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## **Consumer Awareness and Acceptance of Sustainable Packaging in the Food and Beverage Industry: The Mediating Roles of Attitude and Willingness to Pay**

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### **Abstract**

The growing environmental impact of packaging waste has intensified the need for sustainable packaging solutions in the food and beverage industry. This study examines consumer awareness and acceptance of sustainable packaging, focusing on the mediating roles of attitude toward sustainable packaging and willingness to pay in shaping purchase intention. Primary data were collected from 412 consumers of packaged food products using a structured questionnaire. The data were analyzed using descriptive statistics, reliability analysis, exploratory factor analysis (EFA), and structural equation modeling (SEM). The findings reveal that consumers possess a moderate level of awareness regarding sustainable packaging, accompanied by positive attitudes and a moderate willingness to pay a price premium for environmentally friendly packaging. Purchase intention toward sustainably packaged food products was found to be relatively high. The results further indicate that attitude and willingness to pay partially mediate the relationship between sustainable packaging awareness and purchase intention. The study offers valuable insights for policymakers, marketers, and food manufacturers to design effective communication and pricing strategies that encourage the adoption of sustainable packaging practices.

**Keywords:** Sustainable packaging, Consumer awareness, Attitude toward sustainable packaging, Willingness to pay, Purchase intention, Food and beverage industry

### **1. Introduction**

The rapid growth of the global food and beverage industry has led to a significant increase in packaging consumption, making packaging waste one of the most pressing environmental challenges of the modern era. Conventional packaging materials, particularly plastics, have contributed substantially to environmental pollution, landfill accumulation, and marine ecosystem degradation. As a result, sustainable packaging has emerged as a critical strategy for reducing the



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environmental footprint of packaged food products while maintaining product safety, quality, and convenience [1]. Governments, regulatory bodies, and international organizations are increasingly advocating for environmentally responsible packaging solutions, placing pressure on manufacturers and retailers to transition toward sustainable alternatives.

Sustainable packaging broadly refers to packaging solutions that minimize environmental impact through the use of recyclable, biodegradable, compostable, or renewable materials, while also supporting resource efficiency across the product life cycle [2]. In the context of the food and beverage industry, sustainable packaging is particularly important due to the high volume and frequency of food consumption and the resulting packaging waste generated at the household level. However, despite technological advancements and increased availability of eco-friendly packaging materials, the adoption of sustainable packaging remains uneven across markets, largely due to consumer-related factors [3].

Consumers play a pivotal role in determining the success of sustainable packaging initiatives, as their purchasing decisions directly influence market demand. Prior research suggests that consumer acceptance of sustainable packaging is shaped not only by environmental concern but also by awareness, attitudes, trust, perceived value, and economic considerations such as price sensitivity [4]. While many consumers express concern for environmental sustainability, a notable gap persists between positive environmental attitudes and actual purchasing behavior, often referred to as the attitude–behavior gap [5]. This gap is particularly evident in the food and beverage sector, where price, convenience, and brand familiarity frequently outweigh sustainability considerations at the point of purchase.

Consumer awareness of sustainable packaging is a foundational element influencing pro-environmental behavior. Awareness includes knowledge of packaging materials, understanding of environmental impacts, and the ability to recognize sustainability labels and claims on food packaging [1], [6]. Studies have shown that consumers with higher levels of awareness are more likely to evaluate packaging beyond functional attributes and consider its environmental implications [7]. However, awareness alone does not automatically translate into purchase intention, suggesting the need to examine additional psychological and economic mechanisms that mediate this relationship.

Attitude toward sustainable packaging represents an important psychological factor that bridges awareness and behavioral intention. Attitudes reflect consumers' overall evaluations, beliefs, and emotional responses toward environmentally friendly packaging practices [8]. Positive attitudes toward sustainable packaging have been associated with enhanced brand perception, increased trust in companies, and stronger intentions to support sustainable products [9]. In the food and beverage industry, packaging often serves as a visible indicator of a firm's environmental responsibility, thereby influencing consumers' moral and ethical evaluations of brands [10].



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Consequently, attitude toward sustainable packaging is widely recognized as a key mediator in consumer decision-making models.

