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# Exploring the Influence of Green Branding Strategies on Consumers' Purchase Decisions

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## ABSTRACT

The present study contributes to new insights into environmentally conscious consumer behavior by integrating both symmetrical and asymmetrical analytical frameworks. To begin, structural equation modeling (SEM) is employed to assess the direct relationships among green marketing, brand image, perceived risk, and purchase intention. In parallel, fuzzy-set qualitative comparative analysis (fsQCA) is used to uncover distinct combinations of conditions that can lead to elevated purchase intentions. Data were gathered through purposive sampling of individuals with prior experience purchasing sustainable or green-branded products. A suite of multivariate methods, including descriptive analysis, factor analysis, reliability testing, SEM, and fsQCA, was utilized to analyze the data. Findings from SEM demonstrate that green marketing exerts a significant positive effect on both perceived risk and purchase intention. Moreover, brand image and perceived risk are also found to positively influence purchase intention. The fsQCA results further identify two unique condition sets that effectively lead to high purchase intentions across varied consumer profiles.

**Keywords:** Fuzzy set, Green Marketing, Brand Image, Perceived Risk, Purchase Intention

## INTRODUCTION

In the fields of marketing and business management, consumer or customer purchase intention is widely recognized as a critical predictor of actual purchasing behavior and a core issue influencing corporate performance. For instance, Tian et al. (2022) emphasize that behavioral intention serves as a key antecedent variable in analyzing actual behavior, suggesting that research should further explore the relationship between consumers' purchase intentions and actions. Purchase intention significantly impacts the sustainability of business operations, as consumer trust in a company positively affects purchase intention (Newton et al., 2015). Jung et al. (2020) highlight that behavioral intention is particularly strong among consumers with high utilitarian consumption values and those influenced by strong social norms. Purchase intention is closely linked to subsequent purchasing behavior, making it a focal topic for most companies (Costa et al., 2021). Cheng and Lin (2023) argue that intention is the most influential predictor of behavior and plays a crucial role in shaping consumers' purchasing decisions. Consequently, this study identifies purchase intention as a key research focus and examines its antecedent variables. Among the antecedents of purchase intention, green marketing is widely regarded as a significant influencing factor. Consumers prioritize green products to minimize negative environmental impacts, and corporate pricing policies positively influence their purchasing decisions. Furthermore, companies' advertising strategies that support sustainable green marketing shape consumer perceptions and guide purchasing

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behavior. Green advertising raises awareness of environmentally friendly products and triggers purchase intentions (Baltaci et al., 2024). Correia et al. (2023) assert that green marketing involves incorporating a broad range of activities and trends, such as product modifications, production processes, packaging, labeling, and advertising strategies, aimed at fulfilling human needs while minimizing environmental impact. It targets environmentally conscious consumers throughout strategy development processes. Since the 20th century, green marketing (or environmental marketing) has permeated various industries, including apparel, electronics, and even services and tourism (Papadas et al., 2017). Talebi et al. (2018) suggest that green marketing has evolved into a global phenomenon, with some companies leveraging it to address environmental challenges. As a source of competitive advantage, green marketing allows forward-thinking managers to make necessary investments to enhance their green market performance (Nath & Siepong, 2022). Therefore, this study considers green marketing a primary antecedent of purchase intention.

Previous studies have also identified brand image as a key antecedent of purchase intention. For example, Tahir et al. (2024) argue that brand image has become a critical component of brand building, representing consumers' thoughts or perceptions of a particular brand. In a highly competitive environment, businesses enhance brand image by offering high-quality services that boost customer satisfaction and loyalty. Trusted brands allow consumers to associate corporate and product brands, transferring the overall corporate brand image to individual products and adding value to them (Swoboda & Sinning, 2021). Plumeyer et al. (2019) emphasize that brand image reflects consumers' feelings toward a brand and serves as a key factor in evaluating whether a positive relationship exists between the brand and its customers. Building a strong and appealing brand is crucial, as it significantly influences consumers' perceptions and attitudes toward specific products or services. In recent years, brand image has gained prominence due to its positive impact on customer satisfaction and likelihood of recommendations (Rodrigues et al., 2024). Rodrigues & Rodrigues (2019) further highlighted that factors such as brand identity, trust, community connection among brand users, perceived quality, brand anthropomorphism, uniqueness, and reputation are critical predictors of brand image. Therefore, this study also considers brand image as a major antecedent of purchase intention. Lastly, the impact of perceived risk on purchase intention is a central topic in academic research and practical management. When consumers lack sufficient knowledge about a product or seller, perceived risk becomes a significant factor influencing their willingness to purchase (Peng, 2020). Nazir et al. (2021) note that perceived risk negatively affects behavioral intention and significantly influences purchase intention. Stable circumstances tend to reduce perceived risk. Perceived risk is a critical theoretical concept that shapes decision-making processes and consumer behavior patterns (Wang et al., 2024). Yi et al. (2020) state that perceived risk affects consumers' desires, decisions, and behavioral intentions. It is crucial because consumers often rely on risk mitigation measures, such as expert reviews or other consumers' feedback, to assess the reliability of information and reduce their perceived risk (Huifeng et al., 2020). Accordingly, this study incorporates perceived risk as a mediating variable in the research framework to analyze the influence of green marketing and brand image on purchase intention through perceived risk.

