

# The Role of Forward-Looking Disclosure in the Relationship of R&D Expenditure and Firm Value: Testing Agency and Signaling Theories

Angel Presccilia<sup>1</sup> and Harjanti Widiastuti<sup>1\*</sup>

<sup>1</sup>Accounting Department, Faculty Economic and Business, Universitas Muhammadiyah Yogyakarta, Indonesia

**Abstract.** This study aims to examine the effect of Research and Development (R&D) expenditure on firm value with forward-looking disclosure as a moderating variable. This study used a sample of 124 manufacturing companies listed on the Indonesia Stock Exchange (IDX) in 2019 - 2022. Data analysis used panel data regression. The results showed that R&D expenditure has a positive effect on firm value. However, this study found that forward-looking disclosure does not moderate the relationship between R&D expenditure and firm value.

## 1 Introduction

Business competition is increasingly complex, so companies need to carry out a transformational process to win. With these conditions, companies are required to continue to create a good image in order to survive [1]. The company will win the competition when it is able to increase the value of the company and the welfare of shareholders. Company value represents the current state of the company and the company's prospects in the future, so company value is considered capable of influencing investor assessments and decisions [2]. Thus, the company needs to make innovations that can attract investors' attention. Corporate innovation is born from research and development activities, so the greater the allocation of R&D expenditure, the greater the potential for innovation generated.

R&D spending decisions are not easy to make because they are highly uncertain. If a large R&D expenditure is unsuccessful, it will lose potential competitive advantage, become a financial burden, consume resources, and accelerate failure. Although R&D expenditures have a high degree of uncertainty due to long-term payback and inconclusive results, the resulting competitive advantage creates value for the company [3]. Based on signaling theory, R&D expenditure will provide good news about the potential for improving the company's performance in the future so that it can increase the company's value [4].

High R&D expenditure will increase information asymmetry and agency costs, which will impact firm value [5]. Companies usually reduce high agency costs by increasing voluntary disclosures [6]. Forward-looking disclosure is included in voluntary disclosure [7], which can give a positive impression from the perspective of investors because it includes

---

\* Corresponding author: [widyas@umy.ac.id](mailto:widyas@umy.ac.id)

prospects [8]. Consistent with agency theory, forward-looking disclosure is thought to strengthen the relationship between R&D expenditure and firm value by increasing investor confidence, improving public relations, reducing uncertainty, and influencing market views.

This research is important for several reasons. First, R&D expenditure continues to increase, while R&D expenditure can be efficient according to signaling theory or opportunistic according to agency theory. Second, this study tests the signaling theory of R&D expenditures simultaneously with agency theory by examining the role of forward-looking disclosure in reducing agency problems that may arise from R&D expenditures. Formatting the title, authors and affiliations.

## **2 Hypothesis development**

### **2.1 Effect of R&D expenditure on firm value**

According to PSAK 20, R&D costs are all costs that are directly attributable to research and development activities or that can be allocated on a reasonable basis to these activities. Research costs are recognized as expenses in the period in which they are incurred, while development costs will be recognized as assets if they meet certain conditions. Although recording R&D expenditure as an expense leads to management's reluctance to conduct R&D activities, the reduction in R&D expenditure has the potential to harm long-term competitiveness, which impacts the value of the company [9]. Deciding how much resources to allocate to research and development activities is critical to a company's survival and growth [10]. R&D expenditures reflect innovation activities in a company, especially manufacturing companies, so they can provide positive signals to investors regarding new inventions that can be patented and then commercialized [11]. R&D expenditures are a key driver of a company's long-term growth and success in responding to market trends and anticipating competition [12]. R&D expenditures also contribute to sustainability by providing a competitive advantage that impacts the future of the company [13].

In accordance with signaling theory, companies that have superior performance will use financial information to send signals to the market. R&D expenditure can be a positive signal that is not easily imitated, distinguishing good and bad companies. Large R&D expenditures signal the potential for future performance growth, which can increase the value of the company [4].

Based on previous research, [3] found that R&D expenditure influenced increasing firm value. [14] found that R&D expenditure affected the increase in firm value. Several other studies also confirmed that R&D expenditure could increase firm value [5, 15, 16]. It is an advantage of companies that make R&D expenditures compared to those that do not. Based on this explanation, the first hypothesis is stated as follows:

H1: R&D expenditure has a positive effect on firm value.

