



Green Strategies and Business Growth in SMEs: Does Industry Type Matter?

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Abstrak: Penelitian ini menyelidiki pengaruh Strategi Desain Ramah Lingkungan (EDS) dan Penciptaan Nilai Hijau (GVC) terhadap Pertumbuhan Bisnis (BG) di antara Usaha Kecil dan Menengah (UKM) Indonesia, sambil memeriksa peran moderasi Jenis Industri (IT). Dengan menggunakan pendekatan kuantitatif, data dikumpulkan dari 195 UKM di Jakarta, Surabaya, Bandung, dan Makassar dan dianalisis menggunakan Pemodelan Persamaan Struktural Kuadrat Terkecil Sebagian (PLS-SEM). Hasilnya mengungkapkan bahwa EDS dan GVC berdampak signifikan dan positif terhadap pertumbuhan bisnis, yang menyoroti pentingnya strategis dalam mengadopsi praktik keberlanjutan. Namun, efek moderasi jenis industri pada hubungan antara strategi hijau dan pertumbuhan bisnis ditemukan tidak signifikan secara statistik. Temuan ini memberikan dukungan empiris untuk integrasi inovasi ramah lingkungan dan penciptaan nilai hijau sebagai pendorong utama keunggulan kompetitif, terlepas dari kategori industri. Studi ini memberikan kontribusi teoretis terhadap literatur tentang strategi hijau dan kontribusi praktis bagi praktisi UKM dalam pengambilan keputusan strategis.

Kata kunci: *Eco Design Strategy, Green Value Creation, Pertumbuhan Bisnis, UKM, Sustainability*

Abstract: This study investigates the influence of Eco Design Strategy (EDS) and Green Value Creation (GVC) on Business Growth (BG) among Indonesian Small and Medium Enterprises (SMEs), while examining the moderating role of Industry Type (IT). Utilizing a quantitative approach, data were collected from 195 SMEs across Jakarta, Surabaya, Bandung, and Makassar and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results reveal that both EDS and GVC significantly and positively impact business growth, highlighting the strategic importance of adopting sustainability practices. However, the moderating effect of industry type on the relationship between green strategies and business growth was found to be statistically insignificant. These findings provide empirical support for the integration of eco-innovation and green value generation as key drivers of competitive advantage, regardless of industry category. This study provides a theoretical contribution to the literature on green strategies and a practical contribution for SME practitioners in strategic decision-making.

Keywords: *Eco Design Strategy, Green Value Creation, Business Growth, SMEs, Sustainability*

INTRODUCTION

In recent decades, the growing global concern over climate change, environmental degradation, and resource scarcity has driven firms to reconfigure their strategic orientation toward sustainability (Albitar et al., 2023). Small and Medium-sized Enterprises (SMEs), which represent over 90% of businesses worldwide and contribute significantly to economic development and employment (J. B. Halik et al., 2023; J. B. Halik & Halik, 2024; OECD, 2022), are increasingly under pressure to adopt environmentally responsible practices. However, while large corporations often have the resources to invest in sustainable innovation, SMEs face greater challenges due to limited capital, managerial capacity, and technological capabilities (Andrade et al., 2025).

The concept of Green Value Creation (GVC) has emerged as a strategic imperative for businesses to generate competitive advantage through environmentally sustainable practices (Hu et al., 2022). It involves integrating ecological values into products, processes, and organizational culture to deliver long-term value to stakeholders. Simultaneously, the Eco-Design Strategy—which refers to designing products with minimal environmental impact across their life cycle—has been widely acknowledged as a key enabler of green transformation in SMEs (Bocken & Geradts, 2020). Nonetheless, the link between these green strategic actions and business growth outcomes remains fragmented and context-dependent.

Table 1. Environmental Awareness vs. SME Adoption of Sustainable Practices (Selected Countries)

Country	% SMEs Aware of Environmental Regulations	% SMEs Implementing Green Strategies
Germany	85%	65%
Indonesia	71%	28%
South Korea	79%	52%
Brazil	67%	33%
United Kingdom	88%	70%

Source: Adapted from (OECD, 2022)

The data in Table 1 illustrates a significant disparity between environmental awareness and actual adoption of green strategies among SMEs, especially in developing economies such as

Indonesia and Brazil. Despite increasing external pressure and awareness of environmental concerns, many SMEs struggle to align sustainability initiatives with tangible business growth due to sector-specific challenges and operational uncertainties.

This contextual gap suggests that the type of industry may play a moderating role in how green value creation and eco-design influence SME performance. For instance, eco-design may yield higher returns in manufacturing sectors compared to service-oriented businesses, where tangible product innovation is less pronounced (Imtiaz Hossain et al., 2025). Moreover, industry types vary widely in terms of regulatory intensity, customer expectations, and environmental risk exposure, which could amplify or diminish the effects of green strategies on firm growth (Xu et al., 2024). This highlights an urgent academic need to empirically test whether the effectiveness of green strategies is contingent upon industry-specific characteristics, particularly in the context of SMEs in emerging economies.

