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The Effect of Green Marketing Education, Green Marketing Knowledge, and Green Marketing Mindset on Students' Green Entrepreneurial Intention

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Abstract:
This study aims to analyze the influence of green marketing education, green marketing knowledge, and green marketing mindset on students' green entrepreneurial intention. A quantitative approach with a cross-sectional survey design was employed. Respondents comprised 233 students from several universities in Indonesia, selected through purposive sampling. Data were collected using a five-point Likert-scale questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results show that green marketing education has a positive and significant effect on green entrepreneurial intention. Green marketing knowledge also has a positive and significant effect. Meanwhile, green marketing mindset has a positive but not significant effect. The R^2 value indicates that the three independent variables are able to explain the variation in green entrepreneurial intention. These findings confirm the importance of education and the strengthening of green marketing knowledge as a direct foundation for building students' intention to run sustainability-oriented businesses through environmentally responsible marketing practices.

Introduction (مقدمة)

Developments in marketing over recent years show a shift in orientation from traditional approaches toward sustainable marketing and green marketing. Green marketing integrates the creation of economic value with concern for the environment through environmentally friendly product, price, distribution, and promotion strategies. In the context of entrepreneurship, green marketing practices have become increasingly relevant because business activities are required

not only to generate profit but also to respond to environmental issues through green product innovation, transparent marketing communication, and sustainable business models (Leonidou et al., 2013; Peattie & Crane, 2005).

The Covid-19 pandemic reinforced the need for alternative sources of employment and income generation. Job losses and economic pressure encouraged society, including students and the younger generation, to consider entrepreneurship as a career option. In this context, green entrepreneurship supported by green marketing practices offers opportunities related not only to economic value creation but also to solving environmental problems and achieving sustainable development goals (Liguori, 2020; Papadas et al., 2017).

Higher education institutions hold a strategic position in shaping students' ability to recognize green market opportunities, develop sustainable business ideas, and design responsible marketing strategies. Green marketing education can build knowledge of green consumer behavior, sustainable marketing communication skills, confidence in marketing environmentally friendly products, and orientation toward sustainability-based business opportunities. When principles of environmental sustainability are integrated into marketing and entrepreneurship education, the learning process can encourage students to understand the relationship between marketing activities and their environmental impact (Ali et al., 2023; Suguna et al., 2024).

In addition to education, green marketing knowledge is an important cognitive resource. Knowledge helps individuals recognize market opportunities, understand the needs and preferences of green consumers, evaluate alternative marketing strategies, and make sustainability-oriented business decisions. In the green context, this knowledge encompasses an understanding of sustainable marketing practices, environmentally friendly product innovation, resource efficiency, and business opportunities arising from society's need for more sustainable products and services (Ludin et al., 2024; Neumann, 2022a; Wang et al., 2025).

Another factor theoretically related to green entrepreneurial intention is green marketing mindset. This mindset describes an individual orientation that considers environmental sustainability in the marketing thought process and entrepreneurial decision-making. Modern marketing education can contribute to developing this mindset through the introduction of environmental issues, green market opportunities, and sustainable marketing competencies (Inga Uvarova & Atstaja, 2021; Papadas et al., 2017).

Previous studies have examined the relationship between education, knowledge, mindset, and green entrepreneurial intention. However, earlier research models often used more complex structures by positioning knowledge and mindset in mediating relationships. This article simplifies the model into three independent variables that are directly predicted to affect one dependent variable. This more parsimonious model allows the study to focus attention on the relative strength of green marketing education, green marketing knowledge, and green marketing mindset as factors directly related to students' green entrepreneurial intention.

Based on this background, this study aims to analyze the influence of green marketing education, green marketing knowledge, and green marketing mindset on students' green entrepreneurial intention. Specifically, this study tests three direct relationships, namely green marketing education toward green entrepreneurial intention, green marketing knowledge toward green entrepreneurial intention, and green marketing mindset toward green entrepreneurial intention.

Literature Review

Green Marketing Education and Green Entrepreneurial Intention

Green marketing education is a learning process that combines marketing competence with environmental sustainability principles. This education can improve students' ability to recognize green market opportunities, understand environmental issues, design a responsible marketing mix, and develop sustainable business solutions. Previous research shows the importance of education and the learning ecosystem in shaping green entrepreneurial intention (Ali et al., 2023). Based on this argument, the first hypothesis is formulated as follows.

H1: Green marketing education has a positive and significant effect on green entrepreneurial intention.

