The Empirical Analysis of Green Innovation for Fashion Brands, Perceived Value and Green Purchase Intention—Mediating and Moderating Effects

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Abstract: Aiming at the problems of pollution and waste in the clothing industry, the concept of the green innovation of clothing brands is put forward here and analyzed in terms of five dimensions: green product innovation, green technology innovation, green image innovation, green service innovation, and marketing green innovation. Based on the theory of perceived value, in this study we analyzed the mechanism of clothing brand green innovation with regard to consumers' purchase intention and, on this basis, investigated the mediating role of perceived value and the moderating role of consumer innovation. Simultaneously, we designed a measurement scale for clothing brand green innovation and used the structural equation model to test the research hypothesis. The results showed that clothing brand green innovation can effectively promote green purchase intention and behavior, that consumers produce purchase intention and behavior through the perception of novelty, usefulness, and greenness, and that highly innovative consumers are more likely to perceive novelty and are more willing to buy. This study provides new ideas and references for clothing brand green innovation.

Keywords: clothing brand; green innovation; green purchase intention; perceived value; intermediary role; regulatory role

1. Introduction

Innovation can add new vitality to enterprises and is the main driving force of economic growth worldwide. Due to universal technological innovation, the economy has developed rapidly; however, the ecological environment has suffered severe damage. With the increasing development of the world economy, more and more people are conscious of the environmental problems of economic prosperity. While innovation is enabling economic development and social progress, the green effect of innovation has also aroused many industries' attention. Hence, in environmental management research, increasing numbers of scholars attach importance to the study of environmental issues at the strategic level [1].

Due to the short fashion cycle's characteristics and fast-changing consumer demand in the textile and garment industry, the importance of innovation for clothing brands is self-evident [2]. However, with the continuous rise of the textile and clothing industry, pollution problems also follow—such as excessive production emissions of clothing enterprises, clothing hoarding and waste caused by fast fashion, landfills or burning of off-season clothing, and so on—which force clothing brands to find green innovation methods as soon as possible to deal with the increasingly severe environmental problems [3,4]. With the

development of the fast fashion industry, China produces about 26 million tons of used clothing garbage every year, which is expected to be raised to 50 million tons after 2030, of which more than 85% of the discarded clothing will go to landfill and need more than 200 years to decompose slowly. In addition, those abandoned clothing productions will use amounts of electricity and fuel and emit amounts of greenhouse gases and wastewater [5]. Green innovation is an effective method to relieve clothing pollution. However, fashion companies do not know how to recognize and achieve green innovation for fashion brands.

In academia, green innovation has become one topic that scholars pay more attention to in recent years. Academic research mainly focuses on two aspects: one is the method and mechanism of green innovation, including green product innovation, green technology innovation, green innovation systems, and green innovation paths [6]. As the clothing brand comprises product, technology, image, service, marketing, and other elements, clothing brand green innovation must be carried out from many angles. Researchers in universities have been paying more attention to green technology innovation while ignoring the green innovation of other elements. The second aspect is the performance and evaluation of green innovation, including green innovation's efficiency and ability [7]. Due to the close relationship between clothing brands and consumers, clothing enterprises' green innovation activities can be directly perceived by consumers. However, the current research on green innovation performance is rarely measured by consumers' perceptions and behavior. This may be because the current research on green innovation mainly focuses on high-tech industries and manufacturing, while few scholars pay attention to fashion industries such as textile and clothing. To fill this research gap, in this study we explored how green innovation for fashion brands is perceived by consumers and further influences their purchase intention. The following research questions were intended to be analyzed in this study.

1. What is the impact of clothing brand green innovation on green purchase intention, perceived novelty, perceived usefulness, and perceived greenness?
2. What is the impact of perceived novelty and perceived usefulness on green purchase intention?
3. What is the relationship between clothing brand green innovation and green purchase intention, on the one hand, and perceived novelty, perceived usefulness, and perceived greenness, on the other?
4. What is the role and relationship of consumer innovation with regard to clothing brand green innovation, perceived novelty, and green purchase intention?

Taking consumer perceived value as an intermediary variable, a theoretical model of "behavior perception purchase" was constructed, and the motivation of consumers' green purchase intentions in the face of clothing brand green innovation was deeply analyzed to provide a reference and a theoretical basis for clothing enterprises to carry out green innovation activities in the future.

2. Literature Review

2.1. Green Innovation of Clothing Brand

After Schumpeter put forward the concept of "innovation" for the first time through economic development theory, various disciplines introduced innovation and formed the innovation theory applicable to different fields and industries. The concepts of green innovation and brand innovation came into being. Green innovation belongs to a research category of sustainable theory, mainly expounded with regard to on the environmental performance of innovation [8] and green characteristics [9]. According to the object of innovation, green innovation can be divided into "hardware" and "software" [10]. The green innovation of enterprises in "hardware" is mainly realized by adopting environmental protection materials, developing energy-saving technology, and reducing process pollution; the green innovation in "software" is mainly realized by providing green services, implementing green management, and carrying out green marketing. Brand innovation mainly studies the innovation behavior of a specific type of brand from the perspective of

innovation's main body. Eisingerich defined brand innovation as a brand that can provide novel and valuable solutions to meet consumers' needs [11]. As brand innovation's original intention is to meet consumers' diversified needs [12], brands can innovate in combination with consumers' characteristics and preferences [13].

