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Artificial Intelligence Capability and Green Marketing Innovation: Implications for Sustainable Marketing Performance

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Abstract

This study aims to analyze the effect of Artificial Intelligence Capability (AIC) on Sustainable Marketing Performance (SMP), with Green Marketing Innovation (GMI) as a mediating variable. The study used a quantitative explanatory approach, with 100 culinary/F&B MSMEs in Bogor City as the subjects. They used AI-based technology in their marketing activities and implemented sustainability-oriented marketing practices. Data were collected through questionnaires to owners or managers involved in decision-making and analyzed using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with SmartPLS 4.0. The results indicate that Artificial Intelligence Capability has a positive and significant effect on Green Marketing Innovation and Sustainable Marketing Performance. Furthermore, Green Marketing Innovation has a positive and significant effect on Sustainable Marketing Performance. The mediation test results also show that Green Marketing Innovation mediates the relationship between Artificial Intelligence Capability and Sustainable Marketing Performance. These findings show that a company's ability to leverage AI not only supports market and customer analysis but can also translate into environmentally oriented marketing innovation, thereby supporting sustainable marketing performance. This research strengthens the Dynamic Capabilities Theory perspective by showing that AI can support the sensing process. At the same time, Green Marketing Innovation serves as a mechanism that translates these insights into value creation and sustainable marketing performance.

Keywords artificial intelligence capabilities, green marketing innovation, sustainable marketing performance, dynamic capabilities theory, digital sustainability, SEM-PLS.

1. Introduction

The contemporary global business landscape is characterized by a dual transformation of rapid technological advancements and intensifying environmental pressures. Artificial Intelligence (AI) has evolved from a supporting technology to a crucial part of organizational capability development and digital transformation. From an organizational capability perspective, AI can strengthen a company's ability to acquire, process, and utilize information to support decision-making and marketing activities (Mikalef et al., 2023). At the same time, increasing sustainability demands are driving companies to integrate environmental considerations into their strategies, business processes, and marketing activities (Keszey, 2020; Canasa & da Costa, 2026). Thus, modern companies face the need to integrate technological capabilities with a sustainability orientation to more adaptively respond to market changes and stakeholder demands.

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In the marketing realm, AI technology provides increasingly broad analytical and operational capabilities. Companies can leverage AI for customer analytics, predictive modeling, market intelligence, communication personalization, marketing automation, content creation, customer engagement, and decision-making support. Mikalef et al. (2023) demonstrated that AI competency in the B2B marketing context relates to the ability to gain insights into customer behavior, identify market information, and improve the efficiency of organizational activities. Thus, AI can be viewed not merely as a technological tool but also as part of an organizational capability that can strengthen data-driven marketing processes.

From the perspective of Dynamic Capabilities Theory, these capabilities become relevant when technology is used to strengthen organizational processes in understanding environmental changes, seizing opportunities, and reconfiguring resources. Teece (2007) explains that dynamic capabilities are built through sensing, seizing, and reconfiguring, namely the company's ability to detect changes and opportunities, take strategic actions, and reconfigure organizational resources and processes. More recent research also shows that AI can strengthen the process of sensing, seizing, and reconfiguring in the context of business sustainability (Kao, 2026).

This technological evolution has also redefined green marketing practices. Green marketing is no longer limited to communicating about environmentally friendly products, but has evolved into a range of activities that integrate environmental considerations into a company's product, promotion, distribution, and marketing strategies. The literature shows that environmentally oriented marketing capabilities can be linked to innovation strategies and company performance (Pujari et al., 2011; Keszey, 2020).

In this context, AI-enabled green marketing can be understood as leveraging AI capabilities to support sustainability-oriented marketing activities. AI enables companies to process customer and market data at scale, identify environmental preference patterns, develop more targeted communications, and support the personalization of sustainability messages. The growing literature on AI and sustainable marketing suggests that AI can be a supporting mechanism for market intelligence, sustainability-oriented personalization, and developing an organization's ability to respond to environmental changes (Kao, 2026).

Thus, the use of AI in green marketing is not only related to the automation of marketing activities, but also to a company's ability to integrate environmental and market information into the value creation process. From this perspective, AI can provide an analytical infrastructure that supports companies in detecting shifts in consumer preferences, regulatory changes, and developments in environmental issues. While organizational capabilities are needed to translate this information into relevant marketing strategies and innovations.

