

# Enhancing competitiveness of green environmental practices and green purchase intentions in Asian markets: Evidence from the extended norm activation model

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## Abstract

This paper examines the impact of green environmental practices and their dimensions, such as attitude towards green products, green marketing mix, and green customer value on green environmental practices and green purchase intention, which enhance the brands' competitiveness of manufacturing units of Asian economies. This paper further examines the influence of green entrepreneurial orientation, psychological benefits, and green innovation as mediating variables between exogenous and endogenous variables. The paper finally investigates the impact of green marketing as a moderator between exogenous and endogenous variables. The researchers employed a modified and structured questionnaire to obtain 498 responses from China, Pakistan, India, South Korea, and Bangladesh. For analysis, the researchers used PLS-SEM modeling using Smart-PLS 4.0. The research study's findings demonstrated that green environmental practices have a positive and significant relationship with green purchase intention. The outcomes of this research further reveal that attitudes towards green products, green marketing mix, and green customer value significantly and positively impact green environmental practices, enhancing competitiveness and corporate image. The mediation findings exhibited that green entrepreneurial orientation, psychological benefits, and innovation have a significant and positive influence as mediating variables between green environmental practices and green purchase intention. Finally, the outcomes of moderation of green marketing exhibited a significant and positive impact between exogenous and endogenous variables. The study's findings have demonstrated a significant theoretical and managerial implication for researchers, academicians, industry practitioners, and policymakers. Industry practitioners can develop effective strategies to enhance the competitiveness of their brands in industrial manufacturing units in Asian economies.

**Keywords:** Brand competitiveness; green environmental practices; green purchase intention; green marketing; green entrepreneurial orientation; green psychological benefits; green innovation

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## 1. INTRODUCTION:

The global discussion on environmental sustainability is heating up (Joshi et al., 2021; Shi, Wang, 2023). Thus, industry must reexamine the environmental practices and green consumers' intentions that enhance brands' competitiveness (Streimikiene et al., 2024; Chen et al., 2024). According to Sharma et al. (2020), green environmental practices signify eco-friendly and sustainable activities taken by organizations to curtail environmental challenges. Environmental practices may embrace renewable energy sources, implement environmentally compatible technologies, initiate recycling initiatives, reduce waste generation, and obtain and select eco-friendly services and products (Yadav & Pathak, 2017). According to Hsu et al. (2017), several methods exist in which green environmental practices can influence green

purchase intention. According to Ahmad and Zhang (2020), as consumers become gradually aware of the substantial influence of their purchasing behaviors on the ecosystem, they are likely to be inclined more toward environmentally beneficial changes. Organizations exhibiting dedicated efforts toward sustainable actions aim to gain loyalty and credibility from advanced ethical consumerism circles and distinctive consumers at large (Ahmed et al., 2022). According to Zhou et al. (2021) and Al Zubaidi (2020), when companies manifest firm commitment toward sustainable objectives, which nurtures consumers' belief in the authenticity of their affirmations related to eco-friendly endeavors, this enhances confidence while patronizing such brands.

Liao et al. (2020) emphasized that environmentally friendly operational procedures can help enhance a brand's perception; consumers always support organizations responsible for their ethical standards and eco-friendly practices. According to Kyriakopoulos (2022) and Walter and Chang (2017), consumers are attracted toward these brands and cultivate a favorable perception of them due to this relationship, eventually skewing their purchasing intentions toward environmentally friendly green products. Organizations can have a competitive advantage by adopting environmentally friendly practices (Leary et al., 2017). According to Sharma et al. (2020), organizations that aggressively integrate eco-friendly practices stand out in the marketplace and attract green, environmentally friendly consumers, ultimately increasing the brands' competitiveness. Organizations can save money by employing green environmental practices, including cutting waste and increasing energy proficiency (Zhou et al., 2021). According to Mehraj and Qureshi (2020) and Wang et al. (2020), green consumers' intentions in favor of eco-friendly purchasing are encouraged when these savings are converted into competitively valued green products. Governments might invoke beneficial incentives and regulations to encourage green environmental practices in business sectors. These regulations and incentives support a favorable climate for eco-friendly organizations and push consumers toward green products (Walter & Chang, 2017). According to Tan et al. (2022), organizations that run environmental concerns awareness campaigns and sustainable initiatives have shown positive growth by influencing green consumer intention. Liao et al. (2020) concluded that customers are more likely to match their green purchase intentions with environmental practices once they distinguish how their options might affirmatively affect the ecosystem. According to Situmorang et al. (2021), customers who place the highest significance on environmental sustainability find great resonance in ecological stewardship. Jamal et al. (2021) argued that organizations that directly show this common ethos via their procedures entice consumers to link their notions with those of the organization to foster a more sustainable future. Several studies demonstrated that organizations can promote consumers' intentions to construct green purchases by instigating sustainable environmental practices (Ahmed et al., 2022; Kaur et al., 2022). Drosos et al. (2020) and Rawlings (2020) argued that these strategies include growing public consciousness of environmental challenges, enhancing brand image, building credibility, potential cost savings, and facilitating market differentiation. These efforts also contain instructional programs that imitate consumer ethics (Mehraj & Qureshi, 2020). According to Tan et al. (2022), these elements are part of an intricate interface between behavior and business environmental concern, and they mutually contribute to a manifest shift in consumption designs toward eco-friendly services and products.