### **2.2 Moderating effect of forward-looking disclosure on the relationship between R&D expenditure and firm value**

R&D expenditure can be efficient, but it can also be an opportunity for management to be opportunistic. Some investors are doubtful that R&D expenditures can affect a company's long-term profitability [17]. [18] finds that R&D expenditure cannot increase the value of the company. Companies with higher R&D investment will usually face information asymmetry, which will impact firm value [5]. Agency theory mentions the possibility of management taking opportunistic actions through R&D spending. An example of management's opportunistic behavior is management acting on self-interest, reducing R&D investment to

meet short-term income targets [10]. R&D expenditure can signal the potential future performance of the company if the R&D expenditure is efficient. To reduce information asymmetry, companies need to convince investors that their R&D expenditures are efficient and effective. Companies can reduce high agency costs by increasing voluntary disclosures [6], one of which is forward-looking disclosure.

Forward-looking disclosure is the disclosure of information about the company's future estimates or projections, including the successful development of new products. In the context of R&D expenditure, forward-looking disclosure is perceived to confirm the uncertainty arising from R&D expenditure. Forward-looking disclosure can give a positive impression to investors as it informs them of the company's prospects [8]. Consistent with signaling theory, forward-looking disclosure can reduce information asymmetry, allow investors to build expectations about future cash flows, and reduce the cost of private benefits that may accrue to investors and management [19].

No research has examined the effect of forward-looking disclosure on the relationship between R&D costs and firm value. [19] revealed that forward-looking disclosure can increase firm value. In other disclosure research, [20] found that corporate social responsibility disclosure can strengthen the relationship between financial performance and firm value. This study suspects that forward-looking disclosure can help convince investors of the efficiency of R&D expenditure so that it will strengthen the positive effect of R&D expenditure on firm value. Thus, the second hypothesis is stated as follows:

H2: Forward-looking disclosure moderates the effect of R&D expenditure on firm value.

### 3 Method

#### 3.1 Sample and data

The samples in this study are manufacturing companies listed on the Indonesia Stock Exchange in 2019-2022, publish annual reports, and have R&D expenditure data. By using the purposive sampling method, the final sample of this research amounted to 124 firm-years.

**Table 1.** Sample selection criteria.

Description	Number
Manufacturing companies listed on the IDX 2019-2022	239
Companies that do not publish financial reports and annual reports for the period 2019-2022	(15)
Companies that do not have data regarding R&D expenditure for the period 2019-2022	(193)
Total sample	31
Period	4
<b>Final Sample</b>	<b>124</b>

#### 3.2 Sample and variables description and measurement

Variable descriptions and measurements are presented in Table 2.

**Table 2.** Variables description and measurement

No.	Variable	Indicator	References
1.	Forward-looking disclosure	Content analysis indicator $FLD = \frac{\sum_{i=1}^t f_i}{t}$	[21] & [22]

No.	Variable	Indicator	References
2.	R&D Expenditure	$R\&D\ Expense = \frac{R\&D\ Expense}{Sales}$	[12]
3.	Firm Value	$Tobins'Q = \frac{MVS + D}{TA}$	[23]
4.	Profitability	ROA = Net profit/total assets	[19]
5.	Leverage	$Debt\ Ratio = \frac{Total\ Kewajiban}{Total\ Asset}$	[2]
6	Firm Size	SIZE = Ln (Total assets)	[24]

### 3.3 Regression model

This study used panel data regression analysis to test the hypothesis. The regression equation is as follows.

$$FV = \alpha + \beta_1.R\&D + \beta_2.Size + \beta_3.Lev + \beta_4.Profit + e \tag{1}$$

$$FV = \alpha + \beta_1.R\&D + \beta_2.FLID + \beta_3.R\&D.FLID + \beta_4.Size + \beta_5.Lev + \beta_6.Profit + e \tag{2}$$

Notes: FV is Firm value, R&D is R&D expenditure, FLID is forward-looking disclosure, Size is firm size, Lev is leverage, and Profit is profitability

## 4 Result and discussion

With a sample of 124 firms-years, table 3 presents the following descriptive statistics:

**Table 3.** Descriptive statistics

Variable	N	Min	Max	Mean	Std. Deviation
Firm Value	124	0.06993	5.319481	1.402544	0.913197
R&D Expenditure	124	1.48E-05	0.038254	0.004756	0.008167
Forward-Looking Disclosure	124	0.375000	0.833333	0.631384	0.104528
Firm Size	124	11.50123	13,91887	12.78392	0.590237
Leverage	124	0.088823	1.887052	0.472713	0.268259
Profitability	124	-0.213976	0.607277	0.049086	0.103226

The descriptive statistical testing shows that the company's value has a range between 0.06993 and 5.319481, with a mean of 1.402544, indicating that the company's value is quite high. The research & development expenditure variable has a range of 0.001% to 3.8%, with an average of 0.4756% of sales, which indicates that R&D expenses are still relatively low. The forward-looking disclosure variable has a value range of 37.5% to 83%, with an average of 63%, which indicates that forward-looking disclosure is still low.

This study used panel data regression analysis to test the hypothesis. The Chow test results showed that the selected regression model is the fixed effect model (FEM), while the Hausman test results showed that the selected model is the Random Effect Model (REM). The final test results using the Lagrange Multiplier (LM) test showed the Random Effect Model (REM). Thus, the selected regression model is the random effect model (REM), which uses the Generalized Least Square (GLS) approach. The classical assumption test results found that the regression model fulfills the assumption of non-multicollinearity. The results of hypothesis testing are presented in Tables 4 and 5.

**Table 4.** Hypothesis testing

Variable	$\beta$	Sig.	t	Conclusion
(Constant)	-0.168161	0.9573	-0.0533594	
R&D Expenditure	33.75993	0.0222	2.317596	Supported
Firm size	0.094393	0.6989	0.387771	Unsupported
Leverage	0.202590	0.5145	0.653835	Unsupported
Profitability	2.193103	0.0003	3.748029	Supported
Adjusted R-Square		0.117423		
F-Statistic (Prob)		5.091152		
Sig. F		0.000803		

**Table 5.** Hypothesis testing

Variable	$\beta$	Sig.	t	Conclusion
(Constant)	-0.305534	3.3355	-0.09160	
R&D Expenditure	102.2014	0.0538	1.948098	
Forward-Looking Disclosure	0.026308	0.9753	0.030971	
FLID*R&D Expenditure	-126.0881	0.1736	-1.368954	Unsupported
Firm size	0.107333	0.6714	0.425316	Unsupported
Leverage	0.150463	0.6320	0.480141	Unsupported
Profitability	2.293816	0.0002	3.797794	Supported
Adjusted R-Square		0.122304		
F-Statistic (Prob)		3.856603		
Sig. F		0.001511		

Table 4 shows some findings. The test results show that the probability of R&D expenditure is 0.02 less  $<0.05$  with a regression coefficient of 33.760. Thus, the first hypothesis is successfully supported. The results of testing the second hypothesis in Table 5 show that the interaction between R&D expenditure and forward-looking disclosure has a probability of  $0.17 > 0.05$ , so the second hypothesis is rejected. Forward-looking disclosure is found to have a positive effect on firm value. For control variables, profitability has a positive effect on firm value, while firm size and leverage are found not to affect firm value. Adjusted R2 of around 12% in both models 1 and 2 indicates that independent and control variables can explain 12% of variations in firm value. Other variables explain the remaining.

The results of testing the first hypothesis show that R&D expenditure has a positive effect on firm value, which means that the higher the R&D expenditure made by a company, the higher the firm value. Signaling theory suggests that investment spending will provide a positive signal regarding the company's future performance, thereby increasing the stock price [4]. The greater the R&D expenditure incurred by the company, the more it will attract the attention of investors because investors consider that the company has better cash flow and prospects in the future because, with R&D, the company can create new products and increase intangible assets. R&D expenditure is considered to be a procedure to improve the competitiveness of a country around the world, both in developed and developing countries [25]. The findings of this study are consistent with previous research, which shows a positive effect of R&D expenditure on firm value [5, 14-16, 26, 27]. The results showed that R&D expenditure can affect firm value, especially manufacturing companies. R&D expenditures are able to create intangible assets that play an important role and are proven to increase firm value [28].