Despite the increasing investment in AI technology, AI adoption does not automatically guarantee better sustainable marketing performance. An important distinction needs to be made between AI adoption and AI capability. AI adoption primarily refers to the decision or level of use of AI technology, while AI capability refers to an organization's ability to integrate AI with its resources, processes, knowledge, and activities so that the technology generates business

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value (Mikalef et al., 2023).

This distinction is important because the same technology can generate different values when implemented by organizations with different internal capabilities. Within the Dynamic Capabilities Theory framework, technology does not automatically generate competitive advantage; strategic value emerges when a company is able to integrate technological resources with sensing, seizing, and reconfiguring processes (Teece, 2007). Recent studies on AI-augmented dynamic capabilities also show that AI can strengthen organizational capabilities in pattern recognition, decision-making, cross-disciplinary integration, resource orchestration, and organizational transformation (Kao, 2026).

The same applies to green marketing. Carrying out green marketing activities does not necessarily equate to Green Marketing Innovation (GMI). GMI emphasizes the renewal or development of marketing methods that incorporate environmental considerations into value creation and delivery activities. Research by Appiah and Essuman (2024), for example, shows that green marketing innovation is linked to a company's ability to derive economic benefits from green product innovation. Meanwhile, Roh et al. (2022) demonstrate that green marketing innovation is a component of a company's green strategy related to achieving environmental performance.

Therefore, there is a conceptual difference between having an AI infrastructure and having the capability to use AI as a source of green marketing innovation. Organizations need the ability to transform AI-generated data and insights into updates to strategies, communications, offerings, processes, and customer relationships. This transformational pathway is crucial in explaining the relationship between AI capability, green marketing innovation, and sustainable marketing performance.

These challenges are further complicated by the rise of AI-generated sustainability content. Using AI in sustainability communications production can increase the speed and scale of content creation, but it also poses risks when the resulting messages are not fully supported by adequate operational evidence.

Greenwashing essentially involves conveying information or claims that can create a more positive impression of a company's environmental performance than is actually the case (Delmas & Burbano, 2011; Dimes et al., 2026). The literature suggests that the increasing use of AI in sustainability reporting creates both opportunities and risks. While AI can help process large amounts of environmental information, generative technologies can also reproduce language and communication patterns that convey a positive impression of sustainability performance without verifying the substance of those claims (Dimes et al., 2026).

The findings of Dimes et al. (2026) are relevant because their experiment showed that AI-generated sustainability content can contain more greenwashing characteristics than real reports in the experimental context. Participants also tended to rate AI-generated reports as more optimistic, confident, and trustworthy. These findings do not imply that all AI-generated content is greenwashing, but they do indicate a risk that needs to be addressed through human oversight,

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information validation, and adequate governance.

Thus, the use of AI in sustainability marketing needs to be accompanied by transparency and validation mechanisms. This is crucial because perceptions of greenwashing can be linked to decreased brand trust. Research by Policarpo et al. (2023), for example, suggests that perceptions of greenwashing can be a mechanism explaining the negative relationship between social cynicism and trust in green brands.

In this study, Green Marketing Innovation (GMI) is positioned as a transformational mechanism that explains how AI capabilities can be translated into sustainability-oriented marketing outcomes. GMI reflects a company's ability to update its green communication methods, promotional channels, digital marketing practices, customer engagement models, value propositions, and marketing processes to address environmental concerns.

This conceptualization aligns with research by Appiah and Essuman (2024), which positions green marketing innovation as a crucial factor in the relationship between green product innovation and corporate performance. Research by Roh et al. (2022) also shows that green marketing innovation is part of a company's green strategy and is linked to environmental performance.

With this perspective, GMI is not treated as a static marketing activity, but as an organizational capability to renew how the company creates, communicates, and delivers environmental value to the market. GMI's position as a mediating variable allows this study to explain the mechanisms linking technological resources to sustainable marketing outcomes.

The primary business gap in this research centers on the pathway connecting AI investments to sustainable marketing performance. The literature on AI in marketing has demonstrated the numerous benefits of AI in gaining customer insights, market information, and improving the efficiency of marketing activities (Mikalef et al., 2023). However, further understanding is needed regarding how these capabilities are translated into sustainability-oriented marketing innovations and subsequently lead to sustainable marketing performance.

