sdmimd
Shri Dharmasthala Manjunatheshwara Institute for Management Development, Mysuru, India
10th International Conference on
Economic Growth and Sustainable Development: Emerging Trends – November 27-28, 2025

Exploring the impact of sustainable consumer choices in e-commerce using AI powered recommendations

Kavya Sree N
kavya09che@xime.org

Lokesh Kumar J
lokesh09che@xime.org
PGDM students

Sundari R
Sr. Asst. Professor,
Xavier Institute of Management & Entrepreneurship,
Chennai
sundari@xime.org

Abstract

The expansion of e-commerce has significantly transformed global retail structures while simultaneous raising concerns regarding overconsumption and environmental impact. In this emerging context, Artificial Intelligence (AI)-powered recommendation systems, initially developed to enhance personalization in online shopping experiences, are increasingly recognized as potential mechanisms for steering consumers toward more sustainable choices. While prior research has highlighted the role of AI in improving personalization and sales, there remains a gap in understanding how these systems can promote sustainability within digital marketplaces. This study explores how AI-Powered recommendations can influence consumer attitudes and behaviours toward eco-friendly purchasing. The objectives are to assess consumer perceptions of sustainability-focused recommendations, analyse their effect on purchase decisions, and evaluate the importance of trust and transparency in fostering acceptance. A mixed-method approach was adopted, combining consumer surveys with analysis of sales data trends for sustainable products recommended by AI. The findings suggest that consumers generally respond positively when sustainability attributes are clearly integrated into recommendations, particularly when framed in terms of value, convenience, and credibility. However, results also indicate that personalization remains a critical factor for engagement, implying that sustainability should be balanced with individual preferences. The study is expected to provide strategic insights for businesses integrating sustainability into recommendation systems and inform policymakers seeking to promote greener consumption in digital marketplaces.

Keywords: *AI Powered recommendations, E-commerce, Trust and Transparency in AI, Sustainable Marketing, Sustainable Consumer Behaviour, AI Personalization, Perceived Green Value.*

Introduction

Once focused on speed and convenience, e-commerce is now increasingly focused on sustainability and purpose. The development of artificial intelligence (AI) technology has changed the face of online shopping, especially in terms of encouraging sustainable consumption and influencing customer engagement. AI-powered recommendation now plays a crucial role in tailored shopping experiences by pointing customers towards environmentally friendly goods and emphasising their ethical product attributes. Through the integration of sustainability cues and personalisation, these systems have the

potential to impact ethical purchasing decisions. However, the effectiveness of such interventions depends on consumer trust, perceived transparency, and the credibility of brands sustainability claims. This study aims to bridge the gap in research regarding the influence of AI-powered recommendation systems on sustainable consumer behaviours, focusing on online shoppers in CHENNAI, India. The data collected from a diverse sample enables an in-depth analysis of the factors that drive the adoption of eco-friendly products, with particular attention to demographic characteristics purchase pattern of consumers. The findings from this study offer practical insights for AI developers, marketers, and sustainability advocates seeking to leverage AI technologies to encourage environmentally responsible purchasing. Additionally, the study contributes to the broader understanding of the intersection between the AI-Powered recommendations, trust & transparency in AI, perceived green value and sustainable consumer behaviour providing a framework for future research in this domain.

Objectives of the Study

To examine the influence of AI-powered recommendations and trust & transparency in AI systems on consumer's perceived green value where it leads to sustainable consumer behaviour.

To study how perceived green value mediates the relationship between the factors (AI-powered recommendations and trust & transparency in AI systems) and sustainable consumer behaviour.

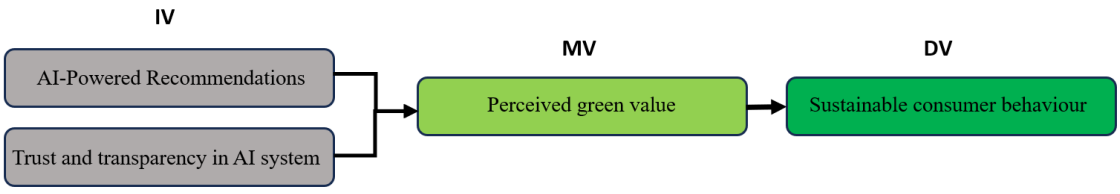
To evaluate the impact of integrating sustainability-related information within AI-powered recommendations on consumer's purchase intention in e-commerce contexts.

