

Consumer Awareness of Greenwashing and Green Purchase Intentions: The Mediating Role of Green Claim Credibility and the Moderating Role of Environmental Knowledge

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Abstract

This study examines the relationship between consumer awareness of greenwashing and green purchase intentions in the Indian fast-moving consumer goods (FMCG) market, focusing on green claim credibility as a mediating mechanism and environmental knowledge as a moderating factor. A quantitative, cross-sectional survey reportedly involving 450 Indian FMCG consumers was analysed using confirmatory factor analysis (CFA), composite reliability, the heterotrait–monotrait ratio (HTMT), and ordinary least squares regression within the Hayes PROCESS framework, employing 5,000 bootstrap resamples. The reported findings indicate that greenwashing awareness is negatively associated with green purchase intentions ($\beta = -0.1941$, $p < .001$) and green claim credibility ($\beta = -0.2385$, $p < .001$), whereas green claim credibility is positively associated with purchase intentions ($\beta = 0.4271$, $p < .001$). The estimated indirect effect is -0.1016 , with a 95% bootstrap confidence interval of $[-0.1435, -0.0627]$. Environmental knowledge reportedly moderates the relationship between greenwashing awareness and purchase intentions ($\beta = -0.1588$, $p < .001$). The conditional association is statistically nonsignificant at low environmental knowledge ($\beta = -0.0564$, $p = .1391$) but significantly negative at high environmental knowledge ($\beta = -0.3317$, $p < .001$). The study integrates Signaling Theory and the Elaboration Likelihood Model to explain how claim credibility and environmental knowledge may shape consumer responses to environmental marketing communications. The findings highlight the importance of transparent, specific, and verifiable environmental claims in promoting credible sustainability communication and informed purchasing decisions.

Keywords: *Greenwashing Awareness; Green Claim Credibility; Green Purchase Intentions; Environmental Knowledge; Signaling Theory; Elaboration Likelihood Model; Sustainable Marketing.*

I. INTRODUCTION

Environmental sustainability has become an important consideration in corporate strategy and consumer decision-making. As businesses increasingly incorporate environmental attributes into product positioning, marketing communications frequently feature claims concerning carbon emissions, recyclable packaging, resource conservation, and responsible sourcing. Although such claims can help consumers identify products with environmental benefits, their usefulness depends on the accuracy, clarity, and verifiability of the information provided. When environmental communications exaggerate benefits, omit material information, or convey unsupported impressions of environmental responsibility, they may constitute greenwashing (de Freitas Netto et al., 2020; Delmas & Burbano, 2011). Greenwashing can therefore undermine consumers' ability to distinguish between substantiated environmental performance and promotional claims that lack adequate evidence.

The consequences of greenwashing extend beyond the credibility of an individual product advertisement. Environmental claims function as informational signals that consumers may use when evaluating products whose environmental attributes are difficult to verify before purchase. From a Signaling Theory perspective, the value of such signals depends on their credibility and the evidence supporting them (Erdem & Swait, 1998; Spence, 1973). When consumers perceive environmental claims as misleading

or unreliable, their confidence in the information may decline, potentially weakening their willingness to purchase the promoted product. Research on perceived greenwashing has similarly examined its implications for consumer responses, green trust, and purchasing intentions (Chen & Chang, 2013; Nyilasy et al., 2014). However, consumers may not respond uniformly to environmental claims. Their evaluations can depend on whether they regard a particular claim as credible and on their capacity to assess the information presented.

An important distinction in this context is the difference between green claim credibility and general brand trust. Brand trust concerns consumers' broader confidence in a brand, whereas green claim credibility refers specifically to the perceived believability and reliability of an environmental assertion. These constructs may be related, but they are not interchangeable. A consumer may trust a brand in general while questioning a particular environmental claim, or may consider a specific claim convincing without possessing a strong overall relationship with the brand. Examining claim-specific credibility can therefore provide a more focused explanation of how consumers' awareness of greenwashing relates to their green purchase intentions. In particular, perceived credibility may represent an explanatory mechanism through which awareness of potentially misleading environmental communication is associated with purchasing decisions.

Environmental knowledge may also influence how consumers interpret environmental marketing. The Elaboration Likelihood Model (ELM) proposes that persuasion depends, in part, on individuals' motivation and ability to evaluate persuasive information (Petty & Cacioppo, 1986). Consumers with greater environmental knowledge may be better equipped to scrutinise environmental terminology, question unsupported assertions, and distinguish specific evidence from general promotional language. Consequently, environmental knowledge should not automatically be assumed to strengthen green purchase intentions. Its role may instead depend on how consumers use their knowledge when evaluating environmental claims. In the context of greenwashing awareness, greater knowledge could be associated with a stronger negative relationship between awareness of misleading claims and purchase intention. This proposed relationship requires empirical testing rather than being treated as an established outcome.

Despite the growing literature on green marketing and sustainable consumer behaviour, three issues warrant further investigation. First, studies that focus primarily on green trust or general brand credibility may not fully capture consumers' evaluations of individual environmental claims. Second, the relationship between environmental knowledge and purchasing intention may be more complex than the assumption that greater knowledge consistently encourages green consumption. Third, examining mediation and moderation separately may provide an incomplete account of how claim credibility and consumer knowledge jointly relate to purchasing intentions. An integrated conditional process framework can address these issues by examining both the proposed explanatory mechanism and the circumstances under which the relationship between greenwashing awareness and purchase intention may vary. The extent to which this combination remains underexamined should, however, be established through a systematic review of the relevant literature.

To address these issues, the present study develops a conditional process framework grounded in Signaling Theory and the Elaboration Likelihood Model. It examines the association between consumer awareness of greenwashing and green purchase intention among consumers in the Indian fast-moving consumer goods (FMCG) market. Green claim credibility is examined as a potential mediator, while environmental knowledge is considered a moderator of the relationship between greenwashing awareness and purchase intention. The study pursues four objectives:

1. To examine the relationship between consumer awareness of greenwashing and green purchase intention.
2. To assess whether green claim credibility mediates the relationship between greenwashing awareness and green purchase intention.
3. To investigate whether environmental knowledge moderates the relationship between greenwashing awareness and green purchase intention.
4. To examine whether the direct and indirect relationships within the proposed framework vary according to consumers' levels of environmental knowledge.

