



# International Journal of Engineering, Science and Humanities

An international peer reviewed, refereed, open-access journal  
Impact Factor 8.3 [www.ijesh.com](http://www.ijesh.com) ISSN: 2250-3552

## **The Impact of Environmental Awareness, Perceived Value and Consumer Attitudes on Eco-Friendly Packaging Adoption in Developing Economies**

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### **Abstract**

Eco-friendly packaging has emerged as a central instrument in the global effort to reduce plastic pollution and decouple economic consumption from environmental degradation. Yet in developing economies the transition from conventional to sustainable packaging remains slow and uneven, constrained by a web of economic, cognitive, structural and institutional factors. This study investigates the barriers and breakthroughs that shape consumer adoption of eco-friendly packaging by examining five determinants: affordability, environmental awareness, infrastructure readiness, government policy and regulatory support, and technological innovation. Drawing on the Theory of Planned Behaviour and the value-attitude-behaviour framework, a structured questionnaire comprising forty-five Likert items measuring six constructs was administered to four hundred consumers. The measurement instrument demonstrated strong internal consistency, with Cronbach's alpha values ranging from 0.81 to 0.90, and the data satisfied the conditions for factor analysis and multiple regression. Descriptive results reveal that environmental awareness and support for pro-environmental policy are high, whereas affordability and infrastructure readiness lag substantially, the latter recording the lowest construct mean in the study. Inferential analysis indicates that all five determinants are positively and significantly associated with consumer adoption, with affordability and technological innovation emerging as the strongest predictors, together explaining the majority of the variance in adoption behaviour. The findings expose a persistent gap between favourable environmental attitudes and actual purchasing behaviour, a gap driven principally by price premiums and inadequate waste-management infrastructure. The study concludes that awareness alone is insufficient to accelerate adoption; breakthroughs will require coordinated action on price parity, recycling infrastructure, credible certification and continued packaging innovation. These findings carry direct implications for manufacturers, policymakers and retailers seeking to mainstream sustainable packaging in emerging-market contexts.

**Keywords:** *eco-friendly packaging; consumer adoption; developing economies; green marketing; affordability; sustainability; attitude-behaviour gap.*



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## 1. Introduction

The accelerating accumulation of plastic waste has become one of the defining environmental challenges of the twenty-first century. Packaging accounts for a disproportionate share of global plastic production, and much of it is designed for single use, entering the waste stream within moments of purchase. In this context, eco-friendly packaging, encompassing biodegradable, compostable, recyclable and reusable materials, has attracted the attention of manufacturers, regulators and consumers alike as a means of mitigating the environmental burden of modern consumption. The commercial and ecological stakes are especially high in developing economies, where rapid urbanisation, expanding middle classes and growing retail penetration are driving packaged-goods consumption upward at a pace that existing waste-management systems struggle to absorb. This introductory section situates the study within its problem context, articulates the research problem, states the objectives and questions that guide the inquiry, advances the hypotheses to be tested, and outlines the significance and scope of the research.

### 1.1 Background of the Study

Consumer packaging occupies a paradoxical position in the sustainability debate. It performs indispensable functions, protecting products, extending shelf life, conveying information and enabling transport, yet it is also a principal source of the solid waste that overwhelms landfills and pollutes waterways. Over the past decade, mounting scientific evidence on marine plastic pollution and microplastic contamination has intensified public and regulatory scrutiny of conventional packaging. Manufacturers have responded with a widening portfolio of eco-friendly alternatives, and retailers in many markets now advertise sustainable packaging as a point of differentiation. In advanced economies, this shift has been reinforced by robust recycling infrastructure, stringent extended-producer-responsibility regulation and comparatively affluent consumers willing to absorb modest price premiums. In developing economies the picture is more complex, because the same aspirations coexist with tighter household budgets, uneven infrastructure and inconsistent enforcement of environmental regulation. The consequence is a distinctive market in which environmental goodwill is abundant but the conditions that would allow it to be expressed in purchasing are frequently absent. It is precisely this asymmetry between disposition and enablement that gives the study its title: the barriers are structural and economic, while the breakthroughs are likely to come from the interaction of innovation, policy and price, rather than from awareness campaigns whose returns appear to be diminishing.

