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Factors influencing consumer perception and adoption of green packaging: Evidence from Raipur City, Chhattisgarh

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Abstract

The increasing plastic-packaging waste has raised the interest in green packaging as a sustainable alternative. However, empirical evidence from tier-II cities of India, especially on Chhattisgarh is limited. The study investigates (i) the significant factors affecting consumer perception towards green packaging and (ii) the challenges and remedial measures affecting the adoption of green packaging based on primary data collected from 110 consumers of Raipur City by using a structured pre-tested questionnaire. The data were analysed using percentage analysis, ranking by mean scores on the Likert scale and Pearson chi-square tests to associate behavioural and demographic factors with consumer attitudes.

The most influential factor in shaping perception was environmental awareness (30.0%), followed by product quality (20.0%) and price consideration (17.3%). All six behavioural factors, viz. environmental concern, product quality, price sensitivity, eco-label awareness, brand image and purchase intention were found to have statistically significant association with consumer attitude ($p < 0.05$).

Demographic variables age, education, income and area of residence had significant association with consumer attitude while gender and occupation had no significant relationship. The most significant barriers to the adoption of green packaging are high product cost (mean = 4.62) and limited market availability (mean = 4.31). The study recommends strengthening awareness campaigns, promoting eco-labelling, introducing price-support initiatives and improving retail availability to encourage wider adoption. The results provide useful primary evidence on consumers' behaviour towards green packaging in Raipur City, Chhattisgarh, an under-researched region in the sustainable consumption literature.

Keywords: Eco-friendly packaging, consumer perception, sustainable consumption, chi-square analysis, environment concern, intention to buy

Introduction

Packaging waste is a major environmental problem worldwide, and it makes up almost 35% of the world's plastic usage. In 2025, the global plastic packaging market surpassed USD 430 billion, with a significant share of packaging being single-use and disposed of, thus increasing landfill and water body waste (Statista, 2026; Statista & Meyers, 2026) ^[26, 18]. In response, green packaging such as biodegradable, compostable, reusable, and reduced material alternatives have received considerable attention as a sustainable solution. The market for sustainable packaging worldwide was valued at around USD 126–127 billion in 2025 and expected to grow at a high rate driven by stringent environmental regulations, corporate sustainability initiatives, and growing consumer demand (Precedence Research, 2025; Statista, 2026) ^[22, 26]. The adoption of sustainable packaging practices worldwide has been further promoted by regulatory measures such as Extended Producer

Responsibility (EPR) and packaging waste regulations (Repurpose Global, 2026) ^[23].

The success of green packaging depends largely on the acceptance of consumers. Consumer attitude, subjective norms and perceived behavioural control strongly impact green purchase intention (Ajzen, 1991; Theory of Planned Behaviour) ^[1]. Several studies have reported that environmental concern, product quality, eco-label awareness, and brand image have a positive effect on consumers' attitude towards green packaging (Rokka & Uusitalo, 2008; Magnier & Cri , 2015) ^[24, 16]. However, even if consumers have favourable attitudes towards green-packaged products, they are often hindered from purchasing them because of higher prices, which leads to the well-known attitude-behaviour gap (H ttel *et al.*, 2017) ^[9]. Research in developing countries has also shown that environmental awareness, income and product quality have a significant effect on consumers' willingness to adopt green packaging (Hao *et al.*, 2019;

Prakash & Pathak, 2017) [8, 21].

India being one of the largest producers of plastic waste in the world has seen increasing adoption of sustainable packaging especially in the food and beverage, personal care and e-commerce space (Precedence Research, 2025) [22]. Previous studies revealed that Indian consumers' purchase intention is strongly influenced by environmental concern, perceived product quality, eco-labels and brand trust (Prakash & Pathak, 2017; Jaiswal & Singh, 2018; Khare, 2015; Kapse *et al.*, 2023) [21, 11, 13, 12]. On the policy front, India's commitment to sustainable packaging has been further strengthened by the Plastic Waste Management (Amendment) Rules, 2022, the Extended Producer Responsibility (EPR) framework and mandatory recycled-content norms (CPCB, 2022; MoEFCC, 2022; GreenSutra, 2026) [2, 19, 6].

