



Influence of product packaging on consumer repurchase intention in case of online purchase

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Abstract:

This study examines the impact of product packaging on consumer repurchase intentions in online buying, as packaging represents the initial physical connection between the consumer and the product. The research examines four essential packaging attributes—design, color, material, and printed information—to determine their individual and cumulative effects on customer behavior. The research was carried out in the Dinajpur district of Bangladesh, collecting data from 211 participants across several professions. The study used Partial Least Squares Structural Equation Modeling (PLS-SEM) to unveil numerous significant findings. Premium and sustainable materials guarantee product safety during transit while appealing to environmentally aware consumers, enhancing brand loyalty. Printed information is essential, as precise, accurate, and comprehensive product descriptions and usage instructions foster trust and reduce post-purchase apprehensions. Packaging design, including aesthetics, forms, and layouts, fosters emotional engagement and cultivates a memorable unboxing experience, encouraging repeat purchases. Although less influential, the packaging's color is crucial for brand recognition and elicits emotional responses through visually appealing and consistent color schemes. The results highlight the simultaneous functional and emotional roles of packaging in consumer decision-making. In the competitive e-commerce landscape, when physical inspection of products is unavailable, adequate packaging can markedly improve consumer happiness, loyalty, and the probability of repeat purchases. This research offers practical insights for organizations, emphasizing the necessity of matching packaging strategies with customer preferences and sustainability objectives. Furthermore, the study enhances the academic literature by examining the insufficiently investigated nexus of packaging characteristics and online repurchase intentions. This study highlights the strategic significance of packaging in online commerce and provides avenues for further investigation. Future research may broaden the geographical reach, examine the influence of packaging on specific businesses, and analyze the impact of new technological elements like augmented reality on the packaging experience.

Keywords: Packaging, Packaging Elements, Consumer Behavior, Repurchase Intention, Online Purchase.

1. Introduction

Packaging refers to the physical appearance of a product's container, including its design, color, shape, labeling, and materials (Agariya, et al., 2012). The first thing consumers look at before deciding to buy is the packaging. Packages provide protection from various factors, including light, heat, cold, evaporation, spilling, spoiling, and breaking. Effective product promotion is essential in today's highly competitive global market, and product packaging has become a more significant means of brand communication (Abdalkrim & Al-Hrezat, 2013). The exterior covering of a product is called packaging. Packaging may play the most important role in consumer-packaged goods (CPG) markets. These markets depend on packaging elements to maintain product quality, prevent product loss, facilitate transportation and storage, and set products apart in the market (Steenis et al., 2017). The role of packaging has evolved over decades in a difficult environment due to growing self-service and shifting consumer lifestyles. In the context of sales promotion, the company's interest in the package as a whole is increasing (Oaya et al., 2017). Businesses now repackage their products and use attractive packaging, making it harder for customers to choose rival products. Packaging can be the entire reason for a brand's existence because it communicates brand identity, attracts attention in commercial contexts, and positions the product within a concrete category (Gómez et al., 2015). Packaging often fulfills an essential function, such as protecting or storing products. Packaging is a comprehensive solution that encourages impulsive purchasing. Packaging reduces marketing and advertising expenses while simultaneously increasing revenue and market share (Sukri et al., 2022). Businesses are becoming increasingly interested in using packages as a sales marketing technique. The package becomes the ultimate selling proposition, boosting impulsive purchase behavior, increasing market share, and lowering promotional expenses (Mitul et al., 2012). Adding creativity to the packaging design also raises the product's perceived worth in the eyes of the buyer. Novel packaging can attract consumers. Innovative packaging can enhance the product's value if it satisfies consumer needs (zekiri & hasani, 2015). There are several advantages to developing packaging for businesses. Some of these include creating a physical manifestation of the brand's or company's values, enhanced influence at the moment of sale, potential for new avenues of distribution (Ahmad et al., 2012). At the point of sale, packaging frequently acts as a silent salesman and is a crucial consumer touchpoint. In today's world, where people are more concerned about the environment, it's crucial to use sustainable and innovative packaging materials to build confidence and loyalty among consumers (Babu, 2025; Magnier & Crié, 2015; Rouf et al., 2025). Consumers are more likely to repurchase a product after reading informative packaging that details its features, how to use it, and the benefits they will receive (Wells et al., 2007). Packaging strategies that align with consumer preferences can serve as a powerful tool to strengthen repurchase intention.

The explosive expansion of e-commerce has redefined consumer interactions with products, and packaging is now more important than ever in influencing behavior and forming perceptions. Online purchasing significantly depends on packaging as the initial physical interaction between the customer and the goods, in contrast to typical retail settings where customers can physically inspect products before making a purchase (Ampuero & Vila, 2006). Packaging has great impact on consumer satisfaction and loyalty, especially in fostering repurchase intentions.

Packaging attributes such as design, color, material, and printed information play a significant role in influencing consumer perceptions in online contexts. For example, packaging design enhances the unpacking experience by fostering an emotional and memorable bond that may promote return business (Azzi et al., 2012). Similarly, color is a powerful visual cue that enhances brand recognition and evokes emotions, influencing consumer preferences (Labrecque & Milne, 2012). Packaging color affects how people feel about a product and how valuable they think it is (Grossman & Wisenblit, 1999). Packaging material selection responds to consumer needs for eco-friendly practices by

reflecting product quality and brand sustainability initiatives (Steenis et al., 2017). Furthermore, printed information, such as product details and branding, builds trust and confidence by offering clarity and transparency to consumers (Ampuero & Vila, 2006). Repurchase intention is a person's assessment of whether to repurchase a specific service from the same business, considering their present and potential future circumstances (Ahmed, 2014). In today's market, retaining a high level of customer loyalty can help businesses sustain increasing profits in the face of international competition from other companies. When businesses know of a recent customer's plan to repurchase, they can win their loyalty (Khuong & Hong, 2016).

