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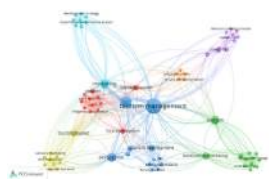
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Articles



Managing Image in the Midst of Uncertainty: A Systematic Analysis of Destination Communication Strategies Post-Security Crisis

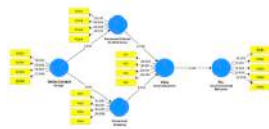
DOI: <https://doi.org/10.38043/jimb.v11i1.7495>

Dedy Iswanto, Sulhan Hadi, Baiq Reinelda Tri Yunarni, Muhammad Fuzail

1-22



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Digital Marketing as Behavioral Architecture: How Online Content Designs Internalize Sustainable Consumption Values

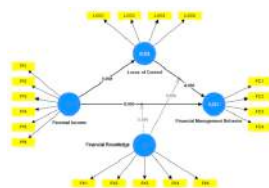
DOI: <https://doi.org/10.38043/jimb.v11i1.7515>

Andri Ardhiyansyah, Yusuf Iskandar, Kurniawan, Kristia

23-44



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Not Just Privilege: Evaluating How Financial Knowledge Moderates the Impact of Locus of Control and Parental Income on the Financial Management of Youths

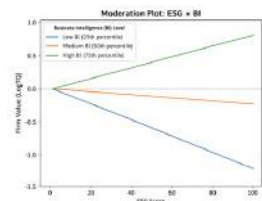
DOI: <https://doi.org/10.38043/jimb.v11i1.7532>

Baiq Reinelda Tri Yunarni, Elok Sri Utami, Dedy Iswanto, Fuzail Muhammad

45-62



Abstract Views: 194 times | Downloaded: 158 times



Does Business Intelligence Reverse the Negative Impact of ESG on Firm Value?

DOI: <https://doi.org/10.38043/jimb.v11i1.7552>

Oviliani Yenty Yuliana, Yenni Mangoting, Audrie Jessalyne Tankilisan, Eugunia Evanthe Yenardi, Desi Arisandi

63-75



Abstract Views: 164 times | Downloaded: 114 times

Financial Management Behaviour of MSMEs in Buleleng Regency - The Mediating Role of Financial Self Efficacy

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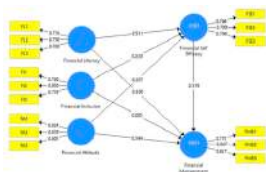
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Ni Made Sri Ayuni, Ni Nyoman Juli Nuryani, Made Dwi Ferayani, Ni Wayan Novi Budiasni, Sebastian Herman, Alexandra Maria Pires

76-93



Abstract Views: 222 times | Downloaded: 209 times



From Adoption to Productivity: The Central Role of Optimal Technology Use in The Informal Economy

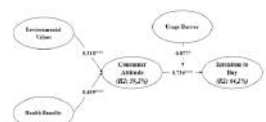
DOI: <https://doi.org/10.38043/jimb.v11i1.7610>

Mizan Ikhlusal Rahman, Chairul Sa'roni, Sri Hidayah, Muhammad Fathur Reza

94-111



Abstract Views: 159 times | Downloaded: 151 times



Explaining Green Skincare Purchase Intention: The Role of Attitudes and Usage Barriers

DOI: <https://doi.org/10.38043/jimb.v11i1.7633>

Ita Nurcholifah, Heny Hidayati, Muhammad Rafiuddin, Hesham Saleem Al Naggat

112-129



Abstract Views: 307 times | Downloaded: 252 times



IPO Underpricing: Financial Vulnerability and Corporate Financial Behavior Disclosure

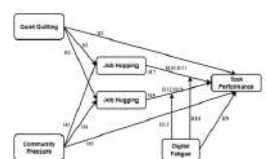
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Gesti Memarista, Kevin Effendy, Nayeon Kim

130-141



Abstract Views: 178 times | Downloaded: 147 times



Beyond Quiet Quitting: Community Pressure and Adaptive Work Behaviors Explaining Family Hope Facilitators' Task Performance

DOI: <https://doi.org/10.38043/jimb.v11i1.7641>

Udik Jatmiko, Suhermin, Putra Budi Ansori

142-167



Abstract Views: 152 times | Downloaded: 108 times



Green Marketing for Millennial Consumer Purchasing Decisions Through Brand Perception

