Eco-Innovation and SME Performance in Time of Covid-19 Pandemic: Moderating Role of Environmental Collaboration

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Abstract

Objectives: All businesses worldwide, especially small and medium-sized organizations, are now concerned about environmental degradation. Eco-innovation and environmental collaboration are expected to be the driving forces for saving the environment and the performance of companies. Therefore, this study aimed to ascertain how eco-innovation and environmental cooperation affect the financial, social, and environmental performance of SMEs. This study also explored environmental collaboration as a moderating variable for the effect of eco-innovation on the performance of SMEs. *Methods/Analysis:* Data from 300 small and medium-sized enterprises of Creative Home Décor were analyzed using structural equation modeling. *Findings*: Eco-innovation is necessary to improve the performance of Indonesia's SMEs. Environmental collaboration has a beneficial and substantial effect on the performance of the environment and society. Regarding environmental collaboration as a moderating variable, this study identified a positive and statistically significant coefficient regulating the relationship between financial performance and eco-innovation. *Novelty /Improvement.* The novelty of this research lies in its focus on the impact of eco-innovation and environmental collaboration on the performance of SMEs, particularly in developing countries such as Indonesia, during the COVID-19 pandemic. The study also contributed to the theoretical and empirical understanding of eco-innovation in developing countries and highlighted the importance of environmental collaboration in enhancing the social and environmental performance of SMEs. Additionally, this paper provided empirical and theoretical contributions on the role of environmental collaboration as a moderating variable that is particularly improving the performance of Indonesia's SMEs in Creative Home Décor during the COVID-19 pandemic.

JEL Classifications: M12, L68, L25, L53, Q56

1- Introduction

The COVID-19 pandemic has caused havoc on the world economy and damaged enterprises across all industries. Small and medium-sized enterprises (SMEs) have been especially susceptible to the detrimental effects of the pandemic. In Indonesia, SMEs are essential to the nation's economic success, contributing over 60% of the national GDP and providing employment for more than 97% of the workforce. Therefore, it is crucial to understand how SMEs can adapt to the pandemic and continue to thrive in the current economic climate. One potential avenue for SMEs to improve their performance during the pandemic is through eco-innovation and the moderating role of environmental collaboration.

Eco-innovation refers to the development of new processes, products, and services that positively impact the environment. Research has shown that eco-innovation can help firms achieve sustainable competitive advantages,

enhance brand reputation, and increase customer loyalty. SMEs, in particular, can benefit from eco-innovation as it allows them to differentiate themselves from their competitors and increase their operational effectiveness and environmental impact. Despite the increasing interest in the topic, the concept of eco-innovation has remained poorly defined, with multiple definitions and classifications in the literature [1, 2]. Moreover, most studies on eco-innovation and the performance of SMEs have been conducted in developed countries, leaving a significant gap in understanding eco-innovation in developing countries like Indonesia [3, 4]. Additionally, the role of eco-innovation in the performance of SMEs during the COVID-19 pandemic remains underexplored [5, 6]. Therefore, further research on eco-innovation in SMEs, particularly in developing countries, is needed to provide a more comprehensive understanding of the topic and its implications for the performance of SMEs during the pandemic.

Environmental collaboration refers to the cooperation between firms, government agencies, and other stakeholders to address environmental issues. Studies have shown that environmental collaboration can facilitate the sharing of knowledge and resources, reduce costs, and improve environmental performance. Concerning the COVID-19 pandemic, environmental collaboration may be even more critical for SMEs, as it can help them overcome resource constraints, improve their access to markets, and enhance their resilience. Therefore, understanding the moderating function of environmental collaboration in the relationship between eco-innovation and SME performance is essential. Environmental collaboration is a crucial aspect of driving company performance, as it involves companies working with their suppliers to jointly manage the environment strategically. Despite its significance, the literature on environmental collaboration and its impact on firm performance has remained limited, particularly in developing countries [1, 7]. Moreover, the relationship between environmental collaboration and eco-innovation is underexplored, although these concepts are closely related (Arajo & Franco, 2021). Hence, further research on the impact of environmental collaboration on eco-innovation and firm performance, particularly in developing countries, is necessary to provide a more comprehensive understanding of the topic and its implications for companies [1, 7].

Environmental degradation, increased pollution, and resource scarcity have resulted in a global ecological crisis, making eco-innovation a significant issue for companies worldwide. Companies are looking for various ways to gain a competitive advantage, improve their performance, and reduce their environmental impact. SMEs are seen as helping to leverage their market flexibility and position themselves as major providers of green products and services. Eco-innovation practices, such as sustainability strategies and ecological innovations, are expected to be adopted by SMEs to improve environmental, social, and financial performance. However, without environmental collaboration, eco-innovation will be less effective. Although earlier studies have enhanced our comprehension of environmental cooperation [8, 9], there is still a lack of a solid understanding of the role of environmental collaboration in fostering the link between eco-innovation and company performance, particularly in SMEs. As a result, it is necessary to combine eco-innovation and environmental collaboration. Environmental issues are frequently ignored in emerging markets in pursuit of short-term economic growth [6, 10].

