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THE ROLE OF GREEN BRAND TRUST, AWARENESS, AND PREFERENCE IN THE RELATIONSHIP BETWEEN GREEN MARKETING AND GREEN BRAND LOYALTY: THE CASE OF MOBILE PHONE BRANDS

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ARTICLE INFO	ABSTRACT
	As environmental pollution and climate change worsen, consumers are increasingly expecting eco-friendly products and expect companies to exhibit a genuine commitment to sustainability through strategic green marketing. Modern consumers require brands to cultivate green trust by implementing tangible and credible environmental policies, thereby reinforcing awareness of sustainable values, enhancing green brand preference, and fostering loyalty. This study explores the relationship between green marketing and green brand loyalty, with green brand trust, awareness, and preference serving as mediating variables. Data were collected from a survey of 340 consumers in Ho Chi Minh City who showed interest in the green marketing practices of mobile phone brands. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), the study finds that green brand trust, awareness, and preference fully mediate the influence of green marketing on green brand loyalty. These findings suggest that mobile phone brands in Ho Chi Minh City should strategically refine their green marketing approaches to build trust, raise awareness, and strengthen consumer preference, thereby enhancing brand loyalty and securing a competitive edge in an increasingly sustainability-conscious market.

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1. Introduction

Marketing has experienced a long process of expansion and continuous innovation, becoming a key driver of business growth. In other words, it helps companies define their objectives and segment markets, thereby developing effective strategies for products, pricing, distribution, and promotion. In the current context, businesses are confronted with constantly evolving customer demands, new regulatory frameworks, and growing societal concerns about the social and environmental impacts of corporate activities (Peattie, 2016). Consequently, many firms have begun to implement green production and marketing strategies to meet customer preferences and pursue sustainable long-term profitability (Peattie, 2016).

Green marketing originated from the wave of environmental concern in the 1970s, during which the term "ecological marketing" was introduced by Henion and Kinnear (1976). As environmental and sustainability issues have become a global priority, green marketing is no longer merely an option but a necessary business strategy, enabling companies to build strong brands and maintain long-term relationships with customers (Ottman, 2017). In Vietnam, the government is actively promoting the implementation of the Net Zero roadmap. At the same time, many businesses have proactively adopted emission reduction measures in response to increasingly stringent green standards (Ha Linh, 2025). With regulations transforming green marketing from a voluntary strategy into a legal obligation, businesses are compelled to integrate sustainability into the core of their operations, positioning green marketing not just as a promotional tool but as a crucial strategy for survival and sustainable growth.

Furthermore, the ultimate goal of marketing campaigns is customer loyalty. When customers are loyal to a brand, it generates sustainable benefits for businesses while strengthening their market position (Sunaryo, 2015). At the same time, consumer preferences are increasingly shifting toward brands that demonstrate social responsibility (Babiak & Trendafilova, 2011). Besides, green brand loyalty is not solely based on perceived value and product quality but also reflects consumers' positive attitudes toward a brand's environmental commitments (Leonidou et al., 2012). This explains why green brands are increasingly gaining strong support from environmentally conscious customers. Although green marketing holds significant potential in fostering green brand loyalty, businesses still face numerous challenges, and not all green marketing strategies are equally effective in promoting customer loyalty (Chen & Chang, 2012). This highlights the need for further research to investigate how green marketing affects green brand loyalty and to develop strategies that maximize its effectiveness.

Mobile phones are among the most frequently replaced consumer electronics, with global smartphone shipments exceeding 1.2 billion units annually, contributing significantly to electronic waste and carbon emissions (Laricchia, 2024). In Vietnam, mobile phones play a vital role in the electronics and telecommunications industries, with export values reaching USD 55.4 billion in 2022, accounting for 16.2% of the country's total export turnover (General Statistics Office, 2024). Vietnam also ranked as the leading mobile phone consumer in Asia, spending USD 2 billion during the first half of 2023 (Khuong Nha, 2023). In response, Fairphone has introduced green marketing strategies, including the use of recyclable materials, carbon-neutral commitments, and take-back programs (Su et al., 2024). Alkhatib et al. (2024) found that social media promotions of green features by Samsung, Apple, and Huawei enhance consumer awareness and can influence

purchasing behavior, laying a solid foundation for trust and loyalty. Moreover, Raj et al. (2023) demonstrated that heightened environmental awareness and green trust in smartphones significantly boost purchase intentions, reinforcing the connection between awareness, trust, and preference within this industry. Due to its high consumer involvement and rapid innovation cycles, the mobile phone sector serves as an ideal empirical setting to explore how green brand constructs mediate the impact of green marketing on green brand loyalty. Based on these arguments and statistics, this study proposes the following research question: "Does green marketing influence green brand loyalty in the mobile phone industry?".

Green marketing activities have been proven to exert a positive impact on green brand loyalty across various industries. However, there remains a lack of research examining the relationship between green marketing activities of mobile phone brands and customer loyalty toward those brands.

