International Journal of Advanced Research in Commerce, Management & Social Science (IJARCMSS)
(An International Quarterly Multidisciplinary Double Blind Open Access Peer Reviewed Refereed Journal)
ISSN :2581-7930 (Online), Impact Factor (Cosmos): 7.270 & PIF (I2OR): 5.010, Volume 09, No. 02(IV), April-June, 2026, pp 51-57

Artificial Intelligence and Sustainable Consumer Behaviour: Drivers, Mechanisms, and Implications for Green Marketing

Anupama Jain[1*] | Moulima Das[2]

[1]Department of Humanities & Applied Sciences, Echelon Institute of Technology, Faridabad, Haryana, India.
[2]Department of Humanities & Applied Sciences, Echelon Institute of Technology, Faridabad, Haryana, India.

[*]Corresponding Author: hodhas@eitfaridabad.co.in

Citation: *Jain, A. & Das, M. (2026). Artificial Intelligence and Sustainable Consumer Behaviour: Drivers, Mechanisms, and Implications for Green Marketing. International Journal of Advanced Research in Commerce, Management & Social Science, 09(02(IV)), 51–57. https://doi.org/10.62823/IJARCMSS/9.2(IV).9128*

ABSTRACT

The convergence of artificial intelligence (AI) and sustainability has introduced a transformative paradigm in the study of consumer behaviour. It has been observed that AI-driven tools, recommendation systems, predictive analytics, and digital nudges subtly influence environmentally and socially conscious purchasing decisions. This review synthesizes interdisciplinary scholarly evidence to examine how it is done. Drawing on empirical studies, industry data, and illustrative case examples, the paper explores the mechanisms through which AI augments sustainable consumption, identifies barriers to adoption, and provides strategic guidance for businesses and policymakers. The analysis demonstrates that AI, when ethically deployed, can serve as a powerful catalyst for green consumer transitions across sectors ranging from retail and energy to fashion and food systems.

Keywords: *Artificial Intelligence, Sustainable Consumer Behaviour, Green Marketing, Digital Nudging, Ethical AI.*

Introduction

The twenty-first century has witnessed an unprecedented intersection of two macro-forces reshaping commerce and society: the urgency of environmental sustainability and the proliferation of artificial intelligence. Global consumers are increasingly confronted with the moral calculus of their purchasing choices, while businesses grapple with aligning profitability against ecological stewardship. In this context, AI has emerged not merely as an operational tool but as a behavioural architect capable of shaping, guiding, and reinforcing sustainable consumption at scale.

Consumer behaviour research has long established that awareness alone is insufficient to bridge the "intention-action gap" in sustainable purchasing—people may value sustainability but still choose convenience or price over ecological impact. AI technologies offer a novel mechanism to close this gap by making sustainable choices more visible, easier, and personally relevant. From personalised sustainability scores in retail apps to algorithmic nudges in smart home energy systems, the applications are both vast and rapidly evolving.

This paper provides a comprehensive review of the relationship between AI and sustainable consumer behaviour, examining the theoretical underpinnings, empirical evidence, practical case studies, and ethical considerations that define this emerging field. The discussion is framed within the context of the United Nations Sustainable Development Goals (SDGs), particularly SDG 12 (Responsible Consumption and Production), which calls for systemic shifts in how goods and services are produced and consumed globally.

Conceptual Framework

- **Defining Sustainable Consumer Behaviour**

Sustainable consumer behaviour refers to purchasing, using, and disposing of products and services in ways that minimise negative environmental impacts, support social equity, and contribute to long-term ecological balance (Peattie, 2010). It encompasses a wide spectrum of actions, including choosing energy-efficient appliances, opting for plant-based diets, reducing single-use plastics, supporting fair-trade brands, and participating in circular economy models such as product sharing, leasing, and recycling.

Academic frameworks including the Theory of Planned Behaviour (Ajzen, 1991), Value-Belief-Norm Theory (Stern, 2000), and the Attitude-Behaviour Gap model have long attempted to explain why consumers sometimes act inconsistently with their stated environmental values. These frameworks underscore the complex interplay of attitudes, social norms, perceived behavioural control, and situational factors that ultimately determine consumption choices.

- **The Role of Artificial Intelligence**

Artificial intelligence, broadly defined, encompasses machine learning (ML), natural language processing (NLP), computer vision, and predictive analytics systems capable of learning from data, identifying patterns, and making decisions with minimal human intervention. In the commercial sphere, AI manifests in recommendation engines, dynamic pricing algorithms, chatbots, sentiment analysis tools, and supply chain optimisation systems.

