



Green Innovation and Green Purchase Intention: Consumer Innovativeness as Moderator

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DOI: <https://doi.org/10.54099/ijibmr.v6i2.1971>

ARTICLE INFO

Research Paper

Article history:

Received: 15 June 2026

Revised: 20 July 2026

Accepted: 30 August 2026

Keywords: green marketing innovation; product innovation; consumer innovativeness; green purchase intention; Diffusion of Innovation theory

JEL: M31; Q56

ABSTRACT

This study aims to examine the influence of green marketing innovation and product innovation on green purchase intention and to investigate the moderating role of consumer innovativeness in strengthening these relationships in Denpasar's culinary sector. Using a quantitative research approach, data were collected from 120 consumers through a structured questionnaire and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The measurement model was evaluated based on outer loading, composite reliability, average variance extracted (AVE), and heterotrait-monotrait ratio (HTMT), while the structural model was assessed using coefficient of determination (R^2) and predictive relevance (Q^2). The results reveal that green marketing innovation significantly enhances green purchase intention ($\beta = 0.286$, $p < 0.001$), and product innovation has a stronger positive effect ($\beta = 0.361$, $p < 0.001$). Furthermore, consumer innovativeness significantly strengthens the relationship between green marketing innovation and green purchase intention ($\beta = 0.173$, $p = 0.014$) and between product innovation and green purchase intention ($\beta = 0.196$, $p = 0.004$). The model explains 67.2% of the variance in green purchase intention ($R^2 = 0.672$) with positive predictive relevance ($Q^2 = 0.481$). This study extends Diffusion of Innovation theory by demonstrating that sustainability-oriented innovations generate stronger consumer responses when consumers possess higher innovativeness toward new products and ideas

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Introduction

Environmental sustainability has become a strategic concern for businesses because consumers increasingly evaluate products not only on functional and economic value but also on environmental consequences. In food and culinary markets, this concern is particularly relevant because packaging waste, resource use, food waste, and sourcing practices are directly visible to consumers. Firms therefore face a dual requirement: they must develop products with credible environmental value and communicate that value in ways that consumers can understand. Green marketing and product innovation provide two complementary mechanisms for meeting these requirements. Green marketing innovation increases the visibility and intelligibility of environmental initiatives, while product innovation translates sustainability claims into tangible attributes such as environmentally responsible packaging, materials, ingredients, and waste-reduction practices (Andersén, 2021; Iqbal et al., 2023).

The Indonesian culinary sector offers an important setting for examining these mechanisms. Bali combines a large tourism economy with dense micro, small, and medium enterprise activity, and firms in the region face continuous pressure to maintain competitiveness while responding to changing market conditions (Widiastini et al., 2023). Denpasar, as Bali's principal urban and commercial centre, provides a context in which consumers are repeatedly exposed to product variety, branding innovation, digital promotion, and sustainability claims. This environment makes it possible to examine whether sustainability-oriented innovation is translated into stronger purchase intention at the consumer level (Setini & Juliasa, 2026; Putra et al., 2026).

Previous studies provide substantial evidence that green marketing and green product attributes can shape consumer preference and purchase intention. Iqbal et al. (2023) show that green marketing is associated with green purchase intention, while Sapsanguanboon and Faijaidee (2024) identify marketing communication and product design among the factors that support green product purchasing decisions. More recent evidence also indicates that green promotion, packaging, and labelling affect consumer preferences (Amarga et al., 2026). On the innovation side, green product innovation can create differentiation advantage and strengthen sustainability performance by embedding environmental value in product development (Andersén, 2021; Awwad et al., 2026). These findings support the expectation that both marketing innovation and product innovation matter for green consumption.

A remaining issue concerns heterogeneity in consumer response. Sustainability-oriented innovations do not affect all consumers with the same strength because individuals differ in their willingness to explore and adopt new products. Diffusion of Innovation (DOI) theory explains adoption through both the perceived attributes of an innovation and characteristics of adopters (Rogers, 2003). Consumer innovativeness therefore provides a theoretically relevant boundary condition. Prior research shows that innovativeness is associated with intention to purchase sustainable products (Li et al., 2021) and green products in Indonesia (Hasudungan & Saragih, 2024). Nasution et al. (2025) also integrates consumer innovativeness into a green purchase intention model, but treats it as a mediating mechanism. The moderating role of consumer innovativeness, specifically whether it changes the effectiveness of green marketing innovation and product innovation, remains comparatively less developed.

This study addresses that gap by examining green marketing innovation and product innovation as antecedents of green purchase intention and consumer innovativeness as a moderator in the culinary sector of Denpasar. The study contributes in two ways. First, it extends DOI theory by linking organizational innovation signals with adopter readiness in a sustainability context. Second, it provides practical evidence for culinary businesses seeking to determine whether green communication and tangible product changes should be targeted differently across consumer segments. Accordingly, the study asks whether green marketing innovation and product innovation increase green purchase intention and whether these relationships become stronger among consumers with higher innovativeness.