2. Theoretical backgrounds and proposed conceptual model

2.1. Stimulus-Organism-Response (S-O-R) theory

The Stimulus-Organism-Response (S-O-R) theory, proposed by Mehrabian and Russell in 1974, comprises three main stages. The first stage involves stimulus reception, during which the organism perceives external environmental influences. In the second stage, these stimuli are processed and manifested through the organism's emotional states. In the context of green marketing, this process can be reflected through the development of brand trust (Soltani et al., 2019) or brand awareness (Chen et al., 2024). Although no prior research has directly conceptualized green brand preference as an emotional state, existing studies have demonstrated the impact of green marketing on green brand preference (Nohekhan & Barzegar,

2024; Kardeş, 2011), suggesting that it may serve as an emotional outcome of environmental stimuli. The final stage is the response, where consumers develop attachment to and loyalty toward sustainable brands (Chang et al., 2024).

The application of the S-O-R theory in this study is supported by the work of Chang et al. (2024), in which the theory was employed to analyze how environmentally friendly behaviors influence customers' perceptions and responses, specifically in the context of loyalty toward eco-friendly hotels. This study applies the S-O-R framework to examine how green marketing affects consumers' green brand loyalty. Environmentally friendly behavior or green marketing activities act as the stimulus (S), shaping consumers' perceptions and emotions (O), such as green trust, awareness, and brand preference, which then influence their responses (R), including loyalty through revisit intentions, willingness to pay more, and positive word-of-mouth.

2.2. Related studies, proposed hypotheses, and conceptual model

2.2.1. Review of related studies

Several studies have examined the contribution of green marketing to enhancing brand loyalty. Nyilasy et al. (2013) found that key activities such as green advertising and eco-labeling can strengthen consumers' loyalty to brands that demonstrate environmental responsibility. Building on this foundation, Shaheer et al. (2024) extended the work of Nyilasy et al. by exploring the moderating role of customer satisfaction in this relationship. Research across various industries further supports these findings. For instance, Sunaryo (2015) found that the connection between green marketing and corporate social responsibility can improve customer loyalty, as evidenced in the cosmetics sector through brands like The Body Shop. Comparable results have also been reported in the fields of social commerce

(Grover & Arora, 2023) and fast-moving consumer goods (Christopher & Sinaga, 2024), where green marketing practices have been linked to stronger consumer loyalty. However, no previous study has specifically examined this relationship within the mobile phone industry. This study contributes by addressing this gap in the Vietnamese market.

Beyond these direct relationships, prior research has also considered the roles of brand awareness and brand preference in explaining how green marketing influences brand loyalty. An effective green marketing strategy can stimulate consumers' interest in a brand (Shabbir et al., 2020). Similarly, green marketing influences customers' awareness of environmental efforts, thereby encouraging sustainable purchasing behavior (Pancić et al., 2023). Other studies have also confirmed the positive relationship between green marketing and brand awareness, such as Nohekhan and Barzegar (2024) and Baltaci et al. (2024). Furthermore, when consumers are clearly aware of a brand's environmental commitments, they are more likely to develop stronger loyalty, especially when green marketing activities are explicitly communicated (Hartmann & Apaolaza-Ibáñez, 2012). This view is also supported by Rahbar and Wahid (2011) and Singh and Singal (2023), who suggested that brand awareness positively influences brand loyalty. Overall, prior studies have focused on the relationships between green marketing and brand awareness, brand awareness and brand loyalty, and green marketing and brand loyalty. However, limited research has explicitly examined the mediating role of green brand awareness in the relation between green marketing and green brand loyalty. Addressing this gap represents the second contribution of this study. In addition to brand awareness, prior research has also recognized the importance of brand preference in linking green marketing to consumer loyalty. When companies implement environmentally friendly activities, including green marketing campaigns such as eco-friendly packaging, consumers tend to prefer those brands (Hasan et al., 2012; Kardeş, 2011). In addition, consumers who expect a particular brand are more likely to develop strong attachment and loyalty to it (Keh et al., 2007). Several studies have also demonstrated that brand preference is positively related to brand loyalty (Cuong, 2020; Esmaili, 2019). Although no prior research has explicitly examined the mediating role of green brand preference in the relationship between green marketing and green brand loyalty, a study by Chukwu and Tom (2020) highlighted that consumers' brand preference strengthens customer loyalty by reinforcing firms' efforts in green marketing campaigns. Therefore, green brand preference may serve as a mediator in the relationship between green marketing and green brand loyalty, which represents the third contribution of this study.

2.2.2. Research gaps

This study identifies three specific research gaps: *First*, existing studies have primarily focused on industries such as FMCG, cosmetics, e-commerce, and hospitality. In Vietnam specifically, prior research has only explored this topic within the dairy industry (Nguyen-Viet, 2023), while the mobile phone industry remains underexplored in terms of how green marketing influences consumer loyalty. Given the highly competitive nature of this industry, particularly in Vietnam, fostering loyalty through green marketing strategies is crucial. Yet, no prior research has examined this relationship in the Vietnamese mobile phone market. *Second*, although previous studies have explored the relationships between green marketing and green brand awareness, as well as between green brand awareness and brand loyalty, the mediating role of green brand awareness between green marketing and green

brand loyalty remains underexplored. *Third*, while studies confirm that green marketing can enhance brand preference, few have explicitly examined whether green brand preference mediates the relationship between green marketing and brand loyalty.

