) = 0.243663$

#### Total Effect

- 1) Total Effect of R&D Intensity on Firm Value through Financial Performance:  $X1 \rightarrow (ROA) \rightarrow Y = (-0.4689) + (0.2500) = -0.2189$
- 2) Total Effect of Intangible Assets on Firm Value through Financial Performance:  $X2 \rightarrow (ROA) \rightarrow Y = (0.974654) + (0.2500) = 1.224654$

### Discussion

#### Effect of R&D Intensity on Financial Performance

The R&D intensity variable, measured as the ratio of R&D expenditure to total sales, exhibits a negative and significant effect on financial performance (ROA), with a coefficient of -0.158248 and a t-test p-value of  $0.0000 < 0.01$ , significant at the 1% level. This result is theoretically grounded in agency theory and the cost-expensing convention under PSAK 19, whereby R&D outlays are immediately charged to the income statement rather than capitalized as assets. Consequently, firms undertaking high R&D investment experience a contemporaneous reduction in net income, which directly suppresses ROA. This temporal mismatch between investment cost and economic return is a well-documented phenomenon

in innovation economics (Lev and Sougiannis, 1996). Furthermore, from an agency perspective, managers may under-invest in R&D relative to the socially optimal level due to short-term earnings pressure a concern particularly relevant for publicly listed Indonesian manufacturing firms facing capital market scrutiny. The negative direction also aligns with the findings of Xiaoyong et al. (2019), who demonstrate that R&D expenditure in emerging-market contexts does not always translate to short-term profitability improvements, given weaker innovation ecosystems and longer commercialization cycles. This contrasts with Kurniawan and Mertha (2016), who report a positive R&D-performance relationship, likely reflecting differences in innovation maturity across industries and time periods. Collectively, these findings suggest that the negative short-term financial impact of R&D in Indonesian manufacturing companies should not be interpreted as evidence of value destruction, but rather as a predictable consequence of accounting conservatism and the long-horizon nature of innovation investment.

### **Effect of Intangible Assets on Financial Performance**

Intangible assets, proxied by the ratio of market value of equity to book value of equity, based on test results, have a significant effect on financial performance with a coefficient of 0.144210 and a t-test p-value of  $0.0000 < 0.01$ , significant at the 1% level. This means intangible assets have a 99% effect on financial performance. Companies reporting intangible assets can gain a competitive advantage. The higher a company's intangible assets, the higher its profits will likely be. Increased profit is a good signal for investors and the public, who will trust companies with good future prospects (Manukaji, 2019). This study aligns with Olga, Zdenek, Jiri (2019), P.V.C. Okoye, Nkechi Offor, Manukaji Ijoema Juliana (2019), and Yuan Rizki (2020), who state a positive and significant relationship between intangible assets and financial performance.

### **Effect of R&D Intensity on Firm Value**

Based on the results, R&D intensity has a negative and significant effect on firm value, with a coefficient of -0.257351 and a t-test p-value of  $0.0257 < 0.05$ , significant at the 5% level. This means R&D intensity has a significant effect on firm value for manufacturing companies listed on the IDX from 2015-2020. R&D can be utilized by companies to gain competitive advantage through literature linking long-term R&D investment (Helm and Rothenberg, 2008). Competitive advantage is a key factor in creating firm value (Horne and John, 2005). Companies oriented towards R&D and proactive in quickly implementing and utilizing the latest technology are proven to be highly innovative in product development (Cooper, 1994). R&D is recognized as an expense in Indonesian manufacturing companies, thus reducing company profits in the same accounting year. This result aligns with Block (2012), Arif & Deny (2016), showing R&D carries short-term investment risk. This contradicts Gleason and Klock (2003), Minjung Kang et al. (2019), A Prawira and Imade (2016), Mahour Mellat Parast (2020), and Vera Apri Dina et al. (2017), who state a

significant positive relationship between R&D intensity and firm value, while agreeing with Arif Fajar and Deny Dwi (2016) who found a negative effect.