By distinguishing claim-specific credibility from general brand trust and incorporating environmental knowledge as a potential boundary condition, this study seeks to provide a more nuanced account of consumer responses to environmental marketing. Its proposed contribution lies in examining how the perceived credibility of environmental claims and consumers' capacity to evaluate those claims may help explain variations in green purchase intention. The resulting evidence may inform businesses seeking to communicate environmental benefits transparently and help identify the importance of substantiated, specific, and verifiable claims in consumer-facing sustainability communication.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Theoretical Framework

This study integrates Signaling Theory and the Elaboration Likelihood Model (ELM) to explain consumer responses to environmental marketing. Signaling Theory explains how environmental claims communicate product attributes that consumers may find difficult to verify independently (Spence, 1973). When claims are perceived as misleading or unsupported, their informational value may decline. ELM explains how consumers evaluate persuasive messages through central or peripheral processing, depending on factors including motivation and ability (Petty & Cacioppo, 1986). Environmental knowledge may help consumers assess environmental claims, although its moderating influence requires empirical testing.

2.2. Greenwashing Awareness and Green Purchase Intention

Greenwashing awareness refers to consumers' recognition or suspicion that environmental claims are misleading or insufficiently substantiated. Green purchase intention refers to their stated willingness to purchase products perceived as environmentally preferable. Perceived greenwashing may undermine consumer evaluations of environmental marketing and reduce willingness to rely on related claims (Chen & Chang, 2013; Nyilasy et al., 2014).

H1: Consumer awareness of greenwashing is negatively associated with green purchase intention.

2.3. Greenwashing Awareness and Green Claim Credibility

Green claim credibility refers to the perceived believability and reliability of a specific environmental claim, rather than general trust in the brand. When consumers suspect that environmental claims exaggerate product benefits or lack supporting evidence, they may evaluate those claims less favourably. This reasoning is consistent with the importance of credible signals in reducing information asymmetry (Spence, 1973).

H2: Consumer awareness of greenwashing is negatively associated with green claim credibility.

2.4. Green Claim Credibility and Green Purchase Intention

Credible environmental claims may help consumers evaluate product attributes and reduce uncertainty about the information communicated. Claim credibility may therefore be positively associated with purchase intention, although other factors, including price and product quality, can also influence purchasing decisions (Atkinson & Rosenthal, 2014; Erdem & Swait, 2004).

H3: Green claim credibility is positively associated with green purchase intention.

2.5. Mediating Role of Green Claim Credibility

Consumers who recognise potentially misleading environmental communication may assign lower credibility to specific environmental claims. Lower claim credibility may, in turn, be associated with weaker purchase intentions. Green claim credibility is therefore proposed as a mechanism that may statistically explain part of the relationship between greenwashing awareness and purchase intention.

H4: Green claim credibility mediates the relationship between consumer awareness of greenwashing and green purchase intention, with a negative indirect association.

2.6. Moderating Role of Environmental Knowledge

Environmental knowledge concerns consumers' understanding of environmental issues and relevant product claims. Under ELM, knowledge may contribute to consumers' ability to scrutinise persuasive messages, although processing also depends on motivation and contextual factors (Petty & Cacioppo, 1986). More knowledgeable consumers may be better equipped to identify weaknesses in environmental claims. Accordingly, the negative association between greenwashing awareness and purchase intention may be stronger among consumers with greater environmental knowledge.

H5: Environmental knowledge moderates the relationship between greenwashing awareness and green purchase intention, such that the negative association is stronger at higher levels of environmental knowledge.

III. CONCEPTUAL MODEL

This study proposes a conceptual model examining the relationship between consumer awareness of greenwashing and green purchase intention, with green claim credibility as a mediator and environmental knowledge as a moderator of the direct relationship. The model examines the direct association, the indirect association through green claim credibility, and the moderating effect of environmental knowledge.

The proposed relationships are expressed through the following equations.

Mediator Equation

$$M_i = \alpha_0 + aX_i + \gamma^T C_i + \varepsilon_{mi} \quad (1)$$

Outcome Equation

$$Y_i = \beta_0 + c'X_i + bM_i + dW_i + q(X_iW_i) + \delta^T C_i + \varepsilon_{yi} \quad (2)$$

where X_i represents consumer awareness of greenwashing, M_i represents green claim credibility, Y_i represents green purchase intention, and W_i represents environmental knowledge for respondent i . The interaction term X_iW_i represents the interaction between greenwashing awareness and environmental knowledge. C_i represents the vector of demographic or other theoretically justified control variables. The coefficients are regression parameters, while ε_{mi} and ε_{yi} represent the respective error terms.

The indirect effect through green claim credibility is calculated as:

$$\text{Indirect Effect} = a \times b \quad (3)$$

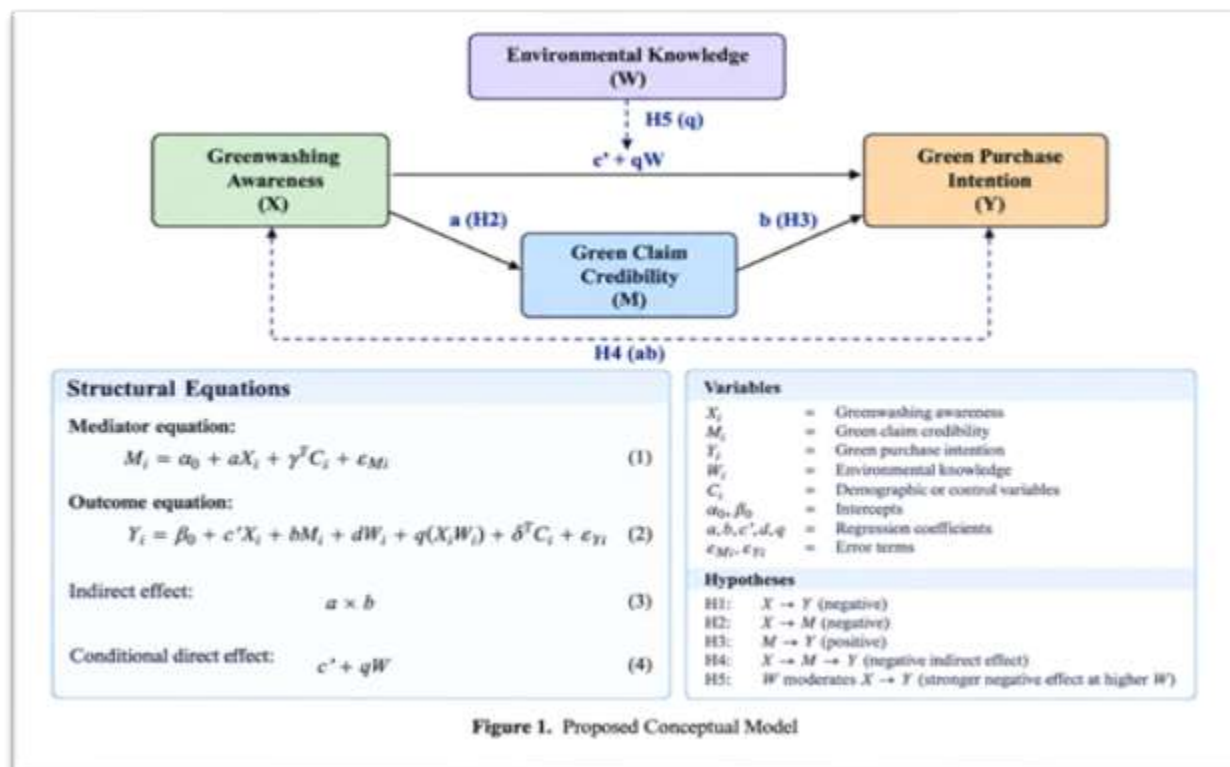
The conditional direct effect of greenwashing awareness on green purchase intention is expressed as:

