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SUSTAINABLE PACKAGING AND CONSUMER TRUST: EXAMINING THE ROLE OF ENVIRONMENTAL BENEFITS AND BRAND COMMUNICATION IN ADOPTION INTENTIONS

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Abstract

As consumers become more environmentally conscious, sustainable packaging is reshaping customer attitudes and purchasing decisions. This study examines the effect of perceived environmental benefits on consumers' willingness to adopt bioplastic packaging and the effects of sustainability-focused brand communication on consumer trust. It also examines how demographic variables, including gender, age, income, and purchasing habits, influence these responses. A standardized questionnaire on a 5-point Likert scale was administered to 403 participants. Convenience sampling (voluntary response) was utilized, supported by secondary data from NITI Aayog, MoEFCC, TERI, and EY reports. The sample size was determined utilizing Cochran's formula, ensuring adequacy at a 95% confidence level with a 5% margin of error. The statistical tools employed included simple linear regression to examine the correlation between environmental perceptions and adoption intent, and Spearman's Rank Correlation to measure the link between brand communication and customer trust. A pilot study with 50 participants demonstrated strong internal reliability (Cronbach's Alpha = 0.955 & 0.971). Findings reveal that higher awareness of environmental advantages significantly enhances the willingness to adopt bioplastics (B = 0.716). Transparent brand communication fosters trust (ρ = 0.549), but inadequate communication develops distrust (ρ = 0.472). Stronger preferences are demonstrated by consumers with higher incomes and those who are moderately-highly knowledgeable about bioplastics (17.6%). The study offers insights for brands and policymakers to enhance sustainability messaging and promote bioplastic adoption.

Keywords: *Sustainable Packaging, Bioplastics Adoption, Consumer Trust, Brand Communication, Environmental Perception.*

JEL Classification: *M31, Q56, L67*

Introduction

Approximately 40% of the 330 million tons of plastics produced annually are exclusively used for packaging, which is a significant contributor to the global plastic pollution crisis (Shah et al., 2021). The consumption of conventional plastics has resulted in severe environmental degradation, which has contaminated terrestrial and marine ecosystems and contributed to air and soil contamination (Jambeck et al., 2015). Plastic waste generation in India exceeds 9.3 million tonnes annually, with 3.5 million tonnes leaking into the environment because of inadequate management (Plastics for Change, 2024). This issue has been aggravated by the increasing per capita plastic consumption of approximately 11 kilograms per year, which is a result of increased urbanization, population growth, and changing consumption patterns (Emami et al., 2024). This demonstrates the urgent need for environmentally friendly packaging options that meet changing customer demands while minimizing adverse effects.

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The emergence of sustainable packaging, particularly bioplastics derived from renewable sources such as starch, cellulose, and agricultural residues, provides a viable solution to plastic pollution (Ghorpade et al., 2022; Jessada et al., 2014). Compared to conventional plastics, bioplastics offer environmental benefits, such as a reduced carbon footprint, faster biodegradability, and reduced reliance on fossil fuels (Siracusa et al., 2008; Bátori et al., 2017). However, despite these advantages, bioplastics continue to constitute a minor portion of the global packaging industry (European Bioplastics, 2019). Their limited adoption is attributed to factors such as cost considerations, performance concerns, consumer perception, and trust.

The adoption of sustainable packaging by consumers is significantly influenced by the effectiveness of brands in communicating the benefits and authenticity of sustainability claims. Consumers frequently have doubts regarding eco-friendly claims due to greenwashing, inconsistent messaging, and inadequate transparency (Filho et al., 2020). It is essential to establish consumer trust and promote the adoption of sustainable packaging through effective, trustworthy, and compelling brand communication (D'Arc et al., 2023).

This study investigates the impact of brand communication and environmental benefits on the adoption of sustainable packaging and consumer trust. Bioplastics are a prospective solution to the increasing problem of plastic pollution; however, their adoption relies on consumer perceptions. It is essential to understand the influence of ecological claims and transparent messaging on consumer behaviour. Effective communication is necessary to establish trust in bioplastics, which are perceived as environmentally sustainable. Green marketing strategies that are consistent with sustainability goals can effectively increase adoption intentions (D'Arc et al., 2023). This research assists governments, policymakers, and companies in the fostering consumer trust and the promotion of eco-friendly packaging.

