

Understanding Sustainable Marketing through Sustainable Digital Advertising: Stimulus-Organism-Response (SOR) Model on Consumers' Sustainable Behavior

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Abstract

This study examines how environmental awareness and sustainability-oriented digital advertising shape consumers' sustainable behavior and purchase intention through behavioral intention. Specifically, the study conceptualizes environmental awareness and sustainability-oriented digital advertising as environmental stimuli, behavioral intention as the organismic mechanism, and sustainable behavior together with purchase intention as behavioral responses. A quantitative cross-sectional survey was conducted with 450 Turkish consumers who reported recent exposure to digital advertisements containing environmental sustainability messages. The findings indicate that environmental awareness and sustainability-oriented digital advertising positively influence behavioral intention, which in turn has significant positive effects on sustainable behavior and purchase intention. Behavioral intention also mediates the relationships between sustainability-related stimuli and behavioral outcomes. The findings therefore advance understanding of sustainability-oriented digital advertising as a conditional persuasive process and inform the design of more context-sensitive and credible sustainability communication strategies.

Keywords: Sustainable Marketing, Sustainable Digital Advertising, Stimulus-Organism-Response Model, Sustainable Behavior

Introduction

Digital advertising has become one of the most influential instruments through which brands shape consumer perceptions, lifestyles, and behavioral choices. At the same time, sustainability has shifted from a peripheral concern within corporate social responsibility to a

central strategic dimension of contemporary marketing. As consumers increasingly expect brands to demonstrate environmental responsibility, organizations have intensified their use of digital platforms to communicate sustainability-oriented values, practices, and campaigns (Gupta *et al.*, 2021; White *et al.*, 2019). In this context, sustainable marketing is no longer confined to promoting environmentally friendly products; rather, it encompasses broader efforts to encourage responsible consumption patterns, foster long-term societal value, and integrate sustainability into consumer decision-making processes (Belz and Peattie, 2009; Kemper and Ballantine, 2019).

The growing dominance of digital advertising has further amplified the importance of sustainability communication in marketing ecosystems. Digital platforms give brands unprecedented opportunities to personalize sustainability messages, create interactive engagement, and disseminate environmentally oriented narratives to large audiences in real time (Boateng and Okoe, 2015; Hamouda, 2018). Social media, algorithmic targeting systems, and content-driven advertising environments have transformed sustainability communication into a continuous and highly visible component of brand strategy. However, despite the increasing prevalence of sustainability-oriented digital campaigns, questions remain about whether such communication genuinely motivates sustainable behavior or merely contributes to symbolic, repetitive “green” messaging. Prior studies indicate that consumers are simultaneously becoming more environmentally conscious and more skeptical of corporate sustainability claims, particularly in digitally saturated environments where exposure to advertising is constant (Nyilasy *et al.*, 2014; White *et al.*, 2019). This tension creates a key challenge for sustainable marketing research: understanding when sustainability communication in digital advertising translates into meaningful behavioral outcomes.

Consumers’ sustainable behavior is shaped not only by rational evaluations but also by affective and psychological processes triggered by marketing stimuli. In this regard, the stimulus–organism–response (SOR) model provides a valuable theoretical framework for explaining how external environmental cues influence consumers’ internal states and subsequent behavioral outcomes. Within digital marketing environments, advertising messages, visual sustainability cues, and brand-related environmental claims can be conceptualized as external stimuli that activate consumers’ internal psychological evaluations, such as behavioral intention, environmental awareness, trust, or emotional engagement, ultimately shaping sustainable behavior and purchase intention (Eroglu *et al.*, 2001; Islam *et al.*, 2021). Compared to purely attitudinal or moral frameworks, the SOR perspective is particularly useful for explaining how digitally mediated sustainability communication operates dynamically through consumers’ internal processing mechanisms.

Rather than extending the SOR framework by introducing new stimulus, organism, or response categories, this study uses SOR as a process framework to identify the boundary conditions of sustainability persuasion in digital advertising environments. The study investigates the moderating roles of award-winning brand image and attitude toward digital advertising to reveal the contextual conditions under which sustainability-oriented digital advertising is more or less effective. The present study does not compare these platform-specific mechanisms; rather, it conceptualizes sustainability-oriented digital advertising at a broader perceptual level to examine consumers’ overall evaluations of sustainability

messages encountered across digital environments. In particular, it addresses whether the translation of sustainability-related stimuli into behavioral intention remains stable across different levels of consumers' attitudes toward digital advertising and brand-related sustainability signals. In doing so, the study shifts attention from whether sustainability-oriented digital advertising is effective to when and under what perceptual conditions its persuasive influence may be strengthened or attenuated, thereby responding to growing concerns regarding advertising saturation, habituation, and skepticism toward sustainability claims (Nyilasy *et al.*, 2014; Nguyen *et al.*, 2023).

Despite the growing body of research on sustainable marketing and green advertising, an important problem remains insufficiently addressed: exposure to sustainability-oriented digital advertising does not necessarily translate into sustainable consumer responses. Existing research shows that environmental awareness and sustainability-related advertising can influence pro-environmental attitudes, behavioral intentions, and purchasing decisions; however, far less attention has been devoted to explaining the psychological process by which these sustainability-related stimuli translate into behavioral outcomes in digital advertising environments. Moreover, digital advertising constitutes a highly saturated communication environment in which consumers repeatedly encounter environmental claims, brand sustainability signals, and promotional messages. Consequently, the persuasive effects of sustainability communication may not remain stable across consumers and communication conditions. This creates a need to move beyond examining whether sustainable digital advertising influences consumer behavior toward understanding how this influence occurs and under what conditions it becomes stronger or weaker.

Against this background, the present study addresses three interrelated gaps in the literature. First, previous research has largely examined environmental awareness, green advertising, and sustainable consumption as direct or attitudinal relationships, leaving the internal mechanism by which sustainability-related digital stimuli translate into behavioral responses comparatively underexplored. Second, although the SOR framework has been widely applied in digital consumer research, its process logic has received relatively little attention in explaining how sustainability-oriented digital advertising translates into both sustainable behavior and purchase intention through behavioral intention. Third, existing research provides limited understanding of the boundary conditions of this process, particularly whether consumers' attitudes toward digital advertising and externally validated sustainability signals, such as an award-winning brand image, alter the strength of sustainability persuasion. Accordingly, this study contributes by conceptualizing environmental awareness and sustainability-oriented digital advertising as stimuli, behavioral intention as the organismic mechanism, and sustainable behavior and purchase intention as responses, while simultaneously examining the moderating roles of attitude toward digital advertising and award-winning brand image. Rather than proposing a new SOR structure, the study therefore contributes by identifying the psychological pathway and perceptual boundary conditions through which sustainability-oriented digital advertising translates into consumer responses.

