

Green Logistics, Green Marketing Communication, and Customer Purchase Intention: The Role of Perceived Innovativeness in Entrepreneurial Firms.

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Abstract

This study examines the relationships between perceived green logistics practices, perceived green marketing communication, perceived entrepreneurial innovativeness, and customer purchase intention toward entrepreneurial firms. Drawing on signaling theory, it integrates environmental and innovation-related customer perceptions within a common explanatory framework. A quantitative, cross-sectional design uses a Google Forms questionnaire targeting 120 respondents recruited through convenience sampling. The model is analyzed using partial least squares structural equation modeling in SmartPLS. The reported results indicate positive and statistically significant relationships between purchase intention and perceived green logistics practices ($\beta = 0.477$), green marketing communication ($\beta = 0.379$), and entrepreneurial innovativeness ($\beta = 0.377$), with all p-values below 0.001. Together, the predictors explain 60.3% of the variance in purchase intention. The findings support the relevance of examining logistics, communication, and innovativeness jointly when investigating customer evaluations of entrepreneurial firms. They suggest managerial value in coordinating environmentally responsible practices, credible environmental messages, and useful innovations. However, the cross-sectional design and non-probability sampling limit causal inference and generalizability.

Keywords: Green logistics; Green marketing communication; Perceived entrepreneurial innovativeness; Customer purchase intention; Signaling theory.

1. Introduction

Environmental responsibility and innovation have become increasingly important in understanding how customers evaluate entrepreneurial firms. Beyond the intrinsic characteristics of a product or service, customers may also consider the environmental implications of packaging and delivery, the credibility of environmental messages, and the firm's ability to introduce useful and innovative solutions. However, sustainable consumption does not depend exclusively on environmental considerations. Consumers frequently face trade-offs involving convenience, habits, perceived benefits, and other purchasing criteria (White et al., 2019). Understanding customer purchase intention therefore requires examining how these different perceptions jointly contribute to willingness to buy from entrepreneurial firms.

Existing research provides important insights into each of these dimensions. Studies on environmentally friendly packaging emphasize the role of environmental considerations and customer perceptions in purchasing evaluations (Prakash & Pathak, 2017; Nguyen et al., 2020). Research on green marketing further highlights the importance of perceived value, perceived risk, and trust, while showing that misleading environmental claims and greenwashing can undermine customer confidence (Chen & Chang, 2012, 2013). In parallel, studies on perceived firm innovativeness identify functional, experiential, and quality-related mechanisms through which innovation perceptions can generate favorable consumer responses (Kunz et al., 2011; Pappu & Quester, 2016).

Despite these contributions, the existing literature remains fragmented. Green logistics research frequently focuses on environmentally friendly packaging or delivery decisions, green marketing studies often emphasize trust, risk, and responses to environmental claims, while research on perceived innovativeness generally examines outcomes such as brand evaluations or loyalty. Consequently, relatively limited attention has been devoted to examining these three customer perceptions simultaneously as determinants of purchase intention toward entrepreneurial firms. This fragmentation creates a need for an integrated framework capable of assessing whether environmental logistics practices, environmental communication, and perceived innovativeness provide distinct explanatory contributions to customer purchase intention.

To address this gap, the present study integrates perceived green logistics practices, perceived green marketing communication, and perceived entrepreneurial innovativeness as three antecedents of customer purchase intention. Drawing on signaling theory, the study considers how customers interpret observable practices and information when evaluating organizational attributes that they cannot fully verify before making a purchasing decision (Connelly et al., 2011). Green logistics practices, environmental communication, and innovative offerings may therefore operate

as signals through which customers form judgments about the environmental responsibility, credibility, and capabilities of entrepreneurial firms.

Accordingly, the central research question is formulated as follows: **How are customers' perceptions of green logistics practices, green marketing communication, and entrepreneurial innovativeness associated with their purchase intention toward entrepreneurial firms?**

The main objective of this study is to empirically examine the relationships between these three customer perceptions and purchase intention while considering their simultaneous effects within a common explanatory model. More specifically, the study investigates whether perceived green logistics practices, perceived green marketing communication, and perceived entrepreneurial innovativeness each make a distinct contribution to explaining customer purchase intention.

