



Does Green Innovation Impact on Profitability of Indonesian Consumer Non-Cyclicals Companies?

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<https://doi.org/10.18280/ijstdp.190738>

ABSTRACT

Received: 2 November 2023

Revised: 9 July 2024

Accepted: 15 July 2024

Available online: 30 July 2024

Keywords:

green innovation, profitability, financial performance, green process, green product

This study aims to obtain empirical evidence regarding the impact of green innovation on profitability in consumer non-cyclicals sector companies listed on the Indonesia Stock Exchange during period of 2018 - 2021. Secondary data was retrieved from Annual Reports and Sustainability Reports, and 96 samples were gathered from 24 companies during study periods. Green innovation is assessed based on two components: green process innovation and green product innovation. The findings indicate that green process innovation has a favorable effect on profitability, however green product innovation does not have a significant influence on profitability. This outcome holds significance for policymakers in formulating more efficacious legislation and support mechanisms to educate consumers about green products and the significance of adopting environmentally conscious consumer behavior. Moreover, it is crucial for corporate boards to determine the extent of their environmentally-friendly investments in order to foster their eco-friendly innovation and actively engage in environmental activities, while ensuring their intended financial outcomes.

1. INTRODUCTION

As the fourth largest population in the world, Indonesia has 280.73 million population in December 2023 and is projected to reach 328.93 million people in 2050 [1]. This condition will result in an increase in the need for primary goods consumed. Primary goods are a fundamental aspect that must be met so that human life their lives adequately [2]. The higher the population in Indonesia, the higher the demand [3]. Businesses may see this as a promising business growth and expansion.

Environmental damage that has occurred over the years has raised concern for the world community which culminated with the holding of the Earth Summit conference in Rio de Janeiro in 1992 which discussed the implementation of sustainable development and saving the environment in the development of every country. Environmental damage is the world's main concern because it will have a direct impact on people's lives and company itself. Environmentally friendly companies prefer to conduct business by developing, creating, modifying, improving, and processing products with green materials so can produce green products and services [4]. For companies, these environmentally friendly practices become an important factor in increasing public trust and eventually may enhance competitive advantage. This drives companies to implement green innovation. In the context of environmental damage, green innovation is carried out by reducing pollution resulted during business processes, designing environmentally friendly products, and by adopting a management system that cares about the environment [5]. Green innovation is very closely related to the finished goods which will be accepted by

society and consumers. The better the company implements green innovation, the less pollution will be produced [6]. Green innovation is an action taken by the company to improve the quality of production and increase the amount of production, while remaining oriented towards creating sustainable development. Green innovation can be divided into two, namely green process innovation and green product innovation [7].

Green process innovation is oriented towards production processes that can reduce environmental damage and reduce pollution emissions [8]. The main goal of green process innovation is to minimize the environmental burden by modifying tools or by implementing new environmentally friendly tools. The method used by green process innovation in minimizing the environmental burden is by controlling pollution disposal, reducing pollution and recycling, as well as eco-efficiency. Previous studies have shown that implementing green process innovation plays a role in increasing a company's competitive advantage compared to other companies [4, 9].

Meanwhile, green product innovation focuses on increasing the efficiency of services and goods in reducing the ecological impact of pollutants and toxic wastes generated in the use of material and energy resources [10]. The main goal of green product innovation is to minimize the impact on the environment by modifying or designing products that are more environmentally friendly. In previous research, it was revealed that green product innovation plays a role in strengthening the company's image so that it can increase the profits received by the company [4, 9].

Profitability is an important resource for the company, especially in developing the company in the future, the higher the level of profitability, the more effective the company is in controlling its business operations. Profitability is one of the bases used as a benchmark for the success or failure of a company. This condition cannot be denied causing partiality by companies in seeking the greatest possible profitability either in the right or wrong way [6]. One of the most common ways for companies to increase profitability is to exploit nature without improving it [11]. This exploitation is carried out by companies on a large scale and has been going on for a long time so that it is suspected to be the main cause of environmental damage.

