





## Article

# Investigating the Effect of Green Brand Innovation and Green Perceived Value on Green Brand Loyalty: Examining the Moderating Role of Green Knowledge

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**Abstract:** The numerous organisations voicing their concerns show that concern for the environment has increased compared to earlier times. This study aims to investigate the relationship between green brand innovation and green perceived value, along with its impact on green brand loyalty within the Ethiopian banking sector. Based upon previous research, this study delves into the distinctions between innovation and innovativeness, exploring their respective influences on brand loyalty. Additionally, this study introduces the roles of green perceived value as a mediator and consumer green knowledge as a moderator in shaping green brand loyalty. To assess the conceptual model, a survey was conducted using convenience sampling among 600 customers using internet banking services across nine reputable banks. This approach aimed to capture a representative sample for the conceptual model. Subsequently, data analysis was performed using a structural equation model (SEM). The results indicated that consumers' perceptions of green value have indirect effects on green brand loyalty and direct effects on green brand innovation. In addition, green knowledge moderates the relationship between green brand innovation and green perceived value in a significant way. Therefore, in order to increase customer loyalty to green brand innovations, organisations should focus on improving consumers' environmental literacy and cultivating positive attitudes towards green businesses.

**Keywords:** green brand; green innovation; green brand innovativeness; green perceived value; green brand loyalty; green knowledge



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**Citation:** Jalu, G.; Dasalegn, G.; Japee, G.; Tangl, A.; Boros, A. Investigating the Effect of Green Brand Innovation and Green Perceived Value on Green Brand Loyalty: Examining the Moderating Role of Green Knowledge. *Sustainability* **2024**, *16*, 341. <https://doi.org/10.3390/su16010341>

Received: 28 November 2023

Revised: 25 December 2023

Accepted: 28 December 2023

Published: 29 December 2023



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## 1. Introduction

In contemporary times, rapid globalisation and industrialization have resulted in adverse effects on the environment, including global warming, air pollution, water pollution, and chemical and toxic explosions [1]. Industrial plants, due to the significant volume of pollutants they generate, stand out as primary contributors to environmental degradation [2]. As the global manufacturing sector undergoes swift transformations, environmental considerations are increasingly becoming a crucial concern in the management of business organisations. With the growth of e-commerce in most banking industries, green banking, concerned with environmental protection and sustainability, is growing. Green banking is a global trend that emphasises sustainable and environmentally responsible

practices within the financial sector. While economic growth is essential, it often comes with environmental challenges. Green banking is becoming more popular in the banking industry, with a focus on environmentally friendly practices in operations, marketing, and finance [3,4]. This method is focused on the principles of individuals, the environment, and economic gain, with the objective of encouraging environmentally responsible actions while also ensuring financial advantages [5,6]. Green banking primarily emphasises waste reduction by limiting paper usage and adopting electronic transactions through ATMs, mobile banking, and Internet banking [7]. This strategic change not only saves paper but also helps save petrol, enabling clients to conveniently carry out transactions from any place. Green marketing employs informative websites to decrease advertising expenses, whereas green financing protects banks' operational capacities, augmenting their financial stability and security [8,9]. Green operations encompass the implementation of novel strategies, such as incorporating electronic banking services. These services provide opportunities for cost savings by eliminating the need for paper, reducing fuel emissions, minimising waiting times, and lowering operating expenses for both banks and clients [10].

Due to consumers' growing environmental awareness, there has been a recent increase in interest in green marketing [6,11]. As a result, a growing number of firms are incorporating environmental factors into their goals, activities, and plans. This is consistent with environmental conservation legislation and regulations, as well as the increasing customer desire for environmentally friendly products [12–14]. Companies have used green brand innovation to demonstrate their commitment to environmental concerns [15,16]. Green brand innovation typically involves implementing ecologically sustainable products and activities [17,18]. Green brand innovation enhances a company's reputation and image, contributing to its commercial success and competitive advantage [19–21]. Nevertheless, not all organisations are capable of efficiently promoting their environmentally friendly brand innovations [22]. Although some organisations have made heightened endeavours to develop ecologically sustainable items, consumers often lack awareness of the advantages associated with these products [23]. A persistent and inconsistent lack of communication may jeopardise the sincere investment endeavours of environmentally conscious companies. To generate favourable reactions and engagement from customers towards a company's sustainability efforts, it is essential to employ efficient green marketing strategies [24,25].