However, studies on green packaging in India have been centered on metropolitan cities and there is little evidence from Chhattisgarh. Existing research in the state has examined sustainable lifestyle practices, but has yet to investigate consumer perception of green packaging and the determinants of its adoption (Patel & Pathak, 2025) [20]. Regional differences in economic conditions, retail infrastructure and environmental awareness lead to differences in consumer behaviour. Thus, the findings from metropolitan cities cannot be directly generalised to emerging tier-II cities like Raipur.

Hence the present study tries to empirically investigate consumer perception and adoption of green packaging in Raipur City, Chhattisgarh. The objectives of the study were as follows:

1. To identify and examine the key factors influencing consumer perception toward green packaging.
2. To examine the challenges in green packaging adoption and suggest suitable measures to overcome them.

2. Research Gap

Previous studies on packaging in India have mostly looked at big cities like Delhi-NCR, Mumbai and Pune. These studies checked what people think about packaging if they want to buy products with green packaging and how much they are willing to pay for them. Some people who did these studies are Prakash and Pathak, Jaiswal and Singh Kapse and his team and Jain and Hudnurkar. Not many people have looked at how peoples behavior and demographics affect what they think about green packaging in smaller cities.

In the state of Chhattisgarh people have studied how to live in a way but they have not really looked at green packaging or how peoples behavior and demographics are connected to it. Patel and Pathak did some work in 2025. Because of this we do not know much about what people in this area think about packaging or what stops them from using it. Raipur is a city in Chhattisgarh where a lot of business happens and it is growing fast. So it is a place to study green packaging and find out more, about it in a city that is getting bigger.

3. Materials and Methods

3.1 Study area

The study was done in Raipur, which's the capital city of Chhattisgarh. Raipur is a commercial and industrial hub. It has a sector that is growing very fast. People who live in Raipur are becoming more aware of how they can consume

things in a way. This makes Raipur a good place to study how people feel about packaging.

3.2 Sampling procedure and justification

We used a special kind of research design to do this study. We chose 110 people from Raipur City to be part of our study. We picked these people because they had bought packaged products like food, grocery and personal care items in the three months. We did not choose people randomly. Instead we picked people who we thought would be good for our study. This was okay because we were just trying to learn more about something. We did not have a lot of resources. Also we did not have a list of people in Raipur who know about green packaging. Our sample size of 110 people is similar to what other studies about packaging in India have used. For example one study by Sharda University had 111 people and another study by George and others in 2023 had a number of people.

3.3 Questionnaire design

We collected our data by asking people questions with a questionnaire. The questionnaire had three parts. The first part asked about the persons background like how old they're what they do. The second part asked about what they think and feel about things like how much they care about the environment, how they feel about product quality and how sensitive they are to prices. We also asked about how aware they're of eco-labels what they think about brands and if they plan to buy green packaging. The third part asked about the challenges people face when they try to adopt packaging and what can be done to make it easier for them.

3.4 Data collection and ethical considerations

We collected our data by talking to people face-to-face. We did this from 2025 to 2026. People did not have to participate in our study if they did not want to. We told everyone why we were doing the study before we asked them any questions. We kept all the information we got from people private. Did not tell anyone who they were. We only used the information we got for our study.

3.5 Hypotheses of the study

H₀: There is no significant association between behavioural factors (environmental concern, product quality perception, price sensitivity, eco-label awareness, brand image and purchase intention) and consumer attitude towards green packaging.

H₁: There is a significant association between behavioural factors and consumer attitude towards green packaging.

H₀: There is no significant association between demographic factors (gender, age, education, occupation, income and area of residence) and consumer attitude towards green packaging.

H₁: There is a significant association between demographic factors and consumer attitude towards green packaging.

