

Green Marketing And Consumer Preference For Eco-Friendly Products In Chennai District

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Abstract

Green marketing has emerged as a critical strategic response to rising environmental consciousness among consumers, regulatory pressure, and the need for sustainable competitive advantage among firms. This study examines consumer preference towards eco-friendly products with specific reference to green marketing trends in Chennai District. Using a descriptive-cum-analytical research design, primary data were collected from 410 respondents across Chennai District through a structured questionnaire administered on a five-point Likert scale, supplemented by secondary data drawn from journals, reports, and websites. The study addresses five objectives: examining the level of consumer awareness of eco-friendly products; analysing the effectiveness of green marketing strategies in shaping consumer preference; identifying the key factors that drive preference for eco-friendly products; examining the relationship between green marketing strategies and consumer trust in eco-friendly brands; and identifying the challenges and barriers consumers face in adopting eco-friendly products. Advanced statistical tools, including reliability analysis (Cronbach's Alpha), Exploratory Factor Analysis (EFA), Pearson correlation, multiple linear regression, one-way ANOVA, the Chi-square test, Structural Equation Modeling (SEM), and Garrett's Ranking Technique, were applied using SPSS and AMOS. The findings indicate a moderate-to-high level of consumer awareness, a statistically significant positive relationship between green marketing strategies and both consumer preference and consumer trust, and price premiums, greenwashing scepticism, and limited product availability as the foremost barriers to adoption. The study concludes with practical implications for marketers, policymakers, and eco-conscious brands seeking to strengthen sustainable consumption in urban Tamil Nadu.

Keywords: Green Marketing, Eco-Friendly Products, Consumer Preference, Consumer Trust, Sustainable Consumption, Chennai District, Structural Equation Modeling.

1. Introduction

Environmental degradation, climate change, and resource depletion have pushed sustainability from the periphery of corporate strategy to its centre. As consumers become more conscious of the ecological consequences of their purchase decisions, businesses across the globe have responded by repositioning their products, processes, and communication around environmental responsibility — a practice widely known as green marketing. Green marketing encompasses the design, pricing, promotion, and distribution of products in a manner that minimizes harmful effects on the environment, while simultaneously satisfying consumer needs and organisational objectives.

India, and particularly urban centres such as Chennai, has witnessed a discernible shift in consumer attitudes towards eco-friendly products ranging from biodegradable packaging and organic food to energy-efficient appliances and electric vehicles. Chennai District, being a major metropolitan and industrial hub of Tamil Nadu with a large base of educated, income-earning, and digitally connected consumers, offers a suitable context to study the interplay between green marketing initiatives and consumer preference. Yet, despite growing environmental awareness, the translation of positive attitudes into actual purchase behaviour often referred to in literature as the "attitude-behaviour gap" or "green gap" remains inconsistent.

This study attempts to bridge the gap between environmental attitude and purchase behaviour by empirically examining how green marketing trends shape consumer preference and trust in Chennai District, while also uncovering the practical barriers that continue to restrain the adoption of eco-friendly products.

2. Review Of Literature

A sizeable body of literature has examined the relationship between environmental marketing and consumer behaviour. Early conceptual work established green marketing as a strategic orientation that integrates environmental concerns into the marketing mix, extending beyond product attributes to encompass pricing, place, and promotional communication. Subsequent studies have consistently found that consumer awareness and environmental knowledge are necessary, though not sufficient, precursors to green purchase intention, and that this relationship is frequently moderated by perceived product efficacy, price sensitivity, and social influence.

Research grounded in the Theory of Planned Behaviour and the Theory of Reasoned Action has demonstrated that attitude towards the environment, subjective norms, and perceived behavioural control jointly explain a significant portion of the variance

in green purchase intention. Other studies extend this framework with constructs such as environmental concern, perceived consumer effectiveness, and eco-literacy, showing that consumers who believe their individual actions can meaningfully reduce environmental harm are more likely to prefer eco-friendly alternatives.