DOI: <https://doi.org/10.38043/jimb.v11i1.7659>

Doddy Adhimursandi, Hairul Anwar, Hidayani

168-180



Abstract Views: 97 times | Downloaded: 80 times

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Digital Marketing as Behavioral Architecture: How Online Content Designs Internalize Sustainable Consumption Values

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ABSTRACT

This study investigates the influence of digitally mediated marketing environments on pro-environmental consumption through indirect perceptual and value-based mechanisms, conceptualizing online content design as an element of broader behavioral architecture within digital decision environments. Drawing on behavioral architecture theory, the research examines how perceived choice architecture and perceived nudging connect digital content design to sustainability-related behavioral tendencies. A quantitative cross-sectional survey was administered to 250 active social media users in West Java, Indonesia. Partial least squares structural equation modeling (PLS-SEM) was used to analyze the relationships among online content design, perceived choice architecture, perceived nudging, value internalization, and pro-environmental behavior. Online content design does not directly affect pro-environmental behavior. Instead, its influence is mediated by perceived choice architecture and perceived nudging, both of which are positively related to value internalization. Value internalization is identified as the most immediate predictor of pro-environmental behavioral tendencies. Although the model exhibits limited explanatory power, the findings highlight a significant indirect mechanism through which digitally structured environments shape sustainability-related behavior. Sustainability-oriented digital marketing strategies should focus on structuring digital environments that frame consumer choices and facilitate value-consistent decisions, rather than relying exclusively on persuasive messaging. This study contributes to digital marketing and sustainability literature by reframing digital marketing as behavioral architecture and identifying value internalization as a central mechanism linking perceived digital environments to pro-environmental behavior.

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1. INTRODUCTION

Over the past decade, digital technologies have transformed consumption by embedding consumers within continuously curated digital environments rather than discrete marketplace encounters. In these environments, consumers are persistently exposed to algorithmically organized, visually structured, and narrative-driven content that shapes attention, comparison, and evaluation processes. As a result, digital marketing increasingly operates not merely as a communication channel but as a structured decision environment that frames how alternatives are perceived and interpreted (Helberger et al., 2022; Verhoef et al., 2021).

The rapid expansion of social media platforms has further intensified this transformation. Platforms such as Instagram and TikTok enable firms to construct immersive consumption contexts through visual storytelling, symbolic narratives, and interactive engagement mechanisms (Jin et al., 2019). Unlike traditional advertising, digital content is dynamic, personalized, and continuously updated, generating repeated exposure that gradually influences consumers' cognitive and evaluative processes. Consequently, digital marketing environments increasingly shape how consumers interpret product meaning, evaluate alternatives, and form consumption preferences (Bashirzadeh et al., 2022).

At the same time, sustainability challenges have highlighted the critical role of consumption behavior in shaping environmental outcomes. Prevailing consumption patterns—such as impulsive purchasing and shortened product use cycles—contribute significantly to resource depletion and environmental degradation (UN Environment Programme, 2020). Although environmental awareness has increased globally, research consistently documents a persistent attitude-behavior gap in which pro-environmental intentions often fail to translate into consistent behavioral change (White et al., 2019). This gap suggests that sustainable consumption cannot be

explained solely by awareness or persuasive messaging but requires a deeper integration of sustainability-related values into individuals' value systems.

An important distinction in sustainability research concerns the difference between attitudinal responses and value internalization. Attitudes typically represent evaluative judgments that may fluctuate across contexts and situations, whereas value internalization reflects the incorporation of normative principles into individuals' enduring evaluative frameworks. While digital content is often perceived as fleeting, contemporary digital environments differ from traditional communication settings because consumers are repeatedly exposed to algorithmically curated information streams as part of their everyday digital routines (Noguti, 2022). Through such repeated exposure, digital cues, narratives, and socially mediated signals may gradually reinforce interpretive frames and normative meanings associated with sustainability (Petersen & Frantz, 2024). Over time, these cumulative interactions can move beyond temporary attitudinal responses and contribute to the deeper internalization of sustainability-related values within individuals' personal evaluative systems.