Understanding how industry characteristics influence the relationship between green strategic orientation and business growth is vital for both academic theory and policy design. This research offers timely insights into the differentiated impact of green value creation and eco-design strategies across various SME industries, thus enabling more targeted support mechanisms for sustainability-driven transformation. The study fills a critical gap in the literature by examining the moderating role of industry type, particularly in the context of emerging economies where empirical research remains limited. This creates an urgent academic need to assess the extent to which industry type influences the effectiveness of green strategies in driving SME growth, particularly in emerging economies.

LITERATURE REVIEW

Theoretical Foundation: Resource-Based View (RBV)

This study is grounded in the Resource-Based View (RBV) of the firm, which posits that firms achieve sustained competitive advantage by developing valuable, rare, inimitable, and non-substitutable (VRIN) resources (Hunt & Madhavaram, 2012). Within the context of sustainability, green capabilities such as eco-design and green value creation can be seen as strategic resources that enhance firm performance

when effectively embedded within organizational processes ([Hermundsdottir & Aspelund, 2022](#)).

The RBV supports the argument that green strategic initiatives are not merely compliance efforts but are integral to long-term business growth, particularly in SMEs that are able to transform environmental responsiveness into core competencies ([Estensoro et al., 2022](#)). Moreover, these capabilities interact with external contextual factors—such as industry characteristics—to determine their effectiveness, which justifies examining industry type as a moderating variable.

Green Value Creation and Business Growth

Green value creation refers to the integration of environmental considerations into value chains in ways that simultaneously create economic and ecological benefits ([Olaleye & Mosleh, 2025](#)). It includes practices such as using sustainable raw materials, reducing waste, improving energy efficiency, and offering environmentally friendly products. Empirical research has found a positive link between green value creation and firm performance, including market share, cost savings, and customer loyalty ([González-viralta et al., 2023](#)).

In SMEs, green value creation plays a strategic role in building competitive positioning, particularly when resources are scarce and differentiation is vital ([Aliya Putri et al., 2025](#)). By embedding environmental concerns into their core value proposition, SMEs can unlock new market opportunities and enhance stakeholder trust—factors that are critical for growth.

“Firms that create and deliver environmental value to stakeholders are more likely to experience growth through reputational capital and operational efficiency” ([Agoraki et al., 2023](#)).

Based on the literature above, the following hypotheses can be formulated:

H1: Green Value Creation has a positive effect on SME Business Growth.

Eco-Design Strategy and Business Growth

Eco-design, also known as design for the environment (DfE), emphasizes minimizing the environmental impact of products throughout their lifecycle—from raw material extraction to end-of-life disposal ([Bocken & Geradts, 2020](#)). In SMEs, eco-design serves as a proactive strategy that aligns product development with

sustainability objectives, offering both ecological and economic returns.

Several recent studies have demonstrated that eco-design contributes to innovation outcomes and performance improvements, especially in environmentally sensitive markets ([Siwiec et al., 2025](#)). Moreover, eco-design facilitates regulatory compliance and enhances resource efficiency, leading to increased profitability and growth ([Wildan et al., 2024](#)).

“Eco-design is no longer a niche practice but a core innovation capability that directly contributes to firm performance, particularly among sustainability-oriented SMEs” ([Janahi et al., 2021](#)).

Therefore, the second hypothesis is formulated as follows:

H2: Eco-Design Strategy has a positive effect on SME Business Growth.

The Moderating Role of Industry Type

Industry type significantly shapes the strategic context in which SMEs operate. Industries vary in their exposure to environmental regulation, customer sustainability expectations, and technological feasibility of green practices ([Imtiaz Hossain et al., 2025](#)). For example, eco-design may have stronger performance implications in manufacturing than in service-based sectors due to the tangible nature of product redesign ([Sierra-Perez et al., 2021](#)).

Empirical studies suggest that the benefits of green strategies are not uniform across industries. Some sectors—such as food, textile, and electronics—face more intense pressure to innovate sustainably due to regulatory scrutiny and consumer awareness ([Bhandari et al., 2022](#)). In contrast, low-impact industries may not experience the same urgency or payoff from environmental innovation.

“Industry dynamics moderate how sustainability strategies translate into business outcomes, making context a crucial determinant of green strategy effectiveness” ([Dharmayanti et al., 2023](#)).

This suggests that industry type moderates the relationships between green value creation, eco-design, and business growth—making it essential to assess whether such strategies are equally effective across different SME sectors.

