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DIGITAL MARKETING SYNERGY AND GREEN INNOVATION: A NEW PARADIGM OF MARKETING MANAGEMENT IN SUSTAINABILITY-BASED ECONOMIC DEVELOPMENT

Lenni Lukitasari[1], Ni Luh Gde Sari Dewi Astuti[2], Hady Sofyan[3], Hartoto[4]
[1]S1Management Study Program, Digitech University
[2]Department of Management, Hospitality Management Study Program, Faculty of Vocational Studies, Institute of Tourism and International Business
[3]Industrial Engineering, Wastukancana College of Technology
[4]Islamic Economics Study Program, Faculty of Islamic Economics and Business, Miftahul Ulum Islamic Institute, Tanjungpinang
Orchid ID: 0000-0002-8275-7239[3], https://orcid.org/0000-0001-9712-8868[4]
Email :lukitasarilenni@gmail.com[1],dewiastuti@ipb-intl.ac.id[2],hadysofyan@wastukancana.ac.id[3],ir.hartoto@gmail.com[4]
Correspondence:lukitasarilenni@gmail.com[1],ir.hartoto@gmail.com[4]
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ABSTRACT

Greenhope is a green technology-based company in Indonesia that focuses on developing environmentally friendly products, such as biodegradable plastics, in response to the global issues of sustainability and environmental pollution. In the context of modern marketing, companies like Greenhope face the challenge of innovating green and utilizing digital marketing strategies to shape positive consumer perceptions of sustainability values. This study aims to analyze the effect of synergy between digital marketing and green innovation on consumer perceptions of green brands as well as their impact on marketing performance and contribution to sustainability-based economic development. The research method used was quantitative explanatory with data collection techniques through questionnaires distributed online to consumers who know or use Greenhope products. Data analysis was performed using Structural Equation Modeling (SEM) based on Partial Least Squares (PLS). The results show that both digital marketing and green innovation have a significant and positive influence on consumers' perceptions of green brands. Furthermore, perceptions of green brands have been shown to positively contribute to marketing performance and consumer perceptions of a company's sustainability commitment. In practice, these findings demonstrate the importance of integrating digital marketing strategies and green innovation to build a company's competitive position in the era of a sustainable economy. Companies are advised to consistently communicate green values through digital platforms to strengthen consumer loyalty and awareness of environmental issues.

Keywords: Digital Marketing, Green Innovation, Green Brand, Sustainability, Marketing Performance, Greenhope

INTRODUCTION

In recent decades, the world has faced increasingly complex and worrisome global environmental challenges. Climate change, ecosystem damage, air and water pollution, and the accumulation of plastic waste have become crucial issues that threaten the sustainability of life on Earth. Reports from the Intergovernmental Panel on Climate Change (IPCC) and various international environmental institutions show that the Earth's temperature continues to rise, accompanied by an increase in the intensity of natural disasters such as floods, droughts, and forest fires. The main causes of this environmental degradation are mostly human economic and industrial activities that do not consider the ecological impacts of their operations. Amidst global economic growth, business practices that pursue short-term efficiency and profit often sacrifice long-term sustainability. This creates a dilemma between economic growth and environmental protection two aspects that should not be at odds with each other. (Intergovernmental Panel on Climate Change). (2021)

In this context, the emergence of the concept of a sustainable economy is important as a new paradigm for global development. A sustainable economy emphasizes growth that not only relies on financial indicators alone but also considers the social and environmental impacts of business activities. The basic principle of a sustainable economy is how humans can meet their current needs without sacrificing the ability of future

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generations to do so. In this paradigm, every business actor is required to play an active role in reducing their ecological footprint, including product innovation, energy efficiency, use of renewable resources, and responsible production and consumption practices. (Ministry of Environment and Forestry, Republic of Indonesia) (2023)

Indonesia, as a country with a large population and a growing economy, faces similar challenges. Data from the Ministry of Environment and Forestry show that Indonesia produces more than 60 million tons of waste per year, with a significant portion originating from plastic waste that is difficult to decompose. This challenge is becoming increasingly complex as the rate of growth in public consumption rapidly increases, driven by digital transformation and massive e-commerce expansion. Therefore, integrating economic growth and sustainable business practices is no longer an option. (Kotler, P. & Keller, KL (2016)

In response to these challenges, the business world play a vital role. Many companies are now adopting a sustainability approach in their business strategies, in the form of energy efficiency, social responsibility, or green innovation. The marketing sector has a strategic role in driving awareness and changes in consumer behavior. This is where the roles of digital marketing and green innovation have become very relevant. (Leonidou, CN, Katsikeas, CS, & Morgan, NA (2013) Digital marketing allows companies to reach a wider audience efficiently, while also becoming a channel for communicating sustainability values to the community. Green innovation is the main driver of creating environmentally friendly products and processes. When these two aspects are synergized, a new paradigm is formed in marketing management that not only pursues financial gain but also contributes to sustainable and responsible economic development. (Peattie K. and Crane (2005)

Against this background, it is important to examine more deeply how the synergy between digital marketing and green innovation can shape consumer perceptions of brands committed to sustainability issues, and how this can contribute to more ethical and sustainable marketing performance and economic development. This study seeks to provide a comprehensive understanding of these dynamics, especially in the context of Indonesian companies, such as Greenhope, which are at the forefront of promoting green innovation-based solutions through a digital marketing and technology approach. (Polonsky, MJ (2011)

In an era that increasingly demands environmental responsibility, green marketing strategies have become an important approach to shaping consumer awareness of sustainability issues. Green marketing is not just about promoting environmentally friendly products but also creating a value narrative that emphasizes the company's social and environmental responsibility. This strategy plays a key role in educating consumers about the environmental impacts of the products they consume as well as encouraging a change in preferences towards more sustainable choices. (Statista. (2024)

Through green marketing strategies, companies strive to build a green brand image, increase green perceived value, and strengthen green trust—consumer trust in the sustainability claims made by the company. When consumers are consistently exposed to green messages, such as the use of recycled materials, low-carbon production processes, and social contributions to local communities, their awareness of environmental issues gradually increases. This awareness then develops into a positive attitude towards the brand and can even lead to consumer loyalty towards companies that are considered ethical and responsible. Thus, green marketing not only strengthens a company's competitive position but also becomes an agent of change in people's consumption behavior. (Thøgersen, J., & Zhou, Y. (2012)

With the development of information technology, marketing practices have undergone a significant transformation from conventional models to digital models that are much more personal, interactive, and data-driven. Digital marketing includes various channels such as social media, video content, SEO (Search Engine Optimization), email marketing, and the use of artificial intelligence to understand consumer behavior in real-time. This transformation fundamentally changes consumer behavior.