Behavioral decision research provides an important perspective for addressing this challenge by emphasizing the role of decision environments in shaping behavior (Cristofaro et al., 2024; Payne et al., 1992). The concept of behavioral architecture holds that how choices are structured and presented can systematically influence decision-making without restricting individual autonomy (Nielsen et al., 2021). Within digital environments, such structures may emerge through content design, interface organization, and algorithmically curated exposure, which together shape how consumers interpret available options and evaluate potential actions.

Within digitally mediated environments, behavioral architecture does not emerge solely as an abstract conceptual metaphor but as a set of observable structural features embedded within digital platforms (Poulsen & Malafouris, 2023). In digital marketing contexts, this architecture may manifest through mechanisms such as algorithmic curation of content feeds, interface-based organization of information, visual hierarchies in content presentation, and socially mediated cues, including likes, shares, and engagement signals. These elements collectively structure how consumers encounter, interpret, and evaluate consumption alternatives within digital environments. Rather than prescribing specific choices, such structural features shape the informational context in which decisions occur, influencing attention allocation, interpretive framing, and the perceived salience of available options.

Despite the rapid growth of research on digital marketing and sustainable consumption, the theoretical link between these domains remains underdeveloped (Davies et al., 2020; Geng & Maimaituerxun, 2022). Digital marketing research has predominantly conceptualized online content as a persuasive stimulus aimed at influencing attitudes, engagement, or purchase intentions within relatively short decision cycles (Verhoef et al., 2021). In contrast, sustainability research has emphasized the role of deeply embedded personal values in driving enduring pro-environmental behavior (Linder et al., 2022). This divergence creates an unresolved theoretical tension. If digital marketing primarily operates through short-term persuasive mechanisms, its capacity to contribute to long-term value formation remains unclear (Breuer & Bretzel, 2012). Conversely, if sustainable behavior depends on internalized value systems, existing sustainability frameworks provide a limited explanation of how such values may develop through everyday marketplace interactions, particularly within digitally mediated consumption environments.

As digital platforms increasingly structure consumers' exposure to information, cues, and evaluative frames, understanding whether digitally organized environments can contribute to sustainability-related value internalization becomes an important theoretical question. However, the mechanisms by which digital marketing environments shape perceptual decision structures and, subsequently, influence value formation remain insufficiently understood (Saura et al., 2026). This study addresses this gap by reconceptualizing digital marketing as a form of behavioral architecture that structures digitally mediated decision environments (Kaman & Deshmukh, 2025). Specifically, the study examines how online content design shapes consumers' perceptions of choice architecture and nudging mechanisms, thereby facilitating the internalization of sustainability-related values and ultimately influencing pro-environmental behavior. Rather than focusing on short-term persuasion effects, this perspective emphasizes how repeated exposure to digitally structured environments contributes to deeper value formation processes.

Empirically, the study examines these mechanisms in the context of West Java, Indonesia, a digitally intensive emerging market characterized by widespread social media engagement and strong social interaction dynamics. West Java represents a particularly relevant context for examining behavioral architecture mechanisms because digital consumption practices are deeply embedded in everyday routines, and social influence processes remain highly salient. In such environments, algorithmically curated content, socially mediated engagement signals, and visually structured information flows may interact with collective norms and shared interpretive frames. These contextual characteristics make West Java an appropriate empirical setting for examining how digitally structured decision environments shape perceptions of choice architecture, nudging mechanisms, and the internalization of sustainability-related values.

By integrating digital marketing, behavioral decision research, and sustainability studies within a unified analytical framework, this study contributes to the literature in two ways. First, it reconceptualizes digital marketing environments as forms of behavioral architecture that structure digitally mediated decision contexts rather than functioning solely as channels for persuasive communication. Second, it identifies value internalization as a key psychological mechanism linking online content design to pro-environmental behavior, thereby providing a process-based explanation of how digitally structured environments may contribute to the formation of sustainability-oriented consumption practices.

Behavioral Architecture in Digital Marketing

Accordingly, individuals who have internalized sustainability-related values are generally more likely to engage in pro-environmental behavioral alternatives. However, such behaviors are also influenced by the structure and context in which choices are presented (Chwialkowska et al., 2020). This perspective challenges the assumption of fully rational consumers by emphasizing bounded rationality, cognitive limitations, and heuristic processing in everyday decision contexts (X. Zhang et al., 2023). As a result, increasing attention has been directed toward the role of the decision environment in shaping behavioral outcomes, rather than focusing exclusively on individual preferences or attitudes.

