



# INNOVATION'S MEDIATING CONTRIBUTION TO THE RELATIONSHIP BETWEEN FINANCIAL FLEXIBILITY AND SUSTAINABILITY PERFORMANCE

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**Abstract:** *This study explores the impact of debt and cash combination arrangements as financial flexibility that can improve sustainable performance in companies. This research also examines how innovation mediates the relationship between a company's financial flexibility and future sustainability achievements. Utilizing a resource-based view and path analysis, we analyze data from sustainability reports of basic and chemical industry firms listed on the IDX from 2020 to 2023. These findings provide empirical evidence that contingency theory can adapt by controlling the effect of financial flexibility on sustainability performance. As tested through debt and cash flexibility, financial flexibility has no direct impact on sustainability performance. Meanwhile, innovation is proven to depend on sustainability achievement. Empirical evidence of resource-based theory, where financial flexibility is a potential competitive advantage over the development and research process in innovation. Likewise, innovation holds a significant role in linking financial flexibility to sustainability performance. Companies with flexible finances can more easily allocate resources to innovate, increasing the company's ability to carry out activities that pay attention to the social and environmental impacts of sustainable business activities.*

**Keywords:** debt flexibility, cash flexibility, financial flexibility, innovation, sustainability performance

## INTRODUCTION

In today's era of globalization, businesses are increasingly pressured to prioritize sustainability alongside financial performance. Companies drive the dual challenge of generating profits, while also addressing the social and environmental consequences of their operations. This study investigates how financial flexibility, defined as the ability to adapt financial strategies through mechanisms such as debt and cash management, can enhance sustainability performance, which refers to a company's effectiveness in implementing practices that promote long-term environmental stewardship and social responsibility. By examining these interconnections, this study offers critical insights into how firms can align their financial strategies with sustainability outcomes. The concept of sustainability is becoming increasingly important in the business world, as awareness of environmental, social, and ethical issues is increasing. According to Ávila-Gutiérrez et al. (2020), sustainable methods must support current and future generations' economic and social demands, while guaranteeing the environment and the world's population. So the sustainability category becomes three pillars, which can be described as the 3E—economy, environment, equality, and the 3P—people, prosperity, and profit (Eizaguirre et al., 2019) Although many companies have adopted sustainability practices in their operations, there are still challenges in effectively

measuring and managing sustainability performance (Agustia et al., 2023) Companies often face difficulties in determining the right metrics to measure the sustainability impact of the company's operations, as well as in integrating sustainability aspects into the overall business strategy (Hegab et al., 2023; Prajati & Purwanto, 2024)

The sustainability challenges faced by the chemical industry in Indonesia over the last three years have become increasingly complex in terms of sustainability. Efforts have been made to solve various problems to achieve a balance between economic growth and environmental protection. The chemical industry must pay attention to sustainability metrics that cover various aspects, such as carbon emission reduction, energy efficiency, waste management, and social welfare. The problems that often arise in the Indonesian chemical industry are related to the high carbon emissions and hazardous waste generated during the production process. This harms the environment and the health of the surrounding community. In addition, the use of hazardous chemicals and lack of recycling practices are problems that need to be addressed immediately to achieve better sustainability (Prajati & Purwanto, 2024).

The Indonesian government and international agencies have taken steps to address the sustainability challenges in the chemical industry. Some of the government's policies include strict regulations related to emissions control, green tax incentives to encourage sustainable practices, and training programs to raise awareness of sustainability in the sector. At the global level, various international initiatives and agreements, such as the Paris Agreement and the Sustainable Development Goals (SDGs), also affect the direction of the development of the chemical industry. Countries around the world are committed to reducing greenhouse gas emissions, improving energy efficiency, and promoting environmentally friendly production practices (Rahman & Islam, 2023; Ye & Dela, 2023), and by focusing on sustainability metrics, identifying emerging issues, and involving government policies and global initiatives, it is hoped that the chemical industry in Indonesia can holistically move towards a more sustainable direction and contribute to sustainable development.

To realize sustainability goals that refer to economic activities supporting environmental improvement and utilizing resources economically and effectively (Li et al., 2024), in the face of an uncertain environment, financial flexibility plays the role of a company's strategy. Financial flexibility is used to reduce financial risk and utilize financial resources effectively in the face of changes in the dynamic financial environment (Hao et al., 2022) Companies can reconfigure corporate resources to adjust and improve their ability to achieve sustainability (Teng et al., 2021) Financially flexible companies have greater access to capital markets and are able to raise capital at a lower cost to fund new growth opportunities, even during crises (Barry et al., 2022; Botta, 2020) There is a need for financial flexibility management and innovation in the chemical industry. This industry is a sector that is heavily influenced by rapid changes in regulations, technology, and market demands. Financial flexibility allows chemical companies to deal with fluctuations in raw material prices, changes in environmental policies, and other financial risks that can affect their sustainability performance. With good financial flexibility, chemical companies can respond to market changes more quickly and efficiently, and optimally allocate resources to support sustainability initiatives (Blundo et al., 2021; Dwikat et al., 2023)