A quantitative, cross-sectional research design is adopted. Data are collected through a structured questionnaire administered via Google Forms and analyzed using partial least squares structural equation modeling (PLS-SEM) through SmartPLS. The study contributes to the literature by bringing together logistics, environmental marketing communication, entrepreneurship, and consumer behavior within a unified customer-based framework. It also provides empirical evidence regarding the respective associations of green logistics practices, green marketing communication, and entrepreneurial innovativeness with purchase intention.

The remainder of the article is organized as follows. The next section develops the theoretical foundations and research hypotheses. The methodology section then presents the research design, sampling procedure, measurement of the constructs, and analytical approach. The empirical results are subsequently reported and discussed in relation to the existing literature and signaling theory. Finally, the article presents the main implications, limitations, and directions for future research.

2. Literature review

Understanding customer purchase intention toward entrepreneurial firms requires examining how customers interpret both environmental responsibility and the capacity to introduce useful innovations. These evaluations draw on different aspects of the firm's offering, including its logistics practices, environmental communication, and perceived innovativeness. Although these dimensions belong to distinct research traditions, they provide complementary perspectives on how customers assess a firm and develop purchasing intentions.

This literature review brings these perspectives together to establish the theoretical foundations of the proposed model. Drawing principally on signaling theory, it considers how observable practices and information inform customers' judgments about attributes they cannot fully verify (Connelly et al., 2011). The discussion first examines the relationship between perceived green

logistics practices and purchase intention, then addresses green marketing communication, and finally considers perceived entrepreneurial innovativeness. Each section synthesizes relevant evidence, identifies the limits of its application to entrepreneurial firms, and develops the corresponding hypothesis.

2.1. Perceived Green Logistics Practices and Customer Purchase Intention

Green logistics practices provide a potential basis for environmental differentiation through packaging, delivery, and the management of returns. From a customer perspective, their relevance depends on how these activities are perceived and incorporated into purchasing evaluations. Research on environmentally friendly packaging illustrates this connection. Prakash and Pathak (2017) identify attitudes, personal norms, environmental concern, and willingness to pay as significant antecedents of intentions to purchase environmentally friendly packaged products. Their findings support the relevance of environmental packaging attributes to consumer decision-making, although they do not directly establish the relationship between an overall perception of green logistics and purchase intention toward a particular firm.

Understanding this relationship requires attention to how customers recognize environmental responsibility. Nguyen et al. (2020) emphasize consumer understandings of environmentally friendly packaging, indicating the importance of aligning packaging strategies with customer expectations. This perspective supports distinguishing perceived green logistics from objectively measured environmental performance. Customers may evaluate visible packaging materials or delivery arrangements while possessing limited information about warehouse operations or transport emissions. Accordingly, the present study conceptualizes perceived green logistics practices as customers' assessments of the environmental responsibility of logistics activities they encounter or about which they receive relevant information.

Nevertheless, environmental attributes do not necessarily outweigh other purchasing considerations. Using stated preference data from the United States, Amaya et al. (2025) found that information about environmental impacts did not influence delivery choices in their study, whereas delivery vehicle information mattered. Their results also reveal the importance of convenience and customers' reluctance to change their behavior. Compared with research examining general intentions toward environmentally friendly packaging, this approach makes service trade-offs more explicit. The evidence therefore suggests that favorable environmental evaluations may coexist with resistance to delivery options that require additional effort or reduced convenience.

These findings support a conditional theoretical argument rather than an assumption of universally favorable responses. Environmentally responsible logistics may strengthen purchase intention

when customers recognize these practices and consider them relevant to the firm's offering. However, selecting a sustainable delivery option and intending to purchase from a firm remain distinct decisions. The present study extends the packaging and delivery literature by examining whether favorable perceptions of green logistics contribute to firm-specific purchase intention. On this basis, the following hypothesis is proposed:

H1: Perceived green logistics practices positively influence customer purchase intention.

2.2. Perceived Green Marketing Communication and Customer Purchase Intention

Green marketing communication enables firms to present their environmental commitments and explain the environmental attributes of their offerings. Its potential influence can be understood through signaling theory, which explains how receivers interpret observable information about qualities they cannot directly verify (Connelly et al., 2011). Applied to environmental communication, this perspective suggests that customers use messages to evaluate a firm's environmental responsibility under conditions of incomplete information. For the present study, communication is therefore examined through customers' perceptions of its clarity, credibility, and informativeness, rather than solely through the frequency of environmental advertising.

