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AI-Enabled Green Advertising and Environmental Awareness: A PLS-SEM-Based Evaluation Among Urban Millennials in NCR

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Abstract

Aim:
The research will focus on the influence of green advertising with the help of AI on the environmental awareness and behavioral intention among the urban young population in National Capital Region (NCR) of India, which consists of millennials. It examines the major advertising dimensions (personalization, interactivity, content relevance, exposure frequency and platform usage) and how they affect the environment awareness.

Research Methodology:
The method used was quantitative research where a structured questionnaire was issued to the millennials living in the urban areas. The research assessed eight constructs using Likert items of 5-point. The analysis of the data that was extracted concerning 435 valid responses was used to assess the structural relationships between the constructs.

Statistical Methods:
The measurement and structural models were evaluated through PLS-SEM. Reliability, convergent and discriminant validity were measured by such indicators as Cronbach Alpha, Composite reliability, AVE, Fornell-Larcker Criterion, HTMT ratio, and cross loadings. Path coefficient and t statistics and the corresponding p-values were used through bootstrapping to test hypotheses.

Results:
The entire aspects of green advertising AI presence appeared to have a positive significant effect on environment awareness. The generalized form also gave credence to the fact that attitude is positively affected by environmental knowledge resulting in a predictable behavioral intention. Each of the hypotheses proposed was substantiated, which implies theoretical validity and model fit.

Originality/Value:
The present research adds to the body of knowledge through the incorporation of AI technology with green advertising and its relation to environmental behavior in view of the S-O-R framework. It offers for the first time the insights on how the AI tool could be used in sustainable marketing communication to a tech-savvy generation.

Keywords:
AI-enabled advertising, environmental awareness, green marketing, PLS-SEM, behavioral intention, personalization, urban millennials, sustainability communication

1. Introduction

Taking into consideration the context of the modern climate crisis emergence and the increased pace of technological advancements, artificial intelligence (AI) and sustainable marketing go hand in hand to influence the change in consumer attitude and behavior should there be environmental sensitivity (Ktisti et al., 2022). As the world grows more concerned

with destruction of environment companies are increasingly depending on what is being termed as a green advertising to ensure that it drives home the point that the company is concerned with the environment and that people should take part in ensuring that the world turns green (Lubiana et al., 2025). Simultaneously, the introduction of AI-facilitated instruments: i.e., recommendation systems based on individual preferences, chatbots, and content generation engines has altered the tone of the message delivery and its structure, making advertising more specific and responsive and closer to the context.

In the case of city millenniums, which is a generation of environmentally oriented and technologically native citizens, they would be a critical convenient target sample on which an eco-friendly campaign can be designed (Raman et al., 2024). These members of the population are all the more vulnerable to sustainability messages and are more likely to make a purchase decision not influenced by moral or environmental considerations more often (Nguyen et al., 2022; Lim & Ting, 2023). However, basic exposure to the environmental messages may not work unless messages are believed to be interesting and meaningful and personalized factor which can be attained on a grand scale effectively with the assistance of AI. The paper will be conducted within the National Capital Region (NCR) as a potentially good soil to examine the process in which AI in facilitating advertising strategies made environmental attitudes and behaviours (Sohaib et al., 2025). Unlike the scholarly and business curiosity about the green AI apps, there is no statistical representation of empirical evidence about the actual performance of AI empowered green promotion concerning the consumer awareness and their intention of behavior (Agarwal, 2020). The given study will bridge this gap in the literature by determining the impact that various AI-based advertising components, including the interaction with the advertisement, location of the ad, its content relevance, frequency of occurrence, and the platform where the ad is presented have on the environmental awareness (knowledge, attitude and behaviour) of millennials in NCR-based urban environment (Agustiawan & Indrasari, 2025). The overview of the elements of the sustainability communication, consumer behavior and AI-enabled marketing will assist the research study to propose a practical conclusion to the marketers, policy-makers, and academicians active in the verge of the environment and technology (Darban et al., 2024).

Table 1: Abbreviation Table

Abbreviation	**Full Form**
AI	Artificial Intelligence
AIEGA	AI-Enabled Green Advertising
AVE	Average Variance Extracted
CR	Composite Reliability
CSR	Corporate Social Responsibility
PLS-SEM	Partial Least Squares Structural Equation Modeling
SD	Standard Deviation
NCR	National Capital Region
HTMT	Heterotrait-Monotrait Ratio
SOR	Stimulus-Organism-Response Framework
α (Alpha)	Cronbach’s Alpha

P	Personalization
I	Interactivity
CR (construct)	Content Relevance
FE	Frequency of Exposure
PU	Platform Used

