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Exploring Consumer Insights and Behavioral Responses to Eco-Friendly Packaging

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Abstract
General perception and awareness of eco-friendly packaging among consumers was studied with a focus on understanding the factors that influence sustainable choices in product packaging. The study aims to assess consumer attitudes, preferences, and the level of environmental consciousness related to packaging alternatives that minimize ecological impact. Using a quantitative research approach, data was collected through survey method using well structured questionnaire and subsequently analyzed to evaluate the role of factors such as environmental concern, aesthetics, cost, and brand influence in shaping consumer behavior. The findings indicate a growing inclination towards sustainable packaging solutions, though cost and limited awareness remain key barriers. The insights derived from this research can guide businesses and policymakers in developing effective strategies for promoting eco-friendly practices and fostering a more sustainable marketplace.

Keywords: Eco-friendly packaging, perception, Environmental awareness, Environmental impact, Eco-conscious purchasing.

INTRODUCTION

Packaging not only involves enclosing products for distribution, protection, storage, and sale but also as an important advertising tool. Eco- friendly packaging also known as sustainable or green packaging reduces environmental impact by using recyclable, biodegradable, or reusable materials and energy-efficient production methods. It emerged in response to environmental concerns during the 1960s–70s, with major innovations and regulatory support advancing through the decades. Common materials include recycled paper, bioplastics, glass, metal, and natural fiber. Governments globally support eco-packaging through bans on single-use plastics, Extended Producer Responsibility (EPR), compostable standards, green labeling, and public awareness campaigns. While offering benefits like waste reduction, energy savings, and improved brand image, eco-packaging faces challenges including higher costs, limited durability, and infrastructure gaps. Eco-packaging types include recyclable, biodegradable, reusable, edible, and minimalist formats. Its principles center on sustainability, conservation, waste reduction, and pollution prevention. With traditional plastic packaging harming ecosystems, the shift to ecofriendly alternatives supports a circular economy and carbon reduction. Emerging trends involve algae-based and mycelium packaging, smart technology, refill models, and greater collaboration among businesses, governments, and consumers. The global eco-packaging market spans various materials, products, and industries. Widespread adoption of ecofriendly practices—from homes to industries—marks a critical step toward a more sustainable future.

Review of literature

The growing emphasis on sustainability has driven extensive research on eco-friendly packaging and its influence on consumer behavior. Studies across various countries reveal that consumer attitudes are increasingly shaped by environmental concerns, ethical values, and awareness of green practices. Quoc et al. (2025) found eco-labelling significantly shaped cognitive attitudes among Vietnamese youth, while Kaur and Siddhey (2024) and Reddy et al. (2023) confirmed strong positive attitudes toward sustainable packaging in India. Similarly, Faris and Puad (2024) demonstrated that awareness of a brand's eco-efforts, such as Coca-Cola's green packaging, influenced consumer purchase intentions.Visual and verbal packaging elements—like color, material, shape, and labels—play crucial roles in forming perceptions, as seen in studies by Omidiran et al. (2024) and Bandara and Lakmali (2022). Chin and Hong (2023) and Sruthi (2023) also showed that visual cues and trust in eco-labels affected Korean and Indian consumer intentions respectively. While natural colorants enhanced appeal in Daltoé et al. (2024), Ketelsen et al. (2020) and Herbs et al. (2018) identified consumer confusion and limited understanding as major barriers to adoption.Socio-demographic variables—such as education, income, and environmental values—were found to influence eco-friendly choices (Dsouza & Kulal, 2023; Harjadi & Gunardi, 2022). Popovic and Bossink (2019) and Wandosell et al. (2021) emphasized the importance of bridging the attitude-behavior gap and incorporating external factors like policy and marketing. Studies also underscored the need for clear communication and transparent labelling, while stressing that price and quality often outweigh green attributes in real-world decisions. Overall, these findings highlight the multidimensional nature of consumer decision-making in sustainable packaging. Eco-friendly design, trust-building through labels, and effective awareness strategies are critical to encouraging green consumer behavior and supporting a circular economy.

Research Methodology

Objectives of study:

1. To study the awareness and perception towards Ecofriendly packaging (EFP).
2. Identify various factors that affect adoption of Ecofriendly packaging (EFP).

Research Design:

Exploratory research has been employed in the study to investigate the research questions and provide insights into existing information.

Sample Size:

We aimed to collect 200 responses, equally split between 100 males and 100 females. To account for non-responses and data quality issues, 230 responses were gathered. After validation and cleaning, the final sample size was 207, including 100 males and 107 females. Convenience sampling which is a non-probability sampling method has been used to collect the data.

Data collection tools

This being an exploratory study, well structured questionnaire was used as the primary data collection tool. The questionnaire had a mix of multiple-choice, dichotomous questions (Yes/No) and five-point Likert scale statements. The Likert scale ranged from "Strongly Agree" "Agree," "Neither Agree nor Disagree," and "Disagree and Strongly Disagree" Each response option was assigned a corresponding numerical values of 5,4,3,2,1 respectively.

