

Impact of Sustainable Circular Packaging Design on Consumer Sustainability Perception and Purchase Decision

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Abstract

The study examines the influence of sustainable circular packaging design on consumer purchase decisions in the Fast-Moving Consumer Goods (FMCG) sector, with a focus on consumers in Bangalore. As environmental concerns continue to shape consumer preferences, businesses are increasingly adopting recyclable, reusable, and eco-friendly packaging solutions to strengthen sustainability initiatives. The research adopts a quantitative approach using a structured questionnaire administered to 277 FMCG consumers selected through convenience sampling. Descriptive statistics and multiple linear regression analysis were employed to evaluate the relationship between sustainable circular packaging attributes and consumer purchase decisions. The findings indicate that consumers show a strong preference for eco-friendly and recyclable packaging materials, and sustainability-related packaging attributes significantly influence their purchasing behaviour. The regression model explains approximately 30% of the variation in purchase decisions ($R^2 = 0.300$), demonstrating a moderate positive relationship between sustainable circular packaging design and consumer purchase behaviour. Among the examined factors, sustainability labels and green certifications emerged as the strongest predictor of purchase decisions, followed by consumers' perception of a brand's environmental commitment and their willingness to recommend brands using sustainable packaging.

The study concludes that sustainable circular packaging has become an important marketing strategy that enhances consumer trust, improves brand perception, and encourages environmentally responsible purchasing behaviour. The findings provide useful insights for FMCG manufacturers and marketers in developing packaging strategies that support

both business performance and sustainability objectives.

Keywords: Sustainable Packaging, Circular Packaging Design, Consumer Purchase Decision, FMCG, Green Certification, Environmental Sustainability, Consumer Behaviour, Bangalore, India

I. Introduction

The increasing awareness of environmental issues has significantly influenced consumer expectations and business practices across industries. In the Fast-Moving Consumer Goods (FMCG) sector, packaging has evolved from serving merely as a protective container to becoming an important tool for communicating a brand's environmental commitment. Growing concerns about plastic waste, resource depletion, and climate change have encouraged manufacturers to adopt sustainable packaging solutions that minimize environmental impact while meeting consumer expectations. Circular packaging design, which emphasizes recyclable, reusable, and biodegradable materials, has emerged as an effective strategy for supporting the principles of a circular economy. As consumers become more environmentally conscious, packaging characteristics increasingly influence their perceptions of a brand's sustainability and their purchasing decisions.

Sustainable circular packaging not only reduces waste but also enhances the perceived environmental responsibility of companies. Consumers are increasingly attracted to products that clearly display eco-labels, recyclable materials, and sustainability certifications, as these features improve trust and create a positive brand image. In the FMCG industry, where purchase decisions are often made quickly, packaging serves as an important source of information that shapes consumer attitudes toward product quality and

sustainability. Environmentally friendly packaging can positively influence consumer confidence, perceived value, and purchase intention by reinforcing a company's commitment to responsible production and consumption.

Despite the growing adoption of sustainable packaging, consumers' responses to circular packaging design vary across markets and demographic groups. While many consumers express positive attitudes toward environmentally friendly packaging, factors such as awareness, trust, product availability, and perceived convenience continue to influence actual purchasing behaviour. In rapidly developing urban markets such as Bangalore, consumers are becoming more exposed to sustainability initiatives, yet limited empirical research has examined how circular packaging design directly shapes sustainability perception and purchase decisions within the FMCG sector.

The increasing environmental impact of packaging waste has become a major concern for governments, businesses, and consumers, particularly in the FMCG sector, where packaging is extensively used. Although many companies have adopted recyclable, reusable, and biodegradable packaging practices, it remains unclear whether consumers genuinely recognize and value sustainable circular packaging when making purchase decisions, since limited awareness, inadequate communication of sustainability information, and varying perceptions of environmental responsibility can influence actual buying behaviour. In the Indian FMCG market, particularly in Bangalore, empirical evidence on this relationship remains limited, which forms the statement of the problem addressed by this study.