In general, when enterprises carry out green innovation, they should pay attention to the combination with brand benefits and give full play to the maximum value of brand green innovation [14]. The same is true for garment enterprises. Enterprises need to integrate the concept of green health into the essential elements of the brand according to consumers' green needs to carry out innovative and valuable creative activities. In this study, the essential elements of clothing brand green innovation include green innovation, green technology innovation, green image innovation, green service innovation, and marketing green innovation.

2.2. Perceived Value

Perceived value belongs to the research category of consumer behavior, which refers to a subjective judgment or overall evaluation obtained by consumers by perceiving the value of the product or service they purchase and balancing the "profit and loss" [15]. Perceived value further affects consumers' brand cognition and purchase decision [16]. The key to clothing brand green innovation lies in whether the innovation activity is original. Does it meet the needs of green environmental protection? Therefore, consumers mainly perceive the value of a clothing brand green innovation from two aspects: perceived innovation and perceived greenness.

2.2.1. Perceived Innovation

Perceived innovation mainly refers to consumers' subjective perception and judgment of product innovation, service innovation, enterprise innovation, and other innovation forms [17]. Perceived innovation mainly includes two dimensions: perceived novelty and perceived usefulness. Perceived novelty refers to the degree of novelty of the product, perceived by consumers in terms of features, functions, and advantages by comparing them with existing ones [18]. Nevertheless, for most consumers, the practical value is generally more significant than the simple novelty. One of the main characteristics of innovation is that the product is superior to other products in the market in terms of quality, efficiency, and function, rather than merely unique and novel. Therefore, the concept of perceived usefulness has been put forward in the academic circle. Perceived usefulness refers to innovative products, services, or ideas being helpful, applicable, and valuable to consumers [19], also known as "perceived practicability" or "perceived innovation significance". Perceived innovation is consumers' subjective perception and association of new products or services provided by enterprises, explaining the relationship between enterprise innovation behavior and consumers' perception, and further explaining consumers' acceptance and satisfaction of enterprise innovation. Therefore, based on perceived innovation theory, this study takes perceived novelty and perceived usefulness as mediating variables to explain the relationship between clothing brand green innovation and green purchase intention.

2.2.2. Green Perception

Hipp first proposed perceived greenness. In his research, perceived greenness refers to students' perceptions of green space and landscape on campus [20]. After that, Raja proposed perceived brand greenness, which is used to measure customers' perception of brand greenness [21]. In the research on the relationship between consumers and green brands, green perceived value is the key to consumers' perceived brand value [22]. Davari believes that green products, technology, price, and marketing make consumers associate with green brands and perceive their brands' greenness [23]. In this study we defined greenness as consumers' perception of green value in clothing brand innovation activities and took it as an intermediary variable.

3. Hypothesis and Model Establishment

3.1. Clothing Brand Green Innovation and Green Purchase Intention

Green purchase intention refers to the degree that consumers are willing to pay for green products or services [24]. The green innovation behaviors of enterprises such as brand green product innovation and green marketing activities often affect consumers' green purchase intention [25]. Ellen et al. pointed out that environmental innovation of products can promote green purchasing intention [26]. Liang pointed out that innovation in environmental protection brands' marketing is conducive to enhancing consumers' green purchase intention [27]. Through green innovation, the brand can make consumers be willing to pay a higher environmental protection premium for the brand, increasing consumers' green purchase intention. Therefore, in this study we proposed hypothesis H1.

Hypothesis 1. *Clothing brand green innovation has a positive impact on green purchase intention.*

3.2. The Mediating Role of Perceived Novelty

The diversification of consumer demand forces a brand to continually update itself to ensure that consumers can continuously perceive its innovation ability and novelty. Therefore, when a brand carries out green innovation, consumers' perception of brand novelty should also be considered [28]. Jung believes that consumers can recognize a brand's innovation ability through their perception of innovative products and then perceive its novelty [29]. Wang believes that consumers can perceive the uniqueness, diversity, and novelty of brands through innovative products or services [30]. Hubert believes that a brand focusing on its innovative products can improve consumers' perception of brand novelty and promote consumers' willingness to buy and pay for the brand [31].

Similarly, clothing brand green innovation also belongs to enterprise innovation behavior, and consumers can also perceive its novelty. Novel products are more attractive to consumers, promoting consumers' purchase intention. That is to say, and the more consumers feel the product is new, the more they are willing to buy the brand. Zhang believes that when consumers perceive the brand's novelty, they are willing to pay a higher price [32]. Shams believes that if consumers think a brand is highly innovative, they will be more willing to buy [33]. Therefore, hypotheses H2, H3, and H4 were proposed in this study.