Review of Literature

Sustainable Packaging and Environmental Benefits

Bioplastics, derived from renewable materials like agricultural and kitchen waste, provide a sustainable substitute for petroleum-based plastics by mitigating pollution, greenhouse gas emissions, and persistent waste (Chauhan, 2024). They are widely used in packaging, agriculture, and textiles and are composed of bio-based and biodegradable polymers; however, their biodegradability depends on environmental conditions and appropriate waste management (Serrano-Aguirre and Prieto, 2024). Although there are advantages such as decreased dependence on fossil fuels, their sustainability is weakened by use of agricultural resource, reduced natural degradability, microplastic generation, and methane emissions from landfills (Islam, 2024). Their environmental effect fluctuates according to production techniques, resource use, and disposal practices, with the possibility of greenwashing in the absence of transparency (Shiff, 2024). Moreover, demographic factors affect sustainable behaviour, with women demonstrating higher levels of pro-environmental attitudes, men motivated primarily by self-efficacy, and older adults displaying stronger emotional attachment to places and sustainable consumption (Čapienė, 2024).

Consumer Trust and Brand Communication

Sustainability advertising significantly impacts consumer perceptions, with environmental ads having a greater impact on brand personality, credibility, and purchase intention than social sustainability ads. This is highlighted by the fact that 75% of consumers primarily link sustainability to environmental protection, underscoring the importance of green messaging for brand differentiation (Sander, 2021). In Vietnam, the purchasing behaviour of young consumers relating to green packaging in FMCG is influenced by environmental concern, knowledge, and trust, with green trust having the most direct impact. Additionally, product quality and availability significantly affect actual purchases, underscoring the necessity of aligning green products with consumer demands (Nguyen et al., 2021). In Indonesia, the intention of consumers to purchase bioplastics is influenced by their perceived value, self-awareness, and green self-identity, with a strong green self-identity enhancing both perceived value and purchase intention, regulated by self-awareness (Salsabila, 2023). Similar to this, green perceived value increases green trust and satisfaction, and green satisfaction in turn strengthens trust, word-of-mouth, and purchase intention. However, because consumers are not very involved with green products, green word-of-mouth alone has little direct impact on purchase decisions (Román-Augusto et al., 2022).

Secondary Data

India's plastic waste management is an urgent issue, with an annual production of 3.47 million tons and a collection rate of only 60% (NITI Aayog, 2022). The country is ranked fifth globally with a total plastic waste accumulation of 34.7 lakh TPA (Bharat & Basu, 2023). A significant amount of this garbage is handled by the informal recycling sector, despite unsafe working conditions (Bharat & Basu, 2023). However, bioplastics, which are made from renewable resources like sugarcane, provide a viable alternative to lessen reliance on fossil fuels (Ernst & Young, 2024). While international events like UNEA 5.2 reinforce India's alignment with international commitments, domestic programs like the Plastic Waste Management Rules and Swachh Bharat Mission 2.0 seek to enhance waste management systems (Bharat & Basu, 2023). At INC-5 in Busan, India strongly opposed managing primary plastic production, emphasized the need to strike a balance between pollution management and sustainable development, and argued for a specific Multilateral Fund to assist developing countries (MoEFFC, 2025). This highlights an urgent necessity for a comprehensive strategy that integrates material innovation, Strict enforcement, infrastructural improvements, and collaborative global efforts to facilitate India's shift towards a circular economy (NITI Aayog, 2022; Ernst & Young, 2024).

Research Objectives

In light of the research gap, this study aims to achieve the following objectives:

- To examine the impact of perceived environmental benefits on consumers' willingness to adopt bio-plastic packaging.
- To analyze how brand communication on sustainability influences consumer trust.

Research Methodology

This study employs a descriptive and analytical research approach to investigate the influence of perceived environmental benefits on consumer's willingness to adopt bioplastic packaging, and the role of sustainability-focused brand communication in shaping consumer trust. Both primary and secondary data were employed to ensure comprehensive analysis.

Primary data was collected through an online structured questionnaire distributed to 403 respondents, chosen through convenience sampling (voluntary response). The sample comprised of students, homemakers, private-sector employees, and self-employed individuals from urban and semi-urban regions, ensuring extensive demographic representation. Cochran's formula validated sample adequacy at a 95% confidence level with a 5% margin of error.

The questionnaire included 5-point Likert scale items evaluating consumer attitudes, trust, and readiness to adopt bioplastic packaging. Demographic information, including age, gender, education, income, and knowledge of bioplastics, offered contextual insight for analysis.