Meanwhile, innovation is also key in the chemical industry as technological advancements and demands to reduce environmental impact have encouraged chemical companies to continue to innovate in creating more environmentally friendly and sustainable products and processes (Calabrese et al., 2018; Deng et al., 2022; Schaltegger et al., 2012) By integrating innovation in their operations, chemical companies can reduce carbon emissions, optimize the use of raw materials, and develop more sustainable solutions (Li et al., 2020; Nguyen, 2024) Some literature evidence suggests that financial flexibility can improve innovation and company performance and innovation improves company performance (Awais et al., 2023; Kafetzopoulos, 2023; Sheng & An, 2024) However, the mediating role of innovation in the relationship between financial flexibility and sustainability is still undone. The management of financial flexibility and innovation, as factors that can affect a company's sustainability performance, is also an important concern. How the management of debt and cash combinations, as well as a company's innovation capabilities, can contribute to achieving optimal sustainability performance remains an area that needs to be explored further. Therefore, a deep understanding of the relationship between financial flexibility, innovation, and corporate sustainability performance is crucial in an ever-evolving and changing business context.

Research that combines aspects of financial flexibility, including debt policy, cash capacity, innovation, and sustainability performance, can provide valuable insights for companies to optimize their sustainability strategies and improve competitiveness in an increasingly complex global market. Therefore, management of financial flexibility and innovation is urgently being researched by chemical companies to ensure operational sustainability and long-term growth in the face of dynamic challenges and opportunities. This new research model raises the

following research questions: (1) Do debt flexibility, cash flexibility, and innovation have a positive effect on sustainability performance? (2) Do debt and cash flexibility have a positive effect on innovation? (3) Is innovation a mediating variable in the relationship between debt, cash flexibility, and sustainability performance?

This study contributes literature that provides evidence that transparency and accountability in the use of financial flexibility funds can affect future sustainability performance (Bag et al., 2018; Blundo et al., 2021; Kafetzopoulos, 2023; Sheng & An, 2024) and are still not fully functional. However, the role of innovation mediation in the relationship between the application of financial flexibility and sustainability performance follows resource-based theory, so it becomes an important competitive advantage that results in sustainability benefits for industrial companies.

Transparency in sustainability reporting on social and environmental expenditures and innovation development can accommodate the expectations of stakeholders to support future sustainability performance. This is in line with contingency theory, in which companies with financial flexibility can adjust their strategies and resources according to changing market conditions. This is especially important in a dynamic and uncertain business environment where the need to innovate is becoming increasingly urgent. Sustainability performance is influenced not only by innovation and financial flexibility but also by external factors such as regulations, market conditions, and consumer preferences. The contingency theory allows companies to understand and adapt to future sustainability strategies. This study is expected to reveal the extent to which contingency theory can be applied in this model, where companies can better understand financial flexibility and the role of innovation in facing various conditions to achieve sustainable performance. It provides a more dynamic and responsive framework for change, which is particularly relevant in today's business world. This study provides managerial implications for how to deal with the various risks of a rapidly changing external situation.

## **THEORETICAL FRAMEWORK AND HYPOTHESES**

### **Contingency Theory**

Contingency theory is the theoretical lens of this research because the implementation of sustainable business models must be able to adapt to the complexity of sustainability that develops and often changes suddenly in today's uncertain environment (Claussen et al., 2018; Maletič et al., 2018). The alignment of company characteristics in flexible financial performance and operational innovation must be effective in achieving sustainability (Broccardo et al., 2023). Achieving long-term sustainability depends on how the company adapts to the specific conditions it faces. This contingency theory is particularly useful in situations in which external and internal variables are constantly changing and require an adaptive approach. Fisher (1998) proposed that the theory of contingency develops as a response to optimize operational process control to maximize efficiency and achieve sustainability. Contingency theory suggests that companies that can adapt quickly and adjust their strategies according to changes in the environment, regulations, and market pressures will be more successful in achieving sustainability goals (Alves et al., 2017). The theory also emphasizes the importance of flexibility and innovation in facing sustainability challenges. Overall, this theory reinforces sustainability performance not only in terms of implementing environmentally friendly practices, but also in terms of how companies can adapt to financial flexibility and innovate to achieve sustainability goals and adapt to the specific conditions that companies face, such as market environment, regulations, and competitive pressures.