Literature review and hypothesis development

Diffusion of Innovation theory

Diffusion of Innovation (DOI) theory explains how innovations are introduced, communicated, and adopted within a social system. Although Rogers (2003) established the theoretical foundation of innovation adoption, recent studies have extended DOI theory by demonstrating that adoption decisions are influenced by both innovation characteristics and individual adopter differences. The five perceived attributes of innovation, namely relative advantage, compatibility, complexity, trialability, and observability, remain important determinants in shaping consumers' willingness to accept new products and practices (Rogers, 2003; Kapoor et al., 2018). Among these attributes, relative advantage and observability are particularly relevant in sustainability contexts because consumers are more likely to adopt green innovations when environmental benefits are clearly demonstrated and perceived as valuable (Kumar et al., 2021).

In green consumption research, DOI theory provides a relevant framework for explaining how firms' sustainability-oriented innovations influence consumer behavioural responses. Green marketing innovation enhances the visibility and communication of environmental value, allowing consumers to better recognize the ecological benefits of products. Meanwhile, product innovation can create perceived relative advantages through improved environmental performance, resource efficiency, and sustainable product attributes (Dangelico & Vocalelli, 2017; Zhang et al., 2022). These innovation characteristics reduce uncertainty and increase consumers' confidence in adopting environmentally friendly alternatives.

Furthermore, DOI theory emphasizes that innovation adoption is not determined solely by innovation characteristics but also by adopter characteristics. Consumers differ in their openness, willingness, and readiness to accept new ideas, which is reflected through consumer innovativeness (Rogers, 2003; Im et al., 2018). Previous studies indicate that highly innovative consumers tend to evaluate and adopt novel products more quickly because they demonstrate greater curiosity, exploration behaviour, and acceptance of change (Mullet et al., 2019; Pandey et al., 2023). Therefore, consumer innovativeness may strengthen the relationship between sustainability-oriented innovation and green purchase intention.

In the present model, green marketing innovation and product innovation represent organization-level innovation efforts perceived by consumers, whereas consumer innovativeness represents an individual-level adoption characteristic. This integrated perspective extends DOI theory by examining not only the direct influence of innovation attributes on green purchase intention but also the conditional role of adopter characteristics. Accordingly, this study investigates whether innovation-driven sustainability initiatives generate stronger consumer responses when consumers possess higher levels of innovativeness.

Green marketing innovation and green purchase intention

Green marketing innovation refers to the development and implementation of marketing strategies that integrate environmental values into product communication, promotion, branding, and consumer engagement activities. Unlike conventional marketing approaches, green marketing innovation emphasizes the communication of ecological benefits, sustainability attributes, and responsible business practices to influence consumer perceptions and decision-making. In the culinary sector, such innovation may involve transparent environmental information, sustainability-oriented promotional campaigns, eco-friendly packaging communication, and responsible sourcing disclosures that enable consumers to evaluate the environmental value of products. Effective green marketing practices can reduce information uncertainty by providing consumers with clearer knowledge regarding the sustainability performance of products and brands (Dangelico & Vocalelli, 2017; Kumar et al., 2021). From the Diffusion of Innovation (DOI) perspective, green marketing innovation enhances two important innovation attributes: observability and compatibility. Observability reflects the extent to which consumers can recognize the benefits and outcomes of an innovation, whereas compatibility refers to the degree to which an innovation aligns with consumers' existing values, lifestyles, and environmental concerns (Rogers, 2003; Kapoor et al., 2018). When sustainability benefits are communicated effectively, consumers can more easily identify differences between environmentally responsible products and conventional alternatives, increasing their acceptance of green offerings. Previous studies demonstrate that environmental communication, green branding, and sustainability claims positively influence consumer attitudes and purchase intention because they strengthen perceived value and trust toward green products (Joshi & Rahman, 2017; Wang et al., 2020).

Furthermore, green marketing innovation contributes to consumer engagement by transforming sustainability attributes into meaningful information that supports purchasing decisions. Research indicates that green promotional activities, eco-labeling, and sustainability-related communication significantly influence consumers' preferences and willingness to purchase environmentally friendly products (Testa et al., 2021; Amberg & Fogarassy, 2019). Therefore, when culinary businesses communicate environmental benefits clearly and consistently, consumers are more likely to perceive green products as valuable, relevant, and compatible with their personal beliefs. Based on this theoretical argument, the following hypothesis is proposed:

H1: Green marketing innovation has a positive and significant effect on green purchase intention.