The observed adoption of eco-friendly packaging in developing economies remains well below the level that stated attitudes would predict. This discrepancy, frequently described in the literature as the attitude-behaviour gap or the green gap, is the central puzzle addressed by this study. Consumers routinely express concern about plastic pollution and declare a preference for



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sustainable products, yet at the point of purchase they frequently revert to conventional packaging. The problem is not, therefore, one of ignorance or indifference alone. Rather, it appears to be the outcome of competing determinants, some acting as barriers and others as potential breakthroughs. Understanding which of these determinants exert the greatest influence on actual adoption, and how they interact, is essential if the transition to sustainable packaging is to be accelerated.

## 1.2 Significance and Scope of the Study

The study contributes to theory by applying the Theory of Planned Behaviour and the value-attitude-behaviour framework to the specific and under-researched domain of packaging adoption in an emerging-market setting, where facilitating conditions such as infrastructure and price parity cannot be assumed. It contributes to practice by disaggregating adoption into measurable determinants, thereby allowing stakeholders to target the barriers that matter most rather than relying on generic awareness campaigns. The scope is delimited to individual consumers of packaged products; it does not extend to industrial or business-to-business packaging decisions, and it treats a single developing-economy context as broadly representative of comparable markets while acknowledging that generalisation beyond that context requires caution.

## 2. Literature Review

This section synthesises prior scholarship relevant to the study. It is organised into three thematic strands: the conceptual and empirical literature on green consumer behaviour, the specific body of work on eco-friendly packaging and its determinants, and the theoretical frameworks that inform the present analysis. Together these strands establish the intellectual foundation for the constructs measured and the hypotheses tested.

### 2.1 Green Consumer Behaviour and the Attitude-Behaviour Gap

A substantial literature documents the divergence between consumers' pro-environmental attitudes and their actual purchasing behaviour. White, Habib and Hardisty (2019) provide an influential synthesis, arguing that sustainable behaviour is shaped by social influence, habit, individual self-concept, feelings and cognition, and tangibility, and that interventions succeed only when they address the specific barrier operating in a given context. Testa, Iraldo and Frey (2020) similarly find that stated willingness to pay for green products routinely exceeds realised purchases, attributing the shortfall to price sensitivity and situational constraints at the point of sale. Joshi and Rahman (2015) review the determinants of green purchasing across studies and conclude that perceived consumer effectiveness and product attributes mediate the translation of environmental concern into behaviour. Wang, Liu and Qi (2021) extend this line of work by demonstrating that the attitude-behaviour gap is wider in emerging markets, where infrastructural and economic constraints intervene between intention and action. Collectively, these studies establish that awareness, while necessary, is insufficient to secure adoption, motivating the multi-determinant approach adopted here.



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## 2.2 Determinants of Eco-Friendly Packaging Adoption

Research focused specifically on packaging identifies a cluster of recurring determinants. Ketelsen, Janssen and Hamm (2020) conduct a systematic review of consumer response to environmentally friendly packaging and report that perceived environmental benefit, price, and the credibility of packaging claims are decisive influences on purchase intention. Nguyen, Parker, Brennan and Lockrey (2020) find that consumers value packaging sustainability but discount it heavily when it carries a price premium, underscoring the primacy of affordability. Steenis, van Herpen, van der Lans, Ligthart and van Trijp (2017) show that consumers form sustainability judgements partly from packaging cues that do not always correspond to actual life-cycle impact, highlighting the role of information and certification. Magnier and Schoormans (2015) demonstrate that congruence between a product's green positioning and its packaging strengthens consumer evaluations, while Prakash and Pathak (2017) report that environmental concern and willingness to pay jointly predict intention to purchase eco-friendly packaged products among young consumers in a developing-economy setting. The role of enabling infrastructure and policy is emphasised by Rhein and Schmid (2020), who argue that recycling facilities and regulatory frameworks constitute facilitating conditions without which favourable attitudes cannot be enacted.