Scope of the Study

This study primarily focuses on consumers in Chennai, India, providing a localized perspective on the role of AI-Powered recommendations and Trust and Transparency in AI in promoting eco-friendly behaviour. The sample includes individuals from various age groups and both genders, allowing for a broad understanding of how different demographic factors influence the adoption of sustainability practices. The scope of the study encompasses the examination of three four constructs: AI-Powered recommendations, trust and transparency in AI, perceived green value and sustainable consumer behaviour. Additionally, the study explores the relationships between these variables and the mediating role of Perceived Green Value, offering insights into how AI technologies can be optimized to encourage sustainable behaviours. The findings are intended to be applicable to AI developers, marketers, and policymakers looking to leverage technology for environmental advocacy, with potential applications beyond the specific geographical region of Chennai.

Conceptual model

The model represents a relationship between four variables: AI-Powered recommendations (Independent Variable), Trust & transparency in AIs (Independent Variable), Perceived Green Value (Mediating Variable) and Sustainable consumer behaviour (Dependent Variable).



Literature Review

As sustainability becomes a global priority, businesses are adopting technology-oriented strategies to promote environmentally responsible consumer behaviour. Artificial Intelligence (AI), particularly recommendation systems, has emerged as a powerful tool for shaping consumer choices and encouraging sustainable purchasing. By analysing consumer data and preferences, AI-powered recommendations personalize shopping experiences while highlighting eco-friendly alternatives, increasing awareness and influencing ethical decision-making. These systems simplify choosing sustainable products by making green options more visible, relevant, and appealing. This literature review examines how AI-powered recommendation systems influence sustainable purchasing behaviour by considering AI-Powered recommendations as the main factor, perceived green value as a mediator, sustainable consumer behaviour as the outcome, and trust & transparency in AI as moderators. It also explores how consumers' perception of green value and AI credibility affect their engagement with sustainability-oriented recommendations and environmentally responsible purchases.

AI-Powered Recommendation (Independent Variable)

Artificial Intelligence (AI) has revolutionized e-commerce by personalizing consumer experiences through intelligent recommendation systems. AI-Powered recommendations analyse user data such as browsing history, preferences, and purchase patterns to predict and suggest relevant products (Jannach & Adomavicius, 2016). These systems influence consumer decision-making by enhancing convenience, product relevance, and engagement (Kumar et al., 2020). Recent studies suggest that AI can also encourage sustainable behaviour by recommending eco-friendly and ethically sourced products, aligning technological personalization with environmental consciousness (Gursoy et al., 2022). Therefore, AI-Powered recommendations act not only as technological innovations but also as behavioural drivers capable of steering consumers toward sustainability in digital marketplaces.

Trust & Transparency in AI (Independent Variable)

Trust and transparency are essential for consumer acceptance of AI technologies. Trust reflects a belief in the system's fairness, reliability, and integrity, while transparency refers to the clarity of how AI systems operate and use data (Shin, 2020). When consumers understand how recommendations are generated and believe their data is handled ethically, trust strengthens (Lee & Shin, 2018). Transparency reduces perceived risks, increases confidence, and encourages engagement with AI systems (Awad & Krishnan, 2006). In sustainability contexts, trustworthy AI recommendations legitimize eco-friendly claims, bridging the gap between technological influence and responsible consumer decision-making. Thus, trust and transparency act as psychological mediators linking AI-Powered recommendation cues to positive behavioural outcomes.

Perceived Green Value (Mediating Variable)

Perceived Green Value refers to consumers' overall evaluation of the environmental and functional benefits of a product compared to the sacrifices made in acquiring it (Chen & Chang, 2012). It reflects the extent to which consumers believe that eco-friendly products provide meaningful value through environmental preservation and personal satisfaction. In e-commerce, AI-Powered recommendation systems can enhance perceived green value by emphasizing sustainable attributes such as recyclability, ethical sourcing, and energy efficiency (Wang et al., 2020). When consumers perceive higher green value in AI-suggested products, they are more likely to translate these perceptions into sustainable purchasing decisions (Huang et al., 2021). Therefore, perceived green value acts as a psychological link connecting AI-Powered recommendations to sustainable consumer behaviour in digital marketplaces.

ISBN code 978-93-83302-82-6.