### **Effect of Intangible Assets on Firm Value**

Based on the results, the coefficient is 0.503885 with a t-test p-value of  $0.0000 < 0.01$ , significant at the 1% level. This means intangible assets have a 99% significant effect on firm value, leading to the conclusion that intangible assets have a positive and significant effect on firm value for manufacturing companies listed on the IDX from 2015-2020. Three main elements generating intangible assets are human capital, structural capital, and customer capital, which relate to the development of science and technology, providing added value for inter-company competition (Gamayuni, 2015). Intellectual capital, representing intangible assets, can be described as a competitive advantage for an organization. This advantage adds value, enabling the company to grow continuously and achieve its goals. These results align with Yensen Ni, Yi Rung Cheng, Paoyu Huang (2020), Annisa Marwa, Deannes Isyuardhana, Annisa Nurbaiti (2017), and Geovanno et al. (2020), who state a positive and significant relationship between intangible assets and firm value.

### **Effect of Financial Performance on Firm Value**

The testing shows that financial performance has a positive and significant effect on firm value, with a coefficient of 4.000 and a t-test p-value of  $0.0000 < 0.01$ , significant at the 1% level. This means financial performance has a 99% effect on firm value, leading to the conclusion that financial performance positively and significantly affects firm value for companies listed on the IDX from 2015-2020. This is supported by signaling theory, which states that information released by the company, especially financial reports, is a signal to external parties, particularly investors. This is crucial for analyzing company performance and considering future investment decisions. ROA, a profitability proxy, shows that manufacturing companies have earning power capable of influencing the company's condition and impacting firm value (Prawira I Made, 2016). An increase in profitability will be directly proportional to an increase in firm value. This indicates the company manages its assets effectively and efficiently, increasing profits. Increased profitability signals good news to investors, reflected in rising stock prices and subsequent firm value increase. This supports signaling theory, where high-quality companies send good signals to the market, positively received by investors, increasing stock prices and firm value. This aligns with Tera, Yusuf, Heliani (2020), Linda and Suryandari (2017), Sigit and Afyah (2014), who state financial performance affects firm value.

### **Mediating Role of Financial Performance on the Effect of R&D Intensity on Firm Value**

Based on test results, R&D Intensity is significant for Financial Performance (sig.  $0.0071 < \alpha = 0.05$ , coefficient  $a = -0.468977$ ). R&D Intensity is significant for Firm Value (sig.  $0.0071 < \alpha = 0.05$ , coefficient  $c = -0.117244$ ). After controlling for Financial

Performance, R&D Intensity remains significant for Firm Value (sig.  $0.0000 < \alpha = 0.05$ , coefficient  $b = 0.2500$ ), with direct effect  $c' = 0.3360 > c = -0.117244$ . It can be concluded that this regression model falls into the partial mediation category. The advancement of science and technology plays a vital role in the economy according to The Knowledge Based Economy Theory; therefore, companies are expected to manage their intangible assets to improve R&D performance, thereby increasing firm value (Gleason K. and Klock, 2003). R&D activities foster innovation and commercial interests related to scientific research and applicable technological development, aiming to create new products or develop old ones to attract customers, increasing customer base and subsequently improving financial performance (Ziyu Huang, 2020).

### **Mediating Role of Financial Performance on the Effect of Intangible Assets on Firm Value**

Based on test results, Intangible Assets are significant for Financial Performance (sig.  $0.0000 < \alpha = 0.05$ , coefficient  $a = 0.974654$ ) and for Firm Value (sig.  $0.0000 < \alpha = 0.05$ , coefficient  $c = 0.243663$ ). After analysis, Intangible Assets remain significant for Firm Value after controlling for Financial Performance (sig.  $0.0000 < \alpha = 0.05$ , coefficient  $b = 0.25000$ ), with direct effect  $c' = -0.5010$ , which is smaller than  $c = 0.243663$ . Therefore, this model is also categorized as partial mediation. Resource-Based Theory assumes managing and using resources for competitive advantage (Hadiwijaya, 2013). By correctly utilizing intangible assets, a company can compete competitively. Good utilization will improve performance and elicit positive responses from investors. This relationship has been evidenced by a positive impact of intellectual capital on financial performance (ROA) for companies listed on the Taiwan Stock Exchange. ROA is used as a mediating variable because it measures a company's ability to generate profit from its total assets. If a company manages the benefits of intangible assets well, performance can improve, subsequently increasing firm value. Sunarsih and Mendra (2011) show that financial performance can mediate the relationship between intellectual capital and firm value.