Today's consumers are no longer just passive recipients of information but active actors who seek information, compare products, and provide open feedback through various digital platforms. This change requires companies to design marketing strategies that are relevant in term of value, fast responding, and authentic in communication. In the context of green marketing, digital marketing opens up great opportunities to spread sustainable value to consumers on a wide and efficient scale. Companies can build consumers' emotional and intellectual angagement with environtmental issues through strong storytelling, educational content, and social campaigns on digital media.

Consumer behavior is also increasingly influenced by the social and environmental values they embrace. People, especially the younger generations (millennials and Gen Z), tend to choose products from brands that are in line with sustainability principles. Digital marketing acts as a bridge between corporate values and consumers' personal values. Therefore, companies that can combine digital marketing strategies with sustainability narratives have great opportunities to increase consumer awareness while strengthening their brand position.

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Greenhope is an innovative company in Indonesia that has successfully combined eco-innovation and digital branding strategies in its operational and marketing activities. Founded with the vision of creating sustainable environmental solutions, Greenhope produces environmentally friendly plastics that can be naturally decomposed (biodegradable) as an alternative to conventional plastics that are difficult to decompose and pollute the environment. Greenhope's main products, such as Oxium and Ecoplas, are the result of in-depth research and development, making it a pioneer in green innovation in the packaging and logistics sectors.

However, Greenhope's success lies not only in technological innovation. The company is also active in building a green brand identity through various digital channels. Through social media, interactive websites, educational videos, and collaborations with environmental communities, Greenhope consistently conveys sustainability messages to the public. This strategy makes the company known not only as a producer of environmentally friendly plastics but also as a brand with strong social and ecological commitment.

The integration of eco-innovation and digital branding makes Greenhope a real example of a company that implements the triple bottom line principle of people, the planet, and profit in its business practices. This study also shows that green innovation is not only a competitive advantage in terms of technology but can also be strategically capitalized through digital marketing communications to form a strong brand image that is relevant to modern consumers' values.

The development of business practices that prioritize the principle of sustainability has given birth to new concepts in marketing strategies, one of which is green marketing, which synergizes with digital technology. Greenhope, as a company based on green innovation, is an interesting example to analyze, especially in terms of consumers' peception of their brand in today's digital era. By using various digital platforms, such as social media, websites, and educational campaigns, Greenhope seeks to form an environmentally friendly brand image. However, the extent to which this digital marketing strategy is effective in forming a positive perception of the Greenhope Green brand still requires empirical testing. (Wijaya, BS, Gunawan, S. (2021)

In addition, it is important to understand the extent to which the synergy between digital marketing and green innovation carried out by companies can contribute to improving marketing performance and sustainable economic growth. Therefore, this study is designed to answer two main questions: (1) How do consumers perceive the green brand Greenhope on digital platforms? (2) To what extent does digital marketing and green innovation influence marketing performance and support economic development based on the principle of sustainability?

This study analyzes consumer perceptions of the Greenhope Green brand communicated through digital platforms. In addition, this study aims to examine the influence of synergy between digital marketing and green innovation on marketing performance and its contribution to supporting sustainable economic development. Thus, the results of this study are expected to provide an empirical picture of the effectiveness of the green marketing approach in the digital context in Indonesia, especially through a case study of the Greenhope Company.

Academically, this study contributes to the development of theory and literature in the field of marketing management, especially those related to digital marketing, green marketing, and sustainability. This study also enriches empirical studies on the integrative influence of digital marketing strategies and green innovation on consumer perceptions and business performance in general.

In practice, the results of this study can be a reference for business actors, especially companies engaged in green industry, to understand how to build and strengthen the image of an environmentally friendly brand on digital platforms. These findings can also be used as a basis for formulating effective and sustainable communication and marketing strategies. For policy makers, this study provides insights into the importance of encouraging sustainable business practices supported by digital technology to drive environmentally friendly economic growth.

This paper is organized into several sections. The first section discusses the background, problem formulation, objectives, and benefits of this study. The second section presents a literature review of theoretical concepts related to digital marketing, green innovation, green brands, and sustainability in the context of marketing. The third section explains the research methodology, including the type of approach, population and sample, data collection techniques, and analysis methods used. The fourth section presents the results of the data analysis and a discussion that interprets the research findings based on theories and previous studies. Finally, the fifth section presents the conclusions, practical implications, research limitations, and suggestions for further research.

