

Mediating Effects of Brand Image and Environmental Knowledge on the Relationship between Sustainable Packaging and Consumer Purchase Behavior in the Era of Green Transformation

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ABSTRACT

The objective of study explored the concept of sustainable packaging in the era of green transformation associated with the consumer behavior integrated with the mediating relationship with the brand image and the environmental knowledge to increase consumer buying behavior. The research model develops through the theory of consumer behavior, and the data collection through the administrative questionnaire, with the non-probability convenience sampling technique. The data analysis through the partial least square, method to conclude the results, measurement and the structural model, and testing of hypotheses. The results suggested that the product packaging design, environmental concern, and the consumer attitude developed the positive and the significance impact on the brand image, environmental knowledge, and also developed the mediated effects. Thus, findings derived from research into packaging and how it influences environmentally conscious consumer behavior should be of interest to marketers and branders alike. It is as a result of these that the companies that embrace environmentally friendly standards in packaging, come out clearly with their green strategies are able to gain trust, credibility and hence consumers loyalty from environmental consumers. Forerunning the intricate relationship between packaging design, environmental knowledge, and consumer behavior becomes all-important to unlock memorable brand stories and loyal customer networks.

Keywords: Packaging Design, Environmental Concern, Consumer Attitude, Brand Image, Environment Knowledge, Consumer Buying Behavior

INTRODUCTION

Research Context and Background

The study suggested that the sustainable packaging has the significance impact on the consumer behaviour, and further provides the researches to gain the learning and gaining knowledge about what was done in past, after studying pervious researches the identify in the production, and has the important to understand about packaging design and the past study suggested that the packaging colours and design affect consumers , further contributes towards the first impression of the product, its taste, quality and brand

(Kalangi, 2022). So that the current study was more explored, how different colours affect the consumer and how different colours and design elements should be used according to the type of product. In past most of the companies not focuses on packaging change philosophy to gain consumers attention, because in past research lack of knowledge and the competition was on low and every industry have few numbers of companies that you can count easily, in nowadays competition is on peek and every industry have now multiple number of companies and producing multiple products with different packaging design (Gauthier, 2022). So that the era of some companies should do not change their packaging and working on old perspective and theories, and the keeping in mind the old research we start new research and collecting information from those companies that working on old packaging or recently change their product packaging (Mysore, 2024). Through the approach of research and development, and through the concept of marketing, after gathering information through the survey and collect data from them to proceed our research towards conclusion and thus the packaging of a product has multiple functions like it protects the product and provides convenience to consumers (Micahel Oyedele et al., 2023). The concept of green packaging has the main component is its environment-friendly nature because in the product production process, which contributions of research department along with sales and production department, green packaging does not harm the environment or consumer health (Wu & Wang, 2025). In terms of packaging, the prior study suggested that great packaging builds strong brand recognition and differentiating your product from the competition and, crucially, definitely influences purchase decisions, ensuring your product makes it from shelf to check-out counter. Every culture has their own colour perception and most religions have their own sacred colour (Fikri & Arief, 2023) The study explained that the colours become the part of memory which reminds consumer about the product which they easily recall for the particular brand and there are plenty of examples where such drastic changes in product packaging resulted in negative consumer feedback for the brand including Pepsi's transformation of its iconic cola bottle to a wider and taller design or Skittles' transition from a paper wrap to a plastic package (Octaviola & Aryanto, 2025). In some cases, smaller packaging changes also resulted in noticeable sales increases, for example, when Hellman's redesigned its mayonnaise bottle. In the highly competitive market environment, businesses are constantly seeking strategies to attract and retain customers, regarding the psychological factors that may have an impact on consumers' buying behaviour, the packaging is often considered crucial (Keller & Guyt, 2023). The study suggested that the packaging of a product is a form of communication with wide ranging implications for the brand, company's product information, and consumers and is the shifts in the impact of product packaging on consumer buying choices. Packing of products is essential to convey its message and establish the needed uniqueness in the competitive market also creating the first impression of the product to the consumer and also determines the initial impression of the product that a consumer will have the wraps, textures, taglines, and graphics, as well as their visual presentation, are the key components that control customers' perceptions and their buying behaviour (Budiman & Mahadwartha, 2026). The prior study suggested that the consumer-prone psychological appeals, and concluded that product packaging is capable of generating different psychological effects, and through the hue and colour theory proposes that each hue is likely to be perceived and felt differently by the viewers and the bright or flashy colours may communicate cheerfulness and passion, whereas bold or dull colours may describe class and refinement. The prior study more explains that in packaging design, imagery, typography, and textures can also create certain perceptions in people's minds, and the originality the design and quality of product packaging is a notable factor that contributes to the customers' perception of a specific brand (Gao & Kim, 2025). Packaging modifications such as shift to more environmentally friendly packaging or even packaging that is more convenient to be taken back for resale also affects the purchase decision through appeals to citizens' values consumers. Marketing communication in the broader context is a crucial aspect that often influences the consumer buying behaviour and in product marketing, this aspect is often captured by product packaging. The study elaborates on the different ways in which modifications of product packaging could have impacts on consumers' attitudes and actions (Wagner & Charinsarn, 2020). The concept of consumer

