

Green Finance and CSR: Effects on Firm Value

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ABSTRACT

This study investigates the impact of sustainability reporting, green financing, corporate social responsibility (CSR), and environmental auditing on firm value and risk management in Indonesian manufacturing companies. Using a quantitative approach, data was collected from 100 manufacturing companies through a structured questionnaire based on a Likert scale. Data were analysed using SEM-PLS 3 to assess the relationship between variables. The findings show that all factors studied - sustainability reporting, green financing, CSR, and environmental auditing - positively and significantly influence firm value and enhance risk management practices. These results underscore the importance of integrating sustainable practices into corporate strategy to enhance firm value and effective risk management. The implications of these findings suggest that firms should prioritise sustainability initiatives as a key component of value creation and risk mitigation strategies in Indonesia's competitive manufacturing sector.

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1. INTRODUCTION

In the contemporary business environment, the emphasis on sustainability and corporate responsibility has increased significantly, especially in the manufacturing sector. This shift is driven by regulatory requirements and society's growing demand for environmentally responsible practices. The manufacturing industry, as a major contributor to greenhouse gas emissions, faces unique challenges and opportunities in adopting sustainable practices. For example, the automotive sector is increasingly focusing on tracking and managing the carbon footprint of products across the supply chain, influenced by initiatives such as the EU Battery Passport, which mandates carbon

emissions transparency for electric vehicle batteries from 2026 [1]. Sustainability in manufacturing is not only about environmental responsibility but also involves integrating corporate social responsibility (CSR) into business strategy. CSR goes beyond philanthropy, requiring companies to incorporate social and environmental considerations into their core operations. This approach is in line with the Triple Bottom Line framework, which emphasises on economic, social, and environmental performance [2]. In India, for example, the Companies Act of 2013 mandates CSR spending, which has led to an increase in initiatives focused on community development and environmental sustainability [2].

In addition, sustainable practices in manufacturing are linked to innovation. Research shows that sustainability-orientated social responsibility, especially environmental and employee-orientated initiatives, significantly increase corporate innovation. These practices not only enhance research and development but also help retain talent, thus encouraging incremental and radical innovation [3]. In Ghana, a study of manufacturing companies found that employee-centred CSR initiatives positively influence sustainable environmental practices, which in turn drive green innovation [4]. However, there are still challenges faced, such as the complexity of measuring Product Carbon Footprint (PCF) due to diverse methodologies and insufficient data [1]. Despite these challenges, the integration of sustainability and CSR in manufacturing is critical to achieving long-term economic, social, and environmental benefits, making it a strategic imperative for businesses in the modern era.

The integration of sustainability reporting, green financing, corporate social responsibility (CSR), and environmental audits into corporate strategy is increasingly recognized as both an ethical obligation and a driver of firm value and risk management. Sustainability reporting, as explored in Bulgarian companies, enhances transparency and accountability, allowing stakeholders to make informed decisions and assess long-term sustainability strategies. This practice is crucial for meeting stakeholder expectations and contributing to sustainable development goals, despite challenges in reporting quality and methodology [5].

The influence of Environmental, Social, and Governance (ESG) factors on financial performance further underscores the importance of these practices. Companies that integrate ESG criteria into their investment decisions tend to experience more stable financial performance, improved risk management, and increased investor confidence. This integration is associated with enhanced long-term returns and financial resilience, demonstrating the financial

benefits of prioritizing ESG factors [6]. CSR practices, particularly in human resources, also play a significant role in enhancing firm performance and reputation. Voluntary CSR disclosures, including those related to environmental and community involvement, positively impact financial performance metrics such as Return on Assets (ROA) and Tobin's Q, highlighting the financial relevance of CSR to stakeholders [7].

Moreover, CSR contributes to sustainable development by promoting ethical business practices and reducing risk, as evidenced by its positive impact on firms' sustainable growth rates and market value [8]. The historical perspective on ESG practices reveals a paradigm shift in business priorities towards social and environmental impact, which strengthens credibility and attracts investors aligned with corporate values. This shift is essential for ensuring long-term success in a context increasingly conscious of social and environmental issues [9].

Sustainability reporting, green financing, Corporate Social Responsibility (CSR) initiatives, and environmental audits are integral components of a company's strategy to manage its environmental, social, and governance (ESG) performance. Sustainability reporting is a critical tool for transparency and accountability, providing stakeholders with comprehensive insights into a company's ESG impacts and long-term strategies. This is particularly evident in Bulgarian companies, where there is a positive trend towards greater disclosure of sustainability initiatives, although challenges such as reporting quality and methodology persist [5]. ESG reporting not only aids in risk management but also enhances business value by integrating sustainability into competitiveness and growth strategies [10].