Green Marketing Knowledge and Green Entrepreneurial Intention

Green marketing knowledge refers to students' understanding of sustainability-oriented marketing principles, including environmentally friendly product marketing practices, green innovation, green consumer behavior, market needs, and business opportunities related to solving environmental problems. Adequate knowledge can help individuals identify market opportunities and make more informed marketing and entrepreneurial decisions (Chen & Chang, 2013; Papadas et al., 2017). Based on this argument, the second hypothesis is formulated as follows.

H2: Green marketing knowledge has a positive and significant effect on green entrepreneurial intention.

Green Marketing Mindset and Green Entrepreneurial Intention

Green marketing mindset describes an individual's tendency to consider environmental sustainability when viewing market opportunities, solving marketing problems, and making entrepreneurial decisions. Conceptually, this mindset can serve as the basis for the emergence of an orientation toward environmentally responsible business. Inga Uvarova & Atstaja (2021) demonstrate the relevance of modern entrepreneurship education in developing a green entrepreneurial mindset. Therefore, this study proposes a positive relationship between green marketing mindset and green entrepreneurial intention.

H3: Green marketing mindset has a positive and significant effect on green entrepreneurial intention.

Research Framework

The research framework shows three direct effect pathways, namely green marketing education toward green entrepreneurial intention (H1), green marketing knowledge toward green entrepreneurial intention (H2), and green marketing mindset toward green entrepreneurial intention (H3). There is no mediating variable in this research model.

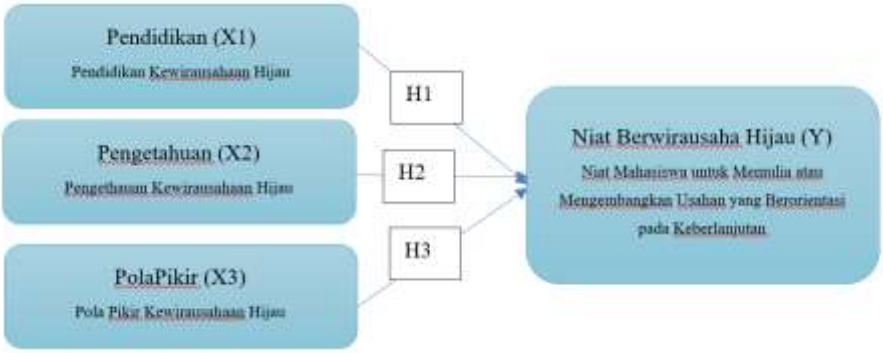

Figure 1. Research Framework

Method (منهج)

This study uses a quantitative approach with a cross-sectional survey design. The research model consists of three independent variables, namely green marketing education, green marketing knowledge, and green marketing mindset, and one dependent variable, namely green entrepreneurial intention. Data analysis uses Partial Least Squares Structural Equation Modeling (PLS-SEM).

The study population comprises students in Indonesia who have received entrepreneurship/marketing education and/or have been involved in entrepreneurial activities. Sampling was conducted using purposive sampling. These criteria were used to ensure that respondents had experience relevant to the research context. Data collection was carried out through an online questionnaire using Google Forms. Of the 234 questionnaires received, 233 responses were deemed suitable for analysis after the screening process.

The research instrument uses a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The instrument was adapted from previous studies in the fields of green marketing and sustainable entrepreneurship and underwent a two-way translation process. Evaluation of the measurement model was conducted through internal reliability, convergent validity, and discriminant validity. Reliability was assessed using Cronbach's Alpha, rho_A, and Composite Reliability. Convergent validity was assessed through Average Variance Extracted (AVE), while discriminant validity was evaluated using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. The structural model was evaluated through Variance Inflation Factor (VIF), R^2, f^2, Q^2, and path coefficient testing through the bootstrapping procedure.

Variable Operationalization

Table 1. Operationalization of Research Variables

Variable	Code	Operational Definition	Number of Indicators
Green Marketing Education	X1	Students' perception of the learning process that provides marketing knowledge, skills, and experience by incorporating environmental sustainability principles.	5
Green Marketing Knowledge	X2	Students' understanding of market opportunities, marketing practices, innovation, and business processes that integrate environmental sustainability.	5
Green Marketing Mindset	X3	Students' thinking orientation that considers sustainability and environmental impact in recognizing market opportunities and making marketing and entrepreneurial decisions.	5
Green Entrepreneurial Intention	Y	Students' desire, commitment, and tendency to start or develop a sustainability-oriented business through environmentally responsible marketing practices.	6

Result (نتائج)

Respondent Characteristics

A total of 233 respondents were deemed suitable for analysis. The respondent composition was dominated by females, totaling 163 people (70%), while males totaled 70 people (30%). Respondents came from seven universities with diverse study program backgrounds. The distribution of semesters was relatively varied, so this study does not represent only a single academic level.