### **The Resource-Based Theory (RBT)**

A company's financial resources can be viewed as an important asset that provides a sustainable competitive advantage for the company. Cash management and corporate debt policy are dynamic capabilities to innovate so that they become superior and competitive resources (Huang & Chen, 2021). The performance of financial capital flexibility as a performance resource for companies operating in less developed market environments using innovation as a step to achieve competitive sustainability performance (Adomako & Danso, 2021). The Resource-Based Theory proposed by Wernerfelt (1984) and developed by Barney et al. (2011) emphasizes the importance of internal resources owned by companies as key to achieving sustainable competitive advantage. Financial flexibility, which refers to companies' ability to adapt their financial strategies according to market conditions and the external environment, is an important resource for companies to innovate. Companies with financial flexibility, limited cash value, and high debt can more easily allocate resources to carry out various innovations. In the context of the relationship between financial flexibility and innovation-mediated sustainability, RBT plays a role in using financial resources to drive sustainable innovation and build capabilities that are not easily replicated by competitors. Innovation mediates flexible financial viability by creating products and processes that

contribute to long-term sustainability. Innovation in the industry contributes to environmental sustainability and has great potential for increased efficiency, lower environmental and social costs, and the development of more affordable and environmentally friendly products.

### **Financial Flexibility and Sustainability Performance**

Contingency theory states that corporate strategies in regulating financial flexibility are more relevant and effective in a dynamic environment (Claussen et al., 2018), in which a company's dynamic ability is used as a flexible financial resource and results in improved operational performance. This makes it flexible in exploiting emerging opportunities, reducing risks and costs, and increasing growth and profitability in a fluctuating and changing business environment (Awais et al., 2023). In this context, financial flexibility, which includes the ability to manage cash and debt, can play an important role in improving a company's sustainability performance. Companies with good debt flexibility can more easily gain access to capital for investment in sustainability projects (Zhang et al., 2020), and debt flexibility allows companies to invest, which not only improves financial performance but also environmental and social performance.

Financial flexibility also allows companies to respond more to regulatory changes related to sustainability. Companies that are able to adjust their financial structures can more quickly adapt to new policies, such as reducing emissions or using raw materials, and can potentially be more sustainable (Nathael, 2023; Nilsson et al., 2021), which shows that financial flexibility not only contributes to financial performance but also to compliance with increasingly stringent sustainability standards. Companies that demonstrate commitment to sustainability through investments backed by financial flexibility tend to have a better reputation among consumers. This reputation can improve customer loyalty and, in turn, the company's financial performance (Guo et al., 2023). Thus, debt flexibility serves as a driver for companies to not only meet stakeholder expectations but also to control their ability to settle obligations to improve sustainability conditions in the future. Therefore, the first hypothesis is

H<sub>1</sub> Debt Flexibility has a positive effect on sustainability performance

According to Fisher's contingency theory (1995), there is no universally appropriate control system to be applied to all organizations in every situation. Cash flexibility as a contingency variable can affect a company's sustainability performance in different ways, depending on the context of the organization and its external environment. According to Lawrence and Lorsch (2015), financial flexibility is part of a set of company resources with various environmental contingencies that can affect company performance. Cash flexibility has special value for managers who control company operations to adapt to the use of cash according to changes in the environment (Zhang et al., 2020). The company's cash holdings are a resource that adapts to the strategies taken during the period of environmental change (Hao et al., 2022). Flexible cash values as needed will adapt to dynamic changes (Teng et al., 2021). Cash flexibility allows companies to optimally allocate financial resources, control financial risks, and make informed decisions during crises (Sheng & An, 2024). This can improve the company's sustainability performance because the company becomes more flexible in managing cash as an asset owned. Adjustments to cash capacity tend to be operational, showing the ability to adapt to changes in the environment and maintain long-term financial stability. Therefore, the second hypothesis is

H<sub>2</sub> Cash Flexibility has a positive effect on sustainability performance

### **Innovation and sustainability performance**

Contingency Theory states that the effectiveness of a strategy depends on the specific context and situation faced by the organization (Lawrence & Lorsch, 1967). A company's innovations can be seen as a strategic response to external pressures, such as environmental regulations and increased consumer demand for sustainable products. Companies that develop innovations not only improve operational efficiency, but also strengthen their reputation, which contributes to better sustainability performance (Dicuonzo et al., 2022; Le et al., 2024). This allows companies to reduce the environmental impact of poor operations and align themselves with sustainability goals (Shahzad et al., 2020). By developing innovations in products and processes that are more environmentally friendly, companies can meet stakeholder expectations and comply with strict regulations that support sustainability performance (Afum et al., 2021). Companies that invest in innovation tend to have better sustainability performance, as they can carry out various innovations to reduce waste, save energy, and improve company performance (Li et al., 2018; Xie et al., 2019). Innovations that can serve as tools to achieve sustainability goals can be a strategy to increase competitiveness in the market. Companies that can adapt to various innovation capabilities, overcome external pressures, and be accepted by stakeholders can improve sustainability performance. Therefore, the third hypothesis that can be put forward is

H<sub>3</sub> Innovation has a positive impact on sustainability performance

### Financial Flexibility and Innovation

Resource-based theory (RBT) states that a company's competitive advantage comes from the management of unique and valuable resources that are not easily imitated by competitors (Barney, 1996), which can be seen as a strategic resource that allows companies to invest in sustainability initiatives. Companies with good financial flexibility have a higher ability to allocate financial resources that enhance the creative process, namely innovation (Han et al., 2021; Marchica & Mura, 2010). The resources that a company has, including financial resources such as debt, can affect a company's ability to innovate. Debt flexibility allows companies to manage financial resources more efficiently and reactively to innovation opportunities (Khan et al., 2020).