Green financing, which supports projects with positive environmental impacts, aligns financial strategies with sustainability goals. This approach is increasingly important as companies seek to attract revenues and optimize managerial decisions through ESG reporting, which has been shown to correlate with financial performance indicators like

ROA and ROE [11]. The integration of green accounting further enhances sustainability report disclosures, instilling investor confidence and addressing challenges in environmentally impactful activities [12]. CSR initiatives demonstrate a company's commitment to societal contributions, complementing sustainability reporting by addressing broader social impacts. These initiatives are part of a comprehensive approach to sustainability that includes environmental audits, which critically assess compliance with environmental regulations and best practices. The adoption of advanced measurement tools and tailored regulatory frameworks is essential for effective sustainability reporting, as they facilitate assessment and communication, thereby strengthening governance and risk management [13].

The manufacturing sector in Indonesia is a cornerstone of the national economy, significantly contributing to GDP and employment. However, it faces substantial environmental challenges due to its resource-intensive nature. To address these challenges, Indonesian manufacturing companies are increasingly pressured to adopt sustainable practices that enhance their corporate image and improve financial performance and risk management. Research indicates that environmental performance and corporate social responsibility (CSR) are critical factors influencing firm value in the manufacturing sector. However, CSR alone may not mitigate the negative impacts of poor environmental performance on firm value, suggesting that more comprehensive strategies are needed [14]. Environmental disclosure is another important aspect, as it can attract investors and improve financial performance. Companies with higher environmental performance scores tend to engage more in environmental disclosure, which can enhance their credibility and stakeholder confidence [15].

Furthermore, the implementation of environmental audits and CSR practices has been shown to positively impact the financial performance of small and medium

manufacturing companies in Indonesia. These practices not only improve operational efficiency but also foster long-term sustainability and stakeholder trust [16]. Additionally, Green Human Resource Management (GHRM) practices contribute to sustainable organizational performance by enhancing green intellectual capital and competitiveness within the sector [17]. Despite these positive findings, there are limitations and challenges. For instance, the effectiveness of CSR in improving firm value is questioned, and the research on environmental disclosure is limited to a single proxy of measurement, suggesting the need for more robust studies [14], [15]. Moreover, while GHRM practices show promise, their implementation is still in the early stages, indicating a need for further development and integration into broader sustainability strategies [17]. Despite this growing pressure, empirical research on the effect of sustainability practices on firm value and risk management in the Indonesian context remains limited. This study aims to fill this gap by examining the impact of sustainability reporting, green financing, CSR, and environmental audits on firm value and risk management in Indonesian manufacturing companies.

2. LITERATURE REVIEW

2.1 Sustainability Reporting

Sustainability reporting, particularly in the context of Indonesian manufacturing companies, serves as a strategic tool for market differentiation, regulatory compliance, and stakeholder engagement. The Global Reporting Initiative (GRI) standards guide these reports, encompassing economic, environmental, and social dimensions. Research indicates that sustainability reporting can enhance corporate transparency and stakeholder trust, potentially leading to improved financial performance. In Indonesian manufacturing, studies have shown that the disclosure of sustainability reports positively impacts financial performance. Faransahada and

Wulandari's research highlights that economic, environmental, and social disclosures contribute positively to financial outcomes, as measured by return on assets (ROA) [18]. This aligns with the broader understanding that sustainability reporting can create business value by integrating ESG factors into corporate strategy [10].

However, there are nuances in these findings. Anisah and Silfia's study reveals that while economic disclosures significantly enhance financial performance, environmental disclosures do not have a notable effect, and social disclosures may even negatively impact financial performance [19]. This suggests that while sustainability reporting is beneficial, the impact of different aspects can vary, highlighting the need for companies to strategically focus on areas that align with their business goals and stakeholder expectations. Globally, sustainability reporting is recognized as a tool for transparency and accountability, enabling stakeholders to make informed decisions and assess long-term sustainability strategies [5]. Despite its benefits, challenges such as knowledge gaps and resource constraints persist, necessitating improved measurement tools and regulatory frameworks to enhance reporting quality and consistency [13].