Data analysis was performed utilizing SPSS software, employing descriptive statistics, simple linear regression, and Spearman's Rank Correlation due to the non-normal distribution of data. A pilot study (n=50) confirmed the instrument's reliability (Cronbach's Alpha = 0.955 for environmental benefits, 0.971 for brand communication). Secondary data from NITI Aayog, MoEFCC, TERI, and Ernst & Young provided industry alignment, enhancing practical relevance.

Statement of Problem

The research identifies a few gaps, such as the need to understand how customers' adoption intentions are influenced by perceived environmental benefits and how consumer trust in sustainable packaging is affected by clear and honest brand communication (Oaten, 2016; Weinrich, 2023). Consumers find it challenging to evaluate the authenticity of eco-friendly claims because of greenwashing, inconsistent labelling, and unclear sustainability communication. These communication barriers not only hinder trust but also reduce consumer willingness to adopt bioplastic packaging.

This study seeks to investigate the relationship between perceived environmental advantages, brand communication strategies, and customer trust regarding sustainable packaging. By analyzing the relationships between them, the study will provide information on how companies may improve their communication strategies to build more trust and increase the adoption of bioplastics by consumers.

Significance of the Study

This study seeks to enhance the existing knowledge by offering empirical evidence on the impact of perceived environmental benefits and brand communication strategies on consumer trust and adoption intentions regarding bioplastic packaging. This research extends the understanding of

sustainable consumer behaviour and green marketing by analysing the relationship between environmental awareness, trust in sustainability assertions, and the willingness to adopt bioplastics.

The results provide actionable insights for environmentally conscious brands to develop transparent and credible communication strategies, thereby strengthening consumer trust in sustainable packaging. Marketers can utilize these insights to create compelling sustainability narratives that connect eco-innovation with consumer adoption.

Effective communication can promote pro-environmental purchasing behaviour by building trust and loyalty. Clear communication regarding environmental advantages increases perceived worth, driving the shift from traditional plastics to bioplastics.

This research offers practical recommendations for brands, policymakers, and marketers, promoting the circular economy initiative in the packaging industry.

Scope of the Study

This study investigates the adoption potential of bioplastic packaging, highlighting perceived environmental benefits and brand communication regarding sustainability. It examines how consumers evaluate eco-friendly characteristics such as biodegradability, recyclability, carbon footprint reduction, and resource efficiency, and how these perceptions affect trust and intention to adopt.

It underscores the importance of clear, transparent, and consistent sustainability communication in influencing consumer trust and purchasing choices.

The findings, while centred on the Indian market, provide globally relevant insights for companies aiming to align packaging practices with sustainability-oriented consumer expectations, thereby contributing to the circular economy and strengthening brand credibility in environmentally conscious markets.

Conceptual Framework

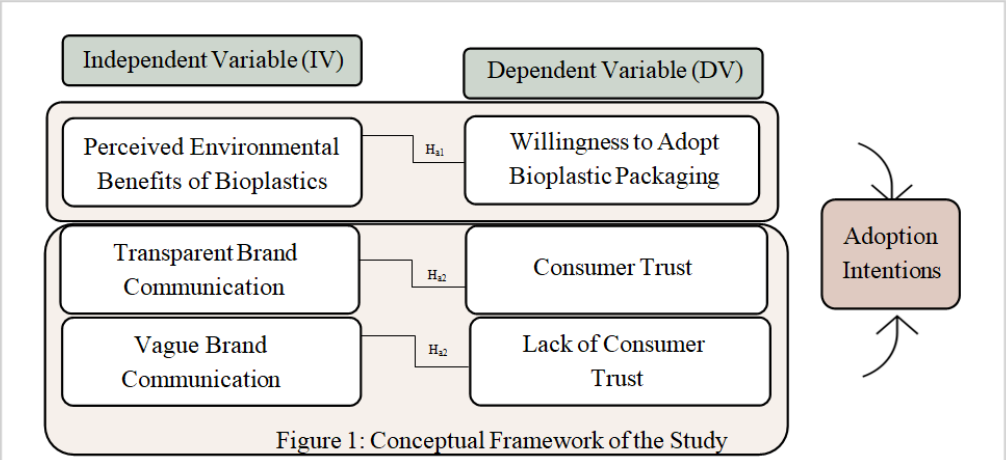

Figure 1: Conceptual Framework of the Study

Source: Primary

Hypotheses

As sustainability increasingly influences consumer choices, companies are anticipated to implement environmentally friendly practices and convey them efficiently. This study analyzes two key variables affecting consumer perceptions of bioplastic packaging: sustainability communication and perceived ecological advantages.