Hypothesis 2. *Clothing brand green innovation has a positive impact on perceived novelty.*

Hypothesis 3. *Perceived novelty has a positive impact on green purchase intention.*

Hypothesis 4. *Perceived novelty plays a mediating role in the relationship between clothing brand green innovation and green purchase intention.*

3.3. Mediating Role of Perceived Usefulness

Hong believes that brand ability is consumers' subjective view that new products can meet their needs; consumers think innovative products are useful [29]. Lee found that, when users use new products, they perceive whether they help meet their needs [34]. Perceived usefulness often positively affects consumers' attitudes towards innovative products and then affects consumers' willingness and behavior [35]. That is to say, the more consumers believe that new products can improve their efficiency, the more likely they are to buy new products [36]. Wu's research found that users' green purchase intention was affected by their perception of the degree of satisfaction of their needs achieved by the new technology of automatic driving and the degree to which it was perceived to improve environmental performance [37]. Lin's research found that consumers purchase decisions were affected by perceptions of brand online advertising [38]. Vahdat found that perceived usefulness positively impacted consumers' attitudes towards using mobile applications and further affected their purchase intention [39]. Clothing brand green innovation is,

from consumers' perspective, an innovation activity to meet their needs, and can also be perceived as helpful. Therefore, hypotheses H5, H6, and H7 were proposed in this study.

Hypothesis 5. *Clothing brand green innovation has a positive impact on perceived usefulness.*

Hypothesis 6. *Perceived usefulness has a positive impact on green purchase intention.*

Hypothesis 7. *Perceived usefulness plays a mediating role in the relationship between clothing brand green innovation and green purchase intention.*

3.4. Mediating Role of Perceived Greenness

Lin believes that green brand innovation is positively related to consumers' perception of a brand's green value [40]. Wang believes that when purchasing green brands, consumers perceive the green quality and green value of their brands, and this affects their green purchase intention [41]. Rajeev believes that consumers' perceived brand greenness positively affects their purchase intention [42]; that is, the higher the green value of the brand is perceived by consumers, the more likely they are to buy the brand, i.e., the green perceived value is positively correlated with the green purchase intention [43]. Clothing brand green innovation is a green innovation activity based on improving environmental performance and reducing pollution. Consumers perceive the green value of brand innovation and this further affect their green purchase intention and behavior. Therefore, hypotheses H8, H9, and H10 were proposed in this study.

Hypothesis 8. *Clothing brand green innovation has a positive impact on the perceived greenness.*

Hypothesis 9. *Perceived greenness has a positive impact on green purchase intention.*

Hypothesis 10. *Perceived greenness plays a mediating role in the relationship between clothing brand green innovation and green purchase intention.*

3.5. The Moderating Effect of Consumer Innovation

Consumer innovation is the prerequisite to change consumers' attitudes towards innovation. This is because consumers with high innovation want to obtain new knowledge and information, which leads to their higher sensitivity to novelty. Therefore, consumer innovation helps in perceiving novelty. With the improvement of consumers' innovation, the impact of product innovation on their perception also increases. Zhang believes that consumers with high innovation pay more attention to new things, so they are more likely to perceive the novelty of new things [32]. Wang believes that consumer innovation moderates the relationship between product innovation and consumer perceived innovation value [30]. As a personal characteristic of consumers, innovation can encourage consumers to seek new things and perceive the changes of new things more quickly [44]. Compared with other consumers, consumers with high innovation pay more attention to brand products' innovation value. Therefore, highly innovative consumers can better evaluate and perceive the novelty of clothing brand green innovation.

As highly innovative consumers pay close attention to and pursue new things, they are more inclined to buy innovative brands, so consumers' innovation also affects their purchase intention [32]. Shams believes that highly innovative consumers have a better experience of and feeling for new products, and their purchase intention is more favorable [33]. Hwang believes that highly innovative consumers are very willing to pay higher prices for new technologies or new products [45]. Once consumers perceive the novelty of clothing brand green innovation, highly innovative consumers are more inclined to buy because they are more willing to experience new products and services. Therefore, in this study we proposed hypotheses H11 and H12.

Hypothesis 11. *Consumer innovation moderates the relationship between clothing brand green innovation and perceived novelty.*

Hypothesis 12. *Consumer innovation moderates the relationship between perceived novelty and green purchase intention.*