buying behaviour is defined as a decision-making process followed by people while acquiring products or services to be utilised for individual need. It is a complex factor that depends on factors such as attitudes, beliefs, knowledge, values, social pressures and promotional appeals. Predictors of perception include product packaging which is one of the marketing stimuli that consumers tend to focus on when making their decisions (Sharma et al., 2023). The packaging does much more than shield the product, as is witnessed by the following: As a result, the packaging can be the first contact that the consumer has with a certain product; it is an essential tool for providing key information about a brand or its products, including their features or quality (Tonikidou & Webb, 2024). Therefore, it is essential to establish the notion of the feeling that packaging brings to the customer's mind and the value proposition that it suggests. This is because packaging plays a very crucial role in influencing the perception of customers towards a particular product when it is on the shelf for sale in the market whenever a company decides to change the packaging of its products through a different design, or different colours or even different material, it has a very big implication on the consumers. These changes may affect the perception consumers have towards the product and brand associations, brand personality, purchase decisions, and overall brand sales and the socio-psychological effects of packaging may include motivation, attitude shift, perception change or self-created impact that affects the decision making of consumers (Chin et al., 2019). The prior study explained that warm colours such as red and orange may create an appetite and buying frenzy in customers or impulsive buying while cool colour such as blue and green may elicit a feeling of tranquillity or they are really trusted. Consequently, writing on the packaging of the product, designing the typography of the text, the images included, and the shape of the packaging impacts the consumer's perception of the product. There has been a shift in consumer preference for more environmentally friendly packaging materials which has been a rising concern in packaging products within the last few years, so that the implementing sustainable packaging within a business allows consumers with specific eco-friendly concerns, self-identify the corporation or product and improve the company's image. Packaging as a subcategory of product design is relevant and plays a crucial role in switching consumer buying behaviour (Sutanto, & Wulandari, 2023). The study suggested that the consumers today are striving to move toward more economical friendly products; thus, more companies are beginning to incorporate ecological packaging materials in their products. Globally, more organizations are adopting environmental-friendly strategies such as the use of naturally degradable materials, minimal packaging, among others because of the awareness of the environmentally conscious citizens (Wenting et al., 2022). Therefore, the sustainability implementation can be beneficial in categorizing the brand from competitors and consequently gaining a strong customer following. A dominant aspect exists considering attitude that has a significant impact on purchasing inclination, particularly for green packaged goods and the behaviour of the consumer purchase more under positive attitude and vice versa (Hlaba & Shava, 2025). One of the most important trends today is the rising popularity of the environmentally friendly packaging materials, and this does influence the purchases made by consumers considerably. A survey conducted by the International Journal of Retail & Distribution Management, consumers are willing to part with their money to buy products that are eco-friendly, even though they are overpriced. It could also be due to the increased awareness of people to sustainable practices when making a purchase (Khaleeli & Jawabri, 2021)

Statement of the Research Problem

Because of growing environmental awareness, sustainability has become a critical concern for many organizations over the past decade, creating a complex and multifaceted challenge. Today, consumers not only prioritize product quality but also place significant importance on the sustainability of the products they purchase, with packaging playing a vital role in shaping these perceptions. So that the shift requires organizations to strike a careful balance between ensuring high quality packaging that protects products and enhancing brand image, while also minimizing environmental impact. Traditional packaging methods have often relied on materials and processes that contribute to environmental degradation through pollution,

excessive consumption of natural resources, and increased waste generation. Thus, consumers are now more discerning when choosing products, specifically with regards to packaging, to prefer packaging that are made from recyclable, biodegradable, or compostable material. The preference puts pressure on businesses to find ways of creating more sustainability, innovation in the packaging to ensure that it meets the functionality, better shelf appearance and affordability of the packing. The research questions that can be derived from the above highlighted research gap are as follows; The study aims at ascertaining how packaging affects consumers' buying behaviour in the backdrop of prevailing environmental issues, here are the outcomes in terms of the particular characteristics of packaging that are particularly crucial to the consumers who are sensitive to environmental issues, and to what extent those factors are likely to influence the decision making (Tonikidou & Webb, 2024). Thus, based on the identification of these dynamics, the study intends to help business entities adapt to consumers' sustainable principles as a basis for effective packaging strategies which at the same time would improve their market standing, and consumers' loyalty towards respective brands.

Research Significance and Implications

The purpose of this research, thus, revolves in filling these spaces by studying the correlation between product packaging and consumer behavior. The main objective of the study providing insights is that can further create an awareness of developing the packaging strategies that are appropriate to the consumers' sensibilities. So that the research area that offers a good understanding of how packaging and environment steering factors affect consumers' buying behavior as well as their preferences for sustainability and emerging market aspects. Reflecting on the content of study one can conclude that it is highly important to understand the connection between the concept of packaging design, its ecology-related aspects, and consumers' behavior.