$$\text{Conditional Direct Effect} = c' + qW \quad (4)$$

The coefficient q indicates whether environmental knowledge moderates the direct relationship between greenwashing awareness and green purchase intention. The indirect effect ($a \times b$) can be evaluated using bootstrap confidence intervals. Because environmental knowledge moderates only the direct relationship in this model, the indirect effect through green claim credibility is not conditional on environmental knowledge.

The model incorporates five hypotheses: H1 proposes a negative association between greenwashing awareness and green purchase intention; H2 proposes a negative association between greenwashing awareness and green claim credibility; H3 proposes a positive association between green claim credibility and green purchase intention; H4 proposes a negative indirect association through green claim credibility; and H5 proposes that the negative association between greenwashing awareness and green purchase intention is stronger at higher levels of environmental knowledge.

Given the cross-sectional design, the proposed relationships will be interpreted as statistical associations rather than definitive evidence of causation.



The proposed relationships among greenwashing awareness, green claim credibility, environmental knowledge, and green purchase intention are illustrated in Figure 1.

IV. RESEARCH METHODOLOGY

4.1. Research Design and Sampling Procedure

This study adopts a quantitative, cross-sectional survey design to examine the relationships between consumer awareness of greenwashing, green claim credibility, environmental knowledge, and green purchase intention in the Indian fast-moving consumer goods (FMCG) market. FMCG products, including personal care, household cleaning, and packaged food products, provide a relevant context for investigating consumer responses to environmental marketing claims.

The target population comprises adult consumers in India who purchase FMCG products. The survey instrument was designed to examine consumer evaluations of environmental claims and their reported purchase intentions. A standardised product-category stimulus may be used to establish a common context for respondents, provided that it was included in the administered questionnaire.

According to the reported sample records, 468 responses were obtained. Following data screening, 18 responses were excluded because of failed attention checks or straightlining, leaving 450 responses for analysis. The specified attention checks required a response of 7 (strongly agree) for ATTN1 and 1 (strongly disagree) for ATTN2. These exclusion criteria should be retained in the final report only if they correspond to the procedures actually implemented during data collection and screening.

The adequacy of the final sample should be evaluated in relation to the proposed regression model, particularly the interaction between greenwashing awareness and environmental knowledge. An appropriate power analysis should consider the anticipated interaction effect, significance level, desired statistical power, and number of predictors. The sample size alone does not establish that the study has sufficient power to detect the hypothesised moderation effect.

4.2. Sample Profile

Table 1 presents the reported demographic and purchasing characteristics of the final analytical sample of 450 respondents. The distributions cover gender, age, educational attainment, income category, and FMCG purchasing frequency.

Table 1. Demographic Characteristics of the Sample (N = 450)

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Female	238	52.89
	Male	205	45.56
	Non-binary/Other	7	1.56
Age	18–24 years	97	21.56
	25–34 years	171	38.00
	35–44 years	98	21.78
	45–54 years	45	10.00
	55 years and above	39	8.67
Education	High school	67	14.89
	Bachelor's degree	255	56.67
	Master's degree	95	21.11
	Doctorate/professional qualification	33	7.33
Income category	Low	77	17.11
	Lower-middle	137	30.44
	Middle	130	28.89
	Upper-middle	78	17.33
	High	28	6.22
FMCG purchase frequency	Weekly	274	60.89
	Every two weeks	104	23.11
	Monthly	59	13.11
	Rarely	13	2.89

Note. Percentages are calculated using the total sample of 450 respondents. Minor differences from 100% may arise because of rounding.

4.3. Construct Operationalisation and Measurement Scales

The proposed research model comprises four constructs: greenwashing awareness, green claim credibility, environmental knowledge, and green purchase intention. The questionnaire uses a seven-point Likert response format ranging from 1 (strongly disagree) to 7 (strongly agree), provided that this format matches the instrument administered to respondents. Measurement items should be adapted from relevant published scales and reviewed for conceptual relevance to the Indian FMCG context.

Greenwashing awareness (X). Greenwashing awareness refers to consumers' recognition or suspicion that environmental marketing claims are misleading, exaggerated, ambiguous, or insufficiently substantiated. The proposed four-item measure assesses consumers' perceptions of potentially misleading environmental communication. Chen and Chang (2013) examine greenwashing in relation to green trust, consumer confusion, and perceived risk. Any items adapted from their work should be documented and evaluated to establish whether they adequately measure the present study's greenwashing-awareness construct.

Green claim credibility (M). Green claim credibility refers to consumers' perceived believability and reliability of a specific environmental claim. The proposed four-item measure focuses on product-level environmental assertions rather than general trust in a brand. Newell and Goldsmith (2001) developed a measure of perceived corporate credibility; adapting that measure to individual environmental claims requires appropriate justification and empirical validation.

Environmental knowledge (W). Environmental knowledge refers to consumers' understanding of environmental issues and relevant product attributes. The proposed four-item measure should distinguish subjective environmental knowledge, which reflects respondents' perceptions of their own knowledge, from objective environmental knowledge, which reflects demonstrable factual understanding. These dimensions should not be combined into a single measure without theoretical justification and evidence that the resulting construct is appropriate.

Green purchase intention (Y). Green purchase intention refers to consumers' stated willingness or intention to purchase products perceived as environmentally preferable. The proposed four-item measure assesses purchasing intentions in the FMCG context. Any items adapted from Chan (2001) should be checked against the original publication, and modifications to wording or product context should be documented.

Before hypothesis testing, the measurement properties should be evaluated using procedures appropriate to the selected analytical approach. Reliability and validity assessments should be reported using the actual results. The analysis should address internal consistency, convergent validity, and discriminant validity where applicable. No reliability or validity criterion should be described as satisfied until the relevant empirical evidence has been obtained.

V. DATA ANALYSIS AND RESULTS

5.1. Item Descriptives and Normality Assessment

Descriptive statistics were examined to assess the distributional characteristics of the 16 measurement items representing greenwashing awareness, green claim credibility, environmental knowledge, and green purchase intention. The analysis considered item means, standard deviations, skewness, and kurtosis. The reported descriptive statistics are presented in Table 2.

