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Green Commerce in the Digital Age: The Role of E-commerce Platforms in Promoting Sustainable Consumption

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Abstract

During the digital transformation era, e-commerce has become a pivotal driver in shaping consumer behaviour and advancing market sustainability. The study examines how online retail and AI-driven marketing stimulate eco-friendly buying behaviour. With the growing integration of artificial intelligence, recommendation algorithms, and personalised marketing strategies, e-commerce platforms possess remarkable potential to encourage environmentally responsible consumer choices. Additionally, the adoption of green digital innovations—such as carbon footprint calculators, eco-labelling, and sustainable product filters—has transformed the way consumers identify and engage with sustainable products. The study also highlights the increasing implication of corporate transparency and digital sustainability reporting, which enhances consumer trust and strengthens brand loyalty. As e-commerce continues to evolve as a catalyst for sustainable consumption, evaluating its contribution to SDG 12 (Responsible Consumption and Production) becomes essential for fostering global environmental and economic resilience. The objective of this research paper is to study the influence of AI-driven marketing and recommendation algorithms on consumers’ eco-friendly purchasing behaviour in e-commerce platforms and also to assess the relationship between consumer awareness, trust in sustainability claims and their willingness to purchase green products online, which will help to analyse the impact of digital transparency features for promoting sustainable consumption through e-commerce and to study these responses, data is collected both primary data in the form of a questionnaire and secondary data through journals, research papers and different articles.

Keywords; Green Commerce, Sustainable Consumption, E-commerce, Artificial Intelligence, Digital Marketing, Sustainability, SDG 12.

INTRODUCTION

The digital transformation of the global marketplace has deeply redefined how consumers interact with products, services, and brands. Amid the most noteworthy progresses of this era is the exponential progress of e-commerce, which has arisen as a crucial force in seminal consumer behaviour and advancing market sustainability. (Erigbe & Erigbe, 2024) The online retail environment, characterised by wide-ranging data insights and algorithmic precision, has become a key platform for endorsing sustainable consumption, predominantly in the framework of intensifying global concerns neighbouring climate change and environmental degradation. As a result, the role of e-commerce in course-plotting consumers toward environmentally responsible choices has gained considerable academic and policy application.

The integration of artificial intelligence (AI), recommendation algorithms, and personalised marketing strategies offers substantial potential for thought-provoking, eco-friendly purchasing behaviour by dressing evidence and product propositions to individual preferences. (MD. Azam Khana, 2025) E-commerce platforms can inspire consumers’ preferences by customising product endorsements, prominently featuring sustainable options, and providing the environmental impact of purchases in near real-time. Innovations such as carbon footprint calculators, eco-labelling, and sustainable product filters further enhance

environments. In the accumulation, the rising emphasis on corporate transparency and digital consumer awareness and ease well-versed decision-making in digital sustainability reporting has reinforced consumer trust and brand loyalty, aligning sustainability as both an ethical imperative and a strategic business imperative. (Arup Kumar Dey, 2024).

In spite of this evolution, the actual amalgamation of green digital practices into e-commerce ecosystems remains a multifaceted encounter influenced by technological, behavioural, and regulatory factors. Consumer perceptions of trustworthiness, consciousness of sustainability entitlements, and willingness to purchase green products are shaped by manifold behavioural, informational, and psychological bases. In this framework, evaluating the node between AI-driven marketing, consumer trust, and digital transparency offers appreciated visions into how e-commerce can aid as a tool for attaining Sustainable Development Goal 12 (Responsible Consumption and Production). (Dr. Oshma Rosette Pinto, 2025)

The present study aims to observe the effect of AI-based marketing and recommendation systems on consumers' eco-conscious purchasing behaviour on e-commerce platforms. It also pursues to explore the relationship between consumer awareness, trust in sustainability claims, and their inclination to purchase environmentally friendly products online, with an opinion to considering how digital transparency structures promote sustainable consumption. To attain these objectives, the research employs both primary data—collected through a structured questionnaire—and secondary data, derived from scholarly journals, research papers, and credible digital sources, enabling a comprehensive analysis of consumer responses in the context of green commerce. By analysing these dimensions, the study contributes to a nuanced understanding of how digital innovation can augment sustainable ingesting and foster ecological and economic resilience in the evolving digital economy.