Sustainable Consumer Behaviour (Dependent Variable)

Sustainable consumer behaviour refers to individuals' willingness and actions to purchase products that are environmentally responsible. It stems from growing environmental awareness and a belief that individual choices can make a positive ecological impact (White et al., 2019). When AI systems highlight product sustainability features—such as recyclability, carbon neutrality, or ethical sourcing—consumers perceive higher value and authenticity in those products (Chen & Chang, 2012). Moreover, trust in AI systems amplifies this effect by making sustainability information more credible (Wiederhold & Martinez, 2018). Consequently, sustainable consumer behaviour becomes a reflection of how technology and ethical communication jointly shape purchasing intentions in the modern digital environment.

Hypotheses

H1: Trust and Transparency AI in have a significant positive influence on AI-powered recommendations.

H2: AI-powered recommendations have a significant positive influence on perceived green value.

H3: Trust and Transparency in AIs have a significant positive influence on perceived green value.

H4: Perceived green value has a significant positive influence on sustainable consumer behaviour.

Research Methodology

a. Research Design: Current research used a descriptive and explanatory research design, this study seeks to analyse the impact of AI-powered recommendations and trust & transparency in AI systems on perceived green value, thereby promoting sustainable consumer behaviour. We created a 25-question survey and shared it with around 152 potential consumers via peers, social media, and other ways. After that, we collated their answers. The respondents were from different parts of *Chennai.*

b. Sampling Method: Based on the research design, convenience sampling was used in this study.

c. Sample Size: The questionnaire generated 152 respondents from different parts of *Chennai, India.*

d. Data Collection Method: The study used both primary and secondary data. Primary data were collected through a structured questionnaire distributed in print and through Google Forms. The questionnaire included demographic details of the respondents and questions related to AI-powered recommendations, Trust and Transparency in AIs, perceived green value and their influence on sustainable consumer behaviour. Secondary data were gathered from research papers, journals, articles, and reliable online sources to support and strengthen the findings of the study.

e. Techniques used: Demographic analysis was used to assess the characteristics of the target population, while consumer's online shopping pattern helped identify trends in sustainable purchasing behaviour. Factor analysis was conducted to identify the key dimensions of AI-powered recommendations, Trust and Transparency in AIs, Perceived Green Value and Sustainable Consumer Behaviour. Finally, Structural Equation Modelling (SEM) using AMOS software was employed to examine the structural relationships among these variables in the proposed model and to analyse how these variables influence sustainable consumer behaviour.

Results And Discussion

The study explores how AI-powered recommendations and Trust & Transparency in AI system influence sustainable consumer choices in e-commerce, focusing on the mediating role of perceived green value. Data were collected through a structured questionnaire from consumers across Chennai.

Demographic characteristics and general survey

Table 1: Demographic characteristics

Variables	No. of Respondents	Percentage (%)
Age of the respondents		
16 – 20	56	25
21 – 25	38	36.8
26 – 30	20	12.5
31 – 35	19	12.5
35 and above	19	13.2
Total	**152**	**100**
Gender of the respondents		
Male	84	44.7
Female	68	55.3
Total	**152**	**100**
Education Level of the respondents		
High School	60	55.9
Undergraduate	44	13.2
Postgraduate	26	15.8
Diploma / Vocational Course	19	8.6
Other	3	6.6
Total	**152**	**100**
Occupation of the respondents		
Student	55.9	85
Employed	13.2	24
Self-employed	15.8	20
Homemaker	8.6	13
Other	6.6	10
Total	**152**	**100**
Annual Income of the respondents		

ISBN code 978-93-83302-82-6.

Less than ₹2,50,000	102	67.1
₹2,50,000 – ₹4,99,999	23	15.1
₹5,00,000 – ₹9,99,999	20	13.2
₹10,00,000 – ₹14,99,999	6	3.9
15,00,000 and above	1	0.7
Total	**152**	**100**

Note: Sample size, n = 152

The demographic characteristics of the respondents indicates that most respondents belong to the 21–25 age group (36.8%), followed by 16–20 years (25%), showing a youthful participant base. In terms of gender, females (55.3%) slightly outnumber males (44.7%). A majority have completed high school education (55.9%), reflecting a fairly educated sample. Students (55.9%) form the largest occupational group, while others are employed (13.2%) or self-employed (15.8%). Most respondents have an annual income below ₹2,50,000 (67.1%), indicating limited earning capacity typical of younger individuals. Overall, the survey represents a young, educated population with modest income levels, suitable for understanding consumer perceptions in e-commerce settings.