In addition to attitudinal factors, economic considerations play a decisive role in shaping consumer acceptance of sustainable packaging. Willingness to pay a premium for eco-friendly packaging reflects the extent to which consumers are prepared to support sustainability financially [11]. Empirical evidence indicates that although consumers generally favor sustainable packaging, their willingness to pay higher prices remains moderate and varies across income levels, cultural contexts, and product categories [12]. In developing and price-sensitive markets, economic constraints often limit consumers' ability to convert positive attitudes into actual purchasing behavior [13]. Therefore, willingness to pay serves as a critical economic mediator that determines whether sustainability awareness and attitudes translate into purchase intention.

Recent studies have also highlighted that consumers themselves can act as both enablers and barriers in the transition toward sustainable packaging systems [14]. While environmentally conscious consumers can accelerate market adoption, skepticism toward green claims, concerns about product performance, and distrust of corporate motives can hinder acceptance [15]. This underscores the importance of examining sustainable packaging from a consumer-centric perspective that integrates awareness, attitudes, and willingness to pay within a unified analytical framework.

Despite the growing body of literature on sustainable packaging, several research gaps remain. First, much of the existing research has focused on developed economies, with limited empirical evidence from emerging markets where consumption patterns, income structures, and environmental awareness levels differ significantly [11], [13]. Second, prior studies often examine awareness, attitude, or willingness to pay in isolation, rather than analyzing their combined and mediating effects on purchase intention [8]. Third, there is a need for robust empirical models that simultaneously test direct and indirect relationships among these constructs using advanced multivariate techniques.

Addressing these gaps, the present study investigates consumer awareness and acceptance of sustainable packaging in the food and beverage industry, with particular emphasis on the mediating roles of attitude toward sustainable packaging and willingness to pay in influencing purchase intention. The study adopts a structured quantitative approach and employs Exploratory Factor Analysis (EFA) and Structural Equation Modeling (SEM) to test the proposed relationships. By integrating cognitive (awareness), affective (attitude), and economic (willingness to pay) dimensions, the study offers a comprehensive understanding of consumer decision-making related to sustainable packaging.

The findings of this research are expected to contribute to the existing literature by providing empirical evidence on the mechanisms through which sustainable packaging awareness influences



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purchase intention. From a practical perspective, the study offers valuable insights for food manufacturers, retailers, and policymakers to design effective awareness campaigns, pricing strategies, and labeling practices that encourage consumer acceptance of sustainable packaging. Ultimately, understanding consumer behavior in this context is essential for accelerating the transition toward environmentally sustainable packaging systems and supporting broader sustainability goals in the food and beverage industry.

## 2. Literature Review

The concept of sustainable packaging has gained significant attention in recent years due to growing concerns over environmental degradation, plastic pollution, and unsustainable consumption patterns. Packaging, particularly in the food and beverage industry, represents a major source of solid waste, prompting researchers and policymakers to explore eco-friendly alternatives. Sustainable packaging is commonly defined as packaging that minimizes environmental impact through the use of recyclable, biodegradable, compostable, or renewable materials while maintaining product safety and functionality [1]. Scholars argue that the transition toward sustainable packaging is not only a technological challenge but also a behavioral one, as consumer acceptance plays a decisive role in market adoption [2].

Consumer awareness of sustainable packaging is widely recognized as a foundational factor influencing environmentally responsible consumption. Awareness encompasses consumers' understanding of packaging materials, environmental consequences of conventional packaging, and familiarity with sustainability labels and symbols [1], [3]. Nguyen et al. [1] emphasize that consumers' definitions of eco-friendly packaging vary considerably, often influenced by personal knowledge, cultural context, and exposure to sustainability information. Similarly, Boz et al. [2], in their comprehensive review, highlight that limited awareness and confusion regarding sustainable packaging concepts remain significant barriers to widespread adoption. These studies suggest that enhancing consumer awareness is a necessary precondition for fostering positive perceptions and acceptance of sustainable packaging.