Aims and Objectives of Research

RO1: To investigate the product packaging design associated with the brand image and the consumer purchase buying behaviour.

RO2: To analysis the environmental concerns associated with the brand image, environmental knowledge and with the consumer buying behaviour

RO3: To explore the effect of the consumer attitude with the brand image, environmental knowledge and the consumer buying behaviour.

Core Questions of the Research

RQ1: How does the relationship of the product packaging design with the brand image, and the environmental knowledge associated with the consumer buying behavior?

RQ2: How does the association of the environmental concern with the brand image, environmental knowledge on the consumer buying behavior?

RQ3: What is the effect of the consumer attitude with the brand image, environmental knowledge and the consumer buying behavior?

EMPIRICAL LITERATURE REVIEW

The empirical findings will be presented in this study while also establishing a connection between them and earlier studies and the consumer behaviour and the new product packaging has been found to be the most crucial element for quickly changing a product's perception in consumers' minds. It is further determined that repackaging components such as colour, packing quality, background images of wrappers, and innovations are more crucial considerations when creating or altering the current presentation of a product. In today's consumer driven market, the Impact of packaging and environmental concerns on consumer buying behavior has become a significant area of interest for businesses and to expand on many of the given research methods that have been applied in endeavoring to understand how packaging and considerations of environment impact the consumers' buying behavior (Ramyashree, 2025)

Exploring Consumer Behavior

Consumer behavior is the process through which consumers make and use decisions in relation to products or other tangible and intangible goods. It is not immune to the psychological, social, cultural and individual factors in its surrounding environment. This paper seeks to describe the importance of packaging, as well as discuss how different types of packaging can meet consumer needs, inform consumers and influence purchasing decisions. It should be noted that there is increasingly growing concern about environmental issues, and this has made many people shift towards using products that would not harm the natural environment (Yegen Ouyang, 2025)

Packaging and Its Influence on Consumer Preferences

Consumer buying behavior and packaging is also found to have an effect on the consumer buying behavior and, in this research, we also tested the following hypothesis: In an advertising environment where there is no steep brand differentiation and dynamic competition of different brands, the type of packaging employed will influence the buying behavior of consumers (Srivastava, 2024)

Influence of Environmental Consciousness on Purchase Behavior

Packaging can be defined as an essential means of visual communication with consumers, as it often represents the first point of contact between the buyer and the product. It not only serves the functional purpose of protecting and preserving the product but also communicates the company's message and assists consumers in making informed purchasing decisions. Existing literature highlights that various packaging elements, such as design, color, material, and ease of use, play a significant role in shaping consumer perceptions and influencing their behavior (Chitturi et al., 2021)

Correlation Between Packaging Color and Consumer Behavior Psychology

The color of packaging is one of the most important components of a product, as it can create a lasting impression on consumers' minds. The present study explores the deeper dimensions of color psychology and seeks to uncover how packaging colors influence consumer perceptions and responses. By understanding these psychological effects, firms can more effectively design packaging strategies that appeal to consumers and enhance emotional connection, ultimately enabling them to capture consumer attention and preference through the strategic use of color (Martinez et al., 2021)

Exploring the Role of Color in Packaging Effectiveness

The study explained that the product packaging color is an important communication tool, as it conveys meanings and emotions while evoking various psychological responses and particularly significant in packaging design, where color plays a vital role in attracting the attention of potential consumers and influencing their perception of a product with each color carries specific associations that can either attract or repel consumers, depending on cultural interpretations and individual preferences. As a result, effective use of color in packaging can significantly shape consumer interest and purchasing behavior (Chitturi et al., (2021)

Exploring Psychological Responses to Colors

The prior study suggested that color, to a considerable extent, can influence emotions and shape perceptions in the consumer's mind and the red is a powerful hue that evokes excitement, passion, and energy, whereas blue is often associated with trust, security, and professionalism. Brands carefully select packaging colors to appeal to specific emotional states and target audiences. The effective use of color combinations can establish emotional associations in consumers' minds, enhance brand recall, and improve product visibility on retail shelves (Khamidova, 2023).

Color Psychology and Its Impact on Human Perception

The prior study suggested that the color is a powerful communication tool, as it conveys meanings, emotions, and evokes various psychological responses. This is particularly important in packaging design, where colors play a vital role in attracting the attention of potential consumers and influencing their perception of a product. Research suggests that each color carries specific meanings that can either attract or deter consumers, depending on cultural interpretations and individual preferences. As a result, the effective use of color in packaging can significantly shape consumer attention, perception, and purchase behavior (Yuting & Mohamed, 2023)

Exploring Psychology behind Colors

The prior study suggested that color specific context, and can dictate certain emotions and perceptions in the consumer's mind and the red is a powerful hue that excites, evokes passion and energy while on the other hand, blue is a faithful hue that portrays trust, security, and professionalism and brands choose their packaging colorants carefully as they try to touch feelings or states of individuals that they want to address. Proper application of color combinations helps associate certain emotions within a shopper's mind, help with memorization of brands, and make a product stand out on a shelf (Jabbarov, 2023)