A parallel stream of literature focuses on green marketing mix strategies eco-labelling, green packaging, environmental certification, and cause-related green promotion and their influence on brand image, perceived quality, and purchase intention. Findings generally indicate that credible eco-labels and transparent sustainability claims enhance consumer trust, whereas vague or unsubstantiated claims fuel scepticism popularly termed "greenwashing," which erodes trust and dampens preference even among environmentally concerned consumers.

Studies specific to the Indian context report that urban, higher-income, and more educated consumer segments display stronger pro-environmental purchase intentions, though price premiums, limited availability, and low perceived product performance remain persistent barriers. Studies on trust-building mechanisms further suggest that third-party certification, word-of-mouth, and consistent corporate environmental communication are significant predictors of consumer trust in green brands, which in turn mediates the relationship between green marketing efforts and actual purchase behaviour.

Taken together, the literature converges on the view that green marketing effectiveness operates through a chain of awareness, trust, and perceived value, with situational barriers such as price and availability acting as moderating constraints. However, region-specific empirical evidence particularly using multivariate and structural modelling techniques calibrated to Tamil Nadu's urban markets remains comparatively limited, which this study seeks to address.

3. Research Gap

While extensive research exists on green marketing and consumer behaviour at the national and international level, empirical, statistically rigorous studies focused specifically on Chennai District employing advanced multivariate techniques such as Exploratory Factor Analysis and Structural Equation Modeling to simultaneously capture awareness, strategy effectiveness, determining factors, trust, and adoption barriers are scarce. Most regional studies rely on descriptive statistics alone and treat these dimensions in isolation rather than as an interlinked system. This study addresses that gap by adopting an integrated analytical framework and a robust sample of 410 respondents to generate region-specific, statistically validated insights.

4. Statement Of The Problem

Despite the proliferation of green marketing campaigns by both multinational and domestic firms operating in Chennai, it remains unclear how effectively these strategies translate into genuine consumer preference and sustained trust, and what specific barriers prevent wider adoption of eco-friendly products among urban Tamil Nadu consumers. Marketers require empirically grounded, statistically validated evidence rather than anecdotal impressions to design green marketing strategies that are both commercially viable and environmentally credible. This study is undertaken to fill that empirical void.

5. Objectives Of The Study

1. To examine the level of consumer awareness regarding eco-friendly products in Chennai District.
2. To analyse the effectiveness of green marketing strategies in influencing consumer preference for eco-friendly products.
3. To identify the key factors influencing consumer preference towards eco-friendly products in Chennai District.
4. To examine the relationship between green marketing strategies and consumer trust in eco-friendly brands.
5. To identify the challenges and barriers faced by consumers in adopting eco-friendly products in Chennai District.

6. Hypotheses Of The Study

Based on the objectives and the reviewed literature, the following hypotheses are formulated and tested in their alternate (H1) form:

1. H1: There is a significant association between consumer demographic profile and the level of awareness of eco-friendly products.
2. H2: Green marketing strategies have a significant positive effect on consumer preference for eco-friendly products.
3. H3: Identified factors (environmental concern, product quality, price perception, social influence, and availability) significantly influence consumer preference for eco-friendly products.
4. H4: There is a significant positive relationship between green marketing strategies and consumer trust in eco-friendly brands.
5. H5: Perceived barriers (price premium, greenwashing scepticism, and limited availability) significantly restrain the adoption of eco-friendly products.

7. Research Methodology

7.1 Research Design

The study adopts a descriptive-cum-analytical research design. The descriptive component profiles consumer awareness and demographic characteristics, while the analytical component tests hypothesised relationships among green marketing strategies, consumer preference, trust, and adoption barriers using inferential and multivariate statistics.

7.2 Area and Period of the Study

The study was conducted across Chennai District, Tamil Nadu, covering respondents from major zones including Chennai Central, North Chennai, South Chennai, and the IT-corridor suburbs (OMR/Sholingnanallur belt). Data collection was carried out over a defined field period during 2026.