Based on the above analysis, this study took perceived novelty, perceived usefulness, and perceived greenness as mediating variables and consumer innovation as moderating variable to build a theoretical model of "behavior perception purchase", as shown in Figure 1.
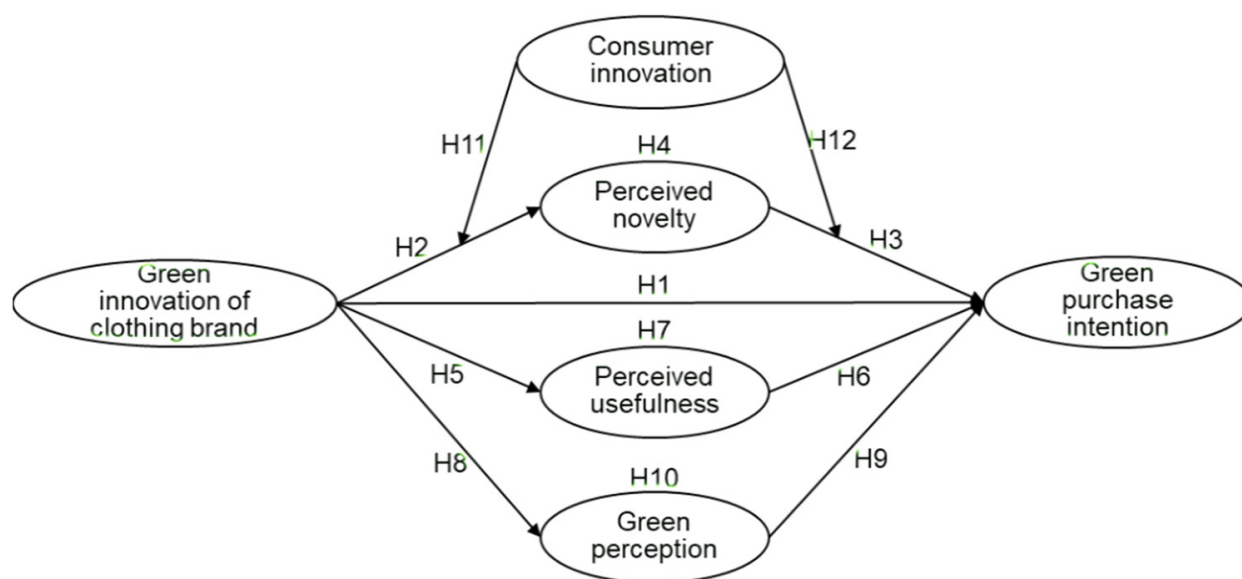
Figure 1. Theoretical model.

4. Results

4.1. Design of Measurement Variables

The measurement variables of this study mainly refer to the previous scale and, on this basis, the scale was modified appropriately. The perceived novelty mainly refers to the scale of Stock [19]. Perceived usefulness refers to the scale of Fu and Michael [46]. The perceived greenness refers to the scales of Chen [43] and Lin [40]. Green purchase intention refers to the scale of Chen [43]. The scale of Tellis et al. [47] was used for innovative consumer reference.

As there is no mature scale for clothing brand green innovation as a reference, in this study we formed an index system of clothing brand green innovation through grounded theory, with a total of 5 dimensions and 32 indicators. The first level includes green product innovation, green technology innovation, green image innovation, green service innovation, and marketing green innovation. According to many references and the previous mature scale, combined with the measurement content, the appropriate modification can be made to form a measurement scale suitable for this study, as shown in Table 1.

Table 1. The scale and origin of green innovation for fashion brands.

Level 1	Level 2	Level 3	Number	Item	Reference
Product green innovation	Green design	Design concept	PGI1	The design style of such brands is green and environmentally friendly	[48–50]
		Clothing style	PGI2	The style of this brand is simple	
		Main tone	PGI3	This kind of brand mainly involves natural color (such as beach color, earth color, forest color, sky color)	
		Minimalist decoration	PGI4	These brands do not have much heavy decoration	
	Green performance	Comfort performance	PGI5	These brands are comfortable to wear	[9,51]
		Easy finishing performance	PGI6	This kind of brand has good finishing (e.g., easy washing, no ironing)	
		Health performance	PGI7	These brands have health properties (such as anti-ultraviolet, anti-radiation)	
		Ecological performance	PGI8	This kind of brand demonstrates ecological performance (such as deodorization, sterilization, anti-itching)	
Green innovation of technology	Green materials	Environmental protection materials	TGI1	These brands use environmentally friendly materials (such as non-polluting, non-toxic, recyclable materials)	[52,53]
	Green packaging	Packing method	TGI2	The packing method used by this kind of brand is simple (such as fewer materials, easy to disassemble)	[54,55]
	Green manufacturing	Green equipment	TGI3	Such brands use low-pollution processing equipment	[29,49,56,57]
		Green technology	TGI4	This kind of brand adopts environmental protection technology (such as natural dyes instead of chemical dyes, intelligent washing to save water resources)	
	Green treatment	Recycling technology	TGI5	This kind of brand carries out environmental protection treatments on the old clothes (such as renovating and reusing, cutting and making rags, burning power generation)	
		Green distribution	TGI6	The whole process of distribution of such brands is environmentally friendly (e.g., using environmentally friendly vehicles to reduce exhaust emissions)	
Image green innovation	Green recognition	Green certification	IGI1	This kind of brand has environmental protection and green certification (if the product has a recyclable mark)	[30,43,56–59]
		Green logo	IGI2	The logo of such brands highlights the concept of green environmental protection	
	Green shop	Simple display	IGI3	The store display of this kind of brand is simple	[23]
		Environmental window	IGI4	This kind of brand shop window takes green environmental protection as the theme	
		Green decoration	IGI5	This kind of brand's shop decoration involves environmental protection (using environmental protection materials, low energy consumption equipment, green plants)	
	Green enterprise	Policy image	IGI6	Such brands support the government's environmental policy	[60–62]
		Public image	IGI7	Such brands cooperate with environmental protection organizations	
		Concept image	IGI8	Such brands encourage green consumption	