Research on green purchasing provides a basis for explaining why these evaluations may matter. Using questionnaire data and structural equation modeling, Chen and Chang (2012) found that green perceived value was positively related to green trust and purchase intention, whereas green perceived risk was negatively related to both. Trust partially mediated these relationships. Although their model did not directly examine the communication construct proposed here, the findings suggest that information supporting favorable value judgments and reducing uncertainty may contribute to purchase intention. This provides an indirect theoretical foundation for expecting credible environmental communication to encourage favorable purchasing evaluations.

The opposite possibility is evident in research on greenwashing. Chen and Chang (2013) found that perceived greenwashing was negatively associated with green trust, with consumer confusion and perceived risk mediating this relationship. Their findings qualify the assumption that environmental messaging necessarily benefits a firm. Communication may undermine confidence when customers perceive a discrepancy between environmental claims and the firm's conduct. Considered together, the two studies indicate that the commercial relevance of environmental communication depends on how it shapes uncertainty and confidence, rather than on the presence of environmental language alone.

Experimental evidence further complicates a purely informational explanation. Schmuck et al. (2018) found that false environmental claims increased perceived greenwashing and damaged advertising and brand evaluations, whereas vague claims did not generate equivalent responses.

Nature imagery could also produce favorable affective reactions despite misleading claims. Unlike cross-sectional surveys, their experiments distinguish the effects of specific message characteristics. However, the outcomes concern advertising and brand evaluations rather than the firm-specific purchase intention examined here. The findings nevertheless demonstrate that environmental communication involves both credibility judgments and emotional responses.

The present study consequently proposes that environmental communication contributes positively to purchase intention when customers evaluate it as clear, credible, and informative. This proposition draws on evidence concerning green trust, perceived risk, and responses to environmental claims, while extending that evidence to the communication–purchase intention relationship. Trust provides an explanatory mechanism in the theoretical discussion but is not introduced as a measured mediator in the proposed model. Accordingly, the following hypothesis is formulated:

H2: Perceived green marketing communication positively influences customer purchase intention.

2.3. Perceived Entrepreneurial Innovativeness and Customer Purchase Intention

Innovativeness is central to the conceptualization of entrepreneurial activity, but its meaning depends on the level of analysis. Lumpkin and Dess (1996) position innovativeness within entrepreneurial orientation and propose that the relationship between entrepreneurial orientation and performance depends on organizational and environmental conditions. This perspective addresses organizational characteristics that customers may not directly observe. A customer-based investigation therefore requires a more specific construct: perceived entrepreneurial innovativeness, understood here as customers' evaluations of an entrepreneurial firm's capacity to introduce new offerings, improve services, and develop useful solutions.

Consumer research provides support for this interpretation. Kunz et al. (2011) developed a consumer-centered measure of perceived firm innovativeness and demonstrated its relationship with loyalty through functional-cognitive and affective-experiential routes. Their findings indicate that innovation perceptions extend beyond individual products and technologies to customers' broader evaluations of the firm. From this perspective, an innovative firm may attract customers because its offerings suggest practical improvements and generate interest or favorable experiences. These mechanisms provide a rationale for examining purchasing evaluations, although loyalty and purchase intention should remain analytically distinct.

Pappu and Quester (2016) offer a complementary explanation grounded in signaling theory. Across two studies involving consumer electronics brands, they found that perceived quality mediated the relationship between brand innovativeness and loyalty. Whereas Kunz et al. (2011)

emphasize functional and experiential routes, Pappu and Quester (2016) identify quality judgments as a mechanism through which innovation perceptions acquire commercial relevance. Together, these studies suggest that customers respond to innovativeness partly because of the benefits they associate with it. Novelty alone does not provide a sufficient explanation of favorable customer responses.

Extending these findings to entrepreneurial firms requires acknowledging differences in context and outcome. Evidence concerning established brands and consumer loyalty does not directly establish how perceived innovativeness relates to purchase intention toward an entrepreneurial firm. The proposition advanced here is that customers who associate the firm with useful new solutions will be more willing to consider purchasing its offerings. This relationship is examined alongside green logistics and green marketing communication to determine whether innovation perceptions contribute beyond environmental evaluations.