Cultural and Contextual Influences on Color Selection

The study explained the important concept for companies and brands looking at specifying their packaging colors to think of the culture and context surrounding such colors. Different cultures can have diverse interpretations of the colors that exist; thus, it is mandatory for the brand to be extremely keen and ensure that it understands consumers in different regions and the continuing in the same manner, also mentioned that the consumption place could also be a factor in the color choice and impression (Chitturi et al., 2021)

The Role of Color in Shaping Brand Perception and Consumer Intentions

Studying the role of color in the branding process often shows it as a crucial factor in the perception of the brand by the customers as well as their subsequent behavior. Color is quite a persuasive factor that can influence consumer purchase decision, and this also applies to the packaging of a particular product as it gives a description of the brand character or personality, quality and value of the product. Consumers show considerable attention to color, and it is possible for a brand to pick specific colors that appeal to the emotions of their target customers, hence ensure that they design good and attractive products that would attract consumers (Safitri & Lestari, 2022)

Color Psychology as a Driver of Packaging Performance

The prior study suggested that color psychology should be understood by the brands to enhance the packaging d Color psychology should be understood by the brands to enhance the packaging designs in such a way that they appeal to the consumers and tempt them into opting for those brands. Picking the best color will influence some emotional response, communicate some value of the brands (Shaura et al., 2025).

Packaging Materials as a Determinant of Product Protection and Integrity

Packaging materials play role of protector and safeguard which helps in preventing various factors like moisture and light from coming into contact with the products or merchandise. The quality of packaging materials and their ability to withstand transportation is vital in delivering goods to the consumers as required without being damaged or in bad shape (Pinedo & Rivera, 2022)

Evaluating Sustainability in Packaging Material Choices

People have developed wisdom when it comes to the use of innovative products and the environment and as a result, brands that deal in packaging materials have to take an extra measure to ensure that packaging materials are eco-friendly. Products such as biodegradable plastics and compostable packaging, as well as using recycled materials are being considered as potential solutions to the problem of conventional packaging materials. Brands should try of selecting sustainable materials so that they can match the customers' concerns of the world's future environment (Wenting et al., 2022).

The New Techniques in Packaging Material Science

The prior study explains that irrespective of the type of packaging, there are ongoing innovations in material advancement that are coming to the market with better performance, efficiency and the evolution of packaging into bio-based polymers and quickly becoming a smart packaging material containing sensors demonstrates how the packaging industry is expanding the choices to fit the ever-growing market demands of brands and consumers. Such innovations give direction to the future packaging industry and consumer packaging industry as they zero on better efficiency and sustainability and the advancements in packaging material technology have led to the development of innovative solutions that offer improved functionality, sustainability, and cost-effectiveness (Chaudhary et al., 2022)

Theoretical Foundations of Research

As previous literature shows the reactions of customers for unexpected things which occur, Such as brand packaging and Logo change and the considering then highlighting the relationship among the variables previously highlighted, it explains the attitude of consumer towards product repackaging and rebranding.

The companies encounter many problems in the process of packaging their products, among them is the difficulty to choose covers and packaging that attract the consumer's attention, Major theory that relates to consumer behavior is the consumer behavior theory and it basically tries to provide an explanation on how people are able to come up with a decision in the process of purchasing goods and services. TPB predicts that a behavior is determined by intention and intention, in return, is determined by attitude towards the behavior, subjective norms and perceived behavioral control and in terms of packaging that is eco pleasant, the consumers with positive attitude towards sustainability will prefer to go for a package that supports (Wismantoro & Susilowati, 2024)

Formulation of Research Hypotheses

H1: The packaging design has a positive and significant impact on the brand image

H2: The packaging design has the positive and the significant impact on the environment knowledge

H3: The environmental concerns have positive and significant impact on the brand image

H4: The environmental concerns have positive and significant impact on the environment knowledge

H5: Consumer attitude has a positive and significant impact on the brand image

H6: Consumer attitude has a positive and significant impact on environment knowledge

H7: The brand image mediates the relationship with the packaging design and the consumer buying behavior

H8: The brand image mediates the relationship with environmental concern and the consumer buying behavior

H9: The brand image mediates the relationship with consumer attitude and the consumer buying behavior

H10: Environmental knowledge mediates the relationship with the packaging design and the consumer buying behavior