Table 2. Respondent Characteristics

Characteristic	Category	Frequency	Percentage
Gender	Female	163	70.00%
	Male	70	30.00%
Semester	2	48	18.00%
	4	59	22.00%
	6	58	21.00%
	5	9	3.00%
	7	10	3.00%
	1/not stated	82	31.00%

Measurement Model Evaluation

The results of the measurement model evaluation show that all constructs meet the internal reliability criteria. Cronbach's Alpha values range from 0.880 to 0.929, while Composite Reliability ranges from 0.918 to 0.944. All AVE values are also above 0.50, ranging from 0.731 to 0.750. Thus, the research constructs meet the criteria for reliability and convergent validity.

Table 3. Reliability and Convergent Validity

Variable	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Green Marketing Education	0.929	0.932	0.944	0.737
Green Entrepreneurial Intention	0.880	0.882	0.918	0.737
Green Marketing Knowledge	0.915	0.917	0.937	0.750
Green Marketing Mindset	0.925	0.930	0.942	0.731

Discriminant validity also shows adequate results. The square root of AVE values in the Fornell-Larcker criterion is higher than the correlations between the related constructs. HTMT values between constructs range from 0.611 to 0.742, all of which are below the 0.90 threshold. These results indicate that each construct has empirically distinguishable characteristics.

Table 4. Fornell-Larcker Criterion

	Education	Intention	Knowledge	Mindset
Education	0.859			
Intention	0.677	0.858		
Knowledge	0.683	0.645	0.866	
Mindset	0.664	0.555	0.689	0.855

Table 5. Heterotrait-Monotrait Ratio (HTMT)

	Education	Intention	Knowledge	Mindset
Education	—	—	—	—
Intention	0.742	—	—	—
Knowledge	0.733	0.714	—	—

Mindset	0.713	0.611	0.740	—

Structural Model Evaluation

Multicollinearity testing shows that VIF values for relationships toward green entrepreneurial intention are below 5.00, namely 2.162 for green marketing education, 2.301 for green marketing knowledge, and 2.196 for green marketing mindset. Thus, there is no indication of multicollinearity disrupting the structural model.

Table 6. Variance Inflation Factor (VIF)

Predictor toward Y	VIF	Note
Green Marketing Education → Green Entrepreneurial Intention	2.162	No multicollinearity
Green Marketing Knowledge → Green Entrepreneurial Intention	2.301	No multicollinearity
Green Marketing Mindset → Green Entrepreneurial Intention	2.196	No multicollinearity

The R^2 value for green entrepreneurial intention is 0.522, indicating a moderate level of explanatory power. This means that green marketing education, green marketing knowledge, and green marketing mindset are jointly able to explain 52.2% of the variation in green entrepreneurial intention, while the remaining 47.8% is explained by other factors outside the model. The adjusted R^2 value is 0.516.

Table 7. Coefficient of Determination (R^2)

Endogenous Variable	R^2	R^2 Adjusted	Note
Green Entrepreneurial Intention	0.522	0.516	Moderate

Effect size analysis shows that green marketing education has an f^2 of 0.173 toward green entrepreneurial intention, which is categorized as moderate. Green marketing knowledge has an f^2 of 0.093, categorized as small, while green marketing mindset has an f^2 of 0.003, indicating a very small effect. These results show that education is the most dominant predictor compared to the other two predictors.

Table 8. Effect Size (f^2)

Predictor	f^2 toward Y	Interpretation
Green Marketing Education	0.173	Moderate
Green Marketing Knowledge	0.093	Small
Green Marketing Mindset	0.003	Very small

Predictive relevance testing shows that the Q^2 value is greater than zero, indicating that the model has predictive relevance. In addition, full collinearity testing shows that all VIF values are below 3.3, so there is no indication of common method bias based on the criteria used.

Hypothesis Testing

Table 9. Hypothesis Testing Results

Hypothesis	Relationship	Path Coefficient	t-statistic	p-value	Decision
H1	Education → Intention	0.422	5.568	<0.001	Supported
H2	Knowledge → Intention	0.319	3.564	<0.001	Supported
H3	Mindset → Intention	0.055	0.714	0.238	Not supported

Hypothesis testing was conducted using PLS-SEM bootstrapping with a one-tailed testing criterion at a 5% significance level. The critical value used was 1.645. Green marketing education has a positive and significant effect on green entrepreneurial intention ($\beta = 0.422$; $t = 5.568$; $p <$

0.001), so H1 is supported. Green marketing knowledge also has a positive and significant effect on green entrepreneurial intention (β = 0.319; t = 3.564; p < 0.001), so H2 is supported. In contrast, green marketing mindset has a positive but not significant coefficient (β = 0.055; t = 0.714; p = 0.238), so H3 is not supported.