Product innovation and green purchase intention

Product innovation refers to the development, improvement, and modification of product attributes to create superior value for consumers and differentiate products from existing alternatives. In the context of sustainability, product innovation emphasizes the integration of environmental considerations into product design, materials, packaging, production processes, and lifecycle management. In this study, sustainability-oriented product innovation is reflected through environmentally friendly product attributes, the use of sustainable materials or packaging, waste reduction initiatives, and improved ecological performance. Compared with marketing-based innovation, product innovation provides more tangible evidence of environmental commitment because consumers can directly evaluate the physical and functional characteristics of sustainable products (Dangelico & Pujari, 2010; Chen et al., 2020).

From the Diffusion of Innovation (DOI) perspective, product innovation influences adoption through the perceived attribute of relative advantage, which refers to the extent to which an innovation is perceived as superior compared with existing alternatives (Rogers, 2003). Sustainable product innovation can create relative advantages when environmental improvements are accompanied by enhanced quality, functionality, convenience, aesthetics, or social value. Recent studies indicate that green product innovation strengthens competitive differentiation by enabling firms to develop environmentally responsible products that provide additional value to consumers (Andersén, 2021; Zhang et al., 2022).

Furthermore, sustainable product innovation can reduce consumer uncertainty regarding green claims because consumers obtain direct product-related evidence of environmental performance. Previous research demonstrates that eco-friendly product attributes, sustainable packaging, and environmentally responsible design significantly influence consumers' attitudes and purchase intentions toward green products (Kumar et al., 2021; Wang et al., 2020). In addition, innovation in product design and sustainability features has been shown to enhance consumer acceptance by increasing perceived usefulness and compatibility with personal environmental values (Sapsanguanboon & Faijaidee, 2024). Therefore, product innovation represents an important organizational capability that translates sustainability efforts into consumer-perceived value. When consumers perceive sustainable products as offering meaningful advantages over conventional alternatives, they are more likely to develop positive purchase intentions. Based on this theoretical and empirical foundation, the following hypothesis is proposed:

H2: Product innovation has a positive and significant effect on green purchase intention.

Consumer innovativeness as a moderator

Consumer innovativeness refers to an individual's tendency to seek, evaluate, and adopt new products, technologies, or ideas earlier than other members of a social system. In the Diffusion of Innovation (DOI) perspective, consumer innovativeness represents an important adopter characteristic that influences the speed and willingness of individuals to accept innovations (Rogers, 2003). Innovative consumers generally demonstrate higher curiosity toward new alternatives, actively search for novel information, show greater tolerance toward uncertainty, and are more willing to experiment with unfamiliar products (Im et al., 2018). Therefore, consumer innovativeness becomes particularly relevant in sustainable consumption contexts, where consumers are often required to evaluate new product attributes, environmentally friendly materials, sustainable packaging, and unfamiliar ecological claims.

Recent studies indicate that consumer innovativeness plays an important role in shaping sustainable consumption behaviour. Highly innovative consumers tend to have stronger environmental awareness and greater willingness to adopt green products because they perceive innovation as an opportunity for improvement rather than as a source of uncertainty (Kushwah et al., 2019). Similarly, research by Li et al. (2021) demonstrates that consumer innovativeness positively influences sustainable product

adoption by increasing consumers' openness toward environmentally responsible alternatives. Furthermore, studies in emerging markets show that personal innovativeness contributes significantly to green purchase intention because innovative consumers are more responsive to sustainability-related information and product improvements (Hasudungan & Saragih, 2024).

From the DOI perspective, consumer innovativeness is expected to strengthen the effectiveness of organizational innovation signals. Consumers with high innovativeness are more likely to recognize the relative advantage, compatibility, and observability embedded in green marketing innovation and product innovation. In the context of green marketing innovation, innovative consumers may process sustainability communication more actively, evaluate environmental messages more positively, and translate green information into stronger purchase intentions. Previous research confirms that consumer innovativeness enhances the influence of innovation-related information on consumer responses because innovative individuals are more receptive to new ideas and value propositions (Moldovan et al., 2020).

Similarly, consumer innovativeness may strengthen the relationship between product innovation and green purchase intention. Innovative consumers are more willing to accept new product characteristics, experiment with sustainable alternatives, and perceive environmentally improved products as valuable innovations rather than uncertain substitutes. This argument is supported by studies showing that consumer innovativeness enhances the adoption of sustainable products by reducing perceived barriers and increasing acceptance of innovative attributes (Wang et al., 2022).

Therefore, consumer innovativeness functions as a boundary condition that determines the strength of the relationship between sustainability-oriented innovation and consumer purchase intention. Consumers with higher innovativeness are expected to respond more strongly to green marketing innovation and product innovation because they possess greater readiness to adopt new sustainable alternatives. Based on these arguments, the following hypotheses are proposed:

H3: Consumer innovativeness positively moderates the relationship between green marketing innovation and green purchase intention.

H4: Consumer innovativeness positively moderates the relationship between product innovation and green purchase intention.