A Review of the Literature and Theoretical Framework

Sustainable Marketing

The academic discourse surrounding sustainability marketing has evolved significantly, yet a definitive conceptualization remains elusive, often leading to fragmented understandings and applications (Kemper and Ballantine, 2019). This fragmentation is partly due to sustainability's broad scope, which encompasses ecological, social, and economic dimensions that marketing efforts must integrate (Rathore, 2017). Consequently, a robust conceptual framework is needed to clarify the interplay between marketing principles and sustainability objectives (Lim, 2015). This integration is often referred to as green marketing or eco-marketing, emphasizing the promotion of environmentally friendly, socially responsible, and ethically produced offerings (Anjorin *et al.*, 2024). This approach prioritizes eco-friendly products, waste reduction, pollution control, and energy efficiency, enabling businesses to gain a competitive advantage while protecting the environment (Zaki and Shared, 2023). While green marketing is a crucial component, a more comprehensive sustainable marketing framework extends beyond ecological concerns to incorporate social and critical marketing perspectives, fostering a holistic approach to responsible business practices (Gordon *et al.*, 2011). This broader conceptualization explicitly situates sustainability within value exchange, considering the processes and actors involved to ensure long-term societal welfare (Davies *et al.*, 2020). This expanded paradigm acknowledges that marketing, historically linked to consumption-oriented practices, must transform its operational framework to address global challenges such as climate change, resource depletion, and socio-economic disparities (Sheth and Parvatiyar, 2020). This reorientation requires a deeper integration of ecological limits and societal well-being into core marketing strategies, moving beyond superficial "greenwashing" to genuinely transformative approaches (Lindgreen *et al.*, 2020).

Sustainable Digital Advertising

The academic discourse surrounding digital advertising has shifted significantly, as scholars examine its role in fostering eco-friendly consumer behaviors and supporting the United Nations Sustainable Development Goals (Bashar *et al.*, 2025). Recent research shows how organizations use digital platforms and big data analytics to communicate environmental commitments, influencing consumer perceptions and promoting sustainable consumption patterns (Singh and Selvasundaram, 2024; Widyastuti *et al.*, 2024). Current research identifies the conceptual convergence of green technology and digital platforms as a foundational pillar for establishing sustainable business practices across diverse industries (Gregurec, 2025; Tyagi and Tyagi, 2025). Studies increasingly categorize the field into five core research domains—strategies, challenges, promotion, consumers, and digital media—to better track the evolution of green marketing trends (Alkhatib *et al.*, 2023). Digital advertising represents a heterogeneous communication environment in which sustainability messages may operate differently depending on platform characteristics, message format, source, and interactive affordances (Pittman *et al.*, 2022; Pittman and Li, 2025).

The intersection of digital advertising and environmental sustainability communication is crucial in today's marketplace as businesses increasingly rely on digital platforms to promote their sustainability efforts. Digital advertising not only disseminates environmental messages but also constructs narratives about sustainable consumption through symbolic frameworks and visual strategies (Syawaladi, 2025; Arantes, 2023). As awareness of environmental issues grows, businesses increasingly employ digital advertising to promote

their green initiatives. However, the effectiveness and authenticity of these messages remain critical concerns (Syawaldi, 2025). Examining the relationship between digital advertising and sustainability communication, it is clear that digital marketing can effectively raise awareness of environmentally friendly products. Digital tools enable companies to transparently demonstrate their sustainable practices, helping consumers assess the environmental impact of their purchasing decisions. Social media platforms, in particular, serve as powerful channels for brands to share information about their sustainability initiatives and connect with audiences that value ethical consumption (Arantes, 2023; Gupta *et al.*, 2021).

Stimulus-organism-response model

The S-O-R framework is a foundational paradigm in behavioral science, integrating intervening cognitive and emotional processes that link external environmental cues to final behavioral outcomes (Daassi and Debbabi, 2021; Hochreiter *et al.*, 2023). This model posits that external stimuli influence an individual's internal state, including cognitive and affective assessments, which then determine whether the resulting behavioral response is approach or avoidance (Kim *et al.*, 2018; Saewanee *et al.*, 2024). Furthermore, this framework facilitates a nuanced understanding of how feedback loops enable internal evaluations to evolve in response to the consequences of previous actions (Tang *et al.*, 2024). By bridging utilitarian decision-making models and hedonic processing, the framework clarifies how affective variables shape long-term consumer involvement and intention (Zamil *et al.*, 2023). By mapping environmental triggers—such as website interface design or marketing scarcity—to specific mental states, the model enables researchers to quantify how internal processing transforms external inputs into measurable purchase decisions (Gao *et al.*, 2022; Jiang *et al.*, 2010). Consequently, scholars have increasingly adapted this paradigm to contemporary digital environments, including e-commerce platforms, influencer-led marketing, and interactive chatbot interfaces, to delineate the underlying drivers of impulse and sustainable consumption behavior (Cheng *et al.*, 2021; Lee and Wan, 2023; Li *et al.*, 2023).

In the context of sustainable marketing, this model enables researchers to evaluate how specific green messaging or eco-conscious branding functions as an environmental stimulus, triggering psychological mediation that shapes long-term brand loyalty (Vatankhah *et al.*, 2023). Sustainable digital advertising further extends this framework by integrating hyper-personalized cues that transform standard environmental stimuli into targeted interactions that elicit internal perceptions of ethical self-identity and health consciousness (Wang *et al.*, 2021). Moreover, digital literacy plays a critical moderating role, shaping how effectively consumers interpret and trust sustainability claims in these complex online environments (Bilhaj *et al.*, 2024). Integrating the S-O-R framework also allows marketers to account for the internal mechanisms—such as emotional arousal and cognitive evaluation—that bridge the gap between environmental cues and tangible purchase intentions (Peña *et al.*, 2025; Uikey and Baber, 2023).

Hypothesis Development and Research Model

Environmental awareness and behavioral intention

This construct has been shown to positively affect pro-environmental behavioral intentions across diverse populations and contexts. Han (2023) notes that stronger environmental attitudes, driven by awareness, lead to greater intentions to engage in pro-environmental behaviors associated with outdoor recreation. Yang *et al.* (2020) further corroborate this

relationship, showing that higher environmental awareness is associated with stronger pro-environmental behavioral intentions across a large, multi-country sample, helping clarify prior inconsistent findings in the literature. Therefore, the following hypothesis was formulated:

H1: There is a positive relationship between consumers' level of environmental awareness and their behavioral intention.