The study is directed by the following hypotheses:

Hypothesis 1:

H_{01}: Perceived environmental benefits have no significant effect on consumers' willingness to adopt bio-plastic packaging.

H_{a1}: Perceived environmental benefits have a significant positive effect on consumers' willingness to adopt bio-plastic packaging.

Hypothesis 2

H_{o2}: There is no significant difference in consumer trust between brands that use transparent sustainability communication and those that use vague sustainability communication.

H_{a2}: Consumer trust significantly differs between brands that use transparent sustainability communication and those that use vague sustainability communication.

Pilot Study

Table 1: Case Processing Summary - Reliability and Validity Test

		N	%
Cases	Valid	50	100
	Excluded	0	0
	Total	50	100

Source: Primary

Table 2: Reliability Statistics

Sl. No	Variables of the Study	Cronbach's Alpha	No. of Items
1.	Perceived Environmental Benefits of Bioplastics and Willingness to adopt to Bioplastics	0.955	20
2.	Sustainability-Focused Brand Communication and Consumer Trust in Bioplastic Packaging	0.971	20

Source: Primary

The reliability test shows high internal consistency for both constructs, with Cronbach's Alpha values of 0.955 and 0.971, indicating excellent reliability. All 40 items across the two variables were retained for further analysis. This confirms that the questionnaire used is reliable for measuring consumer perceptions and trust related to bioplastic packaging.

Results and Discussion

Demographic Results

The survey highlights the primary consumer characteristics that influence packaging and sustainability preferences. Female respondents represent 65% of the sample, which underscores their status as primary domestic decision-makers. The majority of respondents are well-educated and young (18-34); 60% of them hold a bachelor's degree, which suggests a higher level of environmental awareness. 39% of households spend between ₹10,001 and ₹20,000 on essentials and FMCG, which is indicative of their regular consumption of packaged products. Household incomes typically range from ₹50,001 to ₹75,000.

Eco-friendly packaging is more readily available in urban areas, where 95% of respondents reside. However, 43.7% of people have trouble finding certain these products, indicating gaps in availability. Positively, 95% of respondents indicate that they prefer bioplastics to conventional plastics, which indicates that there is strong interest for sustainable alternatives.

Price continues to be an obstacle, as 55.1% are averse to pay an extra cost, while 39.9% are willing to pay a 5% premium. Another obstacle is awareness; 38% of respondents acknowledge that they have inadequate knowledge regarding materials such as bioplastics, while only 12.9% consider themselves as highly informed. This emphasizes the necessity of education campaigns to promote sustainable choices and address awareness gaps.

Results from Data Analysis

Objective 1: To examine the impact of perceived environmental benefits on consumers' willingness to adopt bio-plastic packaging.

H_{a1}: Perceived environmental benefits have a significant positive effect on consumers' willingness to adopt bio-plastic packaging.

Table 3: Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.728[a]	0.529	0.528	0.430

a. Predictors: (Constant), Perceived Environmental Benefits

Source: Primary

Table 4: ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	83.669	1	83.669	451.195	.000[a]
	Residual	74.361	401	0.185		
	Total	158.030	402			

a. Predictors: (Constant), Perceived Environmental Benefit
b. Dependent Variable: Willingness to Adopt Bioplastic Packaging
Source: Primary

Table 5: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.090	0.146	0.728	7.525	.000
	Perceived Environmental Benefit	0.716	0.034		21.241	.000

a. Dependent Variable: Willingness to Adopt Bioplastic Packaging
Source: Primary

Interpretation

X-axis- Independent Variable = Perceived Environmental Benefit

Y-axis- Dependent Variable = Willingness to Adopt Bioplastic Packaging

The Table 3 indicates that perceived environmental benefit account for 52.9% of the variance in the willingness of consumers to accept bio-plastic packaging ($R^2 = 0.529$). An R-value of 0.728 signifies a positive correlation between perceived environmental benefits and the willingness to adopt bio-plastic packaging. This indicates that consumers' willingness to adopt bio-plastic packaging increases as they perceive its significant environmental advantages.