Thus, the underlying business question of this research is not simply whether companies are using AI, but rather how AI capabilities are translated into green marketing innovations and subsequently sustainable marketing performance. This question is relevant to Dynamic Capabilities Theory because it emphasizes that organizational advantage stems from the ability to integrate, build, and reconfigure resources to respond to environmental changes (Teece, 2007).

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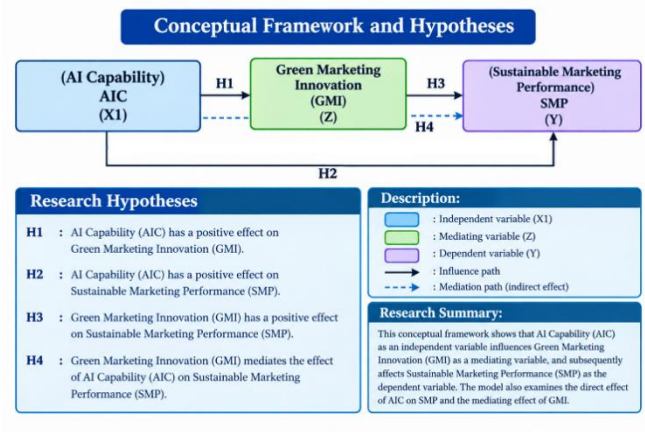

Picture 1. Conceptual framework

The framework starts from the view that AI can enhance the sensing process through analytical and information processing capabilities, while GMI represents the seizing process when companies translate these insights into marketing innovation. In the next stage, the organization's ability to reconfigure marketing resources enables companies to integrate sustainability into value creation and marketing performance (Teece, 2007; Kao, 2026).

Although the literature on AI, green innovation, and sustainability continues to grow, several research gaps can still be identified. 1) Most research on AI in organizations and marketing still places a significant emphasis on productivity, efficiency, customer analytics, and decision-making, while the relationship between AI capabilities and sustainable marketing outcomes requires further development (Mikalef et al., 2023). 2) Research on the relationship between AI and sustainability is growing, focusing on organizational capabilities, environmental innovation, and operational processes. However, the application of AI as a capability specifically supporting sustainable marketing processes remains a relatively new field (Kao, 2026). 3) Green marketing research has extensively addressed consumer responses, green products, green communication, and firm performance. However, the integration of AI technological capabilities and green marketing innovation at the organizational level requires further empirical testing (Appiah & Essuman, 2024; Roh et al., 2022). 4) The role of Green Marketing Innovation as a mediating mechanism explaining how technological capabilities translate into sustainable marketing performance has not been empirically tested within a single integrated model. 5) The integration of AI Capability → Green Marketing Innovation → Sustainable Marketing Performance within a single framework that explicitly utilizes Dynamic Capabilities Theory is still relatively limited. Recent literature is beginning to move toward such integration, but there is still room for empirical testing in different organizational and market contexts (Kao, 2026).

This study uses Dynamic Capabilities Theory (DCT) as its primary theoretical foundation. Teece (2007) explains dynamic capabilities through three main processes: sensing, seizing, and reconfiguring. Sensing relates to an organization's ability to identify changes, opportunities, and

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threats in the environment. Seizing relates to a company's ability to take action and allocate resources to capture these opportunities. Meanwhile, reconfiguring refers to the ability to change or recombine an organization's resources and processes to stay relevant to environmental changes.

In this study, AI capability is positioned primarily as a capability that strengthens the sensing process. AI can help companies process customer data, market information, trends, and various information sources more quickly, thereby expanding the organization's ability to recognize environmental changes. This is consistent with research by Kao (2026), which shows that AI capabilities can strengthen pattern recognition and decision-making processes as part of dynamic capabilities.

Furthermore, Green Marketing Innovation is positioned as a mechanism that represents the seizing process. Once a company has gained insight into market changes and environmental demands, this insight needs to be translated into innovations in products, communications, channels, value propositions, and marketing activities. GMI thus becomes a mechanism that enables companies to seize market opportunities related to sustainability (Appiah & Essuman, 2024; Roh et al., 2022).