Building on the discussions above, this study's primary contribution lies in exploring the relationships among green marketing, brand image, perceived risk, and purchase intention. Specifically, the research establishes its first three objectives based on prior studies to examine the net effects of these constructs. The fourth objective aims to identify the sufficient conditions influencing purchase intention. The four main research objectives are outlined as follows:

1.1 To investigate the impacts of green marketing on perceived risk and purchase intention.

1.2 To examine the effects of brand image on perceived risk and purchase intention.

1.3 To analyze the influence of perceived risk on purchase intention.

1.4 To explore the sufficient conditions leading to high purchase intention using green marketing, brand image, and perceived risk as antecedent variables.

## LITERATURE REVIEW

### Purchase Intention

Regarding the definition of purchase intention, Costa et al. (2021) argue that purchase intention refers to the extent of willingness to buy a specific product or service, which depends on consumers' beliefs. These beliefs influence their perceptions, potentially leading to specific choices. According to Li and Peng (2021), purchase intention can be understood as the conscious planning or commitment by consumers to purchase products from a particular brand. Similarly, Tian et al. (2022) emphasize that purchase intention can be defined as the willingness of consumers to purchase and pay for a product or service. Costa et al. (2021) further state that purchase intention results from the influence of subjective norms, behavioral patterns, and perceived behavioral control, leading to the desire to purchase specific products or services. Cheng and Lin (2023) define purchase intention as consumers' intent to purchase a company's products, highlighting that behavioral intention serves as a determinant of action and reflects the intensity of one's intent to perform a specific behavior. According to Dash et al. (2021), purchase intention involves consumers comparing their perceived value with actual value, leading to purchase decisions driven by their willingness, ability, opportunity, and potential to buy. Based on these findings, purchase intention can be summarized as the degree of consumers' willingness to buy specific products or services, typically influenced by their beliefs, which, in turn, affect their perceptions and may result in particular purchasing choices.

Positive reviews can significantly enhance purchase intention (Song et al., 2023). Newton et al. (2015) suggest that the degree of consumers' desire for specific products or services is a primary factor in measuring purchase intention, which can be influenced by factors such as social responsibility, attitudes, environmental concerns, and willingness to pay. The desire to perform specific actions also serves as a factor in measuring behavioral intention, which may be affected by perceived risks influencing consumers' desires (Yi et al., 2020). According to Eberle et al. (2022), purchase intention is influenced by motivations and needs, which can be shaped by changes in purchasing contexts, new information, or the unavailability of expected alternatives, potentially altering or preventing consumer decisions. The subjective value assessment of products or services offered by a company generates shopping desires, which can measure purchase intention, with perceived value playing a critical role in determining purchase intention (Liao et al., 2022). In summary, this study measures purchase intention based on consumers' subjective value assessments of specific products or services, which give rise to their purchasing desires.

### Green Marketing

Baltaci et al. (2024) define green marketing as encompassing a variety of activities, including product differentiation, production process improvements, packaging innovation, and advertising adjustments. It is described as a management process aimed at identifying, anticipating, and satisfying customer and societal needs and desires in a profitable and sustainable manner. Green marketing must provide innovative solutions to contemporary issues while generating revenue, signifying the process of developing safer products for both the environment and consumers (Ali, 2021). Talebi et al. (2018) emphasize that green marketing involves a wide range of activities, including product modification, changes in production processes, packaging innovations, and advertising adjustments. Green marketing enhances environmental performance through eco-friendly product and process development,

improved recycling, and other environmental initiatives. The environmental benefits companies achieve are closely tied to the green marketing strategies they employ (Nath & Siepong, 2022). Trung and Van-Thanh (2022) argue that green marketing focuses on promoting products and services with an environmentally friendly approach, such as minimizing harmful substances, using renewable materials, designing reusable or repairable products, reducing packaging, and fostering environmental awareness throughout production. Green marketing, therefore, combines eco-friendly characteristics with business value. Based on these findings, this study defines green marketing as a holistic approach that integrates environmental principles into corporate management, product and service development, and marketing strategies.