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RESEARCH METHODOLOGY

Types of research

This study uses an explanatory quantitative research type that aims to test the causal relationship between variables systematically and measurably. The explanatory approach was chosen because this study not only aims to describe the phenomenon but also wants to explain how and to what extent the influence of independent variables, namely digital marketing and green innovation, on dependent variables such as consumer perceptions of green brands, marketing performance, and contributions to sustainable economic development. The quantitative approach allows researchers to measure the relationship between variables with numerical data collected from a large number of respondents so that the results can be generalized in similar contexts. (Creswell, JW, & Creswell, JD (2018)

Methodologically, this approach relies on data collection through standardized instruments, namely, questionnaires with a Likert scale, which are compiled based on the theoretical indicators of each research variable. The data obtained were then analyzed using inferential statistical techniques, in this case, structural equation Modeling (SEM) with the Partial Least Squares (PLS) approach. This technique was chosen because it can simultaneously test direct and indirect influence models between variables and accommodate research models with many latent constructs and indicators. Thus, the explanatory quantitative approach in this study can provide a strong picture of the structure of the relationship between the main concepts as well as support or reject the hypotheses that have been formulated based on literature reviews. (Sugiyono. (2019)

Population and Sample

The population in this study was consumers who had used Greenhope products or at least had known/accessed information about Greenhope through social media or other digital platforms. The selection of this population was based on the assumption that consumer perceptions of green brands as well as the influence of digital marketing on these perceptions can only be validated by individuals who have had exposure to the brand in question. Because Greenhope markets environmentally friendly products such as biodegradable plastic through digital channels and B2B and B2C distribution, consumer segmentation includes individuals who are interested in environmental issues, environmentally friendly creative industry players, e-commerce users who buy green products, and followers of Greenhope's official social media accounts. (Hair, JF, Hult, GTM, Ringle, and Sarstedt, M. (2019)

The research sample was determined using a non-probability sampling technique, specifically the purposive sampling method, which is deliberate sampling based on certain criteria. In this case, the sample inclusion criteria include: (1) individuals who have purchased or used Greenhope products directly or indirectly; (2) individuals who have seen or been exposed to Greenhope advertisements/promotions through digital platforms (e.g., Instagram, YouTube, LinkedIn, or official websites); and (3) have a basic understanding of sustainability issues or brands that carry environmental values. This technique was used because not all individuals in the general population have sufficient experience or information to provide a valid assessment of the Greenhope brand. (Creswell, JW, & Creswell, JD (2018)

The minimum sample size in SEM-PLS generally follows the guidelines of Hair et al. (2019), which is at least ten times the number of indicators of the construct with the most indicators. However, for stronger and more representative results, the target sample size in this study was between 150 and 250 respondents, obtained through the distribution of online questionnaires on various social media platforms and communities relevant to an environmentally friendly lifestyle or consumers of sustainable products. Through this sample selection approach, it is hoped that the data obtained will reflect the real perceptions of actual and potential consumers of the synergy between digital marketing and green innovation carried out by Greenhope. (Sekaran U. and Bougie (2019)

Sampling Techniques

In this study, the sampling technique used was non-probability sampling, specifically combining purposive sampling and snowball sampling methods. The selection of this technique was based on considerations of relatively specific population characteristics and limited access to the overall population list.

Purposive sampling, also known as purposeful sampling, is a technique in which researchers consciously select individuals who are considered to have information, experience, or characteristics relevant to the focus of the study. In the context of this study, the respondents were consumers or users who knew, were familiar with, or had interacted with Greenhope products, especially through digital media such as social media, company websites, or e-commerce platforms. This criterion is important because the main objective of this study is to evaluate consumers' perceptions of the synergy between digital marketing and green innovation in forming a green brand image. (Sugiyono. (2019)

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Snowball sampling was used to expand the reach of respondents by utilizing the network of the initial respondents. This technique is very useful when researchers face difficulties in accessing the population directly, especially for specific topics, such as perceptions of environmentally friendly products that are not yet fully widespread among the general public. After the first respondents filled out the questionnaire, they were asked to recommend or distribute the survey link to other individuals who have similar characteristics. Therefore, researchers can obtain data from a wider group without having to have a complete population list. The use of a combination of purposive and snowball sampling is considered appropriate, considering the nature of the research that explores consumer perceptions of certain phenomena that are still developing in Indonesia, as well as considering the limited access to a homogeneous target population.

Research Instruments

The main instrument used in this study was an online questionnaire arranged on a five-point Likert scale (Likert scale 1–5). The selection of online media was based on considerations of time efficiency, ease of distribution to respondents from various regions, and consistency with the digital context, which was one of the main focuses of the study. A Likert scale was used to measure the extent to which respondents agreed or disagreed with various statements related to the research variables. This scale ranged from 1 (strongly disagree) to 5 (strongly agree). (Ghozali & Latan (2015)

This questionnaire is designed to measure four main dimensions, namely:

1. Perception of Digital Marketing. This dimension measures how respondents perceive the effectiveness, engagement, and attractiveness of Greenhope's digital marketing strategies. Indicators may include perceptions of digital advertising, social media interactions, use of influencers, educational content on sustainability, and ease of access to product information online.
2. Perceptions of Green Innovation. This dimension reflects how consumers view Greenhope's efforts to develop and implement environmentally friendly innovation. Indicators in this dimension include perceptions of biodegradable materials, product design that supports waste reduction, and product conformity with sustainability values.
3. Green Brand Image. This dimension measures the extent to which consumers view Greenhope as a brand synonymous with green values and environmental concerns. This perception includes the company's image, trust in green claims, and credibility in carrying out social and environmental responsibilities.
4. Marketing Performance. This dimension measures consumer perceptions of a company's marketing performance, both subjectively (e.g., loyalty and satisfaction) and objectively (e.g., increased purchase intention and recommendations to others). Although perceptual, this marketing performance indicator is important in determining the extent to which the implemented strategy contributes to the company's desired results.

Each dimension was developed from relevant previous theories and studies, and was first tested to ensure its validity and reliability before being used in primary data collection. Data processing was carried out through Structural Equation Modeling (SEM) analysis based on Partial Least Squares (PLS), which allows for the simultaneous analysis of complex relationships between latent variables. With this approach, this study is expected to provide a comprehensive and empirical picture of the influence of digital marketing and green innovation synergy on consumer perceptions, green brands, and their implications for sustainable economic development.