Table 2: Online Shopping Patterns of Consumers in E-Commerce

Variables	**No. of Respondents**	**Percentage (%)**
Average online shopping frequency of consumers		
Daily	16	10.5
Weekly	30	19.7
Monthly	42	27.6
Rarely	64	42.1
Total	**152**	**100**
Type of products consumers usually buy online		
Clothing and fashion accessories	44	28.9
Electronics and gadgets	32	21.1
Groceries and household essentials	23	15.1
Personal care and beauty products	16	10.5
Eco-friendly or sustainable products	14	8.6

ISBN code 978-93-83302-82-6.

Food and beverages	13	9.2
Books or educational materials	9	5.9
All the above	1	0.7
Total	**152**	**100**
Awareness of AI-Driven Product Recommendations in E-commerce		
Aware	108	71
Neutral	17	17.8
Unaware	27	11.2
Total	**152**	**100**

Note: Sample size, n = 152

The results show that most respondents shop online rarely (42.1%) or monthly (27.6%), indicating moderate online shopping frequency. Clothing and fashion accessories (28.9%) are the most purchased items, while eco-friendly or sustainable products (8.6%) remain less common. However, a large majority of respondents (71%) are aware that e-commerce platforms use AI to recommend products, reflecting good awareness of AI-driven recommendations among consumers

Factor Analysis

Factor Analysis was performed on the four main variables of interest: AI-Powered recommendations, Trust & transparency in AI system, Perceived Green Value and Sustainable consumer behaviour. The results are presented below.

Table 3: Summary of Factor Analysis

Variable	Statement	Factor loading	Rotated sum of square loadings	KMO
AI-Powered Recommendations	AI recommendations make my shopping process easier.	0.716	16.044%	0.836
	I find it useful when recommendations highlight product attributes such as sustainability.	0.658		
	AI recommendations introduce me to innovative or new sustainable products that match my interests	0.601		
Perceived green value	I notice sustainability features (e.g., recyclable, organic) in recommended products.	0.786	31.654%	

	Recommendations highlighting sustainability increase the value I see in those products.	0.720		
	When shopping online, I pay more attention to AI recommendations that promote eco-friendly or ethical brands	0.605		
	I consider sustainability an important factor in my online shopping choices.	0.589		
Sustainable consumer behaviour	AI-Powered suggestions increase my willingness to choose eco-friendly products.	0.792	44.817%	
	I have purchased more sustainable products after seeing them recommended by AI.	0.629		
	I believe my sustainable purchases (influenced by AI) can make a positive environmental difference.	0.588		
	I feel personally responsible for choosing sustainable products when highlighted by AI.	0.574		
Trust and Transparency in AI	I believe AI recommendations use my data responsibly.	0.775	57.807%	
	I am more likely to follow a recommendation when the reason for it is explained.	0.713		
	I worry about privacy when AI recommendations use my personal data.	0.591		

Factor analysis was conducted to identify the underlying dimensions influencing sustainable consumer behaviour in e-commerce through AI-powered recommendations. The overall Kaiser–Meyer–Olkin (KMO) value of 0.836 indicated that the sample was adequate and suitable for further statistical testing. The Rotated Sum of Squared Loadings indicates the proportion of total variance in the original set of variables that is explained by each extracted factor after rotation. The results show that the four constructs collectively explain 57.807% of the total variance, which is considered satisfactory in behavioural and social science research.

The Factor Loading values represent how strongly each item in the questionnaire is associated with its respective construct. In this study, all items recorded loadings above 0.58, confirming their reliability

and relevance. For AI-Powered Recommendations, loadings ranged from 0.601 to 0.716, showing that AI suggestions significantly influence purchase awareness and decision-making. Trust and Transparency in AIs recorded loadings between 0.591 and 0.775, reflecting that secure and transparent AI practices enhance consumer confidence. Perceived Green Value showed loadings from 0.589 to 0.720, indicating that respondents recognise and value sustainable product recommendations. Lastly, Sustainable Consumer Behaviour had loadings between 0.574 and 0.792, confirming that AI-based recommendations promote eco-friendly buying actions. Overall, the factor loading values confirm that all constructs are statistically reliable and conceptually valid. This ensures the data are suitable for further analyses such as Structural Equation Modelling (SEM).

Structural Equation Model Analysis

The Structural Equation Model (SEM) was developed and tested using Analysis of Moment Structures (AMOS) to examine the causal relationships among four major constructs: AI-Powered Recommendations, Trust and Transparency in AIs, Perceived Green Value, and Sustainable Consumer Behaviour.