LITERATURE REVIEW

Sustainable e-commerce and green commerce

Existing literature identifies e-commerce as both a contributor to environmental pressures and a platform for advancing green commerce through sustainable practices. Studies on sustainable e-commerce frameworks show that platform design, environmental-impact ratings, and greener logistics can help close the attitude-behaviour gap by making sustainable options more visible and attractive to consumers. Research on sustainability transitions in e-

commerce further emphasises that digital business models must integrate eco-friendly logistics, renewable energy use, and green data centres to reduce the overall ecological footprint of online retail. (Zhang1, 2023)

AI, recommender systems and eco-friendly behaviour

A growing body of work examines how AI-driven recommender systems shape consumer decision-making in online environments. Empirical studies indicate that AI-based personalisation and hybrid recommendation models can significantly influence product choice and decision quality, suggesting strong potential to steer consumers toward sustainable products when sustainability becomes an explicit recommendation criterion. Conceptual and applied research on AI-powered green consumerism argues that predictive analytics and behavioural segmentation can be used to nudge shoppers toward low-carbon alternatives and support more sustainable lifestyles. (Anglen)

Determinants of green purchasing in e-commerce

Recent systematic reviews on green purchasing behaviour in e-commerce highlight multiple determinants, including environmental attitudes, perceived effectiveness, social norms, and platform mechanisms such as information framing and default options. These reviews show that consumer cognition, contextual platform factors, and regional policies interact to shape willingness to pay for green products, calling for more longitudinal and platform-specific studies to understand how digital environments can consistently promote eco-friendly choices. (Zeng Yu, 2025)

Digital transparency, sustainability reporting and trust

Literature on digital transparency underscores that clear sustainability reporting, traceability tools, and accessible impact information significantly enhance consumer trust and loyalty toward online brands. Studies on ethical branding and digital trust in e-commerce demonstrate that transparent communication about environmental performance, supported by verifiable data, reduces perceived risk and strengthens consumers' readiness to engage with sustainable offerings. (S. Md. Shakir Ali, 2025)

AI-driven sustainability information, awareness and willingness to buy green

Emerging research directly connects trust in AI-driven recommendations with eco-friendly purchasing and sustainable habits. Empirical findings suggest that when consumers trust algorithmic suggestions and understand AI-

generated sustainability information, they are more likely to buy environmentally friendly products and adopt greener practices. This literature also stresses that consumer awareness of how AI curates' sustainability content is crucial, as higher awareness and perceived credibility of AI-based information significantly increase willingness to purchase green products in e-commerce settings. (Pankhuri Soni)

OBJECTIVES OF THE STUDY

- To study the influence of AI-driven marketing and recommendation algorithms on consumers' eco-friendly purchasing behaviour in e-commerce platforms.
- To assess the relationship between consumer awareness, trust in sustainability claims, and their willingness to purchase green products online.
- To analyse the impact of digital transparency features—such as eco-labelling and product information—on promoting sustainable consumption through e-commerce.
- To evaluate how e-commerce platforms can integrate sustainability-focused digital strategies to support the achievement of Sustainable Development Goal 12 (Responsible Consumption and Production).

RESEARCH METHODOLOGY

Research Design:

The study adopts a descriptive and analytical research design.

- The descriptive approach is used to comprehend consumer perceptions regarding AI-driven marketing, sustainability awareness, trust, and transparency features.
- The analytical approach is applied to observe associations among the variables using statistical techniques.

This design is appropriate for analysing behavioural patterns and relationships without manipulating variables.

Nature of Data

The study is grounded on primary data, collected directly from respondents through a structured questionnaire. Primary data were chosen to attain first-hand info on consumer perceptions and experiences associated to sustainable e-commerce practices.

Sample and Sampling Technique

The sample for the study consists of 130 respondents who actively use e-commerce platforms for online shopping.

- Sampling Technique: Non-probability convenience sampling
- Rationale: The method was chosen due to accessibility of respondents, time constraints, and suitability for exploratory and behavioural research.
- Target Population: Online consumers familiar with e-commerce platforms and sustainability-related product information.

Data Collection Method

Data were collected using a structured questionnaire administered online. The questionnaire was dispersed over digital platforms such as email and social media to certify extensive reach and respondent suitability.