This condition of continuously increasing demand for primary goods certainly raises concerns about environmental conditions because it means that the more demand in the market, the more production processes will also increase. It is feared that production processes that do not apply green innovation contribute the greatest amount of pollution to the environment, be it air pollution, energy or single-use packaging pollution used [9]. According to statistics Indonesia, in July 2021, at least 59% rivers in Indonesia are highly polluted [12]. This number is claimed that is better than rivers pollution number of 79.5% in 2015, indeed. Further, some companies in Indonesia have been prosecuted and have to pay penalty for polluting the river. Further, these companies are companies engaged in primary goods, especially in the consumer non-cyclical sector. The effects of this disposal activity can damage the ecology and the environment which at some point cannot be changed [13]. If the impact of post-production activities is not managed properly, restoration ecology accumulates and gets worse. Restoration ecology is a branch of ecological science that contains the practice of carrying out restoration and recovery of an ecosystem or habitat through community structure, natural components of species or natural functions according to the original [14].

This paper has several contributions to the literature of investigating the impact of companies' green innovation on profitability. First, to the best of our knowledge, no previous study examines this relationship in the consumer non-cyclical sector. As demand increased, companies in consumer non-cyclical sector may also release higher pollutions while there is an increasing stakeholders' demand and pressure of green business. Furthermore, global energy transition towards clean energies will gradually encourage companies in the consumer non-cyclical sector to implement green innovation in their business processes. However, the uncertain financial benefits of all sorts of green investment may hold back these green initiatives. Thus, the finding of the impact of green innovation on profitability of companies in consumer non-cyclical sector, become the main concern of their future managerial decision regarding investing in green innovation activities. As the second contribution, we consider that the effect of green innovation activities of companies in consumer non-cyclical sector, can vary depending on the level of activity disclosed.

The aim of this research is to obtain empirical evidence regarding the impact of green innovation on profitability in consumer non-cyclicals sector companies listed on the Indonesia stock exchange, 2018 – 2021. This paper is organized as follows. Section 2 discusses literature review and hypothesis development. Section 3 presents the research methodology which contains variables definitions and research model. Section 4 presents the empirical results and

discussion. The last section discusses the conclusion and implications.

2. LITERATURE REVIEW

2.1 Triple bottom line

Elkington [15] explains that the concept of the Triple Bottom Line is the company's foundation in carrying out its responsibility to the environment. Meanwhile, Marshall and Toffel [16] explained that all the elements in the Triple Bottom line can be put together to describe sustainable company goals such as eco-efficiency and can be linked to economic goals that are in line with environmental preservation goals. Triple bottom line elements consist of people, planet, profit. Where this will later be used as a basis for corporate social responsibility.

2.2 Theory legitimacy

Legitimacy theory is one of the company's conditions that there are values or norms as a limit to the company's actions, especially those related to the environment [17]. This legitimacy was first introduced by Weber in 1978 and is considered as one step in equating the view that activities carried out by a company are activities that are in line with socially developed value norms or definitions [18]. One of the things that underlies legitimacy theory is the social contract between the company and the surrounding community [19]. Social contracts can occur when companies operate with an orientation towards the impact they cause on society in terms of political, social, or economic benefits either explicitly or implicitly.

O'Donovan [20] states that legitimacy is an idea that contains if a company operates continuously in order to achieve profits, then the company must carry out the rules that apply in society because basically this legitimacy itself is beneficial for the company to continue to survive from time to time.

2.3 Green innovation

Innovation can be interpreted as the discovery of something new for a person or company in the form of discovery or invention to achieve certain goals or solve a problem [5]. Innovation means creating something new [21]. Meanwhile, green innovation is a type of environmentally friendly technology that is used to reduce serious problems with environmental preservation. In other words, green innovation is a new discovery in technology which can later be used in various ways with the aim of overcoming existing environmental problems. Green innovation itself includes two main strategies, namely green process innovation and green product innovation [7].