Green marketing focuses on identifying and profitably predicting customer and societal needs through a comprehensive management process. The marketing of green goods or services encompasses design, production, packaging, labeling, promotion, usage, and disposal processes. Key elements of green marketing include green products, pricing, and advertising. Consumers prioritize green products to minimize environmental harm, while pricing policies positively influence their purchasing decisions. Advertising strategies that support sustainability enhance consumer awareness of eco-friendly products and stimulate purchase intentions (Baltaci et al., 2024). Chauhan and Naznin (2023) highlight that green marketing is more than a marketing method; it acts as an intervention between environmental and social impacts, playing an essential role in fostering operational sustainability. However, while green marketing involves various sustainability efforts, certain challenges persist. For instance, green products must be renewable and recyclable, yet the processes for product renewal and recycling can be complex and financially burdensome. Companies can improve green marketing performance through two primary approaches: increasing sales and market share of green products, and enhancing return on investment while reducing environmental costs. First, businesses must better understand the market to anticipate future demand. Second, they should implement strategies through improved green marketing programs and enhanced collaboration between internal departments and external stakeholders (Nath & Siepong, 2022). Yang et al. (2024) identify green self-identity as a critical variable in green marketing, significantly influencing consumers' decisions to choose green products. Green marketing outcomes are shaped by three key variables: intention, feasibility, and government support, with government support exerting the greatest influence (Talebi et al., 2018). Based on these regards, the study evaluates green marketing based on the overall assessment of incorporating environmental considerations into marketing activities.

**Brand Image**

Lin et al. (2017) assert that brand image reflects the overall judgment of a brand's attitude and can be defined as consumers' perceptions of a brand's commitment to environmental issues. Typically, brand image is defined as the consumer's intuitive perception of a brand. Corporate brand image represents consumers' psychological impressions of the company, while product brand image reflects their mental vision of the company's product brand (Swoboda & Sinning, 2021). Rodrigues et al. (2024) argue that brand image can be viewed as the evaluation or value assessment that consumers or customers attribute to a particular brand. It symbolizes brand knowledge and is shaped by the customer's first interaction with the company, providing brand meaning, distinguishing the company's products from competitors, and fostering emotional connections (Blasco-Arcas et al., 2016). Rodrigues and Rodrigues (2019) emphasize that brand image is defined as consumers' perception of a particular brand. It is also regarded as an association, often presented in a meaningful way. Based on the above findings, brand image is the perception and evaluation of a brand by consumers, reflecting their attitudes and values associated with the brand.

Brand image is formed through dual attitude components, namely cognitive and emotional brand attributes. Green brand image is influenced by factors such as functional benefits, symbolic benefits, and experiential benefits (Lin et al., 2017). Tahir et al. (2024) highlight that social and environmental responsibility is a predictor of corporate brand image, while product attributes are the core antecedent of product brand image. Together, corporate and product brand images influence each other. Positive factors such as product image, quality, and cultural relevance are critical to shaping brand image (Rodrigues et al., 2024). Blasco-Arcas et al. (2016) view brand image as an evolving concept, shaped from a multidimensional perspective that depends on the possibilities of interaction and relationship-building facilitated by community experiences and media. Brand image, centered on sensory aspects, is primarily shaped by product experiences and the retail environment, leading to sensory satisfaction (Rodrigues et al., 2019). In summary, this study measures brand image based on the overall evaluation level that consumers or customers attribute to a specific brand.

**Perceived Risk**

Peng (2020) defines perceived risk as the subjective uncertainty individuals associate with the potential negative outcomes of purchase decisions. Perceived risk is the consumer's perception of potential negative consequences stemming from various risks (Zhai et al., 2022). Wang et al. (2024) describe perceived risk as an objective assessment of the probability of adverse outcomes, requiring careful consideration of uncertainty and severity. Similarly, Dai et al. (2023) characterize perceived risk as the level of risk consumers perceive when deciding to purchase a product or service. Yi et al. (2020) emphasize that perceived risk initially referred to the nature of risks perceived by consumers when considering specific decisions. Over time, the concept has evolved to encompass the entire decision-making process, including the adoption of innovations. Based on these insights, this study posits that the core of perceived risk lies in the subjective expectation of loss.