Based on the literature, the following hypotheses can be formulated:

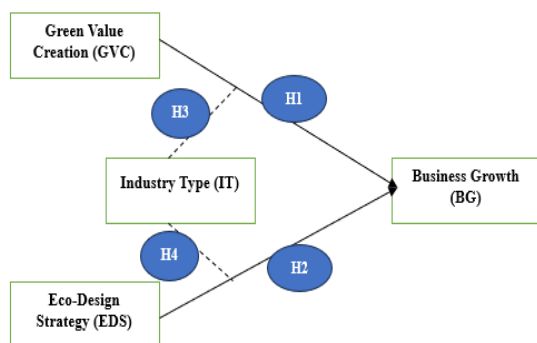
H3: Industry Type moderates the relationship between Green Value Creation and SME Business Growth.

H4: Industry Type moderates the relationship between Eco-Design Strategy and SME Business Growth.

Building upon the theoretical underpinnings and empirical findings discussed above, it becomes evident that sustainability-oriented strategies such as green value creation and eco-design are increasingly instrumental in shaping business outcomes, particularly within the SME sector. However, the effectiveness of these strategies is not uniform across all business environments. Contextual factors, especially the nature of the industry in which SMEs operate, can either amplify or constrain the impact of such green initiatives on firm growth.

Given this complexity, the present study proposes a conceptual framework that integrates both internal strategic capabilities (i.e., green value creation and eco-design strategy) and an external contextual moderator (i.e., industry type) to explain variations in business growth performance. This framework not only aligns with the resource-based view of the firm but also reflects recent calls for a more nuanced understanding of how environmental practices interact with sector-specific dynamics. The model is designed to test both the direct effects of green strategies and the conditional effects influenced by industry-specific characteristics.

The proposed conceptual framework is illustrated in the following diagram.



Source: Author's Personal Conception (2025)

Figure 1. Conceptual Framework

As shown in **Figure 1**, the model posits that green value creation and eco-design directly enhance

business growth, with industry type potentially moderating these effects.

METHODOLOGY

This study employed a quantitative research design using a cross-sectional survey approach (Sekaran & Bougie, 2017) to investigate the relationships between green value creation, eco-design strategy, and SME business growth, with industry type as a moderating variable. The quantitative method was selected to enable statistical testing of hypotheses and to provide generalizable insights across SME sectors (Hair et al., 2021). A structured questionnaire was developed based on previously validated measurement instruments and adapted for the SME context in Indonesia.

The population for this research consisted of Small and Medium-sized Enterprises (SMEs) operating in diverse industrial sectors in Indonesia, particularly those located in major urban and industrial centers such as Jakarta, Surabaya, Bandung, and Makassar. These cities were selected due to their high SME density and active engagement in sustainability initiatives supported by local government and business associations. The industry type construct has been adapted from validated scales in environmental sustainability research (Garcia et al., 2017; Naeem et al., 2022), ensuring conceptual robustness despite perceptual measurement.

A purposive sampling technique was used to identify and select SMEs that have adopted or are in the process of adopting environmental practices, either in production processes, product design, or organizational strategy. The criteria for inclusion were: (1) the firm must fall within the SME category as defined by Indonesia's Ministry of Cooperatives and SMEs (less than 100 employees and/or assets not exceeding IDR 50 billion), and (2) the firm must demonstrate awareness or application of green-related strategies. While the cities were chosen due to SME density and accessibility, this may introduce regional concentration bias, which is addressed in the limitations section.

Based on the recommendation by (Hair et al., 2019) for Structural Equation Modeling using the PLS-SEM approach, the minimum sample size should be 10 times the maximum number of structural paths directed at a latent construct. Since the most complex construct in the proposed model has two predictors, the minimum sample required was 20. However, to ensure higher

statistical power and model stability, a larger sample was targeted. In total, 210 SMEs were surveyed, and after data cleaning, 195 valid responses were retained for analysis. This sample size is considered adequate for SEM analysis and exceeds the minimum threshold for medium-to-large effect detection (Ghozali, 2021; Hair et al., 2019).

The survey was conducted between April and June 2025, both online and through field distribution with the assistance of local chambers of commerce and SME cooperative forums. Key informants were owners, managers, or sustainability officers of SMEs who were knowledgeable about the firm's green initiatives and strategic direction. Participation was voluntary, and ethical research protocols were observed, including informed consent and anonymity assurances. Prior to data collection, the questionnaire underwent content validity assessment by three academic experts in sustainability and SME management. A pilot test was conducted with 20 SME owners to ensure clarity and relevance of items, resulting in minor wording adjustments.

The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with Smart-PLS version 4.0. This method was selected due to its suitability for predictive modeling, smaller sample sizes, and its ability to accommodate non-normal data distributions (Hair et al., 2021). The analysis included both measurement model evaluation (for reliability and validity) and structural model assessment, with additional analysis to test the moderating effect of industry type using multi-group analysis (MGA).

Measurement Items.

Tabel 2. Measurement Indicators

Variable	Code	Measurement Item	Source
Green Value Creation (X1)	GVC1	Our firm develops products or services that provide environmental benefits to customers.	(González-viralta et al., 2023; Olaleye & Mosleh, 2025)
	GVC2	We integrate environmental concerns into our core business value proposition.	
	GVC3	Our company creates value by reducing environmental harm across operations.	
	GVC4	Our environmental practices have helped us attract environmentally conscious customers.	