The intersection of AI and sustainability research draws from behavioural economics, environmental psychology, marketing science, and information systems. AI's capacity to process vast quantities of consumer data and generate personalised, contextually relevant interventions positions it as a potent enabler of sustainable behaviour change—going far beyond traditional top-down environmental campaigns.

Mechanisms through which AI Influences Sustainable Consumption

- **Personalised Sustainability Recommendations**

One of AI's most direct applications in promoting sustainability is through personalised recommendation systems. Unlike generic environmental messaging, AI-driven systems analyse individual purchase histories, preferences, dietary patterns, and location data to generate tailored suggestions for lower-carbon or ethically sourced alternatives. Research by Berger et al. (2022) found that personalised eco-labelling increased the likelihood of sustainable product selection by 34% compared to generic labels.

Retail giants such as Amazon and Alibaba have begun integrating sustainability filters powered by ML models that rank products by carbon footprint, recyclability, and supply chain transparency. When recommendations are framed around both personal benefit (cost savings, health) and collective impact (carbon reduction), adoption rates increase substantially, suggesting that AI personalisation can effectively align individual motivation with broader sustainability goals.

- **AI-driven Nudging and Choice Architecture**

Behavioural nudge theory (Thaler & Sunstein, 2008) suggests that small, well-designed environmental cues can significantly steer decision-making without restricting choice. AI enhances the precision and timing of such nudges by deploying them at critical moments in the consumer journey. Smart energy platforms like Google Nest use ML algorithms to learn household consumption patterns and deliver real-time feedback, automatically adjusting heating and cooling systems to minimise energy waste—resulting in average savings of 10-15% on household energy bills.

Digital nudges can also appear as social proof indicators (e.g., "82% of customers in your area chose the eco packaging option"), gamified sustainability challenges, or real-time carbon footprint trackers embedded in mobile payment apps. These AI-curated interventions exploit well-documented cognitive biases such as loss aversion, social comparison, and present bias to make sustainable defaults more attractive.

- **Transparency and Traceability via AI**

A persistent barrier to sustainable consumption is the opacity of global supply chains—consumers often lack reliable information about a product's true environmental and social impact. Blockchain technology, combined with AI analytics, enables unprecedented levels of supply chain traceability. Companies like Provenance and TextileGenesis use AI-powered platforms that allow consumers to scan product QR codes and instantly access verified data on raw material sourcing, carbon emissions, water usage, and labour conditions.

This transparency fundamentally alters the information asymmetry that has historically disadvantaged ethical consumers. Studies by Nielsen (2023) indicate that 73% of global consumers are willing to change their consumption habits to reduce environmental impact when presented with clear, credible product information—and AI is uniquely positioned to deliver that information at scale and in real time.

- **Predictive Analysis for Demand Forecasting and Waste Reduction**

AI's role in sustainable consumption extends beyond individual behaviour to systemic waste reduction. Machine learning models employed in food retail (e.g., Walmart, Tesco, Reliance Retail) predict demand with high accuracy, enabling stores tooptimise inventory, reduce perishable waste, and redirect surplus food to community programmes. IBM's Food Trust platform uses AI and blockchain to track food products from farm to shelf, reducing spoilage and enabling faster recalls—directly decreasing the environmental burden of food waste, which accounts for approximately 8-10% of global greenhouse gas emissions (FAO, 2023).