According to [26,27], the market performance of environmentally friendly products remains unpredictable, despite significant investments in green brand innovation. This divergence arises due to contrasting interpretations of the terms "innovation" and "innovativeness" between specialists and customers. Previous studies have primarily defined innovation as being a result of a company's business operations, focusing on technological improvements while overlooking the way customers interact with these developments. As a result, these viewpoints have failed to adequately meet the demands of customers [28]. Ref. [29] argue that it is crucial to address this gap by investigating innovation from the perspective of the consumer. For instance, ref. [22] argue that innovativeness should be defined as a company's ability to adopt new ideas and create original solutions, going beyond the sheer results of its actions. Building upon this concept, the present study defines green brand innovation as the degree to which consumers perceive a brand's ability to address their environmental requirements through novel and practical means. Prior research has examined the impact of brand innovation on brand loyalty, but none of the previous studies [30,31] have specifically focused on green brand innovations.

Research on the impact of brand innovation on brand loyalty has yielded inconsistent findings [32]. Based on the application of the signalling theory in this study, the enhancement of perceived value associated with environmental sustainability elucidates the relationship between green brand innovation and green brand loyalty. The underlying concept is that customers will not exhibit loyalty towards environmentally conscious brand innovations until they perceive tangible benefits from them. Moreover, [33] highlight the increasing lack of confidence among consumers in green brands and the necessity for consumer education initiatives aimed at enhancing environmental awareness. Remark-

ably, previous research on green innovation has neglected to consider the role of green knowledge. Consumers with a higher level of environmental awareness are expected to experience less uncertainty when making decisions and to have a greater level of trust and acceptance towards a brand's environmental commitments [34,35]. Green perceived value has the potential to mediate the relationship between green brand innovation and green brand loyalty. The primary objective of this study is to examine the impact of customers' perceptions of green brand developments on their brand loyalty. An integrative framework is established to connect green brand innovation and customer loyalty to the brand, using the perceived value of green as a bridge. The study also aims to determine the impact of green knowledge on this correlation.

## 2. Theoretical Base and Developing Hypotheses

### 2.1. Green Brand Innovation

Numerous enterprises have recognised the correlation between being environmentally conscious and maintaining competitiveness. Sustaining competitiveness in the long run is greatly reliant on embracing green innovation [35,36]. The comprehensive research conducted by [8,37–39] has focused on the development of green innovation strategies. Arham and Dwita [37] found that corporate environmental ethics influence both process and product innovations, which fall under the umbrella of green innovation. Choi and Han [38] found that enhancements in both environmentally friendly processes and eco-friendly products had a favourable influence on a company's ecological brand image. According to [39], the implementation of environmentally friendly processes and the development of sustainable products are crucial for a firm to achieve success in terms of its environmental competitiveness. According to ref. [40], incorporating both technical and non-technical modifications into innovation programmes is advantageous for promoting sustainable consumption behaviour. Although green innovation has garnered significant attention, it has predominantly been studied at the organisational level, where innovation is defined as the result of a company's endeavours. This study introduces a new term called "green brand innovativeness," which is distinct from "green innovation" and "green innovativeness." According to ref. [34], brand environmental efficacy refers to the extent to which customers believe a brand can effectively meet their environmental needs through innovative and practical means. In other words, the ability of a business to meet the environmental expectations of its customers through the creation of innovative and practical solutions has a significant impact on how consumers view the innovation of green brands.

### 2.2. Green Brand Innovativeness and Green Brand Loyalty

Recent research indicates that consumers exhibit a robust sense of allegiance towards environmentally conscious enterprises. According to refs. [33,41], customers' intentions to repurchase a brand as a result of their strong environmental attitudes and commitment to sustainability have an impact on green brand loyalty. Prior studies [33,42] have investigated the factors that impact green brand loyalty, such as green perceived value, green trust, green satisfaction, and self-brand connection. Brand innovation can impact brand loyalty in two distinct ways. According to ref. [33], green brand innovation has the potential to enhance consumer satisfaction and trust by providing imaginative and effective solutions that align with environmental goals. Additionally, a green brand's level of innovation demonstrates its capacity to uphold environmental obligations, increasing the likelihood that customers will make additional purchases [43–45]. These investigations have established a robust association between green brand innovation and green brand loyalty. Therefore, the following hypothesis is proposed:

**Hypothesis 1:** *Green brand innovation has a positive and significant effect on green brand loyalty.*

### 2.3. The Mediating Role of Green Perceived Value (GPV)

According to ref. [46], as well as ref. [47], signalling theory is frequently used to describe the behaviour of two parties who possess asymmetric knowledge. The sender's use of signals to convey information and the recipient's interpretation of these messages are the subjects of this theory. Numerous studies have demonstrated how important the indicators that organisations use to interact with their clientele are, as firms and their target markets do not have as much mutual knowledge as they need to [36,48]. According to ref. [49], signals are informational signals that are easy to obtain and manipulated by marketers. Consumers use them to decide on a product's value or quality, even though they are unrelated to the product itself. In an information-poor society, customers deduce a product's quality through signals [33,50]. Research has indicated that a company's actions and plans are closely linked to quality aspects such as warranty [32], brand name [51], price [48], and advertising [49]. The innovation of a brand can predict its expected utilitarian value [49], competitive edge [52], and capacity to perform the task it claims to perform successfully [29,53]. The authors suggest that there exists a relationship between customers' perceptions of a brand's innovation and their overall brand satisfaction. The same is true for green marketing; businesses should properly inform their clients about it, especially in light of the growing awareness among consumers of "greenwashing" [50,54].