Although the effect of product packaging on consumer purchasing decisions has been thoroughly studied in the past, the majority of these research have concentrated on physical retail settings, ignoring the particularities of online buying (Silayoi & Speece, 2007). Packaging has a crucial role in determining post-purchase happiness and loyalty in e-commerce since it is the initial physical contact between the customer and the goods. However, the impact of certain packaging qualities, such as design, color, material, and printed information, on consumers' intentions to repurchase online has not been well investigated. This study seeks to fill this vacuum by investigating how specific packaging components influence e-commerce repeat business.

The results of this study will help companies or businesses to develop packaging strategies that have an impact and increase customer loyalty. For instance, visually appealing and lasting packaging can enhance the unboxing experience, while clear printed information create trust (Ampuero & Vila, 2006). Moreover, companies might match customer environmental consciousness by utilizing products that answer sustainability concerns, hence fostering brand loyalty (Steenis et al., 2017). This paper adds to scholarly literature by closing the gap in realizing the impact and significance of packaging on consumer repurchase intentions in the framework of online buying. This research is crucial in addressing the important part product packaging plays in determining consumer behavior in the e-commerce scene. Beyond basic operation, packaging in online transactions forms the first tangible relationship between the consumer and the products. This study focuses on packaging design, color, material, and printed information as key factors influencing the intention to make a repeat purchase in order to help companies retain customers in the very competitive digital marketplace.

The study's novelty is its focus on the underexplored intersection of product packaging and consumer repurchase intention in case of online platform. Other key novelty of this study is it consider both emotional and functional roles of packaging in online shopping experiences. According to the report, the unpacking experience has a significant impact on customer satisfaction and loyalty, particularly when it comes to characteristics like as eye-catching design and vibrant colors (Labrecque & Milne, 2012). Furthermore, it combines the increasing relevance of sustainability by exploring how eco-friendly materials affect repurchase intentions, which is compatible with fresh client wishes for firms that practice environmental responsibility (Steenis et al., 2017). Furthermore, a detailed analysis of how printed material relates to customer loyalty in e-commerce is needed. This study fills this knowledge vacuum in a novel way by providing fresh perspectives on how packaging might foster communication and increase customer trust.

2. Literature review and hypothesis design

2. 1. Packaging design

Packaging design includes shapes, images, layouts, and other aesthetically pleasing components of a product's external appearance. The design becomes crucial in online purchases since it reflects the brand's image and provides the first physical interaction the customer encounters during the unwrapping process (Rundh, 2009). Well-designed packaging provides value by invoking emotions and leaving a lasting impression, which can promote repurchase intentions. According to Arun Kumar Agariya (2012) emotions regarding the packaging of consumer goods and retail consumers really

transferred creative forms of packaging, expressing how you feel about the expansion of complexity and packaging to build an iconic brand image in numerous forms. Brand choice is the tendency to choose one brand of a product over another similar brand. Because of this, packaging design has been used as a strategy to set products apart and build brand value (Vazquez et al., 2003). Children are very sensitive in case of wrapper design. So, the corporation has to create a wrapper design that attracts children. Good and well-planned designs are eye-catching, differentiate products on shelves, and attract people more easily (Zekiri & Hasani, 2015). Packaging can significantly impact whether a product is successful or unsuccessful. A product's success depends heavily on how its designers create it. Some contend that the package design gives the product life and individuality, while others view it as a simple protection that only protects a product (Alervall & Saied, 2013).

Rundh (2009) emphasized that Creative packaging designs increase consumer engagement and brand visibility. Silayoi and Speece (2007) found that by providing product information and emotional appeal, packaging design significantly impacts consumer buying decisions. Magnier and Schoormans (2015) identified that appealing and useful packaging facilitates a satisfying customer experience, which can result in repeat business and brand loyalty. A thoughtfully designed package increases customer pleasure, fosters emotional bonds, and increases trust—all of which positively affect repurchase intentions. One example is that designs that are visually beautiful and ergonomic make the unboxing experience memorable, increasing the possibility of repeat purchases from the same company (Magnier & Schoormans, 2015).

H₁: Packaging design has a positive impact on repurchase intention.

2. 2. Packaging color

The color of the packaging is an essential component of visual branding since it communicates psychological and emotional clues. Colors create associations with quality, trust, and attraction, which affects consumer perceptions, product assessments, and purchasing decisions (Labrecque & Milne, 2012). In e-commerce, where buyers mostly rely on images, color becomes a significant consideration. According to Hannele Kauppinen-Raisanen (2010), standard products with similar hues are typically acceptable, mainly when the product line is widely available. It has been demonstrated that colors significantly impact how colors are perceived. The appropriate selection of colors is crucial in establishing the impression required to influence brand and product decisions (Gofman, 2010). The package's color can significantly impact customers' ability to identify the goods. The color of the packaging attracts the attention of the customers. Each color has a different value depending on how the person sees it (Poturak, 2014).