2.3.1 Green process innovation

Green process innovation refers to the act of revamping a company's operations in order to make them more environmentally friendly. This involves enhancing production systems or processes with the goal of minimizing negative effects on the environment. It includes attempts to minimize pollution and conserve energy [22]. The adoption of green process innovation, an internal aspect of the organization,

necessitates substantial expenses. However, these significant costs can enhance the effectiveness of green process innovation compared to alternative approaches [23].

Green process innovation aims to reduce the environmental impact of manufacturing processes by limiting pollution and waste contamination through the deployment of new or modified equipment [8]. Green process innovation and green product innovation are closely interconnected. The presence of green process innovation facilitates the attainment of green product innovation by providing novel tools and machinery for operational and managerial processes, thereby simplifying the achievement of environmentally friendly outcomes [24].

2.3.2 Green product innovation

Green product innovation refers to the development of products by enterprises with the goal of improving the production process while also safeguarding the natural environment. This is achieved by employing recycled materials or implementing recycling procedures [25]. Companies must prioritize the implementation of green product innovation to enhance the quality of their products and reduce the adverse environmental effects caused by energy and material resource use [10]. The objective of green product innovation is to create or modify products in order to make them environmentally friendly. This is achieved by using materials that can be easily broken down during the production process, resulting in reduced environmental impact and increased energy efficiency [4].

Green product innovation offers advantages such as resource and energy conservation, pollution reduction, minimization of hazardous materials, and mitigation of harmful environmental impacts [26]. Companies that adopt green product innovation can enhance consumer interest in their products, resulting in clear benefits for the company. In addition, the development of ecologically sustainable products has the potential to open up new markets, giving the organization a competitive edge over its rivals [27].

2.4 Prior research

Several prior studies examine the relationship between green process innovation and profitability. Implementing green process innovation leads to increased corporate's profitability [7, 28-30]. Moreover, when there is partnership between the government and enterprises engaged in green technology innovation grew stronger when the government started offering financial support or incentives. Nevertheless, study conducted by Sellitto et al. [31] found that green process innovation does not significantly contribute to the enhancement of profitability. Sellitto et al. [31] justify that adopting green process innovation may lead to a competitive benefits by enhancing the market value of products in comparison to competitors, due to the decreased carbon emissions it generates.

Other studies examine the relationship between green product innovation and profitability. Previous researches resulted that the implementation of green product innovation yields a favorable effect on profitability [7, 32-34]. This is due to the fact that companies that adopt green product innovation get a competitive edge over their counterparts. In addition, buyers and suppliers have a preference for items that use green technology which eventually may enhance future product sales.

A conflicting result found by Rezende et al. [35], that there is no correlation between green product innovation and

company profitability. This is due to the fact that companies implementing green product innovation necessitate substantial financial resources at the outset. Therefore, it lacks profitability. Given this, study on green innovation that included the process and product green innovation, is lack of attention.

3. HYPOTHESIS

Hypothesis is a tentative answer provided to a problem based on theory. Figure 1 illustrates the theoretical framework used in this research.