2.2.3. Proposed hypotheses and conceptual model

The Relationships between Green Marketing (GM), Green Brand Trust (GBT), Green Brand Preference (GBP), Green Brand Awareness (GBA), and Green Brand Loyalty (GBL)

When companies effectively implement green marketing programs, such as eco-friendly advertising, ecological labeling, or building a brand associated with environmental responsibility, they enhance customer trust and promote purchase intentions (Grover & Arora, 2023). Through these green marketing campaigns, customers are more likely to trust the brand if they perceive that the brand shares similar values with them (Kumar et al., 2012). Previous study by Wu and Liu (2022) has proven that green marketing activities positively influence customer trust in the brand. Furthermore, companies like Apple, Samsung, and Huawei have begun to integrate GM strategies such as eco-labelling, renewable energy commitments, and carbon neutrality into their branding efforts to foster consumer trust (Alkhatib et al., 2024). Based on these findings, the authors propose the following research hypothesis:

Hypothesis H1: Green marketing (GM) has a positive impact on Green Brand Trust (GBT).

When businesses implement green marketing activities, they not only convey messages regarding environmental responsibility but also directly influence customer awareness, thereby making the brand more distinctive and memorable in the minds of consumers (Baltaci et al., 2024). The elements of green marketing are not only effective in enhancing

brand value but also contribute to the formation and reinforcement of green brand awareness (Nguyen-Viet, 2022). Moreover, Shafiq et al. (2023) found that green marketing efforts positively impact brand reputation and awareness, particularly in the electronics sector, where consumers are increasingly exposed to sustainability-focused campaigns. Based on the above foundations, this study proposes the following research hypothesis:

Hypothesis H2: Green marketing (GM) has a positive impact on Green Brand Awareness (GBA).

When businesses demonstrate commitment or concern for environmental issues, it can positively influence the overall value of their products, thereby leading to a tendency for consumers to prefer that brand over others, even when competing brands offer similar features (Mourad & Ahmed, 2012). Green marketing enhances brand preference by emphasizing the core value of environmental sustainability, educating consumers, and encouraging them to choose environmentally friendly products (Nayak et al., 2024). Moreover, a study by Duarte and Raposo (2009) pointed out that the trend in preference formation within the smartphone market shows that brand attributes, including sustainability, significantly influence consumer choice, highlighting the power of GM tactics in shifting brand preference. Therefore, based on the above foundation, this study proposes the following research hypothesis:

Hypothesis H3: Green marketing (GM) has a positive impact on Green Brand Preference (GBP).

A successful green marketing strategy significantly influences consumers' decisions regarding products launched by a company, leading customers to use the brand's products more frequently and, over time, develop into loyal customers (Gede et al., 2022).

Green marketing campaigns can achieve strong effectiveness if businesses successfully communicate environmental benefits and emphasize sustainability in their retail campaigns, thereby fostering customers' green brand loyalty (Krishnan et al., 2024). Consistent with the above studies, research by Christopher and Sinaga (2024) and Gede et al. (2022) also found a positive relationship between green marketing and customers' brand loyalty. A specialized study on smartphone loyalty in emerging markets identified that environmental values are one of the factors enhancing brand commitment among mobile users, emphasizing sustainability as a component of long-term loyalty in mobile contexts (Masud et al., 2024). Based on the above foundations, this study proposes the following research hypothesis:

Hypothesis H4: Green marketing (GM) has a positive impact on Green Brand Loyalty (GBL).

The Relationship between Green Brand Trust (GBT), Green Brand Preference (GBP), Green Brand Awareness (GBA), and Green Brand Loyalty (GBL):

Brand trust is a crucial factor in fostering brand loyalty; through trust, consumers form an emotional bond with the brand, thereby increasing their long-term attachment (Wu & Liu, 2022). For a company pursuing a green marketing orientation, when customers trust the environmental friendliness of its products, they are more likely to remain attached to the brand and become increasingly loyal to its green products. A study investigated the determinants of green customer loyalty toward sustainable brands in Indonesia (Arasyi & Kusumawati, 2023). Their findings revealed that the more consumers trust a brand's environmental activities, the more likely they are to remain loyal to that brand or service. Studies by Uikey and Baber (2023), Singh and Singhal (2023) all confirmed that brand trust has a positive impact on loyalty toward green brands. Additionally,

a study evaluated Cambodian smartphone users, establishing that brand trust significantly contributes to both satisfaction and loyalty (Hill & Yoeung, 2024). Although their study was not exclusively on green branding, the pathway from trust to loyalty is consistent across contexts. Based on these foundations, this study proposes the following research hypothesis:

Hypothesis H5: Green Brand Trust (GBT) has a positive impact on Green Brand Loyalty (GBL).