People will only care about buying the product if the color is right. Each color the packaging uses aims to highlight and attract distinct emotions (Ali et al., 2015). Colors inspire intense emotions. It can set off both positive and negative feelings and ideas (Sayed, 2022). A lot of information can be gathered from colors. In fact, between 62% and 90% of people's judgments and decisions are based on colors alone (Singh, 2006). People first notice the packaging, especially the logos and colors. Graphics and colors that catch the eye have a long-lasting effect on people's buying decisions (Mohebbi, 2014). Color is essential in many marketing areas, including logo design, advertising, shop atmosphere, and packaging (Marozzo et al., 2020). Companies need to know what meanings people attach to different packaging colors to share their brand positioning goals effectively. Through color, brands can build distinctive visual identities, forge strong connections with their target consumers, and separate themselves from other potential competitors (Labrecque & Milne, 2011). Kauppinen-Raisänen (2014) highlighted that Colors affect customer retention by evoking feelings and reaffirming company identification. Labrecque and Milne (2012) demonstrated that Using color schemes consistently in packaging and marketing materials fosters customer loyalty and trust. Grossman and Wisenblit (1999)

found that Packaging color affects consumers' perception and attention, mainly when it reflects cultural preferences. When it comes to repeat purchases, the color of the packaging significantly impacts consumers' feelings and connections with the brand. For example, using appealing and consistent colors improves brand recognition, makes unpacking enjoyable, and encourages loyalty (Kauppinen-Räsänen, 2014).

H₂: Packaging color has a positive impact on repurchase intention.

2. 3. Packaging material

The term "packaging material" describes the tangible materials used to package products, such as cardboard, plastic, and eco-friendly substitutes. Superior materials raise perceived value, and eco-friendly products appeal to customers who care about the environment (Rokka & Uusitalo, 2008). Durability and sustainability of materials are essential considerations in online purchases since they guarantee product safety in transportation and demonstrate the brand's dedication to accountability and quality. Since packing materials were first used long ago, their applications are highly diverse and include natural, synthetic, single, and composite materials. The most widely used materials currently can be divided into four categories: glass, metal, plastic, and paper packaging materials (Hong and Suhua, 2011).

It is also essential to consider how different packaging materials affect the environment. As people around the world become more aware of environmental issues, the use of sustainable products has received considerable attention. Eco-friendly and biodegradable materials are becoming popular since they cut waste and support sustainability initiatives. For example, Singh et al. (2017) argue that Using bio-based packaging materials can reduce packaging's environmental impact without sacrificing usability or aesthetic appeal. Due to the high energy consumption (embodied) and environmental issues linked to packaging materials, it is essential to consider the appropriate utilization of packaging materials from the perspective of the environment (Varun et al., 2016). Packaging material wraps around the outside of a product to keep it from getting damaged (Ali et al., 2015). Furthermore, materials impact how well a product is viewed; therefore, how consumers view particular materials may also impact how well a product is regarded (Oaya et al., 2017). Rokka and Uusitalo (2008) highlighted that Sustainable materials have a beneficial impact on how environmentally conscious consumers perceive a company. Ampuero and Vila (2006) stressed the necessity of long-lasting packing materials in maintaining product integrity, especially in e-commerce.

Durable and environmentally friendly materials are essential for customer satisfaction in online purchasing since product safety during shipping is a concern (Lockshin & Corsi, 2012). In addition, the demand for environmentally friendly packaging materials has increased dramatically, which aligns with worldwide environmental concerns. High-quality, useful, and environmentally friendly materials improve the consumer's post-purchase experience, leading to increased satisfaction and loyalty, which are important factors in determining the likelihood of future purchases (Rokka & Uusitalo, 2008).

H₃: Packaging material has a positive impact on repurchase intention.

2. 4. Printed information

Print information, which includes details on packaging, includes product descriptions, usage directions, brand logos, sustainability certificates, and other visual and linguistic features. It has been discovered that buyers focus more on printed content when buying high-involvement products (Kupiec & Revell, 2001). In contrast, buyers are more likely to focus on visual appeal while buying products with minimal involvement. The printing of a product's packaging, including labels, is an essential component of the product's overall appeal and aesthetics. The text printed on the packaging serves as the primary connection between the product and the consumer. It details the brand, the product, and sometimes prices and deals (Simske & Sturgill, 2009). One purpose of packaging is to convey product

information, which can help customers make thoughtful selections. Food labels are one instance of such vital information (Silayoi & Speece, 2007). Package layout is essential for information presentation.

Eldesouky & Mesias (2014) discovered that while reading printed materials, people focus more on nutritional content, brand name, price, and expiration date. Labels with helpful information for consumers or users are also written on significant products. If product information were not included on the label of primary packaging, consumers would frequently be unaware of the identity, manufacturer, nutritional value, ingredients, handling recommendations, and storage of many items that are consumed daily (Pascall, 2020). Branding components like slogans, logos, and promotional messaging are used in printed materials to help establish a unique brand identity. Ampuero and Vila (2006) contend that packaging's marketing effectiveness can be increased by strategically using printed content to improve brand recall and recognition. Furthermore, printed information should align with regulatory requirements to ensure compliance and consumer safety. The information printed on the packaging serves as a means of communication between the consumer and the product they are interested in purchasing; it contains all of the information pertaining to the product's usage, its ingredients, instructions for usage, and warnings. The cost of manufacturing, delivering, and exhibiting the packaging must be considered when creating the packaging (Sayed, 2022). When consumers see a product with necessary and clear information, they often try to repurchase it, and this happens often in online shopping.