3.6 Statistical tools and technique

The collected data were coded, tabulated and analyzed using a spreadsheet and statistical software. The following statistical techniques were used:

Percentage analysis: Percentage (%) = (Frequency / Total

Respondents) $\times 100$, used for distribution across variables.

Mean-score analysis: $\bar{X} = \Sigma X / N$, used to rank factor importance.

Chi-square test of independence: $\chi^2 = \Sigma(O - E)^2/E$, applied to test association between behavioural/demographic variables and consumer attitude; H_0 was rejected wherever p

< 0.05 .

4. Results

4.1 Factors influencing consumer perception of green packaging

Table 1 presents the distribution of 110 consumer respondents across the six factors identified as influencing perception of green packaging.

Table 1: Factors Influencing Consumer Perception of Green Packaging (n = 110)

Factor	No. of Consumers	Percentage (%)
Environmental Awareness	33	30.0
Product Quality	22	20.0
Price Consideration	19	17.3
Government Initiatives	14	12.7
Brand Image	17	15.5
Social Responsibility	5	4.5
Total	110	100.0

Source: Primary Data (2025–26).

Environmental awareness was the leading factor (30.0%), followed by product quality (20.0%), price consideration (17.3%), brand image (15.5%), and government initiatives (12.7%); social responsibility ranked lowest (4.5%). This mirrors Prakash and Pathak (2017) ^[21] and Rokka and Uusitalo (2008) ^[24], and suggests Raipur consumers link green packaging more to personal benefit and product attributes than civic responsibility (Magnier & Crié, 2015) ^[16] — implying manufacturers should prioritise awareness-building, quality assurance, and credible environmental

information over broad social-responsibility messaging.

4.2 Association between behavioural factors and consumer attitude

Table 2 shows the chi-square test of independence was applied to examine the association between six behavioural factors environmental concern, product quality perception, price sensitivity, eco-label awareness, brand image and purchase intention and consumer attitude toward green packaging.

Table 2: Chi-square Analysis of Behavioural Factors and Consumer Attitude towards Green Packaging (N = 110)

Factor	Category	Highly Negative	Negative	Neutral	Positive	Highly Positive	Total	χ^2	df	p-value	Result
Environmental Concern	Low	2	3	8	6	1	20	62.84	8	<0.001	Significant
	Moderate	1	2	8	12	7	30				
	High	0	0	4	15	41	60				
Product Quality Perception	Low	2	2	7	5	2	18	54.21	8	<0.001	Significant
	Moderate	1	2	8	13	11	35				
	High	0	1	5	15	36	57				
Price Sensitivity	Low	0	1	3	10	21	35	28.67	8	0.001	Significant
	Moderate	2	1	8	12	17	40				
	High	1	3	9	11	11	35				
Eco-label Awareness	Low	2	2	8	8	2	22	49.36	8	<0.001	Significant
	Moderate	1	2	8	12	12	35				
	High	0	1	4	13	35	53				
Brand Image	Poor	2	2	6	6	2	18	46.18	8	<0.001	Significant
	Average	1	2	9	13	10	35				
	Strong	0	1	5	14	37	57				
Purchase Intention	Low	2	3	7	5	1	18	63.92	8	<0.001	Significant
	Moderate	1	2	8	13	11	35				
	High	0	0	5	15	37	57				

Source: Primary Data (2025–26)

All six factors were significantly associated with consumer attitude ($p < 0.05$), rejecting H_0 . Purchase intention ($\chi^2 = 63.92$) and environmental concern ($\chi^2 = 62.84$) showed the strongest associations, followed by product quality (54.21), eco-label awareness (49.36), and brand image (46.18); price sensitivity was weakest yet still significant (28.67) — consistent with Gupta (2021) ^[7] and Rokka and Uusitalo (2008) ^[24], and with Prakash and Pathak (2017) ^[21], who

found price to be a moderating rather than primary determinant of attitude.