The higher the level of brand awareness for a product, the greater its impact on brand loyalty (Dila & Achmad, 2022). Particularly in the context of green marketing, awareness of the company plays a crucial role in shaping consumer loyalty. Consumers with a high level of green awareness tend to exhibit stronger loyalty toward green brands and are more likely to repurchase environmentally friendly products (Pancíc et al., 2023; Rahbar & Wahid, 2011). Furthermore, various empirical studies have confirmed the relationship between green brand awareness and brand loyalty, demonstrating that green brand awareness can contribute to the formation and reinforcement of customer loyalty (Jalu et al., 2023). In the mobile brands context, a study by Khan et al. (2020) involving 356 young mobile phone users in Pakistan showed that brand awareness increases loyalty, mediated by reputation, engagement, and trust. Therefore, this study proposes the following hypothesis:

Hypothesis H6: Green Brand Awareness (GBA) has a positive impact on Green Brand Loyalty (GBL).

With the increasing emphasis on green initiatives, green brand preference has become a key factor in customer retention (Mourad & Ahmed, 2012). When a strong relationship exists between customers and a brand, understanding their brand preferences helps

foster brand loyalty (Chukwu & Tom, 2020). Brand loyalty strengthens when customers perceive the green values a company offers, with brand preference playing a mediating role (Esmaili, 2019). Similarly, a study by Cuong (2020) argued that brand preference has positive impact on customer loyalty, supporting a sustainable relationship between brands and consumers. Moreover, Upadhyay and Jain (2022) recommend that mobile phone brands seeking competitive advantage in green markets must prioritize eco-centric branding strategies that elevate GBP as a core lever for driving GBL. Based on these findings, this study proposes the following hypothesis:

Hypothesis H7: Green Brand Preference (GBP) has a positive impact on Green Brand Loyalty (GBL).

The Mediating Role of Green Brand Trust (GBT), Green Brand Awareness (GBA), and Green Brand Preference (GBP) in the Relationship between Green Marketing (GM) and Green Brand Loyalty (GBL)

When companies highlight the benefits of using environmentally friendly products through green marketing, it increases consumer trust, leading to higher purchase volumes (Grover & Arora, 2023). Consequently, businesses can build long-term relationships with customers and maintain their loyalty to the brand. Additionally, elements of green marketing, such as eco-friendly labels, branding, and advertisements, have been shown to positively impact consumer trust, thereby contributing to the establishment of brand loyalty (Masocha, 2020). In agreement, Hue et al. (2024) constructed an integrated model that empirically validated the positive path from green marketing to brand trust and subsequently to brand loyalty, using consumers in the mobile sector as the research sample. Based on these foundations, this study proposes the following hypothesis:

Hypothesis H8: Green Marketing (GM) has a positive effect on Green Brand Loyalty (GBL) through the mediating role of Green Brand Trust (GBT).

Green Marketing not only has a direct impact on brand loyalty but can also have an indirect effect by improving customers' brand awareness (Ardiyanti & Nasir, 2024). Furthermore, green marketing tools such as eco-labels, green branding, and environmentally friendly advertising help consumers easily form perceptions and enhance their understanding of the environmental characteristics and aspects of the product (Gede et al., 2022). The increasing level of awareness will support the promotion of customer brand loyalty. In other words, by enhancing consumers' awareness and understanding of a brand's environmental protection commitments, green marketing strategies will strengthen consumers' loyalty to the brand (Singh & Singhal, 2023). Based on these premises, this study proposes the following research hypothesis:

Hypothesis H9: Green Marketing (GM) has a positive effect on Green Brand Loyalty (GBL) through the mediating role of Green Brand Awareness (GBA).

In a socially volatile environment, consumers are becoming more sensitive to environmental issues and tend to prioritize green products to minimize risks (Hasan et al., 2012). As a result, marketers have been striving to establish this preference through green marketing campaigns. Moreover, the higher the preference for a brand, the more likely consumers are to remain loyal to it (Chukwu & Tom, 2020; Esmaili, 2019). The level of consumer preference strongly contributes to reinforcing brand loyalty through companies' efforts to create green marketing initiatives and implement actions that have a positive environmental impact (Mourad & Ahmed, 2012). Furthermore, a study has concluded that components of marketing,

including advertising, positively affect brand loyalty through the mediating role of brand preference (Mousavi et al., 2018). Based on these foundations, the authors suggest that there is a positive relationship between green marketing and green brand loyalty, with green brand preference as a mediator. Therefore, this study proposes the following hypothesis:

Hypothesis H10: Green Marketing (GM) has a positive effect on Green Brand Loyalty (GBL) through the mediating role of Green Brand Preference (GBP).