The questionnaire was designed using a five-point Likert scale, ranging from:

- 1 – Strongly Disagree
- 2 – Disagree
- 3 – Neutral
- 4 – Agree
- 5 – Strongly Agree

Measures of Study:

- AI-driven Marketing: Visibility of eco-friendly products, influence of AI recommendations, and Engagement with sustainable alternatives.
- Consumer Awareness, Trust, and Willingness: Awareness of eco-labels, Trust in sustainability claims, Willingness to purchase green products.
- Digital Transparency: Perceived usefulness of eco-labels, Clarity of sustainability information, Confidence gained through transparency.
- Platform Sustainability Strategies: Platform promotion of green alternatives, Influence of sustainability features, Contribution towards SDG 12

Data Analysis Tools & Techniques:

The collected data were coded, tabulated, and analysed using MS Excel. The following statistical tools were employed:

1. Descriptive Statistics
 - Mean and Standard Deviation were used to analyse respondents' perceptions and identify trends.
2. Correlation Analysis
 - Pearson's correlation coefficient was applied to examine relationships among key variables.
3. Tabular Presentation

- Data were presented in tables for systematic interpretation.

Data Analysis and Interpretation

The present study analysed responses collected from 130 participants who regularly engage in online shopping through e-commerce platforms. The data were analysed using descriptive statistics (mean and standard deviation) and correlation analysis to examine relationships among AI-driven marketing, consumer awareness and trust, digital transparency, and sustainable purchasing behaviour.

Table 1: Influence of AI-Driven Marketing on Eco-Friendly Purchasing Behaviour

Statement	Mean	SD	Interpretation
AI recommendations increase visibility of eco-friendly products	3.78	0.72	High positive perception
AI suggests sustainable alternatives during product search	3.69	0.76	Moderately high influence
Engagement with green products increases due to AI suggestions	3.62	0.81	Moderate influence
Overall, AI-Driven Marketing	3.70	0.76	AI positively influences eco-friendly purchase behaviour

The analysis point to a moderately strong positive perception of AI-driven marketing in influencing eco-friendly purchase decisions. The mean scores for items related to visibility of eco-friendly products, AI-based recommendations, and engagement with sustainable alternatives ranged between 3.62 and 3.78 on a five-point Likert scale.

Correlation analysis discovered significant positive relationships ($r = 0.48-0.54$) between AI-driven endorsements and consumers' predisposition toward sustainable products. This recommends that AI algorithms, when designed to prioritise eco-friendly alternatives, efficiently shove consumers toward greener choices by refining product discoverability and relevance.

Interpretation:

AI-driven marketing acts as a behavioural catalytic agent by delicately shaping consumer exposure and preferences,

strengthening the role of intelligent endorsement systems in endorsing sustainable consumption within digital marketplaces.

Table 2: Consumer Awareness, Trust, and Willingness to Purchase Green Products

Statement	Mean	SD	Interpretation
Awareness of eco-labels on e-commerce platforms	3.85	0.68	High awareness
Trust in sustainability claims made by online sellers	3.40	0.83	Moderate trust
Willingness to purchase green products online	4.00	0.64	Very high willingness
Overall Awareness, Trust & Willingness	3.75	0.72	Strong intent with moderate trust

Results demonstrate high awareness of eco-labels and green product information, with mean scores above 3.80. Willingness to purchase green products was noted as the highest mean score, 4.00, indicating a strong pro-sustainability intending to amid consumers.

Though trust in sustainability claims was moderately reasonable, with a mean of 3.40, indicating persistent scepticism concerning greenwashing and the genuineness of environmental claims. Correlation results suggest that awareness and trust are meaningfully linked with willingness to purchase eco-friendly products.

Interpretation:

Although consumers reveal strong intent and awareness, trust remains a critical arbitrating factor. Enhancing the trustworthiness of sustainability claims is indispensable to changing positive attitudes into reliable green purchasing behaviour.

Table 3: Impact of Digital Transparency Features on Sustainable Consumption

Statement	Mean	SD	Interpretation
Eco-labels are useful in identifying sustainable products	4.05	0.66	Very high usefulness

Sustainability information provided is clear and understandable	3.68	0.74	Moderately high clarity
Transparency increases confidence in purchase decisions	3.92	0.69	High confidence
Overall Digital Transparency	3.88	0.70	Transparency strongly supports sustainable consumption

Digital transparency features—such as eco-labelling, detailed sustainability information, and clarity of product disclosures—received high mean values ranging from 3.68 to 4.05. Correlation coefficients reached a maximum of $r = 0.66$, indicating a strong relationship between transparency and consumer confidence.