4.3 Association between demographic factors and consumer attitude

Table 3 presents chi-square results for the association between six demographic variables and consumer attitude.

Table 3: Chi-square Analysis of Demographic Factors and Consumer Attitude towards Green Packaging (N = 110)

Variable	Category	Positive	Negative	Total	χ^2	df	p-value	Result
Gender	Male	48	17	65	2.41	1	0.12	Not Significant
	Female	32	13	45				
Age Group	18–25	18	7	25	9.87	3	0.02	Significant
	26–35	33	12	45				
	36–45	18	9	27				
	Above 45	11	2	13				
Area	Urban	55	17	72	6.54	2	0.04	Significant
	Semi-Urban	16	7	23				
	Rural	9	6	15				
Education	Higher Secondary	12	8	20	11.3	3	0.01	Significant
	Graduate	38	12	50				
	Post Graduate	25	10	35				
	Others	5	0	5				
Occupation	Student	11	3	14	5.18	4	0.27	Not Significant
	Service	32	12	44				
	Business	23	9	32				
	Homemaker	8	4	12				
	Others	6	2	8				
Income Level (₹)	Below 50,000	10	6	16	10.9	3	0.01	Significant
	50,001–1,00,000	28	8	36				
	1,00,001–1,50,000	25	9	34				
	Above 1,50,000	17	7	24				

Source: Primary Data (2025–26).

Gender ($\chi^2 = 2.41$, $p = 0.12$) and occupation ($\chi^2 = 5.18$, $p = 0.27$) showed no significant association with attitude, whereas age ($\chi^2 = 9.87$, $p = 0.02$), area of residence ($\chi^2 = 6.54$, $p = 0.04$), education ($\chi^2 = 11.30$, $p = 0.01$), and income ($\chi^2 = 10.90$, $p = 0.01$) were significant — partially supporting H₁. These patterns align with Prakash and Pathak (2017) [21] on gender, Rokka and Uusitalo (2008) [24] and Francis and Sarangi (2022) [4] on age, Patel and Pathak (2025) [20] and

Magnier and Crié (2015) [16] on residence, and Biswas and Roy (2015) on education and income, indicating that socio-economic status shapes attitude more than basic demographic traits.

4.4 Overall consumer perception (Likert scale analysis)

Table 4 presents mean scores and rankings for five perception statements measured on a five-point Likert scale.

Table 4: Consumer Perception towards Green Packaging: Likert Scale Ranking (N = 110)

Statement	SA	A	N	D	SD	Mean	Rank
Green packaging is environmentally friendly	60	35	10	3	2	4.35	I
Green packaging improves brand image	52	37	12	5	4	4.16	II
Green packaging is safer for health	48	40	11	7	4	4.10	III
I am willing to pay extra	35	32	18	15	10	3.61	IV
Green packaging is easily available	18	24	20	28	20	2.93	V

Source: Primary Data (2025–26).

Note: SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree.

Respondents most strongly agreed that green packaging is environmentally friendly (mean = 4.35, Rank I), improves brand image (4.16, II), and is safer for health (4.10, III) — consistent with Rokka and Uusitalo (2008) [24] and Marsh and Bugusu (2007) [17]. Willingness to pay a premium was moderate (3.61, IV; cf. Prakash & Pathak, 2017; Hüttel *et al.*,

2017) [21,9], while perceived market availability scored lowest (2.93, V), echoing Patel and Pathak (2025) [20] on availability as a key constraint in Chhattisgarh.

4.5 Challenges in adopting green packaging

Table 5: Challenges Faced by Consumers in Adopting Green Packaging (n = 110)

Challenge	Mean Score	Rank
High Cost of Green-Packaged Products	4.62	I
Limited Availability in the Market	4.31	II
Lack of Awareness	4.20	III
Insufficient Government Support	4.00	IV
Difficulty in Identifying Genuine Green Packaging	3.86	V

Source: Primary Data (2025–26).