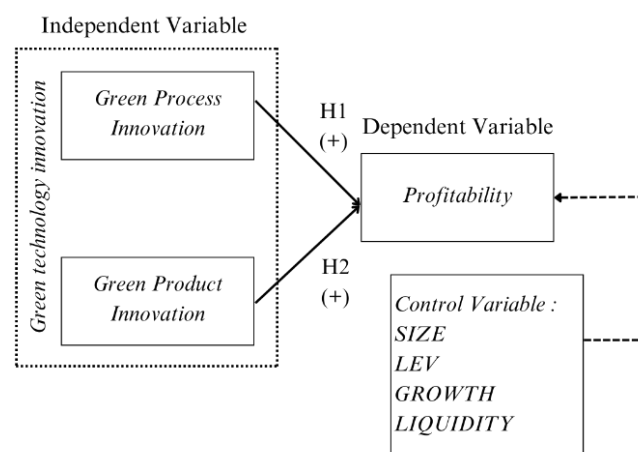


Figure 1. Theoretical framework

3.1 Hypothesis development

3.1.1 Green process innovation to profitability

Green process innovation can be realized by converting the production process through investment in environmentally friendly technology. Companies that adopt sophisticated equipment with the aim of reducing pollution will encourage people to trust the company because it complies with legally applicable procedures [24]. Based on legitimacy theory, the existence of green process innovation can provide an additional perspective to the public that companies that apply this are not only profit-oriented but also to the environment where in the end the company benefits because of the company's improved legitimacy towards the environment [36]. Increasing the legitimacy of companies to society and the environment allows companies to increase their brand image in front of the public which will have an impact on more and more consumers buying goods sold by these companies and maintaining the company's access to the resources needed [24]. Given this, we hypothesize that:

H1: Green Process Innovation impacts positively on Profitability.

3.1.2 Green product innovation to profitability

Agustia et al. [37] argue that customer value to companies and public legitimacy will increase if companies implement green product innovation because they create new markets that care about the environment. Based on the triple bottom line theory, companies make changes or create new products that are environmentally friendly by increasing existing and expected resources so that they can fulfill the three existing

elements, namely people, planet, and profit [38]. In the triple bottom line concept initiated by WRI, IUCN, & UNEP [14], a company that carries out production activities must gain the trust of the public. One way to gain this trust, is by producing environmentally friendly products. Given this, we hypothesize that:

H2: Green Product Innovation impacts positively on Profitability.

4. RESEARCH METHOD

This study utilizes secondary data obtained from financial reports of Indonesia listed companies during period of 2018 to 2021. The selected criteria are implied for non-cyclical consumer sector that are published financial reports or sustainability reports on the Indonesia Stock Exchange website (www.idx.co.id).

The sample size used in this study is 24 samples. All data was analyzed using the panel data testing method. In this study, a balanced panel will be utilized since there are a maximum of 24 cross-sectional units or observations, and they have the same maximum time series observations, which is 4 years. The operational variables consist of independent, dependent, and control variables. The independent variables used in this study are; first, green process innovation, to measure how companies make updates in their production processes so that they are more environmentally friendly and will gain consumer trust; second, green product innovation, measuring the company's evidence in carrying out innovation, improvement or creation of new products that are more environmentally friendly. The dependent variable used is the Return on Asset (ROA). ROA reflects the company's ability to generate profits from all its resources. Control Variable used in this study are Size company, measured by ln total asset; Leverage, measured by total assets per total liabilities; Growth, measured by growth of sales company; and Liquidity, measured by current liabilities deflated by total assets.

In the data analysis, the panel method is used to examine the relationship between the independent variables (green process innovation and green product innovation) and the dependent variable (Return on Asset or ROA), while controlling for other factors that may affect the results, namely firm size, leverage, growth, and liquidity.

The results of this study will provide a better understanding of the extent to which green innovation in processes and products can affect the financial performance of non-cyclical consumer companies on the Indonesia Stock Exchange during the period under study. In addition, this study is also expected to provide a deeper insight into how control factors, such as firm size, leverage, growth, and liquidity, can moderate the relationship between green innovation and financial performance.

In this context, it is important to underline that green innovation is an increasingly important strategy for companies in the modern era. With increasing awareness about environmental issues and climate change, firms are expected to innovate their processes and products to be more sustainable and environmentally friendly. This study makes an important contribution to understanding the positive impact of green innovation on corporate financial performance.

In addition, the use of panel data method in this study allows

for a more in-depth analysis of the dynamics of change over the observed time period. By taking into account control factors, such as firm size, leverage, growth, and liquidity, this study can provide a more complete understanding of how green innovation can be an important factor in achieving higher ROA levels in non-cyclical consumer industries.