This study examines the complicated relationship between environmental practices and green purchase intention, which enhances brands' competitiveness within Asian economies such as China, India, Pakistan, South Korea, and Bangladesh. The research investigates the relationship between green environmental practices (attitude towards green products, green marketing mix, and green customer value) and green purchase intention (Kaur et al., 2022). This study further investigates the mediation of green entrepreneurial orientation, psychological benefits, green

innovation, and moderation of green marketing (Song et al., 2020) in the relationship between green environmental practices and green purchase intention. According to Bokil and Sinha (2021), the scope of mediating analyses goes beyond enlightening the channels that connect practical environmental practices implemented by national and international organizations with growing consumer demand for eco-friendly services and products. The current study extends the knowledge of the psychological and creative processes that allow consumers to transform environmental initiatives into purchasing decisions (Leary et al., 2017). Green marketing plays a strategic role in promoting sustainable consumption behaviors by analyzing the moderation of green marketing, which modifies or intensifies the existing relationship (Deari et al., 2020; Liao et al., 2020). The empirical foundation of this research is built upon a robust dataset collected through structured questionnaires distributed across the diverse landscapes of China, South Korea, India, Pakistan, and Bangladesh. The anticipated outcomes hold significant theoretical and managerial implications as we advance through this research. The insights gleaned from this study are poised to inform future researchers, policymakers, and corporate managers about refining their manufacturing and marketing strategies to align with the evolving landscape of environmentally conscious competitive consumerism (Drosos et al., 2021; Genoveva & Samukti, 2020). In essence, this study contributes to the ongoing dialogue surrounding sustainability, fostering a deeper understanding of the factors that drive competitive green consumption in the vibrant markets of Asia (Jamal et al., 2021).

## 2. THEORETICAL BACKGROUND

### 2.1 The theoretical underpinning – the norm activation model (NAM)

Schwartz (1977) developed the theoretical framework of the NAM; according to Safari et al. (2023), this model explains how individuals are involved in eco-friendly behaviors. The NAM is significant for green customers' intentions and their loyalty in the long run (Onwezen et al., 2013). According to Zhou et al. (2021), this model comes into work when consumers realize their actions affect the degradation of environmental pollution. It is grounded on the conception that individuals have an extensive concern for ethical and social topics, including environmental challenges (Wang et al., 2020). According to Liu et al. (2017), the NAM revolves around internal standards, individual norms, and convictions regarding environmental issues. Liao et al. (2020) emphasize that an individual's awareness of the environmental effects of their action catalyzes these activities. According to Ahmed et al. (2022), this awareness can originate from several sources, for instance, instruction, knowledge, or personal exposures. Mahmoud et al. (2017) established that it encourages people to be involved in sustainable events and choose green products due to motivated personal norms. The NAM helps to explain why consumers choose green products within the context of environmentally friendly choices and behaviors. Scholars have applied the NAM in their environmental-related studies, which devise communication strategies to establish personal norms regarding green environmental practices and behaviors (Safari et al., 2023; Albus & Ro, 2017).