Based on the theoretical backgrounds and results from previous studies, the authors propose the following research model:
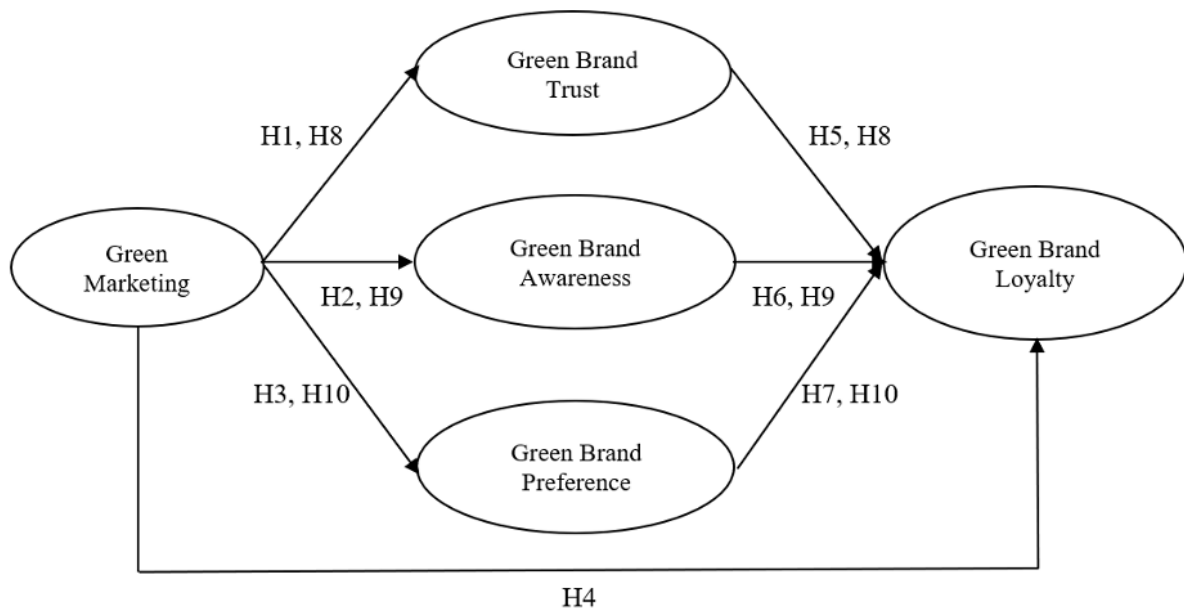

Figure 1. Conceptual model

3. Methodology

3.1. Measurement

The scales used in this study are inherited from previous studies in the field of green marketing. Table 1 presents the detailed scales used in the study:

Table 1. Scale description

Variables		Number of observed variables	Source
GM	Green Marketing	3	Simanjuntak et al. (2023)
GBT	Green Brand Trust	4	Salehzadeh et al. (2021)
GBA	Green Brand Awareness	5	Mourad and Ahmed (2012)
GBP	Green Brand Preference	4	Mourad and Ahmed (2012)
GBL	Green Brand Loyalty	3	Kang and Hur (2011)

3.2. Data collection

The questionnaire was developed using the online platform Google Forms and disseminated to respondents through various social media channels, including Facebook, Zalo, and Email. The survey consists of three main sections:

(i) The first section was designed to screen respondents, only accepting feedback from individuals aged 18–35 who are living in Ho Chi Minh City, have an interest in green marketing activities of mobile phone brands, and are familiar with at least one mobile phone brand engaging in such activities. Respondents who did not meet these criteria were not allowed to proceed with the survey.

(ii) The second section focuses on questions measuring the variables of the research model. Each variable was assessed using a 5-point Likert scale, ranging from 1 (Strongly disagree) to 5 (Strongly agree).

(iii) The final section was designed to collect demographic information of respondents, including gender, age, occupation group, and income, for descriptive statistical analysis.

Before answering the questionnaire, respondents were provided with a set of instructions that explained the purpose and structure of the survey. Specifically, the introduction clarified that the study examines the influence of green marketing on brand loyalty within the mobile phone industry. Participants were assured that their responses would remain anonymous, would be used exclusively for academic purposes, and that there were no correct or incorrect answers. They were encouraged to answer honestly based on their perceptions and experiences. The survey was estimated to take 5-7 minutes to complete. For the main section employing a 5-point Likert scale, respondents were instructed: "Please select a number from 1 (Strongly Disagree) to 5 (Strongly Agree) to indicate your level of agreement with each statement". These instructions were carefully worded to promote respondent engagement and reduce ambiguity, thereby enhancing the overall reliability and validity of the collected data.

3.3. Data analysis

In terms of data analysis techniques, this study continued to validate the measurement model using the indicators previously employed in the preliminary quantitative research, followed by measuring the HTMT index. Next, the authors employed the partial least squares structural equation modeling (PLS-SEM) method to evaluate the structural model. At the same time, the bootstrapping technique with 5,000 resamples was applied to assess the significance of the hypothesized relationships and the stability of the estimated coefficients. Based on these analyses, this study interprets the findings, provides managerial implications, and identifies limitations as well as directions for future research. Data processing was conducted using SPSS 27 and SmartPLS 4 software.

