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Firm Performance Perspective from the Implications of Environmental Conservation

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Abstract
Environmental issues are of the utmost importance and should not be used as a tool for the purposes of competition. Furthermore, consumers are becoming increasingly aware of the environment and prefer products made from sustainable materials. Therefore, adopting environmentally friendly practices is expected to enhance company sales. This study aims to examine the impact of green innovation, adoption of green accounting and environmental management accounting on the performance of manufacturing firms in Indonesia. The research was conducted on manufacturing firms that are listed on the Indonesia Stock Exchange in the period between 2017 and 2021. The structural equation modelling technique was used to test the hypotheses. The results suggest that the implementation of green innovation affects green accounting, environmental management accounting and firm performance, but the implementation of green accounting and environmental management accounting does not affect firm performance. The implications of these findings are examined in the discussion section.

Keywords
Firm Performance; Green Innovations; Green Accounting; Environmental Management Accounting.

Introduction

In early 2020, the COVID-19 pandemic caused significant global crises, especially in Indonesia. The industrial sector was severely affected and the economic growth of every country in the world was affected. Many corporations faced a decrease in sales leading to reduced profits and even closure. Policies have been implemented to support both small and large enterprises to remain viable and prevent losses. During this period, business growth was also affected. The government, particularly in Indonesia, took various measures to alleviate the far-reaching effects of the pandemic. According the data statistic of Indonesia that the growth rate of manufacturing companies witnessed a decline to –2.93 in 2020 (BPS, 2021). The main factors contributing to this decline are the decrease in people's purchasing power and the large number of layoffs and unemployment resulting from the pandemic. In response, the government has implemented policies aimed at restoring economic conditions and their impact on business growth. However, the threat of a global crisis due to the pandemic poses a significant risk to businesses at various scales. Many developed and developing countries have faced a crisis whereby companies have gone bankrupt and subsequently closed down due to a decline in economic growth.

There are a number of factors to be considered in the measurement of business growth, such as the quantity and quality of businesses. An increase in the number of companies indicates the growth of new businesses in the region, which promotes economic development and the security of doing business in the country. Conversely, performance demonstrates the increased growth of businesses, which is reflected in the number of rises in revenue and profits earned by companies shown in their financial statements. According to the table presented above, there was a substantial rise in the following year that denoted an enhancement of the manufacturing industry's growth. Furthermore, the activities of the companies are a source of environ-

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mental pollution and degradation of natural resources (Al-Dhaimesh, 2020). The majority of raw materials come from nature, and waste disposal leads to a negative impact on the environment (Endiana et al., 2020). As a result, it poses a threat to the sustainability of not only the environment but also human beings (Ardito & Dangelico, 2018). The greenhouse gas phenomenon, in which escalating global temperatures influence climate change, is one of the resulting negative effects. Statistics show that climate change has many causes, the most important of which is the increase in greenhouse gas emissions. Another factor contributing to climate change is the fluctuating number of forest fires each year. Emissions from industrial processes and waste, such as IPPU, are also increasing annually, so it is important to reduce these emissions. As a result, it is essential to utilize new production methods (BPS, 2021).

One solution is the enforcement of corporate environmental responsibility policies, which can effectively reduce emissions. The government has issued a regulation that requires all companies to use their profits to pay for repairing damage to the environment. Hence, companies must include these costs in the production expenses. In communicating this information and ensuring its implementation, accountants are therefore crucial.

At present, the success of a company is not only measured by the profit it seeks to make, but also by its ability to maintain environmental and social sustainability (Lusiana et al., 2021). Customers are more likely to value and buy products from companies that prioritise sustainability. Furthermore, stakeholders expect companies to prioritise environmental and social obligations alongside financial performance (Abdalla et al., 2014). This poses a challenge for companies, as managers need to meet performance targets to earn profits and bonuses, while also considering social and societal obligations. The aim of the company is not just to maximise profits, but also to benefit the owner and progress the wider community. In terms of its impact on the long-term sustainability of the company, the manager may view it as a hindrance that could potentially reduce profits and consequently undermine incentives. This creates a conflict of interest between agent and principal, requiring an intermediary to ensure that all interests are met.