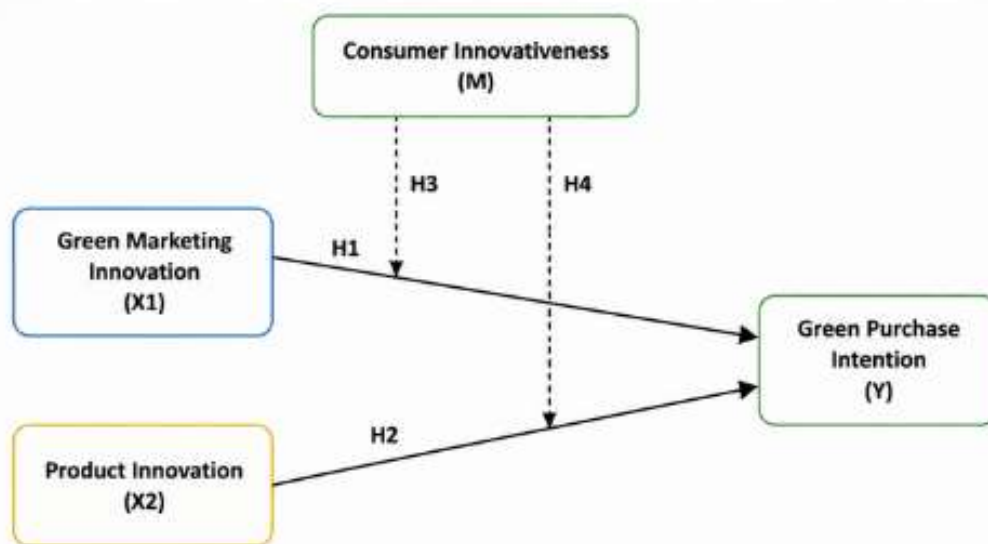


Figure 1. Conceptual framework of the research model

Source: Authors' compilation (2026).

Methods

Research design, population, and sample

This study used a quantitative cross-sectional survey design to test the hypothesised relationships among green marketing innovation, product innovation, consumer innovativeness, and green purchase

intention. The population consisted of consumers who had purchased culinary products in Denpasar, Bali, Indonesia. Denpasar was selected because it is a major commercial and culinary centre in Bali where consumers are exposed to diverse product innovations and sustainability-oriented business practices. Respondents were selected using purposive sampling. Eligibility required experience purchasing culinary products in Denpasar, awareness of environmental or sustainability-related product attributes, and willingness to participate in the survey. A total of 120 valid responses were retained for analysis. Because the sampling method was non-probability based, the findings should be interpreted as relationships observed within the study sample rather than population estimates for all Denpasar consumers.

Construct measurement and data collection

The questionnaire contained demographic questions and measurement items for four constructs. All construct items used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Measurement indicators were adapted and contextually modified from previous green marketing, green innovation, consumer innovativeness, and green purchasing studies. Table 1 summarizes the operational definitions and indicator domains used in the study.

Green marketing innovation was measured through environmental information, sustainability-based promotion, communication of responsible business practices, and green-oriented promotional strategies. Product innovation captured environmentally friendly product development, improvement of sustainability-related features, sustainable materials or packaging, and innovations intended to reduce environmental impact. Consumer innovativeness measured interest in new products, openness to new ideas, willingness to adopt environmentally friendly products, and preference for innovative alternatives. Green purchase intention reflected intention, preference, choice, and recommendation of environmentally responsible culinary products.

Table 1. Research variables and measurement indicators

Variable	Operational definition	Measurement indicators	Source
Green marketing innovation (GMI)	Innovative marketing strategies that integrate environmental values into communication, promotion, branding, and customer engagement.	Environmental information; sustainability-based promotion; responsible business communication; green-oriented promotion.	Iqbal et al. (2023); Amarga et al. (2026); Nasution et al. (2025)
Product innovation (PI)	Development of new or improved products that incorporate environmental considerations and sustainable attributes.	Environmentally friendly products; improved sustainability features; sustainable materials/packaging; reduced environmental impact.	Andersén (2021); Awwad et al. (2026); Nasution et al. (2025)
Consumer innovativeness (CI)	Consumer tendency to explore, accept, and adopt new products, ideas, or sustainable alternatives.	Interest in new products; openness to new ideas; willingness to adopt green products; preference for innovative alternatives.	Li et al. (2021); Hasudungan & Saragih (2024); Nasution et al. (2025)
Green purchase intention (GPI)	Consumer willingness and intention to purchase environmentally friendly culinary products.	Purchase intention; preference for responsible products; willingness to choose green culinary products; recommendation intention.	Iqbal et al. (2023); Sapsanguanboon & Faijaidee (2024); Shang et al. (2024)

Source: Adapted from the study instrument and cited literature.