## 2.3 Theoretical Frameworks and Research Gap

The study is grounded in two complementary frameworks. The Theory of Planned Behaviour posits that behaviour is predicted by intention, which in turn is shaped by attitudes, subjective norms and perceived behavioural control; the last of these maps directly onto the infrastructure and affordability constraints examined here. The value-attitude-behaviour hierarchy proposes that underlying values inform attitudes, which in turn drive behaviour, providing a lens through which environmental awareness can be linked to adoption. Yadav and Pathak (2016) apply an extended Theory of Planned Behaviour in a developing-economy context and confirm the added explanatory power of perceived behavioural control. Zhang and Dong (2020) review green consumption research and call for greater attention to contextual moderators such as policy and infrastructure that are salient in emerging markets. Despite this rich literature, few studies simultaneously model affordability, awareness, infrastructure, policy and innovation as competing determinants of packaging adoption within a single developing-economy sample. This study addresses that gap by testing all five determinants together, thereby permitting an assessment of their relative importance.

## 3. Research Methodology

This study adopts a quantitative, cross-sectional survey design suited to testing the hypothesised relationships between the five determinants and consumer adoption. The research philosophy is positivist, treating the constructs as measurable latent variables inferred from observed Likert



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responses, and the approach is deductive, moving from theory-derived hypotheses to empirical testing.

The target population comprised adult consumers of packaged products in a representative developing-economy market. A structured questionnaire was administered to four hundred respondents selected through purposive and convenience sampling, a pragmatic choice given the exploratory nature of the inquiry and the need for respondents with direct experience of purchasing packaged goods. The achieved sample of four hundred comfortably satisfies the accepted item-to-response ratio of at least five to one for the forty-five measured items, and exceeds the minimum required for multiple regression with five predictors.

The questionnaire consisted of two parts. The first captured eight demographic and behavioural characteristics: gender, age, educational qualification, occupation, monthly income, region of residence, frequency of purchasing packaged products, and prior experience of purchasing eco-friendly packaged goods. The second part comprised forty-five statements measuring six constructs: affordability (eight items), environmental awareness (eight items), infrastructure readiness (seven items), government policy and regulatory support (six items), technological innovation (seven items), and consumer adoption of eco-friendly packaging, the dependent variable (eight items). All items were measured on a five-point Likert scale anchored at one for Strongly Disagree and five for Strongly Agree. Mean scores were interpreted using the conventional interval classification, in which values from 3.41 to 4.20 denote a high level of agreement and values above 4.20 a very high level.

Data were analysed using descriptive and inferential statistics. Frequency distributions summarised the demographic profile; means and standard deviations described the item-level and construct-level responses. Reliability was assessed through Cronbach's alpha, and the suitability of the data for factor analysis was verified through the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity. The hypotheses were tested through Pearson correlation and multiple linear regression, with consumer adoption regressed on the five determinants. Ethical protocols were observed: participation was voluntary, informed consent was obtained, and responses were anonymised.

## 4. Results and Analysis

This section presents the empirical findings in a systematic sequence. It begins with the demographic profile of the sample, proceeds to the reliability and validity of the instrument, reports the descriptive statistics for each construct, and concludes with the correlation and regression analyses that test the hypotheses. Nine tables summarise the results.

### 4.1 Demographic Profile of Respondents

Table 1 summarises the demographic composition of the four hundred respondents. The sample is close to balanced by gender, with a modest male majority, and is concentrated in the younger and



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middle adult age brackets. It is highly educated, with graduates and postgraduates together forming more than three-quarters of the sample, and occupationally diverse, with private-sector employees and students forming the two largest groups. Income is distributed across all bands, with a plurality in the lower-to-middle range, a feature of particular relevance given the centrality of affordability to the findings.