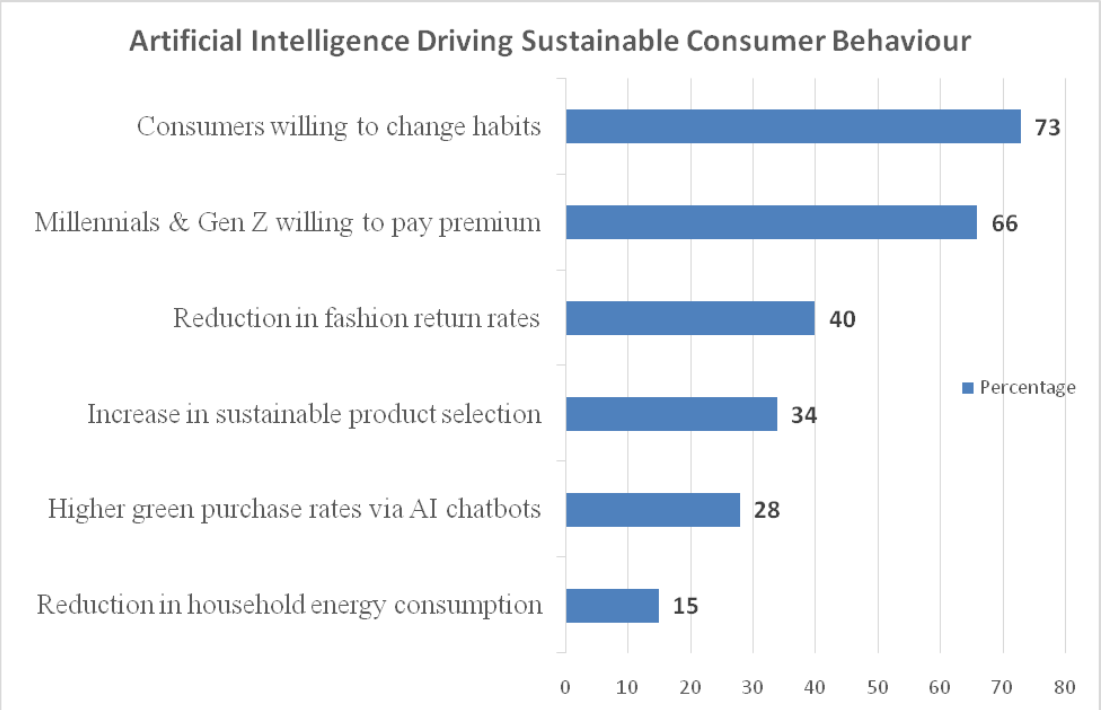
- **Conversational AI and Eco-eductaion**

Chatbots and virtual assistants powered by NLP represent another dimension of AI's influence on sustainable behaviour. Brands are deploying AI-driven conversational interfaces that educate consumers about product sustainability metrics, suggest complementary eco-friendly products, and provide personalised tips for reducing household carbon footprints. Research by Chung et al. (2023) found that consumers who engaged with sustainability-focused chatbots demonstrated a 28% higher rate of subsequent green purchases compared to control groups exposed to static informational websites, suggesting that the interactive, responsive nature of conversational AI creates more durable attitudinal change.

Quantitative Evidence

The following data synthesises key empirical findings from industry research, academic journals, and institutional reports published between 2019 and 2024:

73%	of global consumers say they would definitely or probably change their habits to reduce environmental impact (Nielsen, 2023)
34%	increase in sustainable product selection when AI delivers personalised eco-labels versus generic labels (Berger et al., 2022)
28%	higher green purchase rates among consumers who engaged with sustainability-focused AI chatbots (Chung et al., 2023)
15%	average reduction in household energy consumption enabled by AI-powered smart home systems (Google, 2023)
66%	of millennials and Gen Z consumers willing to pay a premium for AI-verified sustainable products (McKinsey, 2024)
40%	reduction in fashion return rates achieved through AI-powered virtual try-on technology, cutting reverse logistics emissions (Edited, 2023)



These statistics illuminate a consistent pattern: AI-mediated sustainability interventions outperform traditional information campaigns in both reach and behavioural impact, particularly when personalised, contextually delivered, and embedded within existing consumer touchpoints.

Case Studies

- **Olio and AI-powered Community Food Sharing**

Olio, a UK-based food-sharing application, leverages AI to match households with surplus food with nearby neighbours, community groups, and food banks. Its ML recommendation engine analyses user location, food preferences, and availability data to facilitate hyper-local redistribution, preventing edible food from entering landfill.

Key outcomes include:

- Over 7 million portions of food rescued since launch, equivalent to avoiding 3.5 million kg of CO2 emissions
- AI matching algorithms increased successful food-share completions by 45% compared to manual browsing
- User engagement and repeat behaviour significantly higher among those who received AI-curated notifications versus passive app users
- Partnership with Tesco enabled in-store food sharing points managed by AI scheduling systems

Olio's model demonstrates that AI can embed sustainable consumption into everyday social interactions, transforming environmental behaviour into a community-mediated habit rather than an individual sacrifice.

- **IKEA's AI-driven Circular Economy Platform**

IKEA has invested significantly in AI to support its transition from a linear to a circular business model. The company's "Buy Back" programme, powered by computer vision and ML algorithms, allows consumers to return used furniture for AI-assessed valuation and resale through the IKEA Second Life marketplace.

Major outcomes include:

- Computer vision models accurately assess furniture condition in under 30 seconds, eliminating manual inspection bottlenecks
- Over 50 million items refurbished or resold globally since programme inception, diverting significant waste from landfill
- Consumer participation increased by 60% following the introduction of an AI-powered instant price estimate tool
- IKEA reported that circular sales accounted for over 15% of total revenue in pilot markets by 2023

This case underscores how AI removes friction from sustainable behaviour—when the effort of responsible disposal is minimised and the financial incentive is instantly visible, consumer participation accelerates markedly.