In the past, auditors have focused solely on providing information about revenue and financial activities. However, with the demand for companies to consider their social and environmental responsibilities, financial reports need to include these costs. As companies are increasingly required to take account of their social and environmental responsibility, the field of environmental accounting has emerged as an interesting and emerging topic worldwide (Pramanik et al., 2008). Environmental accounting is a branch of accounting that includes not only the reporting of income and expenses of a company's primary operations, but also the accounting of the environmental costs associated with its products (Lusiana et al., 2021; Singh et al., 2022). Although it is common for companies to focus on short-term returns, their long-term growth can be significantly affected by environmental factors. Research has shown that companies may be able to return capital in the short term, but still struggle to survive in the long term (Ardito & Dangelico, 2018). Therefore, the importance of environmental accounting lies in understanding a company's responsibility towards the environment, which is crucial for ensuring environmental security in the future (Riyadh et al., 2020). Therefore, the aim of this study is to investigate other factors, such as green accounting, green innovation and environmental management accounting, which are part of environmental accounting and affect firm performance.

The impact of green accounting appears as the primary factor influencing financial performance. Generally, sustainable corporate performance is determined by three pillars, namely environmental, social and economic (Ismail et al., 2018). These pillars can be achieved through the application of green accounting. As a subfield of accounting, green accounting reports the costs of environmental responsibility in financial operating reports, thereby facilitating decision making (Rounaghi, 2019). For the long-term sustainability of a company, the implementation of green accounting is essential. Moreover, the implementation of this application in firms can lead to the reduction of environmental costs through the adoption of environmentally friendly technologies (Agarwal & Kalpaja, 2018). This can be achieved by including environmental costs in operating costs, which encourages the adoption of new ideas in product design, improves environmental performance and simplifies the process of increasing profit (Tu & Huang, 2015). Therefore, it is important for accountants to understand this concept as it not only improves the performance of the company but also ensures that the company fulfils its environmental responsibilities (Archana, 2017). There is a correlation between the implementation of green accounting practices and improved firm performance, according to a study conducted by (Ulupui et al., 2020). Research by (Endiana et al., 2020) shows that manufacturing firms improved performance by implementing green accounting in production.

Green innovation is the second factor that has an impact on firm performance. Advances in science and technology are driving firms to seek a competitive advantage over others (Agustia et al., 2019; Haseeb et

al., 2019; Robinson-Zańartu et al., 2005). Furthermore, there is a responsibility to conserve the environment, making it crucial to establish an eco-friendly strategy. The implementation of green innovation is one of these strategies. The incorporation of technology is widely acknowledged for its ability to lower operational expenses and enhance both corporate output and societal welfare (Jermsittiparsert et al., 2019). The concept of green innovation refers to how companies develop novel solutions while prioritising environmental concerns, such as environmental safety in the product design process, minimising energy consumption, and significantly reducing the generation of waste and pollution (Chen, 2008a; Woo et al., 2013). An illustrative case is the use of technology to disseminate information about organizational performance. Without technological advancements, consumers face considerable challenges when trying to purchase products directly from manufacturers. The involvement of intermediaries, such as sales agents, often leads to higher prices and longer waiting times for product delivery. Additionally, there are recurring complaints about issues that indirectly cause dissatisfaction with warranty services. The adoption of technology in sales processes allows consumers to bypass intermediaries and purchase directly from producers. Advanced technological tools enable faster delivery by facilitating real-time tracking of goods. Furthermore, direct communication channels, such as email or other digital platforms, offer producers an opportunity to build stronger relationships with customers, providing a competitive advantage in the market. Integrating advanced technology into production processes also improves efficiency and cost-effectiveness. By optimizing resource use and reducing waste, companies can lower production costs while mitigating environmental impacts. This not only enhances operational sustainability but also aligns with consumer demand for more eco-friendly practices. A notable example of an industrial company implementing green innovation is PT Semen Indonesia. The company manufactures eco-friendly cement, significantly lowering its carbon footprint by reducing gas emissions. This initiative not only enhances the company's performance but also helps mitigate its environmental impact. Studies conducted by (Agustia et al., 2019; Sorescu & Spanjol, 2008) show that incorporating green innovations into the management accounting environment can improve firm performance.