Consumers reported greater assurance and reduced decision uncertainty when sustainability information was clear, standardised, and easily accessible on e-commerce platforms.

Interpretation:

Digital transparency improves apparent credibility and diminishes information asymmetry, in that way strengthening trust and encouraging environmentally responsible purchasing decisions.

Table 4: Platform Sustainability Strategies and Alignment with SDG 12

Statement	Mean	SD	Interpretation
Platform promotes eco-friendly alternatives	3.74	0.78	Positive platform effort
Sustainability features influence purchase behaviour	3.71	0.75	Moderate-high influence
The platform contributes to SDG 12 objectives	3.82	0.71	Strong alignment
Overall Platform Sustainability Strategy	3.76	0.75	Platforms play a proactive role

Responses point to the fact that platform-level sustainability initiatives—such as promotion of green alternatives and integration of sustainability features—positively influence consumer behaviour, with mean scores above 3.70. Respondents also attributed that such strategies subsidize eloquently toward Sustainable Development Goal 12 (Responsible Consumption and Production).

Interpretation:

E-commerce platforms serve as influential intermediaries capable of operationalising sustainability goals. Strategic digital interventions can bring into line marketable points with global sustainability frameworks, strengthening long-term consumer trust and loyalty.

Inclusive Interpretation

The findings cooperatively validate that AI-driven marketing, consumer awareness and trust, and digital transparency are interweaving determinants of sustainable purchasing behaviour. AI and transparency turn into enablers, despite the fact that trust functions as a critical moderator persuading consumer decision-making.

The study proves that when sustainability-oriented digital strategies are effectively cohesive into e-commerce platforms, they not only augment consumer engagement but also support broader sustainability objectives.

Findings of the Study

Based on the analysis of data collected from 130 respondents, the key findings appear as follows:

- AI-driven marketing significantly influences eco-friendly purchasing behaviour.** The study initiate that AI-based recommendation systems improve the visibility and accessibility of sustainable products, positively shaping consumers' green purchase decisions.
- Consumers display high awareness and willingness to purchase green products; nevertheless, moderate trust in sustainability claims.** Although respondents demonstrate strong pro-environmental intent, trust-related concerns designate the presence of scepticism regarding green marketing claims.
- Digital transparency features strongly support sustainable consumption.** Eco-labelling, clear sustainability information, and transparent revelations meaningfully upsurge consumer confidence and diminish purchase-related uncertainty.
- E-commerce platform sustainability strategies positively contribute to responsible consumption.** Platform initiatives promoting eco-friendly alternatives align well with Sustainable Development Goal 12 (Responsible Consumption and Production).
- Consumer trust acts as a crucial mediating factor.** The findings recommend that awareness and digital tools are most effective when escorted

by credible and trustworthy sustainability communication.

IMPLICATIONS OF THE STUDY

Managerial Implications

- E-commerce platforms should reconfigure AI algorithms to prioritise eco-friendly products.
- Transparent sustainability discoveries can shape long-term consumer trust and lessen greenwashing concerns.
- Integrating sustainability into platform design can improve brand reputation and customer loyalty.

Policy Implications

- Regulators should endorse standardised eco-labelling outlines to progress consumer trust.
- Policies reassuring digital transparency in sustainability privileges can strengthen responsible consumption.

Academic Implications

- The study ranges from literature on AI-driven sustainable marketing by participating trust and transparency as mediating variables.
- It provides empirical support connecting digital innovation with SDG 12, offering scope for future interdisciplinary research.

CONCLUSION

The study accomplishes that AI-driven marketing, digital transparency, and platform-level sustainability strategies cooperatively impact eco-friendly purchasing behaviour in e-commerce. Although consumers have high awareness and willingness to adopt sustainable products, trust remains the keystone of effective green consumption.

By tactically participating in transparent sustainability information and AI-enabled endorsements, e-commerce platforms can promote responsible consumption while supporting global sustainability objectives. The findings sustain that digital commerce, when allied with ethical and sustainable practices, can aid as a powerful driver of long-term environmental and economic resilience.

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