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ROLE OF ARTIFICIAL INTELLIGENCE IN PROMOTING SUSTAINABLE ONLINE SHOPPING BEHAVIOUR AMONG GENERATION Z

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ABSTRACT

Artificial Intelligence play an important role in promoting sustainability within e-commerce. Gen Z are the chief dominator in digital world and aware about sustainability compare to other generational cohorts. Previous research focus on general consumer group, apparel and grocery yet online shopping behaviour in e-commerce among Generation Z are lacking. The main objective of this study is to analyse the impact of artificial intelligence in sustainable online shopping behaviour and eco-friendly product choices among Gen Z. The study suggests descriptive and quantitative approach of 100 respondents through convenience sampling. Independent variable includes artificial intelligence and dependent variable includes sustainable online shopping behaviour and eco-friendly product choices. Demographic variables were analysed by frequency and percentage. The internal consistency and reliability were measured by Cronbach's Alpha which is 0.77 considered reliable for further analysis. Regression analysis reveal that model is statistically significant, the value R Square is low which show small proportion of the variation in sustainable online shopping behaviour and eco-friendly product choices is explained by AI. Additionally, Coefficient table reflects a moderate positive beta value, shows that AI has a positive impact on sustainable online shopping behaviour and eco-friendly product choices among Gen Z. This study has significant implications for businesses, policymakers and researchers. The purpose of the businesses is to enhance customer engagement in marketing strategies with sustainability also supports ethical use of AI and transparency in promoting sustainability for policymakers. Moreover, study provides valuable insights of artificial intelligence and sustainable online shopping behaviour for researchers.

KEYWORDS: *Artificial Intelligence, Sustainability, Online shopping behaviour, Generation Z, E-Commerce*

INTRODUCTION

In modern era, artificial intelligence rapidly transformed the online shopping behaviour of consumers in e-commerce across the globe. Moreover, consumers are more aware about the environmental concerns which increases the concept of sustainable online shopping behaviour. AI-driven technologies such as personalized recommendation, AI-enabled chatbots, visual search, virtual assistant, dynamic pricing, predictive analytics, smart search system, AI-specific algorithmic transparency & trust enhance the customer experience and effect on consumer decision making along with promote the environmental responsible consumption of consumers towards eco-friendly products and sustainability.

"The concept of sustainable development, first coined in the 1987 report "Our Common Future" by the World Commission on Environment and Development (WCED), has become a guiding principle in the formulation of strategies for both businesses and consumers" (Romero Borrea et al., 2024, p. 540). "Sustainability has become the essential factor for consumers as well as businesses" (Mineeth et al., 2025, p. 313) "With tools like visual AI, retailers can reduce their environmental footprint while boosting revenue and cutting costs. By gaining a real-time view of what customers really want, you'll have the necessary insights to encourage more sustainable shopping habits and improve business outcomes" (Syte, 2023, para. 2).

Among various consumer group, Generation Z are the individual who born between 1997 – 2012 plays an important role in sustainable online shopping. These are the generation who highly engage in technology and connected to digital world. They are more aware about environmental issues compared to other generation. "Sustainability has become a fundamental requirement for 91% of buyers, according to those surveyed. Customers expect more sustainable shipments, from reducing packaging materials and single-use plastics to optimizing transport and deliveries and collaborating with local suppliers. Among digital consumers, 45% declare they are willing to pay more for sustainable products. Meanwhile, more than half claim to have bought or sold second-

hand products, particularly for fashion or cultural products such as books, music, movies and collectibles" (IESE Business School, 2024, para. 3).

Therefore, this study aims to explore the role of artificial intelligence in promoting sustainable online shopping behaviour among Gen Z. As artificial intelligence can act as a bridge between shopping behaviour and sustainable actions by providing information about eco-friendly products. Also, enhance environmental awareness and encourage Gen Z online shopping behaviour.

SIGNIFICANCE OF STUDY

This study is significant in view of the fact that it examines the role of artificial intelligence in promoting sustainable online shopping behaviour by AI-driven technologies among Gen Z. This study provides practical insights for businesses, policymakers, researchers and e-commerce companies to use AI in promoting sustainable consumption. The purpose of the businesses is to enhance customer engagement in marketing strategies with sustainability. This study supports ethical use of AI and transparency in promoting sustainability for policymakers and offer directions for future research.

LITERATURE REVIEW

Popova and Popovs (2022) found that impact of smart economy influences the smart area development. Advancement in technology is a mediator between smart economy and smart areas. Moreover, digital innovation improves the sustainability and enhance decision making.