Ultimately, Sustainable Marketing Performance reflects the results of a company's ability to integrate sustainability into marketing activities and create long-term market outcomes. The literature on sustainable marketing orientation demonstrates a relationship between sustainable marketing orientation and sustainability performance, while research on sustainable marketing performance increasingly positions innovation and marketing capabilities as critical mechanisms for generating sustainable performance (Maldonado-Guzmán et al., 2022; Post et al., 2026). Based on this gap, this study offers five key contributions. 1) Conceptualizing AI Capability as a strategic capability, rather than simply a level of technology adoption. 2) Positioning Green Marketing Innovation as a mediating mechanism, explaining the process of transforming technological capabilities into sustainability-oriented marketing activities. 3) Using Sustainable Marketing Performance as an organizational-level outcome, the research focus goes beyond consumer perceptions or intentions. 4) Integrating AI Capability, Green Marketing Innovation, and Sustainable Marketing Performance into a single conceptual model based on Dynamic Capabilities Theory. 5) Explaining the operational path of AI towards market-based sustainability, namely through AI-enhanced sensing processes, seizing through green marketing innovation, and the creation of sustainable marketing outcomes. 6) Thus, the novelty of this research does not lie solely in the use of AI or green marketing variables separately, but in the integration of capability mechanisms that explain how AI capabilities are converted through Green Marketing Innovation into Sustainable Marketing Performance. Therefore, this study aims to examine the influence of Artificial Intelligence Capability (AI Capability) on Green Marketing Innovation and Sustainable Marketing Performance, while analyzing the mediating role of Green Marketing Innovation in explaining how AI capabilities are converted into sustainable marketing outcomes.

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2. Literature Review

Dynamic Capabilities Theory (DCT). Dynamic Capabilities Theory (DCT) explains an organization's ability to integrate, build, and reconfigure resources and competencies to respond to changes in the business environment (Teece et al., 1997). Unlike the Resource-Based View, which emphasizes strategic resource ownership, DCT focuses on an organization's ability to update and adapt resources to remain relevant in a dynamic environment (Teece, 2007). DCT encompasses three main processes: sensing, seizing, and reconfiguring. Sensing is the ability to identify opportunities and threats, seizing is the ability to seize opportunities through decisions and innovation, and reconfiguring is the ability to adapt and recombine organizational resources (Teece, 2007). In a digital context, these capabilities help companies respond to technological developments, changing consumer behavior, and sustainability demands (Warner & Wäger, 2019). In this study, DCT serves as the basis for explaining how Artificial Intelligence Capability (AIC) can be used to detect market changes, drive Green Marketing Innovation (GMI), and ultimately support Sustainable Marketing Performance (SMP).

Artificial Intelligence Capability (AIC). *Artificial Intelligence Capabilities*AI (AIC) is an organization's ability to integrate and leverage artificial intelligence technology, data, human resources, and processes to support operational and strategic activities. AIC demonstrates not only the use of AI technology but also the organization's ability to transform that technology into a source of value and organizational advantage (Mikalef & Gupta, 2021). AIC enables companies to analyze data, understand consumer behavior, predict trends, automate processes, and support decision-making. From a DCT perspective, this capability strengthens the sensing process by identifying market changes and seizing them by leveraging information to generate decisions and innovation. Thus, AIC can be a strategic capability that supports innovation and organizational performance (Mikalef & Gupta, 2021). Based on research by Sullivan & Fosso Wamba (2024), Mikalef et al. (2023), Bashir et al. (2024) Manis & Madhavaram (2023) in this study Artificial Intelligence Capability (AIC) is measured using the following indicators: 1) Our company effectively utilizes AI tools to analyze market trends and customer insights in real-time. 2) Our company utilizes AI-based predictive modeling to anticipate changes in customer demand. 3) Our company uses AI technology to automate routine marketing processes and operational workflows. 4) Our company applies AI capabilities to deliver personalized marketing messages to target segments. 5) Our company integrates AI analysis into the marketing decision-making process at the executive level.