Flexibility in debt policy allows companies to respond well to regulatory and market demands related to developing and innovating changes. Thus, debt flexibility is important for effective sustainability performance (Chen & Yoon, 2021) and debt flexibility can provide companies with easier access to the financial resources needed to fund innovative projects. With debt flexibility, companies can take the necessary risks to conduct research and development (R&D) and implement new technologies (Hao et al., 2022). Companies with flexible debt structures tend to be more innovative because they can manage funding needs more effectively. Debt flexibility in innovation activities that have the potential to create new markets. Flexible debt values can demonstrate a company's ability to develop exploratory innovation and produce renewable products and services. Thus, debt flexibility can increase a company's innovation ability. Therefore, the fourth hypothesis proposed is

H<sub>4</sub> Debt Flexibility has a positive effect on innovation

From the perspective of resources, companies with flexible cash in line with resource capabilities will use their human capital, namely, with various professional skills, to innovate. The flexibility of well-controlled cash can facilitate new thinking and cutting-edge solutions or the use of new technologies in the work process, which can improve innovation performance (Awais et al., 2023). From the perspective of a company's capabilities, cash flexibility allows companies to adapt quickly to a dynamic environment that drives innovation into a resource to achieve a competitive advantage (Barney et al., 2011; Hao et al., 2022), and a company's cash policy can be achieved through a high cash level to increase sustainable investment (Khan et al., 2020). Medium and high cash holdings are in a better position to increase income (Kafetzopoulos, 2023). Teng et al. (2021) use cash policy as a driver to innovate investment for the future. Cash flexibility can lead to better future capital expenditure and is a component of innovation. By having sufficient cash reserves, companies can quickly adjust their strategies to meet increasingly stringent sustainability demands (Zhang & Liu, 2022), which can result in better future capital expenditure and increase innovation in revenue. Therefore, the fifth hypothesis that can be put forward is

H<sub>5</sub> Cash Flexibility has a positive effect on innovation

### Financial Flexibility, Innovation, and Sustainability Performance

Resource Theory emphasizes that a company's competitive advantage comes from its management of unique and valuable resources (Barney, 1991), which can be considered an important strategic resource for companies. Companies with good finances have greater capacity to allocate resources for innovations that support the sustainable development of environmentally friendly products and conduct efficient operations. Innovation serves as a bridge between financial flexibility and sustainability. With the flexibility of cash management and debt structure, companies can invest in innovative projects to achieve better sustainability performance. Innovations resulting from financial flexibility not only improve operational efficiency, but also reduce environmental impact, thus contributing to good sustainability performance (Nathael & Junarsin, 2024). This makes innovation the key to translating financial flexibility into achieving sustainable sustainability. Thus, financial finance not only contributes directly to well-being but also through innovations that improve the company's competitiveness and market position, and the complex relationship between flexible financial capabilities will improve the ability to innovate and ultimately improve the welfare of sustainability performance in today's business.

Innovation allows companies to be more responsive to changes in the market and customer needs, which improves sustainability performance. Financial flexibility through cash and debt management allows companies to quickly adapt to changing economic conditions. Financial flexibility, which includes a company's ability to effectively manage cash and debt, is essential to support innovation, with sufficient financial capital and the ability of the company to invest in innovative research and development that supports sustainability. The company's sustainability performance includes not only economic, but also social and environmental aspects. Innovation supported by financial flexibility can help companies achieve their sustainability goals more effectively. Therefore, the sixth and seventh hypotheses are

H<sub>6</sub> Innovation mediates the relationship between Debt Flexibility and sustainability performance  
H<sub>7</sub> Innovation mediates the relationship between Cash Flexibility and sustainability performance

**RESEARCH METHODS**

This study uses a sample of companies from the Indonesia Stock Exchange Industrial Classification (IDX-IC) with subcalcifications of basic materials (code B). This research began in 2020 as the beginning of the company's recovery from pandemic conditions, which had a significant impact on business operations. To understand the results of research that show how companies adapt to financial resilience and flexibility, innovations and sustainability achievements are carried out. The details of the companies that used chemical processing for the 2020-2023 period are presented in Table 1.