Environmental management accounting (EMA), which highlights how firms position themselves by enhancing their competitiveness, is another factor influencing performance. The concept aims to integrate the environment and the economy in a synergistic way, enabling firms to improve their performance without harming the environment (Agustia et al., 2019; Singh et al., 2022). The research is intended to offer guidance for academia and industry practitioners by demonstrating that eco-friendly business practices can boost company performance. It is our aspiration that the findings of this study can be widely applied and serve as a reference for companies striving to minimise their environmental footprint whilst maximising profits.

Literature review

The Natural Resource-Based View Theory (NRBV)

The NRBV theory is one of the theories that underpins corporate efforts to reduce the impact of environmental damage that further sets company's competitive advantage among others. The purpose of this theory is to provide an overview of the influence of strategies in the form of eco-innovation on business performance. According to (Wernerfelt, 1984), a company possessing competitive advantages and resources can create a competency by focusing on its environmental impact. This includes reducing damage, managing environmentally-based production processes, and sustainable development (Hart, 1995; S.L. Hart & Dowell, 2011) have also emphasized the importance of environmental awareness for companies with competitive advantages. In order to achieve a competitive advantage, companies need to develop a strategy that creates products that are of high value, are rare and unique, and cannot be imitated by their competitors (Clemens & Bakstran, 2010; Priem & Butler, 2001). Companies need to develop an environmental strategy that is competitive with other companies in order to survive and thrive. The impact of environmental damage is a significant factor in implementing this theory's strategies for products, processes and information. In the lens of the NRBV theory, companies' efforts to embed the environmental factors into their strategy and business operations justify the utilization of resources to set out goals of companies achieving their best outcomes.

Furthermore, companies are under internal and external pressure for the development of new environmentally friendly innovations (Asadi et al., 2020; Weng et al., 2015). Finally, this perspective argues that companies need to engage in environmental innovation in the long term in order to develop the company, protect the environment by developing environmentally friendly innovation strategies, using appropriate resources and implementing efficient production processes in order to gain a competitive advantage over other companies.

Firm performance

In terms of achieving company sustainability, there is a natural-based theory put forward by Hart (1995) which explains that achieving goals and company competitiveness in generating profits can be done through the use of different resources compared to competitors. In this theory there is an emphasis on pollution restrictions, ethical management of goods and future sustainability of the company (Somjai et al., 2020). This theory explains the importance of limiting pollution in order to preserve the environment. Integrating technology in production enhances the environment and leads to more ethical products. Its use is anticipated to boost corporate sustainability and improve overall business performance.

Additionally, stakeholder theory posits that a company's corporate goals are accomplished by effectively managing its relationships with various partners (Riyadh et al., 2020). The connection with the environment is that stakeholders want the expansion of corporate planning to involve the use of the environment (Trotman & Bradley, 1981) where accounting can present environmental assessment components and report them in financial statements. The greater the influence of company activities on environmental problems, the greater the role of accountants in conveying the costs of prevention and environmental preservation through reporting environmental costs (Ningsih & Rachmawati, 2017). On the other hand, managers recognize that environmental concerns can affect their company's income. Therefore, this will allow fraud in financial reporting to occur.

The legitimacy theory emphasises the link between social responsibility and an improvement in public perception, which in turn leads to an increase in product sales. This theory suggests that companies project a positive image of their production processes, products and social responsibility in order to gain legitimacy in society and potentially reap future rewards (Riyadh et al., 2020). Legitimacy theory prioritises that a company's actions and activities influence the public's decision to purchase their products based upon factors such as pollution levels, environmental impact and their responsibility to the environment. Consequently, if a company is viewed negatively, both socially and environmentally, this will affect its bottom line, which inevitably affects its overall performance.

Business performance is a measure of a company's achievements over a specific period of time. The objective is to improve the performance every year through various means such as devising sales strategies, innovating new products, and utilising technology to enhance production processes. According to (Afshan & Sharif, 2016; Haseeb et al., 2019), incorporating technology in production and management processes can enhance company performance promptly. Therefore, developing an appropriate strategy to gain a competitive advantage over rivals will increase the likelihood of achieving optimal company performance. In addition, for stakeholders such as investors seeking dividends and creditors relying on timely debt repayment, firm performance serves as an informative indicator. Therefore, an understanding of the factors that influence a company's performance is critical to the company's future success.