Figure 2: Structural Equation Model illustrating the impact of AI-Powered Recommendations, Trust and Transparency in AI on Perceived Green Value leading to Sustainable Consumer Behaviour

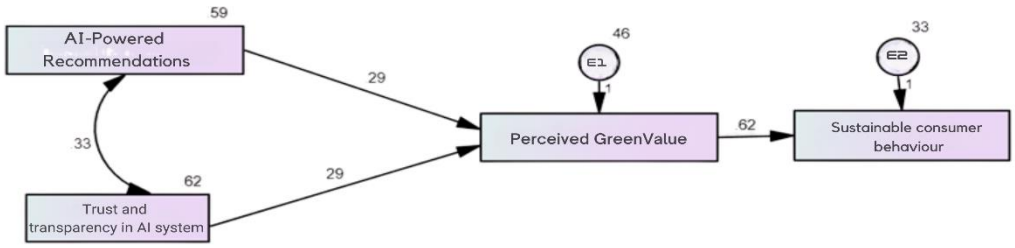


Table 4 showing the model fit indices values

Model	CMIN	DF	P	CMIN/DF	GFI	CFI	RMSEA	RMR
Default model	30.294	2	.000	15.147	.917	.863	.306	.064

Model Structure and Pathways

In the proposed model, AI-Powered Recommendations and Trust & Transparency in AI Systems were considered as independent variables, influencing consumer perception. Perceived Green Value served as the mediating variable, reflecting consumers' evaluation of the environmental and personal benefits of sustainable product recommendations. Sustainable Consumer Behaviour acted as the dependent variable, representing the consumers' eco-friendly purchasing intentions and actions.

The model developed in AMOS tested both direct and indirect relationships among these variables. The direct paths from AI-Powered Recommendations and Trust & Transparency to Sustainable Consumer Behaviour measured the immediate influence of AI features and credibility on consumer actions. The indirect paths, mediated through Perceived Green Value, assessed how positive environmental perceptions strengthen this relationship.

Regression Weights: (Default model)

Table 5: Estimated Regression Weights of the Default Model

	Estimate	S.E.	C.R.	P	Result
AI-Powered recommendations <--- Trust and Transparency in AI	.332	.056	5.938	***	Supported
Perceived Green Value <--- AI-Powered recommendations	.292	.084	3.476	***	Supported
Perceived Green Value <--- Trust and Transparency in AI	.292	.086	3.379	***	Supported
Sustainable consumer behaviour <--- Perceived Green Value	.623	.060	10.432	***	Supported

The table presents the SEM-based hypothesis testing results, showing how AI-Powered Recommendations and Trust & Transparency in AI influence Perceived Green Value and Sustainable Consumer Behaviour among online consumers in e-commerce platforms.

H1: Trust and Transparency in AIs have a significant positive effect on AI-powered recommendations (estimate = 0.332, $p < 0.001$). This confirms that personalized and intelligent recommendations enhance consumer trust in AI-driven platforms.

H2: AI-powered recommendations significantly influence perceived green value (estimate = 0.292, $p < 0.001$). This suggests that consumers associate AI-based suggestions with eco-friendly and responsible choices.

H3: Trust and Transparency in AIs have a significant positive effect on perceived green value (estimate = 0.292, $p < 0.001$), implying that trustworthy AI systems reinforce perceptions of environmental value in online shopping.

H4: Perceived green value has a significant positive influence on sustainable consumer behaviour (estimate = 0.623, $p < 0.001$), confirming that when consumers perceive environmental benefits, they are more likely to adopt eco-conscious consumption patterns.

The findings reveal that AI recommendations, trust & transparency in AI system and perceived green value significantly encourage sustainable consumer behaviour. Consumers tend to make greener choices when they view AI-driven suggestions as honest and environmentally responsible. Hence, brands should focus on building transparent, trustworthy AI systems that highlight eco-friendly values to foster stronger sustainability-driven purchasing intentions.

SUGGESTIONS

Based on the results of the study the following suggestions are proposed for e-commerce companies, digital marketers, and AI system developers,

Enhance AI Recommendation Effectiveness: E-commerce platforms should refine AI algorithms to prioritise and display eco-friendly product options more effectively.

Increase Trust and Transparency: Clear disclosure of how AI recommendations are generated and strong data privacy measures can improve user trust and system credibility.

Communicate Green Value Clearly: Platforms should highlight the environmental and social benefits of sustainable products to strengthen consumer's perceived green value.