Digital ad with environmental sustainability and behavioral intention

Huo *et al.* (2025) argue that green advertising is a powerful tool for shaping consumer perceptions, particularly in the cosmetics sector, where awareness of sustainability is pivotal to building green brand equity. Carrión-Bósquez *et al.* (2023) emphasize that advertising directly influences green purchase behaviors, with millennials increasingly driven by marketing that underscores environmental responsibility. Rinku *et al.* (2023) further support this view, finding that as environmental concerns become more pressing, consumers are more inclined to favor brands that effectively communicate their sustainability commitments via digital platforms. Therefore, we propose the following hypothesis:

H2: There is a positive relationship between digital ads with an environmental sustainability message and behavioral intention.

Sustainable behavior

Research indicates that consumers who are strongly concerned about environmental issues are more likely to engage in pro-environmental behaviors, such as choosing eco-friendly products over conventional alternatives (Yadav and Pathak, 2016; Hudayah *et al.*, 2023). Research by Wei and Jung (2017) further supports the idea that self-interest-related motivations, such as face-saving, can significantly influence sustainable purchasing behavior and intentions for fashion products. Increased environmental concern is positively associated with proactive attitudes and behaviors toward sustainability (Khan and Qureshi, 2025). Environmental values shape how consumers perceive their responsibilities towards sustainability, thus influencing their intentions to act sustainably (Ahsan *et al.*, 2024). Therefore, the following hypotheses are derived from the preceding discussion:

H3a: Consumers' behavioral intention toward environmental sustainability activities positively affects sustainable behavior.

H6a: Consumers' environmental awareness has a significant effect on sustainable behavior through the mediating role of behavioral intention.

H7a: Digital ads with an environmental sustainability message have a significant effect on sustainable behavior through the mediating role of behavioral intention.

Purchasing intention

Lin and Chen (2022) demonstrate that environmental concerns play a pivotal role in shaping consumers' value perceptions and subsequent purchase intentions, particularly for sustainable apparel purchases. Chang *et al.* (2019) support this link by showing that intention to purchase environmentally focused products strongly predicts sustainable consumption behaviors. The study indicates that mere environmental advertising alone does not significantly affect sustainable consumption behaviors, suggesting that underlying intentions are more critical determinants of action than superficial marketing strategies. Based on the literature, we propose the following hypothesis:

H3b: Consumers' behavioral intention toward environmental sustainability activities positively affects purchasing intention.

H6b: Consumers' environmental awareness has a significant effect on purchasing intention through the mediating role of behavioral intention.

H7a: Digital ads with an environmental sustainability message have a significant effect on purchasing intention through the mediating role of behavioral intention.

Attitude toward digital advertising

Hamouda's findings suggest that the attitude toward advertising may influence how consumers process information, thereby affecting their behavioral intention to purchase (Hamouda, 2018; Boateng and Okoe, 2015). Nguyen *et al.* (2023) examine attitude-intention inconsistency in digital environments, revealing that consumers often grapple with gaps between positive attitudes and actual purchase behavior, mediated by various factors. Lim *et al.* (2024) emphasize the role of trust in digital advertising, particularly its capacity to mediate consumer purchase behavior. Thus, the following hypothesis was formulated:

H4: Attitude toward digital advertising moderates the relationship between digital ad with environmental sustainability and behavioral intention.

Award-winning brand image

Award-winning brand image can be understood not merely as a favorable brand evaluation but as an externally validated signal of organizational competence and legitimacy. In sustainability communication, such external recognition may be particularly consequential because consumers often struggle to independently verify firms' environmental claims. Sustainability-related recognition can therefore operate as an institutional credibility cue that reduces uncertainty surrounding corporate environmental commitments and shapes how consumers interpret brand communication (Gupta *et al.*, 2021; Wang *et al.*, 2022). Thus, the following hypothesis was developed:

H5: Award-winning brand image moderates the relationship between consumers' level of environmental awareness and their behavioral intention.

Figure 1 presents the proposed research model and summarizes the research hypotheses.

Methodology

Sampling and procedure

The empirical study was conducted in Türkiye using a quantitative cross-sectional survey design. Data were collected through an online questionnaire designed and hosted on Google Forms. The study used a convenience sampling strategy to reach active digital media users through online platforms and social media networks. To align with the study context, the analysis included only respondents who reported recent exposure to digital advertisements containing environmental sustainability messages. Participants were recruited through social media and personal e-mail using an anonymous invitation link. Because sustainability perceptions and responses to marketing communication may be shaped by country- and culture-specific conditions, Türkiye is the specific empirical context in which this study's findings should be interpreted. Prior to the main data collection, a pilot test was conducted with 30 respondents, and the questionnaire was refined based on their feedback to ensure content validity. After pre-analysis screening and coding procedures, the study retained 450 valid responses for analysis. Table 1 summarizes the demographic characteristics.