Pappu and Quester [32] found that green brand innovation is a positive indicator of green perceived value based on the impact of innovation on brand quality. According to ref. [33] "green perceived value" is the total worth that customers place on a good or service after accounting for their needs, expectations of sustainability, and preferences for the environment. As a result, the demands, expectations, and aspirations of consumers have an impact on the subjective nature of perceived green value. According to [55] this in turn results in an increase in plans to purchase green products and improved relationships between consumers and brands. It also raises green satisfaction, trust, self-brand connection, and brand loyalty. Thus, when examining the relationship between green brand innovation and customer trust, the concept of perceived green value is crucial. Furthermore, ref. [56] discovered a strong correlation between consumers' perceptions of the value and perceived innovation of a product. Green brand innovation, according to refs. [57,58] is the capacity of a brand to use process and product innovation to satisfy customers' environmental needs. Thus, green brand innovation could raise the perceived value of green by giving consumers greater faith in the brand's ability to live up to its green claims. Additionally, ref. [57] proposed that loyalty, positive word of mouth, and repurchase intentions are all significantly influenced by perceived value. For instance, ref. [59] discovered a connection between the green perceptions of a product and brand loyalty. We can therefore infer from what we already know that perceived green value might serve as a mediator between brand loyalty and green brand innovation. Thus, it is possible to propose the following hypotheses:

**Hypothesis 2:** *Green brand innovation has a positive and significant effect on Green Perceived Value (GPV).*

**Hypothesis 3:** *Green Perceived Value has a positive and significant effect on green brand loyalty.*

**Hypothesis 4:** *Green Perceived Value has a significant mediating role between green brand innovation and green brand loyalty.*

### 2.4. The Moderating Role of Green Knowledge

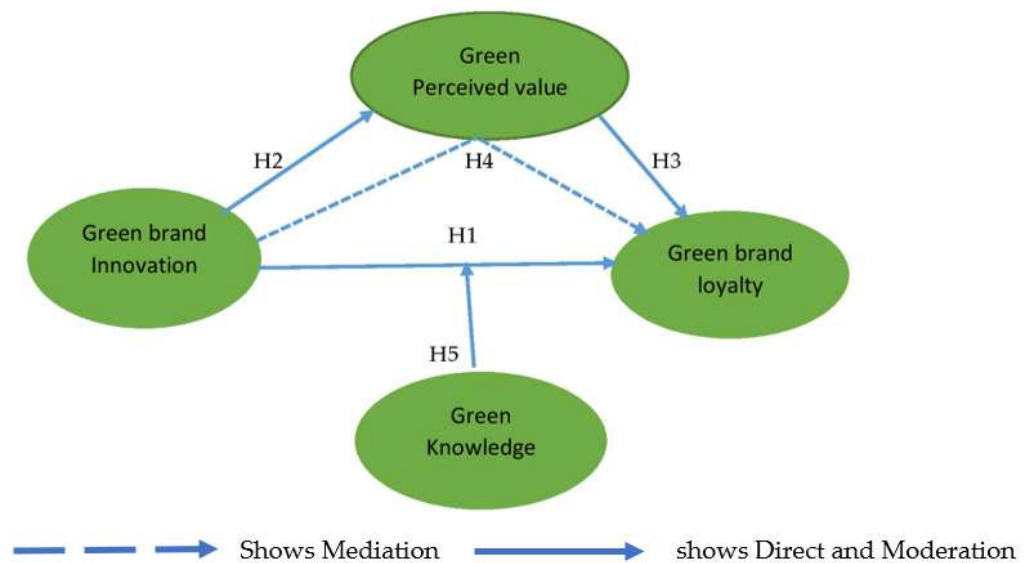
Consumers with a profound understanding of environmentally friendly products and services are more likely to buy them [60,61]. According to refs. [62,63], green knowledge refers to a comprehensive understanding of facts, concepts, and connections related to the natural environment and its primary ecosystems. Goldman [64] categorizes work on green knowledge into two distinct groups: concrete and abstract knowledge. Individuals'

perceptions of their awareness of significant environmental difficulties determine subjective knowledge. Individuals acquire their objective knowledge through their utilisation of items and through the conduct of companies regarding environmental issues. This study examines the impact of abstract green knowledge on the connection between perceived green value and green brand innovation. It argues that abstract green knowledge is more accurate in predicting consumer behaviour towards environmental issues compared to factual green knowledge [65,66]. Prior studies [5,67] have indicated that providing clients with information about environmental concerns can result in their perception that eco-friendly products possess superior quality. According to ref. [68], the provision of green information might enhance consumers' impressions of green products by raising their awareness of environmentally friendly enterprises. As individuals become increasingly aware of environmental concerns, they will also have a greater understanding of the environmental benefits that brands provide. Hence, our study suggests that customers are more inclined to evaluate the environmental worth of a green brand when they possess knowledge about environmental concerns. Thus, the following hypothesis has been proposed:

**Hypothesis 5:** *Green knowledge positively moderates the relationship between green brand innovation and green perceived value.*

### 2.5. Theoretical Framework

The conceptual framework depicted in Figure 1 encompasses the key concepts of green brand innovation, green perceived value, green brand loyalty, and green knowledge. First and foremost, there is a belief that green businesses are seen as more environmentally friendly because of their innovative characteristics. This illustrates that when consumers see a company as being innovative in its implementation of environmentally friendly solutions, they evaluate it more favourably for its ecological advantages. Furthermore, it is hypothesized that the association between green brand innovation and green brand loyalty arises from the perception of green value. Customers are presumed to exhibit more brand loyalty when they perceive it to possess stronger ecological value. The perceived value of the green brand acts as an intermediary by capturing the positive influence of green brand innovation on green brand loyalty based on the value that consumers assign to the brand. Additionally, it is believed that the presence of green knowledge affects the relationship between a green brand's perceived environmental friendliness and its level of innovation. There is a belief that when customers have a greater understanding of environmental issues, green brand innovation has a stronger influence on their perception of its perceived value. Consumers who possess a higher level of environmental consciousness (green knowledge) are more inclined to acknowledge and value the innovative, environmentally friendly solutions offered by the organisation; consequently, the brand's worth increases. The concept of green perceived value serves as a connection between green brand innovation and green brand loyalty. This conceptual framework illustrates how these constructs are believed to interact in general. The framework also takes into account how green knowledge affects the relationship between its perceived value and its degree of innovation. Further empirical studies have been conducted to investigate the correlation between green brand innovation, perceived value, green understanding, and brand loyalty.



**Figure 1.** The proposed conceptual framework.

### 3. Study Methodology

This study's research design incorporates both explanatory and descriptive elements. Descriptive research was conducted to look into the relationship between the independent and dependent variables. This study employed the explanatory technique to determine the association between green brand innovation, green perceived value, green knowledge, and green brand loyalty, which is consistent with findings from previous [5,67]. Participants in this study included customers of Ethiopian commercial banks who used their ATMs and internet banking services. This study's unit of analysis was the clientele of Ethiopia's top nine commercial banks. The nine commercial banks account for around 60% of all customers, which is a sizeable portion of the total customer base. The nine commercial banks considered in this study are the Commercial Bank of Ethiopia, Dashen Bank, Buna International Bank, United Bank, the Bank of Abyssinia, Nib International Bank, Wogagen Bank, Oromia Bank, and Awash International Bank. As part of its quantitative study, this study used standardised questionnaires and a survey strategy to collect data. Section A of the surveys asked questions about the background of the respondents, like their ages, jobs, and highest levels of education, while Section B asked questions regarding the respondents' levels of perception regarding green innovation, green brand loyalty, green perceived value, and green knowledge. Each and every construct was assessed using validated scales. Each topic's impressions were scored using a 5-point Likert scale (1 being strongly disagree and 5 being strongly agree). Fifteen indicators were used in this study. Four indicators for evaluating green brand loyalty were derived from [17], while three items for green brand innovation were modified from [69]. To evaluate green perceived value, the four-item scales were modified [18,70], and to evaluate green knowledge, four indicators were derived from [17]. In this study, we used convenience sampling to obtain cross-sectional data from a sample, similar to earlier survey-based investigations conducted by [57,58]. When the population size is high and unknown (i.e., beyond 50,000), the sample size is computed under the assumption of optimal conditions [71]. Both P and Q have a value of 0.5, which represents the maximum level of variability. The PQ index attains its utmost value when both p and q are precisely 0.5. This study employs [71] formula, which assumes an infinitely large population, to compute the sample size, 95% confidence interval, and 4% sampling error.

$$n = z^2 * p * (1 - p) / e^2$$

where:

n = required sample size

Z = degree of confidence (i.e., 1.96).

$P$  = population variability (0.5)  
 $q$  = the probability of the population not occurring ( $q = 1 - p = 0.5$ )  
 $E$  = tolerable error (0.04)  
 $n = (1.96)^2 \times 0.5 \times 0.5 / 0.04^2$   
 $n = 3.8416 \times 0.5 \times 0.5 / 0.0016$   
 $n = 600$  respondents

The questionnaires were distributed using a quota sampling method, which considered the number of branches that each bank has in Addis Ababa, the capital city of Ethiopia. The distribution is based on the information provided in the Table 1 below.

