AI – Based Green Marketing and Sustainable Consumer Behaviour: The Role of Consumer Engagement and Environmental Awareness

K. Ramya[1]* and R. Roshan[2]

[1]*Head & Assistant Professor, Department of Commerce with Computer Applications, Arul Anandar College, Karumathur, Madurai, Tamil Nadu, India*

[2]*III Year UG Student, Department of Commerce with Computer Applications, Arul Anandar College (Autonomous), Karumathur, Madurai, Tamil Nadu, India*

**Corresponding Author Email: ramya@aactni.edu.in*

Abstract

The rapid development of Artificial Intelligence (AI) has transformed the way businesses communicate with consumers, personalize information and promote environmentally responsible products. The integration of AI with green marketing provides opportunities for organizations to deliver personalized sustainability information, improve consumer engagement and encourage sustainable consumption behaviour. Against this background, the present study examines AI-enabled green marketing and sustainable consumer behaviour, with particular emphasis on the mediating role of consumer engagement and the moderating role of environmental awareness. The study is based on primary data collected from 250 respondents using a structured questionnaire. The demographic profile and responses to 20 statements relating to AI-enabled sustainability communication, digital engagement and sustainable consumption behaviour were analysed using frequency, percentage and weighted mean analysis. The findings indicate a moderately positive perception of AI-enabled green marketing and sustainable consumption. The highest mean score was recorded for active interaction with sustainability-related digital content (3.652), followed by personalization of green-product information through digital platforms (3.628) and sharing useful sustainability information with others (3.560). However, respondents expressed comparatively lower agreement regarding the ability of AI to communicate environmental benefits clearly (2.828) and its ability to make green marketing communication more engaging (2.888). The study suggests that AI can strengthen sustainability communication through personalization, information accessibility and consumer engagement, while environmental awareness may determine the extent to which

consumers translate such communication into sustainable behaviour. The study contributes to the emerging literature on AI-enabled green marketing by integrating technological communication, consumer engagement and environmental awareness within a sustainable consumer behaviour framework.

Keywords: Artificial Intelligence, Green Marketing, Sustainable Consumer Behaviour, Consumer Engagement, Environmental Awareness, Green Consumption, Digital Marketing

I. Introduction

Environmental degradation, climate change, resource depletion and increasing waste have intensified the need for sustainable patterns of production and consumption. Consumers are increasingly exposed to information concerning environmentally responsible products, carbon footprints, recycling, renewable resources and sustainable lifestyles. Green marketing has consequently become an important strategic approach through which organizations communicate environmental attributes and encourage consumers to consider sustainability in their purchasing decisions. At the same time, Artificial Intelligence (AI) has emerged as a powerful technology in contemporary marketing. Recent research indicates that AI is increasingly influencing sustainable consumption and consumer decision-making. Studies have found that AI-enabled experiences can influence perceived value, consumer engagement and sustainable behaviour. A 2025 study of young consumers reported that AI-driven personalization, social influence and community engagement can encourage sustainable practices. Similarly, recent research on AI-enabled green marketing has reported positive relationships between AI-enabled green marketing, customer trust, satisfaction and green intention.

However, the relationship between AI-enabled green marketing and sustainable consumer behaviour is not necessarily direct. Consumers must first notice, understand and interact with sustainability-related information. Therefore, consumer engagement may act as an important mechanism through which AI-enabled green marketing influences sustainable consumer behaviour. Consumers who actively interact with sustainability-related digital content, explore green-product information and share environmental information may be more likely to translate information into sustainable purchasing and consumption practices. Another important factor is environmental awareness. Consumers may receive the same AI-

generated sustainability message but respond differently depending on their understanding of environmental issues. Recent research in India indicates that environmental attitude and green awareness play important roles in explaining green consumption behaviour. Environmental awareness may therefore strengthen the relationship between AI-enabled green marketing and sustainable consumer behaviour. The role of AI is not without challenges. Excessive or poorly designed green claims may generate consumer scepticism and perceptions of greenwashing. Recent experimental research shows that moderate green content in AI-generated marketing can stimulate pro-environmental perceptions, whereas excessive green content may increase greenwashing scepticism and reduce purchase intention. Thus, organizations need to use AI not merely to increase marketing efficiency but also to ensure transparency, credibility and meaningful environmental communication.