Table 1. *Cont.*

Level 1	Level 2	Level 3	Number	Item	Reference
Service green innovation	Sales service	Introduction to greenness	SGI1	Employees of such brands will take the initiative to introduce green products	[6,28]
		Environmental protection products	SGI2	These brands provide environmental protection products (such as environmental protection shopping bags)	
		Maintenance services	SGI3	Such brands provide product maintenance services (such as washing and repairing)	
	Recycling services	Recycling services	SGI4	Such brands provide recycling channels for used clothes	[63–66]
		Circular service	SGI5	This kind of brand provides used clothes recycling services (e.g., encouraging exchanges of old for new or selling second-hand clothes)	
Green innovation in marketing	Green public relations	Environmental protection exhibition	MGI1	This kind of brand holds environmental protection-themed exhibitions (such as an environmental protection clothing conference)	[67,68]
		Green activities	MGI2	This kind of product participates in social, environmental protection, and public welfare activities	
	Green advertising	Advertising theme	MGI3	This kind of brand advertising takes green environmental protection as the theme	[69–74]
		Advertising form	MGI4	This kind of brand advertising adopts the pollution-free form (such as online advertising)	
		Advertising association	MGI5	This kind of brand advertising can make people think of green environmental protection	

4.2. Data Collection

In this study, 564 questionnaires were collected in an online survey, including 514 valid questionnaires, with an effective recovery rate of 91.1%. We conducted a pre-survey among the school's graduate students and modified the scale based on the survey results to ensure the questionnaire's rationality. The basic information of the final collected samples is shown in Table 2.

Table 2. The necessary information of the survey samples.

Statistical Variables		Sample Size	Proportion (%)	Statistical Variables		Sample Size	Proportion (%)
Gender	Male	227	44.2	Income	<2000 yuan	183	35.6
	Female	287	55.8		2000–5000 yuan	174	33.9
Age	<18 years old	3	0.6		RMB 5001–10,000	103	20
	18–25 years old	385	74.9		10,001–15,000 yuan	39	7.6
	26–30 years old	92	17.9		RMB 15,001–20,000	9	1.8
	31–40 years old	17	3.3		>20,000 yuan	6	1.2
	41–50 years old	10	1.9	Education	Junior college or below	44	8.6
	>50 years old	7	1.4		Undergraduate	283	55.1
Occupation	School students	338	65.8		Master's degree or above	187	36.4
	Teachers	17	3.3	Residence	First-tier cities	227	44.2
	Enterprise employees	123	23.9		Second-tier cities	180	35
	Other	36	7		Other cities	107	20.9

4.3. Test of The Scale

The clothing brand green innovation scale data test included a reliability test, validity test, factor test, and goodness-of-fit test. In the exploratory factor analysis, the cumulative variance contribution rate of the scale was 71.037%. It can be considered that the scale contained the basic factors that could explain the variable. Moreover, each item's load for its attribution factor was more significant than 0.7, while the load for other attribution factors was relatively low. In the goodness-of-fit test, all the indicators met the acceptance

criteria. It can be considered that the scale had good reliability, validity, and goodness of fit, as shown in Table 3.

Table 3. The test of the scale.

Dimension	Number	FEA	CR	AVE	Cronbach's α	KMO	Test Validity	
Product green innovation	PGI1	0.764	0.913	0.566	0.913	0.917 ***	X2	836.76 ***
	PGI2	0.739					X2/DF	1.843
	PGI3	0.722					RMSEA	0.041
	PGI4	0.732					NFI	0.937
	PGI5	0.764					CFI	0.97
	PGI6	0.752					TLI	0.967
	PGI7	0.771					GFI	0.906
	PGI8	0.775					AGFI	0.891
Green innovation of technology	TGI1	0.793	0.93	0.69	0.93	0.911 ***	IFI	0.97
	TGI2	0.861						
	TGI3	0.859						
	TGI4	0.873						
	TGI5	0.773						
	TGI6	0.82						
Image green innovation	IGI1	0.804	0.931	0.628	0.931	0.941 ***		
	IGI2	0.799						
	IGI3	0.769						
	IGI4	0.783						
	IGI5	0.76						
	IGI6	0.8						
	IGI7	0.822						
	IGI8	0.8						
Service green innovation	SGI1	0.822	0.92	0.697	0.92	0.889 ***		
	SGI2	0.829						
	SGI3	0.814						
	SGI4	0.849						
	SGI5	0.858						
Green innovation in marketing	MGI1	0.872	0.939	0.754	0.939	0.906 ***		
	MGI2	0.861						
	MGI3	0.874						
	MGI4	0.865						
	MGI5	0.87						
Total	-	-	-	-	0.966	0.968 ***		

Note: ***—means significant at the 0.05 level.