Increasing this ratio means improving company performance and vice versa. Strategies for improving the performance of a company include increasing sales and carrying out promotions. Production volumes must be increased to achieve higher sales and promotion targets. However, this has environmental consequences. For example, pollution and waste affect society. Therefore, an effective strategy is needed to enable progressive production growth without significant negative environmental impacts.

The introduction of environmentally friendly products, processes and management has been the subject of several recent studies. For example, the use of green accounting, green innovation and environmental management accounting can ultimately improve the performance of companies. This study presents findings on the current adoption of green accounting, green innovation and environmental management accounting with the aim of improving business performance while protecting the environment, which has become a major concern worldwide. It is imperative to balance increased profits with minimal environmental impact.

Hypotheses Development Green Innovation

The importance of innovation in business operations can give the company a competitive edge over its rivals. The primary objective of the company is to ensure prosperity and sustainability in order to generate substantial profits. The primary objective of the company is to ensure prosperity and sustainability in order to generate substantial profits. In addition, as countries around the world grapple with a global crisis, companies must adapt and evolve in order to sustain themselves and compete globally. The implementation of green innovation can be a viable option for companies to do this. This approach can bring significant benefits to companies as it improves their performance and enables them to compete with competitors, leading to an increase in the value of the company (Agustia et al., 2019).

Green innovation includes using energy more efficiently, reducing pollution, and designing environmen-

tally friendly products. Green innovation also includes appropriate waste management and managing the ecological effects of businesses (J.Y.-C. Chen, 1991). In addition, according to (Li et al., 2018), the goal of green innovation is to achieve environmental sustainability through the use of new technologies to create products and production processes that promote environmental preservation. Green innovation refers to the formulation and development of operations, including products, services and processes, that result in less environmental damage, according to (Rennings, 2011; Zeng et al., 2017). Product and process innovation are means to achieve green innovation, as argued by (Chang, 2011; Y.S. Chen, 2008b; Dangelico & Pujari, 2010; Woo et al., 2013). Green innovation is an incentive for firms to develop novel strategies that can create competitive advantages over their rivals. Moreover, the presence of this competitive advantage enables the company to optimize resource utilization, develop new market segments, and reduce capital expenses (Ar, 2011; Baah & Jin, 2019; Jin et al., 2017), resulting in enhanced corporate revenue. This advantage has a significant impact on company performance. Research conducted (Novitasari & Agustia, 2021; Siagian et al., 2021; Somjai et al., 2020) indicates that a company's academic performance is affected by the implementation of green innovation and a dedication to environmental conservation. This is consistent with previous research (Jermsittiparsert et al., 2019) that shows that green innovation, environmental proactivity and environmental management accounting have an impact on environmental performance.

Green accounting also requires companies to communicate their commitments transparently to managers, who are responsible for presenting financial data to stakeholders through financial reports. The company has gained a competitive edge over its rivals from the outset through its commitment to creating green innovations. This innovation is very useful in terms of more efficient use of resources, reducing operational costs and reducing negative impacts on the environment. In implementing this strategy, large capital is required, so it is necessary to submit it in the financial report in the form of reporting rules. It is hoped that green innovation will encourage companies to disclose information regarding their operations to the public demonstrating their care for the environment and efforts to prevent damage. By doing so, companies may eventually adopt green accounting in their financial reporting.

However, creating green innovation is a challenging task that requires a carefully devised strategy and significant investment of capital (Cahyandito, 2006). In conventional accounting systems, companies that adopt environmental costs do not convey in detail the amount of environmental management costs, making it difficult to convey accurate information. One approach is to utilise environmental management accounting, in which the company shifts its viewpoint to acknowledge the handling of ecological expenses, ensuring precision in communicating and recognising such costs that can affect decisions taken by management or stakeholders in financing and enhancing company performance. From the aforementioned description, H1 can be inferred: eco-friendly innovation affects company. Based on the description above, the following hypothesis can be drawn:

H1: green innovation influences firm performance

H2: green innovation influences green accounting

H3: green innovation influences the implementation of environmental management accounting

H4: environmental as a mediator in the relationship between green innovation and firm performance.