Conceptually, perceived entrepreneurial innovativeness should encompass the firm's broader ability to introduce meaningful improvements. Restricting it to environmental innovations would create potential overlap with green logistics and weaken the distinction between the predictors. Drawing on the functional, experiential, and quality-based explanations developed in the consumer innovation literature, the following hypothesis is proposed:

H3: Perceived entrepreneurial innovativeness positively influences customer purchase intention.

The reviewed literature provides a theoretical basis for examining perceived green logistics practices, green marketing communication, and entrepreneurial innovativeness as antecedents of customer purchase intention. Research on packaging and delivery highlights the relevance of environmental attributes while showing that customer responses remain sensitive to convenience and other benefits. Green marketing studies emphasize the importance of credibility and the potential consequences of misleading claims. Consumer innovation research further suggests that innovativeness acquires commercial relevance through the functional, experiential, and quality-related benefits customers associate with it.

These contributions support the proposed relationships without establishing them directly in the context of the present study. Evidence concerning sustainable delivery choices, brand evaluations, or loyalty cannot be treated as equivalent to evidence concerning purchase intention toward entrepreneurial firms. The proposed framework therefore extends these research streams by examining the three predictors simultaneously while preserving their conceptual distinctions. Three positive relationships are hypothesized: perceived green logistics practices, perceived green marketing communication, and perceived entrepreneurial innovativeness are each expected to

contribute to customer purchase intention. Their empirical examination will assess whether these perceptions provide distinct explanatory contributions within a common customer-based model.

3. Method

The study will adopt a quantitative, cross-sectional design to examine the relationships between perceived green logistics practices, perceived green marketing communication, perceived entrepreneurial innovativeness, and customer purchase intention. Data will be collected through a structured questionnaire administered using Google Forms. The questionnaire will include respondent characteristics and items measuring the four constructs on a five-point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Participants will evaluate the same identifiable entrepreneurial firm throughout the questionnaire. A preliminary test will assess question clarity before distribution, and participation will be voluntary and based on informed consent.

The target population will comprise adult customers and prospective customers sufficiently familiar with an entrepreneurial firm to evaluate the practices investigated. In the absence of a comprehensive sampling frame, non-probability convenience sampling will be employed, with screening questions to establish respondent eligibility. The questionnaire will be distributed through relevant social media groups, customer communities, and participating firms’ communication channels, targeting **120 valid responses**. Recruitment will seek diversity in respondent characteristics and purchasing experience. Nevertheless, the non-probability sampling procedure will limit the statistical generalizability of the findings.

The collected data will be analyzed using SmartPLS through partial least squares structural equation modeling (PLS-SEM). Following data screening, descriptive statistics will summarize respondent characteristics and the study variables. The measurement model will be assessed through indicator loadings, Cronbach’s alpha, composite reliability, and average variance extracted (AVE), while discriminant validity will be examined using the heterotrait–monotrait ratio (HTMT). The structural model will then be evaluated through collinearity diagnostics, path coefficients, bootstrapped confidence intervals and significance levels, R^2 , and effect sizes (f^2). The findings will be interpreted considering the sample of 120 respondents and the cross-sectional design, recognizing that the estimated relationships do not establish definitive evidence of causality.

The four constructs were operationalized through three proposed items each, informed by the literature on green logistics, environmental communication, perceived firm innovativeness, and purchase intention. The items were formulated to capture customers’ perceptions of the same focal entrepreneurial firm and will be measured using a five-point Likert scale ranging from 1 (“strongly

disagree”) to 5 (“strongly agree”). The following table presents the variables, item codes, and corresponding statements. As these formulations represent conceptual adaptations rather than verbatim reproductions of validated scales, they will be pretested before data collection, and their reliability and validity will subsequently be assessed using SmartPLS.

Table 1. Operationalization of the Study Constructs and Measurement Items

Variable	Code	Measurement item
Perceived Green Logistics Practices	GLP1	This company uses environmentally friendly packaging.
	GLP2	This company avoids unnecessary packaging when preparing orders.
	GLP3	This company uses delivery methods that reduce environmental impact.
Perceived Green Marketing Communication	GMC1	This company clearly explains its environmental practices.
	GMC2	This company provides specific information to support its environmental claims.
	GMC3	This company’s environmental messages are credible.
Perceived Entrepreneurial Innovativeness	PEI1	This company regularly introduces new products or services.
	PEI2	This company develops creative solutions to customer needs.
	PEI3	Compared with its competitors, this company is innovative.
Customer Purchase Intention	CPI1	I intend to purchase products or services from this company in the future.
	CPI2	I am likely to choose this company when I next need the products or services it offers.
	CPI3	I plan to buy from this company when a suitable opportunity arises.