4.4. Reliability and Validity Test and Factor Analysis

In this study, spss25.0 was used for reliability and validity tests and confirmatory factor analysis. The Cronbach's α coefficient and KMO value of each measurement variable were greater than 0.8, and the Cronbach's α coefficient and KMO value of the overall model were greater than 0.9. It can be considered that the reliability and validity of the model were good. The results of the confirmatory factor analysis were good, as shown in Table 4.

4.5. Goodness-of-Fit Test

In this study, amos24.0 was used to test the goodness of fit of the model. It was generally considered that the model with root mean square error of approximation (RMSEA) less than 0.08 and goodness-of-fit index (GFI), normed fit index (NFI), and comparative fit index (CFI) greater than 0.9 had the better goodness of fit. All the measured variables met the requirements, and the ratio of the chi square and degree of freedom of the total model was between 1 and 3, so the model fitting was ideal, as shown in Table 5.

Table 4. The test of model reliability and validity and the confirmatory factor analysis.

Dimension	Item	CITC	After Deleting α	α	KMO	Bartlett Spherical Test			EFA	CR	AVE
						Approximate Chi Square	Freedom	Significance			
Clothing brand green innovation	PGI	0.69	0.869	0.886	0.872	1325.963	10	0	0.74	0.891	0.621
	TGI	0.751	0.855						0.809		
	IGI	0.732	0.859						0.81		
	SGI	0.676	0.872						0.739		
	MGI	0.771	0.85						0.837		
Perceived novelty	PN1	0.781	0.84	0.885	0.833	1118.53	6	0	0.856	0.832	0.558
	PN2	0.778	0.84						0.855		
	PN3	0.73	0.86						0.78		
	PN4	0.708	0.867						0.755		
Perceived usefulness	PU1	0.762	0.843	0.883	0.834	1083.913	6	0	0.831	0.883	0.654
	PU2	0.754	0.847						0.822		
	PU3	0.738	0.853						0.796		
	PU4	0.729	0.856						0.786		
Green perception	PG1	0.678	0.818	0.852	0.813	886.161	6	0	0.74	0.855	0.597
	PG2	0.649	0.832						0.702		
	PG3	0.753	0.787						0.854		
	PG4	0.697	0.809						0.785		
Green purchase intention	GPI1	0.889	0.939	0.954	0.874	2150.663	6	0	0.918	0.954	0.938
	GPI2	0.884	0.94						0.911		
	GPI3	0.886	0.94						0.914		
	GPI4	0.889	0.939						0.918		
Consumer innovation	CI1	0.707	0.91	0.908	0.844	1394.88	6	0	0.742	0.91	0.717
	CI2	0.832	0.867						0.883		
	CI3	0.813	0.874						0.867		
	CI4	0.826	0.87						0.886		
General model	-	-	-	0.945	0.938	12,624.239	528	0	-	-	-

Table 5. The test of the model goodness-of-fit index.

Index		Green Innovation of Clothing Brand	Perceived Novelty	Perceived Usefulness	Green Perception	Green Purchase Intention	Consumer Innovation	General Model
Chi-square test	CMIN	18.671	5.561	7.932	6.425	4.476	5.619	464.612
	X2/DF	3.734	2.781	3.966	3.212	2.238	2.809	1.74
RMR		0.011	0.01	0.012	0.015	0.004	0.01	0.055
RMSEA		0.073	0.059	0.076	0.066	0.049	0.059	0.038
GFI		0.985	0.995	0.992	0.994	0.996	0.995	0.933
AGFI		0.956	0.974	0.96	0.968	0.979	0.973	0.918
NFI		0.914	0.995	0.993	0.993	0.998	0.995	0.951
IFI		0.935	0.997	0.995	0.995	0.994	0.997	0.978
CFI		0.934	0.997	0.995	0.995	0.999	0.997	0.978

4.6. Hypothesis Testing

In this study, we first tested the direct effect hypothesis, and the *p*-value of all hypotheses was less than 0.05, so all the hypotheses of direct effect were valid. However, the path coefficient of H4 was assumed to be very low (less than 0.2), and those of H1 and H7 were also assumed to be low (less than 0.3), as shown in Table 6.

4.7. Mediating Effect Test

Using model 4 from spss25.0 macro, we tested the three mediating effects of perceived novelty, perceived usefulness, and perceived greenness controlling for gender, education background, occupation, age, income, and residence. The effect of clothing brand green innovation on green purchase intention was significant (model 2) and, after adding the three mediating variables, clothing brand green innovation had a significant effect on green purchase intention. The effect of innovation on green purchase intention was more significant (model 3). The positive predictive effect of clothing brand green innovation on

the three mediating variables was significant (model 1), and the positive predictive effect of the three mediating variables on green purchase intention was also significant (model 3), as shown in Table 7. Furthermore, the bootstrap 95% confidence intervals of the direct effect of clothing brand green innovation on green purchase intention and the mediating effect of three mediating variables on green purchase intention did not contain 0, as shown in Table 8. The results show that clothing brand green innovation can not only directly affect green purchase intention but also affect green purchase intention through perceived novelty, perceived usefulness, and perceived greenness. Three mediating variables played an indirect mediating role in the relationship between clothing brand green innovation and green purchase intention. In terms of the proportion of the mediating effects, that of perceived greenness was greater than that of perceived usefulness, which was greater than perceived novelty.