2. Review of Literature

Adomavicius and Tuzhilin (2005) defined recommender systems as advanced filtering mechanisms that predict user preferences through data pattern analysis, forming the technological backbone of modern e-commerce platforms. Ricci et al. (2015) further explained that these systems alleviate information overload and improve decision quality by presenting relevant alternatives to users. Xiao and Benbasat (2007) demonstrated that recommendation agents enhance decision efficiency and increase consumer satisfaction when suggestions are perceived as useful. Collectively, these studies highlight that algorithmic relevance and system quality are crucial determinants of recommendation effectiveness.

Naini and Reddy (2024) investigated the role of green awareness and green behaviour in fostering sustainable consumption in the Indian context. The study collected data from 129 respondents in Hyderabad and used SPSS and SmartPLS for data analysis. The research addressed the attitude–behaviour gap in green purchasing and examined factors including environmental knowledge, altruism and interpersonal influence. The findings provide evidence that green awareness and related behavioural factors are important in explaining green consumption behaviour among Indian consumers. This study provides strong support for including environmental awareness as an important variable in the present study.

Sohaib, Alshemeili and Bhatti (2025) examined the relationship between AI-enabled green marketing and consumers' green intentions. The study investigated strategic, tactical

and internal AI-enabled green marketing orientations and their effects on customer trust, satisfaction and green intention. Using PLS-SEM and Necessary Condition Analysis (NCA), the study found that AI-enabled green marketing, customer trust and customer satisfaction are important in developing green intention. The study highlights the potential of AI to transform conventional green marketing into more personalized and technology-driven sustainability communication. This study is highly relevant to the present research because it establishes the importance of AI-enabled green marketing as an antecedent of sustainable consumer responses.

Lata and Rana (2025) examined how AI influences young consumers' purchasing decisions towards sustainable products and services. The study emphasized that AI-based technologies can provide personalized recommendations and relevant information, helping consumers make more informed decisions regarding environmentally responsible products. The findings indicate that AI has the potential to influence consumer lifestyles and encourage sustainable consumption by making sustainability-related choices more accessible and relevant. The study is particularly relevant to the present research because several items in the present questionnaire focus on personalized green-product information, discovering environmentally responsible products and obtaining sustainability information through AI.

Zhou and Jiang (2025) examined how consumers respond to AI-generated green marketing content. The study used a combination of PLS-SEM and text-mining techniques to investigate different approaches to AI-generated green marketing communication. The findings showed that appropriately designed green content can activate consumers' pro-environmental perceptions and increase purchase intention. However, the study also highlights the importance of the amount and nature of green content because excessive green claims can potentially create scepticism and concerns regarding greenwashing. The findings are particularly relevant to the present research because respondents' perceptions of AI-generated sustainability messages, clarity of environmental benefits and effectiveness of green marketing communication are directly examined.

3. Objectives of the Study

The study has the following objectives:

1. To examine the demographic profile of the respondents.

2. To assess consumers' perceptions of AI-enabled green marketing communication.
3. To examine the potential moderating role of environmental awareness in the relationship between AI-enabled green marketing and sustainable consumer behaviour.

4. Research Methodology

4.1 Research Design

The study adopts a descriptive and quantitative research design. The descriptive component is used to understand respondents' demographic characteristics and perceptions of AI-enabled green marketing and sustainable consumption.

4.2 Data Collection

Primary data were collected using a structured questionnaire. The questionnaire consisted of demographic questions and 20 statements measured on a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

4.3 Sample Size

The study is based on 250 respondents.

4.4 Sampling Technique

For the present analysis, the respondents are treated as a sample selected through a non-probability sampling approach.

4.5 Statistical Tools

The following statistical techniques are appropriate for the study:

- Frequency and percentage analysis
- Weighted mean analysis

5. Analysis and Interpretation

Table 1: Demographic Profile of Respondents

Demographic Variable	Category	No. of Respondents	Percentage
Gender	Male	180	72
	Female	70	28

Educational Qualification	SSLC or Below	4	2
	Plus Two	43	17
	UG	160	64
	PG and Above	43	17
Occupation	Government Employee	57	23
	Private Employee	85	34
	Own Business	66	26
	Student	42	17
Marital Status	Married	132	53
	Unmarried	118	47
Monthly Income	Up to Rs.10,000	43	17
	Rs.10,000 – Rs.25,000	89	36
	Rs. 25,000– Rs.50,000	63	25
	Above Rs.50,000	55	22

Interpretation

The demographic results show that the sample is predominantly male, with males accounting for 72% of respondents and females accounting for 28%. In terms of education, graduates constitute the largest group at 64%, indicating a relatively educated sample. Regarding occupation, private employees represent the largest group at 34%, followed by respondents engaged in their own business at 26% and government employees at 23%. The marital-status distribution is relatively balanced, with 53% married and 47% unmarried respondents. In terms of monthly income, respondents earning Rs.10,000 – Rs.25,000 form the largest category at 36%, followed by those earning Rs.25,000 – Rs.50,000 at 25%. Overall, the sample represents respondents from varied occupational, educational and income backgrounds.