At the same time, the COVID-19 pandemic has had a devastating effect on economies worldwide. The pandemic has also impacted the financial sector [11–13] as well as small and medium-sized enterprises [14–17]. The government has implemented some measures to mitigate the negative consequences. The encouragement of environmental innovations is one of the efforts to save SMEs. However, there is a scarcity of studies on the capacities of Indonesian SMEs regarding eco-innovation, particularly Creative Home Décor enterprises. According to the Central Bureau of Statistics of Indonesia, the contribution of SMEs to GDP has increased from 57.8% to 61% in the last five years. The total number of SME units in Indonesia has now reached approximately 62.9 million units spread across various sectors. Although government funding for SMEs is still limited due to limited government funds and a lack of private and foreign investment [18–20], the government has provided incentives to SMEs through the National Economic Recovery (NER) program. In 2020 and 2021, these incentives amounted to IDR 112.84 trillion and IDR 121.90 trillion for more than 30 million SMEs, respectively.

According to data from the Ministry of Cooperatives and SMEs, there are more than 64 million SMEs in Indonesia, which account for over 97% of the total businesses in the country. The COVID-19 pandemic has significantly impacted the performance of SMEs, with numerous experiencing lower sales and restricted access to finance. Data from the Indonesian Business Data Center (PDBI) shows that SMEs in Indonesia have experienced a decline in sales of an average of 34.5% since the start of the pandemic. Despite these challenges, there are opportunities for SMEs to improve their performance through eco-innovation. A survey conducted by the Global Entrepreneurship Monitor (GEM) found that 67% of SMEs in Indonesia are willing to invest in eco-innovation, indicating a potential for growth in this area. Furthermore, the government has launched various initiatives to support eco-innovation among SMEs, such as the Green Entrepreneurship Program, which provides funding and training for SMEs to develop environmentally friendly services and products.

The purpose of this study was to evaluate how eco-innovation and environmental cooperation affect the financial, environmental, and social performance of SMEs. This paper also examined the impact of eco-innovation on SME performance and the role of environmental collaboration as a moderating variable.

2- Literature Review and Conceptual Model

2-1- Eco-Innovation, Environmental Collaboration and SME Performance

In recent years, the subject of eco-innovation has caught the attention of researchers worldwide. Eco-innovation is thought to be capable of improving company performance. The study of the relationship between the environment and company performance is based on three major theories. First, consider population ecology theory [21]. According to this theory, the environment is a system of resources available to the company, and environmental factors determine the growth and survival of the company. Second, consider contingency theory [22]. Based on this theory, businesses employ various strategies in response to changing environmental conditions. Consequently, implementing environmental management results from the company's adaptation to the nature of the environment. The third theory is the Resource-Based View (RBV) [23]. According to this theory, the competitive advantage of a company is based on its diverse and valuable resources, which cannot be imitated or replaced.

In general, eco-innovation is associated with environmental innovation by businesses, though experts have not provided a clear definition of eco-innovation. Innovation typically involves creating and implementing novel concepts for products, processes, behaviors, and regulations. Additionally, Janahi et al. [1] showed that eco-innovation is related to environmental, green, and sustainable innovations. Johl & Toha [24], Triguero et al. [25], and Horbach [26] investigated three types of eco-innovation: innovation in eco-friendly products, eco-friendly organizations, and eco-friendly processes. Nevertheless, according to Laperche & Picard [2], sustainable innovation encompasses economic, ecological, and social issues, whereas other similar theories emphasize economic and ecological factors, even though these terms are frequently used interchangeably in the scientific literature. Some argue that the application of eco-innovation requires more social and political direction because the innovation process generates social changes that reflect and alter corporate procedures and consumer behavior in the direction of sustainability [27]. Chen et al. [28] define eco-innovation as the proactive use of "green technology innovation" to generate profits. It is often assumed that green product innovation results in ecologically friendly products that extend environmental protection from product development to distribution [29]. In contrast, proactive green product innovation involves environmentally friendly goods [30]. Green process innovation focuses on inventive approaches to manufacturing processes, including the reduction of process-related environmental pollutants and the management of energy consumption [31]. However, eco-innovation is not limited to innovation in green products alone. According to Kemp & Oltra [32], eco-innovation requires technological, organizational, and marketing breakthroughs. Green innovation is divided into four categories by the OECD Oslo Manual [33]: process innovation, marketing innovation, organizational innovation, and product innovation. Literature favors an emphasis on eco-organizational innovation activities, eco-products, and eco-processes when examining internal innovation. Eco-innovation is categorized by Del Rio et al. [34] as mature/immature, process/product, and radical/incremental innovations. Additionally, it attempts to be the first to develop new technology or goods to acquire market leadership and a competitive edge [35].