Table 2. Item-Level Descriptive Statistics

Construct	Item	Mean	SD	Skewness	Kurtosis
Greenwashing awareness	GWA1	4.822	0.996	-0.085	-0.107
	GWA2	4.973	1.070	-0.089	-0.222
	GWA3	4.611	1.018	-0.004	-0.188
	GWA4	4.864	1.017	-0.006	-0.416
Green claim credibility	GCC1	4.218	1.019	-0.041	-0.188
	GCC2	4.453	1.027	-0.215	0.039
	GCC3	4.164	1.034	0.043	0.213
	GCC4	4.300	1.002	-0.041	0.160
Environmental knowledge	EK1	5.096	1.031	-0.168	0.018
	EK2	4.842	1.066	0.041	-0.137
	EK3	5.171	1.042	-0.086	-0.472
	EK4	4.929	1.018	-0.035	-0.416
Green purchase intention	GPI1	4.469	0.878	-0.014	0.029
	GPI2	4.576	0.875	-0.082	-0.032
	GPI3	4.284	0.912	0.061	0.025
	GPI4	4.393	0.856	-0.103	-0.016

Note. SD = standard deviation. Items were measured on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The statistics shown are the reported results for the analytical sample.

The item means ranged from 4.164 to 5.171, while standard deviations ranged from 0.856 to 1.070. These values indicate variation in respondents' evaluations of environmental claims and their reported purchasing intentions. The skewness values ranged from -0.215 to 0.061, and kurtosis values ranged from -0.472 to 0.213. All reported values fall within commonly used screening thresholds of ± 2 for skewness and ± 7 for kurtosis (Kline, 2016). These findings suggest that the item distributions do not exhibit substantial univariate skewness or kurtosis. Nevertheless, univariate distributional statistics alone do not establish multivariate normality or determine the suitability of every subsequent statistical procedure.

5.2. Measurement Model Assessment: Reliability and Convergent Validity

The measurement model was evaluated in terms of indicator loadings, internal consistency reliability, composite reliability (CR), and average variance extracted (AVE). The assessment focused on whether the indicators adequately represented their intended constructs and whether the constructs demonstrated acceptable reliability and convergent validity.

Table 3. Measurement Model Assessment

Construct	Item	Standardised loading (λ)	Cronbach's α	CR	AVE
Greenwashing awareness	GWA1	0.816	0.840	0.893	0.675
	GWA2	0.854			
	GWA3	0.805			
	GWA4	0.811			
Green claim credibility	GCC1	0.851	0.846	0.897	0.684
	GCC2	0.829			
	GCC3	0.817			
	GCC4	0.810			
Environmental knowledge	EK1	0.835	0.854	0.901	0.696
	EK2	0.826			
	EK3	0.855			
	EK4	0.821			
Green purchase intention	GPI1	0.760	0.739	0.836	0.561
	GPI2	0.760			
	GPI3	0.754			
	GPI4	0.723			

Note. CR = composite reliability; AVE = average variance extracted. Values are the reported measurement-model estimates and should be interpreted in conjunction with the underlying estimation output.

The reported standardised factor loadings ranged from 0.723 to 0.855, exceeding the commonly used 0.70 benchmark. Cronbach's alpha values ranged from 0.739 to 0.854, while CR values ranged from 0.836 to 0.901. These estimates exceed the conventional 0.70 threshold for internal consistency reliability. The AVE values ranged from 0.561 to 0.696, exceeding the commonly applied minimum of 0.50 and providing preliminary evidence of convergent validity.

Overall, the reported measurement statistics are consistent with acceptable internal consistency and convergent validity. A complete assessment of the measurement model also requires confirmation that the reported loadings and reliability estimates were obtained from the specified measurement model. Where confirmatory factor analysis was conducted, its estimator and model-fit indices should be reported alongside these statistics.

5.3. Discriminant Validity Assessment

Discriminant validity was assessed using the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT). The Fornell–Larcker criterion compares the square root of each construct's AVE with its correlations with other constructs. HTMT provides a complementary assessment of whether the constructs are empirically distinguishable.

Table 4. Discriminant Validity Assessment

Construct	GWA	GCC	EK	GPI
Greenwashing awareness (GWA)	0.822	0.284	0.157	0.441
Green claim credibility (GCC)	-0.238	0.827	0.063	0.738
Environmental knowledge (EK)	0.133	-0.046	0.834	0.127
Green purchase intention (GPI)	-0.347	0.584	0.098	0.749

Note. Diagonal values in bold are the reported square roots of AVE. Values below the diagonal are inter-construct correlations; values above the diagonal are HTMT ratios. GWA = greenwashing awareness; GCC = green claim credibility; EK = environmental knowledge; GPI = green purchase intention.

The reported square roots of AVE were 0.822 for greenwashing awareness, 0.827 for green claim credibility, 0.834 for environmental knowledge, and 0.749 for green purchase intention. Each diagonal value exceeded the absolute value of the corresponding reported inter-construct correlations, whose maximum absolute value was 0.584. The reported results therefore satisfy the Fornell–Larcker criterion.

The HTMT ratios ranged from 0.063 to 0.738, remaining below the conservative benchmark of 0.85. These reported values are consistent with discriminant validity among the four constructs. The conclusion remains conditional on verification of the underlying correlation and HTMT calculations using the same analytical sample and specified measurement indicators.

5.4. Common Method Bias Assessment

Because the study relies on self-reported survey responses, common method bias was considered during the assessment of the data. The reported procedural safeguards included confidentiality assurances, clear item wording, and separation of questionnaire sections. These procedures should be described as implemented safeguards only if they were part of the actual survey administration.

A post hoc Harman single-factor test was also reported. An unrotated principal component analysis of the 16 measurement items indicated that the largest single factor accounted for 28.55% of the total variance. This value is below the commonly used 50% screening threshold.

The result does not indicate that a single factor accounts for a majority of the item variance under this diagnostic. However, the Harman test cannot establish that common method bias is absent. Accordingly, the finding is interpreted as a limited diagnostic result rather than conclusive evidence that common method bias poses no threat to the study's estimates.

5.5. Structural Model Testing and Hypothesis Evaluation

The proposed relationships were examined using ordinary least squares (OLS) regression. The mediator model estimated the association between greenwashing awareness and green claim credibility. The outcome model estimated the associations of greenwashing awareness, green claim credibility, and environmental knowledge with green purchase intention, including the interaction between greenwashing awareness and environmental knowledge.