Azzi et al. (2012) identified that customer satisfaction and trust are increased when written information is clear and correct. Wells et al. (2007) found that detailed labelling helps people understand products better and lowers confusion after the fact. Ahmed et al. (2014) emphasized that informative packaging has a favourable impact on brand loyalty, particularly in highly competitive areas such as e-commerce. Packaging that provides clear and correct printed information increases customer pleasure and trust, both of which have a favourable impact on repurchase intentions. For instance, thorough product descriptions and usage guidelines can boost customers' confidence in their purchases and increase the likelihood of sticking with a brand (Wells et al., 2007).

H₄: Printed information has a positive impact on repurchase intention.

2. 5. Repurchase intention

Repurchase intention (RI) refers to a customer's decision to partake in future interactions with a service provider and the nature of these interactions. RI is a consequence of the customer's perception of the service performance (Hume et al., 2007). E-commerce websites, as a novel medium for commerce, have transformed how consumers acquire products or services. Customers are becoming accustomed to purchasing products or services from e-commerce websites rather than visiting physical stores. Online repurchase highlights customer behavior. The desire to repurchase online is a concept that integrates information systems theory and marketing theory (Wen et al., 2011). Numerous empirical research (Grewal et al., 2009) have demonstrated that a satisfying online shopping experience can enhance the desire to make repeat purchases. The companies promote their items via online shopping and must also focus on consumer pleasure and repurchase intention. Consumer satisfaction with online shopping performance positively influences their repurchase intention (L.D. Pleessis, 2010).

In e-commerce apps, client repurchase intent emerges following a purchase accompanied by a sense of pleasure with the shopping experience provided by the application. Electronic satisfaction derived from utilizing e-commerce apps is called e-satisfaction (Pandiangan et al., 2021). Repurchase interest refers to the purchasing behavior exhibited by consumers following their initial acquisition of a product or service. It is characterized by repeated transactions over a specified duration, driven by a favorable

disposition and positive experiences with the product or service (Sihombing et al., 2021). Repurchase intention arises after customers acquire goods or services. Favorable perceptions of packaging design, appealing colors, premium materials, and reliable written information substantially enhance consumers' desire to repurchase. Research has repeatedly demonstrated that package components improve the initial purchasing choice and bolster customer satisfaction and loyalty, resulting in repeat purchases (Chae & Lee, 2013).

2. 6. Conceptual framework

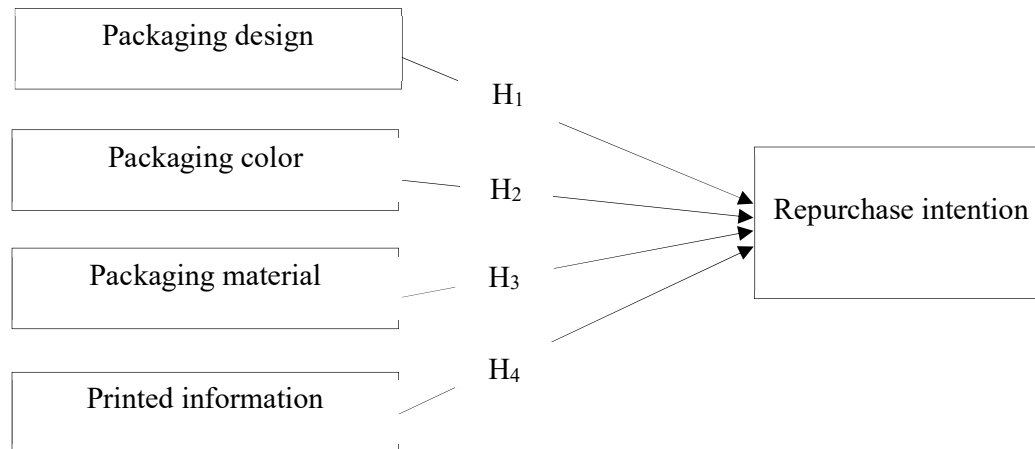


Figure 1. Conceptual Framework

The conceptual framework describes the relationship between four independent variables—packaging design, packaging color, packaging material, and printed information—and the dependent variable, repurchase intention. Packaging Design (H₁): It is posited that appealing and innovative designs favorably affect repeat purchases. Packaging Color (H₂): Colors that elicit favorable feelings or correspond with brand identity may promote repurchase. Packaging Material (H₃): Robust and environmentally sustainable materials are anticipated to increase consumers' propensity to repurchase. Printed Information (H₄): Precise and transparent information on packaging fosters consumer confidence and encourages repeat purchases. The theory indicates that these packaging characteristics jointly influence consumers' inclinations to repurchase in online purchasing scenarios.

3. Research methodology

3. 1. Questionnaire design

The questionnaire was created to examine the impact of product packaging on consumers' intentions to repurchase in online transactions. Each item in the questionnaire was evaluated using a 5-point Likert scale, wherein respondents expressed their degree of agreement with each statement (5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree). The remarks were classified according to repurchase intention, packaging design, packaging color, packaging material, and printed information. The questionnaire consisted of two sections: Demographic data and empirical data. The questionnaire underwent pre-testing with a limited sample, and requisite adjustments were implemented to enhance the clarity and validity of the content.

3. 2. Sampling process

A simple random sampling technique was used to make the sampling process clear and impartial. The sample consisted of people from various professions residing in Dinajpur district. The sample size was

chosen based on the rules for Partial Least Squares-Structural Equation Modeling (PLS-SEM), which say that there should be at least 10 times as many signs of the most complicated construct (Sarstedt et al., 2021).