Perceived risk is not limited to purchasing decisions but also extends to other aspects of consumer behavior, particularly in the selection of new products or services. It is primarily a psychological measure, and for businesses, understanding and reducing consumers' expectations of loss can enhance purchase intentions and build brand trust. Perceived risk is influenced by factors such as financial risk, performance risk, functional risk, psychological risk, physical risk, time risk, and health risk (Wang et al., 2024). According to Huifeng et al. (2020), consumers' subjective perceived risk predominantly includes functional risk and financial risk. Functional risk refers to the loss incurred when a service does not perform as expected, while financial risk pertains to the loss arising when the purchase does not meet the customer's value-for-money expectations. Perceived risk, therefore, represents customers' subjective views of potential negative outcomes during the decision-making process and can significantly influence their purchasing behavior. When customers recognize the possibility of loss, they often tend to avoid purchasing related products or services (Zhai et al., 2022). Peng (2020) further categorizes perceived risk into four types: functional risk, financial risk, hedonic risk, and self-image risk. Functional risk is associated with the possibility that products or services may fail to achieve the expected quality after adopting new measures. Financial risk relates to concerns about whether the product or service is worth the expense. Hedonic risk reflects worries that the product or service might not deliver anticipated excitement or pleasure. Self-image risk pertains to fears that the purchase may not enhance the consumer's status or image. Yi et al. (2020) include physical risk, financial risk, privacy risk, and functional risk in the scope of perceived risk. Synthesizing these findings, this study adopts financial risk and functional risk as the primary factors to measure perceived risk.

**The Impacts of Green Marketing on Perceived Risk and Purchase Intention**

Baltaci et al. (2024) emphasize that enhancing trust in marketing or advertising can reduce the complexity and perceived risk consumers experience during purchase decisions while increasing the perceived certainty of expected outcomes. Green marketing, being closely linked to production, risks financial losses for companies if inadequate measures are taken regarding packaging, distribution, and pricing, potentially leading to high production costs and consumer distrust in green products (Talebi et al., 2018). Yang et al. (2024) suggest that companies equipped with professional green technologies and knowledge of environmental benefits can effectively educate consumers, thereby reducing the perceived risk associated with purchasing such products or services. Moreover, businesses should leverage green marketing strategies to improve perceived quality and reduce consumers' perceived risks associated with environmental concerns (Chen et al., 2013). Rahardjo (2015) argues that implementing green marketing enhances perceived product value and reduces perceived product risk, thereby increasing competitive advantage from an environmental perspective. Baltaci et al. (2024) further propose that businesses can strengthen consumer perceptions and trust in green brand images to enhance awareness of green brands, ultimately increasing consumers' willingness to purchase them. As part of socially responsible communication, green marketing positively influences consumer purchasing behavior (Correia et al., 2023). Yang et al. (2024) emphasize that green marketing plans significantly affect consumers' eco-friendly purchasing decisions. However, unclear labeling—even for eco-labels meant to promote ecological awareness—can have adverse effects, ultimately impacting purchase decisions. Ali (2021) notes that green marketing can foster consumer purchase intention by providing detailed explanations of environmental issues. Similarly, Nath and Siepong (2022) highlight that green marketing encourages consumers to buy green products by raising ecological awareness and emphasizing the importance of a healthy environment and lifestyle. Based on the theoretical foundation above, this study formulates two hypotheses to investigate the effects of green marketing on perceived risk and purchase intention:

H1: Green marketing helps reduce perceived risk.
H2: Green marketing helps enhance purchase intention.

**The Impacts of Brand Image on Perceived Risk and Purchase Intention**

A brand image characterized by reliability, reputation, and strong perceived brand value can effectively reduce consumers' perceived risks (Wang et al., 2024). Kittur & Chatterjee (2023) emphasize the importance of strengthening brand image in mitigating perceived risk. Improving the brand image of green products enhances consumer recognition and trust, thereby reducing perceived risk (Xiao et al., 2023). Similarly, Jones et al. (2015) suggest that consumers can mitigate overall perceived risk through brand recognition and loyalty, while selecting a poorly perceived brand may negatively affect perceived risk (Lu et al., 2022). Fostering a positive emotional connection between the brand and consumers can help reduce the negative impact associated with frequent purchases of green products (Tian et al., 2022). Jung et al. (2020) argue that green brands with sustainable values appeal to consumers who share similar sustainability principles. Increased consumer attention to brand advertising can spark curiosity and desire for the brand, ultimately boosting purchase intention (Li et al., 2021). Tian et al. (2022) further highlight the need for companies to enhance the green attributes of their products, creating a green brand image to strengthen consumer confidence and green purchase intentions. Dash et al. (2021) argue that improving brand image enhances consumer purchase intention, while consumers' perceptions of a brand image can influence the purchase intentions of others (Song et al., 2023). Based on these findings, this study formulates two hypotheses to analyze the effects of brand image on perceived risk and purchase intention:

H3: Brand image helps reduce perceived risk.