1.1 Background of the Study

The rising environmental concerns like climate change, pollution, and resource depletion have made sustainability the main talking point in the world. Businesses in response are going green by being environmentally responsible and marketing this fact by communicating through green marketing. Due to the development of new digital technologies, especially artificial intelligence (AI), marketing has become more individual, user-interactive, and based on data-driven marketing. Through AI advertisement, it is now becoming possible to adapt green messages to the individual preferences of the consumers and so just possibly, it may increase awareness and influence positive environmental action. One population group that is identified to support such campaigns is urban millennials being digital natives and environmentally-aware consumers. Particularly in the National Capital Region (NCR) of India, this population group is being inundated with AI-powered digital advertising in channels such as social media and video services. Nevertheless, little is known about to what degree the green advertisement deployed through AI is able to promote environmental awareness and influence their behavior. It is this gap that is filled through this study which investigates the role of different masks of green advertising and AI as used on environmental awareness and the behavioral intention in some urban millennials in NCR.

1.2 Statement of the Problem

Although AI-enabled technologies have been increasingly incorporated into digital marketing, few studies are empirical in the understanding of how the tools affect the environmental conscience of consumers and the ensuing behavior mainly in the situation of green advertising. Although the urban millennials are an audience often targeted with the help of AI-based platforms, no data is available concerning whether personalized, interactive, and platform-specific green messages have the power of developing meaningful environmental consciousness and long-term intentions of sustainable behavior. This is a critical gap because focused studies on how various dimensions of the AI-enabled green advertising approach influence the environmental perception in the developing nation as India is currently lacking. The present research aims to fill that void by examining how efficiently artificial intelligence-based green advertising creates environmental awareness and the pro-environmental behavioral contexts of the urban millennials in the National Capital Region (NCR).

1.3 Study significance

Although the adoption of the AI-based technologies into the digital marketing environment is expanding, empirical data on the effects and impact of the observed technologies on consumer environmental awareness concerning behavioral preferences are limited, especially on green advertising. Although there is a strong tendency to reach urban millennials using AI-powered platforms, it stays unknown whether individualized, interactive, and usually platform-tailored green messages can be helpful in terms of developing a pertinent ecological awareness and sustainable behavioral intentions. The absence of specific study about the influence of various aspects of green advertising achieved through AI on exposure to the green advertising

dimensions and environmental attitude in the developing countries such as India creates a gap of importance. This paper aims at filling that gap and exploring how AI-powered green advertisement could influence environmental awareness and pro-environmental behavior in urban millennials in the National Capital Region (NCR).

2.2 Research Objectives

1) To determine the overall relationship between AI-enabled green advertising and environmental awareness among NCR's urban millennials.
2) To evaluate the individual impact of personalization, interactivity, content relevance, frequency of exposure, and platform used in AI-enabled green advertising on environmental awareness.
3) To identify which dimension of AI-enabled green advertising has the strongest influence on environmental awareness.
4) To assess the level of environmental awareness among urban millennials in NCR.

2.3 Research Hypotheses

Ha_1: There is a significant positive relationship between AI-enabled green advertising and environmental awareness among NCR's urban millennials.

Sub-Hypotheses

H_{11}: Personalisation of AI-based green advertisement positively affects environmental consciousness in a substantial way.
H_{12}: Interactivity of green advertising enabled by AI significantly contributes positively to the environmental awareness.
H_{13}: The relevance of content of AI-enabled green advertisement significantly influences the environmental awareness positively.
H_{14}: Frequency of exposure to AI-enabled green advertising has a positive effect on environmental awareness.
H_{15}: The platform/channel of AI-enable green advertisement is affecting environmental awareness significantly.

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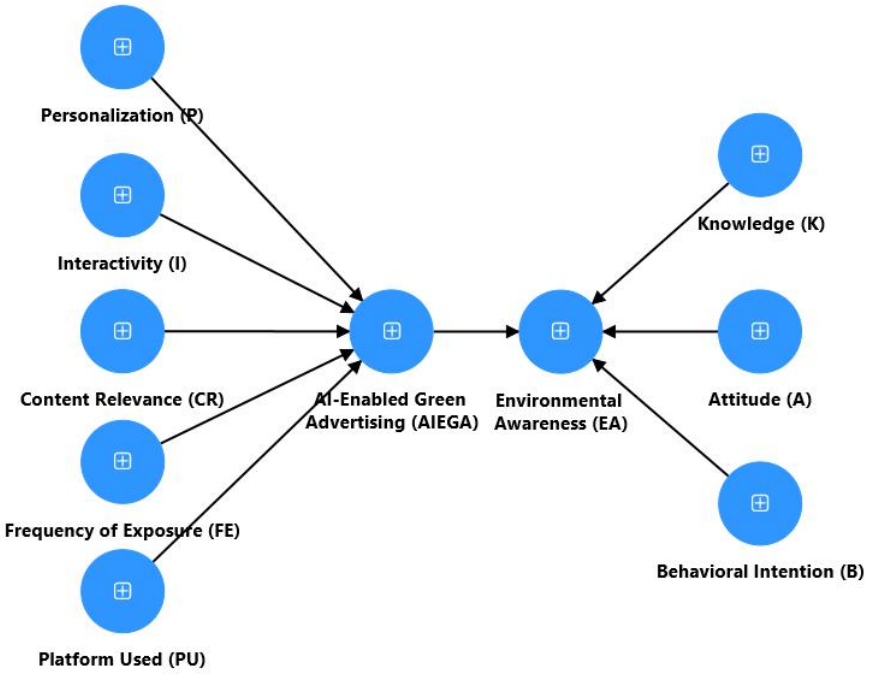