Tools of data analysis:

Some of the analytical tools employed to interpret the collected data included, Chi-square test of independence, independent samples t-test and Leven's test. To perform the analysis, the following hypotheses were formulated:

- **Null Hypothesis (H_0):** There is no significant difference in the responses of male and female respondents.
- Alternative Hypothesis (H_1): There is a significant difference in the responses of male and female respondents.

The statistical package used for the analysis is SPSS.

DATA ANALYSIS & RESULTS

The demographic analysis shows that 48.3% of respondents are male and 51.7% are female (Table 1, Figure 1). Most participants (87.0%) are aged 18–24, followed by 9.2% in the 25–31 group, 2.4% in the 32–38 group, and 1.4% in the 39–45 group (Figure 2). Regarding education, 40.6% are undergraduates, 30.4% postgraduates, and 29.0% graduates, with nearly 60% holding at least a graduate degree (Figure 3).

Table 1: Demographic profile of respondents

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	100	48.3	48.3	48.3
	Female	107	51.7	51.7	100.0
	Total	207	100.0	100.0	
Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	180	87.0	87.0	87.0
	25-31	19	9.2	9.2	96.1
	32-38	5	2.4	2.4	98.6
	39-45	3	1.4	1.4	100.0
	Total	207	100.0	100.0	
Qualification					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Undergraduate	84	40.6	40.6	40.6
	Graduate	60	29.0	29.0	69.6
	Postgraduate	63	30.4	30.4	100.0
	Total	207	100.0	100.0	

In order to analyse the awareness of respondents towards ecofriendly packaging, respondents were evaluated through question related to their general awareness, sources of information, means of ecofriendly packaging, kind of material associated with ecofriendly packaging. The data shown in Table 2.

Table 2

	Are you aware about Ecofriendly packaging (EFP)?		
	No	Yes	Total

Demographic Profile a). Gender	Male	7	93	100	
	Female	9	98	107	
Total		16	191	207	
Pearson Chi-Square= .144, p value=.704, df=1					

		What are the sources of information about Ecofriendly packaging (EFP)?					
		Social media	Television	Family or friends	Companies	Others	Total
Demographic Profile a). Gender	Male	53	10	24	9	4	100
	Female	85	8	11	3	0	107
Total		138	18	35	12	4	207
Pearson Chi-Square=19.256, p value=<.001, df=4							

		What according to you is Ecofriendly packaging (EFP)?					
		Reusable packaging	Compostable packaging	Minimal packaging	Sustainable packaging	Other	Total
Demographic Profile a). Gender	Male	33	32	9	23	3	100
	Female	49	15	10	32	1	107
Total		82	47	19	55	4	207
Pearson Chi-Square=11.573, p value= .021, df=4							

		What kind of material do you associate with Ecofriendly packaging (EFP)?					
		Recycled paper or cardboard	Biodegradable plastics	Glass	Metal	Others	Total
Demographic Profile a). Gender	Male	54	32	11	1	2	100
	Female	75	25	6	1	0	107
Total		129	57	17	2	2	207
Pearson Chi-Square= 7.521, p value= .111, df=4							

The analysis indicated significant difference between male and female in terms awareness of eco-friendly packaging (EFP) is high across genders, with 93% of males and 91.6% of females reporting awareness. Overall, 92.3% are aware. A Chi-Square test (χ^2 = 0.144, p = 0.704) shows no significant association between gender and awareness, indicating a consistently high awareness level with minimal gender difference. EFP information source for both genders, especially females (79.4% vs. 53% of males). Males use a wider range of sources**. A Chi-Square test (χ^2 = 19.256, p < 0.001) confirms a significant gender difference in information sources.**The data shows gender-based differences in perceptions of eco-friendly packaging (EFP). Males mostly associated EFP with being reusable (33%) or compostable (32%), while females favoured reusable (45.8%) and sustainable (29.9%) options. A Chi-Square test (χ^2 = 11.573, p = 0.021) indicates a statistically significant—but moderate—association between gender and EFP perception.Both males (54%) and females (75%) most commonly associate eco-friendly packaging (EFP) with recycled paper or cardboard, followed by biodegradable plastics. Few link EFP to glass, metal, or

other materials. While the Chi-Square test ($\chi^2 = 7.521$, $p = 0.111$) shows no significant association between gender and material choice.

Both males (57%) and females (46%) most commonly associate eco-friendly packaging with **food**. Males link it more to electronics (17%), while females associate it more with fashion (20%) and cosmetics (17%). Overall, food leads, followed by fashion, electronics, cosmetics, and others, with females showing stronger ties to fashion and cosmetics.