H4: Brand image helps enhance purchase intention.

**The Impact of Perceived Risk on Purchase Intention**

When consumers display positive emotions toward social media influencers and trust social media platforms, their perceived risk decreases. This reduction enhances trust in advertising content, thereby increasing purchase intention (Li & Peng, 2021). Song et al. (2023) highlight that online reviews influence consumers' perceived risk regarding products and businesses, which in turn alters their purchase intentions. Similarly, Liao et al. (2022) suggested that perceived risk significantly affects both initial and repeat purchase intentions. Ariffin et al. (2018) find that perceived risk in online shopping negatively impacts consumers' intentions to purchase products online. Additionally, perceived risk, along with factors such as satisfaction and trust transfer, may influence purchase intentions (Lăzăroiu et al., 2020). Based on this theoretical foundation, this study formulates the following hypothesis to analyze the effect of perceived risk on purchase intention:

H5: Reducing perceived risk helps enhance purchase intention.

**METHODOLOGY**

**Research Subjects and Questionnaire Design**

This study adopts both symmetric and asymmetric analytical methods to investigate the relationships among green marketing, brand image, perceived risk, and purchase intention. Empirical data were collected through purposive sampling and an online survey administered via Google Forms. The survey included items covering four key constructs—green marketing, brand image, perceived risk, and purchase intention—as well as demographic data such as gender, marital status, occupation, age, education level, and average monthly income. The questionnaire utilized nominal scales to capture demographic data, with options coded starting from 1. For the research constructs, items were measured using a 7-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (7), allowing respondents to rate their agreement with each statement. Green Marketing: Four items (GM01–GM04, sample item as I consider environmentally friendly green marketing a factor when purchasing products.) were developed based on the findings of Amoako et al. (2022) to measure green marketing. Brand Image: Five items (BI01–BI05, sample item as I think this brand's products have better features compared to competitors.) were adapted from Blasco-Arcas et al. (2016) to assess brand image. Perceived Risk: Six items (PR01–PR06, sample item as I think environmentally friendly green products might be more expensive.), focusing on financial and functional risks, were derived from Wang et al. (2024) to evaluate perceived risk. Purchase Intention: Four items (PI01–PI04, sample item as I think I will purchase products with sustainable packaging.) were adapted from Newton et al. (2015) to measure purchase intention.

**Multivariate Analysis**

This study utilizes a sequential application of multivariate analysis tools, including descriptive statistical analysis, factor analysis, reliability analysis, structural equation modeling (SEM), and fuzzy-set qualitative comparative analysis (fsQCA), to examine the relationships among the research constructs. The analysis process is structured to provide a comprehensive understanding of green marketing, brand image, perceived risk, and purchase intention. Firstly, descriptive statistical analysis is conducted to outline the primary characteristics of the sample and summarize participants' responses to items related to the research constructs. This step provides an overview of the data distribution and ensures clarity in the interpretation of subsequent analyses. Secondly, factor analysis is employed to identify the underlying common factors within the constructs and assess their validity. Following the guidelines of Hair et al.

(2019), factors with eigenvalues greater than 1 are retained, ensuring that the measurement framework accurately represents the constructs. Reliability analysis is then performed to evaluate the internal consistency of items associated with the identified factors, ensuring the stability and reliability of the measurements. Subsequently, SEM, a symmetric analytical approach, is used to test the model fit of the four constructs and validate the proposed research framework. This step also examines the five research hypotheses, offering insights into the direct and mediating effects within the model.

Finally, fsQCA, an asymmetric analytical approach, is applied to investigate the sufficient conditions leading to a high level of purchase intention. Based on Ragin's (2017) guidelines, this method explores configurations of antecedent variables that drive desired outcomes, offering a nuanced perspective on the interplay of green marketing, brand image, and perceived risk in shaping purchase intention. By integrating both symmetric and asymmetric approaches, this study delivers a robust analytical framework that deepens understanding of consumer behavior and provides actionable insights for practitioners.