**Table 1.** Sample Quota.

S/N	Name of Bank	No. of Branches	Share (%)	Sample Size
1.	Commercial Bank of Ethiopia	402	23.9	143
2.	Dashen Bank	159	9.4	57
3.	Buna International Bank	114	6.8	41
4.	United Bank	165	9.8	59
5.	Bank of Abyssinia	221	13.2	79
6.	Nib International Bank	174	10.3	62
7.	Wogagen Bank	145	8.6	52
8.	Oromia Bank	108	6.4	38
9.	Awash International Bank	196	11.6	70
	Total	1684	100	600

Source: NBE Annual Report 2019/2020.

A total of 600 structured questionnaires were given to respondents from Ethiopia's nine leading banks for completion as part of this research. The response rate was 82 percent, with 490 out of 600 questionnaires returned. Among the respondents, 51.2 percent were male, while 48.8 percent were female. The age distribution revealed that 45.5 percent of individuals fell within the age range of 19 to 36, 24.7 percent were between 36 and 54 years old, 22% were below 18 years old, and 7.8 percent were above 54 years old. The study revealed that 25.3 percent of participants had a medium-term affiliation lasting between 6 and 15 years, while 16.3 percent had a short-term affiliation lasting less than 5 years. Furthermore, 58.4 percent of respondents had a long-term affiliation exceeding 15 years with their individual banks. The poll results indicate that 10.2 percent of respondents possessed a current account, 38 percent possessed a demand account, and 51.8 percent possessed a savings account. In terms of educational attainment, 51.4 percent of the participants possessed a bachelor's degree, 20.6 percent possessed a master's degree or higher, and 28 percent possessed a diploma. These demographic profiles offer crucial insights into the characteristics of the sample population and aid in the analysis of the study's findings. The data collected were analysed using SPSS version 24. Moreover, we employed the AMOS software version 23 to evaluate the structural model in alignment with [72] guidelines. SEM serves the purpose of testing and refining theoretical models, scrutinising intricate relationships, and appraising the overall conformity of a model to the observed data. Widely acknowledged and versatile, SEM stands as a prominent technique in research, facilitating a comprehensive understanding of the underlying structures and relationships within datasets.

## 4. Analysis and Results

### 4.1. Reliability and Validity Tests

In this study, we assessed the convergent validity of the latent components using both average variance extracted metrics (AVE) and confirmatory factor analysis (CFA). Table 2 illustrates that all the AVE values for the latent constructs exceed 0.50. According to [73], this indicates that, on average, the latent variables can account for more than half of the variance present in the indicators resulting from latent constructs. To determine the

level of reliability in the structural model, we employed Cronbach's alpha and composite reliability. The total score for composite reliability surpasses the acceptable threshold of 0.70, demonstrating a high level of internal consistency. As per the criteria outlined by [72], the Cronbach's alpha value must be at least 0.70 for the research to be considered quantitative. Consequently, we have successfully satisfied criteria for convergent validity, construct reliability, internal reliability, and composite reliability in this study. The following Table 2 of the study provides an overview of all the items used in this study and their respective results.

**Table 2.** Measures and reliabilities.

Variables	Factor Loading	AVE	CR	A
Green Brand Innovations		0.67	0.86	0.82
This brand meets customer green needs.	0.86			
This brand provides innovative green solutions to customers.	0.78			
This brand offers fresh green solutions to customers.	0.81			
Green Perceived Value		0.62	0.87	0.83
This brand is environmentally friendly	0.82			
I admire this brand's environmental functions.	0.79			
This brand is more eco-friendly.	0.75			
This brand is more environmentally conscious.	0.79			
Green Brand Loyalty		0.65	0.87	0.85
Its environmental benefits make me want to use it again.	0.84			
Its environmental performance makes me prefer this brand.	0.75			
This brand's eco-consciousness keeps me loyal.	0.75			
Because it's eco-friendly, I'll keep using it.	0.75			
Green Knowledge		0.60	0.86	0.79
I use eco-friendly products and packaging.	0.72			
I choose products and packing that minimise landfill waste.	0.72			
I understand product container environmental symbols.	0.83			
I have a wealth of expertise regarding environmental issues.	0.83			

Notes: CR: composite reliability; AVE: average variance extracted.

#### 4.2. Measures of Discriminant Validity

The use of discriminant validity ensures that each item used to measure a construct is distinct [72]. The low association between the relevant measure and the measurements of other constructs serves as evidence [74]. The reliability of the discriminant was examined using the average variance extracted (AVE). The squared correlation for each construct should be lower than the square root of the AVE of the indicators assessing the construct, according to Hair et al. [72]. According to Table 3, there are no stronger connections across the constructs since the indicators are actually unique in how they measure each component. Furthermore, the suggested measuring paradigm offers good convergent and discriminant validity. In general, based on the information provided, the variables appear to have discriminant validity, and many of the correlations are statistically significant. The analysis suggests that the variables are distinct from each other, supporting the validity of the measurement model.