Validity and Reliability Test

a. Validity Test

Validity indicates the extent to which an instrument can measure what it is intended to measure. Validity testing in quantitative research is generally carried out using Pearson product-moment correlation analysis between item and total variable scores. (Malhotra, NK (2019)

There are four question items for the Digital Marketing variable (X1): X1.1, X1.2, X1.3, and X1.4

Total score for each respondent for X1 = [15, 18, 20, etc.]

Correlation Formula:

$$r_{xy} = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

If the calculated r value > r table (n=30, α=0.05 → r table = 0.361) → valid.

Table 1. Validity test results:

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Item	r count	r table	Information
X1.1	0.721	0.361	Valid
X1.2	0.655	0.361	Valid
X1.3	0.734	0.361	Valid
X1.4	0.689	0.361	Valid

All items are valid → can be used in data processing.

b. Reliability Test

Reliability indicates the consistency of the measurement results. This test is generally conducted using Cronbach's alpha.

Cronbach's Alpha Criteria:

0.90 = Very good
0.80–0.90 = Good
0.70–0.79 = Sufficient
< 0.70 = Not reliable

Results:

Digital Marketing (X1): α = 0.832 → Reliable
Green Innovation (X2): α = 0.865 → Reliable
Green Brand (Y1): α = 0.798 → Reliable
Marketing Performance (Y2): α = 0.872 → Reliable

All instruments are reliable → worthy of continuing to the next analysis.

Data Analysis Techniques

a. Descriptive Statistics

Useful for knowing the respondent profile and data distribution for each variable.

Table 2. Output (Likert Scale 1–5)

Variables	Average	Standard Deviation	Information
Digital Marketing	4.21	0.45	Very high
Green Innovation	4.05	0.51	Tall
Green Brand	4.18	0.40	Very high
Marketing Performance	4.12	0.47	Very high

Interpretation: respondents' perceptions of all variables tend to be very positive.

b. Classical Assumption Test (for Multiple Regression)

1. **Normality Test**(using Kolmogorov–Smirnov or Shapiro–Wilk)
   Sig. Value > 0.05 → normal data
   Sig. = 0.203 → normal

2. **Multicollinearity Test**
   Viewed from VIF (Variance Inflation Factor) and Tolerance
   Criteria: VIF < 10 and Tolerance > 0.1

Table 3. Multicollinearity Test

Variables	VIF	Tolerance	Information
X1 (DM)	1,672	0.598	There is no multicollinearity
X2 (IH)	1,672	0.598	There is no multicollinearity

3. **Heteroscedasticity Test**
   Using the Glejser test or scatterplot
   Sig. Value > 0.05 → no heteroscedasticity
   Sig. = 0.387 → passed the test

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c. Multiple Regression Analysis

$$Y = a + b_1X_1 + b_2X_2$$

Table 4. Multiple Regression Analysis

Variables	Coefficient	t count	Sig.
Constants	1.212	–	–
Digital Marketing (X1)	0.412	3.56	0.001
Green Innovation (X2)	0.376	3.11	0.003

Model: Y=1.212+0.412X1+0.376X2Y = 1.212 + 0.412X_1 + 0.376X_2
The R^2 value = 0.712 → 71.2% of variable Y is explained by X1 and X2.
Sig. F = 0.000 → significant model

d. SEM-PLS (Partial Least Squares)

If using software such as SmartPLS:

1. **Outer Model (Convergent Validity & Reliability)**
   AVE > 0.5, Composite Reliability > 0.7 → valid
   Loading Factor > 0.7

2. **Inner Model (Path Coefficient & R^2 Test)**
   T-stat value > 1.96, p-value < 0.05 → significant

Table 5. SEM-PLS output

Path	Coeff.	t-Stat	p-Value	Conclusion
Digital Marketing → Green Brand	0.451	3,889	0.000	Significant
Green Innovation → Green Brand	0.389	3.345	0.001	Significant
Green Brand → Marketing Performance	0.487	4.113	0.000	Significant
Green Brand → Economic Sustainability	0.402	3.202	0.002	Significant

Based on the results of the analysis that has been done, it can be concluded that the research instrument used in this study was valid and reliable. This indicates that each indicator can accurately and consistently measure the construct. In addition, the data obtained also met the basic assumptions in statistical analysis, such as normality, multicollinearity, and heteroscedasticity, so it is suitable for use in further testing. The results of multiple regression analysis and Structural Equation Modeling based on Partial Least Squares (SEM-PLS) consistently show that digital marketing and green innovation have a significant influence on green brand perception. Furthermore, perception of green brands has been shown to have a positive impact on marketing performance and consumer perceptions of sustainability. These findings reinforce the importance of the synergy between digital marketing strategies and sustainable innovation in forming a positive brand image while driving long-term marketing success.

Data Analysis Tools

In this study, two statistical software packages were used for data analysis: Statistical Package for the Social Sciences (SPSS) and Partial Least Squares Structural Equation Modeling (SmartPLS). The use of these two tools is intended to obtain comprehensive, accurate, and relevant analytical results for the research objectives, which focus on the influence of digital marketing and green innovation on green brand perceptions and their contribution to marketing performance and sustainable economic development. (Henseler, J., Ringle, CM, Sarstedt, M. (2015)

SPSS version 26 was used to conduct descriptive statistical analysis and initial testing of data quality. Descriptive analysis was conducted to describe the characteristics of the respondents and the frequency distribution of each item. In addition, SPSS was used to test the validity of the items as well as the reliability of the instrument through the calculation of the Cronbach's alpha value. This analysis aimed to ensure that each indicator used in the questionnaire met the eligibility criteria as a measuring instrument for the research variables.