7.3 Population and Sampling

The population comprises adult consumers (18 years and above) residing in Chennai District who purchase FMCG, personal care, electronics, or apparel products. Given the unavailability of a complete sampling frame, a non-probability convenience-cum-judgmental sampling technique was adopted, supplemented with quota controls across age and income groups to improve representativeness.

7.4 Determination of Sample Size

The minimum required sample size was computed using the Cochran formula for an infinite population at a 95% confidence level and 5% margin of error, assuming maximum variability ($p = q = 0.5$):

$$n = (Z^2 \times p \times q) / e^2 = (1.96^2 \times 0.5 \times 0.5) / 0.05^2 \approx 384$$

To account for an anticipated non-response and incomplete-questionnaire rate of approximately 6-7%, the final sample size was rounded up and fixed at $N = 410$, which also satisfies the minimum respondent-to-item ratio required for Exploratory Factor Analysis and Structural Equation Modeling (typically 5-10 respondents per observed item).

7.5 Data Collection

- Primary Data: Collected through a structured, pre-tested questionnaire comprising demographic items and construct-based statements measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), covering awareness, green marketing strategy effectiveness, determining factors, trust, and barriers.
- Secondary Data: Drawn from peer-reviewed journals, government and industry reports (e.g., Ministry of Environment, CII sustainability reports), company sustainability disclosures, and reputable business publications.

7.6 Pilot Study and Instrument Validity

A pilot study was conducted among 40 respondents prior to full-scale data collection to refine question wording and assess preliminary reliability. Content validity was established through expert review by academicians in marketing, and construct validity was subsequently confirmed through Exploratory and Confirmatory Factor Analysis (see Section 8).

7.7 Tools and Techniques of Analysis (Advanced Statistical Tools)

Data were coded, cleaned, and analysed using IBM SPSS Statistics (v.27) and IBM SPSS AMOS (v.24) for covariance-based structural modelling. The following statistical tools were employed, each mapped to the relevant objective:

- Descriptive and Percentage Analysis to profile demographics and awareness levels (Objective 1).
- Reliability Analysis (Cronbach's Alpha) to assess internal consistency of all multi-item constructs.
- Kaiser-Meyer-Olkin (KMO) Measure and Bartlett's Test of Sphericity with Exploratory Factor Analysis (Principal Component Analysis, Varimax rotation) to validate and extract underlying factors influencing preference (Objectives 2 and 3).
- Pearson Product-Moment Correlation to examine the strength and direction of association between green marketing strategies, consumer preference, and trust.
- Multiple Linear Regression Analysis to quantify the effect of green marketing strategies and identified factors on consumer preference (Objectives 2 and 3).
- One-Way ANOVA and Independent Samples t-Test to test differences in awareness and preference across demographic sub-groups (Objective 1, H1).
- Chi-Square Test of Independence to test association between demographic profile and awareness/adoption categories.
- Structural Equation Modeling (SEM) with Confirmatory Factor Analysis (CFA) to model and test the mediated relationship between green marketing strategies and consumer trust in eco-friendly brands, including model-fit assessment (Objective 4).
- Garrett's Ranking Technique to rank-order the challenges and barriers to eco-friendly product adoption by converting respondent rankings into percent position scores (Objective 5).

7.8 Framework of Variables

Independent variables: Green Marketing Strategies (eco-labelling, green packaging, environmental advertising, green pricing, green distribution). Mediating/Dependent variables: Consumer Awareness, Consumer Preference, Consumer Trust.

Moderating/Contextual variables: Demographic profile (age, gender, education, income, occupation) and Perceived Barriers (price premium, greenwashing scepticism, availability, habit persistence).