To ensure adherence to the assumptions of multivariate analysis, we meticulously examined the variables for missing values, outliers, and normality prior to commencing this study. This study's core components—green brand innovation, green brand loyalty, green perceived value, and green knowledge—underwent rigorous testing for consistency, convergent validity, and discriminant validity, as detailed in Tables 2 and 3. Confirmatory Factor Analysis (CFA) was the chosen method for conducting these assessments. In accordance with the recommendation by [18], Harman's one-factor test was employed to investigate the presence of common method variance (CMV). In this test, all 15 measurement



items were considered as a single general factor. However, the fit indices (RMSEA = 0.13, CFI = 0.81, TLI = 0.76) indicated an inadequate fit for the one-factor model, suggesting the absence of significant common method variance (CMV). Conversely, the data align well with the four-factor structure model ( $\chi^2(82) = 154.074$ ,  $\chi^2/df = 1.8$ ; CFI = 0.96, TLI = 0.94, RMSEA = 0.034), confirming the validity of the chosen model. To further validate and assess the reliability, the obtained findings were compared with the prerequisites outlined in Table 2. Every standardised factor loading was statistically significant and substantially exceeded [72] threshold of 0.50. Cronbach's alphas for all structures ranged from 0.79 to 0.85, demonstrating excellent internal consistency. Additionally, the composite reliabilities of the constructs varied from 0.86 to 0.87, surpassing the recommended threshold of 0.70 [72]. Finally, all of the squared correlation coefficients were less than the average variance extracted (AVE) values. This proved that the results met [72] criteria for discriminant validity. These comprehensive assessments collectively affirm the robustness, reliability, and validity of this study's measures and model.

**Table 3.** Discriminant validity of variables.

Variables	GBI	GPV	GK	GBL
Green Brand Innovativeness	0.82			
Green Perceived Value	0.49 **	0.79		
Green Knowledge	0.58 **	0.48 **	0.77	
Green Brand Loyalty	0.50 **	0.46 **	0.64 **	0.81

Note that the diagonals show the square root of the average variance extracted, while the other entries show the squared correlation and all correlations are significant at the 0.01 level \*\* (2-tailed).

#### 4.3. Findings of the Structural Model

This study employed a structural equation model (SEM) to thoroughly assess the theoretical framework and hypotheses depicted in Figure 1. In order to investigate the moderation role of green knowledge, we used path analysis following the methods outlined by [36]. The process of combining the elements for each construct into a single indicator was achieved by [70], wherein the interaction term was calculated as the sum of the variables for both green brand innovation and green knowledge, after being centred around their respective means. Afterwards, the measurement error for each construct was improved by making adjustments to the loadings and error variances obtained from the measurement model. The results of the path analysis are summarised in Table 4. The findings strongly supported hypotheses H1 and H2, demonstrating that the introduction of green brand innovation had a positive and statistically significant effect on green brand loyalty ( $\beta = 0.37$ ,  $p < 0.01$ ), and that green brand innovation had a positive and statistically significant effect on green perceived value ( $\beta = 0.58$ ,  $p < 0.01$ ).

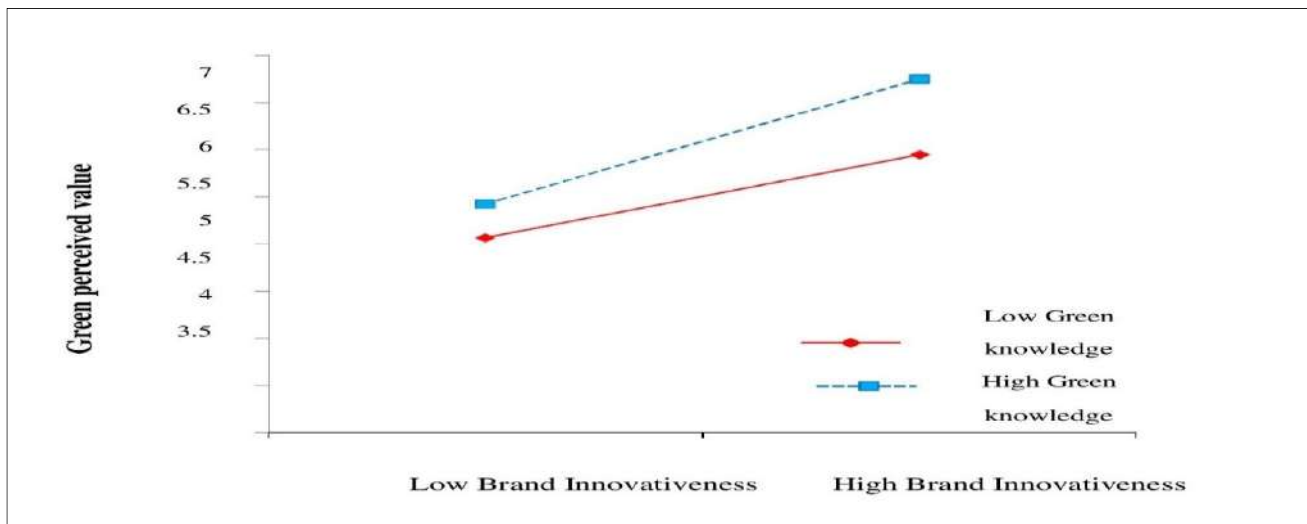
**Table 4.** Structural model results.