4. Results and Discussion

4.1. Descriptive statistics of survey sample

The responses collected from the official survey were initially screened. Out of 396 questionnaires, 340 valid responses remained after removing invalid ones. The detailed The descriptive statistics reveal a difference in the gender distribution of survey participants. Specifically, among the 340 valid responses, the number of female respondents was higher, 205 individuals, compared to 135 male respondents. Due to the use of convenience sampling, the majority of participants were aged 18–25, accounting for 239 observations, or 70.3% of the total sample. There were 68 respondents in the 25–30 age group, while the 31–35 age group had the fewest participants. Regarding income, since most respondents were aged 18–25, a

majority (208 respondents) reported a monthly income of under 10 million VND. In contrast, those with a higher monthly income (10 million VND or more) accounted for 38.8% with 132 respondents.

4.2. Common method variance

To examine whether a single factor accounts for the majority of the variance among the variables, this research conducted Harman's one-factor test. If one factor explains more than 50% of the variance of the observed variables, it can be concluded that common method bias (CMB) may be present (Cooper et al., 2020). Conversely, if the explained variance is less than 50%, it can be concluded that CMB is not present. *(see Appendix 3 online)*

The test results in Table 3 show that the variance extracted for the largest single factor is 40.593% < 50%, indicating that the collected data does not have common method bias (Cooper et al., 2020).

4.3. Measurement Model

4.3.1. Scale Reliability and Convergent Validity tests

This study preliminarily assessed the reliability and convergent validity of the measurement model through the indicators of Outer Loadings, Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) *(see Appendix 3 online)*.

The analysis results indicate that all observed variables have outer loadings exceeding the threshold of 0.7 (from 0.723 to 0.902), meeting the requirements for convergent validity (Hair et al., 2021). The scales also exhibit satisfactory internal consistency reliability, with Cronbach's Alpha values ranging from 0.711 (GBL) to 0.826 (GM) and Composite Reliability (CR) values ranging from 0.832 (GBP) to 0.896 (GBL), all of which exceed the 0.7 threshold (Hair et al., 2021). In addition, all AVE values surpass

the minimum threshold of 0.5 (ranging from 0.590 to 0.741), indicating that the underlying constructs explain more than 50% of the variance in the indicators. This confirms the satisfactory convergent validity of the scales (Hair et al., 2021).

4.3.2. Discriminant Validity tests

Discriminant validity is established when the Heterotrait-Monotrait (HTMT) ratios are below the 0.85 threshold. As shown in Appendix 4 *(see Appendix 4 online)*, all construct pairs in the research model have HTMT values below 0.85, with the highest value being 0.847. This confirms that the constructs exhibit distinctiveness and clear discriminant validity (Vu Huu Thanh & Nguyen Minh Ha, 2023).

4.4. Structural Model tests

4.4.1. Multicollinearity Tests

The multicollinearity assessment reveals that VIF values range from 1.000 to 2.437, all below the threshold of 3, confirming that the model does not suffer from multicollinearity issues and can proceed to subsequent hypothesis testing.

4.4.2. Coefficient of Determination (R^2) Tests

The adjusted R^2 values for the three mediating variables range from 0.194 to 0.416, indicating weak explanatory power, whereas the adjusted R^2 for Green Brand Loyalty (GBL) is 0.531, indicating moderate explanatory power. These values meet the acceptable threshold suggested by Ozili (2023) and confirm the model's adequacy in data fitting (Hair et al., 2021).

4.4.3. Effect Size (f^2) Tests

If f^2 value greater than 0.35 indicates a large effect, values between 0.15 and 0.35 indicate a medium effect, values between 0.02 and 0.15 indicate a small effect, and values below 0.02 indicate a very small or negligible effect (Hair et al., 2021). The results reveal that GM has a large

effect on GBT (f^2 = 0.714) and GBA (f^2 = 0.513), a medium effect on GBP (f^2 = 0.242), and a very small effect on GBL (f^2 = 0.004). GBA exerts a medium effect on GBL (f^2 = 0.191), whereas GBT and GBP exert small effects on GBL (f^2 = 0.051 and 0.09, respectively) *(see Appendix 5 online)*.

4.4.4. Predictive Relevance Tests (Q^2)

Q^2 values of 0, 0.25, and 0.5 indicate low, medium, and high predictive accuracy, respectively (Hair et al., 2021). As shown in Table 2, GBT (Q^2 = 0.330) and GBL (Q^2 = 0.409) exhibit medium predictive accuracy, while GBP (Q^2 = 0.198) and GBL (Q^2 = 0.182) exhibit low predictive accuracy. Nonetheless, as all Q^2 values exceed zero, the model satisfies the criteria for overall quality *(see Appendix 6 online)*.