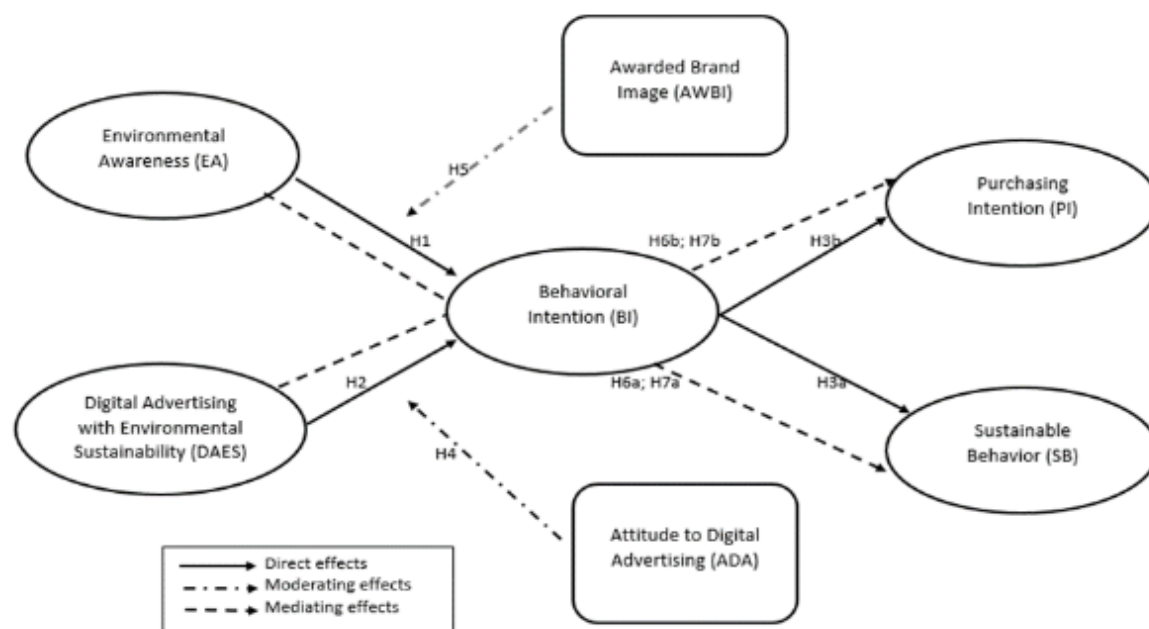


Figure 1. Conceptual model

Source(s): Authors' own work

Measurement instrument

All constructs were measured on a 5-point Likert scale (1 = definitely disagree, 2 = disagree, 3 = neutral, 4 = somewhat agree, 5 = definitely agree). Seven EA questions were adapted from Paul et al. (2016), Fujii (2006), and Zheng et al. (2021); five DAES questions from Aggarwal et al. (2021); nine ADA questions from Ducoffe (1995), Palmieri et al. (2024), and do Paço et al. (2019); five AWBI questions from Watson et al. (2023) and Ghorbanzadeh and Rahehagh (2020). In addition, five BI questions were adapted from Aggarwal et al. (2021) and Kim et al. (2013); four SB questions from Aggarwal et al. (2021) and Minton et al. (2012); seven PI questions from Kim et al. (2013), Sinnapan and Rahman (2012), and Han et al. (2010). All constructs were measured on a 5-point Likert scale. (See Appendix A)

Table 1

Participants' socio-demographic characteristics

Measures	Values	Frequency	%
Gender	Female	259	57,6%
	Male	191	42,4%
Age	<18	9	2,0%
	18-25	38	8,4%
	26-35	128	28,4%
	36-45	132	29,3%
	46-55	93	20,7%
	56 and above	50	11,1%
Marital status	Married	259	57,6%
	Single	191	42,4%
Level of education	High school and below	126	28,0%
	Professional degree	71	15,8%
	Undergraduate	189	42,0%
	Graduate	64	14,2%

Average monthly income	<20.000 TL	20	4,4%
	20.000 - 39.999 TL	63	14,0%
	40.000 - 59.999 TL	101	22,4%
	60.000 - 79.999 TL	87	19,3%
	80.000 TL and above	179	39,8%
Social media platforms used	Facebook	37	8,2%
	Instagram	328	72,9%
	X	53	11,8%
	TikTok	8	1,8%
	LinkedIn	6	1,3%
	Other	12	2,7%
	I am not using	6	1,3%
Number of digital sustainability ads by well-known brands you have encountered	None	113	25,1%
	1-3	113	25,1%
	More than 3	80	17,8%
	I do not remember	144	32,0%

Source(s): Authors' own work

Data Analysis and Findings

Test of the measurement model

Before testing the research hypotheses, a measurement model was assessed using a first-order multiple confirmatory factor analysis to ensure the validity and reliability of the variables' scales and to determine the boundaries of convergent and discriminant validity. Subsequently, to examine the model's convergent and discriminant validity, which demonstrated acceptable goodness of fit, the Fornell–Larcker test was conducted. This test was also used to examine correlations among the constructs. Because the data were collected at a single point in time, Harman's (1976) single-factor test was applied to assess common method bias. No evidence of common method bias was detected, as the single-factor structure accounted for less than 50% of the total variance (43.527%), suggesting that Type I and Type II errors are unlikely (Podsakoff *et al.*, 2003).

An examination of the CFA results indicates that the goodness-of-fit indices obtained from the first-order multiple CFA are well above the commonly accepted thresholds in the literature, demonstrating an excellent model fit (See Appendix B). The empirical data support the constructed measurement model, and the model fit indices fall well above the acceptable thresholds ($\chi^2 = 2392.462$; $df = 798$; $p < 0.001$; $\chi^2/df = 2.998$; CFI = 0.932; IFI = 0.933; RMSEA = 0.067; SRMR = 0.0403). Within the measurement model, recommended cut-off values for factor loadings vary across sources: some researchers suggest a minimum loading of 0.50 (Bollen, 1989; Hair *et al.*, 2013), while others recommend a minimum of 0.70 (Hulland, 1999; Ringle *et al.*, 2020). Nevertheless, for items with factor loadings below 0.50, consider both the item's contribution to model fit and the statistical significance of its standardized loading. Decisions about retaining or removing items in the measurement model should therefore be made in light of these criteria (Hair *et al.*, 2017). In this regard, all standardized factor loadings for the observed variables were well above 0.60 and statistically significant, confirming the measurement model's adequacy.

Table 2

Discriminant validity

	CA	CR	AVE	MSV	ASV	BI	CA	ADA	DAES	AWBI	PI	SB
BI	0.965	0,970	0,865	0,607	0,388	0,930						
CA	0.942	0,972	0,831	0,454	0,306	0,660	0,912					
ADA	0.944	0,945	0,657	0,517	0,285	0,458	0,387	0,810				
DAES	0.958	0,948	0,787	0,517	0,309	0,481	0,456	0,719	0,887			
AWBI	0.969	0,961	0,830	0,397	0,345	0,607	0,542	0,591	0,592	0,911		
PI	0.967	0,971	0,825	0,607	0,405	0,779	0,674	0,462	0,548	0,630	0,908	
SB	0.915	0,920	0,743	0,479	0,344	0,692	0,543	0,523	0,494	0,558	0,678	0,862

Source(s): Authors' own work

It was determined that the Cronbach's Alpha (CA) values for all constructs were above 0.90, which is well above the 0.70 threshold suggested by Tavakol and Dennick (2011), indicating high internal consistency of the scales. All Composite Reliability (CR) values exceeded 0.92, comfortably meeting the ≥ 0.70 criterion recommended by Hair *et al.* (2019). The Average Variance Extracted (AVE) values ranged from 0.65 to 0.87, exceeding the 0.50 threshold proposed by Fornell and Larcker (1981), thereby demonstrating adequate discriminant validity of the constructs (See Table 2).