**RESULTS**

The primary purpose of the descriptive statistical analysis in this study is to present the sample structure. This analysis is grounded in the law of large numbers and focuses on the respondents' basic demographic characteristics, including gender, marital status, occupation, age, educational background, and average monthly income. To identify the dominant distribution patterns for each attribute, the cumulative percentage exceeding 50% was used as the benchmark. The survey was conducted between January and February of 2025 (Year 114 in the ROC calendar), yielding a total of 215 valid responses. The majority of respondents were female (65.1%) and unmarried (81.4%). Most participants were either working in the service sector or were students (a combined 67.5%). In terms of age, 59.5% were between 21 and 30 years old. Regarding educational attainment, the majority (60.9%) held a university or college-level degree. Additionally, more than half of the respondents (54.4%) reported a monthly income of NT$30,000 or less.

Table 1 summarizes the results of the reliability and factor analyses. Following the guidelines of Hair et al. (2019), all constructs exhibit Cronbach's alpha values above 0.85, indicating strong internal consistency among the measurement items. Construct validity was evaluated based on the percentage of variance explained by each factor in the factor analysis. The cumulative variance explained across all constructs exceeds 58%, suggesting that both the reliability and validity of the measurement model are within acceptable thresholds.

**Table 1: Results of reliability and factor analysis**

| Constructs | Number of Items | Reliability | Convergent Validity |
|---|---|---|---|
| Green marketing | 4 | 0.899 | 77.041% |
| Brand image | 5 | 0.883 | 69.519% |
| Perceived risk | 6 | 0.855 | 58.694% |
| Purchase intention | 4 | 0.926 | 82.085% |

According to Hair et al. (2019), the model fit indices in this study meet commonly accepted thresholds: the CMIN/DF is 2.409 (less than 3), GFI is 0.913 (greater than 0.9), AGFI is 0.894 (close to 0.9), NFI is 0.958 (greater than 0.95), CFI is 0.962 (greater than 0.95), and RMSEA is 0.058 (less than 0.08). These results indicate that the proposed model, comprising four research constructs, demonstrates a good overall model fit. Furthermore, the results of the path analysis (see Table 2) reveal that green marketing has a positive and marginally significant effect on perceived risk, with a standardized coefficient of 0.124, a critical ratio (C.R.) of 1.796, and a p-value of 0.072 (p < 0.1). Thus, Hypothesis 1 (H1) is supported. Green marketing also

exhibits a significant positive effect on purchase intention, with a standardized coefficient of 0.286, a C.R. of 5.277, and a p-value of 0.000 (p < 0.01), thereby supporting Hypothesis 2 (H2). With regard to the effect of brand image on perceived risk, the standardized coefficient is 0.069, the C.R. is 0.949, and the p-value is 0.343 (p > 0.1), indicating that brand image does not have a significant effect on perceived risk. Hence, Hypothesis 3 (H3) is not supported. However, brand image has a significant positive impact on purchase intention, with a standardized coefficient of 0.310, a C.R. of 5.457, and a p-value of 0.000 (p < 0.01), supporting Hypothesis 4 (H4). Finally, perceived risk has a significant positive effect on purchase intention, with a standardized coefficient of 0.364, a C.R. of 5.386, and a p-value of 0.000 (p < 0.01), supporting Hypothesis 5 (H5). In summary, green marketing has a significant positive effect on both perceived risk and purchase intention. While brand image does not significantly affect perceived risk, it does positively influence purchase intention. Additionally, perceived risk is positively associated with purchase intention.

**Table 2: Results of path analysis**

| Constricts | Standardized Regression Weights | C.R. | P-value |
|---|---|---|---|
| H$_1$: Green marketing →Perceived risk | 0.124$^*$ | 1.796 | 0.072 |
| H$_2$: Green marketing →Purchase intention | 0.286$^{***}$ | 5.277 | 0.000 |
| H$_3$: Brand image →Perceived risk | 0.069 | 0.949 | 0.343 |
| H$_4$: Brand image →Purchase intention | 0.310$^{***}$ | 5.457 | 0.000 |
| H$_5$: Perceived risk →Purchase intention | 0.364$^{***}$ | 5.386 | 0.000 |

Notes: $^*$ indicates p-value < 0.1; $^{**}$ indicates p-value < 0.05; $^{***}$ indicates p-value < 0.01

This study further applies fuzzy-set Qualitative Comparative Analysis (fsQCA) to examine whether relationship marketing, global marketing strategy, and experiential value serve as sufficient conditions for achieving high customer satisfaction. Following Ragin (2017), the analysis adopts the intermediate solution criteria, using a threshold of solution coverage greater than 0.1 and solution consistency exceeding 0.6. As shown in Table 3, when using green marketing, brand image, and perceived risk as antecedent conditions, two sufficient configurations (labeled A1 and A2) were identified. These configurations collectively exhibit a solution coverage of 0.77 (greater than 0.1) and a solution consistency of 0.97 (greater than 0.6), indicating strong explanatory power and internal consistency. Configuration A1 suggests that even if green marketing efforts cannot be enhanced in the short term, a high level of customer-perceived brand image alone can lead to high purchase intention. Configuration A2 indicates that despite a high level of perceived risk in the short term, if a firm can develop marketing strategies that significantly elevate customers' evaluation of green marketing, high purchase intention can still be achieved.