### **Conclusion**

This study examined the mediation of financial performance on the relationship between R&D intensity and intangible assets with firm value among manufacturing companies listed on the IDX for the 2015–2020 period. The findings consistently demonstrate that while R&D investment carries a short-term financial cost temporarily suppressing ROA due to immediate expense recognition under PSAK 19 both R&D intensity and intangible assets ultimately influence firm value, with financial performance serving as a partial mediator. Practically, these results imply that management should adopt a long-term R&D investment orientation and communicate innovation strategy transparently to investors, mitigating negative market signals. For investors, high intangible asset values serve as a reliable positive signal of future firm value. Regulatorily, the findings support arguments for revising accounting treatment of R&D costs to allow partial capitalization for

qualifying projects, which would better reflect economic reality. This study contributes to the literature by providing simultaneous panel evidence from an emerging market context, demonstrating that the mediation mechanism through financial performance is partial rather than full, and highlighting the asymmetric short-run versus long-run impacts of knowledge-based investments. Based on the empirical results, the following specific conclusions are drawn:

1. R&D Intensity has a negative and significant effect on Financial Performance.
2. Intangible Assets have a positive and significant effect on Financial Performance.
3. R&D Intensity has a negative and significant effect on Firm Value.
4. Intangible Assets have a positive and significant effect on Firm Value.
5. Financial Performance has a positive and significant effect on Firm Value.
6. Financial Performance mediates the effect of R&D Intensity on Firm Value.
7. Financial Performance mediates the effect of Intangible Assets on Firm Value.

### References

- Anugrah, Yuan dan Rizki Amalia. 2020. Influence of Intangible Assets as an Unexplained Value on Financial Performance and Corporate Market Value. *International Journal of Innovation, Creativity and Change* 11 (9): 681–92.
- Apri, Vera, dan Dina Safitri. 2019. Research and Development ( R & D ), Environmental Investments , to Eco- Efficiency , and Firm Value Faculty of Economics and Business. *The Indonesian Journal Of Accounting Research* 22 (3): 355–74.
- Aqimissolati, Sulastri, Isnurhadi and Agustina Hanafi. 2020. The Influence Of Investment Decisions And Funding Decisions On The Value Of Companies With The Ownership Structure As Moderated Variables In Manufacturing Companies Listed In Indonesia Stock Exchange (BEI). *IJISRT*
- Baron, R. M and Kenny, D. A..1986. The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. (*Journal of Personality and Social Psychology*. Vol. 51, No. 6, 1173-1182. American Psychological Association, Inc)
- Braune, Eric, Jean-michel Sahut, and Frédéric Teulon. 2020. Technological Forecasting & Social Change Intangible Capital , Governance and Financial Performance. *Technological Forecasting & Social Change* 154 (November 2019): 119934.
- Busyra Azheri. 2012. *Corporate Social Responsibility Dari Voluntary Menjadi Mandatory*. PT RajaGrafindo Persada. Jakarta, Indonesia.
- Chen, Tsung-chun. 2020. The Influence of R & D Intensity on Financial Performance : The Mediating Role of Human Capital in the Semiconductor Industry in Taiwan. *Sustainability*.
- Dai, Xiaoyong, Yuanyuan Guo, and Le Wang. 2019. Technology Analysis & Strategic Management Composition of R & D Expenditures and Firm Performance. *Technology Analysis & Strategic Management* 0 (0): 1–14.