**Table 1: Demographic Profile of Respondents (N = 400)**

| Characteristic | Category              | Frequency | Percentage % |
|----------------|-----------------------|-----------|--------------|
| Gender         | Male                  | 214       | 53.50        |
|                | Female                | 186       | 46.50        |
| Age            | 18–25 years           | 96        | 24.00        |
|                | 26–35 years           | 134       | 33.50        |
|                | 36–45 years           | 88        | 22.00        |
|                | 46 years and above    | 82        | 20.50        |
| Education      | Higher Secondary      | 44        | 11.00        |
|                | Graduate              | 168       | 42.00        |
|                | Postgraduate          | 142       | 35.50        |
|                | Doctorate / Other     | 46        | 11.50        |
| Occupation     | Private Employee      | 128       | 32.00        |
|                | Student               | 92        | 23.00        |
|                | Government Employee   | 68        | 17.00        |
|                | Self-employed / Other | 112       | 28.00        |
| Monthly Income | Below ₹25,000         | 104       | 26.00        |
|                | ₹25,001–₹50,000       | 132       | 33.00        |
|                | ₹50,001–₹75,000       | 84        | 21.00        |
|                | Above ₹75,000         | 80        | 20.00        |

Source: Primary data (N = 400).

## 4.2 Reliability of the Measurement Instrument

Table 2 reports Cronbach's alpha for each construct. All six values exceed the accepted threshold of 0.70, ranging from 0.81 to 0.90, indicating strong to excellent internal consistency. The dependent variable, consumer adoption, records the highest reliability. These results confirm that



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the scales measure their intended constructs consistently and that subsequent inferences drawn from them are trustworthy.

**Table 2: Reliability Analysis — Cronbach's Alpha by Construct**

| Construct                              | Items | Cronbach's Alpha | Interpretation |
|----------------------------------------|-------|------------------|----------------|
| Affordability                          | 8     | 0.842            | Good           |
| Environmental Awareness                | 8     | 0.867            | Good           |
| Infrastructure Readiness               | 7     | 0.813            | Good           |
| Government Policy & Regulatory Support | 6     | 0.828            | Good           |
| Technological Innovation               | 7     | 0.851            | Good           |
| Consumer Adoption (Dependent)          | 8     | 0.902            | Excellent      |

Source: Primary data (N = 400).

## 4.3 Validity: Sampling Adequacy and Sphericity

Table 3 presents the results of the Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity, which together establish the suitability of the data for factor analysis. The KMO value of 0.891 is well within the range regarded as meritorious, indicating that the pattern of correlations is compact and that factor analysis will yield distinct and reliable factors. Bartlett's test is highly significant, confirming that the correlation matrix departs sufficiently from an identity matrix to justify factor extraction.

**Table 3: KMO Measure and Bartlett's Test of Sphericity**

| Test                                            | Statistic               | Value    |
|-------------------------------------------------|-------------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | KMO                     | 0.891    |
| Bartlett's Test of Sphericity                   | Approx. Chi-Square      | 8642.317 |
|                                                 | Degrees of Freedom (df) | 990      |
|                                                 | Significance (p)        | 0.000    |

Source: Primary data (N = 400). A KMO above 0.80 is considered meritorious.

## 4.4 Comparative Descriptive Statistics for the Constructs

Table 4 compares the grand means and standard deviations of the six constructs, permitting a direct reading of their relative standing. Environmental awareness and government policy support are jointly the highest, both falling clearly within the high band and displaying the tightest dispersion, which signals strong consensus. Technological innovation and consumer adoption follow.



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Infrastructure readiness records the lowest mean of the six, sitting at the boundary between the moderate and high bands, while affordability is the only construct to fall into the moderate band, marking it as the principal economic barrier. The pattern is telling: consumers are aware and supportive in attitude, but the enabling conditions of price and infrastructure lag behind.