Source: Authors’ elaboration based on the literature review.

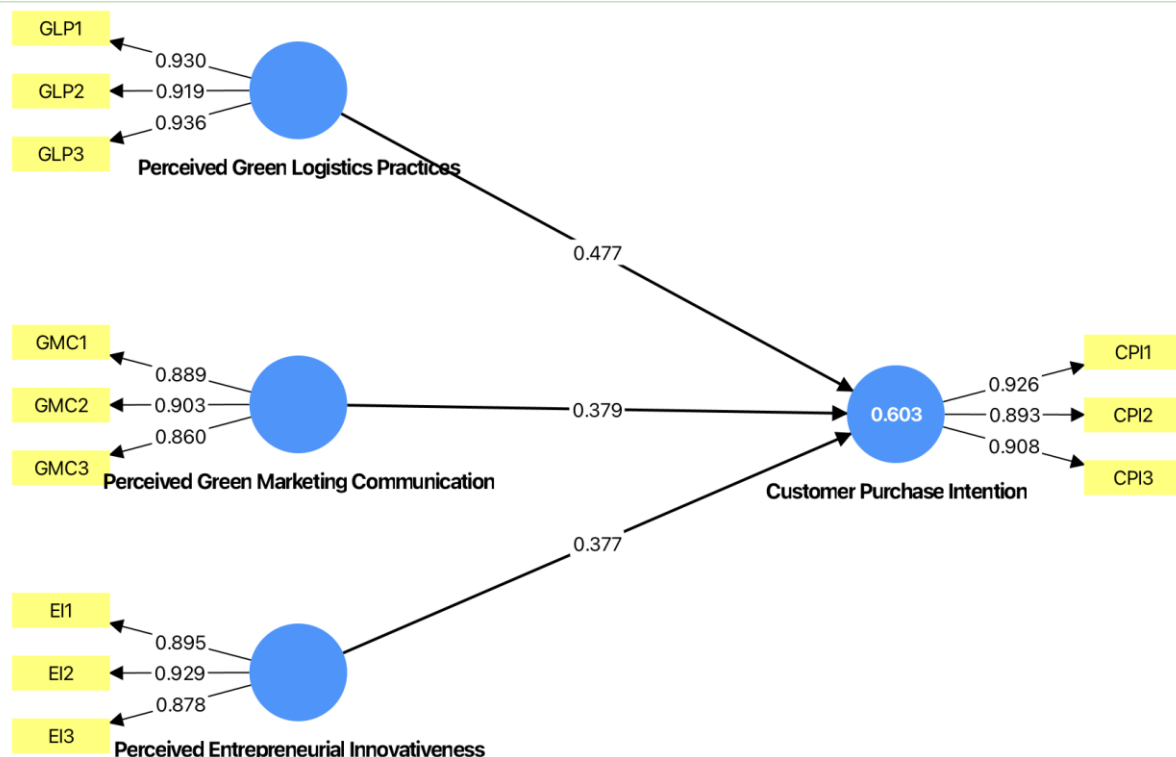
The proposed methodology provides a structured framework for examining the relationships between perceived green logistics practices, green marketing communication, entrepreneurial

innovativeness, and customer purchase intention. A Google Forms questionnaire targeting 120 eligible respondents through convenience sampling will support quantitative data collection, while SmartPLS will be used to assess the measurement model and test the three hypotheses. The findings will be interpreted within the limits of the sample size, non-probability sampling, and cross-sectional design, with conclusions restricted to the observed relationships rather than causal effects.

4. Result

This section presents the results of the empirical analysis examining the relationships between perceived green logistics practices, perceived green marketing communication, perceived entrepreneurial innovativeness, and customer purchase intention. It begins with a description of the respondents and the study variables, followed by an assessment of the measurement model's reliability and validity. The structural model is then evaluated using SmartPLS to examine the proposed relationships and assess the three research hypotheses. Particular attention is given to the direction, magnitude, and statistical significance of the path coefficients, together with the model's explanatory power.