Variable	Code	Measurement Item	Source
Eco-Design Strategy (X2)	EDS1	Environmental criteria are considered during the product design process.	(Bocken & Geradts, 2020; Siwiec et al., 2025; Wildan et al., 2024)
	EDS2	Our products are designed to minimize energy consumption throughout their life cycle.	
	EDS3	We redesign existing products to reduce material usage and waste.	
	EDS4	We use recyclable or biodegradable materials in product design.	
Business Growth (Y)	BG1	Our firm has experienced growth in market share over the past 3 years.	(Agoraki et al., 2023; J. B. Halik et al., 2023, 2025; Janahi et al., 2021)
	BG2	Our revenue has steadily increased in recent years.	
	BG3	Our customer base has expanded due to our sustainability efforts.	
	BG4	We have introduced new products/services that generated new revenue streams.	
	BG5	Our brand reputation has improved as a result of our environmental initiatives.	
	BG6	We have increased operational efficiency as part of our growth strategy.	
Industry Type (Moderator)	IT1	The industry we operate in is highly sensitive to environmental issues.	(Garcia et al., 2017; Naem et al., 2022)
	IT2	Our industry is subject to strong environmental regulations.	
	IT3	Most firms in our industry adopt environmentally friendly practices.	
	IT4	Customers in our industry expect green or eco-labeled products.	
	IT5	Environmental innovation is considered a competitive advantage in our industry.	

Source: Adapted from previous research (2025)

All items were measured using a 5-point Likert scale, where: 1 = Strongly Disagree, to 5 = Strongly Agree, to capture respondents' perceptions and agreement levels toward each statement.

RESULTS AND DISCUSSION

Respondent Demographics

The survey was distributed to 195 owners or senior managers of SMEs operating across four major urban centers in Indonesia—Jakarta, Surabaya, Bandung, and Makassar. **Table 3** presents a summary of the demographic characteristics of the respondents, including gender, age group, business location, years of operation, and type of industry.

Table 3. Respondent Demographics (N = 195)

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	107	54.9%
	Female	88	45.1%
Age	21–30 years	41	21.0%
	31–40 years	76	39.0%
	41–50 years	56	28.7%
	>50 years	22	11.3%
Business Location	Jakarta	53	27.2%
	Surabaya	49	25.1%
	Bandung	48	24.6%
	Makassar	45	23.1%
Years of Operation	<3 years	28	14.4%
	3–5 years	63	32.3%
	6–10 years	71	36.4%
	>10 years	33	16.9%
Industry Type	Manufacturing	51	26.2%
	Services	58	29.7%
	Retail/Trade	50	25.6%
	Creative Industries	36	18.5%

Source: Primary data processed

The respondent profile shows a relatively balanced gender distribution, with a slight dominance of male participants (54.9%). Most of the SME owners fall within the age bracket of 31–40 years (39.0%), reflecting the active involvement of middle-aged entrepreneurs in managing sustainable business practices. In terms of geographic distribution, respondents are fairly evenly spread across the four cities, with Jakarta contributing the largest share (27.2%).

Regarding business maturity, 68.7% of SMEs have been in operation for more than 3 years, indicating a sufficient period for strategy implementation and organizational learning. The industry type distribution highlights the predominance of service-based SMEs (29.7%), followed closely by manufacturing and retail sectors. This variety supports the relevance of

testing industry type as a moderating factor in the relationship between green strategies and business growth.

Descriptive Statistic Analysis

Table 4. Descriptive Statistics of Research Indicators (N = 195)

Indicator	Mean	Median	Scale Min	Scale Max	Observed Min	Observed Max	Std. Dev
GVC1	3.985	4.000	2.000	5.000	2.000	5.000	1.020
GVC2	3.908	4.000	1.000	5.000	1.000	5.000	1.101
GVC3	3.790	4.000	1.000	5.000	1.000	5.000	1.024
GVC4	3.538	4.000	2.000	5.000	2.000	5.000	0.924
EDS1	3.805	4.000	1.000	5.000	1.000	5.000	0.978
EDS2	4.005	4.000	1.000	5.000	1.000	5.000	1.074
EDS3	3.918	4.000	2.000	5.000	2.000	5.000	1.049
EDS4	3.590	4.000	2.000	5.000	2.000	5.000	0.980
IT1	3.862	4.000	2.000	5.000	2.000	5.000	1.140
IT2	3.877	4.000	2.000	5.000	2.000	5.000	1.161
IT3	3.621	4.000	1.000	5.000	1.000	5.000	1.057
IT4	3.390	3.000	2.000	5.000	2.000	5.000	0.951
IT5	3.790	4.000	2.000	5.000	2.000	5.000	0.896
BG1	3.395	3.000	2.000	5.000	2.000	5.000	0.919
BG2	3.687	4.000	1.000	5.000	1.000	5.000	1.050
BG3	3.287	3.000	1.000	5.000	1.000	5.000	0.982
BG4	3.323	3.000	1.000	5.000	1.000	5.000	0.924
BG5	3.292	3.000	2.000	5.000	2.000	5.000	0.935
BG6	3.503	3.000	1.000	5.000	1.000	5.000	1.015

Source: Data processed with Smart-PLS (2025)

The descriptive analysis from a sample of 195 respondents indicates generally favorable perceptions across all observed constructs: Green Value Creation (GVC), Eco-Design Strategy (EDS), Industry Type (IT), and Business Growth (BG). Most mean scores are close to 4.0 on a five-point Likert scale, suggesting moderate to high levels of agreement.