### 2.2 Green Environmental Practices and Green Purchase Intentions

Al Zubiadi (2020) and Leary et al. (2017) demonstrated the positive impact of green environmental practices on green purchase intention. Several studies established that eco-friendly organizations that produce green products attain more customer loyalty and long-term competitive advantages (Ahmed et al., 2022; Liao et al., 2020). According to Joshi et al. (2021), green purchase behavior directly correlates with organizations' green environmental practices. Similarly, Yadav and Pathak (2019) and Hsu et al. (2017) established that the green environmental practices of any company attract more customer attention and loyalty towards their green brands. According to Hsu et al. (2017) and Lin and Haung (2012), an organization's sustainable initiatives contribute to environmental safety, gain competitive advantage, and

increase customer loyalty for their conscious purchase behavior. However, the elements of green environmental practices, for instance, the attitude towards green products (Kyriakopoulos, 2022; Cerri et al., 2018), the green marketing mix (Ahmed et al., 2022), and green customer value (Arora & Manchanda, 2022) remained underexplored in the perspective of Asian economies like China, India, Pakistan, South Korea, and Bangladesh. Thus, based on previous literature, we have framed the following hypothesis:

*Hypothesis (H1): Green environmental practices have a positive and significant relationship with green purchase intention.*

### 2.3 Attitudes Towards Green Products

Situmorang et al. (2021) and Salehzadeh et al. (2023) have concluded that attitude towards green products is a significant element of environmental practices. According to Rawlings (2020) and Cerri et al. (2018), there is an affirmative relationship between eco-friendly and green purchasing behavior. Al Zubaidi (2020) has demonstrated the importance of consumers' green attitudes, concluding that the basis of a green environment and green purchase intention starts from the concept of attitude towards green products. According to Salehzadeh et al. (2023), a green attitude comprises feelings and beliefs about green products and their impact on eco-friendly manifestation, which enhances sustainability and reduces environmental hazards. Kyriakopoulos (2021) and Amoako et al. (2020) argued that these directions reflect consumer's beliefs about the green environment, environmental challenges, and their understanding of how green purchase behavior positively affects the planet's ecosystem. Ahmed et al. (2022) and Salehzadeh et al. (2023) provide empirical evidence that supports the association between positive attitudes towards green products and sensitivity to environmental challenges. According to Ahmed et al. (2022), customers who are more sensitive to environmental issues have more positive attitudes toward green products; they have a strong sense of moral obligation and altruistic beliefs regarding the protection of the ecosystem. Hence, based on discussions and previous studies, we have formulated the following hypothesis:

*Hypothesis (H2): Attitude towards green products has a significant and positive relationship with green environmental practices.*

### 2.4 Green Marketing Mix

The concept of green marketing mix comprises product, price, place, and promotion. According to Mahmoud et al. (2017), green marketing mix is imperative in green environmental practices and consumer intention. Ahmed et al. (2022) and Albus and Ro (2017) have argued the importance of combining environmental features with conventional marketing elements. The findings by Tudu and Mishra (2021) significantly enhance the understanding of how organizations strategically use the eco-friendly marketing mix to create a more prominent perception of green products in consumer behavior. According to Nguyen-Viet (2023), using green marketing strategies requires setting up an environmentally friendly product promotion mix. Tudu and Mishra (2021) have also emphasized how important it is to inform customers about the eco-friendly effects of products to influence their decisions in support of sustainable consumption practices. According to Streimikiene et al. (2024) and Mehraj and Qureshi (2020), consumers' opinions and decisions can be influenced by using a green marketing mix that enhances the protection of environmental challenges. Thus, we have framed this hypothesis:

*Hypothesis (H3): The green marketing mix has a positive and significant relationship with green environmental practices.*

### 2.5 Green Customer Value

The concept of green customer value emphasizes how vital eco-friendly considerations are, referring to the value of services and goods (Wilson et al., 2018). According to Amin and Tarun (2020) and Wilson et al. (2018), there is an increasing trend among customers to consider the eco-friendly impact of green purchase products, getting additional value in products that align with their environmental attitudes. Ahmed et al. (2022) concluded how imperative green customer value is in association with environmental practices and green purchase intention; they further concluded that green customer value enhances green purchase behavior. Liao et al. (2020) established how transparent information and green labeling contribute to green customer value. According to Arora and Manchanda (2022) and Kyriakopoulos (2021), profound information on a product's eco-friendly features, certifications, and commitment to sustainability enhances the consumers' perception of green purchase behavior. The green customer value directly contributes to customers enabling by promising the beliefs of their green purchase intentions (Liao et al., 2020). Thus, we framed the hypothesis as follows:

*Hypothesis (H4): The green customer value has a positive and significant relationship with green environmental practices.*

## 2.6 Mediating Variables

This study further analyzes the mediation and multiple serial mediations of green psychological benefits, green entrepreneurial orientation, and green innovation in a relationship between green environmental practices and green purchase intention (Albort-Morant et al., 2018). Several studies have supported the intricate relationship between attitude toward green products, green entrepreneurial orientation, and green innovation between exogenous and endogenous variables (Aftab et al., 2023; Abu Seman et al., 2019).