The performance of companies has improved significantly as a result of eco-innovation. Company managers have begun to investigate responding to changing market needs and requirements through revolutionary technologies that could potentially render the foundations of many modern sectors obsolete. Eco-innovation is a method for businesses, including MSMEs, to adapt to changing environmental conditions. Kasztelan et al. [3] investigated the significance of innovation systems as a green growth strategy, discovering that environmental technology can improve organizational competitiveness and boost company performance. According to Silvestre & Tirca [5] and Guo et al. [6], the goal of the MSME eco-innovation approach is to help them stand out from traditional markets and gain an edge over less capable MSMEs. Similarly, Hermundsdottir & Aspelund [4] demonstrated that eco-innovation aimed at a sustainable basis is a source of competitive advantage because it can provide a competitive advantage in providing improved resources and goods to the market. However, extrinsic factors are also important in this process. Meanwhile, collaborative partnerships that emphasize activities carried out in collaboration between multiple organizations and civil society stimulate and promote eco-innovation [7, 36]. As a result, Alraja et al. [37] proposed that the COVID-19 pandemic provides a possibility for SMEs to adopt a more favorable environmental position, which will be an element that contributes to continuous performance improvement.

Eco-innovation is a crucial aspect of businesses' responses to changing environmental conditions, and it involves creating and implementing novel concepts for products, processes, behaviors, and regulations. Eco-innovation is generally associated with environmental innovation and encompasses various categories, such as eco-product, eco-process innovation, and eco-organizational innovation. Eco-innovation can significantly enhance the performance of a company, as shown in various studies, and can help businesses stand out from traditional markets and gain a competitive advantage. Collaborative partnerships that emphasize activities carried out in collaboration between multiple organizations and civil society also promote eco-innovation. The COVID-19 pandemic presents an opportunity for SMEs to adopt a more favorable environmental position, contributing to continuous performance improvement. However, challenges such as limited resources and a lack of expertise need to be addressed for businesses to fully realize the benefits of eco-innovation, and policymakers and civil society must work together to create an enabling environment for eco-innovation to thrive.

Multiple studies have found a favorable association between eco-innovation and business performance. Medina et al. [38] found that eco-innovation had a favorable and substantial effect on the financial and environmental performance of South American manufacturing enterprises. Johl & Toha [24] examined publicly traded energy firms in Malaysia and discovered a clear correlation between proactive corporate financial success and eco-innovation. Additionally, the study indicated that product and process sustainability methods link eco-innovation to a circular economy. Utilizing meta-analysis, Hizarci-Payne et al. [39] found that organizational eco-innovation has the most significant influence on firm performance and that this link differs among performance kinds across developing and industrialized nations. De Oliveira Brasil et al. [40] examined the influence of organizational and product eco-innovations on firm performance and discovered a strong beneficial effect of product and process eco-innovations on organizational eco-innovation. In addition, they observed a relationship between process and product eco-innovations. Similarly, Zhang et al. [41] discovered that green innovation had a favorable and statistically significant influence on company performance among China's state-owned enterprises (SOEs). Using the resource-based perspective theory, Cheng et al. [28] discovered that eco-organizational innovation had the greatest influence on company performance. They also observed that eco-product and eco-process innovations mediate the impacts of eco-organizational innovation on firm performance, whereas eco-product innovation partially mediates the effects of eco-process innovations on firm performance. Numerous studies have established the beneficial correlation between eco-innovation and corporate success. These studies emphasized the significance of organizational, product, and process eco-innovations in increasing company performance. In addition, the research demonstrated that the effect of eco-innovation on firm performance differs among performance kinds and across developing and industrialized nations. These findings have significant ramifications for corporations in building eco-innovation strategies and boosting overall performance.

There are few studies on eco-innovation in small and medium-sized firms (SMEs) in Indonesia. Latupeirissa & Adhariani [42] examined the influence of eco-innovation and political linkage on the cost of equity capital and the financial performance of Indonesian non-financial enterprises listed on the stock exchange. The study found no significant effect of eco-innovation on the cost of equity capital and financial performance. However, the study found a significant effect when the political connection was considered a moderating variable. Fernando et al. [43] investigated the role of green networks in promoting eco-innovation in small and medium-sized businesses in the Indonesian furniture industry. The study found that green networks introduced SMEs to eco-innovation practices that helped them enhance their sustainability performance. Their work emphasized that green networks could be a new driver for eco-innovation in SMEs in Indonesia. Susilawati & Kanowski [44] reported that eco-innovation practices were limited to audit reports in Indonesia and revealed that there was a lack of compliance with environmental sustainability requirements, particularly in the pulp and paper industry. These findings highlight the importance of adopting eco-innovation practices in SMEs to promote their sustainability performance in Indonesia. In conclusion, the limited number of studies on eco-innovation in SMEs in Indonesia shows the need for further research in this area. The studies highlight the importance of factors such as political connections, green networks, and compliance with environmental sustainability requirements in promoting eco-innovation in SMEs in Indonesia. These findings can help policymakers and businesses develop strategies for promoting eco-innovation and enhancing the sustainability performance of SMEs in Indonesia.

