

The Impact of Environmentally Friendly Materials in Sustainable Packaging Design on Consumer Purchase Intentions

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Abstract: This study offers a comprehensive exploration of the impact of environmentally friendly materials on consumers' willingness to purchase products in the context of sustainable packaging design. By addressing the research gap regarding how specific environmental materials influence consumer behavior, the study reveals key insights into the relationship between sustainable packaging and purchasing decisions. Through comprehensive analysis, it is revealed that the use of environmental protection materials can enhance consumers' cognitive value of products, enhance brand image and promote purchase decisions, while emphasizing the important impact of consumers' environmental awareness, education level and income level on environmental protection packaging preferences. In addition, consumers' environmental awareness, education level and income level are important factors affecting their preference for environmentally friendly packaging. At the same time, the environmentally friendly materials used in sustainable packaging design also have a positive impact on corporate reputation and brand image, which promotes the development of the whole industry in a more environmentally friendly and sustainable direction. The results are of great significance for enterprises to formulate effective packaging strategies and improve market competitiveness.

Keywords: Sustainable Packaging Design, Willingness to Buy, Environmentally Friendly Materials, Perceived Environmental Value, Brand Image

1. Introduction

With the intensification of global environmental problems, sustainable development has attracted much attention, consumers in the consumer market are paying more and more attention to the environmental impact of products, and the importance of product packaging materials in purchase decisions is becoming more and more prominent [1]. Sustainable packaging design aims to reduce environmental pollution and save resources, which has become the common pursuit of enterprises and consumers. The application of environmental protection materials can not only reduce the burden of production environment, but also convey the concept of environmental protection and social responsibility of enterprises.

This study adopts the theoretical framework of consumer decision-making, which posits that consumer purchasing decisions are multifaceted and involve the recognition, evaluation, and trade-off of various product attributes, including functionality, price, brand image, and environmental

characteristics. Within this context, consumers' willingness to purchase is influenced by numerous factors such as their cognitive appraisal of eco-friendly materials, emotional responses, and their perception of the brand image. Previous research has mostly focused on the performance of environmentally friendly materials, and have not explored the micro psychological and behavioral mechanism of consumers. In the context of current consumption upgrading, consumer purchasing behavior is not only driven by product functions, but also reflects its values. Although environmental protection packaging may become a product differentiation advantage, it is facing problems such as cost, appearance and trust. Especially in terms of the psychological mechanism of environmental protection packaging on consumers' purchase decisions, there are few studies, such as how consumers perceive the value of environmental protection packaging psychologically and how this perception is transformed into purchase intention, which still needs to be discussed in depth. Therefore, this paper will deeply analyze the leverage effect of environmental protection materials on consumer purchase "leverage", fill the research gap by analyzing its application in sustainable packaging design and its impact mechanism on consumer purchase willingness, provide scientific suggestions for enterprises to formulate packaging strategies, and help industrial upgrading.

2. The relationship between environmental protection materials and Consumer purchase intention

2.1. Environmentally friendly materials enhance cognitive value

Consumers form an understanding of a product's environmental attributes by recognizing the specific qualities of eco-friendly materials, such as their biodegradability, renewability, and sustainability [2]. For example, Starbucks coffee has introduced straws made of fully biodegradable materials and "slag pipes" containing extracted coffee powder, which use advanced technology to reuse the extracted coffee powder and are processed with safe and widely commercialized food contact grade polylactic acid (PLA), which can be degraded in a short time. It can make consumers think that these foods have less impact on the environment in the process of production and consumption. This perception further affects consumers' judgment of product value, making them more willing to buy products with environmental attributes.

Value perception formation: Based on environmental characteristics, consumers will form a value perception of product quality, safety and environmental protection contribution [3]. A prime example is Shiseido Baum, which uses recyclable materials in its packaging, incorporating wood waste from furniture to create packaging bottles and caps. In addition, plastic and glass containers are crafted from renewable and recyclable raw materials, supporting the efficient use of forest resources. The design concept takes "tree gift" as the theme, the product packaging has iconic wood components as the brand memory point, and the wood texture packaging design deepens the connection between the brand and trees from inside to outside, conveying the reverence for nature. When consumers use products, the friction between hands and wood rings can form a private customized bottle cap with unique color and color to enhance the emotional interaction between consumers and products. This sense of value is closely related to the willingness to buy, because consumers usually consider the cost-effective and environmentally friendly attributes of products when purchasing products.