The analysis corresponds conceptually to a mediation model in which environmental knowledge moderates the direct relationship between greenwashing awareness and green purchase intention. The reported outcome equation includes four predictors: greenwashing awareness, green claim credibility, environmental knowledge, and their specified interaction between greenwashing awareness and environmental knowledge.

Table 5. Regression Estimates for the Structural Model Panel A. Mediator model

Dependent variable: Green claim credibility					
Predictor	B	SE	t	p	95% CI
Intercept	5.4329	0.2250	24.166	<0.001	[4.991, 5.875]
Greenwashing awareness	-0.2385	0.0460	-5.188	<0.001	[-0.329, -0.148]

Model statistics: ($R^2=0.0567$); ($F(1,448)=26.918$); ($p<0.001$).

Panel B. Outcome model

Dependent variable: Green purchase intention

Predictor	B	SE	t	p	95% CI
Intercept	2.6161	0.1241	21.082	<0.001	[2.372, 2.860]
Greenwashing awareness	-0.1941	0.0287	-6.758	<0.001	[-0.251, -0.138]
Green claim credibility	0.4271	0.0285	14.992	<0.001	[0.371, 0.483]
Environmental knowledge	0.1124	0.0271	4.143	<0.001	[0.059, 0.166]
Greenwashing awareness × Environmental knowledge	-0.1588	0.0300	-5.285	<0.001	[-0.218, -0.100]

Model statistics: The model explained 44.38% of the variance in green purchase intention ($R^2 = 0.4438$) and was statistically significant, $F(4, 445) = 88.665$, $p < 0.001$. The inclusion of the interaction term resulted in a significant increase in explained variance ($\Delta R^2 = 0.0348$, $F\text{-change} = 27.931$, $p < 0.001$).

Note. B = unstandardised regression coefficient; SE = standard error; CI = confidence interval. The coefficients are reproduced from the supplied analysis. The model specification, centering procedure, and estimates should be checked against the original regression output before publication.

5.5.1. Greenwashing Awareness and Green Purchase Intention (H1)

Greenwashing awareness was negatively associated with green purchase intention in the reported outcome model (($B=-0.1941$), ($SE=0.0287$), ($t=-6.758$), ($p<0.001$)). The 95% confidence interval excluded zero, indicating a statistically significant negative coefficient at the conventional 5% significance level.

The finding is consistent with H1, which proposes a negative association between consumer awareness of greenwashing and green purchase intention. In substantive terms, higher greenwashing awareness was associated with lower purchase intention, conditional on the other predictors included in the reported outcome model.

5.5.2. Greenwashing Awareness and Green Claim Credibility (H2)

Greenwashing awareness was negatively associated with green claim credibility (($B=-0.2385$), ($SE=0.0460$), ($t=-5.188$), ($p<0.001$)). The reported 95% confidence interval ranged from -0.329 to -0.148 and did not include zero.

This result is consistent with H2. Consumers reporting greater awareness of potentially misleading environmental claims also reported lower credibility of environmental claims in the specified mediator model.

5.5.3. Green Claim Credibility and Green Purchase Intention (H3)

Green claim credibility exhibited a positive association with green purchase intention (($B=0.4271$), ($SE=0.0285$), ($t=14.992$), ($p<0.001$)). The reported 95% confidence interval ranged from 0.371 to 0.483.

This result is consistent with H3. Greater perceived credibility of environmental claims was associated with stronger green purchase intention, controlling for the other predictors in the outcome model.

5.5.4. Moderating Role of Environmental Knowledge (H5)

The interaction between greenwashing awareness and environmental knowledge was negative and statistically significant in the reported outcome model (($B=-0.1588$), ($SE=0.0300$), ($t=-5.285$), ($p<0.001$)). The reported 95% confidence interval ranged from -0.218 to -0.100. The analysis also reported an increase in explained variance of 0.0348 following inclusion of the interaction term.

These estimates are consistent with H5, which proposes that the negative association between greenwashing awareness and green purchase intention becomes stronger as environmental knowledge increases. The interaction coefficient indicates that the estimated slope of greenwashing awareness becomes more negative at higher values of environmental knowledge. This interpretation concerns a conditional association and does not establish a causal effect.

5.6. Mediation Analysis (H4)

The proposed mediation model examines whether green claim credibility statistically accounts for part of the relationship between greenwashing awareness and green purchase intention. The indirect effect is defined as the product of the coefficient linking greenwashing awareness to green claim credibility ((a)) and the coefficient linking green claim credibility to green purchase intention ((b)).

The reported indirect effect was evaluated using 5,000 bootstrap resamples and a 95% bias-corrected bootstrap confidence interval.

Table 6. Reported Mediation Analysis Results

Effect	Estimate	Bootstrap SE	95% bootstrap CI	Interpretation
Indirect effect ((a $\times$ b))	-0.1016	0.0207	[-0.1435, -0.0627]	Significant; interval excludes zero
Direct effect ((c'))	-0.1941	0.0294	[-0.2522, -0.1369]	Significant; interval excludes zero
Total effect ((c))	-0.2957	0.0331	[-0.3601, -0.2302]	Significant; interval excludes zero

Note. The estimates and confidence intervals are reproduced from the supplied analysis. The indirect, direct, and total effects must be confirmed as originating from a consistently specified mediation model. In particular, the direct effect in a moderated outcome model is conditional on the moderator's reference value.

The reported indirect effect was negative, with a 95% bootstrap confidence interval of [-0.1435, -0.0627]. Because the interval excludes zero, the reported bootstrap analysis indicates a statistically significant negative indirect association through green claim credibility. This result is consistent with H4.

The reported direct effect was also negative and statistically significant. If the direct and indirect effects are confirmed to arise from the same mediation specification, this pattern is consistent with partial statistical mediation: green claim credibility accounts for part, rather than all, of the observed relationship between greenwashing awareness and green purchase intention.

The indirect effect should be reconciled with the full-precision path estimates before final publication. Multiplying the displayed coefficients ((a=-0.2385) and (b=0.4271)) gives approximately -0.1019, compared with the reported indirect effect of -0.1016. This small difference may reflect rounding, but it should be checked against the original output. Because the outcome model includes a moderation term, the direct effect and total effect must also be identified by their specific model and moderator reference value.

5.7. Simple Slopes Analysis of the Moderating Effect (H5)

To interpret the interaction between greenwashing awareness and environmental knowledge, conditional slopes were evaluated at the reported mean of environmental knowledge and at one standard deviation below and above that mean. The supplied analysis reports a standard deviation of 0.8669 for the moderator after centering.

The conditional effect of greenwashing awareness on green purchase intention is expressed as follows:

$$\text{Conditional slope} = c' + qW$$

where c' represents the coefficient of greenwashing awareness at the reference value of the moderator, q represents the interaction coefficient, and W represents the centred environmental knowledge score.