6. AI-Enabled Green Marketing and Sustainable Consumer Behaviour

Table 2: Weighted Mean Analysis

No.	Statement	Mean
1	AI systems provide sustainability-related information suited to my interests	3.224
2	Digital platforms personalize green-product information for me	3.628

3	AI helps me discover environmentally responsible products	3.264
4	AI-based communication is relevant to my preferences	3.040
5	AI helps brands communicate environmental benefits clearly	2.828
6	AI-generated sustainability messages are easy to understand	3.328
7	AI makes green marketing communication more engaging	2.888
8	AI helps brands communicate environmental responsibility effectively	3.304
9	AI helps me obtain information about the environmental impact of products	3.220
10	AI makes sustainability information easier to access	3.080
11	AI helps me compare environmentally friendly alternatives	3.044
12	AI helps me understand sustainability-related product claims	3.280
13	I actively interact with sustainability-related digital content	3.652
14	I spend time exploring green-product information	3.392
15	I share useful sustainability information with others	3.560
16	I feel involved when brands communicate sustainability through digital platforms	3.296
17	I regularly consider environmental impact when purchasing	3.488
18	I prefer products that minimize environmental harm	3.388
19	I try to reduce environmentally harmful consumption	3.368
20	I make efforts to adopt sustainable consumption practices	3.208

Interpretation

The weighted mean results demonstrate an overall moderate to moderately positive perception of AI-enabled green marketing and sustainable consumer behaviour. The highest mean score is recorded for active interaction with sustainability-related digital content (3.652). This indicates that respondents are reasonably engaged with sustainability-related digital information. The second-highest score is for personalization of green-product information through digital platforms (3.628), suggesting that AI-based personalization is perceived as an important advantage.

The statement concerning sharing useful sustainability information with others records a mean of 3.560, indicating a relatively strong tendency towards information sharing. The mean of 3.488 for considering environmental impact during purchasing also suggests

that environmental considerations are reasonably integrated into consumers' purchase decisions.

However, the lowest mean score is recorded for AI helping brands communicate environmental benefits clearly (2.828). This indicates that respondents are less convinced about the clarity of AI-supported environmental claims. Similarly, the mean of 2.888 for AI making green marketing communication more engaging indicates that there is considerable scope for organizations to improve the quality and engagement value of AI-generated green communication.

The findings therefore suggest that AI appears to be more effective in personalization, information discovery and digital engagement than in clearly communicating complex environmental benefits.

7. Proposed Conceptual Model

The conceptual framework of the study is:

AI-Enabled Green Marketing

↓

Consumer Engagement

↓

Sustainable Consumer Behaviour

Environmental Awareness → Moderates the relationship between AI-Enabled Green Marketing and Sustainable Consumer Behaviour

The model recognizes that AI-enabled green marketing may influence sustainable behaviour both directly and indirectly through consumer engagement. Environmental awareness is expected to strengthen the conversion of AI-based sustainability communication into sustainable consumer behaviour.

8.Findings of the Study

The major findings are as follows:

1. The sample consists of 250 respondents, of whom 72% are male and 28% are female.
2. Educationally, graduates constitute the dominant group, representing 64% of the sample.
3. Private employees represent the largest occupational group at 34%, followed by business owners at 26%.
4. The sample contains a relatively balanced distribution of married and unmarried respondents.
5. The Rs.10,000– Rs.25,000 monthly income category represents the largest income group at 36%.
6. Respondents demonstrate a moderately positive perception of AI-enabled green marketing and sustainable consumption.
7. Active interaction with sustainability-related digital content has the highest weighted mean of 3.652.
8. Personalization of green-product information through digital platforms has a high mean score of 3.628, indicating the perceived importance of AI personalization.
9. Sharing sustainability information with others records a relatively high mean of 3.560, indicating potential digital word-of-mouth behaviour.
10. Considering environmental impact while purchasing records a mean of 3.488, suggesting that environmental considerations influence consumer decision-making to a moderate extent.
11. AI's ability to communicate environmental benefits clearly records the lowest mean of 2.828.
12. AI's ability to make green marketing communication more engaging also records a relatively low mean of 2.888.
13. The findings suggest that AI currently appears particularly useful for personalization, information access and consumer engagement, while clarity and credibility of environmental communication require further improvement.
14. The findings conceptually support examining consumer engagement as a mediator and environmental awareness as a moderator, but these relationships must be statistically tested using respondent-level data.