Existing studies have demonstrated that sustainable packaging positively influences consumer attitudes, brand image, and purchase intention. However, most previous research has examined sustainable packaging from a broad perspective without specifically focusing on circular packaging design, which emphasizes recyclability, reusability, and resource efficiency. A large proportion of the available research has also been conducted in developed countries, where consumer awareness, environmental policies, and market conditions differ from those in emerging economies such as India, and research focusing specifically on urban consumers in Bangalore remains scarce. This study addresses these gaps by examining how sustainable circular packaging design influences consumers' sustainability perception and purchase decisions, thereby contributing to the literature on

sustainable marketing, consumer behaviour, and circular economy practices.

Against this background, the present study examines the impact of sustainable circular packaging design on consumer sustainability perception and purchase decision among FMCG consumers in Bangalore. Specifically, the study investigates whether environmentally responsible packaging practices influence consumers' perceptions of a brand's sustainability and encourage favourable purchasing behaviour. The findings are expected to provide valuable insights for FMCG manufacturers, marketers, and policymakers in designing packaging strategies that balance environmental responsibility with consumer expectations, and to contribute to the growing body of literature on sustainable marketing and circular economy practices from an emerging urban market in India.

II. Review of Literature

Existing literature has examined the influence of sustainable and circular packaging on consumer awareness, sustainability perception, trust, and purchase intention across both Indian and international markets. The following review summarises the major empirical studies relevant to the present research.

Ashwini, D. Y., & Moodbidri, S. (2026) examined the factors influencing Generation Z consumers' willingness to pay for sustainable packaging in India, using a quantitative research design and Structural Equation Modelling (SEM). The findings revealed that trust in sustainable brands and environmental awareness significantly increase consumers' willingness to purchase products with sustainable packaging, with social influence also playing an important role. The study concluded that sustainable packaging positively enhances consumers' sustainability perception and buying behaviour, although it focused primarily on Generation Z and did not compare different demographic groups or packaging materials, indicating a need for broader studies.

Vig, S., & Tewary, T. (2026) investigated the influence of eco-consciousness and self-image congruence on circular purchase intention among young Indian consumers using a quantitative survey and Structural Equation Modelling. The findings indicated that higher eco-consciousness significantly improved consumers' perception of circular products and positively influenced purchase intention, with self-image congruence strengthening the relationship between sustainability perception and buying behaviour. The

study, however, was limited to young consumers, leaving scope for research involving a wider population. **Trikha, M. (2026)** conducted an empirical, descriptive quantitative study examining consumer awareness and behaviour towards sustainable packaging in the FMCG sector among urban consumers in Chandigarh. The results indicated that consumers with greater environmental awareness showed a stronger preference for eco-friendly packaging, which positively influenced sustainability perception and encouraged environmentally responsible purchasing. The study recommended improved awareness campaigns but was limited to one geographical region.

Rani, M., & Meet, R. K. (2026) reviewed the evolution of consumer buying behaviour towards environmentally friendly packaging over 2015–2025 through a systematic literature review. The findings suggested that Indian consumers have become increasingly aware of sustainable packaging due to environmental education, government initiatives, and corporate sustainability practices, with younger consumers demonstrating stronger support for circular packaging initiatives, though empirical validation across industries remains limited.

Ghosh, A. (2026) explored consumer behaviour towards organic packaged food products by examining sustainable packaging attributes such as eco-friendly materials, visual appeal, and information transparency, using a quantitative survey and Structural Equation Modelling. The findings revealed that sustainable packaging significantly enhanced consumers' perception of product quality, environmental responsibility, and purchase intention, with transparent sustainability information further strengthening trust, though the study focused only on organic packaged food products.