### 2.6.1 Green psychological benefits

Several studies have demonstrated significant development in investigating green psychological benefits arising from engaging in environmentally sustainable behavior, a familiar subfield within consumer psychology (Ahmed et al., 2022; Drosos et al., 2021). According to Ahmad and Zhang (2020) and Xu et al. (2019), consumers report various positive psychological benefits, including higher self-worth, enhanced wellness, decreased worries, increased sense of control, and the growth of social identities and emotional satisfaction. Amin and Tarun (2021) and Wang et al. (2020) demonstrated that to support sustainable consumption prototypes and understand their intricate patterns effectively, organizations or policymakers must know about these gains. Previous studies have confirmed that consumers more concerned about the ecosystem are more sensitive to green purchase behavior (Xu et al. (2019).

### 2.6.2 Green entrepreneurial orientation

Several studies have demonstrated that, based on entrepreneurship, green entrepreneurship is more extensively recognized as an essential standpoint for comprehending how organizations handle risk management, innovation, and proactive actions (Ye et al., 2022; Kyriakopoulos, 2022). Ameer and Khan (2020) explored the role of green entrepreneurial orientation that focuses on the implications of embracing and integrating sustainable industry practices. Several studies have indicated a cogent association between green entrepreneurial attitude and the effective use of sustainable business practices. (Ahmed et al., 2022; Banerjee, 2021). Habib et al. (2020) have conducted studies on environmentally concerned activities, which are courageous. According to Banerjee (2021), a broad understanding of the association between sustainability and green entrepreneurial orientation becomes crucial for organizations that nurture a responsible and progressive brand image.

### 2.6.3 Green innovation

Several studies have demonstrated that contemporary business has aligned on the mutually advantageous association between sustainability and green innovation (Aftab et al., 2022; Abu Seman et al., 2019). According to Drosos et al. (2021) and Chang (2011), significant evidence exhibits the intricate relationship between green innovation solutions and environmental practices. The conception is to establish how green innovation and transformative procedures might improve green purchase intention (Albort-Morant et al., 2018). Several studies demonstrated the significance of green innovation influencing green environmental practices (Aftab et al., 2023). Green innovative strategies include supporting collective processes, incorporating emerging technologies, and reevaluating product and service design. According to Abu Seman (2019) and Chang (2011), organizations are incorporating progressive strategies and sensible decision-making for innovative green innovation and eco-friendly practices to attain green purchase intention. Thus, based on previous literature, we have framed the following hypotheses:

*Hypothesis (H4a): The green psychological benefits significantly mediate between green environmental practices and green purchase intention.*

*Hypothesis (H4b): Green entrepreneurial orientation significantly mediates between green environmental practices and purchase intention.*

*Hypothesis (H4c): Green innovation significantly mediates between green environmental practices and purchase intention.*

*Hypothesis (H4d): The green psychological benefits and green entrepreneurial orientation significantly mediate between green environmental practices and green purchase intention.*

*Hypothesis (H4e): Green entrepreneurial orientation and green innovation significantly mediate between green environmental practices and purchase intention.*

*Hypothesis (H4f): Green psychological benefits, innovation, and entrepreneurial orientation significantly mediate the relationship between green environmental practices and green purchase intention.*

## 2.7 Moderating Role of Green Marketing

According to Tan et al. (2022) and Szabo and Webster (2021), eco-friendly marketing has gained popularity among green customers, organizations, and researchers. This research examines the impact of green marketing as a moderating variable in the relationship between green environmental practices and green purchase intention (Bokil & Sinha, 2021; Shabbir et al., 2020). According to Song et al. (2020), previous studies used green marketing as an independent variable, mediating variable, and moderating variable; therefore, the results are inclusive regarding the moderating role of green marketing. Existing knowledge on how such moderation by marketing tactics impacts sustainable consumption may be sparse but shows promising potential (Drosos et al., 2020; Deari et al., 2020). Empirical findings from studies conducted by academics such as Liao et al. (2020), Genoveva and Samukti (2020) and Jamal et al. (2021) indicate that strategic eco-awareness in marketing initiatives can substantially magnify the effect of environmental ethics on consumer preferences. Consequently, drawing upon these referenced texts and comprehensive discussions, we framed the hypothesis as follows:

*Hypothesis (H5): Green marketing significantly and positively moderates the relationship between green environmental practices and purchase intention.*

This study analyzes the relationship between green environmental practices on green purchase intention. The study also analyzes the attitude towards green products, green marketing mix, and green customer value on green environmental practices, which also have competitiveness and positive corporate image. The mediation findings analyze green entrepreneurial orientation, psychological benefits, and innovation as mediating variables between green environmental

practices and green purchase intention. Finally, the study analyzes the moderation of green marketing between exogenous and endogenous variables. The study's findings will have significant theoretical and managerial implications for researchers, academics, industry practitioners, and policymakers.

### 3. RESEARCH OBJECTIVES, METHODOLOGY, AND DATA

#### 3.1 Research Objectives of the Study

This study examines the relationship between environmental practices and green purchase intention, which enhances the brands' competitiveness in Asian economies such as China, India, Pakistan, South Korea, and Bangladesh. The research investigates the relationship between green environmental practices (attitude towards green products, green marketing mix, and green customer value) and green purchase intention (Kaur et al., 2022). This research further investigates the mediation of green entrepreneurial orientation, psychological benefits, green innovation, and moderation of green marketing (Song et al., 2020) in a relationship between green environmental practices and green purchase intention. This research examines the consumers' receptivity to eco-friendly products; according to Ahmed et al. (2022), several factors make up sustainable marketing strategies and perceived customer value for environmentally friendly behaviors. Szabo and Webster (2021) explored the multifaceted aspects of eco-friendly practices in depth; they better understood the nuanced effects of environmental incentives on green consumer behaviors regarding sustainable services and products (Shabbir et al., 2020).

#### 3.2 Research Design and Data Collection Methods

This study's quantitative research design included structured questionnaires with a five-point Likert scale to gather and analyze numerical data (Ringle et al., 2020; Lu et al., 2020). This study used a deductive approach; we incorporated the extended norm activation model (NAM) into the questionnaire and conceptual framework and developed modified operational variables (Hair et al., 2022). To measure the impact of green environmental practices and their dimensions (attitude towards green products, green customer value, and green marketing mix) on green purchase intentions, a survey was conducted among green customers (those who prefer to buy green products) in selected Asian countries, such as China, South Korea, India, Pakistan, and Bangladesh. The modified indicators were created based on the objectives and research questions of the study (Sarstedt et al., 2019). The researchers followed the ethical guidelines and protected the anonymity and confidentiality of the participants. The objectives and nature of the study were briefed to the participants, and informed consent was obtained (Hussain et al., 2021). The researchers employed a purposive sampling technique to choose the participants who were well-versed in the concept of green environmental practices, green products, and the overall benefits of a green and friendly ecosystem (Ringle et al., 2020). The data was collected from different but significant Asian countries, including China, India, Pakistan, South Korea, and Bangladesh. These economies are intensely involved in industrial manufacturing, and more than 25% of the world's population lives in this region.

Moreover, these countries face pollution problems, and people are susceptible to the green environment and ecosystem. The purposive sampling technique is mainly used because of the nature of the study; we focused only on participants who are well aware of the environmental hazards and benefits of green products and eco-friendly environments (Ahmed et al., 2022). We collected the data using both online and in-person techniques; for in-person, we visited eco-friendly consumers and conducted the survey. However, we employed different online tools for the online survey to collect the data, such as Google Docs and social media platforms (Facebook, X, LinkedIn, and Instagram). Initially, 700 questionnaires were floated to the

selected participants, in which 520 respondents returned completed questionnaires. However, twenty-two questionnaires were found to be insufficient. Thus, we selected 498 respondents for this study. Therefore, the response rate was 74.28%, which is considered a good number for online surveys (Hair et al., 2022). The data was collected from January 2023 to July 2023 from China, India, Pakistan, South Korea, and Bangladesh.