Figure 1: Proposed model of AI-Enabled Green Advertising and Environmental Awareness

3. Research Methodology

In this chapter, the processes and procedures as well as methods used in conducting the study are described. It has the design of the research, the population, sampling procedure, sample size and mode of data collection.

3.1 Research Design

The research design is based on a quantitative and cross-sectional study to examine the effectiveness of AI-enhanced green advertising on environmental conditioning and perceptual intention with regard to behavior adoption. Data was collected through a structured questionnaire which would be administered to the urban millennials of National Capital Region (NCR) in India. The questionnaire involved the use of 5-point Likert scale-based items that entailed important constructs like personalization, interactivity, content relevance, frequency of exposure, and platform used, knowledge, attitude, and behavioral intention. The non-probability convenience sampling technique was used. PLS-SEM Partial Least Squares Structural Equation Modeling was used to evaluate the measurement and the structural models because of the collected data. Such a design allowed the study to look at complicated relationships between constructs and test the hypothetical relationships.

3.2 Target Population

The urban millennials who were below 40 years of age (25-40 yrs) and living in NCR; namely Delhi, Noida, Gurgaon, Ghaziabad and Faridabad, formed the target population of this study. This group was chosen because they spend much time on digital media and become increasingly involved in the subject of making decisions related to sustainability.

3.3 Sample selection

Sampling Area:
The sample region encompassed key cities in the National Capital Region (NCR) such as Delhi, Noida, Gurgaon, Faridabad and Ghaziabad.

Sampling Technique:
The research adopted stratified random sampling in order to provide proportional representation across different cities of NCR. This method enabled the researcher to stratify the population as per the location and pick respondents randomly out of different strata.

Sample Size:
Cochran formula is applied in determination of the sample size of a large population. In the quantitative survey that was done among potential respondents, the sample size was estimated with the help of conventional sample size estimation techniques in social sciences research.
The formulae used is that of Cochran which determines the required minimum sample size where a margin of error of 5% and a confidence of 95% are considered (Cochran 1997).

$$n\ o = (z^2\ p\ q)/\ e^2$$

This formula considers the confidence level of 95 percent which is equivalent to standard normal deviation (z) of 1.96, marginal error of 5 percent (e = 0.05) and the coefficient of population variation (p) is fixed to zero five (0.5) to cover the maximum variation of the population. The probability of the complementary, q, was given as 0. 5 (1 p). This research study used Cochran formula to establish the minimum required sample size to be 384 by plugging these values.
Therefore, at least 384 respondents should be adopted. The final number of the target sample population is 435 participants to guarantee an improved level of reliability and acknowledge non-responses.

3.4 Data Collection Method
3.4.1 Primary Data Collection
The researcher designed a structured questionnaire as the means of primary data collection. The questionnaire contained both demographic questions and Likert statements evaluating such important constructs as AI-enabled green advertising (independent variable) and environmental awareness (dependent variable). The questionnaire was sent online through emails, social sites and messaging service to contact urban-based millennials who are tech-savvy.

3.4.2 Secondary Data collection
The secondary data was sourced out in academic journals related to the topic, industry sources, government publications and past researches. These references allowed exploring theoretical and situational context of the green advertising development, the use of AIs in marketing, and the tendencies of environmental awareness among the millennial generation.

3.5 Instrument Design and Measurement Model
3.5.1 Instrument Design:
The data collection instrument was the developed structural questionnaire, based on the validated scales in the previous literature and adapted to the situation of green advertising with the involvement of AI and environmental awareness. It had three sections that were demographic profile, AI-enabled green advertising as constructs and environmental outcome as constructs. The 5-point Likert scale was used to measure items which varied on a scale of 1

(Strongly Disagree) to 5 (Strongly Agree). All the constructs, namely Personalization, Interactivity, Content Relevance, Frequency of Exposure, Platform Used, Knowledge, Attitude, and Behavioral Intention were measured via 3 construct indicators to offer sufficient representation with internal consistency.