Table 1. Selected Industry Sample

| No | Sub Industry           | Total |
|----|------------------------|-------|
| 1. | Basic Chemical         | 16    |
| 2. | Agricultural Chemical  | 2     |
| 3. | Specialty Chemical     | 5     |
| 4. | Containers & Packaging | 17    |
| 5. | Paper                  | 7     |
| 6. | Diversified Forest     | 3     |
|    | Total                  | 50    |

Source: processed data

Based on the 50 industrial companies listed in Table 1, which are companies that use chemicals in the processing process, there are three companies with IPO in the year of research, so 47 company data for four years were obtained, and the data were processed.

Table 2. Selected Data Sample

| Description  | Amount |
|--|--------|
| Basic material companies listed on the IDX IC          | 89     |
| Companies with Pure Material Basic Classification      | ( 39 ) |
| Companies that use chemicals in the processing process | 50     |
| Companies that IPO (Initial Public Offering)           | ( 3 )  |
| The amount of research sample                          | 47     |
| The amount of research data processed (47 x 4)         | 188    |

Source: processed data

Sustainability performance in this study is a dependent variable determined based on the number of natural logarithms of social and environmental expenditure (Januarti et al., 2019; Rahmadhani et al., 2024) The independent variable consists of two variables, the first is the debt flexibility measured The formula you provide is a method to calculate debt flexibility based on the gearing ratio. The second variable, cash flexibility, is measured by the cash ratio compared with the industry average (Sheng & An, 2024). The intervening variable, innovation, is measured by the ratio of R&D expenditure to total revenue (Álvarez et al., 2011; Rahmadhani et al., 2024). The statistical implementation in this study uses path analysis to test the relationship between model variables with the Structural Equation Model (SEM) method using the SmartPLS testing tool. The regression equation model used in this study is as follows:

$$SP = \beta_0 + \beta_1 DF + \beta_2 CF + \beta_3 Inno + \beta_4 Size + \beta_5 Age + \varepsilon_1 \quad (1)$$

$$Inno = \beta_0 + \beta_1 DF + \beta_2 CF + \beta_3 Size + \beta_4 Age + \varepsilon_2 \quad (2)$$

where:

SP = Sustainability Performance      DF= Debt Flexibility      CF= Cash Flexibility  
Inno= Innovation      β = coefficient      ε = error

Based on the above discussion, the research model tested the impact of financial flexibility and innovation on sustainability performance, as shown in Figure 1.

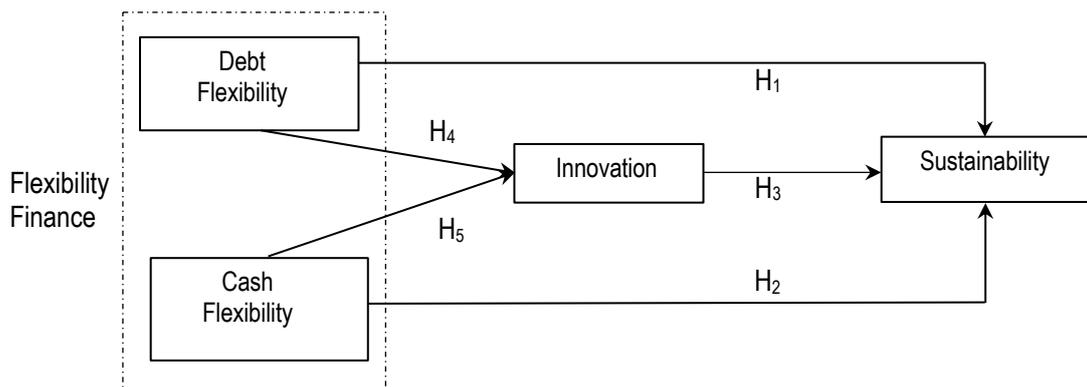


Figure 1. Conceptual Framework

**RESULTS AND DISCUSSION**

**RESULTS**

The steps to assess the feasibility of data processing according to specified limits are described in this section. It is seen in Table 3. It provides statistical summaries of data from the variables used in the analysis. Related to the mean and standard deviation of the variables. Following the literature, data on social expenditure and environmental expenditure were used to determine sustainability performance, and natural log transformations were carried out to correct skewness variables. The last sample in this study is 188 observations from basic and chemical industry companies registered in Indonesia

Table 3. Descriptive Statistics

|                  | N   | Minimum | Maximum | Mean     | Std. Deviation |
|------------------|-----|---------|---------|----------|----------------|
| Debt Flexibility | 188 | .020    | 5.257   | 3.25403  | 1.774757       |
| Cash Flexibility | 188 | .015    | 11.883  | 1.67489  | 1.262182       |
| Innovation       | 188 | .204    | .807    | .61731   | .077205        |
| Sustainability   | 188 | 21.210  | 22.190  | 21.80077 | .188071        |
| Size             | 188 | 20.182  | 23.648  | 21.87018 | .792594        |
| Sales            | 188 | .293    | .797    | .58995   | .137006        |

Source: processed data

Furthermore, the estimation with the maximum probability requires that the observed variable meet the assumption of SmartPLS multivariate normality. The normality analysis was carried out by looking at the SRMR value = 0.019, which is below 0.08; NFI= 0.982, which is above 0.90; and rms Theta = 0.181, which meets the criteria because it is close to 0. Table 4 shows the validity of the discrimination of the model construction evaluated by analyzing the Fornell-Larcker criterion; the value of the coefficient was found to be higher than the correlation coefficient. Cronbach's alpha and CR values greater than 0.7 indicate good internal consistency reliability.