Green Accounting

Nowadays, the world is facing significant environmental problems, particularly due to increased commercial activities aimed at increasing production and sales. These activities result in pollution and waste that have a negative impact on the environment through the depletion of natural resources (Endiana et al., 2020). On the other hand, companies need to enhance their performance, specifically in sales, to benefit owners and contribute to a country's economic growth. From this perspective, the introduction of green accounting can help to address these issues. Green accounting is an approach that can restore damaged ecological systems, as highlighted by (de Beer & Friend, 2006). This activity assists companies in effectively and efficiently utilising resources in a sustainable manner, with consideration for preserving the environment and benefiting the surrounding community (Ulupui et al., 2020). As manufacturing companies extract raw materials from the environment, they have a higher potential to contribute to environmental degradation. Society views products that result from environmental degradation as having a negative value that could ultimately affect the company's revenues and profits (Hendratno, 2016; Marota, 2017; Schaltegger et al., 2016). Therefore, the concept of green accounting, a developing idea (Dutta et al., 2020), may alter public opinion of environmentally harmful firms, by preserving the surroundings, enabling consumers to opt for products yielding high value benefits (Hasyim & Jabid, 2019).

The development of green accounting is still in its infancy (Iskandar et al., 2021) and is of great importance for the environment (Gallhofer & Haslam, 1997; Greenham, 2010; Thornton, 2013). The operationalization of

this concept involves the integration of environmental costs into production costs, rather than their separation from the rest of costs, with the expectation that products become more expensive to reflect the cost of environmental damage caused by the production process and the funds available for product innovation (Tu & Huang, 2015). Studies conducted by various researchers indicate that the practice of green accounting affects firm performance (Astawa et al., 2018; Chu et al., 2019; Gonzalez & Mendoza, 2020; Lusiana et al., 2021; Ulupui et al., 2020). Moreover, traditional accounting methods have failed to adequately support the disclosure of environmental cost management. Thus, accountants must develop suitable strategies to assign these costs. Through the implementation of environmental management accounting, it is expected that it will enhance the environmental accounting of companies and consequently improve their performance. From the aforementioned clarification, it is therefore hypothesised that:

H5: The implementation of Green Accounting affects firm performance

H6: Green Accounting has an impact on Environmental Management Accounting.

H7: Environmental Management Accounting acts as a mediator between Green Accounting and firm performance.

Environmental Management Accounting (EMA)

The environmental performance of a company is crucial to its success, as the growth of a company is directly linked to the level of pollution and damage to the environment. In order to address this issue, environmental management accounting is essential. This type of accounting focuses on environmental impact and is of great interest to stakeholders who prioritise both profitability and sustainability (Christoffersen et al., 2013). Environmental management accounting is a strategy that is used by companies for the enhancement of their competitiveness (Agustia et al., 2019). The aim of this strategy is to minimise the costs incurred due to environmental damage through the allocation of environmental costs to each product, thus improving the performance of the company. In order to achieve significant profits while maintaining the environment, this application aims to bridge the interests of stakeholders. In addition, the application of environmental management accounting can lead to the production of environmentally friendly products that are in high demand, resulting in increased sales and company profits without incurring significant environmental costs. Based on the explanation above, the following hypothesis can be drawn:

H8: Environmental management accounting influences firm performance.

Materials & Methods

The research was carried out in a manufacturing company that is listed on the Indonesian Stock Exchange. The results of this study are informative in terms of the factors that have an impact on the performance of companies in terms of environmental protection. The population of this study consists of manufacturing companies listed on the Indonesia Stock Exchange during the period 2017-2021.