2.2. Emotional factors of environmental protection materials

Environmental protection concept recognition: consumers' recognition of environmental protection concept will affect their attitude towards the use of environmentally friendly packaging products [4]. Environmentally minded consumers are more likely to buy products packaged in environmentally friendly materials because they conform to their values. This identification leads to positive emotions, such as satisfaction and pride, which further promotes willingness to buy.

Pride and willingness to buy: Using environmentally friendly packaging not only reflects a consumer's commitment to sustainability but also evokes feelings of pride, as it signifies their contribution to environmental preservation [5]. This pride translates into a willingness to buy, making consumers more willing to buy and use environmentally friendly packaging products. For example, consumers who purchase Shiseido Baum skincare products often feel that they are making a positive environmental impact through their choice of packaging, which in turn enhances their satisfaction and strengthens their intent to continue buying.

Social responsibility transmission: the use of environmentally friendly materials by enterprises can convey a sense of social responsibility to consumers, which will affect consumers' perception of brand image [6]. Consumers believe that enterprises that actively fulfill social responsibility are more credible and reliable, so they are more willing to buy their products. For example, packaging products with eco-friendly materials helps to position a company as environmentally conscious, which in turn strengthens the brand's image and increases consumer willingness to purchase. Brands that convey their commitment to sustainability can build a deeper emotional connection with their customers, further influencing purchasing behavior.

Brand credibility and purchase decisions: the improvement of brand image will enhance consumers' awareness of brand credibility, which will be transformed into actual purchase decisions [7]. Consumers also become more loyal to the brand, preferring to keep buying products from the same brand and recommending them to others. This loyalty and willingness to recommend help enterprises establish competitive advantages in the market. For instance, Apple has successfully reinforced its brand image and conveyed a sense of social responsibility by using recyclable materials in its product packaging. This not only enhances consumer trust but also bolsters their willingness to purchase, driving both loyalty and positive word-of-mouth recommendations. Through these strategies, brands can establish a lasting connection with their consumers, ultimately gaining a competitive advantage in the market.

3. The moderating effect of individual characteristics of consumers

3.1. Regulation of environmental awareness

High environmental awareness consumers: consumers with strong environmental awareness have higher sensitivity and preference for environmentally friendly materials. They believe that protecting the environment is everyone's responsibility and will actively take environmental actions in daily life, such as reducing the use of disposable products and choosing recyclable or biodegradable materials [8]. When purchasing products, high environmental conscious consumers will pay special attention to the environmental attributes of products, such as whether packaging materials can be recycled, whether the production process is energy-saving and emission reduction. They are more willing to buy products packaged with environmentally friendly materials to support corporate environmental behavior.

Additionally, environmentally conscious consumers tend to prioritize products packaged in eco-friendly materials as their purchasing decisions align with their environmental values. This preference translates into a willingness to buy, making environmentally conscious consumers more willing to buy environmentally friendly packaging products. For example, for environmentally conscious consumers, they highly recognize Starbucks's environmental behavior as a reflection of corporate social responsibility. Thus, when they buy Starbucks coffee, they prefer to choose products packaged with environmentally friendly materials to support Starbucks's environmental philosophy.

Low environmental awareness consumers: in contrast, low environmental awareness consumers have different perceptions of environmentally friendly materials [9]. They may not pay much attention to the environmental attributes of products, and have different perceptions of

environmentally friendly materials. They may pay less attention to the environmental attributes of products and pay more attention to factors such as price and performance. However, through the guidance of marketing strategies, such as emphasizing the benefits of environmentally friendly materials and corporate social responsibility, we can improve the acceptance and willingness of low environmental conscious consumers to buy environmentally friendly packaging.

Moreover, enterprises can further enhance their brand image by showcasing the tangible environmental benefits achieved through the use of eco-friendly materials. These specific data and results can intuitively show the advantages of environmentally friendly packaging, thus stimulating the willingness of low environmental conscious consumers to buy. For price sensitive consumers, enterprises can reduce the cost of purchasing environmentally friendly packaging products by providing price concessions and other means. This helps balance their focus on price and environmental attributes and increase their willingness to buy.