**Table 3: Results of fsQCA**

| Path | Green marketing | Brand image | Perceived risk | Raw coverage | Unique coverage | Consistency |
|------|------|------|------|------|------|------|
| A1 | ○ | ● | | 0.37 | 0.01 | 0.98 |
| A2 | ● | | ● | 0.76 | 0.40 | 0.98 |

Solution coverage: 0.77; Solution consistency:0.97

Notes: Black circles "●" indicate the presence of causal conditions (i.e., antecedents). White circles "○" indicate the absence or negation of causal conditions. The blank cells represent "don't care" conditions.

# DISCUSSION AND CONCLUSION

## Discussion

The main contribution of this study lies in the sequential application of both symmetric (i.e., Structural Equation Modeling, SEM) and asymmetric (i.e., fuzzy-set Qualitative Comparative Analysis, fsQCA) analytical methods to explore the relationships among green marketing, brand image, perceived risk, and purchase intention. Based on the research objectives, the key findings are summarized as follows:

Objective 1 focused on examining the effects of green marketing on perceived risk and purchase intention. As shown in Table 5-1, green marketing has a significant positive impact on both perceived risk and purchase intention. In other words, while implementing green marketing strategies can enhance customers' purchase intentions, it may also inadvertently increase their perceived risk.

Objective 2 aimed to investigate the effects of brand image on perceived risk and purchase intention. The results in Table 5-1 indicate that brand image does not significantly influence perceived risk; however, it does have a significant positive effect on purchase intention. This suggests that improving brand image may not necessarily reduce customers' perceived risk but can effectively enhance their intention to purchase specific brands or products.

Objective 3 explored the influence of perceived risk on purchase intention. Table 5-1 reveals a significant positive relationship between perceived risk and purchase intention. This finding implies that higher levels of perceived risk may, counterintuitively, lead to stronger purchase intentions. Such a result may be more relevant for "experience goods" or "novelty goods." For example, although consumers may perceive high risk due to unfamiliarity with AI-related products, global market trends indicate that consumer purchase intentions for such products or services remain strong.

Objective 4 utilized fsQCA to identify sufficient conditions that lead to high purchase intention. The results reveal two distinct configurations—A1 and A2—that each serve as sufficient pathways for achieving high levels of purchase intention.

## Managerial Implications

The results of the SEM analysis indicate that strengthening green marketing strategies leads to increases in both perceived risk and purchase intention. Enhancing brand image significantly improves purchase intention, while perceived risk also exerts a positive and significant influence on purchase intention. According to the descriptive statistics on green marketing, respondents rated the item GM02 ("I consider eco-friendly green marketing as a factor in my purchasing decisions") relatively low, suggesting substantial room for improvement. The item GM04 ("I prefer to buy products that incorporate environmental protection") demonstrated the highest consistency in perception, indicating that improvements in this area are likely to yield the most uniform benefits across respondents. Additionally, factor

analysis revealed that GM02 had the highest factor loading, implying the greatest potential for impact through targeted enhancement. Based on the content of GM02, this study recommends that companies emphasize their environmental commitments in advertising, product packaging, and official websites to elevate customer perceptions of green marketing value (e.g., through carbon footprint reduction or the use of sustainable materials). Furthermore, green marketing can be translated into tangible customer incentives—such as incorporating it into membership programs that reward environmentally conscious behaviors through points or other benefits—to increase participation and brand loyalty. In reference to GM04, the study suggests that companies strengthen the availability and visibility of green products to reinforce brand image. For example, clearly communicating core brand values such as "eco-consciousness" and "sustainability" in brand positioning can foster customer identification. Additionally, loyalty programs such as exclusive offers, tiered membership levels, or green points accumulation systems can further solidify consumer engagement with green brands.