1. Green accounting is corporate reporting about the creation and preservation of the environment through responsible financial reporting. Green Accounting refers to corporate reporting that focuses on promoting and conserving the environment through responsible financial reporting. We refer to the Public Disclosure Program for Environmental Compliance, established by the Ministry of Environment of the Republic of Indonesia (KLHK, n.d.), known as PROPER. This tool evaluates the implementation of Green Accounting practices among selected samples. PROPER performance involves rating a company on a five-point scale, with 5 being red and 1 being black (Endiana et al., 2020).
2. Green innovation involves changes to business processes and products with the aim of avoiding negative environmental impacts, and is essential for companies to operate sustainably and with consideration for the planet. In this study, green innovation is measured using three indicators: production processes that use new technologies to reduce energy consumption, production processes that reduce water consumption, and production processes that aim to reduce waste output (Vera & Khusnah, 2022). Companies disclosing the indicators are scored 1, otherwise 0.
3. Environmental management accounting involves the identification, measurement and analysis of environmental indicators across all company activities and has two components: monetary environmental management accounting (MEMA) and physical environmental management accounting (PEMA) (Burritt et al., 2002).
4. Firm performance, which is the achievement of the results of the production process up to the sale and profitability. Return on assets and return on equity are used to measure performance (Carandang & Ferrer, 2020; Endiana et al., 2020).

This research uses secondary data drawn from financial and annual reports of manufacturing companies listed on Indonesia's bourse between 2019 and 2022. The Structural Equation Model (SEM) is used to interpret and analyse the data. Its purpose is to discover the relationship between exogenous and endogenous variables and to assess their impact based on the preliminary theory. It also facilitates the simultaneous assessment of variables (including latent ones) and provides statistics to test the validity of the model. To maximise comprehension, technical terms are explained the first time they are used. Prior to testing the hypothesis, a conventional assumption test is conducted in the form of a normality test and a multicollinearity test.

Results

The purpose of this research is to investigate the impact of the variables of green innovation, green accounting, and environmental management accounting on firm performance, as measured by return on assets and return on equity. The sample for this research consisted of 760 observations, which consisted of manufacturing firms that were listed on the Indonesia Stock Exchange during the period 2017 to 2021. Before conducting hypothesis testing, tests for normality and multicollinearity were performed to ensure the data's suitability for hypothesis evaluation. The findings of the normality test are outlined below (Table 1).

Table 1
Normality Test

		Unstandardized Residual
N		760
Normal Parameters[a,b]	Mean	0.0000000
	Std. Deviation	0.21344110
Most Extreme Differences	Absolute	0.056
	Positive	0.056
	Negative	–0.037
Test Statistic		0.056

The data set above indicates that the level of significance is greater than 5%, specifically 20%. In order for the data to be considered reliable, the level of significance must be greater than 5% (Ghozali, 2018). Therefore, it can be concluded that the data is normally distributed. The subsequent test to evaluate is the multicollinearity test, which aims to verify that the independent variables in this study are not interrelated (Ghozali, 2018). For this test to be satisfied, two criteria must be fulfilled: first, the tolerance value should be ≥ 0.10; second, the VIF value should be ≤ 10. If these conditions are met, it indicates that the data is free from multicollinearity. The results of the test are presented below.

As shown in Table 2, the tolerance values exceed 0.1, and the VIF values are below 10. Therefore, it can be concluded that the data successfully passed the multicollinearity test. The test of the hypotheses was through the use of path analysis. In this section we present our findings.

Table 2
Multicollinearity Test

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	GA	0.894	1.119
	GI	0.766	1.305
	EMA	0.825	1.212

Source: data processed in 2023

The study aimed to test the direct impact of green innovation, green accounting and environmental management accounting on firm performance based on the Table 3. Model (Fig. 1) was implemented for the examination of the effect of green innovation on green accounting. The results indicate that green innovation has a positive and statistically significant effect on green accounting at the 0.000 level of significance. The direct effect of green innovation on environmental management accounting and firm performance was examined in the second and third models. The results indicate a significant value of 0.000 and 0.004 respectively. However, the independent variable of green accounting on environmental management accounting as the dependent variable does not show a significant effect with a significant level of 0.154. Similarly, the influence of green accounting and environmental management accounting on firm performance shows a significant level of 0.927 and 0.178 respectively, hence the hypothesis is rejected. The results of testing the hypothesis to assess the direct effect on firm performance are presented in Table 4.