- **Zomato and Swiggy: AI for Sustainable Food Delivery in India**

India's leading food delivery platforms have deployed AI not only for operational efficiency but increasingly for sustainability-oriented consumer nudges. Swiggy's "EcoSaver" feature, powered by ML, clusters nearby orders tooptimise delivery routes, significantly reducing per-order carbon emissions. Zomato's AI system offers a "Plant-Based" filter prominently within its recommendation carousel, backed by personalised nudges informed by user order history.

Empirical impact data includes:

- Route optimisation AI reduced average delivery emissions by 18% per order in pilot Indian cities (Swiggy, 2023)
- Plant-based meal orders increased by 32% among users who received personalised AI recommendations versus the general user base
- Zomato's sustainability badge programme—algorithmically assigned to partner restaurants—drove a 21% increase in orders for certified eco-friendly restaurants
- Consumer awareness of platform sustainability initiatives grew from 24% to 67% among surveyed users following AI-driven in-app messaging campaigns

These outcomes are particularly significant in the Indian context, where price sensitivity and convenience traditionally dominate food consumption choices. The success of these interventions suggests that AI personalisation can make sustainability aspirationally and practically accessible to diverse socio-economic segments.

Barriers and Ethical Considerations

- **Algorithmic Bias and Equity**

A critical concern in deploying AI for sustainable consumer behaviour is algorithmic bias. If training data disproportionately reflects the preferences and behaviours of affluent or Western consumers, AI sustainability recommendations may inadvertently exclude lower-income populations, reinforcing inequitable access to green products and services. Researchers have documented cases where AI-powered energy management systems failed to account for the constrained choices of low-income households, effectively penalising them for patterns of energy use driven by necessity rather than preference (Sovacool et al., 2022).

- **Privacy and Data Surveillance**

The personalisation that makes AI-driven sustainability nudges effective is predicated on extensive data collection about consumer behaviour, location, and preferences. This raises legitimate concerns about privacy, consent, and the potential for data to be repurposed in ways consumers did not anticipate or approve. Regulatory frameworks such as the European Union's General Data Protection Regulation (GDPR) and India's Digital Personal Data Protection Act (2023) provide important safeguards, but enforcement remains inconsistent and public literacy around data rights is limited.

- **Greenwashing and AI Washing**

Just as consumers have grown wary of greenwashing—the superficial or misleading promotion of environmental credentials—a parallel phenomenon of "AI washing" is emerging, where companies claim sophisticated AI-driven sustainability capabilities that are not substantiated in practice. Companies

that overstate the environmental benefits of AI interventions risk severe reputational damage as consumers and regulators become more sophisticated in scrutinising such claims (Mitchell & Vogel, 2023).

- **The Rebound Effect**

An often-overlooked risk of AI-driven efficiency gains is the rebound effect—where reductions in resource use from AI optimisation are offset by increased consumption enabled by the cost savings. For example, if AI-powered smart home systems dramatically reduce energy bills, consumers may compensate by purchasing larger appliances or maintaining higher baseline comfort levels. Addressing the rebound effect requires complementary policy measures, such as carbon pricing and public education, that extend beyond what AI alone can achieve.

Implications for Businesses, Policies and Research

- **For Businesses**

Companies seeking to harness AI for sustainable consumer engagement should adopt the following strategic priorities:

  - Embed sustainability metrics into AI recommendation systems by default, rather than as optional filters
  - Invest in third-party verification of AI sustainability claims to build consumer trust and avoid greenwashing allegations
  - Design AI nudges that are transparent, explaining the basis of recommendations so consumers can make informed choices
  - Ensure AI systems are trained on diverse datasets that reflect the consumption patterns of varied demographic groups
  - Integrate AI with circular economy business models—resale, repair, rental—to create systemic rather than incremental sustainability impact

- **For Policymakers**

Effective governance of AI in sustainability contexts demands coordinated action across multiple policy domains:

  - Establish clear standards for AI-generated sustainability claims, with mandatory disclosure of methodology and data sources
  - Incentivise responsible AI deployment through tax credits or procurement preferences for companies demonstrating verified sustainability impact
  - Fund digital literacy programmes that empower consumers to critically evaluate AI-driven sustainability recommendations
  - Develop international frameworks for sharing anonymised AI sustainability data to accelerate collective learning and prevent duplication of effort

- **For Researchers**

The academic study of AI and sustainable consumer behaviour remains nascent, presenting numerous opportunities for future inquiry:

  - Longitudinal studies examining whether AI nudges create durable behaviour change or merely temporary compliance effects
  - Cross-cultural comparative research on how AI sustainability interventions perform across diverse socioeconomic and geographic contexts, particularly in Global South markets
  - Ethical frameworks for evaluating the social equity implications of AI-driven sustainability systems
  - Investigation of the cumulative environmental footprint of AI systems themselves, including energy consumption of large language models and data centres

Conclusion

Artificial intelligence holds transformative promise as an enabler of sustainable consumer behaviour. By personalising sustainability information, designing intelligent nudges, enhancing supply chain transparency, reducing systemic waste, and democratising access to eco-conscious choices, AI can help close the persistent gap between consumers' stated environmental values and their actual

purchasing decisions. The empirical evidence reviewed in this paper consistently demonstrates that AI-mediated interventions outperform traditional approaches in driving green behaviour across diverse consumption domains.

However, the promise of AI in this context is not unconditional. Algorithmic bias, privacy vulnerabilities, the risk of AI washing, and the rebound effect represent genuine threats that must be addressed through thoughtful design, transparent governance, and robust policy frameworks. AI must be understood not as a technological fix for the sustainability crisis, but as a powerful tool whose impact depends fundamentally on the values, intentions, and accountability structures within which it is deployed.

As climate urgency intensifies and consumer expectations of corporate responsibility deepen, the businesses and institutions that succeed will be those that harness AI not merely for competitive advantage, but as a genuine force for sustainable transformation. In doing so, they will align profit with purpose—and technology with the well-being of both people and planet.

References

1. Ajzen, I. (1991). The Theory of Planned Behavior. Organizational Behavior and Human Decision Processes, Vol. 50(2), 179–211.
2. Berger, J., Packard, G., & Boukis, A. (2022). Personalized eco-labelling and sustainable choice: A field experiment. Journal of Marketing Research, Vol. 59(4), 712–731.
3. Chung, M., Ko, E., & Kim, S. (2023). Conversational AI and green consumer behaviour: Evidence from a randomized controlled trial. Journal of Business Research, Vol. 158, 113666.
4. FAO. (2023). The State of Food and Agriculture: Uncovering the True Cost of Food. Food and Agriculture Organization of the United Nations. https://www.fao.org/publications/sofa/2023
5. Google. (2023). Nest Renew: Impact Report 2023. Google LLC. https://home.google.com/stories/nest-renew-impact/
6. IKEA. (2023). IKEA Sustainability Report FY23. Inter IKEA Systems B.V. https://www.ikea.com/global/en/our-business/sustainability/
7. McKinsey & Company. (2024). Consumers care about sustainability—and back it up with their wallets. McKinsey & Company. https://www.mckinsey.com/business-functions/sustainability/our-insights/
8. Mitchell, R., & Vogel, R. (2023). AI washing in environmental marketing: Definitional boundaries and regulatory implications. Business Strategy and the Environment, Vol. 32(5), 2891–2907.
9. Nielsen. (2023). Global Sustainability Report 2023: Consumer Insights on Sustainability. NielsenIQ. https://nielseniq.com/global/en/insights/report/2023/sustainability/
10. Peattie, K. (2010). Green consumption: Behavior and norms. Annual Review of Environment and Resources, Vol. 35, 195–228.
11. Provenance. (2023). Building Consumer Trust Through AI-Verified Supply Chains. Provenance Ltd. https://www.provenance.org/reports/
12. Sovacool, B. K., Kester, J., Noel, L., & de Rubens, G. Z. (2022). Actors, business models, and innovation activity systems for smart and sustainable mobility transitions in Europe. Environmental Innovation and Societal Transitions, Vol. 42, 51–71.
13. Stern, P. C. (2000). New environmental theories: Toward a coherent theory of environmentally significant behavior. Journal of Social Issues, Vol. 56(3), 407–424.
14. Swiggy. (2023). Swiggy Sustainability Initiatives: Carbon Reduction Report. Bundl Technologies Pvt. Ltd. https://www.swiggy.com/sustainability/
15. Thaler, R. H., & Sunstein, C. R. (2008). Nudge: Improving Decisions About Health, Wealth, and Happiness. Yale University Press.
16. United Nations. (2023). The Sustainable Development Goals Report 2023. United Nations Department of Economic and Social Affairs. https://unstats.un.org/sdgs/report/2023/
17. Zomato. (2023). Zomato Annual Report 2022–23: Sustainability Section. Zomato Ltd. https://www.zomato.com/annual-report/.

❑❑❑