Herbes, C., Beuthner, C., & Ramme, I. (2020) examined how consumers recognize environmentally friendly packaging and the packaging cues that influence sustainability perception across countries using a quantitative survey. The findings revealed that recyclable symbols, natural colours, paper-based materials, and environmental labels positively influenced consumers' perception of sustainable packaging, though the study focused mainly on recognition rather than direct influence on purchase behaviour.

Testa, F., Iovino, R., & Iraldo, F. (2020) investigated the influence of circular economy principles on consumers' intention to purchase products with circular packaging using a quantitative survey and Structural

Equation Modelling. The findings indicated that consumers who actively sought information about circular packaging were more likely to perceive it positively and develop stronger purchase intentions, with environmental awareness and knowledge strengthening sustainability perception, though demographic differences were not extensively examined.

Espineda, M. N., Banocnoc, A. H., & Cababahay, J. C. (2026) explored the influence of sustainable packaging on consumer behaviour using a quantitative research design. The findings showed that consumers perceived products with reusable and eco-friendly packaging as more environmentally responsible, which significantly increased purchase intention and enhanced trust in brands adopting circular economy practices, though the research was conducted within a specific consumer context.

Kozik-Kolodziej, N. (2026) conducted a systematic literature review to understand consumers' attitudes and perceptions towards sustainable packaging. The study found that recyclable materials, biodegradable packaging, environmental labels, and transparent sustainability communication positively influenced sustainability perception and purchase intention, with environmental awareness and trust identified as major determinants, though cross-cultural empirical studies remain limited.

Foo, Y. J., Lin, S. X., & Hon Wei, L. (2026) investigated the factors influencing consumers' intention to purchase products with sustainable packaging in the e-commerce industry using a quantitative survey and Structural Equation Modelling. The findings revealed that environmental concern, perceived usefulness of sustainable packaging, and positive consumer attitudes significantly influenced purchase intention, though the study focused specifically on the e-commerce sector, suggesting scope for research across traditional retail settings.

Overall, previous studies consistently indicate that recyclability, reusability, eco-labelling, green certification, environmental awareness, and information transparency significantly influence consumers' sustainability perception and purchase behaviour. However, relatively few studies have specifically examined circular packaging design—as distinct from sustainable packaging in general—within the Indian FMCG sector, and research focusing on urban consumers in Bangalore remains particularly scarce. This research gap provides the foundation for the present study, which investigates how sustainable

circular packaging design influences consumer sustainability perception and purchase decisions among FMCG consumers in Bangalore.

III. Methodology

The present study adopts a descriptive and explanatory research design using a quantitative research approach. The descriptive design is used to understand consumers' perceptions of sustainable circular packaging, while the explanatory design examines the relationship between sustainable circular packaging design and consumers' sustainability perception and purchase decisions. Quantitative research enables the collection of numerical data through structured questionnaires and facilitates objective analysis using statistical techniques. The study was conducted in Bangalore, Karnataka, one of India's fastest-growing metropolitan cities, selected because of its large urban population, increasing environmental awareness, and growing demand for sustainable FMCG products. The target population consists of consumers residing in Bangalore who regularly purchase FMCG products, as they frequently interact with product packaging and are likely to consider packaging characteristics during purchase decisions.

The study employs a non-probability convenience sampling technique, with respondents selected based on their accessibility and willingness to participate. The required sample size was determined using Cochran's Formula with a 90% confidence level, targeting approximately 271 respondents; a final sample of 277 FMCG consumers was achieved, which is considered sufficient for correlation and regression analysis.

The study relies on both primary and secondary data. Primary data were collected using a structured questionnaire administered to FMCG consumers in Bangalore, employing a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5) to measure respondents' opinions regarding sustainable circular packaging design, sustainability perception, and purchase decisions. Secondary data were obtained from peer-reviewed journal articles, books, government publications, and industry reports related to sustainable packaging and consumer behaviour.