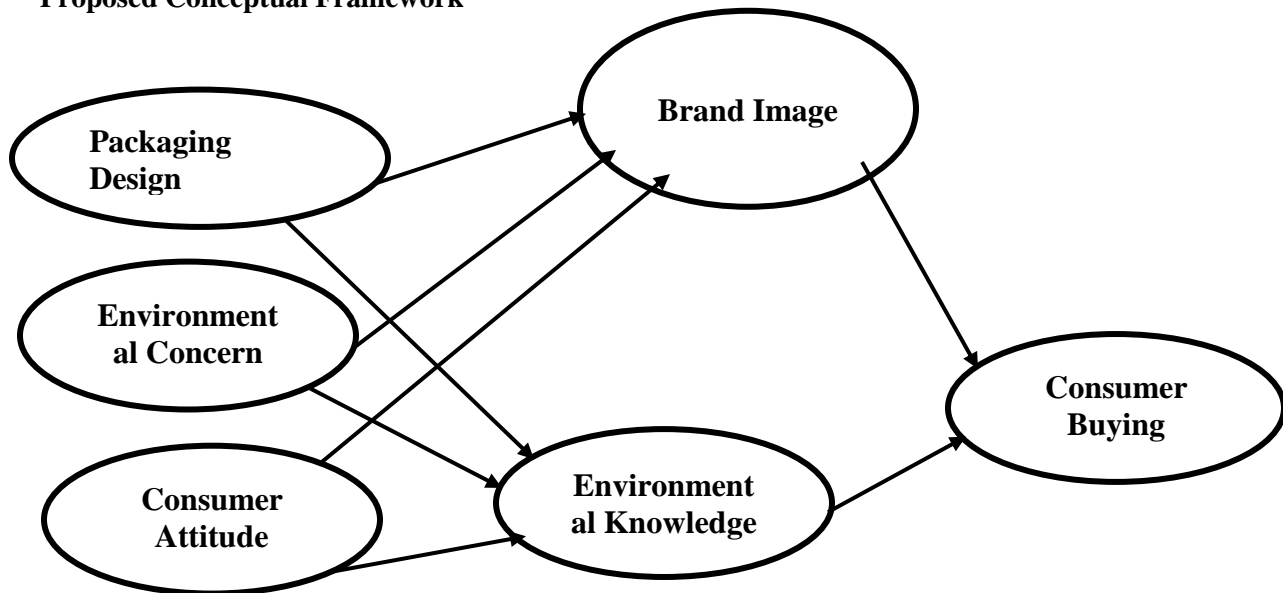
H11: Environmental knowledge mediates the relationship with environmental concern and consumer buying behavior

H12: Environmental knowledge mediates the relationship with consumer attitude and consumer buying behavior

H13: The brand image has a positive impact on consumer buying behavior

H14: Environmental knowledge has a positive impact on consumer buying behavior

Proposed Conceptual Framework



RESEARCH DESIGN AND METHODOLOGY

The purpose of this article will be to present explanatory research on product packaging, with the goal of describing what sorts of factors are likely to prompt a manufacturer to change the packaging of a product, as well as describing some of the difficulties that can arise from these changes. This is pursuant to the objective of gauging the influence of the packaging and environmental concerns on consumer buying behaviour where methodologies and approaches have been used as follows. Many of the studies conducted employ surveys as a method of obtaining information about consumer preference, perception, and behaviour when it comes to the packaging and the environment. Conducting this research through quantitative means enables the collection of an enormous sample and basic quantitative analysis of the results obtained. While survey research measures opinions, attitudes and behaviours of a target population associated with packaging and other environmental factors, experimental research investigates the behaviour of subjects by altering the packaging and or environmental factors as part of the study. This makes the causal relationships between variables easily determinable, which is a major aspect that is taken care of in controlled research. Quantitative research techniques afford consumers' respondents' depth information about their feelings, perceptions, beliefs and attitudes toward packaging and the environment through focus group discussions and interviews. Consumers can provide oral responses to questions and in doing so, researchers can gain insight to reasons for their behaviours Regarding packaging and environmental considerations. Researchers can uncover underlying reasons for consumer behavior through open-ended discussions. Observing consumers in real-world settings, such as retail environments, can provide valuable information on how packaging influences purchasing decisions. Researchers can analyze consumer interactions with products and packaging to gain insight into their decision-making process.

Study Design and Approach

There are two types of research, quantitative and qualitative research. Quantitative research is about asking people for their opinions in a structured way so that you can produce hard facts and statistics to guide you.

To get reliable statistical results, it's important to survey people in fairly large numbers and to make sure they are a representative sample of your target market. The research conducted to identify the impact of packaging on consumer's buying behavior is a quantitative associate. The design we applied to our research study is explanatory, we investigate a problem that is not clearly defined why the firm changed its packaging style, our study helps us to organize a new plan or idea or discover new data. In the previous studies researcher researched packaging style from a customer perspective but our study is based on a firm perspective mainly this strategy uses in our research to explore new data and find the reasons for repackaging according to management and what they perceive. To identify the impact of packaging on consumer's buying behavior is quantitative research.

Population under Investigation

There are two major types of sampling techniques which are probability sampling and non-probability sampling and through the non-probability sampling technique the convenience sampling to be data collection. The sample size of our research as we are using convenience sampling, so the size is 350 questionnaires.