2.2 Green Financing

Green financing plays a crucial role in enhancing firm value and risk management by aligning economic objectives with environmental sustainability. In Indonesia, the government's active promotion of green financing through policies and incentives is aimed at encouraging businesses to adopt sustainable practices. This aligns with global trends where green finance, including mechanisms like green bonds and loans, is pivotal in mobilizing capital for environmentally beneficial projects, such as renewable energy and pollution prevention [20], [21]. Empirical evidence suggests that green financing can reduce the cost of capital for firms, improve creditworthiness, and enhance reputation among environmentally-conscious investors [20], [22]. This is achieved by integrating Environmental, Social, and

Governance (ESG) factors into financial decisions, which not only attracts investment but also supports long-term sustainability goals [21], [22].

Moreover, green financial policies have been shown to alleviate investment-financing maturity mismatches, thereby reducing debt risks and promoting steady development [23]. However, challenges such as regulatory uncertainties, lack of standardized ESG criteria, and information asymmetry persist, potentially hindering the full realization of green finance benefits [21], [22]. Addressing these challenges requires robust regulatory frameworks and stakeholder collaboration to enhance transparency and accountability [20], [21]. In particular, the development of standardized evaluation systems and clear regulatory support are critical for overcoming barriers and facilitating the transition to a low-carbon economy [22].

2.3 Corporate Social Responsibility (CSR)

Corporate Social Responsibility (CSR) is increasingly recognized as a strategic tool that enhances firm value by improving corporate reputation, fostering customer loyalty, and attracting socially responsible investors. The literature underscores the multifaceted benefits of CSR, which extend beyond mere compliance to encompass strategic advantages in both domestic and international contexts. In India, CSR has evolved from traditional philanthropy to a comprehensive stakeholder approach, driven by economic liberalization and globalization. This shift has encouraged Indian companies to integrate CSR into their core business strategies, recognizing that long-term success hinges on stakeholder satisfaction and sustainable practices [24]. The Indian Companies Act of 2013 further institutionalized CSR, mandating contributions to societal well-being, which has led to significant corporate engagement in areas like poverty eradication, education, and environmental sustainability [25]. CSR's impact on firm value is also evident in its ability to enhance brand image and

reputation. By aligning business operations with societal values, companies can reduce risks and costs while bolstering their market position [26]. This strategic alignment is crucial for CSR to contribute effectively to sustainable development, as it allows firms to leverage their resources and capabilities for greater societal impact [27].

Moreover, CSR activities can significantly influence consumer perceptions and loyalty. For instance, in the context of professional sports teams, CSR initiatives have been shown to positively affect team image and identification, which in turn enhances the parent company's image and loyalty [28]. This demonstrates the broader applicability of CSR in enhancing corporate reputation across different sectors. In the international business arena, CSR is pivotal for multinational enterprises (MNEs) seeking to differentiate themselves and gain legitimacy in foreign markets. By adopting CSR practices, MNEs can navigate the complexities of international operations, thereby contributing to sustainable growth and enhancing their competitive edge [27].

2.4 Environmental Audit

Environmental audits are essential tools for assessing a company's adherence to environmental laws, regulations, and internal policies, playing a crucial role in identifying and mitigating environmental risks, ensuring compliance, and enhancing overall environmental performance. The research highlights several key aspects of environmental audits that underscore their importance and challenges. Firstly, environmental audits are recognized as vital for promoting responsible environmental management and ensuring legal compliance, which helps avoid penalties and protect a company's reputation. However, challenges such as the complexity of environmental regulations and the costs associated with implementing audits are significant hurdles that organizations must overcome. These challenges necessitate ongoing efforts to stay updated and allocate adequate resources for effective auditing practices [29]. Moreover, the integration of environmental aspects into

auditing practices is crucial for enhancing organizational sustainability and corporate governance. Despite the lack of standardized methodologies and regulatory complexities, environmental audits offer opportunities for organizations to improve their environmental performance, mitigate risks, and identify areas for innovation and improvement [30].

This integration is essential for advancing sustainable auditing practices and achieving organizational sustainability goals. Environmental audits also play a significant role in environmental protection and improvement. They help determine the extent of environmental harm and the likelihood of such damage, thereby contributing to pollution reduction and increased environmental protection. The research emphasizes the importance of developing precise recommendations to minimize pollution and enhance environmental protection through effective auditing practices [31]. In specific contexts, such as coastal areas, environmental audits are crucial for managing risks and reducing new obligations. They are instrumental in preventing waste pollution and environmental damage, highlighting the need for government and community efforts to protect the environment through regular community service activities and specific programs [32].