The ANOVA Table 4 measures the overall significance of the regression model. The F value of 451.195, with a significance level of 0.000 ($p < 0.05$), indicates that the regression model is statistically significant. This suggests that perceived environmental benefits substantially account for the differences in consumers' willingness to adopt bio-plastic packaging.

In Table 5 table offers further insights into the correlation between the independent and dependent variables. The unstandardized coefficient (B) for perceived environmental benefits is 0.716, indicating that one-unit increase in perceived environmental benefits corresponds to a 0.716 unit increase in the willingness to adopt bio-plastic packaging. The t-value of 21.241 ($p = 0.000$) confirms the statistical significance of this relationship.

The constant (intercept) value of 1.090 shows the initial willingness to adopt bio-plastic packaging when the perceived environmental benefits are zero.

The null hypothesis (H_0), which states that customers' willingness to adopt bio-plastic packaging is not significantly impacted by perceived environmental advantages, is rejected since the p-value is less than 0.05. The alternative hypothesis (H_1) is accepted, suggesting that consumer willingness to adopt bio-plastic packaging is significantly impacted by perceived environmental benefits.

Objective 2: To analyze how brand communication on sustainability influences consumer trust.

H_{a2}: Consumer trust significantly differs between brands that use transparent sustainability communication and those that use vague sustainability communication.

Table 6: Correlation Analysis between Transparent Brand Communication and Consumer Trust

			Transparent Brand Communication	Consumer Trust
Spearman's rho	Transparent Brand Communication	Correlation Coefficient	1	0.550
		Sig. (2-tailed)		.000
		N	403	403
	Consumer Trust	Correlation Coefficient	0.550	1
		Sig. (2-tailed)	.000	
		N	403	403

***. Correlation is significant at the 0.01 level (2-tailed).*

Source: Primary

Table 7: Correlation Analysis between Vague Brand Communication and Lack of Consumer Trust

			Vague Brand Communication	Lack of Consumer Trust
Spearman's rho	Vague Brand Communication	Correlation Coefficient	1	0.472
		Sig. (2-tailed)		.000
		N	403	403
	Lack of Consumer Trust	Correlation Coefficient	0.472	1
		Sig. (2-tailed)	.000	
		N	403	403

***. Correlation is significant at the 0.01 level (2-tailed).*

Source: Primary

Interpretation

Table 6 shows a moderate to significant positive correlation between consumer trust and transparent brand communication, as confirmed by a Spearman's rank correlation coefficient of 0.550. This suggests that companies that effectively communicate their sustainability initiatives with verified, precise information are more likely to earn the trust of consumers.

The statistical significance of this relationship is confirmed by the p-value ($p = 0$), which is significantly lower than the 0.05 threshold. This suggests that it is unlikely to have occurred by coincidence. Clear sustainability communication is crucial for establishing consumer trust, as evidenced by the data collected from the respondents.

These results are consistent with the existing literature, which underscores the importance of authenticity, clarity, and verified sustainability claims to increase consumer confidence in a brand's environmental responsibility. Higher consumer loyalty, stronger engagement, and an enhanced reputation within eco-conscious segments are more common among brands that prioritize transparency.

In Table 7, the relationship between vague brand communication and low consumer trust is examined. The Spearman's rank correlation coefficient of 0.472 indicates a somewhat positive relationship. This suggests that consumer scepticism is increased by imprecise, unclear sustainability messaging.

The statistical significance of the relationship is confirmed by a p-value of 0.000, which indicates that it is not a random event. The research emphasizes that consumers become increasingly skeptical of companies' environmental commitments when they are unable to provide clear and verifiable sustainability claims.

The finding is consistent with the research on greenwashing, as it demonstrates that consumers' trust is eroded, and their purchase intent is discouraged by vague messaging.

Implications

Theoretical Implications

- Contribution to Green Consumer Behaviour Literature: This study contributes to the existing body of research on green consumer behaviour by illustrating the correlation between the adoption of bioplastic packaging and the perceived environmental benefits, particularly in India.
- Nexus of Trust and Communication: The study supports the theory that transparent communication increases consumer trust, while ambiguous or misleading claims foster scepticism—a concept that is particularly pertinent to sustainability marketing.
- Application of Theory of Planned Behaviour (TPB): This study underscores the impact of subjective norms and perceived control on eco-conscious purchasing, with a particular emphasis on perceived benefits (attitude) and brand communication (external influence).
- Bridging the Greenwashing Gap: The study demonstrates that communication clarity serves as a critical trust-repair mechanism in sustainability branding, thereby bridging the greenwashing gap.