Balasubramanian and Sheykhmaleki (2024) examined high environmental awareness effect the sustainable purchase of consumers which support eco-friendly and ethical fashion choices. Along with, social factor influences the consumers to accept sustainable practice of consumption. Despite positive behaviour, high price of sustainable apparel becomes a major barrier in purchasing.

Borre et al. (2024) examined the sustainable purchasing behaviour among new generation consumer. Author analyses how AI role support the sustainable decision making of online shopping. Findings suggests that AI tools help consumers in sustainable choices especially by recommending eco-friendly product. Gen Z consumers are strongly sustainability oriented whereas millennials balanced the sustainability with price, convenience and trust. Singh et al. (2025) investigates to promote sustainability by AI in online shopping which help companies to forecasting demand, optimize inventory and recommendation system to reduce overproduction. Along with, AI technologies improve route optimization, last-mile delivery planning and logistics efficiency which reduces carbon footprint. AI enable automated warehouse management, optimized packaging and logistics optimization which contribute to sustainability.

Mineeth et al. (2025) examined sustainability consumption is increased by AI-driven personalization in addition to improve trustworthiness and increases credibility in green marketing. The study proposed a three-tiered framework, includes an AI-powered recommender system, real-time sentiment analysis and natural language processing tools to detect greenwashing.

Garg et al. (2025) examined that green marketing strategies is strengthen by AI. With addition to increase trust of consumers in eco-friendly brands and supports sustainable brands. Eco-friendly packaging, green branding and sustainability improves brand image and loyalty of consumers.

Ganapathy et al. (2025) examined that environment conscious consumers have stronger preference in sustainable e-grocery shopping. Sustainable e-grocery suggests easy product comparison, door to door delivery and time-saving for consumers. Additionally, sustainable packaging affects purchase decision of consumers. Although, price sensitivity and trust discourage the shopping of consumers.

Alsaffarini and Awwad (2026) investigated the purchasing behaviour of consumer which is influenced by AI personalization. Consumer engagement, purchase probability and brand connection improves emotional engagement. Along-with data privacy, trust, algorithm transparency and data control affects the acceptance of consumers. Ethical AI marketing builds long-term trust and sustainability.

RESEARCH GAP

Most of the study focus on general consumer group, sustainability, apparel, grocery and smart cities but sustainable online shopping behaviour in e-commerce among Gen Z are lacking.

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RESEARCH METHODOLOGY

OBJECTIVES OF THE STUDY

- To analyse the impact of artificial intelligence in sustainable online shopping behaviour among Gen Z.
- To analyse the role of artificial intelligence in eco-friendly product choices among Gen Z towards online shopping behaviour in e-commerce.

HYPOTHESES OF THE STUDY

H_{01}: There is no significant impact of artificial intelligence in sustainable online shopping behaviour among Gen Z.

H_{02}: There is no significant role of artificial intelligence in eco-friendly product choices among Gen Z towards online shopping behaviour in e-commerce.

RESEARCH DESIGN

This study proposes descriptive and quantitative approach to explore the role of artificial intelligence in promoting sustainable online shopping behaviour among Gen Z.

DATA SOURCES

Primary data were collected through questionnaire method including demographic and some research-specific questions. A total of 100 respondents were selected through convenience sampling and 5-point Likert scale were used to capture the responses of Gen Z about role of AI in sustainable online shopping and eco-friendly product choices. Secondary data were collected through various research papers of national and international journal.

VARIABLES

Variables composed independent variable which include artificial intelligence and dependent variable includes sustainable online shopping behaviour and eco-friendly product choices.

ANALYTICAL TOOLS

The collected data was coded and analysed by Microsoft excel. Demographic variables include age, gender and frequency of online shopping were analysed by frequency and percentage. Cronbach's Alpha was used to evaluate the internal consistency and reliability. The significant impact of both variables was analysed by Regression.

DATA ANALYSIS

Table 1: Distribution of Respondents Based on Demographic Variables

VARIABLE	CATEGORY	FREQUENCY	PERCENTAGE
AGE	Below 15	13	13%
	16 - 20	28	28%
	21 - 25	38	38%
	26 - 30	21	21%
GENDER	Male	54	54%
	Female	46	46%
FREQUENCY OF ONLINE SHOPPING	Rarely	19	19%
	Occasionally	36	36%
	Monthly	30	30%
	Frequently	15	15%

Source: Author's own research

Table 1 reflects the demographic distribution of 100 Gen Z respondents between the age group of 15-30 in which 38% respondents of age group between 21-25 shows the higher engagement followed by the respondents of age group between 16-20 which is 28%. At 54% are males followed by 46% are females, shows almost balanced gender diversity. According to survey, 36% respondents are shop on occasionally basis followed by 30% respondents are shop on monthly basis, 19% respondents are shop on rarely basis and 15% respondents are shop on frequently basis.