The study measures Sustainable Circular Packaging Design as the independent variable and Consumer Purchase Decision as the dependent variable. The reliability of the questionnaire was assessed using Cronbach's Alpha, with a coefficient value of 0.70 or above indicating acceptable internal consistency, while

content validity was established through a review of relevant literature and evaluation by academic experts. The collected data were analysed using Microsoft Excel. The statistical techniques included descriptive statistics to summarise respondent characteristics, Cronbach's Alpha to assess reliability, Pearson correlation analysis to examine relationships among variables, and multiple linear regression analysis to evaluate the impact of sustainable circular packaging design on consumer sustainability perception and purchase decisions.

Participation in the survey was entirely voluntary, and respondents were informed about the purpose of the research before data collection. The confidentiality and anonymity of all participants were maintained, informed consent was obtained from all respondents, and the information collected was used solely for academic and research purposes.

Based on the objective of the study, the following hypothesis is proposed:

H₀ (Null Hypothesis): Sustainable circular packaging design has no significant influence on consumer purchase decisions.

H₁ (Alternative Hypothesis): Sustainable circular packaging design has a significant positive influence on consumer purchase decisions.

IV. Results and Discussion

A. Demographic Profile of Respondents

Out of 277 respondents, 57.76% were male, 41.88% were female, and 0.36% preferred not to disclose their gender. Nearly half (49.82%) of the respondents were aged between 18–25 years and 33.57% between 26–35 years, indicating that young adults formed the dominant part of the consumer sample. In terms of education, 50.90% were undergraduates and 36.10% postgraduates, suggesting a well-informed respondent base. Occupation-wise, students (38.99%) and employees (35.74%) together formed the majority, followed by business owners (18.77%). Regarding monthly income, 32.49% of respondents earned below ₹20,000 and 26.35% earned between ₹40,001–₹60,000, reflecting a sample with varied purchasing power. Most respondents resided in urban areas (54.51%), followed by semi-urban (34.66%) and rural areas (10.83%).

With respect to purchase behaviour, 37.55% of respondents purchased FMCG products weekly and 33.57% monthly, while local retail stores and online platforms were equally preferred (32.49% each) as purchase channels. Personal care products (42.24%)

were the most frequently purchased FMCG category. A majority of respondents paid attention to packaging before purchase—33.94% “sometimes” and 28.52% “always”—and 44.77% reported having switched brands due to better packaging, while 20.58% said they might do so. Among packaging elements, material (30.69%) was the most attractive attribute, followed by size (22.74%) and shape (21.66%). Additionally, 35.74% of respondents always considered packaging information such as ingredients, expiry date, and usage instructions before purchase.

B. Descriptive Statistics for Circular Packaging Design and Purchase Decisions

Descriptive statistics were computed for the five statements measuring the effect of circular packaging design on sustainability perception and purchase decisions, using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

Statement	Mean	SD
I prefer FMCG products that use eco-friendly or recyclable packaging materials.	4.19	1.091
Packaging that indicates reusability or minimal waste positively influences my purchase decision.	3.70	1.117
I associate circular/sustainable packaging with a brand's genuine concern for the environment.	3.64	1.254
Packaging that evokes positive feelings (e.g., freshness, trust, excitement) increases my likelihood of repurchase.	3.47	1.295
I am willing to pay a higher price for an FMCG product that has aesthetically superior packaging.	3.39	1.203

The statement “I prefer FMCG products that use eco-friendly or recyclable packaging materials” recorded the highest mean ($M = 4.19$, $SD = 1.091$), indicating a strong consumer preference for eco-friendly and recyclable packaging. “Packaging that indicates reusability or minimal waste positively influences my purchase decision” also recorded a relatively high mean ($M = 3.70$, $SD = 1.117$). Respondents similarly agreed that circular packaging reflects a brand's genuine environmental concern ($M = 3.64$, $SD = 1.254$) and that positive emotional responses to packaging increase repurchase likelihood ($M = 3.47$, $SD = 1.295$). Willingness to pay a premium for aesthetically superior

packaging recorded the lowest mean ($M = 3.39$, $SD = 1.203$), indicating that this preference is comparatively more context-specific. The relatively high standard deviations (1.091–1.295) suggest considerable variation in respondent opinions across the sample.