Green Marketing Innovation. *Green Marketing Innovation*(GMI) is the development or implementation of new or updated methods, processes, communication strategies, and marketing activities that consider environmental aspects while creating value for customers. GMI is not only oriented towards environmentally friendly products, but also encompasses innovations in green communications, digital marketing, customer engagement, and the creation of sustainability-oriented value propositions (Roh et al., 2022). From a DCT perspective, GMI is a form of seizing capability, namely an organization's ability to translate changing consumer needs and sustainability opportunities into marketing innovation. Research shows that green marketing innovation can support environmental strategy and organizational

performance by creating more sustainable value (Roh et al., 2022). In the context of SMEs, a green marketing orientation has also been found to be associated with green innovation and green marketing performance (Nuryakin & Maryati, 2022). Based on research by Appiah & Essuman (2024), in this study, Green Marketing Innovation (GMI) is measured using the following indicators: 1) Our company continues to innovate environmentally friendly communication strategies and green promotional channels. 2) Our company adopts new digital marketing platforms to promote environmental sustainability initiatives. 3) Our company develops innovative ways to engage customers in the company's sustainability efforts. 4) Our company periodically updates its core value proposition to include environmentally friendly features. 5) Our company implements innovative, environmentally friendly processes in its marketing operations.

Sustainable Marketing Performance. *Sustainable Marketing Performance*(SMP) describes an organization's ability to achieve long-term marketing objectives by balancing economic, environmental, and social aspects. SMP is not only oriented towards sales and profitability, but also encompasses customer value creation, stakeholder relationships, brand reputation, market responsiveness, and long-term value creation. This approach positions sustainability as part of marketing success, so that marketing performance is not measured solely by short-term economic results. Green marketing practices and green innovation can support value creation and sustainable performance improvement when integrated into organizational strategy (Nuryakin & Maryati, 2022; Roh et al., 2022). From a DCT perspective, SMP is the result of an organization's ability to sense, seize, and reconfigure. AIC enables an organization to recognize market changes and opportunities, GMI translates these opportunities into environmentally oriented marketing innovations, while SMP reflects the results of an organization's ability to create economic, social, and environmental value in a sustainable manner. Based on research, Sustainable Marketing Performance (SMP) is measured using the following indicators: 1) Our sustainability marketing efforts have significantly increased customer perceived value. 2) Our green marketing initiatives have deepened customer engagement and brand loyalty. 3) Our company has strengthened its market reputation as an authentic and sustainable brand. 4) Our marketing practices have contributed to increased market share in target customer segments. 5) Our sustainability-based marketing practices deliver long-term value and sustainable competitive advantage.

AI Capabilities and Green Marketing Innovation. Artificial Intelligence Capability (AIC) is a company's ability to integrate data, technology, human resources, and organizational resources to generate value through AI. AIC enables companies to rapidly process market data, identify shifts in consumer preferences, and generate insights that support innovation development (Mikalef & Gupta, 2021). In the context of sustainability, this capability can be used to identify consumer needs for more environmentally friendly products and communications. Research by Al Halbusi et al. (2025) shows that AIC significantly influences green innovation. Meanwhile, Verma and Diwan (2024) emphasize that sustainability-oriented marketing innovation can support sustainability-based differentiation and value creation. Therefore, the higher the AIC, the greater a company's ability to develop marketing innovations that integrate environmental

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aspects.

H1: Artificial Intelligence Capability has a positive and significant effect on Innovation Green Marketing.

Artificial Intelligence Capabilities and Sustainable Marketing Performance. AIC can improve company performance through data utilization, automation, prediction, and more accurate decision-making. Mikalef and Gupta (2021) found that AIC contributes to organizational creativity and company performance. In the context of sustainability, Al Halbusi et al. (2025) showed that AIC contributes to sustainable performance, particularly through a company's ability to generate green innovations. In marketing activities, AI capabilities enable companies to segment customers, personalize communications, predict consumer behavior, and optimize the use of marketing resources. These capabilities can increase marketing effectiveness while supporting long-term value creation. Therefore, the higher the AIC, the greater the company's potential to improve sustainable marketing performance.

H2: Artificial Intelligence Capabilities have a positive and significant effect on Sustainable Marketing Performance.