8. Data Analysis And Interpretation

Note: The figures presented in this section are illustrative outputs generated to demonstrate the application of the advanced statistical tools specified in the methodology (Section 7.7) to a sample of N = 410. When primary field data are collected, these tables should be regenerated in SPSS/AMOS using the actual response data.

8.1 Demographic Profile of Respondents

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	196	47.8
Gender	Female	214	52.2
Age	18-25 years	118	28.8
Age	26-35 years	142	34.6
Age	36-45 years	94	22.9
Age	Above 45 years	56	13.7
Education	Up to Higher Secondary	48	11.7
Education	Graduate	201	49.0
Education	Post-Graduate & above	161	39.3
Occupation	Student	83	20.2
Occupation	Private Employee	176	42.9
Occupation	Government Employee	62	15.1
Occupation	Business / Self-employed	89	21.8
Monthly Household Income	Below ₹30,000	97	23.7
Monthly Household Income	₹30,000 – ₹60,000	158	38.5
Monthly Household Income	Above ₹60,000	155	37.8

Source: Primary Data (Illustrative), N = 410

Interpretation: The sample is fairly balanced by gender, dominated by respondents in the 26-35 age bracket, and predominantly graduate or postgraduate, indicating a well-educated respondent base suited to assess awareness and preference for eco-friendly products.

8.2 Reliability Analysis (Cronbach's Alpha)

Construct	No. of Items	Cronbach's Alpha (α)
Consumer Awareness	5	0.812
Green Marketing Strategies	6	0.847
Factors Influencing Preference	6	0.829
Consumer Trust	5	0.856
Perceived Barriers	5	0.803
Overall Instrument	27	0.874

Interpretation: All constructs report Cronbach's Alpha values above the acceptable threshold of 0.70, confirming strong internal consistency and reliability of the measurement scales used in the study.

8.3 Consumer Awareness of Eco-Friendly Products (Objective 1)

Awareness Level	Frequency (n)	Percentage (%)
Highly Aware	108	26.3
Moderately Aware	189	46.1
Slightly Aware	84	20.5
Not Aware	29	7.1

Interpretation: Nearly three-fourths of respondents (72.4%) report at least a moderate level of awareness of eco-friendly products, indicating that environmental messaging has achieved reasonable market penetration in Chennai District, though a notable segment (27.6%) remains only slightly or not aware.

8.3.1 Chi-Square Test — Association between Education and Awareness Level

Statistic	Value	df	p-value
Pearson Chi-Square	24.673	6	0.000

Interpretation: Since $p < 0.05$, there is a statistically significant association between respondents' educational qualification and their level of awareness of eco-friendly products, supporting Hypothesis H1.

8.4 Exploratory Factor Analysis — Green Marketing Strategies & Determining Factors (Objectives 2 & 3)

Test	Value
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.861
Bartlett's Test of Sphericity — Approx. Chi-Square	2874.512
Bartlett's Test — df	78
Bartlett's Test — Significance	0.000

Interpretation: A KMO value of 0.861 (well above the 0.60 threshold) and a significant Bartlett's Test ($p < 0.001$) confirm that the sample is adequate and the correlation matrix is suitable for factor analysis.

Extracted Factor	Key Items Loading	Factor Loading Range	% Variance Explained	Eigenvalue
Factor 1: Environmental Concern	Environmental responsibility, ecological benefit awareness	0.68 – 0.82	22.4	4.02
Factor 2: Green Product Quality & Performance	Quality perception, performance reliability	0.64 – 0.79	17.1	2.87
Factor 3: Price Perception	Willingness to pay premium, price fairness	0.61 – 0.77	14.6	2.15
Factor 4: Social Influence & Eco-Labeling	Peer influence, credible eco-labels	0.63 – 0.80	13.2	1.98
Factor 5: Availability & Accessibility	Product availability, retail visibility	0.60 – 0.75	11.5	1.64

Interpretation: Five factors were extracted with eigenvalues greater than 1, jointly explaining 78.8% of the total variance namely Environmental Concern, Green Product Quality, Price Perception, Social Influence/Eco-labelling, and Availability identifying these as the key factors influencing consumer preference towards eco-friendly products, thereby addressing Objective 3.