Finally, the results of this study are expected to provide valuable guidance for Indonesian companies looking to adopt green innovation practices. They can use the findings of this study as a foundation to develop more effective and sustainable innovation strategies.

5. RESULTS

5.1 Equations

The research was conducted using financial data obtained from the financial reports of 24 companies listed on the Indonesia Stock Exchange (IDX) during the period 2018 to 2021. The financial data used includes variables that are the basis for calculations in the Springate Model, total assets, current liabilities, and sales. In addition to financial data, research data also uses green process innovation and green product innovation implementation data. The 24 companies included in this model, with a total of 96 data company-year observations, which are categorized as consumer non-cyclicals. Data panel is used in the analysis, with the regression model as follows:

$$ROA_{it} = \alpha + \beta_1 GP1_{it} + \beta_2 GP2_{it} + \beta_3 SIZE_{it} + \beta_4 LEV_{it} + \beta_5 GROWTH_{it} + \beta_6 LIQ_{it} + e_1 \quad (1)$$

where,

ROA	: profitability
GP1	: green process innovation
GP2	: green product innovation
SIZE	: firm size
LEV	: leverage
GROWTH	: growth
LIQ	: liquidity
i	: firm
t	: year

The inclusion of these specific financial variables, such as FIRM SIZE, LEV, GROWTH, AND LIQ, in the analysis is essential because they form the basis for calculations. These variables are critical for assessing the financial performance of companies, making them valuable indicators when examining the relationship between financial metrics and green innovation practices.

In addition, the research incorporates financial data and green process innovation and green product innovation. This reflects a broader perspective that goes beyond traditional financial metrics. Green process innovation evaluates how companies modify their production processes to become more environmentally friendly, while green product innovation assesses to what extent companies innovate, improve, or create new products with enhanced environmental attributes. These data points are crucial for understanding how environmental practices and innovation strategies can impact financial performance (Table 1).

Tabel 1. Statistik deskriptif

N = 96	Mean	Median	Max	Min	Std. Dev.
PROCESS	0.629	0.600	1.000	0.200	0.224
PRODUCT	0.537	0.500	1.000	0.333	0.230
ROA	0.048	0.050	0.170	-0.180	0.060
SIZE	22.830	23.015	25.910	20.430	1.440
LEV	0.293	0.265	0.600	0.080	0.126
GROWTH	0.079	0.080	0.500	-0.330	0.157
LIQ	2.142	1.570	6.180	0.420	1.455

This study focuses on companies in the consumer non-cyclicals category since it typically consists of companies that produce essential goods and services that are in constant demand regardless of economic cycles.

Regarding multicollinearity, variance inflation factors (VIF) are checked in preliminary regressions to ensure that multicollinearity is not at a problematic level. The highest VIF is 2.38. Therefore, multicollinearity is not at a problematic level for interpreting the regression results (Table 2).

Table 2. Regression analysis

Dependent Variable: Y				
Method: Panel Least Squares				
Sample: 2018 2021				
Periods included: 4				
Cross-sections included: 24				
Total panel (balanced) observations: 96				
Variable	Coef	Std. Error	t-stat	Pvalue
c	0.182	0.304	0.598	0.555
PROCESS	0.106	0.016	6.396	0.000
PRODUCT	0.013	0.013	0.964	0.338
SIZE	-0.008	0.013	-0.611	0.542
LEV	-0.019	0.036	-0.538	0.592
GROWTH	0.039	0.017	2.221	0.029
LIQ	-0.008	0.004	-2.056	0.043
R-squared	0.920	Adjusted R-squared		0.886
Durbin-Watson stat	2.041	Prob(F-stat)		0.000

Adjusted R-squared in Table 2 shows 88.6 percent variables were included in the regression model. According to regression results, green process innovation has P-value of $0.000 < 0.05$. This means that Green Process Innovation impacts positively on Profitability or H1 is accepted. However, Green product innovation has P-value of $0.33 > 0.05$. This means that green product innovation does not impact on Profitability significantly or H2 is not accepted.