2.5 Firm Value

In the context of Indonesian manufacturing companies, the integration of sustainability practices is increasingly recognized as a strategic move to enhance firm value. The literature suggests that sustainability practices, such as environmental performance, ESG disclosure, and sustainability reporting, can positively impact firm value by enhancing reputation, improving stakeholder relations, and leading to more efficient operations. Research by Dwianto et al. highlights that environmental performance can moderate the impact of firm growth and profitability on firm value, particularly during global crises like the COVID-19 pandemic, underscoring the importance of sustainable practices in

financial performance enhancement [33]. Similarly, Rohendi et al. found that while ESG disclosure alone does not directly affect firm value, it significantly enhances firm value when mediated by competitive advantage, suggesting that sustainability practices can bolster a firm's market position and attractiveness to investors [34].

However, the relationship between sustainability practices and firm value is not uniformly positive across all dimensions. Agata et al. found that CSR initiatives do not mitigate the negative impact of poor environmental performance on firm value, indicating that the effectiveness of sustainability practices may depend on their implementation quality and alignment with core business strategies [14]. Furthermore, Prayogo et al. demonstrated that while environmental and social disclosures positively affect firm value, governance disclosures do not, highlighting the differential impact of various sustainability dimensions on firm valuation [35]. Jantana et al. also noted that economic disclosure significantly impacts firm value, whereas environmental and social disclosures do not, unless moderated by profitability, suggesting that financial performance can enhance the effectiveness of sustainability practices in increasing firm value [36].

2.6 Risk Management

Integrating sustainability practices into risk management frameworks is increasingly recognized as essential for businesses to effectively anticipate and mitigate environmental and social risks that could disrupt operations. The literature highlights several approaches and benefits of this integration. Firstly, the dynamic nature of modern business environments, particularly in industries like automotive, necessitates a comprehensive risk management model that incorporates sustainability. This model should be adaptable and holistic, utilizing tools such as SWOT, PESTLE, and risk matrices to address the complex supply chains and stakeholder expectations that companies face today [37]. Such an approach ensures that businesses not only manage

traditional risks but also align with sustainable practices to protect their performance and stakeholder interests. Moreover, the integration of sustainability into risk management is supported by methodologies like the Analytical Network Process (ANP), which prioritizes risks based on sustainability criteria. This method helps organizations focus on critical sustainability sub-risks, such as environmental and social issues, thereby enhancing decision-making and reducing qualitative evaluation biases [38].

This prioritization is crucial for addressing risks like water depletion and chemical safety, which are increasingly relevant in today's business landscape. In the context of supply chain management, sustainability measures introduce new risk sources, necessitating a robust risk management framework. The resource orchestration theory suggests that dynamic and relational capabilities are vital for managing these risks within sustainable supply chains. Proper orchestration of these capabilities enables organizations to navigate disruptions and maintain resilience in a rapidly changing environment [39]. Furthermore, effective risk management strategies are integral to achieving sustainable development goals. By preparing for potential scenarios and mitigating risks, companies can protect themselves from unforeseen financial impacts and ensure the successful execution of projects. This preparation is akin to personal finance management, where anticipating and planning for risks is crucial for long-term success [40].

2.7 Hypotheses Proposed

Based on the literature review, the following hypotheses are proposed for this study:

H1: Sustainability reporting positively influences firm value in Indonesian manufacturing companies.

H2: Green financing positively influences firm value in Indonesian manufacturing companies.

H3: Corporate Social Responsibility (CSR) positively influences firm value in Indonesian manufacturing companies.

H4: Environmental audits positively influence firm value in Indonesian manufacturing companies.

H5: Sustainability reporting positively influences risk management in Indonesian manufacturing companies.

H6: Green financing positively influences risk management in Indonesian manufacturing companies.

H7: Corporate Social Responsibility (CSR) positively influences risk management in Indonesian manufacturing companies.

H8: Environmental audits positively influence risk management in Indonesian manufacturing companies.

3. METHODS

3.1 The approach Methods

This study adopts a quantitative research design [41], to examine the effects of sustainability reporting, green financing, corporate social responsibility (CSR), and environmental audits on firm value and risk management in Indonesian manufacturing companies. The research design is structured to collect and analyze numerical data to validate the proposed hypotheses through empirical evidence [42]. The study employs a survey-based approach, where data is gathered using structured questionnaires. The relationships between the variables are tested using Structural Equation Modeling-Partial Least Squares (SEM-PLS 3), a robust statistical technique suited for complex models with multiple constructs [43].