3. 3. Data collection

Necessary data were collected using structured questionnaires through google form across Dinajpur district. The questionnaire was used to collect information about the respondent's perception of product packaging and its influence on their repeat purchase intentions. We ensured privacy of the participants when collecting the data. The final dataset consisted of 211 responses.

3. 4. Measurement model

To measure the relationships of packaging design, packaging color, packaging material, and printed information with repeat purchase intention, the study used Partial Least Squares Structural Equation Modeling (PLS-SEM). The study evaluated reliability and validity, used factor loadings to measure each item's contribution, and used hypothesis testing to identify the significance of the correlations between variables. Analyzing the structural connections was done using SmartPLS 4.1.0.

3. 5. Statistical tools and techniques

We used various tools and software to ensure accuracy in the analysis process, including Microsoft Office for organizing gathered data and entering preliminary data, SPSS for examining means, standard deviations and frequency distributions, Smart PLS 4.1.0 for assessing the structural and measurement models and Turnitin to ensure the study was free of plagiarism. We utilized Grammarly to improve the grammatical quality of the content and QuillBot to ensure the clarity of the phrases during paraphrasing.

Analysis and result discussion

Table 1: Demographic Profile

| Particulars | | Frequency | Percentage (%) |
|--------------------|----------|-----------|----------------|
| Gender | Male | 112 | 53.1 |
| | Female | 99 | 46.9 |
| Age (Years) | Below 20 | 58 | 27.5 |
| | 21-30 | 145 | 68.7 |
| | 31-40 | 8 | 3.8 |
| | Above 40 | | |
| Profession | Student | 186 | 88.2 |
| | Business | 2 | 0.9 |
| | Service | 11 | 5.2 |
| | Others | 12 | 5.7 |

The gender distribution of the respondents in Table 1 indicates that among 211 participants, male respondents comprise 53.1% (112 participants), reflecting a slight majority, while female respondents

account for 46.9% (99 individuals). The equitable gender representation indicates that the study encompasses insights from both sexes, illustrating varied viewpoints on the impact of product packaging on consumer repurchase intention. 68.7% of respondents (145 participants) belong to the 21–30 age group, indicating that young adults constitute the bulk of the sample. 27.5% (58 individuals) are under 20 years of age, being the second-largest age cohort. A small percentage of respondents, 3.8% (8 participants), belong to the 31–40 age group, with no responses over 40. This age profile suggests that the study predominantly represents the interests and actions of younger consumers, presumably more involved in internet purchasing. The sample predominantly consists of students, accounting for 88.2% (186 participants), indicating that the data primarily represents the views of an academic demographic. Participants from the service sector constitute 5.2% (11 individuals). The business sector is inadequately represented, including about 0.9% (2 participants). Others comprise 5.7% (12 participants), potentially encompassing freelancers, homemakers, or other vocations. This distribution suggests that the study predominantly reflects students' perspectives, affecting the generalizability of the findings to other professional cohorts.

Table 2: Reliability and Validity Test

| Variables | Item code | Factor loading value | Cronbach's alpha | Composite reliability (rho_a) | Composite reliability (rho_c) | Average variance extracted (AVE) |
|----------------------|-----------|----------------------|------------------|-------------------------------|-------------------------------|----------------------------------|
| Packaging color | PC1 | 0.868 | 0.832 | 0.832 | 0.899 | 0.749 |
| | PC2 | 0.869 | | | | |
| | PC3 | 0.859 | | | | |
| Packaging design | PD1 | 0.829 | 0.849 | 0.858 | 0.909 | 0.769 |
| | PD2 | 0.919 | | | | |
| | PD3 | 0.880 | | | | |
| Printed information | PI1 | 0.910 | 0.902 | 0.902 | 0.939 | 0.837 |
| | PI2 | 0.935 | | | | |
| | PI3 | 0.898 | | | | |
| Packaging material | PM1 | 0.926 | 0.92 | 0.922 | 0.949 | 0.862 |
| | PM2 | 0.914 | | | | |
| | PM3 | 0.945 | | | | |
| Repurchase intention | RI1 | 0.872 | 0.855 | 0.856 | 0.912 | 0.775 |
| | RI2 | 0.878 | | | | |
| | RI3 | 0.891 | | | | |

Table 2 represents the loadings value where each indicator variable corresponds with its respective latent construct. All factor loadings surpass the threshold of 0.7, signifying robust correlations between indicators and their corresponding constructs. Illustrations: Packaging Color (PC): Loadings for PC1, PC2, and PC3 vary from 0.859 to 0.869, indicating a strong latent variable representation. Packaging Design (PD): Loadings vary from 0.829 to 0.919. Packaging Material (PM): All indicators exhibit loadings exceeding 0.9, indicating substantial associations. Repurchase Intention (RI): The indicators vary from 0.872 to 0.891, demonstrating a strong correlation with the construct. Cronbach's Alpha and Composite Reliability (CR) values: All constructions surpass the minimum threshold of 0.7, indicating internal consistency and reliability of the constructs. For instance, Packaging Material (PM) exhibits the highest reliability, with a Cronbach's Alpha of 0.92 and a Composite Reliability (CR) of 0.949. Average Variance Extracted (AVE): All AVE values exceed the criterion of 0.5, confirming that constructs account for a minimum of 50% of the Variance in their indicators. For example, the Average

Variance Extracted (AVE) for the Project Management (PM) construct is 0.862, signifying robust convergent validity.