One study that focuses on the relationship between eco-innovation and firm performance is centered on SMEs. Geng et al. [45] discovered that adopting eco-innovation and reducing internal sources for technology and management innovation can improve the environmental performance of companies. However, this condition could weaken the economic performance of small and medium-sized manufacturing enterprises (SMMEs) in China. In another study, Zubeltzu-Jaka et al. [46] conducted a meta-analysis to investigate the drivers of eco-innovation and how they affect company performance. The study revealed that the primary role of "technology push" is to encourage SMEs to adopt eco-innovation to improve their performance. Arfi et al. [47] examined a sample of small and medium-sized firms (SMEs) in France and found that not all external information sources produced the same eco-innovation outcomes. The study emphasized that having access to knowledge sources, in conjunction with internal and external knowledge elements, were the decisive factors. In the United Kingdom, Mahmud et al. [48] focused on SMEs and found that the decentralized structure of these businesses for environmental management has had a positive effect. However, external pressures from global awareness and social relations have had less impact on corporate environmental management. Almeida & Wasim [49] investigated the impact of eco-innovation on the long-term success of Portuguese and British SMEs. The study revealed that product, process, and green innovation systems were significant predictors of sustainable performance. Nevertheless, environmental technologies and organizational eco-innovation had little influence on the long-term success of SMEs. In Malaysia, Zulkiffli et al. [50] discovered that most of Klang Valley's manufacturing SMEs had implemented eco-logistics and eco-management innovations as critical business competencies during the pandemic. In conclusion, the studies on eco-innovation and firm performance in SMEs revealed the importance of internal and external factors, such as technology push, access to knowledge sources, and green innovation systems, in enhancing the environmental and economic performance of these businesses. The studies also highlighted the positive impact of eco-management and eco-logistic innovation during challenging times, such as the COVID-19 pandemic. These findings can help SMEs develop strategies for promoting eco-innovation and enhancing their overall performance.

Regarding environmental collaboration, this variable cannot be separated from the company's strategy. Environmental collaboration is an essential part of driving company performance. Environmental collaboration is the involvement of companies with their suppliers to jointly manage the environment strategically [9]. Similarly, Ahmed et al. [51] stated that collaboration is the result of well-coordinated partner efforts. Thus, environmental collaboration requires a holistic understanding of environmental responsibility [52]. Therefore, innovative ideas offered by companies must reflect responsible ideas. Products must not harm the health of consumers and the public. In other words, new processes for producing goods and services must be safe and not pollute the environment [53]. Regardless of the results of this environmental collaboration, it should highlight that the adoption of environmental collaboration with supplier partners can lead to responsible innovation.

Several studies have investigated the relationship between environmental collaboration and firm performance; most showed a positive correlation. Adomako & Tran [8] found that environmental collaboration significantly impacts firm performance in Ghana, and stakeholder pressure can strengthen the influence of environmental collaboration on firm performance. Laari et al. [54] revealed a strong correlation between supplier collaboration and environmental performance and monitoring. They also stated that financial performance is favorably and significantly related to the environmental partnership with customers. Tachizawa et al. [55] discovered that supplier monitoring and collaboration significantly improve the environmental performance of Spanish businesses. Ahmed et al. [56] revealed that supplier collaboration ameliorates operational, environmental, and financial performance in Pakistani manufacturing enterprises. In addition, environmental collaboration with suppliers plays a mediating role in the relationship between environmental commitment and financial success, as found by Vu and Dang [57]. They found that the gender of the CEO moderates the association between environmental commitment and supplier-environmental collaboration. Arora et al. [58] found that environmental collaboration improves the relationship between organizational sustainability performance and sustainable strategic purchasing. However, they did not find a significant correlation between environmental collaboration and environmental and social performance. These studies demonstrate the importance of environmental collaboration in enhancing firm performance and suggest that various factors, such as stakeholder pressure and supplier monitoring, can influence the relationship between environmental collaboration and firm performance.