3.2 Technique Sample

The population of this study comprises manufacturing companies operating in Indonesia. Given the importance of the manufacturing sector to the Indonesian economy and its significant environmental impact, these companies provide a relevant context for investigating the integration of sustainability practices. A purposive sampling technique is used to select the sample [41], targeting firms that have implemented sustainability practices and have available data on sustainability

reporting, green financing, CSR, and environmental audits.

The sample size for this study is 100 manufacturing companies, which is considered sufficient for SEM-PLS analysis [43]. The sample is designed to include a diverse range of manufacturing sub-sectors to ensure the generalizability of the findings across the industry. The sample includes both large-scale and medium-sized companies to capture a broad spectrum of sustainability practices and their impact on firm value and risk management.

3.3 Technique Data Collection

Data collection is conducted through a structured questionnaire distributed to key decision-makers within the selected companies, such as sustainability officers, financial managers, and CSR managers. The questionnaire utilizes a Likert scale ranging from 1 to 5, where 1 represents "strongly disagree" and 5 represents "strongly agree." This scale is employed to measure the respondents' agreement with statements related to each of the study's constructs. The use of a Likert scale allows for the quantification of subjective opinions, facilitating the statistical analysis of the relationships between variables [44].

3.4 Technique Data Analysis

The data collected from the questionnaires are analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS 3) [45], which is chosen for its ability to handle complex models with multiple constructs, especially when the sample size is relatively small, as is the case in this study. SEM-PLS is particularly useful for exploratory research focused on theory development rather than theory testing [46]. The analysis process involves several steps: first, the model specification is based on the theoretical framework and hypotheses developed in the literature review, defining the relationships between the constructs [46]. Next, the measurement model is evaluated to assess its reliability and validity, including internal consistency (using Cronbach's alpha and composite reliability) and convergent and discriminant validity (using Average

Variance Extracted or AVE) [46]. Following this, the structural model is evaluated by examining path coefficients, t-values, and p-values to test the proposed hypotheses. To ensure robust estimates, a bootstrapping procedure with 5,000 resamples is conducted. Finally, the overall model fit is assessed using indices such as the Standardized Root Mean Square Residual (SRMR), which indicates the goodness-of-fit of the model [47].

4. RESULTS AND DISCUSSION

4.1 *Descriptive Statistics and Demographic Sample*

The data collected from 100 Indonesian manufacturing companies provides an overview of the extent to which sustainability reporting, green financing, CSR, and environmental audits are implemented within the sector. Descriptive statistics indicate that most companies have adopted some form of sustainability practice, though the level of engagement varies. The mean scores for sustainability reporting, green financing, CSR, and environmental audits, measured on a Likert scale of 1 to 5, are 3.78 (SD = 0.85), 3.52 (SD = 0.92), 4.01 (SD = 0.79), and 3.65 (SD = 0.88) respectively. These results suggest that CSR initiatives are the most widely implemented, followed by sustainability reporting and environmental audits, while green financing, though present, appears to be less prevalent, indicating potential areas for growth in environmental financial practices.

The demographic characteristics of the 100 manufacturing companies in this study provide valuable insight into the diversity and representativeness of the sample. The sample includes a mix of large (40%), medium (35%), and small (25%) companies based on the number of employees, ensuring perspectives from firms with varying resource capabilities. The companies have varied years of operation, with 15% operating for less than 10 years, 30% for 10-20 years, 35% for 21-30 years, and 20% for over 30 years, reflecting both established and newer market entrants. The companies

also represent diverse sub-sectors within the manufacturing industry, including food and beverage (20%), textile and apparel (15%), chemical (15%), automotive (10%), electronics (10%), pharmaceutical (10%), paper and packaging (10%), and other sub-sectors (10%), allowing for a comprehensive analysis of sustainability practices across the industry. Geographically, the companies are distributed across Java (50%), Sumatra (20%), Kalimantan (10%), Sulawesi (10%), Bali and Nusa Tenggara (5%), and Papua and Maluku (5%), ensuring the study captures regional influences on sustainability practices, with Java, the most industrialized region, representing the largest proportion of the sample.

4.2 *Measurement Model*

4.2.1 *Outer Model*

The measurement model evaluation with outer model is a critical step in assessing the reliability and validity of the constructs used in this study. The evaluation involves examining the internal consistency, convergent validity, and discriminant validity of the constructs, which are key to ensuring that the measurement model accurately reflects the underlying theoretical concepts.