The results of testing hypothesis two showed that forward-looking disclosure does not moderate the effect of R&D expenditure on firm value. Forward-looking disclosure does not provide enough additional information that can confirm the success of R&D expenditure. The results also found that forward-looking disclosure did not affect firm value. In this case, forward-looking disclosure is not enough to provide information that can influence investors'

decision to invest. In forward-looking disclosure, there are several indicators related to corporate R&D, one of which is the introduction of new products, but many companies do not disclose this information. Indicators regarding future market share also tend to project revenue in the short term, so it is not in line with the decisions of investors who have a long-term orientation. Investor types can influence their behavior in making investment decisions [29]. The effectiveness of forward-looking disclosure in increasing firm value has been proven by [19] dan [30]. However, the effectiveness of forward-looking disclosure is also determined by the quality of the disclosure because [19] showed that forward-looking disclosure only affects companies audited by the Big 4 accounting firms.

## 5 Conclusion

This study aims to find evidence of the effect of R&D expenditure on firm value based on signaling theory. The results confirmed the signaling theory that research and development expenditures provided a positive signal to investors regarding the potential prospects of the company so as to increase the value of the company. Investors pay attention to R&D expenditures made by manufacturing companies when making investment decisions. This finding implied the importance of the company conducting continuous research and development in order to be able to produce innovative products that are competitive and attract investors' attention.

Forward-looking disclosure was found to have no direct effect nor moderate the effect of R&D expenditure on firm value. This result indicated that forward-looking disclosure is not enough to provide additional information that can influence investors' decisions. Companies need to improve the quality of forward-looking disclosure that is able to provide additional information about the company's competitive advantage and prospects. Profitability is found to consistently increase firm value, indicating that efficient R&D expenditure should be able to increase profitability.

This study is a cross-sectional study with a limited number of samples, so it is unable to capture variations in R&D expenditure and forward-looking disclosure between periods. Research on R&D expenditure and forward-looking disclosure using panel data may be able to capture the phenomenon of the sustainability of corporate innovation. Future research can use the same sample with a longer period, focus on a sample of companies that carry out intensive R&D activities, use samples from several countries with different levels of innovation, or add variables such as audit quality.

## References

1. Puspita, I.L., Sariningsih, E., and Maharani, Y., Faktor–faktor yang mempengaruhi nilai Perusahaan. *Jurnal Riset Akuntansi dan Manajemen Malahayati (JRAMM)*. **10**, (2), 97-103 (2021)
2. Ardiansyah, G.G.K., Pengaruh profitabilitas, ukuran perusahaan, leverage dan likuiditas terhadap nilai Perusahaan. *Jurnal Paradigma Akuntansi*, **2**, (1), 367-375 (2020)
3. Yildirim, D., Relationship between R&D investment and firm value from R&D intensity, firm size, and risk perspectives: evidence from Turkey'. book: *Researches on Financial Performance*. 79-97 (2020)
4. Triani, N., and Tarmidi, D., Firm value: impact of investment decisions, funding decisions and dividend policies. *International Journal of Academic Research in Accounting, Finance and Management Sciences*. **9**, (2), 158-163 (2019)