Practical Implications

- Consumer Education Initiatives: The study emphasizes the necessity of educational campaigns to address knowledge gaps and promote sustainable choices, as it demonstrates a lack of awareness regarding bioplastics.
- Packaging Innovation and Certification: Brands can mitigate scepticism by employing eco-labels and third-party certifications to verify sustainability claims.\
- Market Positioning and Product Differentiation: Brands can distinguish themselves by emphasizing verified environmental benefits, including biodegradability, reduced carbon footprint, and materials that are responsibly sourced.
- Price-Value Communication: To substantiate price premiums, marketers should develop compelling narratives that emphasize both environmental and functional benefits, particularly for price-sensitive consumers.

Managerial Implications

- Sustainability Communication Guidelines: In order to guarantee that all sustainability claims are fact-checked, data-supported, and readily understandable, marketing teams must establish explicit internal guidelines.
- Proactive Greenwashing Mitigation: In order to guarantee that messaging is consistent with actual supply chain practices, managers should implement internal audits.
- Targeted Consumer Segmentation: To progressively expand to rural and semi-urban areas, brands should initially focus on educated, urban eco-conscious segments (Gen Z, Millennials) that exhibit increased adoption intent.
- Establishing Trust Through Transparency: In order to cultivate lasting trust, managers should disclose the advantages and constraints of sustainability initiatives.

Societal Implications

- Encouraging Sustainable Consumption: The promotion of sustainable packaging and eco-friendly lifestyles can be facilitated by creating a culture of trust and awareness.
- Consumer Advocacy: Consumers can become sustainability advocates by demanding corporate accountability and supporting genuinely sustainable brands through improved awareness and communication.
- Reducing Plastic Waste: The promotion of bioplastics contributes to the reduction of single-use plastic pollution, thereby supporting national and global sustainability objectives, such as the SDGs.
- Policy and Regulation: The study offers policymakers with evidence to support the implementation of more stringent regulations for sustainability claims, thereby promoting responsible and transparent marketing.

Suggestions

For Companies (Brands/Manufacturers)

Businesses are instrumental in the implementation of responsible waste management, innovation, and transparent communication efforts. Key actions include:

- Clear Labelling: Implement recognized standards (e.g., ISO 17088:2021) for packaging that is compostable, recyclable, or biodegradable.
- Transparent Communication: Use clear terminologies, such as circular packaging and certified compostable, to effectively communicate the advantages of sustainability.
- Waste Management Partnerships: Collaborate with waste processing units, composting facilities, and recycling facilities to guarantee that post-use materials are handled appropriately.

For Consumers

Through their purchasing decisions and responsible waste management practices, consumers have the ability to influence sustainability. Recommended actions:

- Stay informed: Understand the distinctions between biodegradable, compostable, recyclable, and conventional plastics.

- Segregate Waste: To facilitate efficient processing, it is essential to implement appropriate waste segregation at home.
- Insist on Clarity: Request that brands provide verified sustainability claims and transparent labelling.

For Educational Institutions, NGOs, and Advocacy Groups

These stakeholders are responsible for the promotion of awareness, research, and policy influence.

- Research and Innovation: Design bioplastics that are appropriate for the climate and infrastructure of India.
- Waste Audits: Implement sustainable packaging for institutional use and conduct campus waste audits.
- Awareness Campaigns: Organize student-led initiatives to raise awareness of sustainable packaging and greenwashing.

For Government and Policymakers

The future of environmentally friendly packaging is influenced by regulations.

- Revise the PWM Rules: Establish explicit labelling standards and define industrial decomposition.
- End EPR Exemption: Make biodegradable plastics subject to EPR requirements.
- Offer incentives: Offer tax incentives and reduced GST rates for certified sustainable packaging.

Limitations and Future Directions

This study examines bioplastic users in South India, with a sample size of 403 respondents, which may limit generalizability. Future research may broaden its scope to include wider geographic region and larger sample size to gather more comprehensive insights.

The study highlights consumer perceptions and adoption intentions; however, future research should investigate longitudinal effects to evaluate the impact of sustainable packaging on long-term brand loyalty and repeat purchases. As e-commerce and direct-to-consumer brands expand, subsequent research can examine the influence of digital platforms, eco-labels, and sustainability messages on customer trust and purchasing behaviour.

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