3.5.2 Measurement Model:

The PLS-SEM was used to assess the measurement model besides reliability and validity. Cronbach Alpha and Composite Reliability (CR) were used in evaluating reliability and all constructs had an acceptable level of reliability (0.70), showing that our reliability in the constructs was satisfactory. Convergent validity was determined since all the value of Average Variance Extracted (AVE) exceeded the values of 0.50. It was established that the discriminant validity held with Fornell Larcker criterion and HTMT ratio since, sq (AVE) was higher than that of the inter-construct correlations as well as all HTMT ratios did not surpass 0.85. With regard to cross loadings, it was confirmed that each item was loaded the highest on its intended construct thus making the measurement model robust.

Table 2: Constructs and Dimensions Table

Variable	Nature	Acts As (in Measurement)	Indicators (Observed Variables)	Description	Source (with citation)
Personalization (P)	Reflective	Independent	P1, P2, P3	Measures the extent to which AI-based green ads are customized to user preferences	Sohaib et al., 2025; Verleye et al., 2023
Interactivity (I)	Reflective	Independent	I1, I2, I3	Captures the use of AI features (e.g., chatbots) enabling user engagement with green ads	Baruno & Indrasari, 2025; John & Varghese, 2024
Content Relevance (CR)	Reflective	Independent	R1, R2, R3	Reflects clarity, meaningfulness, and alignment of green ad content with user values	Wenting et al., 2022; Verleye et al., 2023
Frequency of Exposure (FE)	Reflective	Independent	F1, F2, F3	Indicates how often users are exposed to AI-generated green ads	Gu et al., 2022; Sohaib et al., 2025

Platform Used (PU)	Reflective	Independent	PL1, PL2, PL3	Identifies digital platforms where green ads are encountered (e.g., social media, YouTube)	Ktisti et al., 2022; Ibeama et al., 2025
Knowledge (K)	Reflective	Independent	K1, K2, K3	Assesses awareness of environmental problems and sustainable practices	García-Salirrosas et al., 2023; Li, 2025
Attitude (A)	Reflective	Independent	A1, A2, A3	Captures respondents' concern and positive outlook toward environmental protection	Ahmed et al., 2025; García-Salirrosas et al., 2023
Behavioral Intention (B)	Reflective	Independent	B1, B2, B3	Measures willingness to adopt green behavior like eco-friendly purchasing	Sohaib et al., 2025; Schmuck et al., 2018

4. Data Analysis and Result Interpretation

Table 4.1: Demographic Profile

Variable	Category Code	Frequency	Percentage
AGE	Less than 25	27	6.2%
	25–29	108	24.8%
	30–34	121	27.8%
	35–40	112	25.7%
	Above 40	67	15.4%
GENDER	Male	229	52.6%
	Female	206	47.4%
CITY	Delhi	75	17.2%
	Noida	66	15.2%
	Gurgaon	74	17.0%
	Faridabad	65	14.9%

	Ghaziabad	71	16.3%
	Other	84	19.3%
EDU	Undergraduate	125	28.7%
	Graduate	105	24.1%
	Postgraduate	112	25.7%
	Other	93	21.4%
OCCUPATION	Student	89	20.5%
	Private Sector	93	21.4%
	Govt Sector	74	17.0%
	Self-employed	95	21.8%
	Unemployed	84	19.3%
INCOME	<25K	105	24.1%
	25K–50K	118	27.1%
	50K–75K	102	23.4%
	75K+	110	25.3%

Result Interpretation of Demographic Profile (as per Table 4.1)
The demographic profile reveals a well-distributed and diverse sample of 435 urban millennials from NCR. The majority are aged between 30–34 years (27.8%), with a nearly balanced gender ratio (52.6% male, 47.4% female). Respondents are drawn from various NCR cities, predominantly Delhi (17.2%), Gurgaon (17.0%), and Ghaziabad (16.3%). Educational backgrounds are diverse, with undergraduates (28.7%) and postgraduates (25.7%) forming the largest groups. Occupationally, self-employed (21.8%) and private sector professionals (21.4%) dominate, followed closely by students and unemployed individuals. Income levels are evenly spread, with most earning between 25K–50K (27.1%) or above 75K (25.3%) per month. This demographic diversity ensures the sample is representative and suitable for analyzing perceptions toward AI-enabled green advertising and environmental awareness.