3.2. Educational adjustment

High education level consumers: consumers with higher education level have strong ability to understand and obtain information on environmental protection materials. They can better understand the importance and advantages of environmentally friendly materials, so they are more inclined to choose environmentally friendly packaging products in purchase decisions [10]. In addition, highly educated consumers generally pay more attention to environmental protection and social responsibility, so they are more willing to buy products that meet these values. For example, some high-end skin care brands, like Shiseido Baum, use recyclable materials for packaging and emphasize their environmental philosophy. Highly educated consumers are more likely to understand and accept such environmentally friendly packaging, and they may believe that the use of recyclable materials not only reduces environmental pollution, but also reflects the brand's sense of social responsibility. As a result, when they buy skin care products, they tend to choose products packaged with environmentally friendly materials.

Low educated consumers: On the other hand, low educated consumers may face difficulties in understanding environmentally friendly materials and related information. They may not understand the importance and advantages of environmentally friendly materials, and their awareness of environmentally friendly packaging is relatively limited [11]. This leads them to pay less attention to the environmental attributes of products in their purchase decisions, and pay more attention to other factors such as price and performance. However, companies can communicate effectively with low educated consumers by simplifying information transmission and providing easy to understand environmental knowledge. For example, the identification and instructions of environmental protection materials are clearly marked on product packaging, so that consumers can intuitively understand the environmental protection attributes of products. At the same time, through marketing activities and social responsibility projects, this part of consumers' awareness and acceptance of environmentally friendly packaging should be improved.

3.3. Income adjustment

High-income consumers: high-income consumers are less sensitive to the price of environmentally friendly packaging products and pay more attention to product quality and environmental attributes [12]. They are often willing to pay higher prices for products packaged in environmentally friendly materials because they conform to their environmental philosophy and lifestyle. Therefore, environmental protection materials have a significant impact on the purchase willingness of high-income consumers.

Low-income consumers: when low-income consumers buy environmentally friendly packaging products, they usually need to weigh the price and environmental value. They may pay more attention to price factors than to environmental attributes. For example, in supermarket settings, low-income consumers may choose products with cheaper packaging options, even if they contain more plastic, because the price is more accessible. While economic pressures may prompt them to sacrifice environmental considerations, their purchasing behavior may gradually shift as environmental awareness and the availability of affordable eco-friendly alternatives increase. However, it is worth noting that with the popularization of environmental awareness and environmental protection products, low-income consumers may gradually accept and buy environmentally friendly packaging products. Enterprises can meet the needs of this group by providing environmentally friendly packaging products with reasonable price and high performance price ratio, and guide them to pay attention to the environmental attributes of products through marketing strategies.

4. Long-term impact of environmentally friendly materials on corporate reputation and brand image

4.1. Corporate reputation enhancement

Environmental protection image shaping: enterprises can gradually shape a positive environmental protection image by continuously using environmental protection materials [13]. A strong environmental image can attract a wide range of stakeholders, from consumers to investors, who are increasingly prioritizing sustainability in their decision-making processes. For example, consumers are more likely to buy products from companies that actively fulfill their social responsibilities and use environmentally friendly materials; Investors are also more willing to invest in companies with sustainable development potential.

Acquisition of competitive advantage: good corporate reputation has significant advantages in market competition. Companies that use environmentally friendly materials can attract more attention and recognition from consumers, partners and investors, thus establishing a competitive advantage. In addition, the environmental image can also differentiate from competitors, making enterprises stand out in the market. For example, Tesla has successfully created a positive environmental image by adopting environmentally friendly materials and sustainable production methods, becoming a leader in the electric vehicle industry. This not only improves the reputation of enterprises, but also attracts the attention and recognition of a large number of consumers and investors.

4.2. Brand image consolidation and expansion

Consumer loyalty training: environmental protection materials play an important role in improving brand image and cultivating consumer loyalty [14]. Consumers continue to buy and recommend to others because they recognize the brand's environmental philosophy. The formation of this loyalty helps enterprises to establish a stable customer base in the market and increase market share.