**Table 4: Comparative Descriptive Statistics for the Six Constructs**

| Construct                              | Grand Mean | Std. Deviation | Level    |
|----------------------------------------|------------|----------------|----------|
| Environmental Awareness                | 3.94       | 0.71           | High     |
| Government Policy & Regulatory Support | 3.94       | 0.74           | High     |
| Consumer Adoption (Dependent)          | 3.79       | 0.78           | High     |
| Technological Innovation               | 3.69       | 0.82           | High     |
| Infrastructure Readiness               | 3.44       | 0.88           | High     |
| Affordability                          | 3.19       | 0.94           | Moderate |

Source: Primary data (N = 400). Levels follow the five-point interval classification.

## 4.5 Affordability

Table 5 disaggregates the affordability construct. Respondents strongly agree that eco-friendly packaged products carry a price premium and that price is a decisive factor in their choices; they are far less convinced that such products offer value for money at current prices. Critically, respondents indicate strongly that price relief, bringing eco-friendly prices into parity with conventional products, would prompt them to switch. The construct's moderate grand mean and its wide dispersion identify affordability as the weakest link and the most actionable barrier in the study.

**Table 5: Affordability — Item-Wise Mean Scores**

| No. | Statement (abridged)                                    | Mean | S.D. | Level    |
|-----|---------------------------------------------------------|------|------|----------|
| 1   | Eco-friendly packaged products are more expensive       | 4.11 | 0.79 | High     |
| 2   | Willing to pay slightly more for eco-friendly packaging | 3.02 | 1.08 | Moderate |
| 3   | Eco-friendly products offer value for money             | 2.71 | 1.12 | Moderate |
| 4   | Price relief would increase my purchase intention       | 4.18 | 0.74 | High     |
| 5   | Price is one of the most important factors in choice    | 4.09 | 0.81 | High     |
| 6   | I would buy eco-friendly if priced like conventional    | 4.14 | 0.77 | High     |



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| No.               | Statement (abridged) | Mean        | S.D.        | Level           |
|-------------------|----------------------|-------------|-------------|-----------------|
| <b>Grand Mean</b> | <b>Affordability</b> | <b>3.19</b> | <b>0.94</b> | <b>Moderate</b> |

Source: Primary data (N = 400). Selected representative items shown.

## 4.6 Environmental Awareness and Infrastructure Readiness

Table 6 juxtaposes representative items from the two constructs that most sharply illustrate the attitude-behaviour gap. Awareness of the environmental harm caused by plastic packaging is near-universal and personal responsibility is strongly felt, yielding a high construct mean with the narrowest range in the study. Infrastructure readiness tells the opposite story: respondents report that recycling and segregation facilities are frequently unavailable and that collection systems for used packaging are weak. The contrast is the empirical heart of the study, favourable cognition confronts unfavourable facilitating conditions.

**Table 6: Environmental Awareness and Infrastructure Readiness — Selected Items**

| Construct      | Statement (abridged)                                 | Mean | S.D. |
|----------------|------------------------------------------------------|------|------|
| Awareness      | Aware of environmental harm from plastic packaging   | 4.21 | 0.63 |
| Awareness      | Feel personal responsibility to reduce plastic waste | 4.02 | 0.69 |
| Awareness      | Understand meaning of eco-friendly certification     | 3.61 | 0.86 |
| Infrastructure | Recycling facilities are easily available to me      | 3.08 | 0.97 |
| Infrastructure | Waste segregation is practised in my locality        | 2.94 | 1.04 |
| Infrastructure | Collection systems for used packaging are adequate   | 3.02 | 0.99 |

Source: Primary data (N = 400). Awareness grand mean 3.94; Infrastructure grand mean 3.44.

## 4.7 Policy, Technological Innovation and Consumer Adoption

Table 7 summarises the three remaining constructs. Government policy support is high: respondents trust products that comply with official environmental standards and favour restrictions on single-use plastics, though they rate the influence of awareness campaigns comparatively lower. Technological innovation is viewed favourably, with respondents agreeing that improved materials and designs would increase adoption. Consumer adoption, the dependent variable, is high overall, driven especially by strong future purchase intention and broad support



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for widespread adoption, even as current substitution behaviour lags behind stated intention, again reflecting the gap between willingness and action.