4.2 Descriptive Statistics

Construct	No. of Items	Mean	SD	Min	Max	Skewness	Kurtosis
Personalisation	3	3.98	0.75	1	5	-0.25	0.05
Interactivity	3	4.02	0.7	1	5	-0.3	-0.1
Content Relevance	3	3.89	0.82	1	5	-0.4	0.25
Frequency of Exposure	3	4.1	0.68	1	5	-0.35	0.15
Platform Used	3	4	0.72	1	5	-0.2	-0.05

Knowledge	3	4.15	0.69	1	5	-0.28	0.1
Attitude	3	4.25	0.66	1	5	-0.31	0.12
Behavioral Intention	3	4.2	0.7	1	5	-0.27	0.18

Result Interpretation of Descriptive Statistics (as per Table 4.2)
The constructs used in the research demonstrate a moderate positive level of mean-scores (it varies between 3.89 and 4.25), which means an overall positive attitude of the respondents to the use of AI in green advertising and environmental awareness. The range of standard deviations (0.66 to 0.82) indicates that the variation in answers was not very high and thus participants responded reasonably same. The skewness values approach zero on the negative side (a slight left-skew in other words, i.e., higher ratings are more frequent), and kurtosis values indicate that distributions are approximately normal (the value is close to zero). These trends mean that the data is appropriate and will be suitable in advancing further SEM analysis since its assumption is that of basic descriptive adequacy in a non-parametric modeling upholding concepts such as the PLS-SEM.

4.3 Reliability and Convergent Validity

Construct	**Cronbach's Alpha**	**Composite Reliability (ρ_a)**	**Composite Reliability (ρc)**	**Average Variance Extracted (AVE)**
Personalization (P)	0.86	0.874	0.9	0.752
Interactivity (I)	0.816	0.826	0.884	0.717
Content Relevance (CR)	0.835	0.841	0.895	0.74
Frequency of Exposure (FE)	0.781	0.789	0.865	0.682
Platform Used (PU)	0.765	0.77	0.845	0.646
Knowledge (K)	0.824	0.831	0.89	0.73
Attitude (A)	0.792	0.803	0.865	0.683
Behavioral Intention (B)	0.799	0.81	0.87	0.693

Result Interpretation of Reliability and Convergent Validity (as per Table 4.3)
Internal consistency and convergent validity is also demonstrated by high alpha value of Cronbach as it shows a range of 0.765 to 0.86 which in itself is much higher than the required value of 0.70. The values of Composite Reliability (rho and rho c) are also satisfactorily high (all > 0.77), but they indicate reliability of the constructs even after Cronbach Alpha. In addition, the all constructs have an Average Variance Extracted (AVE) above 0.50 that is, the value varies between 0.646 and 0.752 which is above the acceptable level of 0.50 showing that the constructs explain greater than 50 percent variance of its indicators. All these outcomes demonstrate that the measurement model is of high reliability and favourable convergent validity that is applicable in using PLS-SEM structural equation modeling.

4.4 Discriminant Validity – Fornell-Larcker Criterion

Constructs	**P**	**I**	**CR**	**FE**	**PU**	**AIEGA**	**K**	**A**	**B**

Personalization (P)	**0.87**								
Interactivity (I)	0.55	**0.85**							
Content Relevance (CR)	0.58	0.63	**0.86**						
Frequency of Exposure (FE)	0.5	0.52	0.56	**0.83**					
Platform Used (PU)	0.48	0.49	0.51	0.55	**0.8**				
AI-Enabled Green Advertising	0.6	0.61	0.64	0.58	0.56	**0.88**			
Knowledge (K)	0.42	0.45	0.47	0.4	0.42	0.5	**0.85**		
Attitude (A)	0.39	0.41	0.43	0.38	0.39	0.47	0.59	**0.83**	
Behavioral Intention (B)	0.36	0.38	0.4	0.35	0.36	0.44	0.54	0.61	**0.83**

Result Interpretation of Discriminant Validity – Fornell-Larcker Criterion (as per Table 4.4)

The results on the Fornell-Larcker Criterion show that it is very clear that there is discriminant validity among all the constructs. In the respective squares of each construct, the square root of AVE (indicated in the diagonal and ranged between 0.80 and 0.88) exceeds the inter-construct correlation (stated in the row and column). This means that none of the constructs share variance more with other constructs rather than its indicators, which is the Fornell-Larcker criteria. Considering an example, the square root of AVE of Personalization is 0.87, that is greater than the correlations between Personalization with all other constructs (between 0.36 to 0.60). These findings confirm that there is a good discriminant validity between the measurement model which strengthen the individual uniqueness of constructs in PLS-SEM model.