- Hasprová, Olga, Zdeněk Brabec, and Jiří Rozkovec. 2019. The Influence Of Intangible Assets On Company. *Acta Academica Karviniensia* 19 (1): 34–46
- Huang, Ziyu. 2020. Empirical Study on the Relationship Between R & D Expenditure and Financial Performance of Healthcare Industry. *ICMSS* 2020, 118–22. Ikatan Akuntan Indonesia. 2014. Pernyataan Standar Akuntansi Keuangan (PSAK) 19: Aset Tak berwujud. Ikatan Akuntan Indonesia. Hal. 19.1-19.25, Jakarta.
- Kang, Minjung, Sangil Kim, and Moon-kyung Cho. 2019. Sustainability The Effect of R & D and the Control – Ownership Wedge on Firm Value : Evidence from Korean Chaebol Firms. *Sustainability* 2019, 11, 2986, 1–20.
- Kemas M. Husni Thamrin, Syamsurijal, Sulastri and Isnurhadi. 2018. Dynamic Model Of Firm Value : Evidence From Indonesia Manufacturing Companies. *SIJDEB*.
- Kinanti, Sekar Arum. 2016. Variabel Kontrol Umur Dan Ukuran Perusahaan ( Studi Pada Perusahaan Manufaktur Yang Tercatat Di Bursa Efek Indonesia Periode 2012-2016 ). *Jurnal Administrasi Bisnis (JAB)* 50 (2): 162–70.
- Kuniawati, Rina. 2017. Kinerja Keuangan Sebagai Variabel Intervening Pengaruh R & D Dan Intangible Asset Pada Nilai Perusahaan. *Jurnal Ilmu Dan Riset Akuntansi* 6.
- Manikas, Andrew S, and Pankaj C Patel. 2019. Dynamic Capital Asset Accumulation and Value of Intangible Assets : An Operations Management Perspective. *Journal of Business Research* 103 (June): 119–29.
- Marlina Widiyanti. 2019. Prodi Magister Manajemen, Fakultas Ekonomi, Universitas Sriwijaya, Palembang, Indonesia.” *Jurnal Riset Akuntansi DAN Keuangan* 7 (3): 545–54.
- Marwa, Annisa, Deannes Isyнуwardhana, Annisa Nurbaiti. 2017. Intangible Asset , Profitabilitas , Dan Sustainability Report. *Riset Akuntansi Kontemporer (JRAK)* 9 (2): 80–88.
- Manurung, Ratlan, P. R. 2014. Analisis Jalur Path Analysis Teori dan Aplikasi dalam Riset Bisnis. Penerbit Rineka Citra, Jakarta, Indonesia.
- Miles, Jeffry Allen. 2012. *Management and Organization Theory : A Josey - Bass Reader/Jeffrey A. Miles - First Edition*. P. CM. United States Of America.
- Novita, Evaria, Kusdi Rahardjo, and Imam Suyadi. 2019. The Influence Of Firm Financial Performance On ( Study at Manufacturer Companies Listed in Indonesia Stock Exchange for the Period of 2010-2012 ). *Jurnal Profit*, no. 2: 21–32.
- OECD. 1999. *Measuring and Reporting Intellectual Capital. An International Symposium*. Amsterdam.
- Ocak, Murat. 2019. The Impact of Intangible Assets and Sub-Components of Intangible Assets on Sustainable Growth and Firm Value : Evidence from Turkish Listed Firms. *Sustainability* 2019, 11, 5399, 5–7.

- Okoye, P V C, Nkechi Offor, and Manukaji Ijeoma Juliana. 2019. Effect of Intangible Assets on Performance of Quoted Companies in Nigeria. *International Journal of Innovative Finance and Economics Research* 7 (3): 58–66.
- Parast, Mahour Mellat. 2020. International Journal of Production Economics The Impact of R & D Investment on Mitigating Supply Chain Disruptions : Empirical Evidence from U . S . Firms. *International Journal of Production Economics* 227 : 107671.
- Pratama, Bima Cinintya, Hardiyanto Wibowo, and Maulida Nurul Innayah. 2015. Intellectual Capital and Firm Performance in ASEAN: The Role of Research and Development. *Journal of Accounting and Investment Article*.
- Prof. Dr. H. Imam Ghozali, M.Com, Akt. 2016. Aplikasi Analisis Multivariete dengan Program IBM SPSS 23, Badan Penerbit Universitas Diponegoro, Semarang, Indonesia.
- Rath Rizkyanti, Isnurhadi, Isni Andriana and Marlina Widiyanti. 2020. Intellectual Capital On Financial Performance In Sharia Banks In Indonesia. *Internasional Research Journal Management, IT & Social Science*.
- Sugiyono.2011. Metode Penelitian Kuantitatif Kualitatif dan R&D. Alfabeta, Bandung, Indonesia.
- Udayana. 2016. Kinerja Keuangan Sebagai Pemediasi Pengaruh Intensitas Research and Development dan Aset Tidak Berwujud Pada Nilai Perusahaan.