**Table 7: Policy, Innovation and Adoption — Selected Item Means**

| Construct  | Statement (abridged)                                          | Mean | S.D. |
|------------|---------------------------------------------------------------|------|------|
| Policy     | I trust products complying with govt. environmental standards | 4.06 | 0.72 |
| Policy     | Govt. should restrict single-use plastic packaging            | 4.12 | 0.75 |
| Policy     | Govt. awareness campaigns influence my purchases              | 3.51 | 0.93 |
| Innovation | Better packaging technology would increase my adoption        | 3.88 | 0.80 |
| Adoption   | I intend to purchase eco-friendly packaging in future         | 4.09 | 0.71 |
| Adoption   | I support widespread adoption of eco-friendly packaging       | 4.15 | 0.68 |
| Adoption   | I actively substitute conventional with eco-friendly          | 3.34 | 0.96 |

Source: Primary data (N = 400). Policy 3.94; Innovation 3.69; Adoption 3.79.

## 4.8 Correlation Analysis

Table 8 reports the Pearson correlation coefficients between each determinant and consumer adoption. All five determinants correlate positively and significantly with adoption at the one per cent level. Affordability and technological innovation show the strongest associations, followed by government policy, environmental awareness and infrastructure readiness. The uniformly positive and significant coefficients provide preliminary support for all five hypotheses and justify their joint inclusion in the regression model.

**Table 8: Pearson Correlations with Consumer Adoption**

| Determinant                            | r with Adoption | Sig. (p) | Strength        |
|----------------------------------------|-----------------|----------|-----------------|
| Affordability                          | 0.612           | 0.000    | Strong          |
| Technological Innovation               | 0.598           | 0.000    | Moderate-Strong |
| Government Policy & Regulatory Support | 0.541           | 0.000    | Moderate        |
| Environmental Awareness                | 0.507           | 0.000    | Moderate        |
| Infrastructure Readiness               | 0.489           | 0.000    | Moderate        |

Source: Primary data (N = 400). Correlation significant at the 0.01 level (2-tailed).



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## 4.9 Regression Analysis and Hypothesis Testing

Table 9 presents the multiple regression of consumer adoption on the five determinants. The model is statistically significant and explains a substantial proportion of the variance in adoption, with an adjusted R-squared of 0.583, indicating that the five determinants jointly account for approximately fifty-eight per cent of the variation in adoption behaviour. All five standardised beta coefficients are positive and significant, so all five hypotheses (H1 to H5) are supported. Affordability carries the largest standardised coefficient, confirming price as the single most influential determinant, followed closely by technological innovation. Infrastructure readiness, though significant, is the weakest predictor, suggesting that while inadequate infrastructure depresses adoption, its marginal effect once other factors are controlled is smaller than that of price and innovation.

**Table 9: Multiple Regression — Determinants of Consumer Adoption**

| Predictor                                                             | Beta ( $\beta$ ) | t-value | Sig. (p) | Result    |
|-----------------------------------------------------------------------|------------------|---------|----------|-----------|
| Affordability (H1)                                                    | 0.312            | 6.842   | 0.000    | Supported |
| Environmental Awareness (H2)                                          | 0.188            | 4.021   | 0.000    | Supported |
| Infrastructure Readiness (H3)                                         | 0.141            | 3.118   | 0.002    | Supported |
| Government Policy & Regulation (H4)                                   | 0.207            | 4.507   | 0.000    | Supported |
| Technological Innovation (H5)                                         | 0.264            | 5.933   | 0.000    | Supported |
| Model: $R^2 = 0.591$ ; Adj. $R^2 = 0.583$ ; $F = 113.6$ ; $p = 0.000$ |                  |         |          |           |

Source: Primary data ( $N = 400$ ). Dependent variable: Consumer Adoption of Eco-Friendly Packaging.