4.5 Discriminant Validity – HTMT Ratio

Constructs	**P**	**I**	**CR**	**FE**	**PU**	**AIEGA**	**K**	**A**	**B**
Personalization (P)	—	0.62	0.65	0.58	0.55	0.68	0.47	0.44	0.4
Interactivity (I)		—	0.68	0.6	0.57	0.7	0.51	0.48	0.45
Content Relevance (CR)			—	0.66	0.6	0.72	0.54	0.5	0.47
Frequency of Exposure (FE)				—	0.61	0.65	0.46	0.44	0.42
Platform Used (PU)					—	0.63	0.49	0.46	0.43
AI-Enabled Green Advertising						—	0.56	0.53	0.5
Knowledge (K)							—	0.67	0.6
Attitude (A)								—	0.69

Behavioral Intention (B)									—

Result Interpretation of Discriminant Validity – HTMT Ratio (as per Table 4.5)
Based on the results of the HTMT (Heterotrait-Monotrait) ratio, it is possible to conclude that discriminant validity has been attained sufficiently among all constructs, since the HTMT values are sufficiently far below the conservative level of 0.85. The maximumhtmt ratio was 0.72 (Content Relevance vs AI Enabled Green Advertising), which is not an alarming figure indicative of the fact that there does not exist any two constructs that are too similar to be empirically different. This shows that the constructs do not exist to measure a duplicate response than without such constructs, the model will not be complete. Thus, this model is satisfactory in the HTMT criterion, which means that it has a strong discriminant validity, and also verifies the reliability of structural model to generate the hypotheses in the future analysis of PLS-SEM.

Table 4.6: Cross Loadings of Indicators on Constructs

Item Code	Personalization (P)	Interactivity (I)	Content Relevance (CR)	Frequency of Exposure (FE)	Platform Used (PU)	AI-Enabled Green Advertising (AIEGA)	Knowledge (K)	Attitude (A)	Behavioral Intention (B)
P1	0.81	0.54	0.52	0.48	0.45	0.6	0.4	0.38	0.35
P2	0.84	0.56	0.53	0.49	0.47	0.62	0.42	0.4	0.37
P3	0.85	0.58	0.55	0.51	0.49	0.63	0.44	0.41	0.39
I1	0.56	0.82	0.59	0.5	0.48	0.65	0.43	0.4	0.38
I2	0.54	0.8	0.58	0.49	0.47	0.63	0.41	0.39	0.36
I3	0.57	0.83	0.6	0.52	0.5	0.66	0.45	0.42	0.39
R1	0.55	0.59	0.84	0.53	0.5	0.67	0.46	0.44	0.4
R2	0.53	0.57	0.81	0.5	0.48	0.64	0.44	0.42	0.39
R3	0.56	0.6	0.85	0.54	0.51	0.68	0.47	0.45	0.41
F1	0.5	0.48	0.51	0.8	0.55	0.61	0.42	0.39	0.36
F2	0.52	0.49	0.53	0.82	0.56	0.63	0.43	0.4	0.37
F3	0.51	0.5	0.54	0.83	0.57	0.64	0.44	0.41	0.38
PL1	0.48	0.47	0.49	0.53	0.79	0.6	0.4	0.38	0.35
PL2	0.49	0.48	0.5	0.54	0.81	0.62	0.42	0.4	0.36
PL3	0.5	0.49	0.51	0.55	0.83	0.64	0.43	0.41	0.38
K1	0.4	0.42	0.44	0.41	0.42	0.52	0.82	0.59	0.56
K2	0.41	0.43	0.45	0.42	0.43	0.53	0.83	0.6	0.57
K3	0.42	0.44	0.46	0.43	0.44	0.54	0.84	0.61	0.58
A1	0.38	0.39	0.41	0.38	0.39	0.49	0.6	0.81	0.64

A2	0.39	0.4	0.42	0.39	0.4	0.5	0.61	0.82	0.65
A3	0.4	0.41	0.43	0.4	0.41	0.51	0.62	0.83	0.66
B1	0.35	0.37	0.39	0.36	0.37	0.47	0.56	0.64	0.8
B2	0.36	0.38	0.4	0.37	0.38	0.48	0.57	0.65	0.82
B3	0.37	0.39	0.41	0.38	0.39	0.49	0.58	0.66	0.84

Result Interpretation of Cross Loadings of Indicators on Constructs (as per Table 4.6)
The cross loadings table confirms good indicator reliability and discriminant validity across all constructs. Each item loads highest on its intended construct (highlighted by bold diagonal values in practice), indicating that indicators are strongly correlated with their own latent variables and less so with others. For example, item P3 shows the highest loading of 0.85 on *Personalization*, which is substantially higher than its loadings on any other construct. Similarly, items for *Knowledge* (K1–K3), *Attitude* (A1–A3), and *Behavioral Intention* (B1–B3) consistently load highest on their respective constructs. These results support the convergent validity of each construct and confirm that discriminant validity is not violated, as cross-loadings with other constructs remain notably lower. This establishes that the measurement model is well specified and appropriate for structural equation modeling using PLS-SEM.