Reliability and the validity Analysis

Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Attitude	0.859	0.899	0.642
Brand Image	0.892	0.920	0.697
Consumer Buying Behavior	0.832	0.883	0.605
Environment Concern	0.859	0.897	0.637
Environment Knowledge	0.924	0.943	0.769
Package Design	0.923	0.942	0.766

Reliability refers to the internal consistency of the measurement items used to represent each construct. It indicates how consistently the items measure the same underlying concept. In this study, reliability is assessed using Cronbach's Alpha and Composite Reliability (CR), where values above 0.70 are considered acceptable. Additionally, Average Variance Extracted (AVE) is used to assess convergent validity, where values above 0.50 indicate adequate explanatory power of the construct. The results show that all constructs meet the required reliability standards. Attitude has a Cronbach's Alpha of 0.859, Composite Reliability of 0.899, and AVE of 0.642, indicating strong internal consistency. Similarly, Brand Image shows high reliability with Cronbach's Alpha (0.892), Composite Reliability (0.920), and AVE (0.697). Consumer Buying Behavior also demonstrates acceptable reliability with values of 0.832 (CA), 0.883 (CR), and 0.605 (AVE). Likewise, Environment Concern meets the reliability threshold with Cronbach's Alpha (0.859), Composite Reliability (0.897), and AVE (0.637). Furthermore, Environment Knowledge exhibits very strong reliability with Cronbach's Alpha (0.924), Composite Reliability (0.943), and AVE (0.769). Similarly, Package Design shows excellent internal consistency with Cronbach's Alpha (0.923), Composite Reliability (0.942), and AVE (0.766). Overall, all constructs in the study exceed the recommended thresholds for Cronbach's Alpha (>0.70), Composite Reliability (>0.70), and AVE (>0.50). This confirms that the measurement model has high internal consistency and acceptable convergent validity, making it suitable for further structural analysis.

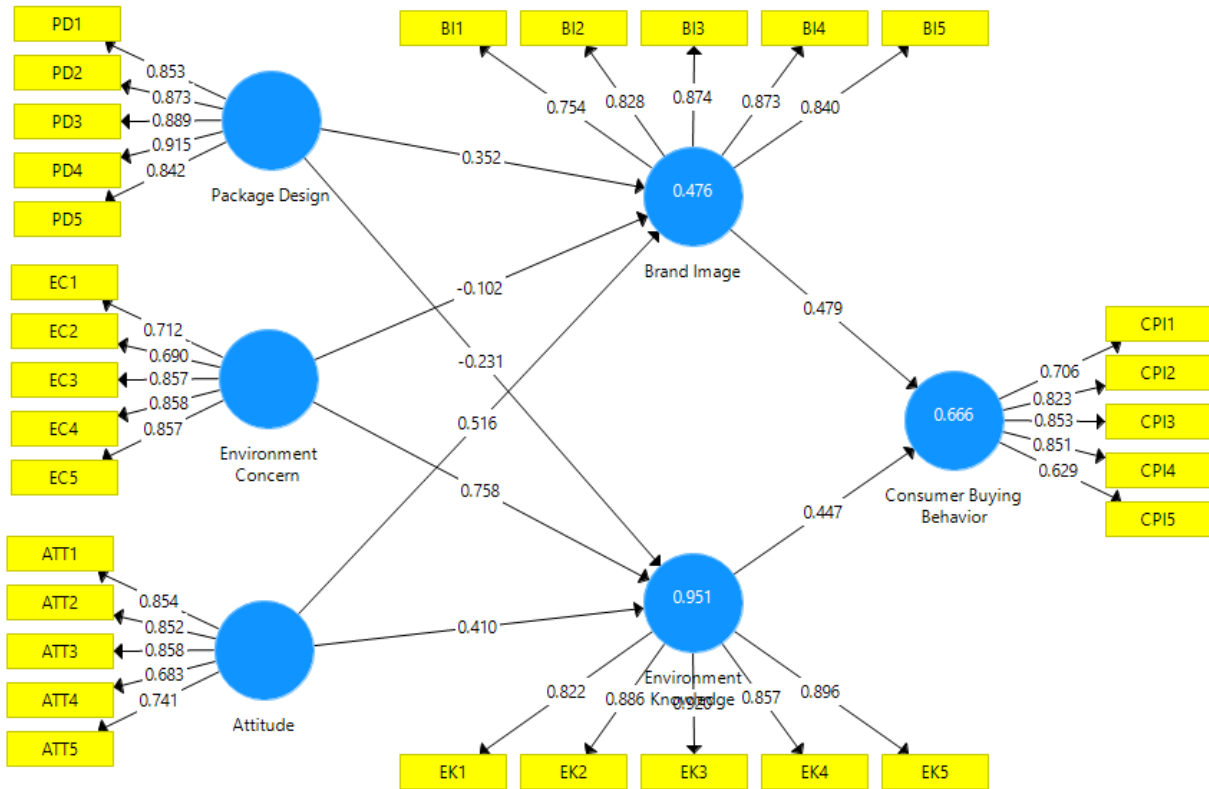


Figure 1: Measurement Model

Discriminant Validity: Fornell-Larcker Criterion

	Attitude	Brand Image	Consumer Buying Behavior	Environment Concern	Environment Knowledge	Package Design
Attitude	0.801					
Brand Image	0.638	0.835				
Consumer Buying Behavior	0.894	0.726	0.778			
Environment Concern	0.827	0.574	0.736	0.798		
Environment Knowledge	0.901	0.552	0.712	0.934	0.877	
Package Design	0.588	0.583	0.690	0.709	0.547	0.875

Discriminant validity is assessed using the Fornell–Larcker criterion, which requires that the square root of the Average Variance Extracted (AVE) for each construct should be higher than its correlation with other constructs. This confirms that each construct is distinct and measures a unique concept within the model.