Beyond awareness, consumer attitude toward sustainable packaging has been identified as a critical psychological determinant of purchasing behavior. Attitude reflects consumers' overall evaluations, beliefs, and emotional responses toward environmentally friendly packaging solutions [4]. Empirical studies demonstrate that favorable attitudes toward sustainable or biobased packaging are associated with increased trust in brands, improved corporate image, and stronger purchase intentions [5]. Herbes et al. [6] conducted a cross-cultural study and found that while consumers generally express positive attitudes toward biobased packaging, these attitudes vary significantly across regions, indicating the influence of cultural and contextual factors. This highlights the importance of examining attitudes within specific market settings.



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Several studies have adopted theoretical frameworks such as the Theory of Planned Behavior (TPB) to explain consumer attitudes and intentions related to sustainable packaging. Molina-Besch and Keszleri [7] applied the TPB framework to investigate drivers and barriers to the adoption of biobased plastics in food packaging. Their findings reveal that attitude is a strong predictor of intention, but its effect is moderated by perceived behavioral control and economic considerations. This reinforces the notion that positive attitudes alone may not be sufficient to drive sustainable purchasing behavior unless supported by enabling conditions.

Economic factors, particularly willingness to pay (WTP), represent another crucial dimension in consumer acceptance of sustainable packaging. Willingness to pay reflects the extent to which consumers are prepared to bear additional costs associated with environmentally friendly packaging [8]. Hao et al. [8], using empirical evidence from China, found that although consumers generally support green packaging, their willingness to pay a price premium is moderate and highly sensitive to income levels and perceived benefits. Similarly, Notaro et al. [9] reported that while consumers express preferences for bioplastic products, price remains a decisive factor influencing final purchase decisions. These findings suggest that economic trade-offs often constrain the translation of positive attitudes into actual purchasing behavior.

The literature also highlights skepticism and trust-related issues as important factors affecting willingness to pay and acceptance. Ferreira-Filipe et al. [10] critically examined biobased plastics and cautioned that not all alternatives marketed as “green” deliver genuine environmental benefits. Such ambiguity can reduce consumer trust and weaken willingness to pay premiums for sustainable packaging. Herbes et al. [11] further argue that consumers themselves can act as barriers to sustainability transitions due to doubts about product performance, greenwashing concerns, and limited perceived personal impact. These insights underscore the importance of transparent communication and credible sustainability claims in influencing consumer behavior.

Purchase intention is commonly used as a proxy for actual buying behavior in sustainability research. Studies consistently show that awareness and attitude positively influence purchase intention toward sustainable products, including packaging [2], [7]. However, the strength of this relationship varies depending on contextual and economic factors. In the food and beverage sector, where purchasing decisions are frequent and often routine, sustainable packaging must compete with traditional determinants such as price, convenience, and brand loyalty [12]. As a result, purchase intention toward sustainable packaging tends to be higher than actual market adoption, reflecting the persistence of the attitude–behavior gap.

Despite the growing body of research on sustainable packaging, several limitations remain evident in the literature. First, many studies focus on single constructs such as awareness or willingness to pay without examining their combined effects within an integrated framework [4], [8]. Second, there is limited empirical research from emerging economies, where income constraints and



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awareness levels differ significantly from developed markets [8]. Third, relatively few studies explicitly test the mediating roles of attitude and willingness to pay in explaining how awareness translates into purchase intention.

### 3. Research Methodology

The present study adopts a quantitative research approach to examine consumer awareness and acceptance of sustainable packaging in the food and beverage industry. A descriptive and analytical research design was employed to analyze the relationships among sustainable packaging awareness, attitude toward sustainable packaging, willingness to pay, and purchase intention.

Primary data were collected using a structured questionnaire designed on a five-point Likert scale ranging from *strongly disagree* to *strongly agree*. The questionnaire consisted of sections covering demographic characteristics, sustainable packaging awareness, attitude toward sustainable packaging, willingness to pay, and purchase intention. The measurement items were developed based on established literature and adapted to suit the context of the study.

The target population comprised consumers who regularly purchase packaged food products. Data were collected from 412 respondents using a purposive sampling technique, ensuring that participants were actively involved in packaged food purchasing decisions.

The collected data were analyzed using descriptive statistics, reliability analysis (Cronbach's alpha), exploratory factor analysis (EFA), and structural equation modeling (SEM). These techniques were used to assess the reliability and validity of the measurement scales and to test the hypothesized relationships among the study variables. The methodological approach ensured robustness, reliability, and suitability for examining both direct and mediating effects within the proposed conceptual framework.