Table 4. Criteria Fornell-Larcker

|                  | Debt Flexibility | Cash Flexibility | Innovation   | Sustainability | Size         | Sales        |
|------------------|------------------|------------------|--------------|----------------|--------------|--------------|
| Debt Flexibility | <i>1,000</i>     |                  |              |                |              |              |
| Cash Flexibility | 0,000            | <i>1,000</i>     |              |                |              |              |
| Innovation       | 0,188            | 0,159            | <i>1,000</i> |                |              |              |
| Sustainability   | 0,142            | 0,187            | 0,267        | <i>1,000</i>   |              |              |
| Size             | 0,158            | 0,057            | 0,036        | 0,151          | <i>1,000</i> |              |
| Sales            | 0,389            | 0,200            | 0,136        | 0,057          | 0,374        | <i>1,000</i> |

Note: The diagonal value reported in italics is the square root of the AVE

Source: processed data

The heterotrait/monotrait (HTMT) ratios are shown in Table 5. indicating a limit of less than 0.85. Thus, all results provide strong evidence of the reliability of internal consistency, convergent validity, and discriminatory validity of model constructions.

Table 5. Rasio Heterotrait-Monotrait (HTMT)

|                  | Debt Flexibility | Cash Flexibility | Innovation | Sustainability | Size  | Sales |
|------------------|------------------|------------------|------------|----------------|-------|-------|
| Debt Flexibility | -                |                  |            |                |       |       |
| Cash Flexibility | 0,000            | -                |            |                |       |       |
| Innovation       | 0,188            | 0,159            | -          |                |       |       |
| Sustainability   | 0,142            | 0,187            | 0,267      | -              |       |       |
| Size             | 0,158            | 0,057            | 0,036      | 0,151          | -     |       |
| Sales            | 0,389            | 0,200            | 0,136      | 0,057          | 0,374 | -     |

Note: An HTMT criterion ratio of less than 0.85 indicates the validity of the discrimination of the model construction  
Source: Data Process

The outer model shows a variance inflation factor (VIF), with all values significantly below the acceptable threshold below 5 in Table 6. The value of VIF can be ascertained, as multicollinearity does not cause critical attention in the analysis. The test track model was used to determine the fit of the model.

Table 6. Variance Inflation Factor

|                  | Innovation | Sustainability |
|------------------|------------|----------------|
| Debt Flexibility | 1,000      | 1,220          |
| Cash Flexibility | 1,000      | 1,074          |
| Innovation       |            | 1,076          |
| Sustainability   |            | 1,405          |
| Size             |            | 1,174          |

Source: Data Process

The results of the data test from the output of the empirical model meet the specified criteria and are stated following the empirical data, namely, the Inner Model. A discussion of the test results obtained using path analysis is summarized in Table 7. Present data on path coefficients, t-values, p-values, and decisions regarding hypotheses results.

Table 7. Hypothesis Results for Path Analysis

| Hypothesis         | Flow   | Coefficient | t Statistics | P value | Conclusion |
|--------------------|--|-------------|--------------|---------|------------|
| H <sub>1</sub>     | Debt Flexibility -> Sustainability               | 0,115       | 1,572        | 0,117   | reject     |
| H <sub>2</sub>     | Cash Flexibility -> Sustainability               | -0,162      | 1,919        | 0,055   | reject     |
| H <sub>3</sub>     | Innovation -> Sustainability                     | 0,242       | 3,671        | 0,000** | Accept     |
| H <sub>4</sub>     | Debt Flexibility -> Innovation                   | -0,188      | 3,011        | 0,003*  | Accept     |
| H <sub>5</sub>     | Cash Flexibility -> Innovation                   | 0,159       | 2,845        | 0,005*  | Accept     |
| <b>Intervening</b> |  |             |              |         |            |
| H <sub>6</sub>     | Debt Flexibility -> Innovation -> Sustainability | 0,045       | 2,958        | 0,003*  | Accept     |
| H <sub>7</sub>     | Cash Flexibility -> Innovation -> Sustainability | 0,038       | 2,497        | 0,013*  | Accept     |

Note: \*p-value < 0.05; \*\* p-value <0.01

Source: Data Process

The focus of this study is to achieve sustainable performance in basic chemical material companies. The results of this study were able to close the gap in previous research by testing the path analysis of the developed model framework. The study received five accepted hypotheses and two rejected hypotheses, with the following discussion