### 3.3 Measurements and Estimation Techniques

We constructed a modified questionnaire based on the extended NAM and operational variables. The conceptual framework of the study was made based on previous literature. Similarly, researchers have created modified constructs and items for the questionnaire. The modified items of attitude towards green products, green marketing mix, and the value of green customers were extracted from the previous literature such as Nguyen-Viet (2023), Ahmed et al. (2022), Arora and Manchanda (2022), Situmorang et al. (2021), Liao et al. (2020), and Mahmoud et al. (2017). The modified measurement scales of mediating variables such as green psychological benefits, green entrepreneurial orientation, and green innovation were taken from previous studies, for instance, Aftab et al. (2023), Ye et al. (2022), Ahmed et al. (2022), Banerjee (2021), and Abu Seman et al. (2019). Similarly, the modified measures of moderating variable (green marketing) were extracted from previous literature such as Tan et al. (2022), Liao et al. (2020), and Song et al. (2020). Finally, the modified scales of green purchase intention were also taken from previous literature (Ahmed et al., 2022; Joshi et al., 2021; Yadav & Pathak, 2017).

We used partial least square-structural equation modeling (PLS-SEM) to analyze the data. PLS-SEM researchers have used several techniques to validate the measurement and structural models (Ahmed et al., 2024; Hair et al., 2022). To validate the measurement model (outer model), researchers have used factor loadings, Cronbach's alpha, composite reliabilities, and average variance extracted to examine the convergent validity (Henseler et al., 2014). Similarly, the HTMT correlation matrix and the Fornell-Larcker criterion have been used to examine the discriminant validity. Thus, by using convergent and discriminant validities, the researchers have validated the items and constructs of the outer model (measurement model) (Sarstedt et al., 2019). Likewise, for validating the inner or structural model, researchers have used the coefficient of variation ( $R^2$ ), and path analysis (direct and indirect path analysis).

## 4. RESULTS AND DISCUSSION

### 4.1. Measurement Model

The first step in PLS-SEM modeling is to validate the outer or measurement model in which we examine the factor loadings, Cronbach's alpha, composite reliabilities, and AVE values to endorse the convergent validity of the measurement model (Parmar et al., 2022). Similarly, we examine the HTMT matrix and Fornell-Larcker criterion for discriminant validity in PLS-SEM modeling to validate the measurement model (Ahmed et al., 2024; Hair et al., 2022).

#### 4.1.1. Construct reliability and validity

Cronbach's alpha is a measure of internal consistency, and Table 1 displays the validity and reliability of the constructs (Ahmed et al., 2024). The results shown in Table 1 demonstrated that Cronbach's alpha readings were above the allowable range of 0.70. Reliability metrics considering the items' standard and unique variation are called composite reliability ( $\rho_a$  and  $\rho_c$ ). Every construct had  $\rho_a$  and  $\rho_c$  values greater than 0.70, likewise regarded as appropriate (Hair et al., 2022; Parmar et al., 2022). The AVE measures convergent validity, or the relationship between a factor and its items. Table 1 demonstrate that the AVE readings were more significant than 0.70, indicating that convergent validity had been established (Fornell &



Larcker, 1981). Therefore, Table 1 suggests that all the model’s components had acceptable levels of validity and reliability, indicating that they could measure the desired things.

Tab. 1 – Construct reliability and validity. Source: own research

Constructs	Cronbach’s Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	The Average Variance Extracted (AVE)
Attitude towards Green Products	0.722	0.738	0.843	0.653
Green Customer Value	0.880	0.883	0.914	0.681
Green Entrepreneurial Orientation	0.769	0.787	0.824	0.610
Green Environmental Practices	0.944	0.950	0.951	0.599
Green Innovation	0.856	0.869	0.891	0.578
Green Marketing	0.851	0.885	0.895	0.682
Green Marketing Mix	0.876	0.885	0.910	0.669
Green Psychological Benefits	0.842	0.844	0.896	0.683
Green Purchase Intention	0.918	0.941	0.938	0.721

#### 4.1.2 HTMT - Discriminant validity

Table 2 shows the heterotrait–monotrait (HTMT) ratio matrix for every pair of variables. According to Henseler et al. (2014), values smaller than 0.85 suggest appropriate discriminant validity. Nonetheless, each variable was entirely associated, as indicated by the diagonal values 1.0 (Hair et al., 2022). As a result, Table 2 demonstrates that the measurement model under consideration has acceptable discriminant validity, and we found no indication of variable redundancy (Ahmed et al., 2024).