In your results, the diagonal values represent the square root of AVE, while the off-diagonal values represent the correlations between constructs. The results show that all constructs meet the Fornell–Larcker criterion. For example, Attitude (0.801) is higher than its correlations with Brand Image (0.638), Consumer Buying Behavior (0.894), Environment Concern (0.827), Environment Knowledge (0.901), and Package Design (0.588), indicating acceptable discriminant validity. Similarly, Brand Image (0.835) is greater than its correlations with other variables, confirming that it is distinct from other constructs. Consumer Buying Behavior (0.778) also shows stronger validity as its square root of AVE is higher than most inter-construct correlations. Furthermore, Environment Concern (0.798), Environment Knowledge (0.877), and Package Design (0.875) all demonstrate strong discriminant validity, as their diagonal values are consistently higher than their respective correlation values with other constructs. Overall, the results confirm that all constructs in the model are empirically distinct and demonstrate satisfactory discriminant validity, supporting the reliability of the measurement model for further structural analysis.

Structural Path Coefficients

	T Statistics (O/STDEV)	P Values
Attitude -> Brand Image	6.245	0.000
Attitude -> Environment Knowledge	12.079	0.000
Brand Image -> Consumer Buying Behavior	10.397	0.000
Environment Concern -> Brand Image	1.034	0.302
Environment Concern -> Environment Knowledge	17.185	0.000
Environment Knowledge -> Consumer Buying Behavior	8.660	0.000
Package Design -> Brand Image	4.669	0.000
Package Design -> Environment Knowledge	8.645	0.000

Since the results suggested that the probability value is less than 0.05, showing that the consumer attitude has a positive impact on the brand image, thus concludes that the attitude of the consumer positive integrated with the brand image. Furthermore, the consumer attitude develops the relationship with environmental knowledge, therefore, the consumer attitude associated with the environmental knowledge. The results explained that the also brand image has developed the significance relationship with the consumer buying behavior, and the brand image has the greater impact on the consumer behavior. Through the results suggested that environmental concern has a positive impact on the brand image, then concludes that the environmental concern is associated with consumer behavior and associated with brand image. The analysis of the path coefficients reveals that consumer attitudes significantly influence brand image, with positive feelings enhancing the brand's image, while negative feelings harm it. A strong brand image positively impacts consumer buying behavior, and the environment plays a crucial role in shaping both brand image and environmental knowledge. Product design, particularly in terms of sustainability, significantly improves brand image and boosts environmental knowledge. Furthermore, environmental knowledge mediates the relationship between attitude and consumer buying behavior, highlighting that consumers with greater awareness of environmental issues are more likely to make eco-conscious purchases. Overall, the findings indicate that factors like attitude, brand image, product design, and environmental knowledge are interrelated and significantly influence consumer buying behavior, emphasizing the importance of sustainability in shaping consumer perceptions and decisions. Overall, most hypothesized relationships are supported except for the link between Environment Concern and Brand Image. This suggests that while environmental concern plays a strong role in increasing knowledge, it does not directly shape brand

perception. The findings confirm that attitude, environmental knowledge, and package design are key drivers influencing consumer buying behavior in the context of sustainable packaging.

Specific Indirect Effects

Relationships	T Statistics (O/STDEV)	P Values
Attitude -> Brand Image -> Consumer Buying Behavior	4.626	0.000
Environment Concern -> Brand Image -> Consumer Buying Behavior	1.001	0.318
Package Design -> Brand Image -> Consumer Buying Behavior	4.456	0.000
Attitude -> Environment Knowledge -> Consumer Buying Behavior	6.072	0.000
Environment Concern -> Environment Knowledge -> Consumer Buying Behavior	9.268	0.000
Package Design -> Environment Knowledge -> Consumer Buying Behavior	7.039	0.000