Data analysis

The data were analysed using partial least squares structural equation modelling (PLS-SEM). This approach is suitable for prediction-oriented models that estimate multiple latent-variable relationships and interaction effects (Hair et al., 2019). The analysis proceeded in two stages. First, the measurement model was evaluated through indicator loadings, Cronbach's alpha, composite reliability, average variance extracted (AVE), and heterotrait-monotrait (HTMT) ratios. Loadings of approximately 0.70 or higher, reliability coefficients above 0.70, and AVE above 0.50 indicate satisfactory indicator reliability, internal consistency, and convergent validity; HTMT values below 0.90 provide evidence of discriminant validity (Hair et al., 2019; Henseler et al., 2015).

Second, the structural model was evaluated using the coefficient of determination (R^2), effect sizes (f^2), predictive relevance (Q^2), path coefficients, t statistics, and p values. Consumer innovativeness was examined as a moderating construct through the interaction terms $GMI \times CI$ and $PI \times CI$. The source model reports the two focal direct effects and the two interaction effects; it does not report a separate hypothesis for the direct $CI \rightarrow GPI$ path. Statistical significance was evaluated at the 5% level.

Results and discussion

Respondent profile

The sample comprised 120 culinary-product consumers in Denpasar. Women represented 60.0% of respondents and men 40.0%. The largest age group was 26-35 years (37.5%), followed by respondents under 25 years (26.7%). More than half held a bachelor's degree (51.7%). Most respondents purchased culinary products at least four times per month, indicating that the sample had regular exposure to the market context examined in this study. These characteristics define the empirical setting of the results and should not be interpreted as evidence that demographic groups differ in green purchase intention unless such differences are tested directly.

Table 2. Respondent characteristics

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	48	40.0
	Female	72	60.0
Age	<25 years	32	26.7
	26-35 years	45	37.5
	36-45 years	28	23.3
	>45 years	15	12.5
Education	Senior high school	21	17.5
	Diploma	25	20.8
	Bachelor degree	62	51.7
	Master degree	12	10.0
Occupation	Student	24	20.0
	Private employee	42	35.0
	Entrepreneur	31	25.8
	Government employee	23	19.2
Purchase frequency	1-3 times/month	18	15.0
	4-7 times/month	56	46.7



Characteristics	Category	Frequency	Percentage (%)
	>7 times/month	46	38.3

Source: Authors' compilation (2026).

Measurement model assessment

The measurement model was assessed to evaluate indicator reliability, internal consistency reliability, and convergent validity. As presented in Table 3, all constructs achieved the recommended threshold values for PLS-SEM measurement evaluation (Hair et al., 2019). Regarding indicator reliability, all outer loading values reported in Table 3 exceeded the recommended value of 0.70, indicating that each indicator adequately represented its corresponding construct. For Green Marketing Innovation (GMI), the loading values ranged from 0.798 to 0.845, with GMI1 loading at 0.812, GMI2 at 0.845, GMI3 at 0.798, and GMI4 at 0.821. The construct obtained a Cronbach's alpha value of 0.835, composite reliability (CR) of 0.889, and AVE of 0.666, indicating satisfactory reliability and convergent validity. For Product Innovation (PI), the indicator loadings ranged from 0.809 to 0.874, consisting of PI1 (0.836), PI2 (0.874), PI3 (0.809), and PI4 (0.851). As shown in Table 3, PI achieved a Cronbach's alpha value of 0.862, a CR value of 0.907, and an AVE value of 0.710. These results confirm that all PI indicators consistently measure the product innovation construct and explain a substantial proportion of variance. For Consumer Innovativeness (CI), all indicators also exceeded the minimum loading threshold, with values ranging from 0.790 to 0.866. Specifically, CI1 loaded at 0.823, CI2 at 0.847, CI3 at 0.790, and CI4 at 0.866. The construct demonstrated acceptable internal consistency with a Cronbach's alpha value of 0.846 and CR value of 0.898. Furthermore, the AVE value of 0.687 indicates that the construct achieved adequate convergent validity. For Green Purchase Intention (GPI), the indicator loading values ranged from 0.834 to 0.881, including GPI1 (0.858), GPI2 (0.881), GPI3 (0.834), and GPI4 (0.872). According to Table 3, GPI obtained the highest reliability among the constructs, with a Cronbach's alpha value of 0.887, CR value of 0.922, and AVE value of 0.748. These values demonstrate strong internal consistency and indicate that GPI indicators explain a high proportion of variance within the construct. Overall, the results presented in Table 3 demonstrate that all constructs meet the recommended criteria for measurement model assessment. The outer loading values above 0.70 confirm indicator reliability, Cronbach's alpha and composite reliability values above 0.70 establish internal consistency reliability, and AVE values above 0.50 confirm convergent validity. Therefore, the measurement model is considered reliable and valid for further structural model evaluation.