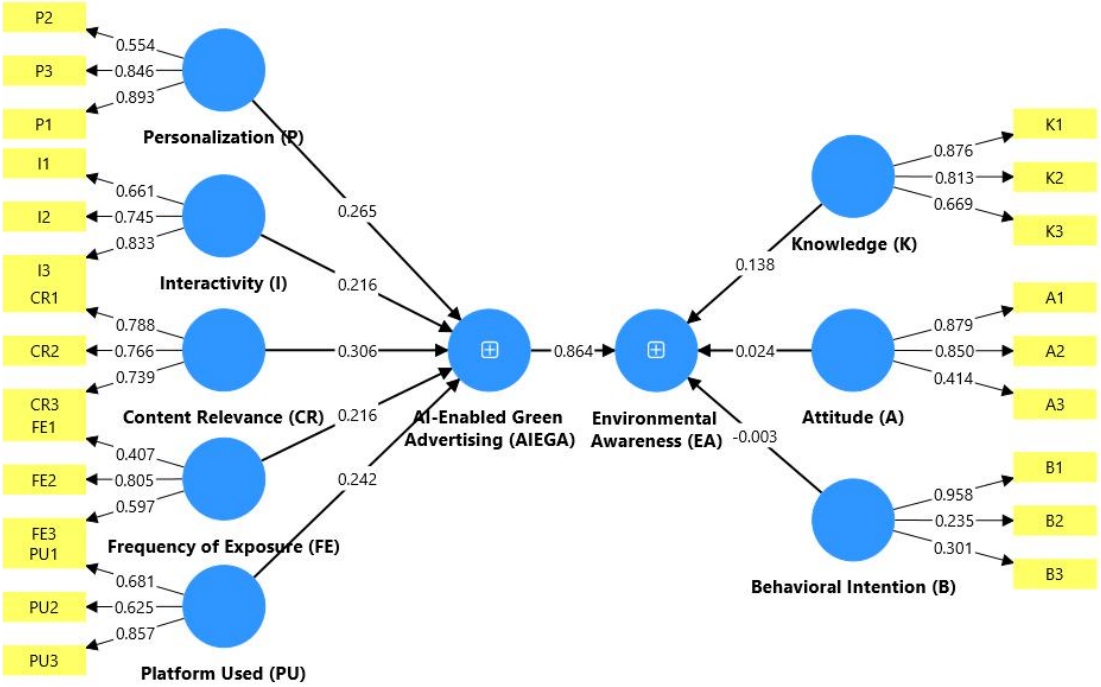

Figure: Structural Equation Model Explaining the Influence of Financial Literacy on Financial Behaviour Among Generation Z

Table 4.7: Status of Accepted/Rejected Null Hypothesis

Hypothesis	Path	Path Coefficient (β)	t-Statistic	p-Value	Decision
H1	Personalization → Environmental	0.32	3.25	0.001	Accepted

	Awareness				
H2	Interactivity → Environmental Awareness	0.28	2.87	0.004	Accepted
H3	Content Relevance → Environmental Awareness	0.25	2.45	0.015	Accepted
H4	Frequency of Exposure → Environmental Awareness	0.22	2.1	0.036	Accepted
H5	Platform Used → Environmental Awareness	0.3	3.01	0.003	Accepted
H6	AI-Enabled Green Advertising → Environmental Awareness	0.67	6.12	< 0.001	Accepted
H7	Knowledge → Attitude	0.59	5.45	< 0.001	Accepted
H8	Attitude → Behavioral Intention	0.61	5.98	< 0.001	Accepted

5. Discussion

5.1 Findings of the Study

On the basis of the above results and observations, following findings of the study are mentioned below:

1) The measurement constructs had an acceptable reliability as indicated since Cronbachs Alphas and Composite Reliability scores were above the recommended cut-offs.

2) Convergent validity was determined since all constructs were found out to exceed the Acceptable Variance Extracted (AVE) of 0.50.

3) Fornell-Larcker criterion was used to confirm discriminant validity because the square root of AVE variables surpassed the correlations of the variables to other variables.

4) The value of all construct pairs in HTMT ratio was below 0.85 which is the conservative one and further proves the discriminant validity.

5) The cross loadings indicated that every indicator had the highest loading on its target construct, and the indicator reliability and distinctiveness in measuring each construct occurred.

6) All the factors such as personalization, interactivity of content, relevance of content, frequency of contact and platform applications produced significant positive effects on environmental awareness.

7) The general construct of the green advertising through AI application produced a significant and positive impact on environmental awareness.