2-2- Conceptual Model

Based on the literature review, the conceptual model as the research framework relating the eco-innovation, environmental collaboration, and the financial, environmental, and social performance of SMEs is shown in Figure 1. Therefore, following a discussion of the literature review, the nine hypotheses listed below were developed:

H1: Eco-innovation positively influences environmental performance.

H2: Eco-innovation positively influences financial performance.

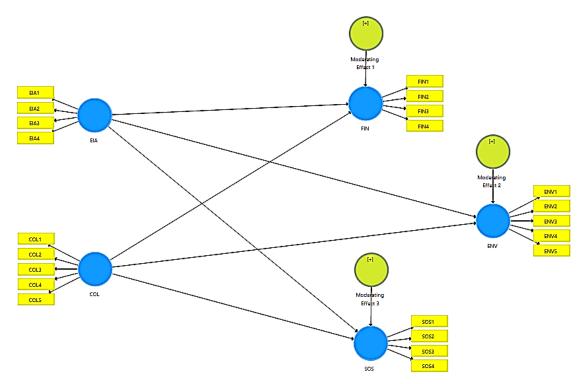*H3:* Eco-innovation positively influences social performance.

Figure 1. Conceptual framework

H4: Eco-environmental collaboration positively influences environmental performance.

H5: Eco-environmental collaboration positively influences financial performance.

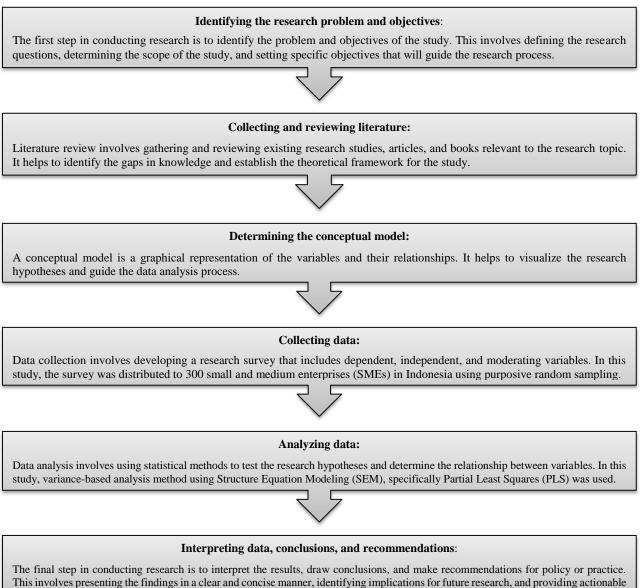*H6:* Eco-environmental collaboration positively influences social performance.

H7: Eco-environmental collaboration moderates the relationship between eco-innovation and environmental performance.

H8: Eco-environmental collaboration moderates the relationship between eco-innovation and financial performance.

H9: Eco-environmental collaboration moderates the relationship between eco-innovation and social performance.

3- Data, Variables, and Methodology

This study used dependent (the financial, environmental, and social performance of small and medium enterprises), independent (eco-innovation), and moderating (environmental collaboration) variables. Environmental performance (ENV) is measured employing a five-item scale developed by Almeida & Wasim [49], Geng et al. [45], Zhang et al. [41], and Cheng et al. [28]. Financial performance (FIN) and social performance (SOS) were measured using a four-item scale developed by Medina et al. [38], Johl & Toha [24], Ahmed et al. [51], Latupeirissa & Adhariani [42], and Almeida & Wasim [49]. Eco-innovation (EIA) was measured by applying a four-item scale developed by Almeida & Wasim [49], Medina et al. [38], Geng et al. [45], Johl & Toha [24], and Zulkiffli et al. [50]. The environmental collaboration (COL) as the moderating variable was measured using a five-item scale developed by Ahmed et al. [51], Adomako & Tran [8], Vu & Dang [57], and Arora et al. [58]. The 5-point Likert scale, which ranges from strongly disagree to strongly agree, was applied to measure each variable. Figure 2 depicts the outlined research procedure:

Identifying the research problem and objectives:

The first step in conducting research is to identify the problem and objectives of the study. This involves defining the research questions, determining the scope of the study, and setting specific objectives that will guide the research process.

Collecting and reviewing literature:

Literature review involves gathering and reviewing existing research studies, articles, and books relevant to the research topic. It helps to identify the gaps in knowledge and establish the theoretical framework for the study.

Determining the conceptual model:

A conceptual model is a graphical representation of the variables and their relationships. It helps to visualize the research hypotheses and guide the data analysis process.

Collecting data:

Data collection involves developing a research survey that includes dependent, independent, and moderating variables. In this study, the survey was distributed to 300 small and medium enterprises (SMEs) in Indonesia using purposive random sampling.

Analyzing data:

Data analysis involves using statistical methods to test the research hypotheses and determine the relationship between variables. In this study, variance-based analysis method using Structure Equation Modeling (SEM), specifically Partial Least Squares (PLS) was used.