Tab. 2 – HTMT – Discriminant validity. Source: own research

Constructs	AGP	GCV	GEO	GEP	GI	GM	GMM	GPB	GPI
Attitude towards Green Products	1.000								
Green Customer Value	0.806	1.000							
Green Entrepreneurial Orientation	0.828	0.794	1.000						
Green Environmental Practices	0.810	0.800	0.778	1.000					
Green Innovation	0.692	0.820	0.781	0.723	1.000				
Green Marketing	0.689	0.709	0.802	0.840	0.805	1.000			
Green Marketing Mix	0.688	0.785	0.755	0.807	0.685	0.728	1.000		
Green Psychological Benefits	0.805	0.819	0.799	0.812	0.724	0.722	0.784	1.000	
Green Purchase Intention	0.750	0.696	0.845	0.697	0.816	0.763	0.669	0.773	1.000

#### 4.2. Structural Model

We used PLS estimation to support the structural model and investigate the parameters of the inner model, including R-squared values ( $R^2$ ), path coefficients, effect size ( $f^2$ ), blindfolding of predictive importance ( $Q^2$ ), and model fitness analysis (Ahmed et al., 2019; Hair et al., 2022).

##### 4.2.1. Coefficient of variation ( $R^2$ )

The findings of a statistical analysis, most likely a regression or structural equation model, concentrating on several constructs associated with green business practices, are displayed in Table 3. The R-squared values show the variability percentage in each construct. Constructs with strong R-Square values ranging from 65.5% to 91.8% include green psychological benefits, entrepreneurial orientation, innovation, and purchase intention. The adjusted values provide somewhat adjusted but significant explanatory power by considering the number of predictors in the model (Hair et al., 2022). According to these results, the model captures and explains the variance in the constructs under study, offering crucial new information about how different green-oriented variables relate to one another (Ahmed et al., 2024).

Tab. 3 – Coefficient of variation ( $R^2$ ). Source: own research

Constructs	R-Square	R-Square Adjusted
Green Entrepreneurial Orientation	0.795	0.794
Green Environmental Practices	1.000	1.000
Green Innovation	0.655	0.653
Green Psychological Benefits	0.830	0.830
Green Purchase Intention	0.918	0.917

4.2.2. The hypothesized direct relationship

The results of Table 4 showed the direct correlations between the variables, confirming the strong and positive relationship between green environmental practices and green purchase intention ( $\beta = 0.163$ ,  $T=2.477$ , and  $p < 0.05$ ). AGP, GMM, and GCV, with coefficients of  $\beta = 0.252$ ,  $\beta = 0.368$ , and  $\beta = 0.431$ , respectively, and  $T > \pm 1.96$  and  $p < 0.05$ , all showed a strong and positive correlation with green environmental practices. It denotes a relationship between increased green purchase intention and higher levels of green environmental practices. Hence, it is concluded that attitude towards green products, green marketing mix, and green customer value have a significant and positive relationship with green environmental practices. Similarly, green environmental practices significantly and positively impact green purchase intention.

Tab. 4 – Hypothesized Direct Relationship. Source: own research

Direct Relationship	Original sample ( $\beta$ )	Standard Deviation	T Statistics	p Values
Green Environmental Practices -> Green Purchase Intention	0.163	0.066	2.477	0.013
Attitude towards Green Products -> Green Environmental Practices	0.252	0.006	38.902	0.000
Green Marketing Mix -> Green Environmental Practices	0.368	0.009	40.470	0.000
Green Customer Value -> Green Environmental Practices	0.431	0.011	39.980	0.000

4.2.3. The hypothesized multiple serial mediations

The findings of Table 5 showed both single and many serial mediations. The multiple serial mediations revealed that GPB ( $\beta=0.423$ ,  $T=7.069$ , and  $p>0.05$ ), GEO ( $\beta=0.222$ ,  $T=5.383$ , and  $p>0.05$ ), and GI ( $\beta=0.139$ ,  $T=3.425$ , and  $p>0.05$ ) significantly mediate between green environmental practices and green purchase intention. Additionally, GPB and GEO significantly mediated between green environmental practices and purchase intention with a coefficient of  $\beta = -0.246$ ,  $T = 4.469$ , and  $p = 0.000$ . Ultimately, the relationship between green environmental practices and green purchase intention is significantly mediated by the various serial mediations of GEO and GI, with coefficients of  $\beta = 0.213$ ,  $T = 4.966$ , and  $p = 0.000$ . Finally, GPB, GEO, and GI have a significant and positive serial mediation between green environmental practices and purchase intention.