Green Marketing Innovation and Sustainable Marketing Performance. Green Marketing Innovation (GMI) is the development and implementation of marketing strategies and activities that incorporate environmental considerations into the creation and delivery of value to consumers. GMI enables companies to communicate environmental benefits more innovatively while building sustainability-based differentiation. Appiah and Essuman (2024) demonstrated that green marketing innovation strengthens the contribution of green product innovation to financial performance. Similarly, Verma and Diwan (2024) demonstrated that sustainability-oriented marketing innovation can support brand differentiation and create sustainability-based advantages. Thus, GMI can help companies translate environmental value into market value through increased customer engagement, differentiation, and long-term relationships.

H3: Green Marketing Innovation has a positive and significant effect on Sustainable Marketing Performance.

The Mediating Role of Green Marketing Innovation. AI does not automatically generate sustainable marketing performance because the value of AI depends on a company's ability to transform information and analysis into strategic actions. Mikalef and Gupta (2021) assert that the value of AI emerges through an organization's ability to integrate AI resources to generate creativity and performance. In the context of sustainability, Al Halbusi et al. (2025) found that AIC drives green innovation, which subsequently contributes to sustainable performance. In this study, this mechanism is developed through GMI. AI provides analytical capabilities to understand consumers and markets, while GMI translates these insights into environmentally oriented communications, strategies, and marketing activities. Empirical support for GMI's role in converting green innovation into performance benefits is also demonstrated by Appiah and Essuman (2024). Thus, GMI can be a mechanism that connects AIC with sustainable marketing performance, as AI capabilities generate market insights that are then converted through green

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marketing innovation into value for consumers and companies.

H4: Green Marketing Innovation mediates the positive relationship between Artificial Intelligence Capability and Sustainable Marketing Performance.

3. Research Method

This study employed a quantitative explanatory research design to examine the relationships among Artificial Intelligence Capability (AIC), Green Marketing Innovation (GMI), and Sustainable Marketing Performance (SMP). The research framework was developed based on Dynamic Capabilities Theory (DCT), which explains organizational capabilities through sensing, seizing, and reconfiguring processes. In this framework, AIC was positioned as the independent variable, GMI as the mediating variable, and SMP as the dependent variable.

The population consisted of culinary and food & beverage (F&B) Micro, Small, and Medium Enterprises (MSMEs) operating in Bogor City, Indonesia. The study focused on MSMEs because they increasingly utilize artificial intelligence technologies and sustainability-oriented marketing practices to strengthen competitiveness and marketing performance. Data were collected through a structured questionnaire administered to business owners or managers who were directly involved in strategic and marketing decision-making.

Sampling was conducted using a non-probability, purposive sampling approach. Respondents were selected based on the following criteria: (1) the MSME had utilized AI-based technology in marketing activities for at least six months; (2) the firm had implemented green or sustainability-oriented products, programs, or marketing initiatives; and (3) the respondent was the owner or a manager with decision-making authority. We obtained 100 valid responses and included them in the analysis. This sample size satisfies the recommended minimum requirement for Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis.

Data were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Artificial Intelligence Capability (AIC) was measured using five indicators adapted from Mikalef and Gupta (2021), Mikalef et al. (2023), Sullivan and Fosso Wamba (2024), Bashir et al. (2024), and Manis and Madhavaram (2023), covering AI-enabled market analysis, predictive analytics, process automation, marketing personalization, and AI-integrated decision-making. Green Marketing Innovation (GMI) was measured using five indicators adapted from Appiah and Essuman (2024), including innovation in green communication, digital marketing platforms, customer engagement, sustainability value propositions, and environmentally friendly marketing processes. Sustainable Marketing Performance (SMP) was measured using five indicators reflecting customer value creation, customer engagement and loyalty, brand reputation, market share development, and long-term competitive advantage.

The collected data were analyzed using Structural Equation Modeling based on Partial Least Squares (SEM-PLS) with SmartPLS 4.0 software. SEM-PLS was selected because it suits predictive research models involving mediation relationships and relatively small sample sizes. The analysis was conducted in two stages. First, the measurement model (outer model) was evaluated through indicator reliability, internal consistency reliability, convergent validity, and

discriminant validity. Reliability was assessed using Cronbach's Alpha and Composite Reliability, while convergent validity was evaluated using Average Variance Extracted (AVE). Second, the structural model (inner model) was assessed by examining path coefficients, the coefficient of determination (R^2), and hypothesis testing using bootstrapping. A hypothesis was considered supported when the t-statistic exceeded 1.96, and the p-value was below 0.05.