For control variables, only GROWTH and LIQ significantly positively impact on profitability. GROWTH or sales growth showing an increase in sales from year to year may enhance a company's profitability. gives positive impact on profitability and LIQ of liquidity variable gives positive impact on profitability.

6. DISCUSSION

Green innovation encompasses all types of invention that strive to reduce ecological harm and optimize the utilization of natural resources. This study specifically examines the concepts of green process innovation and green product innovation. The analysis can be explained in the following section.

6.1 Green process innovation and profitability

The result of this study shows that green process innovation significantly gives positive impact on company's profitability, which means that H1 in this study is accepted. This condition also indicates that the higher level of green process innovation implementation, the higher profitability achieved by the companies. Companies that implement green process innovation may enhance profitability because the actions taken by the company may improve company's image and reputation. Green process innovation may include business process changes which are carried out as a form of corporate social responsibility, give competitive advantage because it differentiates itself from its competitors. Based on legitimacy theory, companies must comply with the norms in society to gain or maintain its legitimacy status. Therefore, green process innovation is expected to be a tool by the company in order to gain legitimacy from the public. The implementation of green process innovation shows that companies are carrying out its business processes in environmentally friendly and socially ways. Companies need to be concerned about giving benefits to the community where the business being operated.

Furthermore, this study's findings emphasize the multifaceted advantages of integrating green process innovation into a company's operations. Beyond its positive impact on profitability, such innovation aligns with broader sustainability goals and environmental consciousness.

1. Sustainable Practices: The adoption of green process innovation signifies a commitment to sustainable business practices. By reducing the environmental footprint of their operations, companies contribute to long-term ecological preservation, which is increasingly important in an era marked by heightened environmental awareness and regulations.

2. Competitive Edge: As mentioned earlier, embracing green process innovation provides a competitive edge. Companies that proactively address environmental concerns are better positioned to meet evolving customer expectations for eco-friendly products and services. This can lead to increased market share and customer loyalty.

3. Reputation Enhancement: Green process innovation enhances a company's reputation, not only among consumers but also with stakeholders such as investors, partners, and regulatory bodies. A strong reputation for environmental responsibility can attract investment and foster collaborative opportunities.

4. Risk Mitigation: Companies that integrate environmental considerations into their processes are better equipped to mitigate environmental risks. This includes minimizing exposure to regulatory fines and legal liabilities associated with environmental harm.

5. Long-Term Viability: Sustainability initiatives, including green process innovation, contribute to a company's long-term viability. By reducing waste, conserving resources, and minimizing environmental impact, companies position themselves to thrive in a world where sustainability is a key driver of success.

In conclusion, the positive relationship between green process innovation and profitability, as revealed in this study, underscores the importance of environmentally conscious practices in today's business landscape. It not only bolsters financial performance but also aligns companies with the evolving expectations of customers, investors, and society at large. As the business world continues to prioritize sustainability, embracing green process innovation becomes

not just a choice but a strategic imperative for companies aiming to thrive in the long run.

Both growth and liquidity impact on profitability. When a firm experiences favorable growth and liquidity levels, this might motivate the company to adopt green process innovation, which in turn can have an influence on profitability, albeit indirectly. This might occur when the company has greater autonomy to conduct its business in compliance with relevant legislation.

Given this, the findings of this study are aligned with the research carried out already [4, 6]. Xie et al. [7] empirically demonstrated that green process innovation implementation, not only requires significant commitment, but also effective management so can lead to positive outcomes.

6.2 Green product innovation and profitability

The result of green product innovation shows that green product innovation does not impact significantly on company's profitability, which means that H2 is not accepted. This condition occurs because the implementation of green product innovation requires large financial investment at the beginning of implementation.