### 4. Results And Data Analysis

This results presents the results obtained from the empirical analysis of primary data collected to examine consumer awareness and acceptance of sustainable packaging in the food and beverage industry. The analysis is structured in a systematic manner, beginning with the demographic and behavioural profile of respondents, followed by reliability analysis, descriptive statistics, and exploratory factor analysis (EFA). Each table is presented with detailed data and is supported by concise interpretative explanations to facilitate clarity and coherence.

#### 4.1 Demographic and Behavioural Profile of Respondents

**Table 1: Frequency Distribution of Respondents by Gender**

Gender	Frequency	Percentage
Male	202	49.0%
Female	210	51.0%
<b>Total</b>	<b>412</b>	<b>100%</b>



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The gender-wise distribution shows an almost equal representation of male and female respondents. Such balance enhances the representativeness of the sample and ensures that gender-related bias in analyzing sustainable packaging awareness and acceptance is minimized.

**Table 2: Frequency Distribution of Respondents by Age Group**

Age Group	Frequency	Percentage
Below 20 years	27	6.6%
21–30 years	132	32.0%
31–40 years	116	28.2%
41–50 years	82	19.9%
Above 50 years	55	13.3%
<b>Total</b>	<b>412</b>	<b>100%</b>

The majority of respondents belong to the economically active age groups of 21–40 years. These groups are more exposed to sustainability communication and actively participate in packaged food purchasing, making them highly relevant to the objectives of the study.

**Table 3: Frequency Distribution of Respondents by Marital Status**

Marital Status	Frequency	Percentage
Single	150	36.4%
Married	220	53.4%
Divorced / Separated	29	7.0%
Widowed	13	3.2%
<b>Total</b>	<b>412</b>	<b>100%</b>

More than half of the respondents are married, indicating a strong representation of family decision-makers who often play a key role in food purchasing decisions. This strengthens the relevance of the findings to real household consumption behavior.

**Table 4: Frequency Distribution of Respondents by Educational Qualification**

Educational Qualification	Frequency	Percentage
Up to Higher Secondary	66	16.0%
Undergraduate	157	38.1%
Postgraduate	152	36.9%
Doctorate / Professional Degree	37	9.0%
<b>Total</b>	<b>412</b>	<b>100%</b>

The sample is highly educated, with more than four-fifths of respondents holding undergraduate or higher qualifications. Education plays a crucial role in shaping awareness and understanding of sustainability concepts, thereby strengthening the validity of the responses.



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**Table 5: Frequency Distribution of Respondents by Occupation**

Occupation	Frequency	Percentage
Student	47	11.4%
Private Sector Employee	138	33.5%
Government Employee	85	20.6%
Self-Employed / Business	66	16.0%
Homemaker	43	10.4%
Unemployed	20	4.9%
Other	13	3.2%
<b>Total</b>	<b>412</b>	<b>100%</b>

The occupational profile indicates a predominance of economically active respondents. Such diversity allows meaningful examination of how employment status influences awareness, willingness to pay, and purchase intention.

**Table 6: Frequency Distribution of Respondents by Monthly Family Income**

Monthly Family Income	Frequency	Percentage
Below ₹20,000	52	12.6%
₹20,001 – ₹40,000	113	27.4%
₹40,001 – ₹60,000	140	34.0%
₹60,001 – ₹80,000	70	17.0%
Above ₹80,000	37	9.0%
<b>Total</b>	<b>412</b>	<b>100%</b>

The income distribution is concentrated in middle-income groups, which is particularly relevant for examining willingness to pay as an economic mediator in sustainable packaging adoption.

**Table 7: Frequency Distribution of Respondents by Place of Residence**

Place of Residence	Frequency	Percentage
Urban	230	55.8%
Semi-Urban	118	28.6%
Rural	64	15.5%
<b>Total</b>	<b>412</b>	<b>100%</b>

A majority of respondents reside in urban areas, aligning with the sampling frame of urban retail consumers, while still allowing comparative insights across different residential contexts.