## 4.10 Discussion of Findings

The results paint a coherent picture of the barriers and breakthroughs shaping adoption. The breakthroughs lie on the demand side of attitude: environmental awareness is high, trust in credible standards is strong, and future purchase intention and support for widespread adoption are robust. Consumers, in short, are willing. The barriers lie in the enabling conditions. Affordability, the only construct in the moderate band and the strongest predictor in the regression, confirms that the price premium is the decisive brake on adoption; consumers who express willingness to switch nonetheless revert to cheaper conventional packaging at the point of purchase. Infrastructure readiness, the lowest-scoring construct, represents the second major barrier: even motivated consumers cannot fully enact their intentions where recycling and segregation facilities are absent. These findings corroborate the emerging-market extension of the attitude-behaviour gap reported by Wang, Liu and Qi (2021) and the primacy of price documented by Nguyen, Parker, Brennan



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and Lockrey (2020). At the same time, the significant and sizeable coefficient on technological innovation points to a genuine breakthrough lever: advances that lower the cost and improve the performance of sustainable materials can simultaneously ease the affordability barrier and strengthen adoption. The significant, if smaller, effect of policy affirms the facilitating role of regulation emphasised by Rhein and Schmid (2020).

Read together, the correlation and regression results carry a subtle but important message about the ordering of interventions. Because affordability and technological innovation dominate the model, and because these two determinants are themselves linked, innovation that reduces unit cost feeds directly into affordability, the most efficient policy sequence is one that treats price as the fulcrum. Interventions that lower the effective price of eco-friendly packaging, whether through subsidies, tax differentials, scale economies or material breakthroughs, are likely to unlock adoption faster than interventions aimed at the already-high levels of awareness. Infrastructure and policy operate as necessary enabling conditions rather than as primary motivators: they set the ceiling on how far intention can be converted into behaviour, but they do not by themselves generate the willingness to adopt. This layered interpretation reconciles the apparently competing findings that awareness is high yet adoption is incomplete, and that infrastructure is weak yet only modestly predictive once price is controlled. The practical corollary is that stakeholders should resist the temptation to treat every determinant as equally actionable; the evidence points to a clear hierarchy of leverage in which economic and technological factors lead and structural and institutional factors support.

## 5. Conclusion

This study set out to identify the barriers and breakthroughs in consumer adoption of eco-friendly packaging in a developing-economy context, examining affordability, environmental awareness, infrastructure readiness, government policy and regulatory support, and technological innovation as determinants of adoption. The evidence, drawn from four hundred consumers using a reliable and valid instrument, supports all five hypotheses: each determinant is positively and significantly associated with adoption, and together they explain approximately fifty-eight per cent of the variance in adoption behaviour.

The central conclusion is that awareness is not the binding constraint. Consumers in the studied context are well informed about the environmental costs of plastic packaging and broadly favourable towards sustainable alternatives; the obstacle to adoption is the misalignment between this favourable disposition and the economic and structural conditions required to act on it. Affordability emerges as the single most powerful determinant, followed by technological innovation, indicating that the most effective route to accelerating adoption runs through price parity and material advancement rather than through further awareness-raising alone.



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Infrastructure readiness, the lowest-rated construct, constitutes a structural barrier that dampens even motivated behaviour.

These findings carry clear practical implications. For manufacturers, the priority is to reduce the price premium through economies of scale and innovation, and to communicate value credibly through verifiable certification. For policymakers, the priority is twofold: to invest in recycling and segregation infrastructure that converts intention into action, and to deploy fiscal instruments and regulation that narrow the cost gap between conventional and sustainable packaging. For retailers, positioning eco-friendly options at accessible price points and prominent shelf locations can lower the situational barriers that suppress green choices at the moment of purchase.

The study is not without limitations. Its cross-sectional design precludes causal inference, its reliance on purposive sampling and a highly educated sample limits generalisation to less educated segments, and self-reported adoption may overstate actual behaviour. Future research should employ longitudinal or experimental designs, incorporate observed purchase data, and extend the analysis across multiple developing-economy markets to test the robustness of the determinants identified here. Notwithstanding these limitations, the study advances understanding of why favourable environmental attitudes so often fail to translate into sustainable packaging choices, and it identifies affordability, innovation and infrastructure as the levers most likely to convert consumer goodwill into widespread adoption.

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