However, the H2 regression result is not significant can be caused by the observation period of this study is in the There is other factor that cause green product innovation does not show significant effect since it includes COVID-19 period, at which time the market was experiencing an abnormal symptom situation due to the COVID-19 pandemic. Pandemic conditions may make the public or market tend to be very sensitive to the price of an item and prioritize saving. In general, the cheaper the product price, the greater possibility will be purchased by consumers. This condition can be disadvantage for green product which usually with higher price. The green raw material tends to escalate the product cost which eventually high selling price. As a result, this strategy may not be attractive for consumers and may deteriorate the company's profitability.

Based on the triple bottom line theory, companies that implement green product innovation tend to be assessed as companies that try to meet all the elements of this theory, namely people, planet, and profit. Fulfillment of all these elements aims to meet public expectations to generate trust which will impact on profitability. However, fulfilling all these elements cannot only be done through one or two parameters. The process carried out must cover many things and be carried out in synergy with one another. This condition is the reason why green product innovation does not have a significant impact on profitability. There are still many companies that only implement green product innovation practices. Of the total observation, companies that implement green product innovation are below 53.7%. This means that more than 40% of sampled companies are not interested in this initiative since it may give competitive disadvantage dan high investment and cost, which may come to fail in achieving expected profitability.

Furthermore, it is important to recognize that achieving a substantial impact on profitability through green product innovation entails a comprehensive transformation of business practices. Companies must not only invest in product development but also consider factors such as marketing, consumer education, and supply chain management to effectively bring eco-friendly products to the market. One of the notable challenges revealed in the research is that many

companies still do not fully commit to the complete adoption of green product innovation. This partial implementation is reflected in the data, where a significant portion of the companies falls below the 50% threshold. This underscores the need for a more holistic approach that encompasses all aspects of green product innovation, from ideation to commercialization.

The findings of this study align with the research conducted by Rezende et al. [35], which asserts that green product innovation has no substantial impact on profitability. This might occur due to the substantial financial requirements associated with green product innovation, resulting in the company not reaping any benefits in the short term. The green initiatives from management are solely driven by the desire for public recognition but not prioritize in gaining profit.

7. CONCLUSION

The independent variable of green process innovation demonstrates a significant positive impact on profitability. This could be attributed to the fact that its implementation often results in cost efficiencies that directly influence the overall profitability of a company. By optimizing processes and reducing resource consumption, companies can achieve cost savings, which in turn positively impacts their bottom line.

Conversely, the independent variable of green product innovation does not exhibit a significant partial effect on profitability. This may be caused by many companies not fully embrace green product innovation in its entirety, or they may face substantial initial implementation costs. Companies may hesitate to invest extensively in green product innovation if they perceive the costs as prohibitive, potentially resulting in a lack of significant impact on their overall profitability. These findings shed light on the nuanced relationship between different types of green innovation and their effects on a company's financial performance. While green process innovation appears to deliver immediate benefits through cost efficiencies, the impact of green product innovation may be more gradual and contingent on the level of commitment and investment made by companies in developing environmentally friendly products.

This study's findings may give implication for industry. Energy and resource savings can be achieved by implementing green process innovations, which often result in more efficient utilization of energy and raw materials. This can greatly decrease production costs by eliminating waste and reducing utility prices. In addition, implementing environmentally friendly process innovations can optimize manufacturing operations, resulting in accelerated production times and decreased operating expenses, ultimately leading to increased profit margins.

This study has several limitations that can be addressed in future research. The sample size is small since not all of them consistently included their social and environmental responsibilities into their annual reports or sustainability reports between 2018 and 2021. Moreover, due to the influence of COVID-19 may impact on anomalous market conditions, some other factors that affect the outcomes cannot be explained. Given these limitations, researchers are encouraged to expand the sample size, by including some other sectors. Researchers are advised to expand the study period to capture changes and developments of green

innovation so the causality between green innovation and profitability can be observed and understand.

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