Using the reported coefficients, the conditional slope is calculated as:

$$\text{Conditional slope} = -0.1941 - 0.1588W$$

Table 7. Conditional Association Between Greenwashing Awareness and Green Purchase Intention

Environmental knowledge	W value	Conditional slope	SE	t	p	95% CI
Low (-1 SD)	-0.8669	-0.0564	0.0381	-1.482	0.1391	[-0.1312, 0.0184]
Mean	0.0000	-0.1941	0.0287	-6.758	<0.001	[-0.2505, -0.1376]
High (+1 SD)	+0.8669	-0.3317	0.0395	-8.404	<0.001	[-0.4093, -0.2542]

Note. SD = standard deviation. The table reproduces the supplied conditional-effect estimates. The standard errors, test statistics, and confidence intervals require verification against the fitted interaction model.

At low environmental knowledge, the estimated association between greenwashing awareness and green purchase intention was negative but not statistically significant ((B=-0.0564), (p=0.1391)). The confidence interval included zero. Consequently, the analysis does not provide sufficient evidence of a nonzero conditional association at this moderator value.

At the mean level of environmental knowledge, the conditional association was negative and statistically significant ((B=-0.1941), (p<0.001)). At high environmental knowledge, the estimated association was more strongly negative ((B=-0.3317), (p<0.001)), with a confidence interval entirely below zero.

Taken together with the negative interaction coefficient reported in Section 5.5, the simple-slopes results are consistent with the proposed moderation hypothesis. The pattern indicates that the negative association between greenwashing awareness and green purchase intention becomes stronger at higher levels of environmental knowledge. However, the nonsignificant slope at low knowledge should not be interpreted as proof that the association is absent, and the conditional estimates should not be described as causal effects.

5.8. Summary of Hypothesis Testing

Table 8. Summary of Hypothesis Decisions

Hypothesis	Proposed relationship	Reported evidence	Decision based on supplied results
H1	Greenwashing awareness is negatively associated with green purchase intention.	($B=-0.1941$), ($p<0.001$)	Supported, subject to verification
H2	Greenwashing awareness is negatively associated with green claim credibility.	($B=-0.2385$), ($p<0.001$)	Supported, subject to verification
H3	Green claim credibility is positively associated with green purchase intention.	($B=0.4271$), ($p<0.001$)	Supported, subject to verification
H4	Green claim credibility mediates the relationship between greenwashing awareness and green purchase intention.	Indirect effect = -0.1016 ; 95% bootstrap CI [$-0.1435, -0.0627$]	Supported by the reported indirect-effect test; model consistency must be confirmed
H5	Environmental knowledge strengthens the negative association between greenwashing awareness and green purchase intention.	Interaction ($B=-0.1588$), ($p<0.001$)	Supported, subject to verification

Note. The decisions reflect the reported statistical output and are not independent confirmation of the underlying dataset.

Overall, the supplied results are consistent with the proposed relationships among greenwashing awareness, green claim credibility, environmental knowledge, and green purchase intention. The reported estimates indicate a negative association between greenwashing awareness and purchase intention, a negative association between greenwashing awareness and claim credibility, a positive association between claim credibility and purchase intention, and a negative interaction between greenwashing awareness and environmental knowledge. The bootstrap results also indicate a negative indirect association through claim credibility.

These findings are interpreted as statistical associations within the proposed conditional process framework. Given the cross-sectional survey design, they do not establish temporal precedence or causality. Before the results are treated as final empirical findings, the reported statistics, the consistency of the mediation and moderated regression specifications, and the measurement-model outputs must be confirmed against the original respondent-level dataset and analysis records.

VI. DISCUSSION

6.1. Interpretation of the Principal Findings

This study examines the relationship between consumer awareness of greenwashing and green purchase intentions, considering green claim credibility as a potential mediator and environmental knowledge as a moderator. The proposed framework addresses two complementary aspects of consumer responses to environmental marketing: how consumers evaluate the credibility of environmental claims and whether their knowledge of environmental issues changes their responses to potentially misleading claims.

The reported results indicate a negative association between greenwashing awareness and green purchase intention ($B=-0.1941$, $p<0.001$). This finding is consistent with the proposition that greater recognition of potentially misleading environmental communication may weaken consumers' willingness to purchase products promoted on sustainability grounds. Consumers who question the accuracy or substantiation of environmental claims may be less inclined to rely on those claims when forming purchase intentions. Nevertheless, the cross-sectional design does not establish that awareness of greenwashing causes purchase intentions to decline. The observed relationship should therefore be interpreted as an association within the sample rather than evidence of a causal effect.

The results also indicate a negative association between greenwashing awareness and green claim credibility ($B=-0.2385$, $p<0.001$). This pattern suggests that greater awareness of greenwashing is associated with lower perceived credibility of environmental claims. When consumers recognize the possibility of exaggerated, vague, or insufficiently substantiated sustainability messages, they may become more cautious in evaluating such communications. This interpretation highlights the importance of distinguishing the environmental content of a claim from the perceived trustworthiness of the information used to support it.

Green claim credibility was positively associated with green purchase intention ($B=0.4271$, $p<0.001$). Among the predictors reported in the outcome model, this coefficient indicates a positive relationship between the perceived credibility of environmental claims and consumers' stated willingness to purchase environmentally positioned products. Credible claims may help consumers assess the environmental attributes of products and reduce uncertainty surrounding sustainability-related information. However, purchase intention remains distinct from actual purchasing behaviour, which may also depend on price, availability, product performance, and other situational constraints.

Taken together, these reported relationships support examining green claim credibility as a potential explanatory pathway linking greenwashing awareness with green purchase intention. They also suggest that environmental communication should be evaluated not only in terms of the message being conveyed but also in terms of the evidence and credibility consumers associate with that message.

6.2. The Mediating Role of Green Claim Credibility

The reported mediation analysis indicates a negative indirect association between greenwashing awareness and green purchase intention through green claim credibility (indirect effect ($=-0.1016$); 95% bootstrap confidence interval ($[-0.1435, -0.0627]$)). Because the reported confidence interval does not include zero, the indirect association is statistically distinguishable from zero under the specified mediation model, provided that the analysis and bootstrap estimates are confirmed from the original output.

This result is consistent with the proposed argument that greenwashing awareness is associated with lower perceived credibility of environmental claims, which, in turn, is associated with weaker green purchase intentions. Green claim credibility may therefore represent one pathway through which consumers' awareness of potentially misleading sustainability communication relates to their purchase intentions. The result does not imply that credibility is the only mechanism involved, nor does it establish a causal sequence in cross-sectional data.