## DISCUSSION

### The Effect of Financial Flexibility on Sustainability Performance

The results of the hypothesis test prove that financial flexibility does not affect sustainability performance. Both the first hypothesis (H<sub>1</sub>), namely debt flexibility, and the second hypothesis (H<sub>2</sub>), namely cash flexibility, had no effect on sustainability performance. This study proves this through the perspective of contingency theory, which

emphasizes that the effectiveness of the company will adjust the structure and strategies applied to the environmental conditions that occur. Fluctuations in financial flexibility do not directly contribute to changes in sustainability. Companies use contingencies in the face of market conditions and regulatory policies to achieve better sustainability values. This result is in line with that of the study conducted by Xie et al. (2019) Uyar et al. (2023) one of the causes of debt flexibility in chemicalis the use of anies using effective management strategies to manage debt risk. While debt can provide additional resources for investments, overreliance on it can increase the risk of bankruptcy and affect operational stability.

Chemical industry companies have high financial flexibility, but are not in line with specific environmental needs and challenges, such as strict environmental regulations and market demand for sustainable products. Companies that have a balanced financial structure tend to be better able to maintain their performance despite fluctuations in debt levels (Febrian & Hendriyeni, 2024) The debt fluctuations that have occurred at Kimia Farma have succeeded in maintaining a positive performance in strengthening the business foundation and transforming human resources (Pertiwi & Putri, 2021). Sustainability performance achievement strategies make it possible to remain competitive and adapt to changes without relying on increasing debt. Thus, sustainability performance is more influenced by internal factors, such as operational management and product innovation, than by debt structure (Dwijayanti & Jayanti, 2024). Meanwhile, companies in the chemical sector have sufficient resources to fund their business operations without relying on high cash flexibility. While liquidity in a good shape can help companies face uncertainty, sustainability performance is more influenced by managerial strategies and innovation than just cash availability. Companies use long-term investments in infrastructure and technology, which is not enough to make cash more flexible because it does not support the large-value investments needed for innovation that follow the trend of modernization.

Finally, while financial flexibility is important in the context of risk management, its impact on sustainability performance in Indonesia's chemical industry during this period was limited. Contingency theory underlines the importance of the alignment between financial strategy and other external factors. Therefore, companies with the ability to integrate financial flexibility with a broader sustainability strategy are more sensitive and responsive to environmental changes. Thus, without alignment between financial flexibility and the relevant operational context, sustainability performance does not improve significantly.

### **The Influence of Innovation on Sustainability Performance**

The results of the hypothesis test ( $H_3$ ) prove that innovation has a significantly positive effect on sustainability performance. Companies in the chemical sector in their operations prioritize innovation efforts and operational efficiency in response to external pressures. The results of this study are supported by those of Shahzad et al. (2020), Z. Khan et al. (2020), Zhao et al. (2022), Dicuonzo et al. (2022) and Le et al. (2024) Contingency theory states that there is no one universal approach that can be applied to all companies. Instead, the right approach should take into account existing contextual variables, namely that companies choose to invest their resources in environmentally friendly technologies and sustainable practices rather than increasing financial flexibility. This shows that success in achieving sustainability goals is influenced more by the company's ability to innovate to adapt to market conditions and regulations rather than relying solely on financial flexibility. Companies that can carry out the innovation process not only improve operational efficiency but also strengthen their reputation in the market, which contributes to better sustainability performance.

### **The Effect of Financial Flexibility on Innovation**

This theoretical framework shows that financial flexibility has a unique strategy, cannot be replicated, and is an important ability to innovate in industrial processes. Financial flexibility is an important source of competitive advantage that ensures improved performance and ability to innovate. The results of the fourth hypothesis test ( $H_4$ ) prove that debt flexibility has a significantly negative effect on innovation. The results of this study are consistent with those of Shao (2024) and Sheng and An (2024). Debt flexibility can have a significantly negative effect on innovation, in line with RBT, which emphasizes the importance of efficient resource management. Low debt flexibility can increase a company's innovation activities. When companies have low debt levels, they tend to have more resources available to invest in research and development (R&D), which is key to innovation.

Zhang et al. (2023) show that companies with low debt burdens have greater financial capacity to allocate funds to innovative projects. In this case, companies can be free to take risks in R&D investments without worrying about meeting urgent debt obligations. Thus, the financial flexibility gained from low debt levels allows companies to explore greater innovation opportunities, which can improve their competitiveness and market position. Likewise,

companies with high debt burdens may be forced to shift resources from innovation to debt repayment, thereby reducing their capacity for innovation activities. In this context, high debt flexibility often leads to more conservative decision making, where companies tend to focus on meeting debt obligations rather than investing in innovation. When companies are stuck in a high debt cycle, they may not have enough resources to dedicate themselves to research and development (R&D), which is a key element in creating new innovations. Therefore, while debt flexibility can provide access to additional capital, if not managed properly, it can reduce a company's ability to develop its innovative capabilities.