Building on this line of inquiry, the concept of behavioral architecture, closely associated with choice architecture, highlights how the design of decision environments can systematically influence behavior without restricting freedom of choice (Mills & Sætra, 2024). Behavioral architecture refers to the intentional structuring of information, options, and cues—such as framing, ordering, salience, and default settings—that guide how individuals perceive and evaluate alternatives (Landais et al., 2020). Empirical studies across policy, health, and consumer domains have shown that such contextual features can meaningfully shape decisions even when individuals retain full autonomy over their choices (Anker, 2020).

In marketing contexts, the relevance of behavioral architecture has become increasingly pronounced with the rise of digital technologies and platform-based interactions. Digital environments differ fundamentally from traditional offline settings in their capacity to continuously curate, personalize, and algorithmically structure consumer experiences (Airoidi & Rokka, 2022). Through interfaces, recommendation systems, and content design, digital platforms actively organize the flow of information and the visibility of options, thereby functioning as dynamic decision environments rather than passive communication channels (Verhoef et al., 2021).

In digital marketing, content is not merely informational; it is a central element of the behavioral architecture consumers encounter. Online content integrates visual hierarchies, narrative framing, interactive elements, and temporal sequencing, all of which shape how consumers cognitively process their consumption choices (Taufiq, 2021). Research on digital advertising and consumer behavior suggests that such design features influence attention allocation, interpretation, and preference formation, often before conscious deliberation (Santoso et al., 2022). Consequently, digital marketing practices increasingly operate by shaping the context of choice rather than directly persuading consumers through explicit arguments.

Importantly, the behavioral architecture perspective distinguishes between direct persuasion and contextual influence. Whereas traditional persuasive approaches seek to change beliefs or attitudes through argumentation, behavioral architecture emphasizes how subtle contextual cues embedded in decision environments can guide behavior by altering how options are perceived and evaluated (Kang et al., 2024). This distinction is particularly relevant in digital settings, where repeated exposure to structured content can gradually normalize certain patterns of evaluation and choice. As such, digital marketing can be understood as a form of behavioral architecture that operates through continuous interaction with consumers rather than discrete persuasive messages (Bharti et al., 2024).

However, the influence of behavioral architecture in digital environments should not be interpreted as deterministic. Consumers in contemporary digital settings are increasingly exposed to high volumes of promotional content, which may lead to phenomena such as digital fatigue, ad avoidance, or reduced attention to marketing stimuli. When consumers perceive digital cues as overly persuasive, intrusive, or manipulative, they may activate persuasion knowledge and engage in resistance behaviors such as ignoring, filtering, or dismissing the content. In such situations, the intended nudging effects of digital architecture may weaken or fail to influence consumer decision processes.

These dynamics suggest that the effectiveness of digital behavioral architecture depends not only on how decision environments are structured but also on how consumers interpret the contextual signals embedded within them. When digital cues are perceived as informative, relevant, or supportive of autonomous decision-making, they may facilitate deeper cognitive processing and value-related reflection. Conversely, when such cues are perceived as manipulative attempts at persuasion, consumers may resist or disengage from the content. Recognizing these boundary conditions provides a more balanced understanding of how digital decision environments interact with consumer agency in shaping behavioral outcomes. This perspective highlights that behavioral architecture operates within interpretive processes in which consumers actively evaluate contextual cues rather than passively responding to environmental structuring.

From this standpoint, digital marketing environments provide a theoretically appropriate context for examining value-related behavioral outcomes, including pro-environmental behavior (Lee et al., 2022). Prior research suggests that behaviors grounded in internalized values are more likely to emerge from sustained contextual influences rather than from short-term persuasive appeals. By structuring digital decision environments that emphasize norms, consequences, and meanings, behavioral architecture offers a mechanism through which digital marketing can contribute to the formation and reinforcement of value-oriented consumption patterns (Hasan & Talukder, 2023).

Online Content Design in Digital Marketing

Online content design has emerged as a central component of digital marketing practices, reflecting a shift from information transmission toward the deliberate structuring of consumer experiences within digital environments (Dwivedi et al., 2023) in contrast to traditional advertising formats, online content is characterized by its visual richness, interactivity, and capacity for continuous modification, allowing marketers to shape how information is encountered, interpreted, and evaluated over time (Babić Rosario et al., 2020). As such, online content design extends beyond message creation to encompass the organization, presentation, and sequencing of digital stimuli within consumer decision contexts.