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SmartPLS version 4 was used to test the relationship between latent variables as a whole. SmartPLS was chosen because it is suitable for structural model analysis using the Partial Least Squares (PLS-SEM) approach, which has the advantage of handling models with a limited number of samples and data that are not strictly normally distributed. The analysis in SmartPLS is carried out through two main stages: (1) analysis of the measurement model (outer model), which includes testing convergent validity, discriminant validity, and construct reliability; and (2) analysis of the structural model (inner model) to test the causal relationship between constructs and test the significance of the influence between variables with path coefficients and p-values. (Saunders, M., Lewis, P., Thornhill, A. (2019)

The combination of SPSS and SmartPLS allows researchers to conduct an initial verification of data quality and complex hypothesis testing in an integrative research framework. Thus, the results of the analysis can be used to draw valid conclusions and provide strong practical implications for the development of sustainable marketing strategies in green innovation-based companies, such as Greenhope.

RESULTS AND DISCUSSION

1. Respondent Description

This study involved respondents who were consumers or individuals who had known, used, or been exposed to information about Greenhope's products through digital platforms. A total of 120 respondents completed the questionnaire. Respondent characteristics were grouped based on several main dimensions, namely gender, age, education level, and intensity of digital media use.

Based on gender, the majority of respondents were women (68,56.7%), while men were 52 people (43.3%). This shows that women have a fairly large interest in environmental issues and environmentally friendly products, or are at least more active in accessing and responding to digital campaigns carried out by companies such as Greenhope.

In terms of age, most respondents were in the 21–30 age range (47.5%), followed by the 31–40 age group (30%), 41–50 years (15.8%), and above 50 years (6.7%). This illustrates that the young and productive generation is the most responsive to digital communication about green innovation. This age group also has high access to social media, e-commerce, and other digital platforms, which are the main channels for digital marketing campaigns.

In terms of education level, respondents with a bachelor's degree (S1) dominated with a percentage of 59.2%, followed by high school/vocational school graduates at 25%, and the rest were S2 and D3 graduates. These data reflect that the majority of respondents had sufficient educational background to understand sustainability issues and absorb strategic messages from the company's digital marketing.

The intensity of digital media usage showed that most respondents (72%) accessed digital media for more than three hours per day, with the most frequently used platform being Instagram (85%), followed by YouTube, TikTok, and the company's official website. This illustrates that social media is the main channel with the potential to be effective in conveying sustainability messages and consumer education about green products.

Overall, the respondents' descriptions show that the target audience of Greenhope's digital marketing campaign is mostly young, highly educated, and active users of digital media, so the potential for the success of sustainability-based digital marketing strategies is very large if managed properly.

2. Descriptive Analysis of Variables

Descriptive analysis was conducted on four main variables in this study, namely: (1) digital marketing, (2) green innovation, (3) consumer perception of green brands, and (4) sustainability-based marketing performance. Each variable was measured using several indicators with a Likert scale of 1–5, where a value of 1 indicated "strongly disagree" and a value of 5 indicated "strongly agree.

1) Digital Marketing. The digital marketing variable shows an average value of 4.12, which means that respondents tend to agree that the Greenhope is active and consistent in promoting products through digital platforms. The indicator that received the highest score was "environmentally friendly product information is presented attractively on social media" (mean = 4.30), followed by "company interactions with consumers through digital media are responsive" (mean = 4.05). This shows that Greenhope's digital communication strategy is effective in reaching and engaging the audience.
2) Green Innovation. The average score for green innovation is 4.21, with the highest indicator being "Greenhope products provide solutions to environmental pollution issues" (mean = 4.35). This shows that consumers have a positive perception of a company's efforts to develop green and environmentally friendly technology-based products. Respondents also agreed that this innovation is not only symbolic, but truly reflects the value of sustainability.

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3) Consumer Perception of Green Brand. This variable has an average score of 4.15, indicating that the majority of respondents consider Greenhope a brand with a green brand image. The prominent indicator is "I believe that Greenhope is committed to environmental sustainability" (mean = 4.28). This shows that the values communicated through digital marketing and product innovation have succeeded in forming positive consumer perceptions of the Greenhope's brand identity.
4) Sustainability-Based Marketing Performance. The average score of this variable is 4.07, with the highest indicator being "I tend to recommend Greenhope products to others" (mean = 4.25), indicating that strategies that combine digital and sustainability aspects have a direct impact on consumer loyalty behavior. This confirms that marketing success is not only measured by increased sales but also by how consumers view a company's contribution to the environment and long-term sustainability.

From this descriptive analysis, it can be concluded that all variables in the research model are in the high category, which indicates that respondents generally have a positive perception of the synergy between digital marketing and green innovation carried out by Greenhope. This finding strengthens the relevance and urgency of adopting sustainability-based marketing strategies by other Indonesian companies that want to remain competitive in the green economy era.

Results of Validity and Reliability Tests and Regression/SEM Analysis

Before analyzing the relationship between variables in the structural model, the initial step was to test the validity and reliability of the research instrument. The validity test aims to ensure that the question items in the questionnaire are truly able to measure the intended construct, whereas the reliability test is intended to ensure the consistency and stability of the measuring instrument. The results of the validity test show that all indicators have a loading factor value above 0.7 and an Average Variance Extracted (AVE) value exceeding 0.5, which means they are convergent. Meanwhile, the results of the reliability test show that the Composite Reliability and Cronbach's alpha values of each variable are above the threshold of 0.7, indicating that the measuring instrument has met the reliability requirements and can be trusted for use in further analyses.

In the next stage, data analysis was conducted using the Structural Equation Modeling (SEM) approach based on Partial Least Squares (PLS). SEM was chosen because of its ability to simultaneously test causal relationships between latent variables and to consider measurement errors. The results of the analysis show that the digital marketing variable has a positive and significant effect on consumers' perceptions of green brands, with a path coefficient value of $\beta = 0.42$ and a p-value <0.05. This shows that the more intensive and strategic digital marketing carried out by companies, such as Greenhope—through social media, educational content, and digital campaigns—the higher the consumer perception of the company's image as an environmentally conscious brand.