Structural equation model and hypothesis testing

After assessing the measurement model, we employed a two-stage hypothesis-testing strategy because the structural and conditional components of the proposed model address analytically distinct objectives. Covariance-based SEM was used to estimate the latent structural relationships, including the hypothesized indirect effects, whereas moderation analyses were subsequently conducted to examine whether the strength of the focal relationships varied across levels of the proposed moderators (Kline, 2023; Hayes, 2018). Accordingly, the moderation analyses complement rather than replace the latent structural model and were used to probe conditional effects and interaction patterns (Hayes, 2018).

SEM model was constructed to test hypotheses regarding both direct and indirect effects. Figure 2 presents the results of the first-order multiple latent SEM analysis. The goodness-of-fit indices of the first-order multiple latent SEM model exceed the commonly accepted thresholds in the literature ($\chi^2 = 1602.615$; $df = 459$; $p < 0.001$; $\chi^2/df = 3.492$; CFI = 0.935; IFI = 0.935; RMSEA = 0.077; SRMR = 0.0783). To estimate indirect effects, I used a bootstrap with 5,000 resamples and evaluated results within a 95% confidence interval. Indirect effects whose confidence intervals did not include zero were considered statistically significant (Gürbüz, 2020). Accordingly, Table 3 presents the direct and indirect effects associated with the research hypotheses.

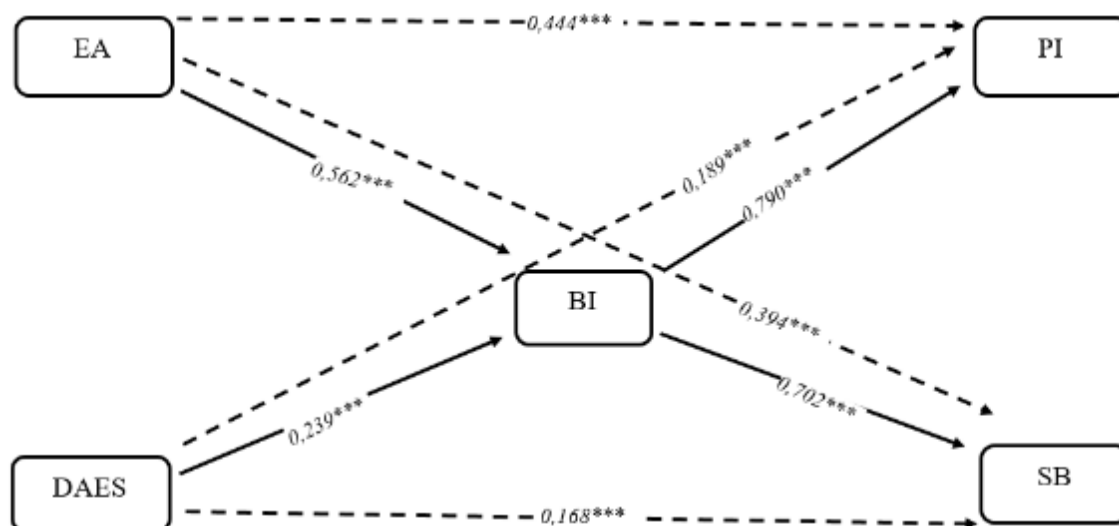


Figure 2. Values in the hypothesized model

Source(s): Authors' own work

Table 3

Summary of hypothesis test results

Hypotheses	Structural path (from → to)	β	S.E.	C.R.	p	Remarks
H1	EA → BI	0,562	0,050	13,413	***	Supported
H2	DAES → BI	0,239	0,041	5,744	***	Supported
H3a	BI → SB	0,702	0,042	14,608	***	Supported
H3b	BI → PI	0,790	0,035	21,718	***	Supported
H6a	EA → BI → SB	0,394	0,066	5,969	***	Supported
H6b	EA → BI → PI	0,444	0,078	5,692	***	Supported
H7a	DAES → BI → SB	0,168	0,039	4,307	***	Supported
H7b	DAES → BI → PI	0,189	0,043	4,395	***	Supported

Notes: CMIN: 1175,867; DF: 345; CMIN/DF: 3,408; RMSEA: ,074; CFI: ,949; ***: $p < 0.001$

Source(s): Authors' own work

Environmental awareness (EA) was found to have a significant and positive effect on behavioral intention (BI) ($\beta = 0.562$, $p < 0.001$). In addition, digital advertising with environmental sustainability (DAES) also had a significant positive effect on behavioral intention ($\beta = 0.239$, $p < 0.001$). In this context, environmental awareness and environmentally sustainable digital advertising explain 50.2% of the variance in behavioral intention. Accordingly, H1 and H2, which posit that EA and DAES significantly affect BI, are supported. Another result examining direct effects confirms that behavioral intention (BI) has a significant and positive direct effect on purchase intention (PI) toward environmentally friendly brands ($\beta = 0.790$, $p < 0.001$). Similarly, behavioral intention was found to have a significant and positive direct effect on sustainable behavior (SB) ($\beta = 0.702$, $p < 0.001$). Accordingly, H3a and H3b, which posit that BI significantly affects PI and SB, are supported.

The indirect-effect analyses indicate that BI mediates the relationships between EA and DAES, as well as between EA and the outcome variables. Specifically, EA exerts statistically significant indirect effects on PI ($\beta = 0.444$, $p < 0.001$, 95% CI [0.315, 0.563]) and SB ($\beta = 0.394$,

$p < 0.001$, 95% CI [0.281, 0.500]) through BI. Similarly, DAES demonstrates statistically significant indirect effects on PI ($\beta = 0.189$, $p < 0.001$, 95% CI [0.104, 0.271]) and SB ($\beta = 0.168$, $p < 0.001$, 95% CI [0.090, 0.244]) via BI. Notably, the bootstrap confidence intervals for all indirect paths do not include zero, providing robust empirical support for the mediating role of behavioral intention. These findings suggest that both environmental awareness and exposure to environmentally sustainable digital advertising influence consumers' purchase intentions and sustainable behaviors primarily by shaping their behavioral intentions. In this respect, behavioral intention functions as a key psychological mechanism that translates cognitive and attitudinal antecedents into concrete behavioral outcomes. Furthermore, when the significant direct effects identified in the structural model are considered alongside the indirect effects, the mediation is partial rather than complete. This indicates that, while behavioral intention plays a central explanatory role, environmental awareness and environmentally sustainable digital advertising may also directly affect pro-environmental outcomes. Accordingly, the mediation hypotheses (H6a, H6b; H7a, H7b) are supported.