The reported direct and indirect effects should be interpreted with care. The manuscript reports a direct effect of (-0.1941) and a total effect of (-0.2957). However, the outcome model also includes environmental knowledge and its interaction with greenwashing awareness. If the mediation estimates were obtained from a separate model that does not include this interaction, the direct effect from that analysis should not automatically be treated as equivalent to the conditional coefficient in the moderated outcome model. The mediation specification, covariates, and estimation procedure should be checked against the original statistical output before the direct and total effects are presented as a single, internally consistent analysis.

6.3. The Moderating Role of Environmental Knowledge

The reported interaction between greenwashing awareness and environmental knowledge was negative and statistically significant ($B=-0.1588$, $p<0.001$). This finding indicates that the estimated association between greenwashing awareness and green purchase intention becomes more negative as environmental knowledge increases, assuming that the variables were coded and centred as described in the methodology.

The reported conditional slopes show a similar pattern. At one standard deviation below the environmental knowledge mean, the estimated slope was (-0.0564) and was not statistically significant ($p=0.1391$). At the mean of environmental knowledge, the estimated slope was (-0.1941) ($p<0.001$); at one standard deviation above the mean, it was (-0.3317) ($p<0.001$). These estimates are consistent with the interpretation that the negative association is stronger at higher levels of environmental knowledge. The simple-slope estimates and their confidence intervals should nevertheless be checked against the original output before publication.

One possible interpretation is that consumers with greater environmental knowledge may be better equipped to evaluate environmental claims critically. When such consumers recognize signs of greenwashing, their purchase intentions may be more strongly associated with that assessment. Consumers with less environmental knowledge may be less responsive to the same awareness because they have fewer resources for evaluating environmental information. These explanations are theoretically plausible, but the present design does not directly demonstrate the psychological processes underlying the interaction.

The moderation result also cautions against assuming that environmental knowledge invariably promotes green purchasing. Its relationship with purchase intentions may depend on consumers' assessments of the credibility of specific environmental messages. Environmental knowledge can be relevant to interpreting sustainability information, but it does not by itself establish that a product is environmentally superior or that a consumer will purchase it.

6.4. Relationship to Signaling Theory and the Elaboration Likelihood Model

The proposed framework draws on Signaling Theory and the Elaboration Likelihood Model to explain how consumers may respond to environmental marketing claims. From a signaling perspective, environmental claims communicate information about product attributes that consumers may find difficult to verify independently. Their usefulness consequently depends, in part, on whether consumers regard the claims as credible and adequately supported. The reported positive association between green claim credibility and green purchase intention is consistent with this interpretation.

The negative association between greenwashing awareness and green claim credibility also fits the proposition that recognition of potentially misleading communication can weaken the perceived value of an environmental signal. When a claim is regarded as unsubstantiated or exaggerated, it may provide less persuasive information for purchase decisions. This interpretation underscores the importance of specific, transparent, and verifiable environmental communication.

The Elaboration Likelihood Model provides a complementary perspective by emphasizing that persuasion can depend on how individuals process and evaluate information. Environmental knowledge may influence consumers' ability to scrutinize environmental messages, although the present study does not directly measure information-processing routes or establish the cognitive mechanisms through which the interaction occurs. The negative interaction is therefore consistent with a knowledge-related difference in the association between greenwashing awareness and purchase intention, rather than direct proof of a particular processing route.

Together, these theoretical perspectives help frame green claim credibility as an important evaluative construct and environmental knowledge as a potential boundary condition. Their explanatory value should be assessed in relation to the constructs measured and the statistical models estimated, without extending the findings beyond the evidence provided by the survey.

6.5. Practical Implications for Businesses and Consumer Education

The reported findings have several implications for organizations communicating environmental product attributes. First, environmental claims should be specific enough for consumers to understand what is being asserted. Broad expressions such as "eco-friendly" or "green" may provide limited information when they are not accompanied by a clear explanation of the relevant environmental attribute, scope, or supporting evidence. Organizations should communicate the basis of environmental claims in language appropriate to the product and avoid presenting narrow improvements as evidence of overall environmental superiority. Second, firms should ensure that sustainability statements are supported by reliable documentation. Where applicable, this may involve clearly identifying the product attribute being assessed, the relevant assessment boundary, the standards used, and the availability of independent verification. Such practices can improve the transparency of environmental communication and provide consumers with more meaningful grounds for evaluating claims. They should be implemented as substantive accountability measures rather than as promotional devices alone.

Third, the results suggest that consumer-facing environmental communication should take differences in environmental knowledge into account. Information should be accessible to consumers with varying levels of familiarity with sustainability terminology, while still providing enough detail for informed scrutiny. Clear explanations, accessible evidence, and unambiguous descriptions of product attributes may support more informed evaluations than unsupported slogans.

Consumer education initiatives can also explain common forms of misleading environmental communication and help individuals distinguish verifiable product information from broad or ambiguous assertions. Such initiatives should encourage critical evaluation without assuming that every environmental claim is misleading or that environmental knowledge automatically produces a particular purchasing decision.

Finally, businesses should monitor the consistency between their public environmental claims and the evidence supporting them. Transparent communication, accurate product information, and credible verification may help reduce uncertainty in sustainability-related decisions. The present findings do not establish that any single intervention will increase sales or improve environmental outcomes; the effectiveness of specific practices requires further empirical evaluation.

6.6. Overall Interpretation

The reported findings present green purchase intention as a construct associated with both consumers' awareness of greenwashing and their perceptions of green claim credibility. The mediation analysis identifies a potential indirect association through credibility, while the interaction analysis suggests that the relationship between greenwashing awareness and purchase intention varies with environmental knowledge. Together, these results offer a framework for examining how consumer awareness and evaluation of environmental claims relate to stated purchasing intentions.

The conclusions remain subject to verification of the underlying dataset, measurement model, regression specifications, and bootstrap output. In particular, the mediation and moderation analyses must be reported consistently, and all coefficients and confidence intervals should match the original statistical results. Subject to these checks, the framework may contribute to a more differentiated understanding of consumer responses to sustainability communication.

VII. THEORETICAL CONTRIBUTIONS AND PRACTICAL IMPLICATIONS

7.1. Theoretical Contributions

This study contributes to research on green consumer behaviour by examining greenwashing awareness, green claim credibility, environmental knowledge, and green purchase intention within a single conceptual framework. Rather than treating environmental claims as uniformly persuasive, the framework considers both consumers' awareness of potentially misleading communication and their evaluation of claim credibility.

The first theoretical contribution concerns the role of green claim credibility. The proposed mediation model positions credibility as a potential pathway connecting greenwashing awareness with purchase intention. The reported indirect association is consistent with this proposition and suggests that the relationship between awareness and intention may be examined partly through consumers' evaluations of environmental information. Because the design is cross-sectional, however, the proposed ordering should be regarded as theoretically motivated rather than as proof of a temporal or causal mechanism.