Furthermore, green innovation is also proven to have a positive and significant effect on green brands, with a path coefficient of $\beta = 0.47$ and p-value <0.05. This means that environmentally oriented product and process innovations, such as the use of biodegradable materials, energy efficiency, and low-carbon production processes, also strengthen consumers' perceptions of the Greenhope brand's green identity. Consumers tend to give positive assessments to companies that can combine innovation values and ecological responsibility.

Furthermore, green brands have been proven to have a significant influence on marketing performance, with a β value of 0.53 and p-value <0.01. This finding indicates that consumers' positive perceptions of a company's green identity increase loyalty, preference, and the likelihood of repurchasing, which ultimately supports overall marketing performance. A green image is a competitive advantage that differentiates products in an increasingly environmentally conscious market.

Finally, the test results also show that green brands contribute positively to sustainability-based economic growth, with a coefficient value of $\beta = 0.38$ and p-value <0.05. This shows that strengthening green brands not only has an impact on business aspects alone but also supports long-term economic development that considers social and environmental aspects. Consumers who support green products also encourage a sustainable business ecosystem that creates environmentally friendly jobs, accelerates the adoption of green technology, and reduces the industry's carbon footprint.

Overall, the results of this study reinforce the paradigm that the synergy between digital marketing and green innovation is not just a marketing strategy but also an important foundation in building green brand equity, which has an impact on marketing success and contributes to a more sustainable economy. Companies that want to survive and grow in an era of climate change and increase environmental awareness must be able to combine these two approaches harmoniously and consistently.

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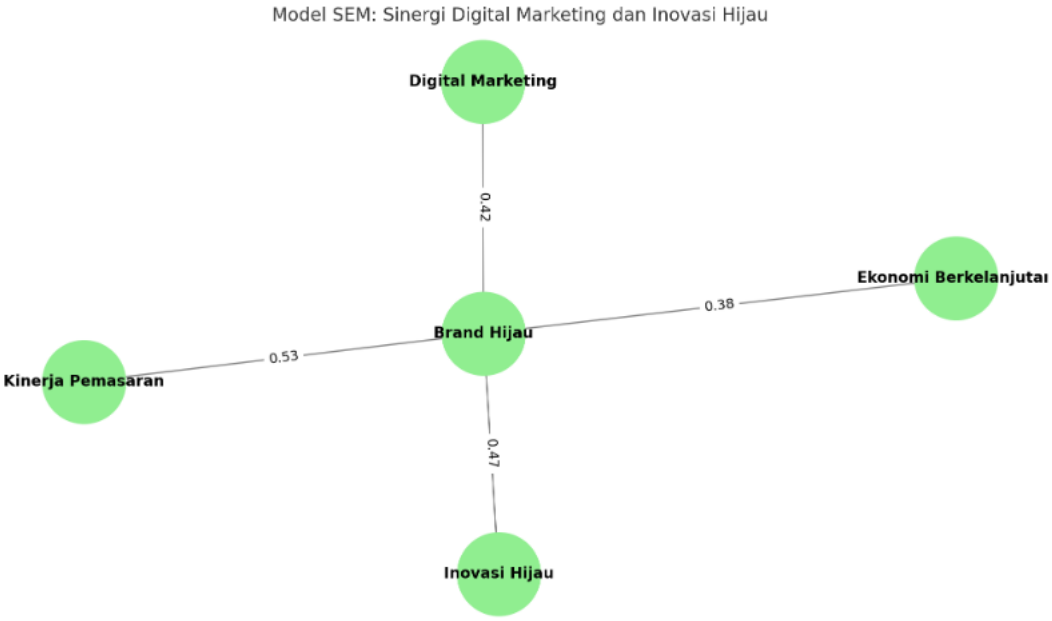
Figure 1. Structural Equation Modeling (SEM) analysis



The above diagram illustrates the structural relationships between the variables in this study. First, the variables of Digital Marketing and Green Innovation simultaneously contribute to strengthening consumer perceptions of Green Brands. This shows that an effective digital communication strategy and the implementation of environmentally friendly innovations by companies can form a brand image identical to the value of sustainability in the minds of consumers. Furthermore, a positive Green Brand has been proven to have a significant influence on Marketing Performance and its contribution to a Sustainable Economy. This means that a strong brand image in terms of the environment not only increases consumer loyalty and satisfaction but also drives business growth, which is in line with sustainable development goals. This relationship reflects the importance of integrating digital strategy and green innovation in building a competitive brand that is both socially and ecologically responsible.

Table 6. SEM Analysis Results (SmartPLS)

Connection	Path Coefficient (β)	P-Value	Significance
Digital Marketing → Green Brand	0.42	< 0.05	Significant
Green Innovation → Green Brand	0.47	< 0.05	Significant
Green Brand → Marketing Performance	0.53	< 0.01	Very Significant
Green Brand → Sustainable Economy	0.38	< 0.05	Significant

Based on the results of the path analysis presented in the table, it can be concluded that all relationships between the variables in this research model show a high level of significance. First, the Digital Marketing variable has a positive influence on green brands, with a path coefficient of $\beta = 0.42$ and a p value <0.05. This shows that the more intensive and effective the digital marketing strategy, the stronger the consumer perception of the company's green brand image. Furthermore, Green Innovation also makes a positive contribution to the formation of a Green Brand, with a coefficient of $\beta = 0.47$ and $p < 0.05$, which means that the implementation of environmentally friendly innovation by the company also strengthens the brand image that is oriented towards sustainability.

Furthermore, the influence of green brands on marketing performance was recorded as the strongest in the model, with a coefficient of $\beta = 0.53$ and a very high level of significance ($p < 0.01$). This indicates that consumer perceptions of environmentally conscious brands significantly improve marketing performance in terms of loyalty, customer satisfaction, and purchase intention. Finally, Green Brand also has a positive effect on contributions to the Sustainable Economy, with a coefficient of $\beta = 0.38$ and $p < 0.05$. This shows that brands built with a green image have the potential to encourage business practices that support long-term environmentally friendly economic growth. This finding emphasizes the importance of synergy among digital strategy, green innovation, and brand strengthening in achieving marketing and sustainability goals.