Table 2: Reliability Analysis

Scale	No. of items	Cronbach's Alpha
Measurement Scale	12	0.77

Source: Author's own research

Table 2 reflects the Cronbach's alpha value of measurement scale is 0.77 which is above the acceptance level of 0.70. Thus, measurement scale in this research considered reliable for further analysis.

Table 3.1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error
1	0.355143216	0.126126704	0.11720963	0.66227532

Source: Author's own research

The model summary table reflects the R Square value is 0.12, shows 12% of the variation in sustainable online shopping behaviour is explained by AI, while the remaining 88% is influenced by other factors. This shows a weak explanatory power of the model.

Table 3.2: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	6.203857254	1	6.203857254	14.14440406	0.000288154
Residual	42.98364275	98	0.438608599		
Total	49.1875	99			

Source: Author's own research

The ANOVA table shows the p-value 0.0002 which is less than 0.05 is statistically significant and suitable to anticipate the relation between AI and sustainable online shopping behaviour.

Table 3.3: Coefficients

Variable	Coefficient (β)	Std. Error	t-value	p-value
Constant	2.097754134	0.293989361	7.135476355	1.68406E-10
AI	0.337166155	0.089650279	3.760904686	0.000288154

Source: Author's own research

The coefficient table reflect that AI has a beta value of 0.33 which shows moderate positive relationship with sustainable online shopping behaviour. Additionally, p-value is 0.0002 which is less than 0.05 shows that the impact is statistically significant.

Table 4.1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error
2	0.414195614	0.171558007	0.163104517	0.790641785

Source: Author's own research

The model summary table reflects the R Square value is 0.17, shows 17% of the variation in eco-friendly product choices is explained by AI, while the remaining 83% is influenced by other factors. This shows a weak explanatory power of the model.

Table 4.2: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.68628571	1	12.68628571	20.29434144	1.83622E-05
Residual	61.26121429	98	0.625114431		
Total	73.9475	99			

Source: Author's own research

The ANOVA table shows the p-value 0.00001 which is less than 0.05 is statistically significant and suitable to anticipate the relation between AI and eco-friendly product choices.

Table 4.3: Coefficients

Variable	Coefficient (β)	Std. Error	t-value	p-value
Constant	1.857571429	0.33088416	5.613962985	1.8435E-07
AI	0.425714286	0.094499768	4.504924133	1.83622E-05

Source: Author's own research

The coefficient table reflect that AI has a beta value of 0.42 which shows moderate positive relationship with eco-friendly product choices. Additionally, p-value is 0.00001 which is less than 0.05 shows that the impact is statistically significant.

RESULTS AND FINDINGS

The result shows that most Gen Z consumers are shop online on occasional and monthly basis followed by few Gen Z consumers shop online on rarely and frequently basis. The reliability analysis of the measurement scale confirmed that the study is acceptable and considered reliable for further research. The regression analysis reveal that model is statistically significant, R Square value is low, shows only small proportion of the variation in sustainable online shopping behaviour and eco-friendly product choices is explained by AI and ANOVA shows the p-value which is statistically significant. Additionally, Coefficient table reflects a moderate positive beta value, shows that AI has a positive impact on sustainable online shopping behaviour and eco-friendly product choices. Hence, null hypothesis (H_{01}) states that there is no significant impact of artificial intelligence in sustainable online shopping behaviour among Gen Z is rejected and concluded that AI have a significant impact in sustainable online shopping behaviour among Gen Z. Moreover, null hypothesis (H_{02}) states that there is no significant role of

artificial intelligence in eco-friendly product choices among Gen Z towards online shopping behaviour in e-commerce is rejected and concluded that AI awareness have a significant impact in eco- friendly product choices among Gen Z.

CONCLUSION

The study conclude that artificial intelligence has a positive impact in promoting sustainable online shopping behaviour and eco-friendly product choices among Gen Z. Moreover, the study shows that AI have a potential to promoting sustainable online shopping behaviour and eco-friendly product choices but its effectiveness depends on consumer awareness. Thus, it concludes that artificial intelligence influences the Gen Z behaviour with significant impact on sustainable online shopping behaviour and eco-friendly product choices.

LIMITATIONS

- This study is focus on Gen Z consumers; other generational cohorts is ignored.
- This study is limited to 100 respondents which does not represent the entire population have limited generalizability.
- This study uses convenience sampling which affect the accuracy and representativeness of the results.
- This study uses excel-based statistical tools for data analysis. Study does not apply advanced tools like SPSS or SEM which is limited to deeper analysis.

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