C. Multiple Linear Regression Analysis

A multiple linear regression analysis was conducted to examine the influence of three sustainable circular packaging attributes—perceived environmental commitment, sustainability labels/green certification, and willingness to recommend—on consumer purchase decision.

Regression Statistic	Value
Multiple R	0.548
R Square	0.300
Adjusted R Square	0.292
Standard Error	1.075
Observations	277

ANOVA results confirmed that the regression model was statistically significant, $F(3, 273) = 39.032$, $p < 0.001$, indicating that the selected sustainable packaging attributes jointly have a significant influence on consumer purchase decisions.

Predictor Variable	β (Coefficient)	Std. Error	t-Stat	p-value
Intercept	1.380	0.214	6.459	< 0.001
Perceived brand environmental commitment (circular packaging reflects genuine concern for the environment)	0.165	0.070	2.341	0.020
Sustainability labels / green certification increase trust	0.232	0.071	3.245	0.001
Willingness to recommend	0.213	0.072	2.942	0.004

Predictor Variable	β (Coefficient)	Std. Error	t-Stat	p-value
brands using sustainable circular packaging				

The regression coefficients reveal that all three predictors have a statistically significant positive influence on consumer purchase decision ($p < 0.05$ in each case). Perceived brand environmental commitment associated with circular/sustainable packaging significantly predicts purchase decision ($\beta = 0.165$, $p = 0.020$). Sustainability labels and green certifications recorded the highest regression coefficient among the three predictors ($\beta = 0.232$, $p = 0.001$), indicating that clearly visible sustainability labelling plays the strongest role in encouraging consumers to choose sustainably packaged FMCG products. Willingness to recommend brands using sustainable circular packaging also significantly predicts purchase decision ($\beta = 0.213$, $p = 0.004$). Since the significance values of all independent variables are below 0.05, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1)—that sustainable circular packaging design has a significant positive influence on consumer purchase decisions—is supported.

V. Conclusion

The present study examined the impact of sustainable circular packaging design on consumer sustainability perception and purchase decision among 277 FMCG consumers in Bangalore. The findings confirm that sustainable circular packaging design plays a significant role in influencing consumer purchase decisions in the FMCG sector. Consumers increasingly prefer products packaged with environmentally friendly materials and respond positively to sustainability-related packaging attributes such as eco-labels, green certifications, and reusable packaging. The multiple regression analysis confirms that sustainable circular packaging significantly contributes to purchase decisions ($R^2 = 0.300$, $p < 0.001$), with sustainability labels and green certifications emerging as the most influential factor, followed by perceived brand environmental commitment and willingness to recommend.

These findings suggest that sustainable packaging is not only an environmental initiative but also a strategic marketing tool capable of strengthening brand image, enhancing consumer trust, and encouraging responsible

purchasing behaviour. FMCG companies should therefore increase the use of recyclable, reusable, and biodegradable packaging materials, prominently display sustainability labels and recognised green certifications, and clearly communicate their environmental commitment through packaging design and product information. Consumer awareness campaigns can further educate buyers about the benefits of circular packaging, while companies should balance sustainability with functionality, convenience, and visual appeal to encourage wider acceptance. Continued investment in innovative circular packaging solutions, supported by policy incentives and industry awareness programmes, can help FMCG companies integrate circular packaging practices into their overall business strategy to achieve long-term environmental sustainability while meeting evolving consumer expectations.

Overall, this study contributes to the growing body of literature on sustainable marketing, consumer behaviour, and circular economy practices by providing empirical evidence from an emerging urban market in India. The findings offer practical insights for FMCG manufacturers, marketers, and policymakers seeking to design packaging strategies that support both business performance and environmental sustainability objectives.

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