According to the table presented, none of the hypotheses tested were accepted. Therefore, it can be concluded that green innovation has no impact on firm performance, regardless of its implementation through green accounting or environmental management accounting, as the significant level is above 5%. In addition, the influence of green accounting through environmental management accounting shows no significant effect on firm performance, with a significant level of 0.369.

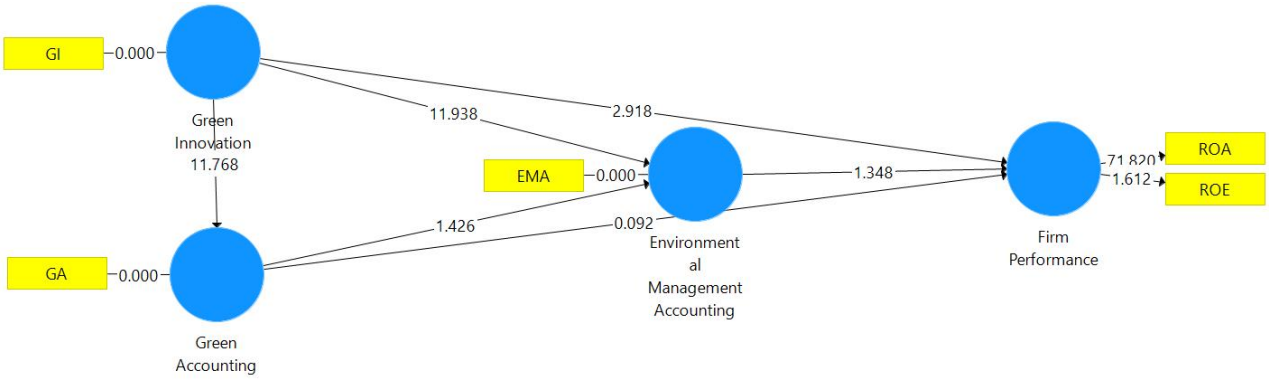

Fig. 1. Path Analysis, Source: data processed in 2023

Table 3
Hypothesis Testing

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Environmental Management Accounting → Firm Performance	0.057	1.348	0.178
Green Accounting → Environmental Management Accounting	0.055	1.426	0.154
Green Accounting → Firm Performance	0.003	0.092	0.927
Green Innovation → Environmental Management Accounting	0.424	11.938	0.000
Green Innovation → Firm Performance	0.133	2.918	0.004
Green Innovation → Green Accounting	0.373	11.768	0.000

Table 4
Indirect Effect

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Green Innovation → Green Accounting → Environmental Management Accounting	0.020	1.412	0.159
Green Accounting → Environmental Management Accounting → Firm Performance	0.003	0.881	0.379
Green Innovation → Green Accounting → Environmental Management Accounting → Firm Performance	0.001	0.872	0.384
Green Innovation → Environmental Management Accounting → Firm Performance	0.024	1.344	0.179
Green Innovation → Green Accounting → Firm Performance	0.001	0.092	0.927

Discussion

Based on the results of hypothesis testing using path analysis, it was found that green innovation had a significant impact on the improvement of environmental management accounting, which contributes to the adoption of green accounting, which ultimately improves firm performance. Enterprises are adopting innovative practices at three key levels, namely the

process, product and organisational levels. Based on the results of this study, it is shown that the adoption of green innovations by firms has a positive impact on the adoption of green accounting. Green accounting is a decision-making tool that enables managers to effectively manage environmental costs while adopting environmentally friendly technologies (Agarwal & Kalpaja, 2018). Through the adoption of green innovation, companies aim to support the creation of goods that are environmentally friendly in order to promote sustainable growth (Xie et al., 2019). By implementing green innovation, companies can develop strategies that are superior to those of their competitors in the use of natural resources in the production of goods and services, ultimately resulting in a competitive advantage. Objective evaluation is a priority to avoid biased statements and to ensure a clear and concise flow of information.

In the context of environmental management accounting, the results indicate that the application of green accounting can improve the quality of accounting information used by managers in making environmental financing decisions. This effect is due to the increased accountability of managers in providing information related to the use of natural resources. The direct impact of green innovations on the environment and consumers makes managers more careful in providing such information. As with the production of goods from natural resources, the use of natural resources needs to be regulated to prevent damage to the environment. The resulting process must not have a negative impact. Finally, companies need to be more diligent in disclosing information about the use of natural resources and their impacts.