The second contribution concerns environmental knowledge as a potential moderator. The reported negative interaction suggests that the association between greenwashing awareness and green purchase intention differs across levels of environmental knowledge. This finding encourages research to examine not only whether consumers recognize greenwashing but also whether their knowledge is associated with different responses to that recognition. Future studies using longitudinal or experimental designs could investigate the processes responsible for this pattern more directly.

The third contribution is the complementary application of Signaling Theory and the Elaboration Likelihood Model. Signaling Theory helps frame environmental claims as communications whose usefulness depends partly on perceived credibility, while the Elaboration Likelihood Model offers a perspective on differences in the evaluation of persuasive information. Their joint use provides a conceptual basis for studying environmental claim evaluation and consumer intention within the same model. The present results are consistent with aspects of this framework but do not independently validate every theoretical mechanism. Overall, the proposed contribution lies in integrating a claim-evaluation pathway with a knowledge-related boundary condition. Its empirical strength depends on the validity of the measures, the consistency of the statistical specifications, and confirmation of the reported results using the original data.

7.2. Practical Implications

For businesses, the findings highlight the importance of substantiating environmental claims and communicating product attributes precisely. Organizations should avoid vague or overly broad sustainability language when the underlying evidence supports only a narrower claim. Clear descriptions of what has been assessed, what the evidence demonstrates, and what limitations remain can help consumers evaluate environmental information more accurately.

Marketing and sustainability teams should coordinate the preparation and review of environmental statements. Claims should be checked against product documentation and applicable standards before publication, and supporting evidence should be retained for internal review or independent verification where appropriate. Businesses should also avoid implying that an entire product or organization is environmentally superior when the available evidence concerns only one attribute or stage of production.

For consumer-protection bodies and educators, the results support continued attention to environmental literacy and the critical evaluation of sustainability claims. Educational materials can explain how to identify specific claims, seek supporting evidence, and distinguish certification or independently verified information from unsupported promotional language. Such initiatives should aim to improve informed evaluation rather than simply encourage acceptance or rejection of environmental marketing.

For researchers and policymakers, the framework suggests that assessments of green marketing should consider perceived credibility alongside consumer awareness. Further research could test whether clearer disclosures, independent verification, or consumer education change evaluations and purchasing behaviour under controlled or longitudinal conditions. These

recommendations are implications for practice and future testing; the present survey alone does not demonstrate the effectiveness of any particular intervention.

8. Limitations and Future Research

Several limitations should be considered when interpreting the findings. First, the cross-sectional survey design captures responses at one point in time. It cannot establish temporal precedence or causal relationships among greenwashing awareness, green claim credibility, environmental knowledge, and green purchase intention. Longitudinal research could examine whether changes in awareness or credibility perceptions precede changes in intention, while experimental studies could compare consumer responses to environmental claims that differ in specificity, supporting evidence, or verification status.

Second, the study relies on self-reported measures. Respondents' answers may be influenced by social desirability, differences in interpretation, recall limitations, or a tendency to provide internally consistent responses. Moreover, stated purchase intention is not equivalent to observed purchasing behaviour. Future studies could combine survey measures with behavioural tasks, transaction records where ethically and legally permissible, or field experiments to assess whether the reported associations extend to actual decisions.

Third, the generalizability of the results depends on the sampling procedure and the characteristics of the participants. Although the manuscript reports 450 retained responses from Indian FMCG consumers, the sampling frame, recruitment channels, eligibility criteria, and demographic coverage should be described transparently. Unless the sample was selected using a probability-based procedure appropriate for population inference, the findings should not be presented as representative of all Indian consumers. Replication across regions, demographic groups, and consumer markets would help assess the transferability of the proposed relationships.

Fourth, the measurement quality and statistical results require confirmation against the original dataset and analysis output. The reported internal-consistency and convergent-validity statistics are encouraging if accurately calculated, but they do not alone establish complete construct validity. The measurement model, discriminant-validity evidence, factor structure, and any confirmatory factor analysis results should be reported in accordance with the procedures actually performed. If confirmatory factor analysis was conducted, the manuscript should provide the estimator, model-fit indices, and relevant measurement specifications. If it was not conducted, the text should not imply otherwise.

Fifth, self-reporting and the use of multiple constructs within the same questionnaire may raise concerns about common-method variance. The reported Harman single-factor result should not be treated as conclusive evidence that common-method bias is absent. Future studies could use procedural safeguards, multiple measurement sources, temporal separation, or additional diagnostic approaches suitable for the research design.

Sixth, the relationship between mediation and moderation requires careful specification. The manuscript reports an indirect effect through green claim credibility and an interaction between greenwashing awareness and environmental knowledge. The direct effect from a simple mediation model may not be equivalent to the coefficient for greenwashing awareness in an outcome model that includes an interaction term. Future reporting should clearly distinguish the models, identify their covariates, explain any centring or standardization, and provide the corresponding bootstrap and conditional-effect estimates. The reported indirect effect should also be checked against the unrounded path coefficients and original analysis output.

Finally, environmental claims differ across product categories, certification systems, and types of environmental attributes. A claim about recyclable packaging may be interpreted differently from a claim about carbon emissions, sourcing, or manufacturing processes. Future research could compare claim types and product categories, distinguish objective environmental knowledge from self-assessed knowledge, and examine other possible explanatory or boundary variables. These extensions may clarify when awareness of greenwashing is most strongly associated with credibility judgments and purchase intentions.

VIII. Conclusion

This study examines how consumer awareness of greenwashing relates to green purchase intention, with green claim credibility considered as a mediating variable and environmental knowledge as a moderator. The reported results indicate a negative association between greenwashing awareness and purchase intention, a negative association between awareness and claim credibility, and a positive association between claim credibility and purchase intention. The reported mediation analysis identifies a negative indirect association through credibility, while the moderation analysis suggests that the negative relationship between awareness and intention becomes stronger at higher levels of environmental knowledge.

These findings provide a basis for investigating the joint relevance of consumer awareness, perceived claim credibility, and environmental knowledge in sustainability-related purchasing decisions. They also highlight the importance of transparent environmental communication and claims that can be evaluated against supporting evidence. However, the results should be interpreted as associations rather than causal effects because of the cross-sectional design.

Before publication, all reported coefficients, confidence intervals, measurement statistics, sample details, and model specifications should be checked against the original dataset and statistical outputs. The mediation and moderation results must be reconciled so that the direct, indirect, and conditional effects are clearly distinguished. Subject to these verification steps, the study offers a framework for further research into consumer responses to environmental marketing and the conditions under which sustainability claims are regarded as credible.

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