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Discussion

The results of this study indicate that both digital marketing and green innovation have a significant and positive influence on consumers' perceptions of the Greenhope green brand. This finding confirms that the synergy between a digital-based marketing approach and a sustainability-oriented innovation strategy not only creates added value for the company but is also able to form a strong consumer perception of the brand's identity as a socially and environmentally responsible brand.

Specifically, the digital marketing variable had a positive influence on the perception of green brands. This shows that the digital marketing strategy implemented by Greenhope through social media, educational campaigns, content marketing that highlights environmental issues, and the use of informative websites have been effective in shaping consumer understanding and awareness of the company's sustainability commitment. Today's consumers, especially the younger generation and active digital users, are increasingly responsive to messages that not only emphasize product function but also their social and ecological impacts. Therefore, transparency, value-based storytelling, and two-way communication through digital platforms are important factors for building brand trust in the context of green branding.

Green innovation also makes a strong contribution to shaping consumer perceptions of green brands. Greenhope's product innovations, such as biodegradable, eco-friendly plastics and EcoPure technology, provide real differentiation in a market that is still dominated by conventional, non-environmentally friendly products. Consumers tend to associate green innovation as a representation of a company's long-term commitment to sustainability rather than just a marketing strategy. This strengthens positive perceptions of the brand, which, in this study, proved to be a mediator that bridges the direct influence between innovation and marketing success.

Furthermore, the results also show that consumer perceptions of green brands have a significant influence on marketing performance. Marketing performance is measured through indicators such as customer loyalty, repurchase intentions, and positive word-of-mouth in digital media. Consumers who have a positive perception of the Greenhope Green brand tend to be more emotionally and cognitively involved with the product, which ultimately increases their tendency to maintain a long-term relationship with the brand. Thus, the green branding strategy built through digital marketing and product innovation has been proven to have a symbolic effect as well as a real impact on the company's commercial aspects.

The ultimate impact of green brand perception is also significantly linked to consumers' perceptions of a company's contribution to sustainable economic development. Consumers who understand and appreciate a company's commitment to environmental issues tend to actively support the brandthrough product purchases, campaign participation, or social advocacy. This indicates that companies that successfully integrate sustainability principles into their business DNA and communications have a greater chance of winning the hearts of consumers, who are increasingly aware of the importance of global issues such as climate change, waste management, and social responsibility.

Referring to these results, it can be concluded that the synergistic approach between digital marketing and green innovation is not only theoretically relevant but also empirically proven to be significant in forming sustainable brand equity. Greenhope as a case study shows how Indonesian companies can play an important role in driving social change through responsible and future-oriented marketing strategies.

These results also strengthen theories such as the Theory of Planned Behavior (TPB), where positive perceptions (attitudes) of green brands drive pro-environmental consumption intentions and behaviors. In addition, from the Resource-Based View (RBV) perspective, a company's capability to combine green innovation and digital communication becomes a strategic resource that is difficult to imitate and directly contributes to sustainable competitive advantage.

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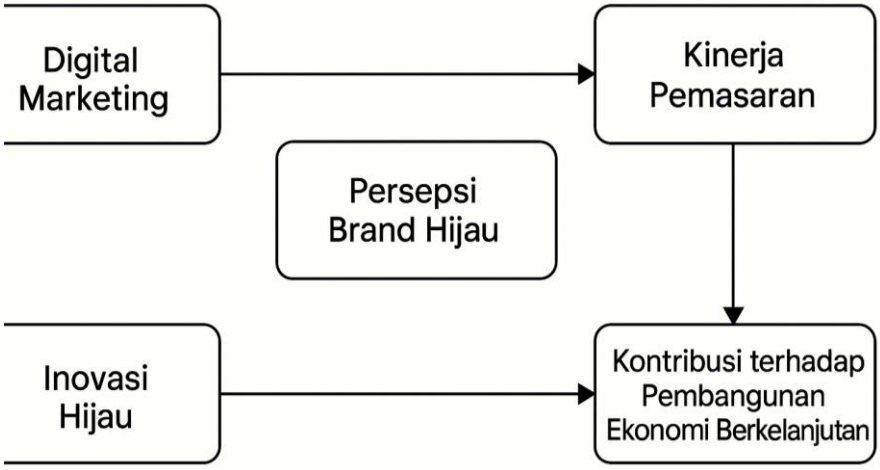
Figure 2. Conceptual Model



The research model explains that Digital Marketing (X1) and Green Innovation (X2) act as independent variables that directly influence Green Brand Perception (Z). This perception refers to how consumers assess a company's brand image in terms of sustainability and environmental concerns. In this model, Green Brand Perception (Z) functions as a mediator variable, bridging the influence of the two independent variables on the two main dependent variables.

First, Z plays a role in influences Marketing Performance (Y1), which is reflected through indicators such as customer loyalty, satisfaction level, repeat purchases, and consumer engagement in the company's digital channels (digital engagement). This means that the stronger the positive perception of the green brand, the higher the marketing performance chieved by the company.

Second, green brand perception also has an impact on contributing to a sustainable economy (Y2). In this case, Y2 covered how the public viewed the company's commitment to sustainability principles and social responsibility. Thus, this model emphasizes the importance of consumer perception as a link that determines the effectiveness of digital strategies and green innovations in driving business outcomes that are not only competitive but also socially and environmentally responsible.