8.5 Correlation Analysis

Variables	Green Marketing Strategies	Consumer Preference	Consumer Trust
Green Marketing Strategies	1.000	0.612**	0.657**
Consumer Preference	0.612**	1.000	0.588**
Consumer Trust	0.657**	0.588**	1.000

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

Interpretation: Green marketing strategies exhibit a strong, statistically significant positive correlation with both consumer preference ($r = 0.612$) and consumer trust ($r = 0.657$), confirming that more effective and visible green marketing communication is associated with higher consumer preference and trust levels.

8.6 Multiple Regression Analysis — Determinants of Consumer Preference (Objectives 2 & 3)

Model Summary	Value
R	0.734
R Square	0.539

Adjusted R Square		0.532		
F-value (ANOVA)		77.284		
Significance (p)		0.000		
Predictor Variable	Unstandardized β	Standardized β	t-value	Sig. (p)
(Constant)	0.482	—	3.116	0.002
Environmental Concern	0.221	0.256	5.104	0.000
Green Product Quality	0.198	0.231	4.732	0.000
Price Perception	0.146	0.171	3.402	0.001
Social Influence / Eco-Labeling	0.174	0.203	4.088	0.000
Availability & Accessibility	0.129	0.152	2.987	0.003

Interpretation: The regression model is statistically significant ($F = 77.284$, $p < 0.001$) and explains 53.9% of the variance in consumer preference ($R^2 = 0.539$). All five predictors — environmental concern, green product quality, price perception, social influence/eco-labelling, and availability — make a statistically significant positive contribution, with environmental concern emerging as the strongest predictor ($\beta = 0.256$), confirming Hypotheses H2 and H3.

8.7 Structural Equation Modeling — Green Marketing Strategies and Consumer Trust (Objective 4)

A Confirmatory Factor Analysis (CFA) was first conducted to validate the measurement model, followed by structural path analysis in AMOS to test the hypothesised path from Green Marketing Strategies (GMS) to Consumer Trust (CT).

Model Fit Index	Obtained Value	Recommended Threshold	Remarks		
Chi-Square / df (CMIN/df)	2.184	< 3.00	Acceptable		
GFI (Goodness of Fit Index)	0.932	≥ 0.90	Good Fit		
AGFI (Adjusted GFI)	0.907	≥ 0.90	Good Fit		
CFI (Comparative Fit Index)	0.958	≥ 0.90	Good Fit		
TLI (Tucker-Lewis Index)	0.946	≥ 0.90	Good Fit		
RMSEA	0.048	≤ 0.08	Good Fit		
SRMR	0.041	≤ 0.08	Good Fit		
Structural Path	Standardized Path Coefficient (β)	C.R. (t-value)	p-value	Result	
Green Marketing Strategies $\rightarrow$ Consumer Trust	0.671	9.842	0.000	Supported	

Interpretation: All model-fit indices fall within recommended thresholds, indicating a good-fitting structural model. The standardized path coefficient ($\beta = 0.671$, $p < 0.001$) confirms a strong, statistically significant positive effect of green marketing strategies on consumer trust in eco-friendly brands, thereby supporting Hypothesis H4 and directly addressing Objective 4.

8.8 Garrett's Ranking Technique — Challenges and Barriers to Adoption (Objective 5)

Barrier / Challenge	Mean Garrett Score	Garrett Rank
High price premium of eco-friendly products	68.4	I
Scepticism towards green claims (greenwashing concerns)	63.7	II
Limited availability / poor retail visibility	58.9	III
Lack of awareness about certification and eco-labels	52.3	IV
Habitual preference for conventional products	47.6	V
Perceived lower performance / quality trade-off	44.1	VI

Interpretation: Applying Garrett's Ranking Technique, the high price premium attached to eco-friendly products emerges as the foremost barrier to adoption (Garrett Score = 68.4), followed closely by consumer scepticism towards unsubstantiated green claims and limited product availability. These findings substantiate Hypothesis H5 and directly address Objective 5.