Table 6. The results of a hypothesis test.

	Hypothesis	Path Coefficient	S.E.	T Value	*p* Value	Conclusion
H1	Clothing brand green innovation has a positive impact on green purchase intention	0.291	0.081	3.59	***	Support
H2	Green innovation of a clothing brand has a positive impact on perceived novelty	0.758	0.057	13.352	***	Support
H3	Perceived novelty has a positive impact on green purchase intention	0.199	0.054	3.707	***	Support
H5	Clothing brand green innovation has a positive impact on perceived usefulness	0.553	0.057	9.641	***	Support
H6	Perceived usefulness has a positive impact on green purchase intention	0.259	0.049	5.309	***	Support
H8	Clothing brand green innovation has a positive impact on perceived greenness	0.655	0.061	10.65	***	Support
H9	Perceived greenness has a positive impact on green purchase intention	0.345	0.05	6.878	***	Support

Note: *** means significant at the 0.05 level.

Table 7. The test of the mediating effect.

Variable		Model 1			Model 2	Model 3
		Perceived Novelty	Perceived Usefulness	Green Perception	Green Purchase Intention	Green Purchase Intention
Gender		−0.583	0.585	−0.259	10.117 ***	0.085
Education		0.74	0.733	2.968 **	0.081	5.115 ***
Occupation		−1.831	−0.466	−0.477	5.680 ***	0.82
Age		0.776	1.976 *	1.627	0.279	2.999 **
Income		1.217	−0.133	1.502	3.70 ***	−0.424
Residence		0.646	−1.261	1.071	0.177	−5.086 ***
Green innovation of clothing brand		12.122 ***	7.895 ***	9.319 ***	2.923 **	3.981 ***
Perceived novelty		-	-	-	-	2.449 **
Perceived usefulness		-	-	-	-	5.757 ***
Green perception		-	-	-	-	7.346 ***
Fitting index	R	0.517	0.401	0.473	0.623	0.731
	R2	0.267	0.161	0.224	0.389	0.534
	F value	26.345	13.85	20.864	45.937	57.718

Note: *** means significant at the 0.005 level, ** means significant at the 0.01 level, * means significant at the 0.05 level.

Table 8. Analysis of the test of the mediating effect.

Route	Effect Value	Boot Standard Error	Boot Confidence Interval (CI) Lower Limit	Upper Bound of Boot Confidence Interval (CI)	Effect Proportion
Mediating effect of perceived novelty	0.067	0.0292	0.0089	0.1237	11.86%
Mediating effect of perceived usefulness	0.107	0.0259	0.0617	0.1642	18.94%
Perceived greenness mediating effect	0.16	0.0333	0.1027	0.2337	28.32%
Direct effect	0.231	0.058	0.117	0.3449	40.88%
Total effect	0.565	0.0558	0.4551	0.6745	-

4.8. Moderating Effect Test

Using model 58 in SPSS25.0 macro, we tested the moderating effect of consumer innovation controlling for gender, education background, occupation, age, income, and residence. After putting consumer innovation into the model, the product term of clothing brand green innovation and consumer innovation had a significant predictive effect on perceived novelty. The product term of perceived novelty and consumer innovation also had a significant predictive effect on green purchase intention, as shown in Table 9, which shows that consumer innovation was not only in clothing brand innovation but also in perceived novelty. It also played a moderating role in the effect of perceived novelty on green purchase intention.

Table 9. The test of the moderating effect.

Variable		Perceived Novelty		Green Purchase Intention	
		Standardization Coefficient	T Value	Standardization Coefficient	T Value
Gender		−0.036	−0.611	0.016	0.283
Education		−0.034	−0.61	0.228	4.253 **
Occupation		−0.091	−2.019 *	0.023	0.524
Age		0.036	0.815	0.15	3.491 **
Income		0.03	0.694	−0.015	−0.348
Residence		0.025	0.657	−0.17	−4.651 **
Green innovation of clothing brand		0.6	9.889 **	0.351	19.149 **
Perceived novelty		-	-	0.151	5.647 **
Consumer innovation		0.189	5.237 **	0.175	3.547 **
Clothing brand green innovation x consumer innovation		0.155	2.758 **	-	-
Perceived novelty x consumer innovation		-	-	0.091	4.942 **
Fitting index	R	0.566		0.671	
	R2	0.32		0.45	
	F value	26.361 **		41.188 **	

Note: ** means significant at the 0.01 level, * means significant at the 0.05 level.

5. Discussion

The results suggest that clothing brand green innovations can influence consumers' buying intentions, whilst consumers' perceptions of novelty, usefulness, and greenness can promote their purchasing intentions, and innovative consumers are more apt to perceive a clothing brand's novelty green innovation, and more inclined to purchase. The results reveal the "black box" for green innovation and consumer purchasing intentions.