Figure 1. Estimated PLS-SEM model: Outer loadings, path coefficients, and explained variance



Source: SmartPLS output.

Figure 1 presents the estimated relationships between perceived green logistics practices, perceived green marketing communication, perceived entrepreneurial innovativeness, and

customer purchase intention. Each construct is measured through three reflective indicators. The outer loadings range from 0.860 to 0.936, indicating strong associations between the indicators and their respective constructs. Specifically, loadings range from 0.919 to 0.936 for green logistics practices, from 0.860 to 0.903 for green marketing communication, from 0.878 to 0.929 for entrepreneurial innovativeness, and from 0.893 to 0.926 for purchase intention.

The structural relationships display positive coefficients for all three predictors. Perceived green logistics practices has the largest estimated coefficient ($\beta = 0.477$), indicating the strongest positive association with purchase intention among the predictors included in the model. Perceived green marketing communication ($\beta = 0.379$) and perceived entrepreneurial innovativeness ($\beta = 0.377$) exhibit numerically similar associations. These coefficients describe the relationships while accounting for the other predictors; their statistical significance is assessed separately through bootstrapping.

The coefficient of determination for customer purchase intention is $R^2 = 0.603$. Thus, the three predictors jointly explain 60.3% of the variance in purchase intention in the analyzed sample, while 39.7% remains unexplained by the model. This result describes the model's in-sample explanatory power and does not independently establish causal effects or predictive performance in new samples.

Table 2. Internal consistency reliability and convergent validity

Construct	Cronbach's α	rho_A	Composite reliability (rho_C)	AVE
Perceived Green Logistics Practices	0.920	0.921	0.949	0.862
Perceived Green Marketing Communication	0.861	0.877	0.915	0.782
Perceived Entrepreneurial Innovativeness	0.884	0.902	0.928	0.812
Customer Purchase Intention	0.895	0.895	0.934	0.826

Source: SmartPLS output.

The results indicate strong internal consistency across the four constructs. Cronbach's alpha values range from 0.861 to 0.920, while rho_A values extend from 0.877 to 0.921. Composite reliability values range from 0.915 to 0.949, providing further evidence of consistency among the indicators assigned to each construct. Perceived green logistics practices records the highest reliability values, whereas perceived green marketing communication exhibits comparatively lower, but still satisfactory, values.

Convergent validity is supported by AVE values ranging from 0.782 to 0.862. Perceived green logistics practices explains 86.2% of the variance in its indicators, followed by customer purchase intention at 82.6%, perceived entrepreneurial innovativeness at 81.2%, and perceived green marketing communication at 78.2%. These results indicate that each construct captures a substantial proportion of its indicators' variance.

Overall, the findings support internal consistency reliability and convergent validity. However, these statistics do not establish whether the constructs are empirically distinct from one another; discriminant validity requires a separate assessment using HTMT.

Table 3. Indicator loadings and outer-model collinearity statistics

Construct	Indicator	Outer loading	VIF
Perceived Green Logistics Practices	GLP1	0.930	3.311
	GLP2	0.919	3.109
	GLP3	0.936	3.772
Perceived Green Marketing Communication	GMC1	0.889	2.429
	GMC2	0.903	2.218
	GMC3	0.860	2.023
Perceived Entrepreneurial Innovativeness	EI1	0.895	2.418
	EI2	0.929	2.890
	EI3	0.878	2.383
Customer Purchase Intention	CPI1	0.926	3.254
	CPI2	0.893	2.428
	CPI3	0.908	2.722

Source: SmartPLS output.

The outer loadings range from 0.860 to 0.936, indicating strong associations between the indicators and their respective constructs. Perceived green logistics practices exhibits consistently high loadings, ranging from 0.919 to 0.936. The corresponding values range from 0.860 to 0.903 for perceived green marketing communication, from 0.878 to 0.929 for perceived entrepreneurial innovativeness, and from 0.893 to 0.926 for customer purchase intention. These results support indicator reliability across the four constructs.