**Table 8: Frequency Distribution of Respondents by Frequency of Purchasing Packaged Food Products**

Purchase Frequency	Frequency	Percentage
Daily	57	13.8%



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Weekly	185	44.9%
Occasionally	135	32.8%
Rarely	35	8.5%
<b>Total</b>	<b>412</b>	<b>100%</b>

A substantial majority of respondents purchase packaged food products regularly, ensuring that respondents are sufficiently exposed to food packaging and sustainability-related information.

**Table 9: Frequency Distribution of Respondents by Place of Purchase**

Place of Purchase	Frequency	Percentage
Supermarkets	204	49.5%
Local Grocery Stores	100	24.3%
Organic Food Stores	74	18.0%
Online Platforms	34	8.3%
<b>Total</b>	<b>412</b>	<b>100%</b>

Supermarkets dominate as the primary place of purchase, highlighting the importance of organized retail in influencing exposure to sustainable packaging options.

**Table 10: Preferred Type of Food Packaging**

Packaging Type	Frequency	Percentage
Plastic Packaging	150	36.4%
Paper-based Packaging	103	25.0%
Biodegradable / Compostable Packaging	119	28.9%
No Specific Preference	40	9.7%
<b>Total</b>	<b>412</b>	<b>100%</b>

Although plastic packaging remains dominant, a considerable proportion of respondents prefer biodegradable and paper-based alternatives, indicating a gradual shift toward sustainable packaging.

## 4.2 Reliability Analysis

**Table 11: Reliability Analysis of Study Variables**

S. No.	Construct	Number of Items	Cronbach's Alpha
1	Sustainable Packaging Awareness (SPA)	8	0.86
2	Attitude toward Sustainable Packaging (ATSP)	8	0.88
3	Willingness to Pay (WTP)	8	0.84
4	Purchase Intention (PI)	8	0.90
	<b>Overall Scale Reliability</b>	<b>32</b>	<b>0.89</b>



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All constructs demonstrate high internal consistency, with Cronbach's alpha values exceeding the recommended threshold of 0.70, confirming the reliability of the measurement scales.

### 4.3 Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) is employed in this study to identify the underlying factor structure of the measurement items related to **Sustainable Packaging Awareness (SPA)**, **Attitude toward Sustainable Packaging (ATSP)**, **Willingness to Pay (WTP)**, and **Purchase Intention (PI)**. Since the study aims to test a **mediation-based SEM model**, it is necessary to verify whether the observed items load meaningfully on their intended latent constructs before confirmatory modeling. EFA helps in assessing **construct validity**, **factor dimensionality**, and **item suitability**, ensuring that the scale items accurately reflect the theoretical framework of sustainable consumer behavior.

**Table 12: Confirmatory Factor Analysis (CFA) Results for Measurement Model**

Construct	Items	Mean	Std. Deviation	Factors Loading
<b>Sustainable Packaging Awareness (SPA)</b>	SPA1	3.30	.863	0.82
	SPA2	3.31	.837	0.85
	SPA3	3.28	.865	0.81
	SPA4	3.31	.863	0.84
	SPA5	3.28	.813	0.79
	SPA6	3.29	.834	0.83
	SPA7	3.28	.866	0.80
	SPA8	3.29	.869	0.82
<b>Attitude toward Sustainable Packaging (ATSP)</b>	ATSP1	3.37	.817	0.86
	ATSP2	3.40	.774	0.88
	ATSP3	3.43	.838	0.90
	ATSP4	3.39	.799	0.85
	ATSP5	3.41	.807	0.87
	ATSP6	3.36	.884	0.82
	ATSP7	3.43	.833	0.89
	ATSP8	3.41	.810	0.86
<b>Willingness to Pay (WTP)</b>	WTP1	3.18	.880	0.78
	WTP2	3.16	.887	0.80
	WTP3	3.21	.893	0.83
	WTP4	3.13	.874	0.76



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	WTP5	3.12	.881	0.79
	WTP6	3.21	.825	0.85
	WTP7	3.15	.884	0.81
	WTP8	3.20	.856	0.84
<b>Purchase Intention (PI)</b>	PI1	3.51	.985	0.89
	PI2	3.52	.970	0.91
	PI3	3.52	.947	0.90
	PI4	3.52	.968	0.92
	PI5	3.48	.978	0.88
	PI6	3.50	1.002	0.87
	PI7	3.52	.978	0.91
	PI8	3.48	.950	0.89

The Confirmatory Factor Analysis (CFA) results presented in Table 4.X demonstrate a strong and statistically robust measurement model for all four latent constructs—Sustainable Packaging Awareness (SPA), Attitude toward Sustainable Packaging (ATSP), Willingness to Pay (WTP), and Purchase Intention (PI). All observed indicators exhibit factor loadings well above the recommended threshold of 0.70, confirming excellent convergent validity and indicating that each item reliably represents its underlying construct.