The study tested the mediating effect of Green Marketing Innovation through indirect-effect analysis using the bootstrapping method. This procedure enabled the study to determine whether Green Marketing Innovation serves as a mechanism through which Artificial Intelligence Capability influences Sustainable Marketing Performance.

4. Finding and Discussion

Sampling in this study used a non-probability sampling technique with a purposive sampling approach. The sample size was set at 100 culinary/F&B MSMEs operating in Bogor City. The sample criteria were determined based on: (1) MSMEs that have integrated AI-based technology in marketing activities for at least 6 months, (2) have green/sustainability-oriented marketing programs or products, and (3) respondents are owners or decision-making managers. This sample size of 100 is considered adequate for Partial Least Squares-based Structural Equation Modeling (SEM-PLS) analysis according to the criteria of Hair et al. (2021) which requires a minimum sample size of between 50 and 100 respondents to achieve 80% statistical power. Based on the results of testing the Structural Model and Hypothesis using SEM PLS 4.0, the results are obtained in the following table:

Table 1. Evaluation of Measurement Model (Outer Model)

Construct	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AIC	0.811	0.835	0.878	0.648
GMI	0.816	0.823	0.872	0.578
SMP	0.813	0.834	0.87	0.575

The test results show that the AIC, GMI, and SMP constructs have good reliability, indicated by Cronbach's Alpha and Composite Reliability values > 0.70. The AVE value for all constructs is > 0.50, thus meeting the convergent validity criteria. Thus, all constructs are declared reliable and valid and suitable for use in further analysis.

Table 2. Hypothesis Testing Results and Path Coefficients

Hypothesis	Structural Path	Path Coefficient	*t*-statistics	*p*-Value
H1	AIC → GMI	0.778	19,419	0,000
H2	AIC → SMP	0.510	7,109	0,000
H3	GMI → SMP	0.395	5,463	0,000
H4	AIC → GMI → SMP	0.307	5,363	0,000

Based on the results of the hypothesis testing in the table, all structural paths show a positive

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and significant influence. H1 shows that AIC has a positive effect on GMI with a path coefficient of 0.778, a t-statistic of 19.419, and a p-value of 0.000. H2 shows that AIC has a positive effect on SMP with a coefficient of 0.510, a t-statistic of 7.109, and a p-value of 0.000. H3 shows that GMI has a positive effect on SMP with a coefficient of 0.395, a t-statistic of 5.463, and a p-value of 0.000.

Furthermore, H4 shows that GMI mediates the effect of AIC on SMP with an indirect effect value of 0.307, a t-statistic of 5.363, and a p-value of 0.000. Thus, all hypotheses H1, H2, H3, and H4 are supported because the t-statistic value is > 1.96 and the p-value is < 0.05.

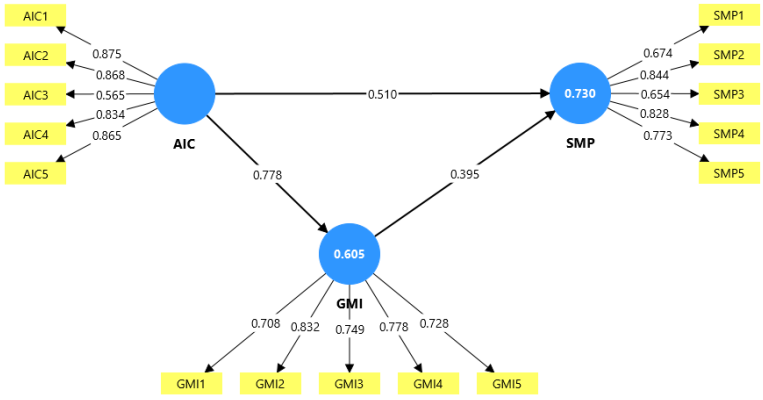

Figure: SEM PLS 4.0 Model

The Influence of AI Capabilities on Green Marketing Innovation (H1). The test results show that AIC has a positive and significant effect on GMI, with a path coefficient of 0.778, a t-statistic of 19.419, and a p-value of 0.000. In the AIC construct, the highest outer loading value of 0.875 is found in the AIC1 indicator, which is the company's ability to utilize AI to analyze market trends and customer insights in real-time. Meanwhile, the lowest outer loading value of 0.834 is found in the indicator of AI's ability to deliver personalized marketing messages to target segments. Both values indicate that all indicators make a strong contribution in reflecting AIC. These findings indicate that the use of AI, especially for market and customer analysis, supports companies in developing green marketing innovations.