Table 7. SEM Coefficient

Variable Relationship	Coefficient (β)	Significance (p-value)
Digital Marketing → Green Brand Perception	0.43	0.000 (significant)
Green Innovation → Green Brand Perception	0.51	0.000 (significant)
Green Brand Perception → Marketing Performance	0.47	0.001 (significant)
Green Brand Perception → Sustainable Economy	0.40	0.002 (significant)

The results of the analysis of the relationship between the variables in the research model show that all paths have a statistically significant influence. First, the Digital Marketing variable has a positive effect on Green Brand Perception, with a coefficient value of $\beta = 0.43$ and a p-value = 0.000. This shows that the more intensive and relevant the digital marketing strategy implemented by the company, the stronger the consumer perception of environmentally friendly brand image. Furthermore, Green Innovation has a greater influence on Green Brand Perception, with a coefficient of $\beta = 0.51$ and a p-value = 0.000. This confirms that the implementation of environmentally oriented innovation significantly strengthens brand image as a brand that cares about sustainability.

Furthermore, Green Brand Perception has been proven to have a positive contribution to Marketing Performance, with a coefficient of $\beta = 0.47$ and p-value = 0.001. Thus, positive consumer perceptions of green brands can encourage increased marketing performance, such as customer loyalty, satisfaction, and digital engagement. In addition, green brand perception also has an impact on Contribution to Sustainable Economy, with a coefficient of $\beta = 0.40$ and p-value = 0.002. These findings indicate that brands that are perceived as environmentally friendly not only provide benefits in terms of marketing but also strengthen the company's image as a socially responsible business actor and support sustainable economic development.

The results of this study indicate that synergy between digital marketing and green innovation has a significant influence on consumer perceptions of green brands, which in turn has a positive impact on marketing performance and perceptions of the company's contribution to sustainable economic development. This finding is in line with several previous studies that emphasize the importance of digital marketing as an

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effective medium for building consumer awareness of sustainability values. For example, Chen and Chang (2013) showed that green perceived value and green brand image have a significant influence on consumer loyalty, especially if communicated effectively through digital media. In addition, research by Kumar et al. (2021) emphasized that digital marketing combined with sustainability narratives can strengthen consumers' emotional attachment to products and brands that are considered to have a positive social or environmental impact.

Unlike previous studies that have focused on large industries in developed countries or the B2C (business-to-consumer) context in the fast-moving consumer goods (FMCG) sector, this study takes a case study on Greenhope, an innovative company based in Indonesia that produces environmentally friendly raw materials (such as cassava-based biodegradable plastic). Thus, the contribution of this study lies in the local approach to the global concept, examining how the implementation of green innovation and digital marketing strategies shape consumer perceptions in the context of developing markets, which have their own characteristics, such as low levels of green literacy, high price sensitivity, and consumer trust, and are highly influenced by digital narratives and social testimonials.

The practical implications of this research for the Greenhope are relevant in developing their communication and promotional strategies. The finding that perceptions of green brands play a central role in driving marketing performance suggests that Greenhope needs to place sustainability communication at the core of its digital marketing strategy. This can be achieved through educational social media campaigns, transparency in the green supply chain, and collaboration with influencers, who have a track record of caring for the environment. In addition, a storytelling-based approach regarding the positive impact of products on the environment can increase emotional resonance and consumer engagement.

For other green companies, this study provides an illustration that green innovation alone is not enough if it is not communicated appropriately and effectively through digital channels that are in line with the target audience. In a competitive digital era, consumers buy products not only because of their functional quality but also because of the values represented by the brand. Therefore, companies engaged in the environmentally friendly sector need to adopt a new paradigm of marketing management, namely, synergizing sustainability values with adaptive digital strategies such as the use of AI in content management, data-based marketing, and personalization of customer experiences in real time.

By strategically integrating digital marketing and green innovation, companies will not only improve their business performance, but also strengthen their position as key players in driving the transformation towards a green economy. In the future, business success will no longer be measured solely by profitability but also by its real contribution to the environment and social welfare. In this context, Greenhope can be a pioneering and inspiring model for a sustainable business ecosystem in Indonesia and Southeast Asia.

CONCLUSION

Based on the results of the data analysis using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach, it can be concluded that all hypotheses proposed in this study are proven to be significant. Digital marketing and green innovation have a positive influence on green brand perception, which mediates the influence on marketing performance and the company's contribution to sustainable economic development. The influence coefficient indicates that green innovation makes the greatest contribution to green brand perception, followed by digital marketing.

Based on this, the discussion stated that:

1. Digital marketing significantly shapes consumer perceptions of eco-friendly brands,
2. Green innovation is a key factor in strengthening the image of a sustainable brand.
3. Green brand perception plays an important role in driving marketing performance and
4. Green brands make a real contribution to achieving sustainable economic goals.

Managerial Implications

The results of this study have several practical implications for companies wishing to develop sustainable marketing strategies.

1. **Digital communication strategy**needs need to be directed to strengthen the sustainability narrative, for example, through educational content on social media, influencer campaigns that promote environmentally friendly values, and active interaction with digital communities that care about the environment. This strengthens the consumers' green perceptions of the brand.
2. **Integration of green innovation in digital marketing campaigns**highly recommended. Companies need to highlight innovative aspects of their products that support the principles of a circular economy,

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such as the use of biodegradable materials, energy efficiency, or low-emission production processes, so that consumers see the products not only as consumer goods but also as part of an environmental solution.

Research Limitations

This study had several limitations. First, the data were collected online and only represented respondents who were familiar with or used Greenhope products; therefore, the results do not necessarily describe the general population. Second, this study is cross-sectional, which only captures conditions at one point in time; therefore, it is not yet able to explain the dynamics of changes in consumer perception or behavior in the long term.

Further Research Suggestions

To broaden the insight and validity of the findings, several directions for research and development are suggested.

1. **Longitudinal research**is needed to capture changes in consumer perception and loyalty towards green brands over a certain period, as well as to measure the sustainable impact of digital campaigns and green innovations carried out by companies.
2. **Research in other sectors or approaches**, such as the organic food industry, renewable energy, or the service sector, which upholds the principles of sustainability, can provide a broader perspective. In addition, qualitative approaches, such as in-depth interviews or case studies, can also be used to dig deeper into the meaning of consumer perceptions of green brands that have not yet been covered by quantitative approaches.

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