Although improving brand image does not directly reduce perceived risk, it significantly enhances purchase intention. Descriptive statistics show that BI05 ("I feel that buying this brand reflects who I am") was rated relatively low, indicating a need to better address consumers' self-identification with the brand. Meanwhile, BI03 ("I feel that this brand has characteristics that distinguish it from competitors") showed the highest consistency of perception, and BI04 ("I feel this is a good brand") had the highest factor loading, reflecting the strongest impact potential. Based on BI05, this study recommends that firms enhance the symbolic meaning and cultural relevance of their brand. This could be achieved by aligning the brand with specific lifestyles, values, or sociocultural movements (e.g., environmentalism or minimalism), allowing consumers to express their identity through brand choices. Emotional brand communication and ambassador strategies may also be effective—leveraging relatable spokespersons or authentic customer stories to convey the brand's identity and lifestyle message, thereby deepening emotional resonance and self-congruence. Regarding BI03, companies are advised to focus on clearly differentiating their brand from competitors by articulating unique value propositions (e.g., innovation, sustainability) through brand storytelling, product design, or marketing communications. These differentiators should also be reflected in the customer experience—such as packaging, customer service, or loyalty programs—so that customers can tangibly experience the brand's uniqueness and value.

In light of BI04, this study suggests that enhancing overall positive brand perception should be a core strategic objective. This includes consistent, high-quality brand presentation and product experiences that build customer trust and affection. Additionally, this item could serve as a key performance indicator (KPI) in brand tracking, helping guide strategic adjustments through periodic customer feedback. Given the positive influence of perceived risk on purchase intention, descriptive results show that PR03 ("I feel I might waste money on services from green products") received relatively low ratings, indicating an opportunity to reduce financial risk perception. PR04 ("I worry whether green products will perform as promised") had the highest consistency and factor loading, highlighting its importance as a leverage point.

In response to PR03, companies should implement mechanisms to reduce customers' perceived financial risk during purchasing. Strategies may include transparent pricing, value comparison information, and communications that emphasize long-term benefits and cost-efficiency. Trial programs, product demonstrations, or satisfaction guarantees can also help alleviate customers' psychological hesitation. For PR04, enhancing product credibility and authenticity is essential. Firms can offer third-party certifications, performance data, case studies, or user reviews to reinforce the reliability of product claims. Multimedia content such as videos, customer testimonials, and live demonstrations can further help bridge the gap between product expectations and actual outcomes.

Regarding the fsQCA results, two sufficient configurations (A1 and A2) were identified. The practical implication of A1 is that enhancing customers' evaluations of green marketing can lead to high purchase intention—but only when brand image is also reinforced. In other words, even if green marketing cannot be improved immediately, companies can still stimulate purchase intention by strategically investing in brand image (as previously discussed). Configuration A2 suggests that high purchase intention can also be achieved when customers have strong evaluations of both green marketing and perceived risk. This implies that companies should simultaneously enhance green marketing efforts and manage perceived risk. Based on this finding, this study recommends implementing case-based marketing strategies that showcase before-and-after data or success stories related to green product use. Creating FAQ sections or customer feedback platforms can help address common concerns and bridge any cognitive gaps in expectations versus outcomes. Marketing communications should not only highlight environmental values but also emphasize the direct benefits to consumers (e.g., health, safety, energy savings), thereby increasing purchase motivation. Finally, incorporating brand ambassador narratives or authentic customer testimonials can foster emotional proximity, reducing skepticism and enhancing trust in green products.

**Limitations and Future Research**

This study acknowledges several limitations and offers corresponding suggestions for future research. First, the study's scope was limited to four primary constructs—green marketing, brand image, perceived risk, and purchase intention. While these constructs were central to exploring the relationships within the proposed model, future studies are encouraged to incorporate additional variables such as perceived value, which may further enrich the theoretical framework and provide a more comprehensive understanding of consumer behavior. Second, the research model in this study includes two independent variables, one mediating variable, and one dependent variable. Future research may consider adopting more complex models that involve multiple mediators or include moderating variables to capture more nuanced interaction effects and enhance explanatory power.

Third, this study employed a questionnaire survey as the primary data collection method, conducted between December 2024 and February 2025. Future studies may consider employing alternative data collection methods, such as in-depth interviews or secondary data analysis, to obtain richer and more diverse insights. Moreover, extending the data collection period—such as over a two-year span—may help mitigate potential temporal biases and enhance the robustness of the findings. Additionally, this study primarily relied on multivariate analysis techniques, including descriptive statistics, factor analysis, reliability analysis, structural equation modeling (SEM), and fuzzy-set qualitative comparative analysis (fsQCA). Future research could explore the use of alternative quantitative methods such as discriminant analysis, cluster analysis, or regression analysis. Alternatively, qualitative research approaches—such as ethnographic fieldwork—could also be adopted to gain deeper, context-specific insights into consumer perceptions and behavior.

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