Among the GVC indicators, GVC1 (Mean = 3.985) and GVC2 (Mean = 3.908) had the highest average scores, reflecting strong awareness and implementation of value creation through sustainable practices. However, GVC4 had the lowest mean (3.538), suggesting a possible gap in that particular green innovation element.

For Eco-Design Strategy (EDS), EDS2 scored the highest mean (4.005), indicating that eco-friendly design initiatives are fairly well integrated. All EDS items consistently hover around 4.0, showing relatively uniform implementation across different aspects of eco-design.

The Industry Type (IT) indicators also show consistent responses, with IT2 (Mean = 3.877) and IT1 (Mean = 3.862) slightly outperforming the others. IT4 (Mean = 3.390) had the lowest average, potentially indicating differing perceptions of sustainability across various industry sectors.

In terms of Business Growth (BG), the means tend to be slightly lower, particularly for BG3 (Mean = 3.287) and BG5 (Mean = 3.292), suggesting room for improvement in translating sustainable strategies into actual business performance. Nevertheless, the relatively narrow standard deviation across all items (ranging from 0.896 to 1.161) reflects a consistent response pattern among the sample.

Overall, the results reflect a positive orientation toward green innovation and eco-design, although disparities among indicators point to specific areas requiring managerial focus and policy attention, particularly in enhancing sustainable performance outcomes.

Measurement Model Evaluation (Outer Model Test)

To assess the robustness of the measurement model, item reliability, internal consistency, convergent, and discriminant validity were tested (see **Table 5**). Convergent validity was confirmed as all item loadings exceeded 0.70 and AVE values surpassed 0.50 (Hair et al., 2019). Cronbach's Alpha and Composite Reliability (CR) also exceeded the 0.70 threshold, indicating strong internal consistency (Hair et al., 2021; Santosa, 2018). Discriminant validity was verified using the Fornell Larcker Criterion. The square root value of AVE must be higher than the correlation between latent variables, using the Fornell-Larcker Criteria (Hair et al., 2021). See the result at **Table 6**.

Table 5. Evaluation of Measurement Models

Construct	Code	Loading Factor	Cronbach's Alpha	CR	AVE
Green Value Creation	GVC1	0.912	0.904	0.933	0.778
	GVC2	0.892			
	GVC3	0.909			
	GVC4	0.810			
Eco Design Strategy	EDS1	0.811	0.853	0.901	0.697
	EDS2	0.904			
	EDS3	0.873			
	EDS4	0.741			
Industry Type	IT1	0.877	0.884	0.915	0.685
	IT2	0.885			
	IT3	0.865			
	IT4	0.794			
	IT5	0.702			

Business Growth	BG1	0.843	0.905	0.927	0.679
	BG2	0.887			
	BG3	0.813			
	BG4	0.842			
	BG5	0.796			
	BG6	0.756			

Source: Primary Data Processed with Smart-PLS (2025)

Table 6. Discriminant Validity with the Fornell and Larcker Approach

Construct	Business Growth (BG)	Eco Design Strategy (EDS)	Green Value Creation (GVC)	Industry Type (IT)
Business Growth (BG)	0.824			
Eco Design Strategy (EDS)	0.620	0.835		
Green Value Creation (GVC)	0.399	0.316	0.882	
Industry Type (IT)	0.503	0.718	0.285	0.828

Source: Primary Data Processed with Smart-PLS (2025)

Outer loadings from the measurement model (Table 5) demonstrate that all indicators have standardized factor loadings above the recommended threshold of 0.70 (Hair et al., 2019), confirming strong indicator reliability. For instance, all indicators for Business Growth (BG1–BG6) load significantly, ranging from 0.756 to 0.887, while Eco Design Strategy (EDS1–EDS4) load between 0.741 and 0.904. Similarly, Green Value Creation (GVC1–GVC4) and Industry Type (IT1–IT5) exhibit strong loadings above 0.80, indicating that these indicators are robust and reliable measures of their respective constructs.