Table 3. Discriminant validity: Heterotrait-Monotrait ratio (HTMT) matrix

| | PC | PD | PI | PM | RI |
|----|-------|-------|-------|-------|----|
| PC | | | | | |
| PD | 0.832 | | | | |
| PI | 0.547 | 0.488 | | | |
| PM | 0.72 | 0.617 | 0.673 | | |
| RI | 0.784 | 0.73 | 0.754 | 0.828 | |

The HTMT ratio evaluates discriminant validity by analyzing the relationships among constructs (Table 3). A threshold of < 0.85 (strict criterion) or < 0.90 (lenient criterion) is typically recognized for establishing discriminant validity in HTMT. Packaging Design (PD) and Packaging Color (PC): HTMT = 0.832. This score is below 0.85, signifying strong discriminant validity between these two constructs. Packaging Design (PD) and Printed Information (PI): HTMT = 0.488. The number is markedly below 0.85, indicating robust discriminant validity. Packaging Material (PM) and Printed Information (PI): HTMT = 0.673. This value is also below 0.85, so affirming sufficient discriminant validity. Repurchase Intention (RI) and further constructs PC (0.784), PD (0.73), PI (0.754), and PM (0.828) all fall below 0.85, indicating that RI is separate from the other components. All HTMT values in the matrix are below 0.85, signifying adequate discriminant validity among all constructs. This suggests that each construct (PD, PC, PM, PI, and RI) is conceptually unique within the framework of the investigation.

Table 4. Discriminant validity: Fornel-Larcker criterion

| | PC | PD | PI | PM | RI |
|----|--------------|--------------|--------------|--------------|--------------|
| PC | 0.865 | | | | |
| PD | 0.702 | 0.877 | | | |
| PI | 0.474 | 0.429 | 0.915 | | |
| PM | 0.63 | 0.547 | 0.614 | 0.928 | |
| RI | 0.661 | 0.624 | 0.664 | 0.735 | 0.880 |

In Table 4, the Fornell-Larcker criterion assesses discriminant validity by contrasting each construct's square root of the Average Variance Extracted (AVE) with its correlations to other components. A construct must account for more variation in its indicators than it shares with other constructs; specifically, the diagonal value (square root of AVE) should exceed the off-diagonal values within the corresponding row or column. Packaging Design (PD): Square root of Average Variance Extracted (AVE) (diagonal value) = 0.877. This exceeds its associations with PC (0.702), PI (0.429), PM (0.547), and RI (0.624). Discriminant validity has been established. Packaging Color (PC): Square root of Average Variance Extracted (AVE) equals 0.865. This exceeds its correlations with other constructs (e.g., PD = 0.702, PI = 0.474, PM = 0.63, RI = 0.661). Discriminant validity is affirmed. Printed Information (PI): The square root of AVE equals 0.915. The diagonal value of PI surpasses its correlations with all other constructs (e.g., PD = 0.429, PC = 0.474, PM = 0.614, RI = 0.664), affirming its validity. Packaging Material (PM): The Average Variance Extracted (AVE) square root is 0.928. The result surpasses correlations with other constructs (e.g., PD = 0.547, PC = 0.63, PI = 0.614, RI =

0.735). Repurchase Intention (RI): The square root of the Average Variance Extracted (AVE) equals 0.880. The diagonal value of RI exceeds its correlations with other constructs (e.g., PC = 0.661, PD = 0.624, PI = 0.664, PM = 0.735). Each concept's square root of the Average Variance Extracted (AVE) exceeds its correlations with other constructs, affirming discriminant validity.

Table 5. Collinearity statistics (VIF) – Inner model – Matrix

| | PC | PD | PI | PM | RI |
|-----------|----|----|----|----|-------|
| PC | | | | | 2.388 |
| PD | | | | | 2.055 |
| PI | | | | | 1.648 |
| PM | | | | | 2.147 |
| RI | | | | | |

The Table 5 displays the collinearity diagnostics for the inner model via the Variance Inflation Factor (VIF). VIF quantifies the extent to which the variance of a regression coefficient is augmented due to multicollinearity among the predictor variables. Lower VIF values signify negligible multicollinearity, but elevated values (exceeding 5 or 10) indicate concerning amounts of multicollinearity. Packaging Color (PC): VIF equals 2.388. This result is beneath the threshold of 5, signifying that multicollinearity is not an issue for this design. Packaging Design (PD): Variance Inflation Factor (VIF) = 2.055. This result falls within the permitted range, indicating the absence of multicollinearity concerns. Printed Information (PI): Variance Inflation Factor (VIF) = 1.648. This build exhibits the lowest VIF, signifying negligible multicollinearity for this variable. Packaging Material (PM): VIF = 2.147. This result is comfortably within the permitted range, indicating the absence of multicollinearity issues. Repurchase Intention (RI): The table does not give a direct VIF value for RI, as it presumably functions as the dependent variable. All VIF values are beneath the standard threshold of 5, indicating minimal multicollinearity among the independent variables. This signifies that the independent variables (PC, PD, PI, and PM) do not substantially overlap in their explanation of variance in the dependent variable (RI). Low VIF values indicate that the constructs are independent and appropriate for structural equation modeling (SEM).