Hypothesis	Paths	Beta Value	Results
Hypothesis 1	Green brand innovation → Green brand loyalty	0.37 **	Supported
Hypothesis 2	Green brand innovation → Green perceived value	0.58 **	Supported
Hypothesis 3	Green perceived value → Green brand loyalty	0.61 **	Supported
Hypothesis 4	Green brand innovation >> Green perceived value >> Green brand loyalty	0.356 **	Supported (partial mediation)
Hypothesis 5	Green brand innovativeness × Green knowledge → Green perceived value	0.16 **	Supported

Notes:  $t > 1.96$ ,  $p < 0.05$ . All correlations are significant at the 0.01 level \*\* (2-tailed).

Furthermore, it was noted that green perceived value had a significant and noteworthy effect on green brand loyalty ( $\beta = 0.61$ ,  $p < 0.01$ ). Significantly, green perceived value played a vital role in partially mediating the relationship between green brand innovation and green brand loyalty towards environmentally friendly brands ( $\beta = 0.356$ ,  $p < 0.01$ ).

Moreover, this study found that green knowledge significantly moderated the relationship between green perceived value and green brand innovation ( $\beta = 0.16, p < 0.01$ ), providing evidence in favour of hypothesis H5. Figure 2 provides a visual depiction of these important results. Notably, the analysis showed that the effect of green brand innovation on the perception of value related to environmental sustainability differs depending on the importance of the interaction aspects among customers with different levels of awareness about environmental issues. This detailed analysis improves our comprehension of the complex interactions within the domain of environmentally conscious marketing and customer actions.



**Figure 2.** Impact of green brand innovation on green perceived value at varying levels of consumer green knowledge.

#### 4.4. Discussion

The aim of this study was to investigate the impact of brand innovation on green brand loyalty within the context of green branding. To achieve this objective, this study introduces a novel construct termed “green brand innovation” and explores its influence on green brand loyalty. Additionally, this study examines the effects of two variables, namely, a mediating variable (green perceived value) and a moderating variable (consumer green knowledge), on the developmental process of green brand loyalty.

The empirical findings of this study reveal that green brand innovation has a direct effect on green brand loyalty and an indirect impact through green perceived value. In essence, both green brand innovation and green perceived value emerge as crucial determinants that contribute to the enhancement of green brand loyalty. The results also underscore the significant mediating role of green perceived value in the relationship between green brand innovation and green brand loyalty. Notably, green perceived value exhibits a robust predictive capability concerning brand loyalty. As a result, this study suggests that mere innovation is insufficient to increase consumer brand loyalty; green brand innovation must successfully create value in the eyes of consumers to ensure brand loyalty. Furthermore, this study identifies the moderating effect of consumer green knowledge on the relationship between green brand innovation and green perceived value. Consumer green knowledge is recognised as an effective factor that facilitates the developmental process of green brand loyalty by strengthening the relationship between brand innovation and green perceived value.

More importantly, this study stands out as the first exploration of the concept of green brand innovation from the consumers’ perspective. In contrast to the majority of prior studies that have heavily relied on the perceptions of managers or experts regarding green innovation, our research breaks new ground by delving into the consumer’s perspective

and uncovering the consequences of innovation at this level [15]. This approach adds depth to the existing green innovation literature, moving beyond managerial or expert viewpoints and offering insights into how consumers perceive and respond to green innovations. Additionally, our findings offer insightful information that addresses concerns about the effectiveness of significant investments in green brand innovation in ensuring the market success of green products. By focusing on consumer perspectives, our study provides a more comprehensive understanding of the dynamics that influence the market reception and success of green products, thereby contributing to a more nuanced perspective of the relationship between green product innovation and market outcomes. In addition, our study makes a noteworthy theoretical contribution by applying the 'innovation–loyalty' model within the specific context of green branding. This extension enriches the body of knowledge on green innovation and green branding, shedding light on the intricate dynamics that govern the relationship between innovation and loyalty in the green brand context.