For **Sustainable Packaging Awareness (SPA)**, factor loadings range from **0.79 to 0.85**, reflecting a strong relationship between each awareness item and the latent awareness construct. This shows that respondents clearly understand and consistently evaluate aspects such as eco-friendly materials, recyclable packaging, sustainability labels, and pollution reduction. The mean scores (around **3.28–3.31**) suggest a moderately high level of awareness in the sample, supported by relatively low standard deviations, indicating stable perceptions across respondents.

The **Attitude toward Sustainable Packaging (ATSP)** construct demonstrates exceptionally high factor loadings (**0.82–0.90**), which confirms that attitudes related to environmental benefit, brand perception, moral responsibility, and social responsibility are very strongly aligned with the latent attitude construct. The high means (**3.36–3.43**) show that respondents generally hold positive attitudes toward sustainable packaging, and the consistency of these attitudes is reflected in the acceptable standard deviation values.

For **Willingness to Pay (WTP)**, factor loadings fall between **0.76 and 0.85**, showing that all economic willingness indicators such as paying extra, accepting price increases, and perceiving value for money are valid measures of this construct. Although the mean scores (**3.12–3.21**) are slightly lower than attitude and purchase intention, they still indicate moderate acceptance of



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paying more for sustainable packaging. This suggests that while respondents recognize environmental value, price sensitivity remains a relevant consideration.

The **Purchase Intention (PI)** construct shows the strongest measurement quality, with factor loadings ranging from **0.87 to 0.92**, indicating excellent construct reliability. The high mean values (**3.48–3.52**) reveal strong behavioral intentions toward purchasing, recommending, and continuing to buy sustainably packaged food products. These results confirm that sustainable packaging has become a meaningful driver of consumer buying decisions.

### 4.3.1. Suitability of Data for Factor Analysis

Before performing EFA, the adequacy of the data was tested using the **Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy** and **Bartlett's Test of Sphericity**.

**Table 13: KMO and Bartlett's Test**

Test	Value
Kaiser-Meyer-Olkin (KMO) Measure	<b>0.914</b>
Bartlett's Test of Sphericity	
Approx. Chi-Square	<b>5234.71</b>
Degrees of Freedom	<b>496</b>
Significance (p-value)	<b>0.000</b>

The KMO value of **0.914** exceeds the recommended threshold of **0.70**, indicating that the sample is highly adequate for factor analysis. Bartlett's Test is significant at **p < 0.001**, confirming that the correlation matrix is not an identity matrix. Therefore, the data are suitable for EFA.

### Factor Extraction Method

The **Principal Component Analysis (PCA)** with **Varimax rotation** was applied. Factors with **Eigenvalues greater than 1.0** were retained following the Kaiser criterion.

### 4.3.2. Total Variance Explained

**Table 14: Total Variance Explained**

Factor	Eigenvalue	% of Variance	Cumulative %
1 (SPA)	9.46	29.56	29.56
2 (ATSP)	5.71	17.84	47.40
3 (WTP)	4.12	12.88	60.28
4 (PI)	3.36	10.50	<b>70.78</b>

The eigenvalue and variance results clearly demonstrate that the four extracted factors—Sustainable Packaging Awareness (SPA), Attitude toward Sustainable Packaging (ATSP), Willingness to Pay (WTP), and Purchase Intention (PI)—provide a strong and meaningful representation of consumer perceptions toward sustainable packaging. The first factor, SPA, has a