Interpreting data, conclusions, and recommendations:

The final step in conducting research is to interpret the results, draw conclusions, and make recommendations for policy or practice. This involves presenting the findings in a clear and concise manner, identifying implications for future research, and providing actionable recommendations for stakeholders.

Figure 2. Research Process for Analyzing the Relationship between Eco-Innovation, Environmental Collaboration, and Performance of Small and Medium Enterprises

The study used a quantitative research design and collected data through a survey method. Between July and December 2021, managers of small and medium-sized enterprises (SMEs) in Indonesia were surveyed using purposive random sampling. A survey was developed and shared with the participants, and 300 responses were received. Preliminary processing was conducted to check for incorrect or insufficient entries by respondents and ensure the quality of the data. The questionnaire was uploaded and distributed using Google Forms and consisted of two parts. The first part collected profile information such as gender, age, education level, number of employees, and length of business operation. The second part contained the values of all the variables.

The study utilized Structure Equation Modeling (SEM) with Partial Least Squares (PLS), a variance-based technique that overcomes the limitations of other methods that rely heavily on assumptions and theoretical foundations. PLS evaluates the outer and inner models of the data, testing the reliability and validity of the variables using criteria such as composite reliability, Cronbach's alpha, factor loading, and Average Variance Extracted (AVE). This paper also assessed convergent validity with factor loadings greater than 0.70 and AVE greater than 0.50 [59]. In the inner model, the relationship between the latent variables was determined, and the PLS method included a bootstrapping technique to estimate the significance of the relationships between the variables. The PLS model was assessed based on various criteria, such as convergent and discriminant validity, in addition to composite reliability. This variance-based analytical approach requires few assumptions during assessment and a theoretical background, making it a great choice for data analysis. Overall, the study ensured the validity and reliability of the results by utilizing multiple criteria to evaluate the model.

4- Empirical Results

Table 1 presents the sample demographics of the study participants (300 individuals). The sample population comprised 53% male and 47% female participants. The highest percentage of participants fell within the age range of 25 - <50 years, accounting for 44% of the sample population, followed by those aged 18 - <25 years (31.7%) and those aged >50 years (24.3%). The educational background of the participants was primarily university/college-educated, with 68% of the sample population holding this level of education. The remaining participants had completed senior high school (21.3%), junior high school (6%), or elementary school (4.7%).

Table 1. Sample demographic (n = 300)

Characteristics	Group	Frequency	Percentage
Gender	Male	159	53
	Female	141	47
Age	18 - <25	95	31.7
	25 - <50	132	44
	>50	73	24.3
Education	University/Collage	204	68
	Senior high school	64	21.3
	Elementary school	14	4.7
	Junior high school	18	6
Length of business operation	3 – <5 Years	88	29.3
	5 – 10 Years	142	47.3
	> 10 Years	70	23.3
Employee	<10	113	37.7
	10 - <25	109	36.3
	25 - <50	49	16.3
	> 50	29	9.7

The validity and dependability of the data are demonstrated in Table 2 for environmental performance (ENV), financial performance (FIN), social performance (SOS), eco-innovation (EIA), and environmental collaboration (COL). The outer model analysis shows the connection between latent variables and indicators by evaluating the validity and reliability of the constructs. While reliability is evaluated using composite reliability and Average Variance Extracted, construct validity is assessed using convergent and discriminant values (AVE). Convergent validity examines the relationship between the item and variable scores based on the reflecting indicator measurement model's loading factor. If the loading factor is greater than 0.70, the indicator is likely to be reliable. This demonstrates that all variable indicators have a loading value greater than 0.70, indicating a high level of convergent validity.

Table 2. Validity and Reliability Result

Variables	Item	Item Loadings	Cronbach's Alpha	Composite Reliability	AVE
Eco-Innovation (EIA)	EIA1	0.937	0.953	0.966	0.878
	EIA1	0.971			
	EIA1	0.977			
	EIA1	0.859			
Environmental Collaboration (COL)	COL1	0.909	0.940	0.954	0.808
	COL1	0.958			
	COL1	0.968			
	COL1	0.855			
	COL1	0.793			
Environmental Performance (ENV)	ENV1	0.938	0.969	0.975	0.888
	ENV1	0.966			
	ENV1	0.963			
	ENV1	0.941			
	ENV1	0.901			
Financial Performance (FIN)	FIN1	0.981	0.987	0.990	0.961
	FIN1	0.995			
	FIN1	0.988			
	FIN1	0.956			
Social Performance (SOS)	SOS1	0.919	0.942	0.959	0.855
	SOS1	0.969			
	SOS1	0.971			
	SOS1	0.832			