Discussion (مناقشة)

The results show that green marketing education is the strongest predictor of green entrepreneurial intention. This finding indicates that learning experiences that specifically connect marketing with sustainability can build students' readiness to consider green business as a viable option. Education not only provides knowledge about the marketing mix but can also introduce examples of green businesses, market opportunities among environmentally conscious consumers, environmental problems, and ways to turn these problems into business opportunities through responsible marketing strategies. This finding is consistent with Ali et al. (2023), who position education and ecosystem support as important factors in the development of green entrepreneurial intention, as well as with the green marketing literature that emphasizes the role of education in shaping sustainable marketing capability (Leonidou et al., 2013; Papadas et al., 2017).

Green marketing knowledge is also proven to have a positive and significant effect. These results show that entrepreneurial intention cannot be built through motivation alone but requires an understanding of how product, price, distribution, and marketing communication can be designed and implemented sustainably. Students who understand green market opportunities, sustainable marketing practices, environmentally friendly product innovation, and environmental challenges have a stronger cognitive foundation for assessing the feasibility of green businesses. This finding reinforces the argument that knowledge is an important resource in the process of identifying market opportunities and making marketing and entrepreneurial decisions (Chen & Chang, 2013; Neumann, 2022b).

In contrast, green marketing mindset does not show a significant effect on green entrepreneurial intention. Although the path coefficient is positive, the relationship is statistically non-significant. This result is interesting because, theoretically, an environmentally oriented mindset should encourage the intention to engage in green entrepreneurship. One possible explanation is that a sustainability-oriented mindset remains at the level of general awareness and value orientation, but has not yet been translated into concrete entrepreneurial intention among students. Without sufficient green marketing knowledge and practical exposure, students may recognize the importance of environmental issues yet still feel uncertain about how to turn that orientation into a viable green business. In other words, mindset alone may function as a foundational orientation, but it requires applicable marketing knowledge and educational experience to be converted into entrepreneurial intention.

This finding is consistent with previous studies that suggest green entrepreneurial mindset or sustainability orientation does not always exert a direct and significant effect on entrepreneurial intention when knowledge, skills, or perceived feasibility are limited (Inga Uvarova & Atstaja, 2021). Some prior research also indicates that environmental awareness or green values tend to influence intention more strongly when mediated by knowledge, self-efficacy, or institutional support. Therefore, the non-significant effect of green marketing mindset in this study does not necessarily mean that mindset is unimportant; rather, it suggests that mindset needs to be supported by more concrete educational and cognitive resources before it can effectively shape green entrepreneurial intention.

Overall, the findings suggest that strengthening green marketing education and knowledge is more directly important than merely building a mindset. Universities can use these findings to develop green marketing learning that does not stop at raising environmental awareness but continues with mastery of market knowledge, sustainable business models, product innovation, resource management, credible marketing communication, and hands-on experience in prototyping green ventures.

Conclusion (خاتمة)

This study shows that green marketing education and green marketing knowledge have a positive and significant effect on students' green entrepreneurial intention. Green marketing education emerges as the relatively strongest predictor, while green marketing knowledge also makes a significant positive contribution. In contrast, green marketing mindset has a positive but non-significant effect on green entrepreneurial intention. The research model produces an R^2 of 0.522, indicating that the three independent variables together explain 52.2% of the variation in green entrepreneurial intention.

These findings indicate that the development of green entrepreneurship in higher education needs to position green marketing education and knowledge as the primary foundation. A sustainability-oriented mindset remains important as a value base, but it is not sufficient on its own to generate entrepreneurial intention without adequate knowledge and structured learning experiences.

Practically, these results suggest that entrepreneurship education programs should integrate green marketing content more systematically into the curriculum. Universities can strengthen students' green entrepreneurial intention by providing courses or modules that combine sustainability principles with marketing strategy, market opportunity analysis, green product development, and hands-on business project experience. In addition, learning activities should move beyond raising environmental awareness and focus more on building applied knowledge and practical competence so that students are better prepared to translate sustainability values into concrete green business initiatives.

Future research is recommended to expand the sample, use a longitudinal design, and include additional variables such as green marketing self-efficacy, university support, social support, perceived behavioral control, entrepreneurial experience, and green market orientation.

Author Contributions

Sri Nitta Crissiana Wirya Atmaja, as the first author, contributed to the conceptualization of the study, development of the research framework, data analysis, interpretation of results, and manuscript preparation. Dodi Ria Atmaja, as the second author, contributed to data collection, processing of research materials, manuscript review, and critical revision of the article.

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Competing Interests

The authors declare that there are no competing interests that could influence the research or the interpretation of its results.

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