Table 3. Measurement model results

Construct	Indicator	Loading	Cronbach α	CR	AVE
GMI	GMI1	0.812	0.835	0.889	0.666
	GMI2	0.845			
	GMI3	0.798			
	GMI4	0.821			
PI	PI1	0.836	0.862	0.907	0.710
	PI2	0.874			
	PI3	0.809			
	PI4	0.851			
CI	CI1	0.823	0.846	0.898	0.687

Construct	Indicator	Loading	Cronbach α	CR	AVE
GPI	CI2	0.847	0.887	0.922	0.748
	CI3	0.790			
	CI4	0.866			
	GPI1	0.858			
	GPI2	0.881			
	GPI3	0.834			
	GPI4	0.872			

Source: Authors' compilation (2026).

Discriminant Validity

Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT) criterion. As presented in Table 4, all HTMT values were below the recommended threshold of 0.90, indicating that all constructs achieved adequate discriminant validity (Henseler et al., 2015).

The HTMT values between GMI and PI, GMI and CI, and PI and CI were 0.742, 0.681, and 0.715, respectively, confirming that these constructs represent distinct concepts. Furthermore, the HTMT values between GMI and GPI, PI and GPI, and CI and GPI were 0.783, 0.821, and 0.756, respectively. Although the relationship between PI and GPI showed the highest HTMT value (0.821), it remained below the threshold of 0.90.

The results presented in Table 4 confirm that Green Marketing Innovation (GMI), Product Innovation (PI), Consumer Innovativeness (CI), and Green Purchase Intention (GPI) have sufficient discriminant validity, indicating that each construct captures a unique theoretical dimension in the research model.

Table 4. HTMT discriminant validity results

Construct	GMI	PI	CI	GPI
GMI	-			
PI	0.742	-		
CI	0.681	0.715	-	
GPI	0.783	0.821	0.756	-

Source: Authors' compilation (2026).

Structural model assessment and hypothesis testing

The structural model explained 67.2% of the variance in green purchase intention ($R^2 = 0.672$). The positive Q^2 value of 0.481 indicates predictive relevance for the endogenous construct. As presented in Table 5, the R^2 value demonstrates that green marketing innovation, product innovation, and the interaction effects involving consumer innovativeness collectively provide substantial explanatory power for green purchase intention, while the remaining variance is explained by other factors outside the research model.

Effect-size results shown in Table 5 indicate that product innovation had the largest contribution to green purchase intention ($f^2 = 0.237$), followed by green marketing innovation ($f^2 = 0.184$). These findings suggest that product-related sustainability improvements provide a stronger contribution to explaining green purchase intention compared with marketing-based sustainability communication. The two interaction effects were smaller, with f^2 values of 0.092 for $GMI \times CI$ and 0.126 for $PI \times CI$. These results indicate that the direct innovation effects provide greater explanatory contribution than the interaction terms, while consumer innovativeness still plays a meaningful role in strengthening the relationships between sustainability-oriented innovation and green purchase intention.

Table 5. Structural model explanatory and predictive power

Endogenous construct	R ²	Q ²	Interpretation
Green purchase intention	0.672	0.481	Moderate explanatory power; positive predictive relevance

Source: Authors' compilation (2026).

The effect size analysis was conducted to evaluate the contribution of each exogenous construct to green purchase intention. As presented in Table 6, all hypothesized relationships demonstrated meaningful effect sizes based on the reported f^2 values. The relationship between green marketing innovation and green purchase intention ($GMI \rightarrow GPI$) obtained an f^2 value of 0.184, which indicates a medium effect size. This result suggests that green marketing innovation provides a meaningful contribution to explaining variations in consumers' green purchase intention. Similarly, product innovation and green purchase intention ($PI \rightarrow GPI$) showed the largest effect among the direct relationships, with an f^2 value of 0.237, categorized as a medium effect size. This finding indicates that sustainability-oriented product improvements contribute substantially to consumers' intention to purchase green products. Regarding the moderating effects, the interaction between green marketing innovation and consumer innovativeness on green purchase intention ($GMI \times CI \rightarrow GPI$) produced an f^2 value of 0.092, representing a small effect size. Meanwhile, the interaction between product innovation and consumer innovativeness on green purchase intention ($PI \times CI \rightarrow GPI$) obtained an f^2 value of 0.126, which is also categorized as a small effect size. These results indicate that consumer innovativeness strengthens the relationships between sustainability-oriented innovations and green purchase intention, although its contribution is smaller compared with the direct effects of innovation variables.

The results presented in Table 6 demonstrate that both direct innovation effects and moderation effects contribute to explaining green purchase intention, with product innovation showing the strongest explanatory contribution among the examined relationships.

Table 6. Effect size results

Relationship	f^2	Effect size
$GMI \rightarrow GPI$	0.184	Medium
$PI \rightarrow GPI$	0.237	Medium
$GMI \times CI \rightarrow GPI$	0.092	Small
$PI \times CI \rightarrow GPI$	0.126	Small

Source: Authors' compilation (2026).

The hypothesis testing results were evaluated based on the path coefficient (β), t-value, and p-value. The significance level was determined at $p < 0.05$. The results of the hypothesis testing are presented in Table 7.