Table 5 also presents the construct reliability analysis. All constructs exhibit Cronbach's alpha values exceeding 0.80, with the lowest being 0.853 (Eco Design Strategy), indicating high internal consistency (Hair et al., 2021). Composite Reliability (CR) values, both ρ_a (rho_A) and ρ_c (rho_C), are also above the threshold of 0.70, with values ranging from 0.901 to 0.933, supporting the reliability of the constructs (Hair et al., 2019). While both forms of composite reliability are reported, ρ_c (rho_C) is generally preferred in PLS-SEM due to its more consistent estimation in measuring latent variables (Henseler et al., 2015). The AVE values for all constructs are above the recommended cutoff of 0.50 (Ghozali, 2021; Hair et al., 2019), confirming convergent validity.

According to the Fornell-Larcker criterion (Table 6), the square root of the AVE for each construct (diagonal values) is greater than the

correlation coefficients with other constructs (off-diagonal values), establishing discriminant validity. For instance, the square root of the AVE for Green Value Creation is 0.882, which exceeds its correlations with Eco Design Strategy (0.316), Business Growth (0.399), and Industry Type (0.285). Similar patterns are evident across the other constructs, confirming that each construct is empirically distinct from the others (Ghozali, 2021; [Hair et al., 2019](#); [Henseler et al., 2015](#)).

Structural Model Evaluation (Inner Model Test)

The structural model in this research is subsequently assessed using the R-squared (R^2) value, which reflects the explanatory power of the model. The evaluation begins by examining the R^2 values of each endogenous latent construct. These values offer insights into the degree to which exogenous latent variables account for the variance in endogenous constructs, indicating the significance of their relationships (Ghozali, 2021; Hair et al., 2019). According to ([Hair et al., 2019](#)), an R^2 value exceeding 0.670 indicates a substantial effect, values between 0.330 and 0.670 suggest a moderate impact, and values ranging from 0.190 to 0.330 imply a weak explanatory power.

Table 7. R-Square

Endogenous Variable	R-Square	R-Square Adjusted	Interpretation
Business Growth	0.437	0.422	Moderate Influence

Source: Primary Data Processed with Smart-PLS (2025)

Based on **Table 7**, the R-square value for the endogenous variable *Business Growth* is 0.437, while the adjusted R-square is 0.422. These values indicate that approximately 43.7% of the variance in Business Growth can be explained by the exogenous variables included in the model. According to the threshold suggested by (Hair et al., 2019), an R-square value between 0.330 and 0.670 reflects a moderate level of explanatory power.

This moderate R-square value implies that the constructs such as Green Value Creation, Eco Design Strategy, and Industry Type—either directly or through moderating mechanisms—have a considerable but not exhaustive impact on Business Growth. While the model demonstrates a meaningful level of predictability, it also suggests that other unexamined variables may contribute significantly to the variation in Business Growth. Therefore, future studies are encouraged to explore additional factors that may enhance the predictive capability of the model.

In the subsequent stage, the effect size (F-square) was computed to assess the extent to which each exogenous latent variable contributes to the variance of the corresponding endogenous latent variable. This analysis evaluates whether the inclusion of an external construct meaningfully improves the explanatory power of the model. As outlined by (Ghozali, 2021; [Hair et al., 2019](#)), an F-square value of 0.02 indicates a small effect, 0.15 reflects a moderate effect, and 0.35 or higher represents a large effect. The detailed results of the F-square values are presented in **Table 8**.

Table 8. F-Square

Predictor Variables	Business Growth	Eco Design Strategy	Green Value Creation
Eco Design Strategy	0.122		
Green Value Creation	0.067		
Industry Type	0.009		
Industry Type × Green Value Creation	0.003		
Industry Type × Eco Design Strategy	0.002		

Source: Primary Data Processed with Smart-PLS (2025)

Table 8 displays the F-square values, which reflect the effect size of each exogenous construct on the respective endogenous variables. Following the thresholds proposed by Hair et al. (2019) and Ghozali (2021), an F-square of 0.02 is regarded as small, 0.15 as moderate, and 0.35 or more as large.

- Eco Design Strategy shows a value of 0.122 on Business Growth, indicating a small to approaching moderate effect size. This suggests that while its impact is not dominant, it still contributes meaningfully to explaining variance in business performance.
- Green Value Creation has a value of 0.067, which also represents a small effect, implying a modest but relevant influence on Business Growth.
- The impact of Industry Type on Business Growth is 0.009, indicating a negligible effect, while its interaction effects with Green Value Creation (0.003) and Eco Design Strategy (0.002) are extremely small and statistically weak.

Overall, the results highlight that the two strategic variables—Eco Design Strategy and Green Value Creation—play a more critical role in driving Business Growth, whereas Industry Type and its moderating role do not substantially strengthen these relationships. This may imply that the effectiveness of

green strategies is relatively consistent across different industries.