5. Kim, W.S., Park, K., Lee, S.H., and Kim, H., R&D investments and firm value: Evidence from China. *Sustainability*. **10**, (11), 4133 (2018)
6. Agyei-Mensah, B.K., The relationship between corporate governance, corruption, and forward-looking information disclosure: A comparative study. *Corporate Governance: The International Journal of Business in Society*. **17**, (2), 284-304 (2017)
7. Biandari, T.R., and Harahap, L. Perancangan sistem pengendalian internal persediaan barang guest supplies pada department housekeeping. *Competitive Jurnal Akuntansi dan Keuangan*. **5**, (2), 41-61 (2021)
8. Pramaishella, V.T., and Kristanto, A.B., Kualitas dan kuantitas forward looking disclosure berdasarkan prediksi kebangkrutan Perusahaan. *Jurnal Bingkai Ekonomi (JBE)*. **4**, (2), 46-54 (2019)
9. Roychowdhury, S., Shroff, N., and Verdi, R.S., The effects of financial reporting and disclosure on corporate investment: A review. *Journal of Accounting and Economics*. **68**, (2-3), 101246 (2019)
10. Feng, Y., Ma, C., Wang, Y., and Ma, J., A double-edged sword: The effects of R&D intensity and capitalization on institutional investment in entrepreneurial firms. *Frontiers in Psychology*. **13**, 942931 (2022)
11. Agung, C.P., and Inawati, W.A., Bagaimana R&D memoderasi hubungan antara intellectual capital dengan kinerja perusahaan? . *Modus*. **35**, (1) (2023)
12. Cherkasova, V., and Kurlyanova, A.: 'Does corporate R&D investment support to decrease of default probability of Asian firms?', *Borsa Istanbul Review*, 2019, 19, (4), pp. 344-356
13. Prananto, F.K.P., Pengaruh pengeluaran research and development dan beban periklanan terhadap nilai perusahaan di sektor manufaktur yang terdaftar di BEI tahun 2014-2018. Universitas Atma Jaya Yogyakarta (2020)
14. Safitri, V.A., Sari, L., and Gamayuni, R.R., Research and development (R&D), environmental investments, to eco-efficiency, and firm value. *The Indonesian Journal of Accounting Research*. **22**, (3) (2020)
15. Gupta, K., Banerjee, R., and Onur, I., The effects of R&D and competition on firm value: International evidence. *International review of economics & finance*. **51**, 391-404 (2017)
16. Min, B.S., and Smyth, R., Determinants of R & D intensity and its impact on firm value in an innovative economy in which family business groups are dominant: The case of South Korea. Monash Univ., Department of Economics (2015)
17. Honoré, F., Munari, F., and de La Potterie, B.v.P., Corporate governance practices and companies' R&D intensity: Evidence from European countries. *Research Policy*. **44**, (2), 533-543 (2015)
18. Murinda, C.S., Islahuddin, I., and Nuraini, A., Firm value: Does corporate governance and research & development investment matter?. *Jurnal Reviu Akuntansi dan Keuangan*, **11**, (2), 266-284 (2021)
19. Hassanein, A., Zalata, A., and Hussainey, K., Do forward-looking narratives affect investors' valuation of UK FTSE all-shares firms?. *Review of Quantitative Finance and Accounting*. **52**, 493-519 (2019)
20. Hasanah, K., Chandrayanti, T., and Putri, S.Y.A., Pengaruh kinerja keuangan terhadap nilai perusahaan dengan corporate social responsibility disclosure sebagai variabel moderasi pada perusahaan pertambangan yang terdaftar di BEI tahun 2017-2019. *Ekasakti Pareso Jurnal Akuntansi*. **1**, (1), 44-53 (2023)

21. El-Deeb, M.S., and Elsharkawy, L.M., Characteristics on the disclosure of the forward-looking information: Evidence from the Egyptian stock market
22. Kılıç, M., and Kuzey, C., Determinants of forward-looking disclosures in integrated reporting. *Managerial Auditing Journal*. **33**, (1), 115-144 (2018)
23. Van Linh, N., Hung, D.N., and Binh, T.Q., Relationship between sustainability reporting and firm's value: Evidence from Vietnam', *Cogent business & management*, **9**, (1), 2082014 (2022)
24. Hartono, J., Teori portofolio dan analisis investasi (2022)
25. Hutaaruk, M.R., The effect of R&D expenditures on firm value with firm size moderation in an Indonesia palm oil company. *Cogent Business & Management*. **11**, (1), 2317448 (2024)
26. Choi, S., and Yoo, J., The impact of technological innovation and strategic CSR on firm value: Implication for social open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*. **8**, (4), 188 (2022)
27. Habtewold, T.M., Impacts of internal R&D on firms' performance and energy consumption: Evidence from Ethiopian firms. *International Journal of Innovation Studies*, **7**, (1), 47-67 (2023)
28. Gleason, K.I., and Klock, M., Intangible capital in the pharmaceutical and chemical industry. *The Quarterly Review of Economics and Finance*. **46**, (2), 300-314 (2006)
29. Mentari, N.M.I., and Dewi, K.I.K., Moderasi CSR disclosure terhadap pengaruh green investment pada nilai Perusahaan. *Jurnal Ilmiah Akuntansi dan Bisnis*. **8**, (1), 60-71 (2023)
30. Guo, Z., Chan, K.C., and Xue, Y., The impact of corporate culture disclosure on performance: a quantitative approach. *Review of pacific basin financial markets and policies*. **19**, (02), 1650012 (2016)