The study evaluated the construct reliability of environmental performance (ENV), financial performance (FIN), and social performance (SOS) using Cronbach's alpha and composite reliability. The results revealed that the Cronbach Alpha values for ENV, FIN, and SOS were 0.969, 0.987, and 0.942, respectively, indicating that these constructs had high levels of internal consistency and reliability. Similarly, the composite reliability values for these constructs were 0.954, 0.990, and 0.959, respectively, showing that the constructs were reliable measures of their underlying constructs. The AVE values for these constructs were 0.808, 0.961, and 0.855, respectively, indicating that these constructs had good convergent validity. The study also evaluated the reliability and validity of environmental collaboration (COL) and eco-innovation (EIA) constructs. The Cronbach's alpha value for COL was 0.940, indicating high internal consistency and reliability. The composite reliability value for COL was 0.954, indicating that the construct was a reliable measure of its underlying construct. The AVE value for COL was 0.808, indicating that the construct had good convergent validity. The study also evaluated the reliability and validity of the eco-innovation (EIA) construct. The Cronbach's alpha value for EIA was 0.953, indicating high internal consistency and reliability. The composite reliability value for EIA was 0.966, demonstrating that the construct was a reliable measure of its underlying construct. The AVE value for EIA was 0.878, indicating that the construct had good convergent validity. Overall, the results indicated that the evaluated constructs had high levels of reliability and validity.

The R-square results examining the association between the constructs and the significant value are presented in Table 3. These estimations showed that environmental performance (ENV), financial performance (FIN), and social performance (SOS) had R-square values of 0.366 or 36.6%, 0.091 or 9.1%, and 0.547 or 54.7%, respectively. The remaining variation of 63.4% for ENV and 90% for FIN was explained by factors beyond the scope of the research. These findings suggested that the eco-innovation (EIA) and environmental collaboration (COL) constructs considerably impact ENV, FIN, and SOS. The inner model was also analyzed and scored based on the R-squared dependent variable, the size of the Q-squared test, and the magnitude of the structural route coefficients. The Q-Square measures a structural element with Partial Least Squares (PLS), and the resulting value was 0.738. This value indicates that the model accurately explained 73.8% of the variance in EIA and COL, while the remaining 26.2% was explained by other variables. These results suggest that the study model provided a good fit for the data and effectively captured the relationships between the constructs. The R-square results presented in Table 3 showed that the eco-innovation (EIA) and environmental collaboration (COL) constructs had a significant influence on environmental performance (ENV), financial performance (FIN), and social performance (SOS). The findings suggest that these constructs are essential for understanding the relationships between the constructs and should be considered in future research studies. Additionally, the evaluation of the inner model using the size of the Q-squared test and the structural path coefficients' magnitude provided evidence that the model accurately explained the relationships between the constructs, indicating that the results are reliable and valid.

Table 3. The Results of the R-square

Structural Model	Dependent Variable	R Square
1	Environmental Performance (ENV)	0.366
2	Financial Performance (FIN)	0.091
4	Social Performance (SOS)	0.547

Table 4 presents the summary of structural equation modeling that was used to evaluate the assumptions. The findings indicate that eco-innovation positively impacted environmental performance (p-value 0.000; β = 0.412, t = 6.546), confirming H1. Accepting the null hypothesis that eco-innovation had no beneficial effect on financial performance (p-value 0.000; β = 0.286, t = 4.556), eco-innovation had a favorable effect on social performance (p-value 0.000; β = 0.384, t = 4.790). Hence, Hypothesis 3 is supported. Moreover, the data demonstrated a positive relationship between environmental collaboration and environmental performance (p-value 0.000; β = 0.233, t = 3.761), supporting H4. The data indicate that environmental collaboration had a beneficial impact on financial performance (p-value 0.877; β = 0.011, t = 0.156), refuting Hypothesis 5. The data indicate that environmental collaboration had a beneficial effect on social performance (p-value 0.000; β = 0.445, t = 7.163), confirming H6.

Table 4. Summary of Path Coefficient

Hypothesis	Path coefficient	T Statistic	P-Value	Result
H1: EIA → ENV	0.412	6.546	0.000	Supported
H2: EIA → FIN	0.286	4.556	0.000	Supported
H3: EIA → SOS	0.348	4.790	0.000	Supported
H4: COL → ENV	0.233	3.761	0.000	Supported
H5: COL → FIN	0.011	0.156	0.876	Rejected
H6: COL → SOS	0.445	7.163	0.000	Supported

The final hypothesis examined the potential moderating influence of environmental collaboration on the association between eco-innovation and SME success (environmental, financial, and social performance). The data presented in Table 5 indicate that environmental collaboration had a negative effect on the link between eco-innovation and environmental performance (p-value 0.750; β = -0.009, t = 0.319), refuting Hypothesis 7. The association between strategic eco-innovation and financial success was positively influenced by environmental collaboration (P-value 0.001; β = 0.110, t = 3.075), supporting H8. H9 is rejected because environmental collaboration negatively impacted the connection between eco-innovation and social performance (p-value 0.801; β = –0.012, t = 0.253).