Moderating model effects

To test two separate hypotheses concerning moderating effects, the next analytical step involved conducting regression analyses using the PROCESS Macro Version 4.3 (Hayes, 2018) and specifying two separate models. In Model 1, EA was the independent variable, BI the dependent variable, and award-winning brand image related to environmental sustainability activities (AWBI) the moderating variable. The observed variables were computed as the mean values of the constructs derived from the measurement model. Table 4 presents the analysis findings. EA had a significant, positive effect on BI ($\beta = 0.391$, $p < 0.001$). AWBI also has a significant, positive impact on BI ($\beta = 0.309$, $p < 0.001$). Because the path for the moderating variable ($X \times W$) is statistically significant and its confidence interval does not include zero, AWBI moderates the relationship between EA and PI ($\beta = -0.106$, 95% CI [-0.16, -0.04], $p < 0.001$). To illustrate the distribution of the moderating effect, a simple slope analysis was conducted. Figure 3 presents the slope analysis results. A closer examination of the moderating effect reveals that the impact of EA on BI is significant and positive at low levels of AWBI ($\beta = 0.498$, 95% CI [0.40, 0.59], $p < 0.001$), remains significant and positive at moderate levels of AWBI ($\beta = 0.371$, 95% CI [0.23, 0.51], $p < 0.001$). Although the coefficient decreases at high levels of AWBI, the effect remains significant and positive ($\beta = 0.286$, 95% CI [0.10, 0.46], $p < 0.001$). The slope plot indicates that as AWBI increases, the effect of EA on BI decreases. Accordingly, the proposed moderating hypothesis (H5) is supported.

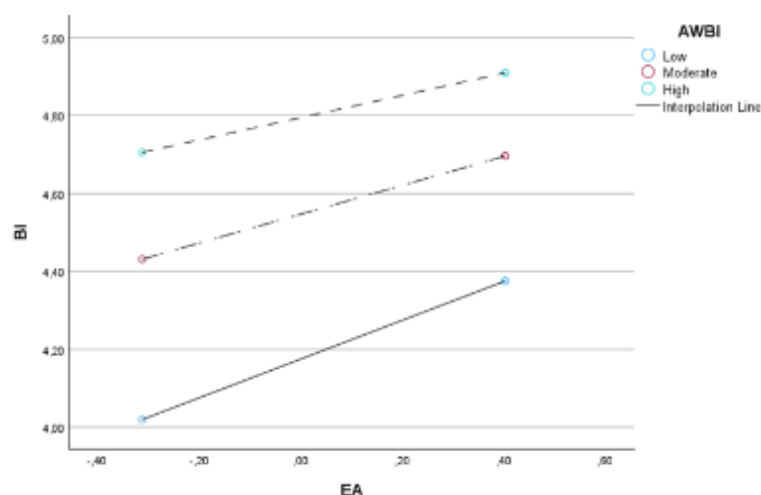


Figure 3. Moderating model 1

Source(s): Authors' own work

Table 4

Results for moderating model 1

Variables	β	S.E.	t	Result
Constant	4,487*** (4,41/4,55)	0,035	125,348	
EA (X)	0,391*** (0,20/0,52)	0,066	5,879	
AWBI (W)	0,309*** (0,23/0,38)	0,036	8,616	
X.W	-0,106*** (-0,16/-0,04)	0,032	-3,309	Supported

Note: $R = 0.722$, $R^2 = 0.521$, *** $p < 0.001$, S.E. = Standard Error. Values in parentheses indicate confidence intervals. The standardized beta coefficient (β) is reported.

Source(s): Authors' own work

For Model 2, digital advertising with environmental sustainability (DAES) was the independent variable, BI the dependent variable, and attitude toward digital advertising (ADA) the moderating variable. The findings related to this analysis are presented in Table 5. The results indicate that DAES has a significant and positive effect on BI ($\beta = 0.208$, $p < 0.001$). In addition, ADA has a significant positive effect on BI ($\beta = 0.182$, $p < 0.001$). Regarding the moderating effect, the interaction term ($X \times W$) was significant and negative on BI ($\beta = -0.135$, $p < 0.001$). Accordingly, the results support the hypothesis related to the moderating role of ADA (H4). Figure 4 presents the slope analysis results examining the magnitude of the moderating effect. Based on the interaction plot, the relationship between DAES and BI was examined at low, medium, and high ADA levels. The findings indicate that at low ADA, the relationship between DAES and BI is significant and positive ($\beta = 0.375$, $p < 0.001$). Similarly, at a medium level of ADA, the relationship remains significant and positive, albeit with a smaller magnitude ($\beta = 0.194$, $p < 0.001$). However, at a high level of ADA, the relationship between DAES and BI is not statistically significant ($\beta = 0.044$, $p = 0.522$). These results suggest that as ADA levels increase, the positive relationship between DAES and BI gradually weakens and eventually becomes non-significant. These findings confirm that the relevant hypothesis (H4) is supported.

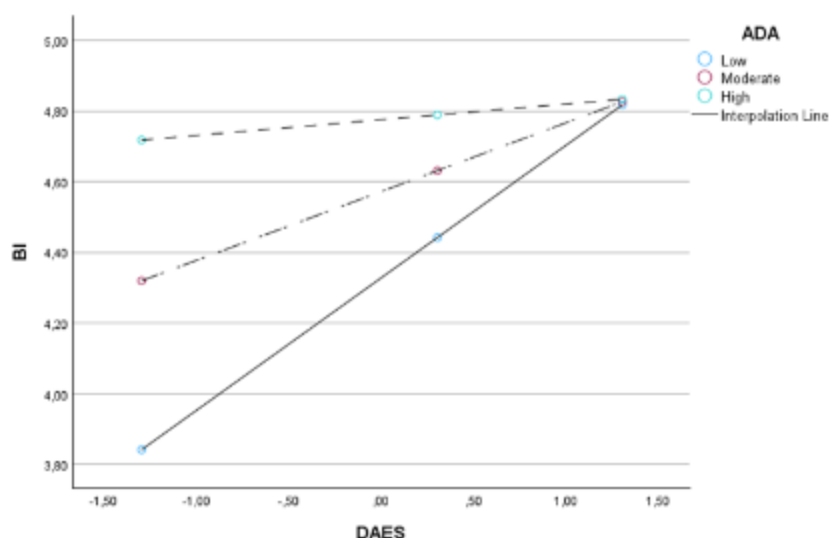


Figure 4. Moderating model 2

Source(s): Authors' own work

Table 5

Results for moderating model 2

Variables	β	S.E.	t	Result
Constant	4,554*** (4,46/4,64)	0,047	97,044	
DAES (X)	0,208*** (0,11/0,30)	0,050	4,153	
ADA (W)	0,182*** (0,08/0,28)	0,050	3,654	
X.W	-0,135*** (-0,19/-0,08)	0,029	-4,654	Supported

Note: $R = 0.524$, $R^2 = 0.275$, *** $p < 0.001$, S.E. = Standard Error. Values in parentheses indicate confidence intervals. The standardized beta coefficient (β) is reported.