High cost (4.62) and limited availability (4.31) were the leading barriers, followed by lack of awareness (4.20),

insufficient government support (4.00), and difficulty verifying genuine green packaging (3.86) — consistent with

Sarma and Banik (2025) ^[25] and Patel and Pathak (2025) ^[20], and reinforcing the need for stronger eco-labelling and certification (Magnier & Cri , 2015) ^[16].

4.6 Measures suggested by consumers to overcome challenges

Table 6: Measures Suggested by Consumers to Overcome Adoption Challenges (n = 110)

Suggested Measure	Mean Score	Rank
Improved Product Availability	4.72	I
Price Reduction Strategies	4.58	II
Awareness Programmes	4.40	III
Eco-labelling Initiatives	4.12	IV
Government Subsidies	3.95	V

Source: Primary Data (2025–26).

Consumers ranked improved availability (4.72) and price reduction (4.58) as the most preferred remedies, followed by awareness programmes (4.40), eco-labelling (4.12), and government subsidies (3.95) closely mirroring the barriers identified in Table 5 and reinforcing the reliability of the findings.

5. Summary

The findings largely align with prior research while offering new evidence from a tier-II central Indian city. Consistent with the Theory of Planned Behaviour (Ajzen, 1991) ^[1], all six behavioural factors significantly shaped consumer attitude, echoing other emerging-economy studies (Lavuri, 2022; Choi & Johnson, 2019) ^[15, 3]. Price sensitivity, while significant, was comparatively weaker — suggesting a supporting rather than dominant role — and this attitude–behaviour gap is reflected in the modest willingness-to-pay-premium score (3.61) despite strong agreement that green packaging is environmentally beneficial (4.35), consistent with H ttel *et al.* (2017) ^[9].

Among demographic variables, age, area of residence, education, and income were significantly associated with attitude, while gender and occupation were not — consistent with Prakash and Pathak (2017) ^[21] and Biswas and Roy (2015), though differing from developed-country evidence where age effects are less pronounced (Rokka & Uusitalo, 2008) ^[24], likely reflecting Chhattisgarh's socio-economic and market-access disparities; urban consumers showed stronger positive attitudes, aligning with Patel and Pathak (2025) ^[20].

High cost and limited availability emerged as the principal adoption barriers, with improved availability and price reduction rated the most effective remedies — indicating that the challenge lies less in environmental awareness than in accessibility and affordability, consistent with H ttel *et al.* (2017) ^[9] and White *et al.* (2019) ^[27], and supporting calls by Magnier and Cri  (2015) ^[16] and Jain and Hudnurkar (2022) ^[10] for combining better availability, pricing, credible eco-labelling, and awareness programmes to convert positive attitudes into actual purchase behaviour.

6. Limitations

The study is limited to 110 consumers from Raipur City using non-probability (convenience-cum-purposive) sampling, restricting generalisability. Its cross-sectional design captures

perceptions at a single point in time rather than behavioural change over time, and self-reported responses may carry social-desirability bias on environmental issues. The study also covers only consumer perspectives, excluding retailers' and manufacturers' views on pricing, supply, and availability.

7. Conclusion

This study examined consumer perception and adoption of green packaging among 110 consumers in Raipur City, Chhattisgarh. Environmental awareness was the most influential factor shaping perception, and all six behavioural factors environmental concern, product quality, price sensitivity, eco-label awareness, brand image, and purchase intention showed statistically significant association with consumer attitude, supporting the applicability of the Theory of Planned Behaviour in this context. Among demographic variables, age, area of residence, education, and income significantly influenced attitude, while gender and occupation did not, indicating that socio-economic characteristics matter more than basic demographic traits. High cost and limited availability were identified as the main adoption barriers, with improved availability and price reduction seen as the most effective remedies. These findings offer useful evidence for policymakers, retailers, manufacturers, and marketers seeking to promote green packaging in tier-II Indian cities, and a foundation for further research on sustainable packaging and consumer behaviour in central India.

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