Table 7. Hypothesis testing results

Hypothesis	Relationship	β	t-value	p-value	Result
H1	$GMI \rightarrow GPI$	0.286	3.921	<0.001	Supported
H2	$PI \rightarrow GPI$	0.361	5.214	<0.001	Supported

Hypothesis	Relationship	β	t-value	p-value	Result
H3	$GMI \times CI \rightarrow GPI$	0.173	2.467	0.014	Supported
H4	$PI \times CI \rightarrow GPI$	0.196	2.891	0.004	Supported

Source: Authors' compilation (2026).

Hypothesis Testing Results

The hypothesis testing results are presented in Table 7. The structural model was evaluated based on the path coefficient (β), t-value, and p-value. A relationship is considered significant when the p-value is below 0.05.

Direct Effects

The results in Table 7 show that green marketing innovation (GMI) has a positive and significant effect on green purchase intention (GPI), with a path coefficient of $\beta = 0.286$, t-value = 3.921, and p-value < 0.001. Therefore, H1 is supported, indicating that stronger green marketing innovation increases consumers' intention to purchase environmentally friendly products.

Similarly, product innovation (PI) positively and significantly influences green purchase intention, with $\beta = 0.361$, t-value = 5.214, and p-value < 0.001. These results support H2, demonstrating that sustainability-oriented product improvements provide a significant contribution to consumers' green purchase intention. Compared with green marketing innovation, product innovation shows a stronger direct effect based on its higher path coefficient.

Moderating Effects

The moderating effects of consumer innovativeness (CI) are presented through the interaction terms in Table 7. The interaction between green marketing innovation and consumer innovativeness ($GMI \times CI \rightarrow GPI$) shows a positive and significant effect, with $\beta = 0.173$, t-value = 2.467, and p-value = 0.014. Therefore, H3 is supported, indicating that consumer innovativeness strengthens the relationship between green marketing innovation and green purchase intention.

Furthermore, the interaction between product innovation and consumer innovativeness ($PI \times CI \rightarrow GPI$) also demonstrates a positive and significant effect, with $\beta = 0.196$, t-value = 2.891, and p-value = 0.004. Thus, H4 is supported, suggesting that consumers with higher innovativeness respond more strongly to sustainability-oriented product innovations.

The results presented in Table 7 confirm that both direct innovation effects and moderation effects significantly contribute to explaining green purchase intention. The direct effects demonstrate the importance of organizational innovation initiatives, while the interaction effects highlight the role of consumer innovativeness as a condition that strengthens consumers' responses toward sustainable innovations.

Discussion

Green marketing innovation and green purchase intention

H1 is supported because green marketing innovation has a positive and significant effect on green purchase intention ($\beta = 0.286$, $t = 3.921$, $p < 0.001$). This finding indicates that sustainability-oriented marketing practices contribute to consumers' willingness to choose environmentally responsible culinary products. Green marketing innovation appears to function not only as a promotional strategy but also as an information mechanism that helps consumers identify, evaluate, and understand environmental value embedded in products. In the culinary sector, communication regarding sustainable packaging, responsible sourcing, waste reduction, and environmentally friendly practices

can increase consumer confidence because consumers receive clearer signals regarding the ecological benefits of their choices.

This finding is consistent with Iqbal et al. (2023), who demonstrated that green marketing activities positively influence purchase intention by increasing consumer awareness and environmental knowledge. Similarly, Amarga et al. (2026) found that green promotion, packaging information, and environmental labelling influence consumer preferences toward sustainable products. The present finding extends these studies by positioning green marketing innovation within the Diffusion of Innovation framework, particularly the attribute of observability. Unlike conventional marketing communication, green marketing innovation allows consumers to observe and interpret sustainability attributes before making purchase decisions. This result suggests that environmental communication becomes more effective when businesses provide specific and verifiable information rather than relying on general green claims.

Product innovation and green purchase intention

The findings in Table 7 demonstrate that product innovation has a positive and significant effect on green purchase intention ($\beta = 0.361$, $t = 5.214$, $p < 0.001$), supporting H2. Among the direct relationships examined in this study, product innovation shows the strongest effect, which is also reflected in the effect-size analysis in Table 6, where product innovation produces the highest contribution ($f^2 = 0.237$). This finding indicates that consumers place substantial importance on tangible sustainability attributes, such as environmentally friendly materials, sustainable packaging, improved product features, and waste-reduction practices.

The stronger influence of product innovation compared with green marketing innovation suggests that consumers may respond more positively to actual product improvements than to sustainability communication alone. This finding supports the relative advantage dimension of Diffusion of Innovation theory, where adoption occurs when consumers perceive an innovation as providing superior value compared with existing alternatives. The result is consistent with Andersén (2021), who found that green product innovation strengthens differentiation advantage by embedding environmental value into products. It also supports Zhang et al. (2022), who highlighted that green innovation contributes to sustainable consumption through improved consumer perceptions of product value.