The implementation of environmentally sustainable innovations is expected to enhance business performance (Y.S. Chen et al., 2006; Ebrahimi & Mirbargkar, 2017). Companies that embrace this ethos will gain a competitive edge over their counterparts. Responding to pressing environmental issues is a good strategy for companies to produce environmentally friendly products. Consumers prefer environmentally friendly products, so exploiting this concept can be a viable marketing strategy to boost company sales. Eventually, it is expected that the performance of the company will increase, leading to a rise in the value of the company.

Environmental accounting refers to the incorporation of environmental costs into financial reports with the aim of achieving sustainable development while demonstrating a commitment to social and environmental responsibility (Lusiana et al., 2021). Moreover, green accounting converts environmental costs into operational costs, which requires the adoption of new ideas to improve product design, increase profits, improve environmental performance and comply with the rules of green accounting (Tu & Huang, 2015). Thus, green accounting aims to serve as a decision-making tool for the reduction of environmental costs that have traditionally been perceived as burdensome for firms and for the adoption of more eco-friendly technologies (Agarwal & Kalpaja, 2018). However, the results of the hypothesis testing revealed that green accounting does not have a significant impact on the adoption of environmental management accounting, which ultimately has an impact on the firm's performance. This is because the firm sees green accounting as a regulatory burden regarding the disclosure of information on the use of natural resources. In addition, it has no impact on the performance or the value of the company. These results are inconsistent with the studies conducted by (Abbas & Sağsan, 2019; Ulupui et al., 2020), who found that green accounting had a positive impact on the implementation of environmental management accounting and the improvement of firm performance.

Furthermore, environmental management accounting is a process by which organisations, particularly management, provide information about their environmental activities and impacts. This concept enables management accounting to provide information about resource use and processes to support decision making. Therefore, the results of the study suggest that the role of management accounting in preventing environmental damage does not have a significant impact on improving business performance. These findings are in contrast to the findings of a previous study by (Somjai et al., 2020).

This study's findings add to the existing body of knowledge in several ways. In general, we incorporate the NRBV as an underlying model providing key insights into the boundary among green innovation, green accounting, environmental management accounting performance and, firm performance Although the test results of several hypotheses of this study are not supported, it does not necessarily obscure the fact that the interrelationship between green innovation, green accounting, environmental management accounting, and firm performance based on the perspective of NRBV theory is denied. The results of this study open new perspectives for future research to adjust the research setting that is relatively applicable in the context of developed Western countries to the conditions of Asian countries, especially those that are developing or towards developing ones. As a result, future studies can broadens and include social and political related factors to overcome issues in the distinct scarcity of data on environmental concerns' status and trends in Indonesia or other region nearby.

Conclusions

Based on the findings of the research:

1. Green innovation significantly affects the practice of accounting for environmental responsibility. This finding is consistent with the research conducted by (Abu Seman et al., 2019), where environmental responsibility is increased through the application of green innovation and companies are accountable for production costs.
2. Green innovation has a significant impact on the accounting of the environmental management system. These results contradict research conducted (Abbas & Sağsan, 2019; Ulupui et al., 2020). Ecologically focused innovation enables companies to provide process-based information that adds value to decisions.
3. Green innovation leads to significant improvements in firm performance. The findings of this research are consistent with research by (Agustia et al., 2019; Y.S. Chen et al., 2006; Ebrahimi & Mirbargkar, 2017; Somjai et al., 2020), suggesting that adopting green innovation could provide a competitive advantage over other firms, ultimately improving firm performance and value.
4. Green accounting does not have a significant impact on environmental management accounting or the performance of the firm. These findings contradict previous studies by (Abbas & Sağsan, 2019; Ulupui et al., 2020), which found that incorporating environmental costs into the production process and financial reporting did not significantly affect firm sales or help firms develop effective strategies to improve performance.
5. Environmental management accounting has not demonstrated a significant impact on firm performance. These findings contradict the study conducted (Somjai et al., 2020), which found that accounting manager's information on firm activities, despite its relevance to firm performance, did not affect profit growth.

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