The outer-model VIF values range from 2.023 for GMC3 to 3.772 for GLP3. All values remain below 5, although the three green logistics indicators and CPI1 exceed the more conservative benchmark of 3. These results suggest comparatively greater overlap among the green logistics

indicators, consistent with their high internal consistency. However, the reported values alone do not justify removing indicators from the reflective measurement model.

Overall, the findings support the strength of the relationships between the constructs and their indicators. The collinearity statistics presented here concern the outer model; a separate assessment of inner-model VIF values is required to evaluate collinearity among the three predictors of customer purchase intention.

Table 4. Bootstrapping results and hypothesis testing

Hypothesis	Relationship	β	Bootstrap mean	Standard deviation	t-value	p-value	Decision
H1	Green Logistics Practices → Customer Purchase Intention	0.477	0.479	0.066	7.196	< 0.001	Supported
H2	Green Marketing Communication → Customer Purchase Intention	0.379	0.379	0.066	5.741	< 0.001	Supported
H3	Entrepreneurial Innovativeness → Customer Purchase Intention	0.377	0.380	0.060	6.255	< 0.001	Supported

Source: SmartPLS output.

The bootstrapping results indicate that perceived green logistics practices are positively and significantly associated with customer purchase intention ($\beta = 0.477$; $t = 7.196$; $p < 0.001$), supporting H1. This relationship exhibits the largest estimated coefficient among the three paths. Customers who evaluate the firm's logistics practices more favorably in environmental terms therefore tend to report higher purchase intention, accounting for the other predictors included in the model.

Perceived green marketing communication also demonstrates a positive and statistically significant relationship with customer purchase intention ($\beta = 0.379$; $t = 5.741$; $p < 0.001$), supporting H2. Similarly, perceived entrepreneurial innovativeness is positively associated with purchase intention ($\beta = 0.377$; $t = 6.255$; $p < 0.001$), supporting H3. These two coefficients are numerically close, although their difference has not been formally tested.

The bootstrap means closely approximate the original coefficients across all three relationships, with differences ranging from 0.000 to 0.003. Overall, the findings support the three hypothesized

positive relationships within the analyzed dataset. These results establish statistical associations consistent with the conceptual model, while the cross-sectional design limits causal interpretation.

5. Discussion

The findings indicate that perceived green logistics practices, perceived green marketing communication, and perceived entrepreneurial innovativeness are positively associated with customer purchase intention. Together, these constructs explain 60.3% of the variance in purchase intention in the analyzed sample. The results suggest that customers' willingness to purchase from entrepreneurial firms is associated with complementary evaluations of environmental practices, communication, and innovation. Their simultaneous inclusion provides evidence that each perception contributes to explaining purchase intention while accounting for the other two predictors. However, the unexplained variance indicates that the model captures only part of the purchasing decision.

Perceived green logistics practices exhibit the largest estimated path coefficient ($\beta = 0.477$; $p < 0.001$), supporting H1. This result extends research on environmentally friendly packaging by examining customers' broader evaluations of logistics practices in relation to firm-specific purchase intention. Prakash and Pathak (2017) established the relevance of attitudes, environmental concern, and personal norms to intentions to purchase environmentally friendly packaged products. Nguyen et al. (2020) further emphasized the importance of understanding packaging sustainability from the consumer's perspective. The present findings complement these contributions by suggesting that favorable perceptions of packaging and delivery practices are associated with willingness to purchase from the focal firm. Nevertheless, this relationship concerns perceived environmental responsibility and does not establish the firm's objective environmental performance.

The positive logistics relationship should also be considered alongside evidence of trade-offs in sustainable delivery decisions. Amaya et al. (2025) found that convenience remained important and that disclosing environmental impacts did not influence delivery choices in their study. The present result does not necessarily contradict those findings because the two studies examine different outcomes and decision conditions. A favorable assessment of a firm's logistics can be associated with purchase intention even when customers are reluctant to accept additional costs, delays, or effort for a particular delivery option. The distinction suggests that general environmental evaluations and choices involving explicit service trade-offs should not be treated as interchangeable.

The positive relationship between perceived green marketing communication and purchase intention ($\beta = 0.379$; $p < 0.001$) supports H2. This finding is consistent with the interpretation that

clear, credible, and informative environmental messages contribute to favorable customer evaluations. Chen and Chang (2012) demonstrated the relevance of green perceived value, perceived risk, and trust to purchase intention, while Chen and Chang (2013) showed that greenwashing undermines trust through confusion and perceived risk. The present result complements this literature by identifying a positive association for communication evaluated favorably by customers. It should not be interpreted as evidence that increasing the volume of environmental advertising will necessarily encourage purchasing.