Encourage Sustainable Behaviour through Personalisation: Personalised AI suggestions based on users' eco-friendly preferences, along with sustainability filters or labels, can motivate greener purchase decisions.

Suggestions Based on Open-Ended Responses

Based on the open-ended responses from 152 participants, the following practical suggestions emerged for enhancing the trustworthiness and eco-friendliness of AI-powered recommendations in e-commerce platforms.

Product Quality and Authenticity: Respondents suggested ensuring genuine, high-quality products by displaying verified reviews, official certifications, and seller credibility. This boosts both user satisfaction and platform reliability.

Active Promotion of Sustainable Products: Many recommended actively highlighting eco-friendly, locally sourced, and ethically produced products, offering green filters, and reducing non-recyclable packaging to encourage environmentally responsible shopping.

Data Privacy and User Protection: Clear data privacy practices were emphasized, including explaining data use, obtaining consent, and safeguarding personal information. Strong security enhances consumer trust

Conclusion

This study examined how AI-powered recommendations and Trust & Transparency in AI influence sustainable consumer behaviour in e-commerce, focusing on the mediating role of perceived green value. The results from 152 respondents in Chennai showed that AI-powered recommendations positively affect consumer trust and perceived green value, which together encourage consumers to make more sustainable purchase decisions. The findings suggest that when AI systems are transparent and highlight sustainability features such as eco-friendly or ethically sourced products, consumers are more likely to trust the system and value its suggestions. This leads to a stronger intention to buy sustainable products.

The study contributes to understanding how AI and sustainability can work together to promote responsible consumption. It also provides useful insights for e-commerce companies and marketers to design AI tools that are transparent, credible, and focused on sustainability. Although limited to a specific region, this research offers a base for future studies in other locations and product categories. Overall, the study concludes that effectiveness of AI-powered recommendation, trust, transparency, and perceived green value play a key role in shaping sustainable consumer behaviour, supporting Sustainable Development Goal 12 – Responsible Consumption and Production.

References

Awad, N. F., & Krishnan, M. S. (2006). The personalization–privacy paradox: An empirical evaluation of information transparency and the willingness to be profiled online. *MIS Quarterly, 30*(1), 13–28.

Chen, Y. S., & Chang, C. H. (2012). Enhance green purchase intentions: The roles of green perceived value, green perceived risk, and green trust. *Management Decision, 50*(3), 502–520.

https://doi.org/10.1108/00251741211216250

Gursoy, D., Chi, C. G., Lu, L., & Nunkoo, R. (2022). Nudging toward sustainability in digital marketplaces: The role of artificial intelligence. *Journal of Business Research, 145*, 80–91.

https://doi.org/10.1016/j.jbusres.2022.02.011

Huang, M.-H., Rust, R. T., & Maksimovic, V. (2021). The feeling economy: Managing in the next generation of artificial intelligence. *California Management Review, 63*(4), 43–65.

https://doi.org/10.1177/00081256211000261

Jannach, D., & Adomavicius, G. (2016). Recommendations with a purpose. *Proceedings of the 10th ACM Conference on Recommender Systems*, 7–10. https://doi.org/10.1145/2959100.2959186

Kumar, A., Sharma, R., & Agarwal, S. (2020). Artificial intelligence in e-commerce: Personalization and customer engagement. *International Journal of Retail & Distribution Management, 48*(5), 456–470. https://doi.org/10.1108/IJRDM-12-2018-0279

Lee, S., & Shin, D. (2018). Trust in AI-powered recommendation systems. *Telematics and Informatics, 35*(2), 345–357. https://doi.org/10.1016/j.tele.2017.12.009

Shin, D. (2020). How AI-powered recommendations influence consumer trust. *Computers in Human Behavior, 108*, 106826. https://doi.org/10.1016/j.chb.2020.106826

Wang, C., Zhang, Q., & Zhang, J. (2020). Green value perception and sustainable consumption: The mediating role of trust. *Sustainability, 12*(20), 8456. https://doi.org/10.3390/su12208456

White, K., Hardisty, D. J., & Habib, R. (2019). The elusive green consumer. *Harvard Business Review, 97*(4), 124–133.

Wiederhold, M., & Martinez, L. F. (2018). Ethical consumer behaviour in e-commerce: Sustainability and responsibility. *Journal of Consumer Marketing, 35*(2), 212–223. https://doi.org/10.1108/JCM-03-2017-2126