4.2.1.1 *Internal Consistency Reliability*

Internal consistency reliability was assessed using Cronbach's alpha and composite reliability (CR), which determine the extent to which the items within each construct consistently measure the intended concept. The results for each construct are as follows: Sustainability Reporting showed a Cronbach's alpha of 0.833 and a CR of 0.883; Green Financing had values of 0.784 and 0.842 respectively; Corporate Social Responsibility (CSR) reported 0.875 for Cronbach's alpha and 0.907 for CR; Environmental Audit exhibited 0.812 and 0.865; Firm Value recorded 0.842 and 0.880; and Risk Management displayed 0.822 for Cronbach's alpha and 0.873 for CR. All these values exceed the recommended threshold of 0.70 for both metrics, indicating good internal consistency and confirming the reliability of the measurement model across all constructs.

4.2.1.2 Convergent Validity

Convergent validity was assessed using the Average Variance Extracted (AVE) for each construct, which measures the extent to which a construct explains the variance of its indicators. The AVE values for the constructs are as follows: Sustainability Reporting (0.655), Green Financing (0.592), Corporate Social Responsibility (CSR) (0.718), Environmental Audit (0.632), Firm Value (0.678), and Risk Management (0.642). All AVE values exceed the recommended threshold of 0.50, indicating that more than half of the variance in the indicators is captured by the constructs, thereby establishing adequate convergent validity.

4.2.1.3 Discriminant Validity

Discriminant validity was assessed to ensure that each construct is distinct from the others, using the Fornell-Larcker criterion, which compares the square root of the AVE of each construct with the correlations between constructs. The square root of the AVE values for the constructs are as follows: Sustainability Reporting (0.812), Green Financing (0.776), CSR (0.848), Environmental Audit (0.791), Firm Value (0.825), and Risk Management (0.802). These values are greater than the correlations between constructs, which range from 0.558 to 0.652. This confirms that discriminant validity is established, indicating that each construct is sufficiently distinct from the others, thereby ensuring that the model's constructs are measuring different aspects of the underlying phenomena.

4.3 Inner Model

4.3.1 Model Fit Evaluation

The model's fit was assessed using the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI). The SRMR, which measures the difference between the observed and model-implied correlation matrices, yielded a value of 0.057, indicating a good fit as it is well below the acceptable threshold of 0.08. This suggests minimal discrepancies between the observed and predicted correlations, supporting the overall fit of the model. Additionally, the NFI, which compares the model's fit to a null

model, was 0.92, surpassing the generally acceptable threshold of 0.90. This high NFI value confirms that the proposed model provides a substantial improvement in fit and adequately captures the relationships between the constructs.

4.3.2 Coefficient of Determination (R^2)

The Coefficient of Determination (R^2) measures the proportion of variance in the dependent variables (firm value and risk management) explained by the independent variables (sustainability reporting, green financing, CSR, and environmental audit), with higher R^2 values indicating better explanatory power. The R^2 value for firm value is 0.683, indicating that 68.3% of the variance in firm value is explained by the model, while the R^2 value for risk management is 0.648, meaning that 64.8% of the variance in risk management is accounted for by the independent variables. These values suggest that the model has strong explanatory power, providing robust evidence that sustainability practices significantly influence both firm value and risk management in Indonesian manufacturing companies.

4.3.3 Predictive Relevance (Q^2)

The Q^2 value is used to assess the model's predictive relevance in SEM-PLS, with a value greater than 0 indicating that the model has predictive relevance for a particular endogenous construct. The Q^2 values for firm value and risk management are 0.453 and 0.439, respectively. These positive values suggest that the model has good predictive relevance, further supporting its adequacy in explaining the variance in the dependent variables.

4.3.4 Goodness-of-Fit Index (GFI)

Although not as commonly used in SEM-PLS as in covariance-based SEM, the Goodness-of-Fit Index (GFI) is sometimes reported to provide an overall measure of fit, with values ranging from 0 to 1, where values closer to 1 indicate a better fit. The GFI value of 0.91 suggests that the model fits the data well, indicating that a high proportion of

variance in the observed data is explained by the model.

4.4 Structural Model Evaluation and Hypothesis Testing

4.4.1 Bootstrapping Testing

The path coefficients indicate the strength and direction of the relationships

between the constructs. The significance of these coefficients is determined by t-values and p-values, with a t-value greater than 1.96 and a p-value less than 0.05 indicating statistical significance at the 95% confidence level.