Source(s): Authors' own work

Discussion

This study examined how sustainability-oriented digital advertising shapes consumers' sustainable behavior and purchase intention by integrating the stimulus–organism–response (SOR) model into the sustainable marketing literature. Grounded in the SOR framework, the findings demonstrate that environmental awareness and sustainability-oriented digital advertising serve as environmental stimuli that influence consumers' internal psychological processing, as reflected in behavioral intention, which subsequently generates behavioral responses such as sustainable behavior and purchase intention. In this respect, the study confirms the central assumption of the SOR paradigm that external environmental cues influence behavioral outcomes through consumers' internal cognitive and affective evaluations (Eroglu *et al.*, 2001).

The findings show that environmental awareness has a significant positive effect on behavioral intention. Within the SOR framework, environmental awareness can be interpreted as a sustainability-related stimulus that activates consumers' internal cognitive evaluations regarding responsible consumption. This finding suggests that consumers with

higher environmental consciousness are more likely to process sustainability-related information internally in ways that strengthen their readiness to act sustainably. Consistent with previous studies (Han, 2023; Yang *et al.*, 2020), the findings indicate that environmental awareness functions not merely as a static attitudinal orientation but as a psychologically activating stimulus that shapes consumers' internal responses within digital sustainability communication environments.

Similarly, sustainability-oriented digital advertising positively influenced behavioral intention. This result supports the proposition that sustainability-related advertising cues embedded in digital environments serve as external stimuli that can shape consumers' organismic states. From the SOR model perspective, sustainability-oriented digital advertisements appear to stimulate consumers' internal evaluations of ethical responsibility, environmental concern, and sustainable consumption, thereby increasing behavioral intention. This finding aligns with previous studies emphasizing the persuasive role of green and sustainability-focused advertising in shaping consumer responses (Huo *et al.*, 2025; Rinku *et al.*, 2023). More importantly, the findings show the explanatory value of the SOR framework by demonstrating how sustainability-oriented digital communication operates not merely as informational content but as a psychologically activating environmental stimulus whose effects translate into downstream sustainable responses through consumers' internal motivational processing.

A central contribution of this study lies in confirming the mediating role of behavioral intention within the SOR framework. The results demonstrate that behavioral intention mediates the effects of both environmental awareness and sustainability-oriented digital advertising on sustainable behavior and purchase intention. In the context of the SOR paradigm, behavioral intention represents the organism dimension reflecting consumers' internal cognitive and motivational processing of sustainability-related stimuli. The findings therefore support the assumption that external sustainability-related cues influence consumer behavior indirectly through internal psychological mechanisms rather than generating immediate behavioral outcomes. This finding is theoretically important because it clarifies the psychological pathway through which sustainable marketing communication translates environmental stimuli into tangible consumer responses. In digitally saturated environments, sustainability-oriented advertising alone may not directly produce sustainable consumption; instead, its effectiveness depends on how fully consumers internalize these sustainability cues and translate them into behavioral intentions.

The strong positive effects of behavioral intention on both sustainable behavior and purchase intention further reinforce the SOR framework's explanatory power in sustainable marketing research. The findings suggest that once sustainability-related stimuli successfully activate consumers' internal motivational states, these organismic evaluations significantly shape both ethical consumption behaviors and market-related purchasing decisions. This supports prior SOR-based research arguing that consumers' internal emotional and cognitive states serve as crucial mechanisms linking environmental stimuli to behavioral outcomes (Daassi and Debbabi, 2021; Gao *et al.*, 2022). In this regard, the present study contributes to sustainable marketing literature by demonstrating that sustainable behavior and purchase intention emerge as interconnected behavioral responses resulting from consumers' psychological processing of sustainability-oriented digital communication.

Beyond the direct and mediating relationships, the study also provides important insights into the conditional nature of sustainability communication in digital environments. The findings reveal that award-winning brand image negatively moderates the relationship between environmental awareness and behavioral intention. Within the SOR framework, this suggests that institutional sustainability signals alter how consumers internally process sustainability-related stimuli. Specifically, strong award-related brand credibility may reduce consumers' reliance on their own environmental awareness when forming behavioral intentions. One possible explanation is that highly recognized sustainable brands create a perception that sustainability responsibility is already institutionally guaranteed, thereby weakening the motivational influence of consumers' personal environmental awareness. This finding extends prior sustainability communication research by suggesting that external sustainability legitimacy cues may partially substitute for consumers' internal psychological activation processes.

Overall, the study shows that the SOR framework provides a robust theoretical explanation of how sustainability-oriented digital advertising shapes consumers' sustainable behavior in contemporary digital marketing environments. By conceptualizing environmental awareness and sustainability-oriented digital advertising as stimuli, behavioral intention as the organismic mechanism, and sustainable behavior together with purchase intention as behavioral responses, the study offers a comprehensive explanation of how sustainable marketing communication operates psychologically in digital environments. More importantly, the findings reveal that sustainability persuasion is conditional rather than universally effective, emphasizing the importance of contextual and perceptual factors in shaping consumers' responses to sustainability-oriented digital communication.

Conclusion and Implications

This study examined how sustainability-oriented digital advertising shapes consumers' sustainable behavior and purchase intention within the stimulus–organism–response (SOR) model. The findings show that environmental awareness and sustainability-oriented digital advertising serve as key environmental stimuli that positively influence consumers' behavioral intentions, which in turn lead to sustainable behavior and purchase intention. In this respect, behavioral intention emerged as the central organismic mechanism translating sustainability-related stimuli into behavioral responses. The results further reveal that the effectiveness of sustainability-oriented digital communication is not universally stable but depends on contextual and perceptual conditions within digital environments. The moderating effects of award-winning brand image and attitude toward digital advertising indicate that consumers' psychological responses to sustainability-related messages may weaken under conditions of strong institutional signaling, advertising saturation, or increased familiarity with digital advertising environments. These findings suggest that sustainability communication in digital media operates as a conditional persuasive process rather than a uniformly effective strategy.