Although the existing literature explores various green brand-related factors like green satisfaction, trust, brand image, loyalty, and brand equity, there has been limited attention given to green brand innovation. This study fills this gap by confirming the applicability of the innovation–loyalty model in the context of green brands. The research establishes that enhancing consumer-perceived green brand innovation can strengthen green brand equity by increasing green brand loyalty. Additionally, this study introduces green perceived value (GPV) as a mediator in the innovation–loyalty model, following the signalling theory. The results show that green perceived value partially mediates the relationship between brand innovation and brand loyalty, contrasting with previous findings on perceived value as a full mediator [75]. This study suggests that, in the context of green brands, providing innovative solutions to meet green needs enhances satisfaction, trust, and loyalty. It emphasises the importance of considering criteria like perceived green benefits and transparency alongside perceived value, highlighting the mediating role of green perceived value in the green brand innovation–loyalty model [76].

Finally, this research reveals that green knowledge positively moderates the relationship between green brand innovation and green perceived value (GPV). According to the signalling theory, a brand signals its green innovation by addressing consumers' green needs, thereby enhancing perceived green value [77]. This signalling process is particularly effective for consumers who possess higher levels of green knowledge. Increased green knowledge boosts consumer confidence in selecting green products and fosters trust in the chosen green brands [23]. This study underscores the crucial, yet overlooked, role of consumer green brand knowledge as a moderator. In essence, our findings enhance our understanding of the origins and development process of green brand loyalty.

#### *4.5. Implications*

The empirical results of this study yield several managerial implications. Firstly, it confirms that boosting green brand innovation has a positive impact on green brand loyalty. Therefore, for organisations seeking to bolster green brand loyalty, the emphasis should be on strengthening consumers' perceptions of the innovation of a green brand rather than solely concentrating on green innovation from a managerial perspective. To achieve this, companies should allocate more resources to research and development, focusing on designing and developing green products and services that address both current and latent green consumer needs. Additionally, organisations can effectively communicate green brand innovation through online communities. Using these communities as a communication tool facilitates the exchange of information and feedback, allowing consumers to actively participate in the co-innovation process [23,24]. As a result, these strategic green promotions can contribute to the enhancement of consumer-based brand equity, ultimately narrowing the gap between green consumers' environmental beliefs and their actual purchasing behaviour.

Secondly, the research findings indicate that green perceived value (GPV) serves as a robust mediator in the relationship between green brand innovation and green brand

loyalty. This study suggests that unless consumers perceive value in the green brand's innovation, the likelihood of strengthening brand loyalty is diminished. Additionally, our research underscores the substantial influence of green perceived value on green brand loyalty, underscoring the importance of organisations employing effective communication strategies to fortify the associations between 'green innovation' and green perceived value. While [78] posit that green benefits and transparency drive green perceived value, our findings propose an alternative effective approach: increasing consumers' perception of the green innovation of the brand. In light of this, organisations are encouraged to utilise communication strategies that enhance this 'green innovation-green perceived value relationship.

Finally, the results suggest that consumer green knowledge positively moderates the relationship between 'green brand innovation' and green perceived value. Consequently, organisations should prioritise consumer education to enhance green knowledge through impactful communication campaigns. For example, organising and participating in environmentally related activities and presenting third-party green certifications and eco-labelling can significantly influence consumers' environmental awareness.

## 5. Limitations and Future Research Directions

There are a few limitations to consider, even if the current study makes some important theoretical advances and has some important management implications. To begin, cross-sectional data are used to assess the study's hypotheses. Therefore, to better understand these dynamic relationships, longitudinal data collection is helpful. Second, the study's findings can only be broadly extended because the model was only tested with data from Ethiopia. Future research can benefit from an examination of the effects of cultural variations on customers' perceptions of green value, innovativeness towards green brands, and brand loyalty. Lastly, if we had examined how the models for brands of tangible goods and services varied or were equivalent, this study might not have been as successful. Therefore, in future research, the suggested relationships could be examined in the context of other brand kinds.

**Author Contributions:** Conceptualization, G.J. (Gebeyehu Jalu), G.J. (Gurudutta Japee), A.T. and A.B.; Methodology, G.J. (Gebeyehu Jalu) and G.D.; Software, G.J. (Gebeyehu Jalu) and G.D.; Formal analysis, G.J. (Gebeyehu Jalu); Investigation, G.J. (Gurudutta Japee); Resources, G.D., A.T. and A.B.; Data curation, A.B. and G.D.; Writing—original draft, G.J. (Gebeyehu Jalu); Supervision, G.J. (Gurudutta Japee); Project administration, G.J. (Gurudutta Japee), A.T. and A.B.; Funding acquisition, A.T. and A.B. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Data can be available based on request at: jalugebeyehu13@gmail.com.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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