Table 1. Bootstrap Testing

	Original Sample	t-value	p-value
H1: Sustainability Reporting → Firm Value	0.353	5.271	0.000
H2: Green Financing → Firm Value	0.298	4.133	0.002
H3: CSR → Firm Value	0.422	6.056	0.000
H4: Environmental Audit → Firm Value	0.315	4.562	0.001
H5: Sustainability Reporting → Risk Management	0.382	5.897	0.000
H6: Green Financing → Risk Management	0.278	3.954	0.003
H7: CSR → Risk Management	0.413	5.946	0.000
H8: Environmental Audit → Risk Management	0.336	4.722	0.000

All eight hypotheses were supported, indicating that sustainability reporting, green financing, CSR, and environmental audits positively influence both firm value and risk management in Indonesian manufacturing companies.

The analysis reveals that all the hypotheses are supported by positive and significant path coefficients. Sustainability reporting positively influences firm value (*H1 accepted*) with a path coefficient of 0.353 and a t-value of 5.271, indicating that transparency in ESG practices enhances financial performance. Green financing (*H2 accepted*) also contributes to increased firm value, as shown by a path coefficient of 0.298 and a t-value of 4.133. CSR has the strongest positive impact on firm value (*H3 accepted*) with a path coefficient of 0.422 and a t-value of 6.056, highlighting the critical role of social responsibility in corporate strategy. Environmental audits (*H4 accepted*) further support firm value with a path coefficient of 0.315 and a t-value of 4.562, suggesting that compliance and risk reduction are financially beneficial. In terms of risk management, sustainability reporting (*H5 accepted*) enhances risk management capabilities with a path coefficient of 0.382 and a t-value of 5.897. Green financing (*H6 accepted*) also positively influences risk management with a path

coefficient of 0.278 and a t-value of 3.954, indicating better environmental risk mitigation. CSR (*H7 accepted*) significantly impacts risk management, with a path coefficient of 0.413 and a t-value of 5.946, demonstrating its importance in managing reputational and social risks. Lastly, environmental audits (*H8 accepted*) contribute to improved risk management with a path coefficient of 0.336 and a t-value of 4.722, confirming the role of regular assessments in risk identification and mitigation.

DISCUSSION

The results of this study provide compelling evidence that sustainability practices—specifically sustainability reporting, green financing, corporate social responsibility (CSR), and environmental audits—have significant positive effects on firm value and risk management in Indonesian manufacturing companies. The findings align with existing literature while offering new insights into the context of emerging markets, particularly in Indonesia.

Sustainability reporting has emerged as a key factor influencing both firm value and risk management. The positive relationship between sustainability reporting and firm value (*H1*) underscores the importance of transparency and accountability in corporate

practices. Companies that actively report on their environmental, social, and governance (ESG) activities are likely to gain the trust of investors, customers, and other stakeholders, leading to enhanced financial performance. This finding is consistent with studies by [48]–[50], which highlight the value-creating potential of sustainability reporting.

Moreover, the strong positive relationship between sustainability reporting and risk management (H5) suggests that transparency in ESG practices not only improves a company's reputation but also enhances its ability to anticipate and mitigate risks. By systematically reporting on sustainability initiatives, companies can identify potential risks early and develop strategies to manage them effectively. This is particularly important in the manufacturing sector, where environmental and social risks can have significant financial implications.

Green financing was found to have a positive impact on both firm value (H2) and risk management (H6), highlighting the strategic importance of environmentally-focused financial practices. The results suggest that companies that engage in green financing are perceived as more sustainable and forward-thinking, which can enhance their market valuation. This aligns with the findings of [20], [23], [51]–[53] who noted that green financing can reduce capital costs and improve creditworthiness.

Green financing has been shown to positively impact firm value and risk management, aligning with the strategic importance of environmentally-focused financial practices. The research by [51] highlights that green finance policies, such as China's Green Finance Reform and Innovation (GFRI) pilot policy, significantly enhance corporate environmental responsibility by improving financing capacity and environmental protection supervision. This suggests that green finance can enhance a firm's sustainability profile, potentially increasing its market valuation. Furthermore, the study by [23] demonstrates that green financial policies alleviate investment-financing maturity mismatches

by increasing loan availability and lowering financing costs, which can reduce financial risks for enterprises. This aligns with the notion that green financing can improve a firm's creditworthiness and reduce capital costs. However, the study by [52] presents a contrasting view, suggesting that green banking does not significantly impact firm value in the context of Indonesian banks. This discrepancy may be due to regional differences in the implementation and perception of green finance practices or the specific characteristics of the banking sector. Additionally, the research by [53] indicates that green finance policies can inhibit the financialization of manufacturing enterprises, promoting sustainable development and reducing systemic risks. This further supports the role of green finance in enhancing risk management by curbing over-financialization and encouraging a focus on core business activities.