Market share expansion: the improvement of brand image helps enterprises enter new markets or expand their share in existing markets with the help of environmental protection advantages. For example, enterprises can attract more potential consumers by introducing environmentally friendly packaging products to meet the needs of consumers for environmentally friendly attributes. In addition, enterprises can further enhance their brand image and market share by cooperating with environmental protection organizations and participating in environmental protection activities. For example, Coca-Cola has successfully enhanced its brand image and expanded its market share by introducing plant-based bottles, catering to the increasing consumer demand for sustainable products. This not only meets the needs of consumers for environmental attributes, but also enhances consumers' loyalty to the brand and willingness to recommend.

5. Conclusion

The study deeply discussed the impact of environmentally friendly materials on consumers' willingness to buy in sustainable packaging design, and drew the following conclusions:

The use of environmentally friendly materials significantly improves consumers' cognitive value of products. By recognizing the environmental attributes of materials such as degradability and renewability, consumers form a value perception concerning product quality, safety, and environmental contribution. This perception is closely tied to purchase intent, as consumers are more inclined to buy products with clear environmental benefits, reinforcing the importance of sustainability in their purchasing decisions. Environmentally friendly materials also inspire emotional factors among consumers, especially a sense of environmental identity. Environmentally minded consumers are more likely to buy products packaged in environmentally friendly materials because they conform to their values. Using environmentally friendly packaging can bring pride to consumers because they contribute to environmental protection in the process of purchasing and using products. This pride is further translated into willingness to buy, increasing consumer preferences for environmentally friendly packaging products.

In addition, environmentally friendly materials have a positive impact on brand image perception. The use of environmentally friendly materials by enterprises can convey a sense of social responsibility to consumers, which will affect consumers' perception of brand image. Consumers believe that enterprises that actively fulfill social responsibility are more credible and reliable, so they are more willing to buy their products. The promotion of brand image will enhance consumers' awareness of brand credibility, which will be transformed into actual purchase decisions and form brand loyalty.

Individual characteristics, including environmental awareness, education level, and income, play a moderating role in the effect of environmentally friendly materials on purchase intention. Consumers with high environmental awareness, high education level and high income level are more inclined to buy environmentally friendly packaging products, while consumers with low environmental awareness, low education level and low income level have great differences in their understanding of environmentally friendly materials, but through the guidance of marketing strategies, they can also improve their acceptance and willingness to buy environmentally friendly packaging.

Finally, the use of environmentally friendly materials has also had a long-term positive impact on corporate reputation and brand image. The continuous use of environmental protection materials by enterprises can shape a positive environmental protection image, attract more stakeholders' attention and recognition, and thus gain an advantage in market competition. The consolidation and expansion of brand image will help enterprises enter new markets or expand their share in existing markets with the help of environmental protection advantages.

To sum up, the application of environmental protection materials in sustainable packaging design has a significant impact on consumers' willingness to buy, which is not only reflected in enhancing cognitive value and stimulating emotional factors, but also in improving brand image and shaping corporate environmental protection image.

6. Research limitations and future prospects

6.1. Research limitations

This study focuses on specific industries and markets and may lack broad applicability. In addition, the diversity and complexity of consumer behavior mean that other factors may affect purchase decisions, which have not been fully considered in this study.

In terms of research methods, the measurement of consumer purchase intention and brand loyalty may not be accurate enough, and there is a lack of long-term follow-up surveys. In addition, when analyzing the relationship between environmentally friendly materials for sustainable packaging design and consumer behavior, the impact of cultural differences, changes in social environment and other factors on consumer decision-making may not be fully taken into account.

6.2. Future outlook

Differences in impact under different cultural backgrounds:

Examine how consumers' perceptions and purchasing behaviors toward environmentally friendly packaging products vary across different cultural contexts. This would offer more tailored market strategies for companies targeting diverse consumer segments.

Application effect of new environmental protection materials: Investigate the market performance and consumer acceptance of new environmentally friendly materials in packaging design. The findings could guide companies in selecting the most suitable materials for sustainable packaging.

Consumer trust building mechanism for environmental packaging: Explore the process by which consumers build trust in environmentally friendly packaging and how this trust influences their purchasing decisions. This would provide valuable insights for companies aiming to strengthen their brand image through sustainable packaging initiatives.

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