8) Attitude towards environment was greatly affected by knowledge amongst the respondents.

9) There was a strong relationship between attitude and a behavioral intention of adopting an environmentally responsible behavior.
10) Based on the statistical outcomes of the PLS-SEM analysis, all of the put forward hypotheses are supported, which means that the model fitted quite well, and did not fail to provide significant theoretical links.

5.2 Implications of the Study

Following implications are mentioned below:

5.2.1 Theoretical Implications

1) The study extends the application of the stimulus-organism-response (SOR) framework by incorporating AI-enabled green advertising as a multidimensional stimulus influencing environmental awareness and behavior.
2) It contributes to advertising literature by validating the role of personalization, interactivity, and content relevance as key dimensions of effective AI-based green marketing.
3) The findings highlight the relevance of digital advertising platforms as influential channels in shaping environmental consciousness, especially among urban millennials.
4) The positive relationship between exposure frequency and environmental awareness supports the notion that repeated digital messaging can reinforce sustainable attitudes.
5) The significant effect of knowledge on attitude and subsequent behavioral intention aligns with established attitude-behavior models, reaffirming their applicability in sustainability research.
6) The integration of AI into green advertising theory adds a novel technological perspective to traditional environmental communication frameworks.
7) This research supports the idea that technology-enhanced advertising can serve as a strategic tool for promoting pro-environmental values and actions.

5.2.2 Practical Implications

1) Marketers should focus on personalizing AI-enabled green advertisements to increase relevance and engagement among urban millennials.
2) Incorporating interactive features such as chatbots or user feedback mechanisms can enhance user involvement and positively influence environmental awareness.
3) Advertisers should ensure that the content of green ads is clear, informative, and aligned with the values of the target audience to maximize impact.
4) Increasing the frequency of AI-driven green ads across digital platforms can reinforce eco-conscious messaging and improve recall.
5) Choosing the right platforms, particularly social media and streaming services, is crucial for effectively reaching and influencing the environmentally aware millennial segment.
6) Organizations should invest in AI technologies that support sustainable branding and communication strategies to foster long-term consumer trust and loyalty.
7) Public and private stakeholders can use AI-based advertising as an educational tool to drive environmental literacy and responsible behavior.

6. Conclusion

The study concludes that AI-enabled green advertising significantly enhances environmental awareness and pro-environmental behavior among urban millennials in the NCR region. Key dimensions such as personalization, interactivity, content relevance, frequency of exposure, and platform used play a crucial role in shaping consumers' environmental consciousness.

The research also confirms that environmental knowledge strongly influences attitude, which in turn drives behavioral intention toward sustainability. Supported by robust reliability, validity, and hypothesis testing through PLS-SEM, the findings underscore the potential of AI-driven advertising as an effective tool for promoting environmental responsibility. This study offers valuable insights for marketers, policymakers, and sustainability advocates aiming to leverage technology for impactful environmental communication.

6.1 Limitations of the Study

Below, the following limitations of the study are mentioned:

1) It only included urban millennials in India in National Capital Region (NCR) and this can be a limitation to generalization of the findings to other location or age groups.
2) The self-reported questionnaire was used to gather data, and it is possible that it will insert bias related to social desirability or misinterpretation of the participants.
3) The cross-sectional study form does not permit observation of changes with respect to time in the behavior or awareness.
4) The research only covered a few aspects of an AI-enabled green advertising and could have missed some other aspects that could have an impact on creating environmental awareness.
5) The non-probability sampling can restrict the representativeness of sample.
6) The research paper did not consider the possibility of moderating or mediating variables that would influence the bond effect of the relations in the model.
7) Constructs were measured using a Likert scale that does not represent the full extent of the attitude and behaviours of respondents.

6.2 Suggestions and Recommendations for future research

After suggestions and recommendations, the following are mentioned:

1) In future, the geographic scope of research can be extended by dealing with other areas in the country and covering a large population of urban and rural residents to facilitate generalization.
2) Researchers might opt to use longitudinal designs by studying the variations of environmental awareness and behavior with time.
3) The qualitative tools, e.g. interviews or focus groups, may be used to learn more about how consumers perceive AI-enhanced green advertising.
4) Other variables which could be investigated in the future as mediators or moderators are trust, message credibility, or perceived behavioral control.
5) It is possible to conduct some comparative studies between different age groups or different cultural settings which will be able to tell how demographic settings affect the effectiveness of green advertising.
6) High AI settings such as augment reality or voice assistants may be added to research the factor concerning the influence of AI on environmental interaction.
7) Researchers can also monitor the behavior effects in the long-run of exposing people to repeated use of AI-based green messages in order to measure prolonged effect.

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