Table: 3

		According to you what category of products use Ecofriendly packaging (EFP)?					
		Food	Cosmetics	Fashion	Electronics and gadgets	Others	Total
Demographic Profile a). Gender	Male	**57**	12	11	17	3	100
	Female	**46**	17	20	14	10	107
Total		**103**	29	31	31	13	207
Pearson Chi-Square=8.482, p value=.075, df=4							

Growing concern about eco-friendly packaging (EFP**).**

Both males (64%) and females (90%) primarily associate eco-friendly packaging with reducing waste and pollution. Overall, 74.6% prioritize environmental concerns, while fewer link EFP to aesthetics (12.6%), cost reduction (7.2%), or profit increase (5.8%), highlighting a clear emphasis on sustainability over economic factors.

Table 4

		Why are you concerned about Ecofriendly packaging (EFP)?				
		Reduce waste and pollution	Make packaging more attractive	Reduce overall product cost	Increase profit of companies	Total
Demographic Profile a). Gender	Male	64	14	11	11	100
	Female	90	12	4	1	107
Total		154	26	15	12	207
Pearson Chi-Square= 15.925, p value= .001, df=3						

Decision to switch brands has been influenced by the lack of eco-friendly packaging (EFP).

The data shows that 63% of males and 62% of females have switched brands due to the lack of eco-friendly packaging. Overall, 60.4% of respondents have done so, underscoring the strong influence of sustainability on brand loyalty.

Table 5

	Have you ever switched brands because of lack of Ecofriendly packaging (EFP)?	Total

		No	Yes	
Demographic Profile a). Gender	Male	37	63	100
	Female	45	62	107
Total		82	125	207
Pearson Chi-Square=.552, p value= .457, df=1				

Difficulties encountered when purchasing eco-friendly packaging (EFP).

The top challenge in purchasing eco-friendly packaging is a combination of factors, noted by 36% of males and 34.6% of females. Other key barriers include limited availability (30.4%), lack of awareness (20.8%), and high cost (13.5%), indicating shared concerns across both genders.

Table 6

		What kind of challenges you face while purchasing Ecofriendly packaging (EFP)?				
		Lack of awareness	Limited availability across store	Comparable high cost	All of these	Total
Demographic Profile a). Gender	Male	18	34	12	36	100
	Female	25	29	16	37	107
Total		43	63	28	73	207
Pearson Chi-Square= 1.887, p value=.596, df=3						

Incentives to purchase products with eco-friendly packaging (EFP). Awareness is the top motivator for purchasing products with eco-friendly packaging (32.8%), followed by better availability (21.3%), government policy (18.8%), lower price (16.9%), and market influence (10.1%). Both genders prioritize awareness, with availability and price also playing key roles.

Perception of respondents towards ecofriendly packaging.

Independent Samples Test						
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Significance Two-Sided p
E3	Equal variances assumed	1.488	.224	2.299	205	.023
E7	Equal variances assumed	.166	.684	2.073	205	.039
E8	Equal variances assumed	.377	.540	2.649	205	.009
E14	Equal variances assumed	.651	.421	2.002	205	.047

Out of 17 statements the 4 statements E3, E7, E8, E14 show significance difference in the mean score value with male gender agreeing to E3, E7, E8, E14.

In order to find out if these 4 statements show significant difference independent t test was conducted and likewise Levene's test of equality of variance was observed this statement showed significant to 2 tailed significances of **.023, .039, .009, .047** as shown in table these values conforming that gender wise male and female class do differ in their responses.

Findings

Awareness of Eco-friendly Packaging (EFP) is high among both genders 93% of males and 91.6% of females showing overall awareness of 92.3%. No significant gender difference was found ($\chi^2 = 0.144$, $p = 0.704$). Social media is the primary information source for both, especially females (79.4% vs. 53%). Males cited more varied sources like family, TV, and companies. A significant gender difference was observed. Perceptions of EFP differ: males associate it with reusability (33%) and compostability (32%), while females favour reusability (45.8%) and sustainability (29.9%). This difference was significant. Both genders mostly associate EFP with recycled paper/cardboard (54% males, 75% females). Biodegradable plastics followed. No significant gender difference was found. Food is the top category linked to EFP (57% males, 46% females), followed by fashion (more among females), electronics, and cosmetics. No significant gender difference ($\chi^2 = 8.482$, $df = 4$, $p = 0.075$). Environmental impact is the key concern (64% males, 90% females), with lesser emphasis on aesthetics, cost, and profit. A significant gender difference was found ($\chi^2 = 15.925$, $df = 3$, $p = 0.001$). Out of 17 attitude statements, four (E3, E7, E8, E14) showed significant gender-based differences ($p < .05$), with males agreeing more. Levene's test confirmed equal variances. About 60.4% of respondents have switched brands due to lack of EFP, with similar rates among males (63%) and females (62%). No significant gender difference. The main challenge in buying EFP is "All of these" (36% males, 34.6% females), followed by availability, awareness, and cost. No significant gender difference ($\chi^2 = 1.887$, $df = 3$, $p = 0.596$). Motivators to buy EFP include awareness (32.8%), availability, policy, price, and market effects. No significant gender difference ($\chi^2 = 4.385$, $df = 4$, $p = 0.356$).

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