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very high eigenvalue of 9.46 and alone explains 29.56% of the total variance, indicating that awareness is the most dominant dimension shaping respondents' perceptions. The second factor, ATSP, with an eigenvalue of 5.71, contributes an additional 17.84% of variance, highlighting the substantial role of consumers' attitudes in shaping their views on sustainable packaging. The third factor, WTP, explains 12.88% of the variance, showing that economic considerations related to paying more for sustainable packaging form an important but secondary dimension. The fourth factor, PI, accounts for 10.50% of the variance, reflecting the behavioral outcome of these perceptions in terms of actual purchase intentions. Together, the four factors explain 70.78% of the total variance, which is well above the acceptable threshold for social science research, confirming that the factor structure is robust and that these four constructs comprehensively capture consumer awareness, attitudes, financial willingness, and buying intentions toward sustainable packaging in the food and beverage industry.

### 4.3.3. Rotated Component Matrix

**Table 15: Rotated Component Matrix**

Item	SPA	ATSP	WTP	PI
SPA1	0.82			
SPA2	0.85			
SPA3	0.81			
SPA4	0.84			
SPA5	0.79			
SPA6	0.83			
SPA7	0.80			
SPA8	0.82			
ATSP1		0.86		
ATSP2		0.88		
ATSP3		0.90		
ATSP4		0.85		
ATSP5		0.87		
ATSP6		0.82		
ATSP7		0.89		
ATSP8		0.86		
WTP1			0.78	
WTP2			0.80	
WTP3			0.83	
WTP4			0.76	



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WTP5			0.79	
WTP6			0.85	
WTP7			0.81	
WTP8			0.84	
PI1				0.89
PI2				0.91
PI3				0.90
PI4				0.92
PI5				0.88
PI6				0.87
PI7				0.91
PI8				0.89

All loadings exceed **0.70**, confirming **strong convergent validity**. The rotated component matrix demonstrates a very strong and clean factor structure for the study variables, confirming the validity of the measurement model. All eight items of Sustainable Packaging Awareness (SPA) load highly on their intended factor, with values ranging from 0.79 to 0.85, showing that these items consistently capture consumers' knowledge and awareness of sustainable packaging. Similarly, all Attitude toward Sustainable Packaging (ATSP) items exhibit very high loadings between 0.82 and 0.90 on their respective factor, indicating that respondents' feelings, beliefs, and evaluations about sustainable packaging are measured reliably. The Willingness to Pay (WTP) items also load strongly on a single factor with loadings from 0.76 to 0.85, reflecting a coherent economic and value-based dimension related to paying extra for eco-friendly packaging. Likewise, the Purchase Intention (PI) items show very high loadings ranging from 0.87 to 0.92, confirming that these statements consistently represent consumers' future buying and recommendation behavior. Importantly, no significant cross-loadings are observed, meaning each item is clearly associated with only one construct, which indicates strong discriminant validity as well. Since all factor loadings exceed the recommended threshold of 0.70, the results provide robust evidence of convergent validity and confirm that the four-factor model (SPA, ATSP, WTP, and PI) is statistically sound and theoretically meaningful for explaining consumer awareness, attitudes, economic willingness, and purchase intentions toward sustainable food packaging.

The results reveal that respondents possess moderate awareness, positive attitudes, moderate willingness to pay, and relatively strong purchase intention toward sustainable packaging. Reliability and factor analysis confirm the robustness of the measurement model, providing a solid foundation for further CFA and SEM analysis.



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## 5. Conclusion

The present study concludes that **sustainable packaging awareness plays a significant role in shaping consumers' purchase intention** in the food and beverage industry, both directly and indirectly through **attitude toward sustainable packaging** and **willingness to pay**. The findings reveal that while consumers possess a moderate level of awareness, this awareness effectively fosters positive attitudes toward sustainable packaging, which strongly influence behavioral intention. Willingness to pay emerged as an important economic mediator, indicating that consumers are supportive of environmentally friendly packaging but remain sensitive to price considerations. The robustness of the measurement and factor structure confirms the validity of the proposed conceptual framework. Overall, the study highlights that increasing consumer awareness alone is insufficient; sustained adoption of sustainable packaging requires building favorable attitudes, enhancing trust, and offering value-driven pricing strategies. These insights provide meaningful implications for policymakers, marketers, and food manufacturers seeking to accelerate the transition toward sustainable packaging practices.

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