4.4.5. Direct Relationships Tests

Table 2. Path Coefficients and Direct Relationship Testing

Hypotheses	Standardized path coefficient	P_value	Results
H1: GM -> GBT	0.647	0.000	Accepted
H2: GM -> GBA	0.585	0.000	Accepted
H3: GM -> GBP	0.446	0.000	Accepted
H4: GM -> GBL	-0.058	0.346	Rejected
H5: GBT -> GBL	0.241	0.000	Accepted
H6: GBA -> GBL	0.428	0.000	Accepted
H7: GBP -> GBL	0.243	0.000	Accepted

The study employs the PLS-SEM method to test the hypotheses. The results indicate that hypotheses H1, H2, H3, H5, H6, H7 are supported with p_value = 0,000 < 0,05. In contrast, hypothesis H4 is rejected, as its p-value of 0.346 exceeds 0.05. Thus, in the research context, Green Marketing may not exert a direct impact on Green Brand Loyalty.

4.4.6. Mediating Relationships Tests

Table 3. Path Coefficients and Mediating Relationship Testing

Hypotheses	Standardized Path Coefficient	p_value	Result
H8: GM -> GBT -> GBL	0.156	0.000	Accepted
H9: GM -> GBA -> GBL	0.107	0.000	Accepted
H10: GM -> GBP -> GBL	0.250	0.000	Accepted

According to Table 3, all mediating hypotheses in the research model (H8, H9, H10) are supported. Specifically, the p_values are all less than 0.05, and the β coefficients range from 0.107 to 0.250. Moreover, since GM does not directly affect GBL (p = 0.346 > 0.05), the authors conclude that the mediation effects observed in this study are full mediation effects.
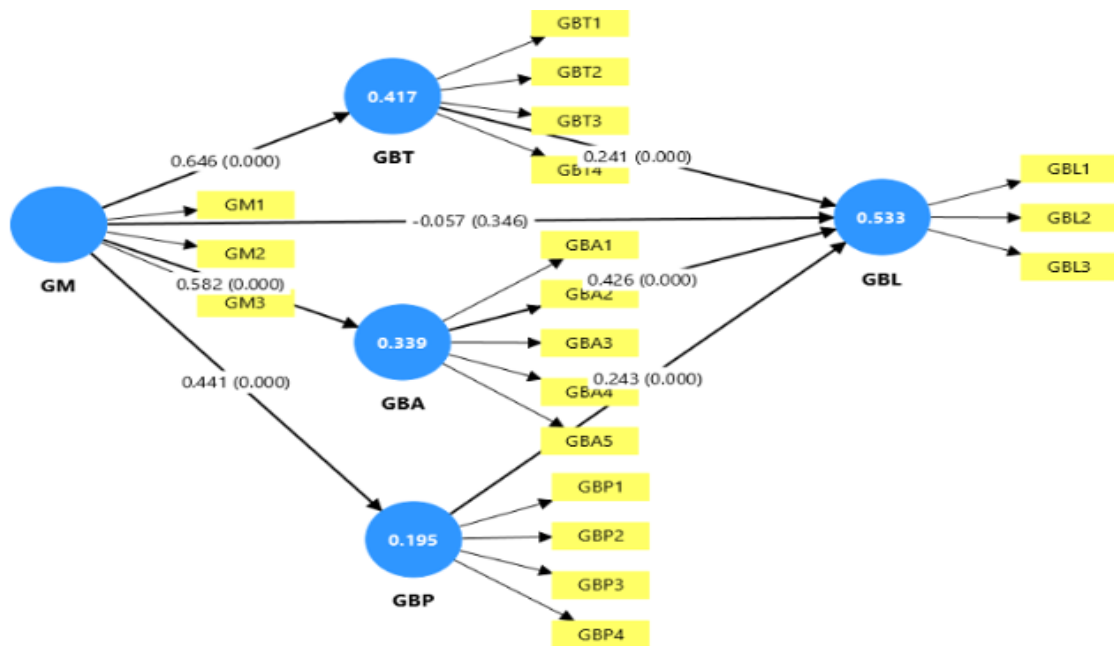
4.5. Discussion

Figure 2. Path coefficient test results

The analysis results indicate that hypotheses H1, H2, H3, H5, H6, H7, H8, H9, and H10 are statistically significant with p-values less than 0.05. In contrast, hypothesis H4, which proposes a direct relationship between green marketing and green brand loyalty, is rejected (p-value = 0.346 > 0.05). This suggests the existence of full mediation between green marketing and green brand loyalty through mediating factors. Specifically:

Hypothesis H1 demonstrates that green marketing has a positive impact on green brand trust, implying that transparent and clear green marketing strategies enhance customers' trust in the brand (Chen, 2010). Hypothesis H2 confirms that green marketing has a positive impact on green brand awareness, helping customers more easily recognize brands associated with sustainable commitments (Alamsyah et al., 2018; Dangelico & Vocalelli, 2017). Hypothesis H3 indicates that green marketing also has a positive impact on green brand preference, suggesting that enterprises implementing effective green marketing campaigns can leave a strong impression on customers, thereby encouraging them to prioritize the brand's

products (Hamisi, 2024). Furthermore, hypotheses H5, H6, and H7 affirm that green brand trust, green brand awareness, and green brand preference positively affect green brand loyalty (Grover & Arora, 2023; Pancíc et al., 2023; Esmaili, 2019). This indicates that the higher the level of consumers' trust, awareness, and preference toward a brand, the stronger their loyalty towards that brand. Meanwhile, the rejection of hypothesis H4 indicates that there is no direct relationship between green marketing and green brand loyalty. This result may stem from variations in research contexts, such as geographic and industry-specific differences, which limit the generalizability (Krishnan et al., 2024). Furthermore, the relationship between green marketing and brand loyalty is not necessarily direct. Therefore, in the context of this study, green marketing must be combined with mediating factors to effectively foster customers' loyalty toward using green brands. Finally, hypotheses H8, H9, and H10 are confirmed, illustrating that green brand trust, green brand awareness, and green brand preference serve as crucial mediators in the relationship between green marketing and

green brand loyalty (Grover & Arora, 2023; Chukwu & Tom, 2020). These results highlight the necessity of mediating factors such as trust, awareness, and preference to enhance customer loyalty, emphasizing that green marketing alone is insufficient to establish enduring loyalty without the support of these mediators.

Overall, this study highlights practical implications for businesses, emphasizing the importance of investing in sustainable and responsible green marketing campaigns while simultaneously focusing on strengthening customer trust, enhancing brand awareness, and cultivating brand preference to drive green brand loyalty ultimately.

5. Conclusion and Managerial implications

5.1. Conclusion

Through the official quantitative survey of 340 consumers, primarily aged 18–35 and currently living, studying, and working in Ho Chi Minh City, with prior experience using products from mobile phone brands adopting green marketing strategies, the research findings revealed that 9 out of 10 hypotheses were accepted at the 5% significance level. The exception was Hypothesis H4, which proposed that green marketing has a positive and direct impact on green brand loyalty; this was rejected due to a p-value greater than 0.5. This confirms that there is no direct relationship between green marketing and green brand loyalty in the mobile phone sector among consumers aged 18–35 in Ho Chi Minh City. Instead, the relationship is mediated through three factors: green brand trust, green brand awareness, and green brand preference.

Particularly, the research has addressed the gaps identified in the initial literature review. First, the results confirmed the mediating role of green brand awareness in the relationship between green marketing and green brand loyalty. Second, the study clarified the mediating effect of green brand preference, indicating that when customers prioritize brands with green

marketing strategies, they are more likely to remain loyal to those brands. Additionally, these relationships were examined in the context of the mobile phone industry in Ho Chi Minh City, providing important practical contributions for businesses in this sector.

Based on these findings, the research emphasizes the crucial critical role of green brand trust, green brand awareness, and green brand preference in explaining how consumers in Ho Chi Minh City develop loyalty to brands through green marketing activities. Overall, the study suggests that customers are more likely to remain loyal to mobile phone brands that engage in transparent and clear environmentally friendly marketing campaigns, successfully build brand trust, enhance customer awareness, and become their preferred choice.

5.2. Managerial implications

The findings provide strategic insights for managers in the mobile phone industry, particularly in Vietnam's dynamic market, such as Ho Chi Minh City, where young consumers are increasingly environmentally conscious. *First*, as green marketing alone does not directly enhance brand loyalty but influences it through trust, awareness, and preference, firms should prioritize building authentic and transparent green brand trust. This requires consistently communicating verifiable environmental achievements (e.g., reductions in carbon emissions, use of recycled materials, or sustainability certifications), alongside transparent reporting of environmental performance such as recycling rates and energy savings. Long-term transparency fosters trust and strengthens brand credibility. *Second*, enhancing green brand awareness is essential. Companies should adopt integrated communication strategies to reinforce consumer recognition of their green efforts through clear and consistent messaging via eco-labels, social media, and CSR reports. Highlighting initiatives such as recycling programs for old devices or replacing plastic packaging with

biodegradable materials can make green attributes more salient during purchase decisions. *Third*, cultivating green brand preference through meaningful differentiation is critical. Firms should move beyond generic eco-friendly claims to offer products including environmental and functional superiority, such as modular or recyclable designs aligned with circular economy principles. These efforts should be clearly tied to the brand's sustainable values to reinforce preference and loyalty. *Finally*, managers should recognize that enhancing green brand loyalty requires a long-term, coherent strategy integrating trust, awareness, and preference. Investments should align with broader sustainability goals to ensure sustained consumer commitment.

5.3. Limitation and future research

First, the geographical scope is limited to Ho Chi Minh City, making it difficult to generalize the results to other regions with different markets and cultural characteristics. Second, the survey method may not fully represent the entire consumer population in Ho Chi Minh City due to a lack of diversity in age, occupation, income, and educational background, which could lead to biased results. Third, the study was conducted over a short period, which may not capture the full fluctuations in consumer trends, policies, or economic conditions, whereas long-term research could provide a more comprehensive perspective.

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