The structural model results show the relationships between variables based on t-values and p-values, where a relationship is considered significant if the p-value is less than 0.05. The results indicate that Attitude has a significant positive effect on Brand Image (t = 6.245, p = 0.000), meaning that a more positive consumer attitude leads to a stronger brand image. Similarly, Attitude also has a highly significant effect on Environmental Knowledge (t = 12.079, p = 0.000), showing that positive attitudes increase consumers' environmental awareness and knowledge. Brand Image significantly influences Consumer Buying Behavior (t = 10.397, p = 0.000), indicating that a strong brand image plays an important role in shaping consumer purchasing decisions. However, the relationship between Environment Concern and Brand Image is not significant (t = 1.034, p = 0.302), as the p-value is greater than 0.05. This suggests that environmental concern does not directly influence brand image in this study. On the other hand, Environment Concern has a strong and significant effect on Environmental Knowledge (t = 17.185, p = 0.000), indicating that individuals with higher environmental concern tend to have greater environmental knowledge. Furthermore, Environment Knowledge significantly affects Consumer Buying Behavior (t = 8.660, p = 0.000), meaning that environmentally knowledgeable consumers are more likely to make sustainable purchasing decisions. In addition, Package Design significantly influences Brand Image (t = 4.669, p = 0.000), showing that attractive and sustainable packaging improves how consumers perceive a brand. Similarly, Package Design has a significant effect on Environmental Knowledge (t = 8.645, p = 0.000), indicating that packaging design also helps enhance consumers' environmental awareness. Overall, most hypothesized relationships are supported except for the link between Environment Concern and Brand Image. The results suggest that while environmental concern plays a strong role in increasing knowledge, it does not directly shape brand perception. The findings confirm that attitude, environmental knowledge, and package design are key drivers influencing consumer buying behavior in the context of sustainable packaging.

DISCUSSION OF FINDINGS

The relationship between packaging and environmental concerns has evolved significantly over the past few decades. As global awareness of environmental issues grows, consumers are becoming increasingly concerned with the sustainability of the products they purchase, including how these products are packaged. Packaging, especially plastic packaging, has long been a source of environmental degradation, contributing to waste, pollution, and the depletion of natural resources. As a result, consumers are increasingly factoring

environmental considerations into their purchasing decisions. Recent studies indicate that packaging plays a critical role in shaping consumer preferences, with many consumers opting for brands that prioritize environmentally friendly packaging options. The shift is particularly evident among younger generations, such as Millennials and Gen Z, who have demonstrated a higher level of environmental consciousness. These consumers are more likely to support companies that use recyclable, biodegradable, or compostable materials, and they often express concern over products that come in excessive or non-recyclable packaging. One of the key drivers behind this change is the growing awareness of the environmental impact of packaging waste. With the rise of environmental campaigns, documentaries, and increased media coverage of plastic pollution, many consumers are more knowledgeable about the detrimental effects of packaging on ecosystems. As a result, they are demanding more sustainable packaging alternatives, such as paper, glass, or plant-based plastics, and actively seeking products with eco-labels or certifications. However, it is important to note that while environmental concerns are a significant factor in consumer decision-making, they are not always the primary consideration. Price, convenience, and product quality often remain more immediate priorities for consumers. The challenge for companies, therefore, lies in balancing the demand for sustainable packaging with the need to keep costs competitive and ensure that products are still convenient for consumers to use. Furthermore, regulatory pressures are intensifying, with governments around the world implementing stricter packaging regulations aimed at reducing waste and promoting sustainability. These regulations, alongside growing consumer expectations, are encouraging businesses to innovate and adopt sustainable packaging solutions. The study concludes that sustainable packaging, attitude, brand image, and environmental knowledge collectively play a vital role in shaping consumer purchase behavior in the era of green transformation. The findings emphasize that companies should focus on improving packaging design and enhancing environmental awareness to strengthen consumer engagement and promote sustainable consumption.

RESEARCH CONCLUSION

In conclusion, the impact of packaging and environmental concerns on consumer buying behavior is becoming more pronounced, with sustainability emerging as a key factor in consumer decision-making. While consumers increasingly prefer environmentally friendly packaging, their purchasing behavior is influenced by a combination of factors, including price, convenience, and the perceived quality of the product. Sustainable packaging is now seen as a competitive advantage for brands, but there remains a challenge in balancing environmental responsibility with the practical realities of production and consumer demand. As consumers continue to prioritize sustainability, businesses will need to adapt their strategies to meet these demands. However, the industry must also navigate the complexities of cost, performance, and convenience to ensure that sustainable packaging remains viable and attractive to the broadest possible audience.

DIRECTIONS FOR FUTURE RESEARCH

While there has been substantial research on consumer preferences regarding sustainable packaging, several important avenues remain for future exploration. Future studies should examine consumer segmentation and sustainability preferences by analyzing how demographic factors such as age, income, education level, and geographic location influence attitudes toward sustainable packaging. In addition, further research is needed to understand the behavioral and psychological drivers behind packaging choices, particularly how consumers balance price, convenience, and sustainability in their purchasing decisions. Longitudinal studies are also recommended to investigate the long-term effects of sustainable packaging adoption on consumer loyalty, brand perception, and repeat purchasing behavior over time. Moreover, cross-cultural and global perspectives should be explored to understand how cultural differences and regional environmental concerns shape consumer attitudes toward packaging sustainability in different markets.

Another important area for future research is the economic impact of sustainable packaging, including cost-benefit analyses that assess how firms manage higher production costs while gaining benefits such as brand loyalty, regulatory compliance, and environmental responsibility. Finally, emerging packaging technologies such as smart packaging, edible packaging, and 3D-printed packaging should be further studied to evaluate their environmental impact, cost efficiency, and consumer acceptance. Overall, continued research in these areas will help businesses and policymakers develop more effective and sustainable packaging strategies that align with evolving consumer expectations and environmental goals.

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