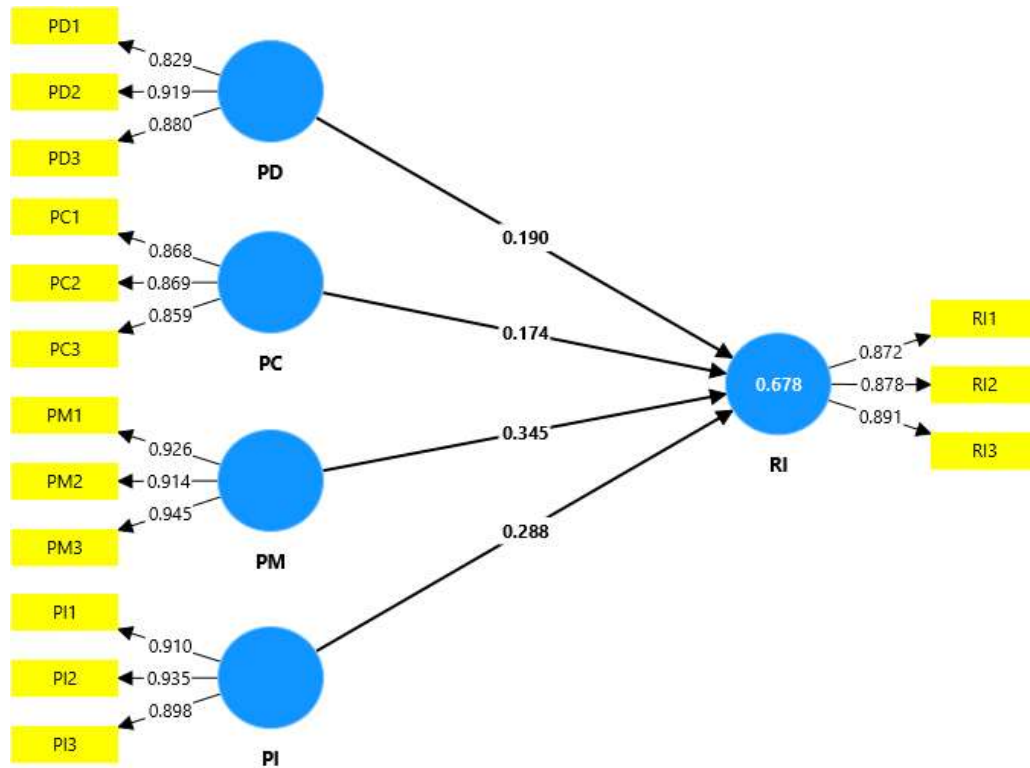


Figure 2. Model resolution by Smart PLS using PLS-SEM algorithm

Table 6: Path Analysis

| Path Direction | Original sample (O) | Standard deviation (STDEV) | T statistics (O/STDEV) | P values | Decision |
|----------------|---------------------|----------------------------|--------------------------|----------|----------|
| PC -> RI | 0.174 | 0.076 | 2.292 | 0.022 | Accepted |
| PD -> RI | 0.190 | 0.078 | 2.433 | 0.015 | Accepted |
| PI -> RI | 0.288 | 0.06 | 4.804 | 0.000 | Accepted |
| PM -> RI | 0.345 | 0.08 | 4.282 | 0.000 | Accepted |

Table 6 displays the path analysis findings, illustrating the correlation between the independent factors (packaging color, packaging design, printed information, and packaging material) and the dependent variable (repeat purchase intention). The analysis encompasses the original sample (O), standard deviation (STDEV), t-statistics, p-values, and decision results. The impact of each variable on repeat purchase intention is assessed by Structural Equation Modeling (SEM).

Packaging Color (PC) => Repeat Purchase Intention (RI): Original Sample (O): 0.174, T-statistics: 2.292, P-value: 0.022, Decision: Accepted. The color of packaging substantially affects consumers' inclination to repurchase. The positive path coefficient (0.174) signifies that visually appealing packaging colors enhance buyers' propensity to repurchase. The t-statistic (2.292) exceeds the critical value of 1.96, and the p-value (0.022) is below 0.05, affirming this relationship's statistical importance. Packaging Design (PD) => Repeat Purchase Intention (RI): Original Sample (O): 0.190, T-statistics: 2.433, P-value: 0.015, Decision: Accepted. Packaging design significantly influences the intention to repurchase, evidenced by a path coefficient of 0.190. This indicates that attractive and functional

packaging design encourages people to repurchase products. The t-statistic (2.433) surpasses the crucial value, and the p-value (0.015) demonstrates substantial statistical significance. Printed Information (PI) => Repeat Purchase Intention (RI): Original Sample (O): 0.288, T-statistics: 4.804, P-value: 0.000, Decision: Accepted. Printed information on product packaging significantly enhances the inclination to repurchase. The path coefficient of 0.288 is very high, signifying that comprehensive and precise product information fosters consumer trust and promotes repurchase behavior. The t-statistic (4.804) and p-value (0.000) furnish compelling evidence to affirm this association. Packaging Material (PM) => Repeat Purchase Intention (RI): Original Sample (O): 0.345, T-statistics: 4.282, P-value: 0.000, Decision: Accepted. The packaging material significantly affects repeat purchase intention, evidenced by a path coefficient 0.345. This finding underscores that consumers prioritize the quality and sustainability of packaging materials. The elevated t-statistic (4.282) and a p-value of 0.000 validate the considerable and statistically significant association. The path analysis results indicate that all four independent variables—packaging color, packaging design, printed information, and packaging material—positively and significantly affect consumers' desire to repurchase.