Hypotheses H1 and H2 were established and show that clothing brand green innovation positively affects consumers' green purchase intentions and behavior. By carrying out green innovation activities for products, technologies, images, services, and marketing,

clothing brands can make more consumers purchase ideas, implement purchase behavior, effectively achieve brand realization, and enhance brand competitiveness and market share.

Hypotheses H3, H4, and H5 were established and show that consumers purchase a brand's green innovative products due to perceived novelty. Consumers' perception of novelty can be very high, but it may not necessarily lead to solid purchase intention, which indicates that a brand merely relying on uniqueness to attract consumers is not enough to make consumers have a strong purchase desire. This further shows that if a brand blindly pursues advanced novelty and uniqueness without considering consumers' characteristics and acceptance, it cannot promote brand innovation and the shaping of a green image.

Hypotheses H6, H7, and H8 show that consumers produce green purchase intention and behavior through perceived usefulness. As the product of clothing brand green innovation is intended to establish direct contact with consumers, if green innovation can help consumers solve problems in the market pain point, then the innovation activity can promote purchase by being perceived as helpful.

The hypotheses H9, H10, and H11 hold and indicate that their perception of greenness generates consumers' green purchase intention and behavior. Consumers' purchase intention was relatively high through the perception of greenness, which indicates that clothing brand green innovation can effectively improve environmental performance. Moreover, it contributes to solving the environmental protection problems and shapes the green image so that the brand's green environmental protection nature and the brand image of having the courage to take social responsibility can be perceived and thus produce a strong resonance and trigger the purchase.

The hypotheses H11 and H12 show that highly innovative consumers can better perceive the brand's innovation and decide to buy innovative green products. As highly innovative consumers have the characteristics of daring to try and pursuing innovation, it is easy for them to perceive the novelty of green innovation and purchase the product to satisfy their curiosity about innovation.

6. Conclusions and Suggestions

This research defines the concept of clothing brand green innovation and its different dimensions in comparison with the previous research. It reveals the influence relations between clothing brand green innovation and green purchasing intentions, which is beneficial for improving green innovation and solving clothing industry pollution. The answers to four questions raised in the introduction section are summarized as follows:

1.　Fashion brand green innovation positively affects perceived novelty, perceived greenness, perceived usefulness, and green purchasing intention in turn.
2.　Perceived novelty and perceived usefulness promote green purchasing intention. However, the effect of perceived novelty is weaker than perceived usefulness, which means that consumers' perceived novelty may not always cause strong buying. In other words, fashion brand green innovation cannot always pursue novelty ahead of the current market.
3.　Fashion brand green innovation positively affects green purchasing intention. It can enhance purchasing intention if consumers perceive the novelty, usefulness, and greenness of fashion brand green innovation.
4.　Consumer innovation's moderating roles are significant positive between fashion brand green innovation and perceived novelty, as well as between perceived novelty and green purchasing intention.

The results indicate that consumers have high green awareness of clothing brand green innovation and show high purchase intention and behavior, so clothing brands should fully highlight the characteristics of green environmental protection in the process of green innovation. In terms of "hardware", we could uphold the design concept related to public welfare and environmental protection, launch high-quality creative and environmental protection products, develop recyclable clothing materials, use low-energy and low-pollution processing equipment, and adopt energy-saving and low-waste production technology to

enhance consumers' perception and recognition of green innovation of clothing brands. In terms of "software", consumers could have a better brand green experience through brands' adopting an internationally recognized green environmental protection certification, creating energy-saving and simple green shops, creating a responsible environmental protection image, providing highly convenient and high-quality green services, and carrying out green marketing with the themes of environmental protection and public welfare to improve recognition of the green nature of the brand and strengthen the green relationship with the brand color in order to resonate with consumers and promote purchases.

In green innovation, clothing brands should pay attention to differentiated innovation and consider innovative products' practical performance. We should pay attention to the fact that green innovation highlights the "new" characteristics and understand the target market's demand trend from consumer demand. If consumers can only perceive the product's novelty, and the product itself does not have practical value, it can only be called "advanced art", rather than "consumer goods" with liquidity. Therefore, green innovation should focus on asking whether the innovation direction aligns with the general trend. Does innovative content meet customer needs? Can consumers accept innovative forms? And so on.

It can be seen from the results that products with high novelty do not necessarily lead to consumer purchase. If brands only focus on novelty and uniqueness, it is counterproductive. Therefore, green innovation can start from many angles and pay attention to analyzing the target population's characteristics. If the target group is highly innovative, the brand can appropriately carry out the innovative design of differentiation and novelty. If the target group is more conservative in accepting new things, then the brand may be more inclined to improve and innovate in usefulness and greenness when carrying out green innovation.

7. Research Limitations

This study aimed to explore the impact of clothing brand green innovation on consumer perception and green purchase intention. There were two limitations to this research. Firstly, the dimensions of green innovation for a fashion brand in this research were defined in terms of product, technology, image, service and marketing, as well as from research samples from clothing brand consumers, which may not be applicable in the analyses of other industries. Secondly, consumer purchasing power and green awareness were not considered in this research. We believe that a detailed study should be carried out to explore these research objectives in the future.

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