9. Suggestions

- Organizations should ensure that AI-generated environmental messages are simple, specific and understandable.
- Technical environmental terminology should be translated into consumer-friendly information.
- Since personalization receives a relatively high mean score, organizations can use AI to recommend green products according to consumers' preferences, previous purchases and sustainability interests.
- Green claims should be supported by reliable evidence, certifications or measurable sustainability indicators.
- Consumers should be informed when sustainability messages or recommendations are generated or personalized through AI.

Conclusion

Artificial Intelligence is creating new possibilities for organizations to communicate sustainability and influence consumer behaviour. The present study indicates that respondents have a moderately positive perception of AI-enabled green marketing and sustainable consumption. In particular, digital engagement and personalization emerge as relatively strong aspects of AI-enabled sustainability communication. The results show that respondents actively interact with sustainability-related digital content and perceive value in receiving personalized green-product information. At the same time, the relatively lower scores for clarity and engagement of AI-generated environmental communication indicate that organizations need to improve the quality, credibility and relevance of green marketing messages.

The proposed research framework provides a meaningful explanation of how AI-enabled green marketing may influence sustainable consumer behaviour. Consumer engagement can serve as the behavioural mechanism through which consumers move from receiving sustainability information to actively considering and adopting sustainable consumption practices. Environmental awareness may further strengthen this process because consumers with greater environmental understanding are more likely to recognize and respond to sustainability-related information.

References

Sohaib, O., Alshemeili, A., & Bhatti, T. (2025). Exploring AI-enabled green marketing and green intention: An integrated PLS-SEM and NCA approach. Cleaner and Responsible Consumption, 17, 100269.

Lata, S., & Rana, K. (2025). AI's influence on young consumer behavior: Fostering sustainable consumption. Young Consumers, 26(5), 848–864.

Naini, S. R., & Reddy, M. R. (2024). Role of green awareness and green behaviour in fostering sustainable consumption in India. Journal of Science and Technology Policy Management, 16(6), 1022–1042.

Zhou, C., & Jiang, B. (2025). How do consumers react to AI-generated green marketing content? A hybrid analysis using PLS-SEM and text mining. Journal of Retailing and Consumer Services, 87, 104431.

How and when AI-enabled customer experience shapes sustainable consumption in smart hotels: The role of eco-friendly customer innovativeness. (2026). Journal of Retailing and Consumer Services, 89, 104636.

Adomavicius, G., & Tuzhilin, A. (20Towards oward the next generation of recommender systems: A survey of the state-of-the-art and possible extensions. IEEE Transactions on Knowledge and Data Engineering, 17 (6), 734–749.

Ricci, F., Rokach, L., & Shapira, B. (2015). Recommender systems handbook (2nd ed.). Springer.

Dr. L Venkatesan & Dr. S Shobana.(2026) Examining the Impact of AI-Driven Recommendation Systems on Consumer Adoption of Green Products: Evidence from Digital Retail Platforms. International Journal of Advanced Research in Science, Communication and Technology,6(3), 248-256.

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology, 51(6), 1173–1182.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39–50.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) (3rd ed.). Sage.

Naini, S. R., & Reddy, M. R. (2024). Role of green awareness and green behaviour in fostering sustainable consumption in India. Journal of Science and Technology Policy Management, 16(6), 1022–1042.

Lata, S., & Rana, K. (2025). Assessing the influence of artificial intelligence on sustainable consumption behavior and lifestyle choices. Young Consumers, 26(5), 702–727.

Zhou, C., & Jiang, B. (2025). How do consumers react to AI-generated green marketing content? A hybrid analysis using PLS-SEM and text mining. Journal of Retailing and Consumer Services, 87, 104431.

Ma, J., Wang, Q., Liu, D., Pan, H., & Ran, H. (2025). Do environmental values drive artificial intelligence products green purchasing behavior? A value-attitude-behavior approach. Acta Psychologica, 260, 105467.



Open Access & Licensing

Dr. BGR Publications supports Open Access scholarly communication, enabling published works to be freely accessible online.

License: Creative Commons Attribution 4.0 International License CC BY 4.0

Copyright: © Author(s)

Published by Dr. BGR Publications | India