4. 1. Discussion

This study's findings highlight the complex influence of product packaging on consumers' intentions to repurchase in online shopping. The structural model and hypothesis testing demonstrate substantial correlations between the independent variables—packaging design, packaging color, packaging material, and printed information—and the dependent variable, repurchase intention. These findings align with prior studies and provide significant insights into customer behavior dynamics in e-commerce contexts.

The design of packaging substantially affects consumer repurchase intention, demonstrated by its path coefficient (0.190, $p = 0.015$). This discovery corresponds with previous research emphasizing the significance of aesthetically pleasing and useful packaging in establishing an emotional bond with consumers (Rundh, 2009; Magnier & Schoormans, 2015). In online transactions, where the initial physical touch takes place during unwrapping, a meticulously crafted design improves the customer experience, creating a lasting impact and promoting brand loyalty. Aesthetically pleasant layouts and ergonomic designs draw attention and enhance the unboxing experience, potentially resulting in repeat purchases (Zekiri & Hasani, 2015). The influence of container color on repurchase intention is moderate yet significant, as evidenced by its path coefficient (0.174, $p = 0.022$). Color serves as a potent visual signal that elicits emotions, improves brand awareness, and shapes customer views (Labrecque & Milne, 2012). The outcomes of this study support previous studies indicating that consistent and attractive color schemes enhance brand recall and cultivate favorable emotional associations (Kauppinen-Räsänen, 2014). Vivid and appealing colors can elevate the unpacking experience, rendering it memorable and fostering loyalty. Nonetheless, the somewhat diminished influence of color relative to other packaging characteristics indicates that, although color holds significance, it is frequently more efficacious when combined with additional packaging components. Packaging material was identified as the primary predictor of repurchase intention, exhibiting a path coefficient of 0.345 ($p < 0.001$). This underscores the essential importance of material quality and sustainability in shaping consumer behavior. Premium, resilient materials guarantee product safety during transportation, especially in e-commerce, when the likelihood of damage is elevated (Rokka & Uusitalo, 2008). The utilization of sustainable resources appeals to environmentally aware consumers, bolstering the company's reputation and loyalty. The results correspond with Steenis et al. (2017), who highlighted that sustainable materials signify brand responsibility and address increasing customer expectations for eco-friendly actions. This highlights the dual function of packing materials in fulfilling practical requirements and enhancing brand values. Printed information considerably influences repurchase intention, as demonstrated by its path coefficient (0.288, $p < 0.001$). Clear and comprehensive written information fosters consumer trust by ensuring transparency and enabling

educated decision-making (Wells et al., 2007). In the realm of online transactions, where the tactile examination is unfeasible, printed information, including product specifications, usage guidelines, and sustainability certificates, is essential. This research corroborates the assertions of Ampuero and Vila (2006), who contended that informative packaging improves brand recall and consumer trust. Furthermore, the provision of precise and comprehensive information diminishes post-purchase ambiguity, enhancing satisfaction and loyalty.

5. Conclusion

This study examines the significant impact of product packaging on consumers' intentions to repurchase in online shopping. The results highlight that packaging characteristics—design, color, material, and written information—substantially affect repurchase intentions, with packaging material demonstrating the most significant impact. Packaging design cultivates emotional connections and improves customer experience during unwrapping, whilst packaging color promotes brand recognition and provokes emotional reactions. Eco-friendly and premium packaging materials guarantee product safety and correspond with customer inclinations for sustainable activities. Concise and comprehensive printed information fosters trust and alleviates post-purchase apprehensions. These data highlight that product packaging serves as a protective barrier and a strategic instrument to enhance consumer loyalty and stimulate repeat purchases in the competitive e-commerce environment. The research further corroborates the conceptual framework, demonstrating a robust model match. The components jointly account for 67.8% of the variance in repurchase intention, demonstrating the robustness of the findings. The substantial impact of each packaging aspect underscores the complex role of packaging in shaping customer behavior, especially in the online buying environment when tactile product engagement is restricted.

5.1 Implication

Companies should invest in visually appealing and ergonomically crafted packaging to improve the unboxing experience and reinforce emotional connections with consumers. To create a memorable impact, visual components, including shapes, layouts, and visuals, must correspond with brand identity. Companies must meticulously choose color schemes that align with their target audience's preferences and cultural values. Consistent application of colors can enhance brand awareness and cultivate loyalty. Highlighting sustainable and resilient packaging materials can appeal to environmentally aware consumers and enhance the company's reputation. Companies ought to convey their environmental initiatives via certifications and labels. Delivering precise, transparent printed information encompassing product attributes, usage instructions, and sustainability assertions can foster trust and diminish post-purchase discontent. This research enhances the literature on e-commerce and customer behavior by examining the overlooked connection between packaging characteristics and repurchase intentions. The results underscore the simultaneous emotional and functional aspects of packaging in online buying, establishing a basis for future research on consumer-brand connections.

5.2 Future work

Subsequent research could increase the sample size and incorporate participants from various locations and nations to improve the generalizability of the results. Examining the function of packaging in specific sectors, whether food, cosmetics, or electronics, may yield tailored recommendations for enterprises. Investigating the impact of demographic variables, including age, gender, and income level, on packaging choices may provide an enhanced understanding of consumer behavior. Future research may investigate the effects of integrating bright packaging elements, such as QR codes and augmented reality, on consumer engagement and loyalty. Subsequent research could investigate the quantifiable impacts of sustainable packaging on consumer confidence and enduring brand allegiance. By exploring these areas, subsequent research can expand upon this study's findings to formulate

comprehensive methods for utilizing packaging as a pivotal factor influencing consumer behavior in e-commerce.

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