This distinction is reinforced by Schmuck et al. (2018), whose experiments showed that false environmental claims could damage advertising and brand evaluations, while nature imagery could generate favorable affective responses. Environmental communication therefore involves both the assessment of information and emotional reactions. Although the present findings are compatible with credibility-based explanations, the model does not directly test trust or emotional responses as mediators. It consequently establishes the communication–intention association without determining the psychological process through which it operates.

Perceived entrepreneurial innovativeness is also positively associated with customer purchase intention ($\beta = 0.377$; $p < 0.001$), supporting H3. This finding extends consumer innovation research from loyalty-related outcomes to purchase intention toward entrepreneurial firms. Kunz et al. (2011) identified functional and experiential routes connecting perceived firm innovativeness with loyalty, whereas Pappu and Quester (2016) demonstrated the mediating role of perceived quality. These explanations suggest that customers value innovativeness through the benefits they associate with new offerings and useful improvements. The present association is consistent with this reasoning, although perceived quality and experiential benefits were not measured as explanatory mechanisms.

From a theoretical perspective, the combined findings are compatible with signaling theory. Customers may use environmental practices, communication, and innovative offerings to evaluate firm attributes that are not fully observable (Connelly et al., 2011). The study's contribution lies in examining these three perceptions within a common model of customer purchase intention. Nevertheless, the findings do not directly demonstrate signal credibility or information-asymmetry reduction. Furthermore, the numerical similarity between the communication and innovativeness coefficients does not establish equal effects, and the larger logistics coefficient does not establish a statistically significant difference between predictors without additional testing.

For entrepreneurial firms, the results suggest the relevance of coordinating environmentally responsible logistics, substantiated environmental communication, and useful innovation. Packaging and delivery practices can provide concrete content for environmental messages, while

product and service improvements can address customer needs beyond environmental considerations. These implications should remain proportionate to the evidence: the study does not measure intervention effectiveness, financial returns, or actual purchasing behavior. Its cross-sectional convenience sample limits causal inference and generalizability, while the use of self-reported measures leaves potential common-method influences unresolved. Discriminant validity and structural collinearity also require confirmation through HTMT and inner-model VIF assessments. Future research could combine customer surveys with observed purchases, independently assessed logistics practices, or experiments involving explicit price and convenience trade-offs.

Conclusion

This study examined the relationships between perceived green logistics practices, perceived green marketing communication, perceived entrepreneurial innovativeness, and customer purchase intention. The results support all three proposed hypotheses. Green logistics practices exhibit the largest estimated path coefficient ($\beta = 0.477$), followed by green marketing communication ($\beta = 0.379$) and entrepreneurial innovativeness ($\beta = 0.377$). All three relationships are statistically significant at $p < 0.001$, and the model explains 60.3% of the variance in customer purchase intention in the analyzed sample. These findings indicate that environmental and innovation-related perceptions each contribute to explaining customers' willingness to purchase.

The study contributes to the literature by examining these perceptions simultaneously rather than treating logistics, environmental communication, and innovativeness as separate domains. Its findings are compatible with the signaling perspective, suggesting that customer evaluations of observable practices and firm-related information are associated with purchase intention. However, the model does not directly establish the psychological mechanisms underlying these relationships. Trust, perceived quality, and experiential benefits remain possible explanations requiring separate empirical examination.

For entrepreneurial firms, the findings suggest the relevance of combining environmentally responsible logistics with credible communication and useful product or service improvements. Environmental messages should be grounded in identifiable practices, while innovation should address customer needs. The larger logistics coefficient should not be interpreted as proof that logistics investment produces greater commercial returns, since neither differences between coefficients nor investment outcomes were tested.

The conclusions remain bounded by the cross-sectional design, convenience sampling, and reliance on self-reported perceptions and intentions. These features limit causal inference and generalizability, while purchase intention does not establish actual purchasing behavior. Future research could use longitudinal designs, observed purchase data, and experiments incorporating price and convenience trade-offs. Such approaches would clarify when favorable environmental and innovation perceptions translate into customer action.

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