The Influence of AI Capabilities on Sustainable Marketing Performance (H2). The test results show that AIC has a positive and significant effect on SMP, with a path coefficient of 0.510, a t-statistic of 7.109, and a p-value of 0.000. In the AIC construct, the highest indicator is AIC1 with an outer loading value of 0.875, found in the indicator Our company effectively utilizes AI tools to analyze market trends and customer insights in real-time. This indicates that the ability to analyze market trends and customer insights in real-time is the strongest aspect in reflecting AIC. Meanwhile, the lowest indicator was AIC4 with an outer loading value of 0.834, found in the indicator "Our company applies AI capabilities to deliver personalized marketing messages to target segments." Despite being the lowest indicator, a value of 0.834 still indicates

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a strong contribution to the AIC construct. Thus, AI's ability to analyze markets and customers in real time is the most dominant aspect, while personalization of marketing messages is the aspect that reflects the relatively lowest AIC.

The Influence of Green Marketing Innovation on Sustainable Marketing Performance (H3). The test results show that GMI has a positive and significant effect on SMP, with a path coefficient of 0.395, a t-statistic of 5.463, and a p-value of 0.000. In the GMI construct, the highest outer loading of 0.832 is found in the indicator of the company's ability to adopt new digital marketing platforms to promote environmental sustainability initiatives. Meanwhile, the lowest outer loading of 0.700 is found in the indicator of the company's ability to continuously innovate environmentally friendly communication strategies and green promotion channels. These results indicate that the adoption of digital marketing platforms is the strongest indicator in reflecting GMI, while communication innovation and green promotion channels provide a relatively lower contribution but still support the construct. Thus, green marketing innovation contributes to improving sustainable marketing performance.

The Mediating Effect of Green Marketing Innovation on Sustainable Marketing Performance (H4). The test results show that GMI mediates the effect of AIC on SMP, with an indirect effect coefficient of 0.307, a t-statistic of 5.363, and a p-value of 0.000. In the SMP construct, the indicator with the highest outer loading of 0.844 is SMP2, which is a green marketing initiative that deepens customer engagement and brand loyalty. Meanwhile, the lowest outer loading of 0.674 is found in SMP1, which is a sustainability marketing effort that increases customer perceived value. These findings indicate that customer engagement and brand loyalty are the strongest indicators in reflecting SMP, while increasing customer perceived value makes a relatively lower contribution. Overall, these results indicate that AIC can improve SMP both directly and through GMI as a mediating variable.

5. Conclusion

Based on the research results, it can be concluded that AI Capability has a positive and significant impact on Green Marketing Innovation. This indicates that the better a company is at utilizing AI, the greater its ability to develop innovative and environmentally friendly marketing strategies and activities. The ability to analyze market trends and customer insights in real time is the most dominant aspect reflecting AI Capability. Furthermore, AI Capability also has a positive and significant impact on Sustainable Marketing Performance. These findings indicate that the use of AI can help companies improve marketing performance sustainably. AI's ability to analyze market trends and customer insights is the strongest aspect, while personalization of marketing messages still makes a strong contribution, albeit relatively lower.

Green Marketing Innovation has a positive and significant effect on Sustainable Marketing Performance. This means that the better a company implements environmentally-oriented marketing innovation, the better its sustainable marketing performance. The adoption of digital marketing platforms to promote sustainability is the strongest factor reflecting Green Marketing Innovation, while innovation in communication strategies and green promotional channels

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contribute relatively less. Finally, Green Marketing Innovation mediates the effect of AI Capability on Sustainable Marketing Performance. This indicates that AI capabilities can not only improve sustainable marketing performance directly but also through the development of green marketing innovation. Customer engagement and brand loyalty are the strongest factors reflecting Sustainable Marketing Performance, while increasing customer perceived value contributes relatively less.

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