Table 5. Summary of Moderating Effects

Hypothesis	Path coefficient	T Statistic	P-Value	Result
H7: EIA*COL → ENV	-0.009	0.319	0.750	Rejected
H8: EIA*COL → FIN	0.110	3.075	0.002	Supported
H9: EIA*COL → SOS	-0.012	0.253	0.801	Rejected

5- Discussion

The results showed that eco-innovation positively affects SME performance (environmental, financial, and social). These results agree with hypotheses 1 through 3. Accordingly, eco-innovation has a significant role in enhancing the performance of SMEs in Indonesia. The results are consistent with Medina et al. [38], Johl & Toha [24], Hizarci-Payne et al. [39], de Oliveira Brazil [40], Zhang et al. [41], and Cheng et al. [28]. The findings are consistent with the previous studies on Indonesia: Latupeirissa & Adhariani [42], Fernando et al. [43], and Susilawati & Kanowski [44]. They documented that eco-innovation improves SME performance in Indonesia.

This study examined the impact of environmental collaboration on the performance of small and medium enterprises' creative home décor. The results showed that environmental collaboration positively and significantly affects environmental and social performance, thus supporting hypotheses 4 and 6. The present work implies that environmental collaboration can improve social and environmental performance. This result is consistent with Grekova et al. [9], Ahmed et al. [51], Hollos et al. [52], Voegtlin & Scherer [53], Adomako & Tran [1], Laari et al. [54], Tachizawa et al. [55], Ahmed et al. [56], Vu and Dang [57], and Arora et al. [58]. In contrast, this study found a negative but insignificant coefficient of environmental collaboration on financial performance. In other words, it implies that environmental collaboration does not influence financial performance. Thus, it does not support Hypothesis 5.

Finally, this paper explored the possible moderating effect of environmental collaboration on the relationship between eco-innovation and SME performance (environmental, financial, and social). This study found a negative but insignificant moderating effect of environmental collaboration on the relationship between eco-innovation and environmental and social performance. Consequently, it does not support hypotheses 7 and 9. However, this study documented a positive and significant coefficient moderating effect of environmental collaboration on the relationship between eco-innovation and financial performance, supporting Hypothesis 8. The result is consistent with Adomako & Tran [8], Latupeirissa & Adhariani [42], Medina et al. [38], Johl & Toha [24], Hizarci-Payne et al. [39], and Ahmed et al. [51]. These results are contextually relevant for Indonesia because environmental collaboration necessitates a significant investment, particularly in encouraging suppliers to develop innovative techniques for decreasing their carbon footprint and assisting suppliers in improving their waste reduction efforts. This cost can be reduced by partnering with suppliers, boosting the income and efficiency of the company in the long run.

6- Conclusion

This research aimed to investigate the impact of eco-innovation and environmental collaboration on the financial, environmental, and social performance of SMEs, particularly in developing countries such as Indonesia, during the COVID-19 pandemic. The study used a sample of 300 SMEs in Creative Home Décor in Indonesia to test the hypotheses developed from a literature review. The findings indicated that eco-innovation has a positive impact on the financial, environmental, and social performance of SMEs, thus contributing to the theoretical and empirical understanding of eco-innovation in developing countries. Moreover, environmental collaboration was found to positively affect environmental and social performance but not financial performance. It was also concluded that environmental collaboration moderates the relationship between eco-innovation and financial performance positively, but not environmental and social performance.

The findings suggest that SMEs should prioritize eco-innovation and environmental collaboration to enhance their financial, environmental, and social performance, particularly during the COVID-19 pandemic. SMEs can benefit from investing in eco-innovation by reducing costs and improving their competitiveness in the market. Moreover, SMEs can improve their environmental and social performance by collaborating with their suppliers to manage the environment strategically together. The results inform policymakers and stakeholders in developing countries about the importance of eco-innovation and environmental collaboration for SMEs during the COVID-19 pandemic. Policymakers can encourage SMEs to adopt eco-innovation and collaborate with their suppliers to improve their environmental and social performance. The study's limitations suggest that future research should explore other factors that may affect the relationship between eco-innovation, environmental collaboration, and SME performance, such as firm size and industry sector. Moreover, the findings are based on a single country (Indonesia) and Creative Home Décor enterprises. Therefore, further studies are needed to analyze the topic across countries using different enterprises.

7- Declarations

7-1- Author Contributions

7-2- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7-3- Funding

7-4- Acknowledgements

7-5- Institutional Review Board Statement

Not applicable.

7-6- Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

7-7- Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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