The results of the fifth hypothesis test ( $H_5$ ) prove that cash flexibility has a significant positive effect on innovation in Indonesia's chemical industry, which can be explained through the Resource-Based Theory (RBT) approach. RBT emphasizes the importance of unique internal resources and the company's capabilities in creating a competitive advantage. The results of this study are supported by those of the study conducted by Teng et al. (2021), Zhang and Liu (2022), Hao et al. (2022) and Awais et al. (2023). Cash allows allocate resources efficiently or to research and development (R&D), which is key to innovation. When liquidity is sufficient, companies can invest in innovative projects without worrying about the short-term impact of these expenses. The results show that companies with high cash flexibility tend to be more proactive in exploring new opportunities and creating new products or processes that can improve sustainability performance. Additionally, cash flexibility allows companies to quickly adapt to market changes and consumer needs. In a dynamic business environment, the ability to respond quickly to change is crucial (Farida et al., 2024). RBT shows that companies that are able to manage their resources well and adapt to external changes have a competitive advantage. With cash flexibility, companies can make strategic investments in innovations that not only meet today's needs but also prepare them for the challenges of the future. This creates an organizational culture that encourages creativity and innovation, thereby improving the overall performance of the company.

#### **Innovation as a Mediator of Financial Flexibility and Sustainability Performance Relationships**

The results of the sixth hypothesis ( $H_6$ ) and seventh hypothesis ( $H_7$ ) study prove that innovation is a mediating variable in the relationship between financial flexibility, debt flexibility, and cash flexibility to achieve sustainable performance. These results relate to the first hypothesis ( $H_1$ ) and the second ( $H_2$ ) which show that financial flexibility does not affect sustainability performance. These findings demonstrate the role of innovation in connecting financial flexibility strategies to achieve sustainable performance. Companies in the chemical sector emphasize innovation and operational efficiency as ways to improve sustainability. Companies in this sector rely on increased productivity and reduced costs rather than flexible debt risks. Success in achieving sustainability goals is influenced more by the company's ability to innovate to introduce new products and more efficient processes. This, in turn, can reduce the environmental impact and improve a company's reputation in the eyes of stakeholders. Research shows that companies that invest in innovation tend to have a better sustainability performance because they can meet the growing market demand for environmentally friendly products. Thus, although debt flexibility does not directly affect sustainability performance, innovation plays an important role as a mediator that becomes a resource that can adapt to external changes and have a competitive advantage.

In addition, the chemical industry in Indonesia faces unique challenges and opportunities, such as increasingly stringent environmental regulations and the market demand for more environmentally friendly products. Companies cannot integrate cash flexibility into sustainability strategies to adapt and compete. Thus, cash flexibility requires innovation to influence sustainability. Innovation allows companies to create new products and improve production processes, which can reduce environmental impact and improve operational efficiency. Innovations resulting from financial flexibility can improve operational efficiency, reduce waste, and reduce environmental impacts, which in turn improves a company's sustainability performance. Innovation plays a key role in the flexible use of cash to achieve sustainability goals. Thus, although cash flexibility does not directly affect sustainability performance, its role as a supporter of innovation makes it an important factor for achieving positive results in the long term.

#### **CONCLUSION**

This study examined the important role of innovation in mediating the relationship between financial flexibility and corporate sustainability performance. The findings indicate that debt and cash flexibility do not directly affect sustainability performance, but innovation plays a key role in linking the two variables. Thus, companies with good financial flexibility can be more efficient in allocating resources to innovation, which in turn contributes to achieving sustainability. This study provides valuable insights for companies, especially in the chemical industry sector, to

optimize corporate sustainability strategies when facing environmental and social challenges. Innovation plays an important role in linking financial flexibility to sustainability performance, especially in the Indonesian industry, which is facing increasingly complex environmental and social challenges. Amid increasing regulations and market demands, companies in sectors such as the chemical industry must adapt quickly. The results of this study indicate that although debt and cash flexibility do not directly improve sustainability performance, innovation can be a key driver in creating more environmentally friendly and efficient solutions. In the Indonesian context, where awareness of sustainability is increasing, companies that are able to optimally allocate resources for innovation will have a significant competitive advantage.

The limitations of the study still focus on one industrial sector and its limited methodological approach; therefore, it needs to be studied further. By expanding the scope of research to various industries in Indonesia, including renewable energy and sustainable agriculture, we can gain a more holistic understanding of how financial flexibility and innovation interact. In addition, considering external variables such as government policies and local market dynamics will provide a richer context for companies in formulating sustainability strategies. Therefore, future research should explore more complex relationships in Indonesian industries to provide relevant practical guidance for developing effective sustainability strategies.

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