Compared with previous studies that often examine green innovation from an organizational perspective, this study provides consumer-level evidence from the culinary sector in Denpasar. The finding indicates that sustainability initiatives are more likely to influence purchase intention when consumers can directly experience or evaluate the environmental benefits of the product itself.

Moderating role of consumer innovativeness

The moderating results presented in Table 7 indicate that consumer innovativeness significantly strengthens the relationship between green marketing innovation and green purchase intention ($\beta = 0.173$, $t = 2.467$, $p = 0.014$), supporting H3. This finding demonstrates that sustainability communication does not influence all consumers with the same intensity. Consumers with higher innovativeness are more responsive to new environmental information because they are more willing to explore new ideas, process unfamiliar messages, and evaluate innovative alternatives.

This result extends previous research on consumer innovativeness. Li et al. (2021) found that consumer innovativeness influences sustainable product adoption by increasing openness toward environmentally responsible alternatives. However, previous studies generally focused on the direct relationship between innovativeness and sustainable consumption. The present study expands this perspective by demonstrating that consumer innovativeness acts as a moderating condition that strengthens the effectiveness of firm-level innovation efforts.

Furthermore, Table 7 shows that consumer innovativeness also strengthens the relationship between product innovation and green purchase intention ($\beta = 0.196$, $t = 2.891$, $p = 0.004$), supporting H4. Although the interaction effect is smaller than the direct effect of product innovation, the result indicates that innovative consumers are more likely to recognize the value of newly developed sustainable

products. This finding is consistent with Hasudungan and Saragih (2024), who reported that personal innovativeness contributes to green purchase intention among Indonesian consumers. It also complements Nasution et al. (2025), who identified consumer innovativeness as an important mechanism in green purchase models.

These moderation findings provide an important theoretical contribution by extending Diffusion of Innovation theory. Previous applications of DOI often emphasize innovation characteristics such as relative advantage and observability. The current study demonstrates that innovation effectiveness also depends on adopter readiness. Therefore, sustainability-oriented innovation generates stronger behavioural responses when consumers possess greater psychological readiness to accept novelty.

Theoretical and managerial implications

The findings contribute to sustainable marketing literature by integrating organizational innovation and consumer characteristics within a single DOI-based framework. The results from Table 7 demonstrate that green marketing innovation and product innovation independently influence green purchase intention, while consumer innovativeness strengthens these relationships. This indicates that sustainable consumption is shaped not only by the availability of innovative products and communication strategies but also by consumers' willingness to adopt new alternatives.

From a managerial perspective, culinary businesses should prioritize product-based sustainability improvements because product innovation demonstrates the strongest direct influence ($\beta = 0.361$; $f^2 = 0.237$). However, these improvements should be supported by transparent green marketing communication to increase consumer understanding and trust. Businesses should also consider consumer innovativeness when designing market strategies because innovative consumers may serve as early adopters who accelerate the diffusion of sustainable culinary products.

Conclusion

This study examined the effects of green marketing innovation and product innovation on green purchase intention and tested consumer innovativeness as a moderator among 120 culinary consumers in Denpasar. All four hypotheses were supported. Green marketing innovation positively influenced green purchase intention, while product innovation produced the strongest direct effect. Consumer innovativeness significantly strengthened both relationships. The structural model explained 67.2% of the variance in green purchase intention and showed positive predictive relevance.

The findings support a DOI-based interpretation in which innovation adoption depends on both innovation-related signals and adopter readiness. For culinary businesses, the practical priority is to develop tangible environmental value through product innovation and communicate that value transparently through green marketing. Consumer innovativeness should also be considered when segmenting and introducing sustainability-oriented offerings. The results suggest that early adopters can play an important role in the diffusion of green culinary products, but environmental claims remain most credible when they are supported by visible product-level improvements.

Research limitations and future research

The study has several limitations. First, the sample was limited to 120 consumers in Denpasar and was selected through purposive sampling. The findings therefore should not be generalised statistically to all consumers in Bali or Indonesia. Future research should replicate the model across cities, tourism destinations, and different culinary segments using larger and, where feasible, probability-based samples.

Second, the cross-sectional design captures perceptions at one point in time and cannot establish how responses to green innovation change as consumers gain experience. Longitudinal or experimental designs could test whether repeated exposure, actual product trial, or price changes alter the observed relationships. Third, the study focuses on purchase intention rather than actual purchasing behaviour. Future work should connect intention with verified purchases, repeat purchase, willingness to pay, or behavioural loyalty.

Fourth, the source model reports consumer innovativeness through interaction terms but does not report a separate direct $CI \rightarrow GPI$ hypothesis. Future research should test the direct, moderating, and potentially mediating roles of consumer innovativeness within the same structural specification. Additional moderators such as sustainability awareness, environmental knowledge, perceived



greenwashing, price sensitivity, and trust in environmental claims may also clarify when green marketing and product innovation translate into actual market response.

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