Table 9. Model Fit

Fit Indices	Saturated Model	Estimated Model
SRMR	0.073	0.073
d_ ULS	1.014	1.017
d_ G	0.419	0.420
Chi-square	441.818	442.455
NFI	0.838	0.838

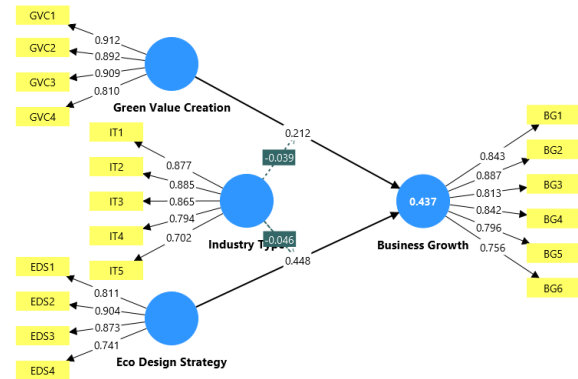
Source: Primary Data Processed with Smart-PLS (2025)

Table 9 presents the model fit indices used to assess the overall adequacy of the structural model. These indicators include Standardized Root Mean Square Residual (SRMR), d_ ULS, d_ G, Chi-square, and Normed Fit Index (NFI).

- The SRMR value of 0.073 for both the saturated and estimated models is below the conservative threshold of 0.08 recommended by (Hair et al., 2019; Henseler et al., 2015), indicating a good model fit between the hypothesized model and the observed data.
- The d_ ULS (1.017) and d_ G (0.420) values represent the discrepancy between the empirical and model-implied correlation matrices. Although no strict cut-off values exist for these indices, values close to those in the saturated model (1.014 and 0.419 respectively) suggest acceptable approximation quality of the estimated model.
- The Chi-square statistic (442.455) is marginally higher than that of the saturated model (441.818), which is expected since the estimated model is typically more constrained. However, in Partial Least Squares Structural Equation Modeling (PLS-SEM), Chi-square is not the primary criterion for model evaluation due to its sensitivity to sample size.
- The NFI (Normed Fit Index) value of 0.838 exceeds the minimum acceptable threshold of 0.80, indicating a moderately good model fit. This reflects that the model explains a substantial proportion of the variance when compared to a null model.

Overall, the reported fit indices provide evidence of an acceptable model fit, supporting the structural validity of the theoretical model tested in this study. These results indicate that the proposed relationships among constructs are consistent with the observed data and meet recommended PLS-SEM quality standards.

Figure 2 shows the path coefficients for the structural equation model.



Source: Primary Data Processed with Smart-PLS (2025)

Figure 2. Structure Equation Model

Hypothesis Testing

Hypothesis testing in this study was conducted using the Bootstrapping feature in Smart-PLS 4. Within the disciplines of economics and management, it is widely recognized that an acceptable significance threshold ranges from 5% to 10%. A hypothesis is considered supported when the T-statistic exceeds 1.960 and the p-value is less than or equal to 0.050, indicating a statistically significant influence between the exogenous and endogenous constructs. Conversely, if the p-value exceeds 0.050 and the T-statistic falls below 1.960, the relationship is not considered statistically significant, implying that the exogenous variables do not exert a meaningful effect on the endogenous variables (Ghozali, 2021; Hair et al., 2019).

Table 10. Hypothesis Testing Results

Hypothesis	Relationship	Path Coefficient (β)	T-Statistic	P-Value	Conclusion
H1	Green Value Creation → Business Growth	0.212	3.112	0.002	Supported
H2	Eco Design Strategy → Business Growth	0.448	4.665	0.000	Supported
H3	Industry Type × Green Value Creation → Business Growth	-0.039	0.611	0.541	Not Supported
H4	Industry Type × Eco Design Strategy → Business Growth	-0.046	0.599	0.549	Not Supported

Hypothesis	Relationship	Path Coefficient (β)	T-Statistic	P-Value	Conclusion
	Business Growth				

Source: Primary Data Processed with Smart-PLS (2025)

The results presented in **Table 10** reveal that Eco Design Strategy (EDS) and Green Value Creation (GVC) exert a significant positive impact on Business Growth (BG), as indicated by their T-statistics (4.665 and 3.112) exceeding the critical value of 1.960 and p-values below 0.050. These findings **support H1 and H2**, demonstrating that eco-conscious strategic initiatives contribute meaningfully to firm performance.

On the other hand, the interaction terms—Industry Type (IT) moderating the effects of GVC and EDS on BG—do not reach statistical significance. Both T-statistics are below the 1.960 threshold (0.611 and 0.599), with corresponding p-values greater than 0.050 (0.541 and 0.549). Therefore, **H3 and H4 are not supported**, suggesting that the type of industry does not significantly alter the relationship between eco-oriented strategies and business growth outcomes.

Discussion

The findings of this study reveal that Eco Design Strategy (EDS) and Green Value Creation (GVC) significantly influence Business Growth (BG), while the moderating role of Industry Type (IT) on these relationships is not statistically significant. These outcomes carry important implications and offer fresh insights into the growing body of research on sustainability-oriented strategies within SMEs.