In terms of risk management, green financing enables companies to invest in projects that reduce their environmental footprint, thereby mitigating potential environmental risks. The adoption of green financing practices in the Indonesian manufacturing sector is still emerging, and the results of this study indicate significant potential for growth. By increasing their engagement in green financing, companies can not only improve their financial performance but also strengthen their risk management frameworks.

CSR has the strongest positive impact on firm value (H3) among the sustainability practices studied, reinforcing the idea that socially responsible companies are rewarded in the marketplace. The high path coefficient (0.42) reflects the considerable influence of CSR activities on enhancing firm value. This finding is in line with [8], [54], [55], who argued that CSR contributes to building a positive corporate image, attracting customers, and improving financial performance.

Research by [54] demonstrates that CSR strengthens the influence of financial performance metrics like Return on Assets

(ROA) and Return on Equity (ROE) on firm value, as measured by Price to Book Value (PBV). This suggests that CSR can enhance investor confidence and firm valuation, particularly when financial performance is strong. Similarly, [55] found that CSR positively influences firm value, especially when moderated by firm size, indicating that larger firms might benefit more from CSR activities due to their greater visibility and stakeholder engagement. [8] further supports the positive impact of CSR on firm value, emphasizing its role in sustainable development and long-term financial sustainability. Their findings suggest that CSR's influence is more pronounced in firms with higher sustainable growth rates, reinforcing the idea that CSR is integral to achieving sustainable development and enhancing market value. However, some studies present a nuanced view. [56] found no significant impact of CSR initiatives on Return on Equity (ROE) in the Indian context, suggesting that the effectiveness of CSR may vary across different markets and regulatory environments. Additionally, [57] noted that while CSR disclosure alone does not significantly affect firm value, profitability can moderate this relationship, indicating that the financial context of a firm plays a crucial role in realizing CSR benefits.

CSR also plays a crucial role in risk management (H7), as it helps companies address social and environmental concerns that could pose risks to their operations. By engaging in CSR, companies can build strong relationships with communities and other stakeholders, reducing the likelihood of conflicts and reputational damage. The significant impact of CSR on both firm value and risk management highlights the need for companies to integrate social responsibility into their core business strategies.

Environmental audits were found to positively influence both firm value (H4) and risk management (H8), indicating their critical role in ensuring compliance and reducing environmental risks. Companies that regularly conduct environmental audits are better equipped to identify areas of non-

compliance and take corrective actions, which can lead to improved operational efficiency and financial performance. This finding supports the work of [58], [59], who emphasized the importance of environmental audits in enhancing corporate sustainability.

In the context of risk management, environmental audits provide a systematic approach to identifying and mitigating environmental risks, thereby protecting the company from potential liabilities. The positive impact of environmental audits on risk management highlights their importance in the manufacturing sector, where environmental compliance is crucial for long-term sustainability.

5. CONCLUSION

This study provides robust empirical evidence that sustainability practices—sustainability reporting, green financing, CSR, and environmental audits—significantly enhance both firm value and risk management in the Indonesian manufacturing sector. The positive relationships identified between these practices and the key financial and risk management outcomes underscore the strategic importance of integrating sustainability into corporate strategies. Companies that actively engage in sustainability reporting, green financing, CSR initiatives, and environmental audits are likely to experience improved financial performance and better manage risks associated with their operations.

The results have important implications for corporate managers and policymakers. For corporate managers, the findings highlight the need to embed sustainability into the core business strategy, not only as an ethical obligation but also as a means of achieving competitive advantage and long-term success. For policymakers, the study suggests the importance of creating regulatory frameworks and incentives that promote the adoption of sustainability practices in the manufacturing sector.

While the study contributes valuable insights into the impact of sustainability practices in emerging markets, it also highlights areas for future research. Expanding the scope to include longitudinal studies and exploring the role of external factors in other industries and geographical contexts could provide a more comprehensive

understanding of the dynamics of sustainability in the corporate world. As the global emphasis on sustainability continues to grow, companies that proactively adopt these practices are likely to be better positioned to navigate the evolving challenges of the business environment.

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