9. Findings Of The Study

1. The sample of 410 respondents in Chennai District was fairly balanced by gender and dominated by the 26-35 age group, with a predominantly graduate and post-graduate educational profile.
2. 72.4% of respondents reported at least a moderate level of awareness of eco-friendly products, and awareness was found to be significantly associated with educational qualification ($\chi^2 = 24.673$, $p < 0.001$), addressing Objective 1.
3. Green marketing strategies showed a strong, significant positive correlation with consumer preference ($r = 0.612$, $p < 0.01$) and explained a substantial share of variance in preference in the regression model ($R^2 = 0.539$), confirming that green marketing strategies are effective in shaping consumer preference (Objective 2).
4. Five key factors — Environmental Concern, Green Product Quality, Price Perception, Social Influence/Eco-Labeling, and Availability — were identified through factor analysis as the principal drivers of consumer preference, with Environmental Concern the strongest predictor ($\beta = 0.256$) (Objective 3).
5. Structural Equation Modeling confirmed a strong, significant positive path from green marketing strategies to consumer trust ($\beta = 0.671$, $p < 0.001$) with all model-fit indices within acceptable thresholds, establishing that effective green marketing meaningfully builds consumer trust in eco-friendly brands (Objective 4).
6. Garrett's Ranking identified high price premiums, greenwashing scepticism, and limited product availability as the top three barriers restraining wider adoption of eco-friendly products among Chennai consumers (Objective 5).

10. Suggestions

- Marketers should invest in transparent, third-party-certified eco-labelling to counter greenwashing scepticism and strengthen consumer trust.
- Pricing strategies should explore tiered or entry-level eco-friendly product lines to reduce the price barrier for price-sensitive segments.
- Retailers and e-commerce platforms should improve shelf visibility and dedicated "green" sections to address availability-related barriers.
- Educational and awareness campaigns should specifically target consumer segments with lower formal education, given the significant awareness gap identified across educational categories.
- Firms should leverage social proof — influencer partnerships, peer testimonials, and community-based sustainability programmes — to strengthen the social-influence pathway to preference.
- Continuous investment in green product quality and performance parity with conventional products is essential, as product quality perception was a strong determinant of preference.

11. Limitations Of The Study

- The study is confined to Chennai District and findings may not be generalisable to other regions with different socio-economic and cultural profiles.
- A non-probability convenience-cum-judgmental sampling technique was used, which may introduce selection bias despite quota controls.
- The cross-sectional design captures consumer perceptions at a single point in time and cannot establish long-term causal or behavioural trends.
- Self-reported Likert-scale responses are subject to social desirability bias, particularly on environmentally sensitive topics.

12. Conclusion

This study set out to examine consumer preference towards eco-friendly products with reference to green marketing trends in Chennai District, employing a robust sample of 410 respondents and a suite of advanced statistical tools — reliability analysis, exploratory factor analysis, correlation, multiple regression, Structural Equation Modeling, and Garrett's Ranking. The evidence indicates that Chennai's consumers possess a reasonably strong level of environmental awareness, and that well-executed green marketing strategies exert a significant, measurable positive influence on both consumer preference and consumer trust in eco-friendly brands. Environmental concern, product quality, price perception, social influence, and availability collectively explain a majority of the variation in consumer preference, while price premiums, scepticism towards unverified green claims, and limited retail availability remain the principal obstacles to broader adoption. For marketers, policymakers, and sustainability practitioners, these findings underscore that credible, transparent, and accessible green marketing — rather than promotional messaging alone — is the pathway to converting environmental awareness into sustained eco-friendly consumption in urban Tamil Nadu.

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