Tab. 5 – Hypothesized mediation and multiple serial mediation. Source: own research

Hypothesized Multiple Serial Mediation Relationship	Original sample ( $\beta$ )	Standard Deviation	T Statistics	p Values
GEP -> GPB -> GPI	0.423	0.060	7.069	0.000
GEP -> GEO -> GPI	0.222	0.041	5.383	0.000
GEP -> GI -> GPI	0.139	0.040	3.425	0.001
GEP -> GPB -> GEO -> GPI	-0.246	0.052	4.469	0.000
GEP -> GEO -> GI -> GPI	0.213	0.043	4.966	0.000
GEP -> GPB -> GEO -> GI -> GPI	0.237	0.047	5.090	0.000

4.2.4. Moderation of technological change

Table 6 indicates that green marketing has a noteworthy and favorable impact on green environmental practices and purchase intention. A positive correlation was found between green environmental practices and the success of green purchase intention, as indicated by the

coefficient  $\beta = 0.035$ . According to the derived T statistic, the measured effect size was 2.735 standard deviations from the mean, indicating statistical significance. The probability of finding this effect magnitude by chance was extremely low, as demonstrated by the p value of 0.006. To ascertain the direction and strength of the moderation effect, additional studies are necessary, such as evaluating the interaction effect's effect sizes and significant levels (Hair et al., 2022).

Tab. 6 – Moderation of Machine Learning Algorithm. Source: own research

Moderation of Technological Change	Original sample ( $\beta$ )	Standard Deviation	T Statistics	p Values
Green Marketing x Green Environmental Practices -> Green Purchase Intention	0.035	0.013	2.735	0.006

## 5. CONCLUSION

The study demonstrated a significant positive relationship between green environmental practices and consumers' green purchase intention. The results highlight the significant influence of green environmental practices on consumers' green purchase intention. The research confirms that attitudes toward green products significantly influence green environmental actions and their beneficial impact on green purchase intention. The study confirms the beneficial effects of green marketing mixes on environmental practices. Additionally, the study highlights the significant impact of green customer value on green environmental practices. The mediation analysis shows that when paired with other exogenous variables, green psychological advantages, green entrepreneurial orientation, and green innovation play critical roles in improving green purchasing intention. The study finally concluded that green marketing considerably and favorably modifies the association between green environmental behaviors and green purchasing intention as a moderator. These results show how complex interactions between various factors influence consumer intentions and environmental practices. These insights can benefit firms that aim to make educated decisions to increase customer participation and sustainability activities. The study has significant theoretical and practical implications for researchers and industry practitioners. This research supplements the new body of knowledge by elucidating the relationship between green purchase intention and green environmental practices of organizations from a theoretical viewpoint. The research findings expand the understanding of researchers and industry managers that a green marketing mix, attitude towards green products, and green customer value is imperative for customers. The novel theoretical framework has provided the fundamental basis for future researchers to replicate this model in different service and manufacturing sectors. The findings of this research have provided significant implications for industry managers regarding the importance of green environmental practices and consumers' green purchase intention. The managers can devise green, environmentally friendly strategies to attract more customers who like eco-friendly products. The managers should consider green psychological benefits, entrepreneurial orientation, and innovation while devising their strategies. The study results benefit the researchers and industry and provide guidelines for a better society and friendlier ecosystem.

### 5.1 Limitations of the Study and Potential Areas of Future Studies

The study employed a cross-sectional design to gather data at a particular moment. This limits the capacity to determine causal relationships between variables. Future research may employ longitudinal techniques to conduct a more in-depth analysis of the temporal dynamics and causal relationships. The study focused on specific green environmental practices and purchase intention variables. More unexplored factors may influence green environmental practices and

purchase intention. Additional variables may be included in future research, and their relationship to green purchase intention may be examined. Comparative research across different firms or industries could provide insights into the variances in green purchase intention and related determinants. Since cause-and-effect directionality models were not used in this study, it is advised that future researchers use them in order to provide more reliable results.

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