The significant effect of Eco Design Strategy on Business Growth aligns with previous studies which emphasized that integrating environmental considerations into product design enhances efficiency, innovation, and customer loyalty, all of which contribute to long-term business performance (Siwiece et al., 2025; Wildan et al., 2024). Firms adopting eco-design often reduce material waste and energy consumption, thus decreasing operational costs while enhancing brand image and consumer trust. The results confirm that EDS is not merely a regulatory or ethical obligation, but a strategic tool that supports firm growth in dynamic markets (Hariyani et al., 2024; Wildan et al., 2024).

Similarly, the positive impact of Green Value Creation on business growth corroborates findings from studies such as (González-viralta et al., 2023), who argued that green innovation—particularly when it delivers value that resonates with environmentally

conscious consumers—can lead to competitive advantage. SMEs that successfully embed green value propositions into their offerings are more likely to differentiate themselves, foster stronger customer relationships, and access niche markets.

However, the non-significant moderating effects of Industry Type suggest that the benefits of EDS and GVC are not contingent upon the industrial context. This finding diverges from previous assumptions that environmentally-driven strategies might be more effective in certain sectors, such as manufacturing or energy-intensive industries (Janahi et al., 2021). The absence of moderation implies that green strategies generate value consistently across industry boundaries, offering broader relevance and applicability. The non-significant moderation effect suggests that green strategies may have a universal impact across industries, indicating that industry-specific contingencies may be less critical in determining the success of sustainability initiatives in SMEs. These finding challenges sector-based strategic prescriptions in prior literature. This contributes to the novelty of the current research by demonstrating that sustainability-driven growth is industry-neutral, particularly in the context of emerging economies where environmental awareness is rapidly rising across sectors.

Theoretical Implications

Theoretically, this study extends the Resource-Based View (RBV) and Stakeholder Theory by affirming that intangible assets such as eco-design capabilities and green value creation can function as strategic resources that foster growth. The findings highlight the role of internal capabilities in sustainability as a source of differentiation and competitive advantage (Hunt et al., 2006). Furthermore, by demonstrating that industry type does not moderate these effects, this research contributes to ongoing debates about contextual boundaries in sustainability research, suggesting a move toward more universal frameworks of green strategy adoption.

Practical Implications

From a managerial perspective, the study encourages SME leaders to invest in eco-design and green value creation regardless of their industrial classification. Firms that embrace environmentally responsible practices are more likely to attract loyal customers, improve brand equity, and achieve sustainable growth. Importantly, the results imply that green strategies should not be confined to traditionally “green” industries, but can be adopted broadly to drive performance.

Policymakers and business development agencies may also consider these findings in formulating incentives, training programs, and regulatory frameworks that support green transformation across all sectors, rather than focusing solely on environmentally intensive industries.

CONCLUSION

This study set out to investigate the influence of Eco Design Strategy (EDS) and Green Value Creation (GVC) on Business Growth (BG), while also examining the moderating role of Industry Type (IT). The findings reveal that both EDS and GVC have a significant and positive impact on business growth among SMEs adopting green economic principles. These results affirm the relevance of environmental sustainability as a strategic driver of performance, particularly when embedded within organizational design and value creation processes.

The hypothesis testing shows that **H1** and **H2** are accepted, confirming that GVC and EDS are both significant predictors of BG. This highlights that SMEs that integrate environmentally conscious design strategies and deliver green value to stakeholders are better positioned to achieve sustainable growth. These findings support prior research and offer empirical evidence within the Indonesian SME context, further enriching the literature on sustainable business strategy.

Conversely, hypotheses **H3** and **H4**—which proposed that Industry Type moderates the effect of GVC and EDS on BG—were not supported. This implies that the positive effects of EDS and GVC on BG are consistent across different industry types, suggesting a universal applicability of these green strategies. The absence of moderating effects suggests that SMEs, regardless of sector, can benefit equally from sustainability-oriented initiatives. This contributes to the academic discourse by challenging assumptions that industry specificity dictates the success of green innovation.

Theoretically, this study strengthens the strategic management literature by demonstrating that green innovation strategies are not only ecologically beneficial but also economically advantageous. It provides evidence that supports the Resource-Based View (RBV) and stakeholder theory, emphasizing that environmental capabilities can lead to superior firm performance.

Practically, it encourages SME owners and managers to actively invest in green design and value creation, as these practices drive tangible business benefits regardless of their sector.

Unlike prior studies that suggest sectoral differences in the impact of green strategies, this research demonstrates that such strategies consistently drive business growth across diverse industry types.

Limitations and Future Research

This research is limited by its cross-sectional nature, which restricts the ability to observe long-term impacts of green strategies on growth. Furthermore, the study focused solely on SMEs in four major Indonesian cities, which may limit the generalizability of the results to other regions or large enterprises. Future research should employ longitudinal designs and expand the sample to include a broader range of firm sizes and locations. Moreover, exploring other potential moderating variables such as firm size, innovation capability, or digital readiness could provide deeper insights into the mechanisms that strengthen the sustainability–performance linkage.

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