Theoretical Implications

The study contributes to the growing sustainable marketing literature by demonstrating that sustainability-oriented digital advertising can be conceptualized as an environmental stimulus that shapes consumers' internal psychological evaluations and subsequent behavioral outcomes. While prior sustainable marketing studies have primarily focused on attitudinal,

ethical, or value-based explanations of sustainable consumption, the present study introduces a process-oriented perspective by explaining how sustainability-related digital stimuli are cognitively translated into sustainable behavior through consumers' internal psychological mechanisms. Second, the findings reinforce the SOR framework's explanatory relevance in digitally mediated sustainability communication environments. By conceptualizing environmental awareness and sustainability-oriented digital advertising as stimuli, behavioral intention as the organism dimension, and sustainable behavior together with purchase intention as behavioral responses, the study empirically validates the sequential psychological mechanism proposed by the SOR paradigm. In doing so, the study extends previous SOR-based research beyond conventional online shopping, website design, or e-commerce environments toward sustainable marketing communication and pro-environmental consumer behavior contexts (Eroglu *et al.*, 2001; Daassi and Debbabi, 2021). More specifically, the findings demonstrate that sustainability-oriented digital communication influences consumer behavior not directly, but through consumers' internal motivational and cognitive processing mechanisms. Third, the study contributes to the sustainable digital advertising literature by highlighting the conditional nature of sustainability persuasion in digital environments. The moderating effects identified in the study reveal that the effectiveness of sustainability-oriented digital advertising depends on contextual and perceptual conditions related to both the communication environment and brand-related sustainability signals. In particular, the negative moderating effect of attitude toward digital advertising suggests that greater familiarity with digital advertising environments may reduce the persuasive influence of sustainability-related stimuli because of cognitive saturation, message habituation, or skepticism toward sustainability claims. This finding contributes to emerging discussions on green advertising fatigue, digital advertising saturation, and consumer skepticism in sustainability communication literature (Nyilasy *et al.*, 2014; Nguyen *et al.*, 2023). In addition, the moderating role of award-winning brand image extends existing sustainable marketing and signaling literature by demonstrating that institutional sustainability signals may reshape consumers' internal processing of sustainability-related stimuli. The findings suggest that strong external sustainability credentials can weaken the motivational influence of consumers' own environmental awareness when forming behavioral intentions. This result contributes to the literature by showing that sustainability-related institutional legitimacy signals function not only as credibility enhancers but also as contextual boundary conditions influencing consumers' organismic reactions within the SOR process.

Practical Implications

The results demonstrate that both environmental awareness and sustainability-oriented digital advertising positively influence consumers' behavioral intentions, which in turn shape sustainable behavior and purchase intentions. This suggests that sustainability communication strategies should move beyond merely presenting environmental claims and focus on stimulating consumers' intrinsic motivation and psychological engagement. In line with the stimulus–organism–response (SOR) framework, sustainability-oriented digital advertisements should be designed as psychologically activating stimuli that strengthen consumers' internal commitment to sustainable action. The findings indicate that sustainability-oriented digital advertising functions more effectively when sustainability-related messages are translated into concrete, relatable, and behavior-oriented communication practices. Rather than relying solely on generic environmental claims, brands

should emphasize actionable sustainability narratives, transparent environmental commitments, and visually engaging storytelling that activates consumers' internal evaluations of personal responsibility and ethical consumption.

The findings regarding the moderating role of award-winning brand image also suggest that recognition of institutional sustainability alone may not guarantee stronger behavioral outcomes. Although sustainability awards and recognition enhance brand legitimacy and credibility, overreliance on institutional sustainability signals may weaken the motivational role of consumers' own environmental awareness. Managers should therefore avoid assuming that sustainability credentials automatically strengthen consumer persuasion. Instead, brands should balance institutional legitimacy signals with communication strategies that continue to actively engage consumers' personal environmental concerns and internal motivations. The moderating role of attitude toward digital advertising also provides important implications for sustainability communication strategies in digitally saturated environments. The findings indicate that the persuasive effect of sustainability-oriented digital advertising weakens at high levels of positive attitude toward digital advertising. This suggests that consumers who are highly exposed to and familiar with digital advertising environments may develop message habituation, advertising fatigue, or skepticism toward sustainability-related claims. For practitioners, this implies that repetitive or standardized sustainability messaging may gradually lose effectiveness in highly saturated digital media environments. Brands should therefore differentiate sustainability communication strategies by focusing on authenticity, creativity, narrative depth, and experiential engagement rather than repetitive promotional sustainability claims. Finally, the findings suggest that sustainable marketing communication in digital environments should be approached as a dynamic and context-dependent persuasion process.

Limitations and Future Research

Despite its theoretical and practical contributions, this study has several limitations that should be considered when interpreting the findings and that provide directions for future research. First, the study employed a cross-sectional research design, which limits the ability to establish definitive causal relationships among the constructs within the proposed stimulus–organism–response (SOR) framework. Although the structural model provides strong evidence of the relationships among environmental stimuli, internal psychological processing, and behavioral responses, future studies may employ longitudinal or experimental designs to better capture the dynamic, evolving nature of sustainability-oriented digital communication effects. Repeated exposure to sustainability-related digital advertising may alter consumers' organismic reactions differently over time, particularly in digitally saturated media environments. Second, the study relied on convenience sampling and self-reported measures collected via an online survey. Although the sample size was sufficient for structural equation modeling and the measurement model demonstrated strong psychometric properties, self-reported sustainability-related behaviors may still be affected by social desirability bias or respondents' tendency to overstate environmentally responsible behaviors. Future studies may therefore benefit from incorporating behavioral tracking data, experimental advertising exposure settings, neuromarketing techniques, or observational approaches to better capture consumers' actual behavioral responses to sustainability-oriented digital advertising stimuli. The study examined sustainability-oriented digital advertising as a general digital communication stimulus without distinguishing among specific

digital platforms, advertising formats, or technological environments. However, consumers may respond differently to sustainability-related stimuli depending on the communication environment, such as social media platforms, influencer marketing, video advertising, chatbot-based communication, immersive technologies, or personalized algorithmic advertising systems. Future research could therefore compare different digital advertising formats and platform-specific sustainability communication strategies within the SOR framework to better understand how technological affordances shape consumers' organismic processing and behavioral responses.

Ethical Statement

The research protocol for the survey was approved by the Ethics Committee of the Graduate School on November 28, 2025 (Approval No: 61351342/020-1615). All respondents provided informed consent before commencing the questionnaire.

Conflict of Interest

The author declares that there is no conflict of interest regarding the publication of this paper.

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