Prior Research conceptualizes online content design as a multidimensional construct that integrates visual elements, narrative structures, framing strategies, and interactive features to guide consumer cognition and affect (Gu et al., 2023). Visual design elements, including color, layout, imagery, and hierarchy, play a critical role in directing attention and shaping first impressions, often influencing judgments before conscious deliberation occurs. Similarly, narrative and framing components embedded within digital content can influence how consumers interpret product attributes, consequences, and meanings by emphasizing values or reference points (Taufiq, 2021).

In digital marketing environments, the structure of content presentation is particularly salient due to the abundance of information and limited cognitive resources available to consumers. Research on information overload suggests that consumers rely heavily on cues embedded in content design—such as prominence, ordering, and repetition—to simplify decision-making processes (L. Wang et al., 2024). Consequently, online content design serves as a mechanism that organizes information to reduce cognitive effort while simultaneously guiding evaluation and choice (Kozyreva et al., 2020).

The interactive nature of digital platforms further amplifies the Influence of online content design. Features such as likes, shares, comments, and algorithmically curated feeds introduce social and contextual cues that shape how content is perceived and valued (Zafar & Saleem, 2025). These cues not only signal popularity or social approval but also contribute to the perceived relevance and legitimacy of content, thereby affecting how consumers interpret and respond to marketing messages (Li et al., 2020). Through repeated exposure in personalized feeds, online content design can gradually shape perceptions and expectations related to consumption.

Online content design differs from traditional persuasive communication in its emphasis on contextual Influence rather than explicit argumentation. Whereas persuasive messages aim to change attitudes through reasoning or appeals, online content design shapes the environment in which evaluations take place, influencing what consumers attend to, how alternatives are compared, and which attributes are considered salient (Braca & Dondio, 2023). This distinction aligns with behavioral decision-making Research, which highlights the role of contextual cues in guiding choice under conditions of bounded rationality.

From this perspective, online content design can be understood as an antecedent that structures consumers' experiences of digital decision environments (Yadav & Pavlou, 2020). By integrating visual, narrative, and interactive elements, digital content provides the initial conditions through which consumers perceive choice structures and experience subtle guidance in their consumption decisions (Gu et al., 2023). Accordingly, online content design occupies a foundational position in models that seek to explain how digital marketing environments shape downstream cognitive, affective, and value-related outcomes (Sang & Cuong, 2025).

Online Content Design and Perceived Choice Architecture

Online content design plays an important role in shaping how consumers perceive the structure of choices within digitally mediated decision environments (Z. Wang, 2025). Prior research on behavioral decision-making suggests that how information is organized, framed, and visually prioritized can significantly influence individuals' perceptions of available options, even when the objective set of alternatives remains unchanged (Joseph & Gaba, 2020; Korteling et al., 2023). In digital marketing contexts, content elements such as visual hierarchy, information sequencing, and the curated presentation of alternatives guide consumers' attention and interpretation, thereby shaping their subjective experience of how constrained or guided a choice environment appears (Mohamed, 2025).

Empirical studies in digital marketing further indicate that well-designed online content reduces cognitive effort by structuring complex information into coherent, interpretable formats, thereby enhancing consumers' reliance on contextual cues embedded in the content (Sultana, 2025). As consumers repeatedly interact with such

tightly structured digital content, they are more likely to perceive the decision environment as intentionally organized rather than neutral, leading to stronger perceptions of an underlying choice architecture (Helberger et al., 2022). Accordingly, online content design is expected to function as a key antecedent of perceived choice architecture in digital consumption settings.

H1: Online Content Design positively influences Perceived Choice Architecture.

Although nudging is frequently discussed as a mechanism within broader choice architecture frameworks in behavioral economics, the two constructs may represent distinct perceptual experiences in digitally mediated consumption environments. Choice architecture refers to the structural organization of decision contexts through the arrangement, framing, and presentation of alternatives. Nudging, by contrast, reflects the experience of subtle behavioral guidance embedded within that structure.

In digital environments, consumers may perceive the configuration of available options (choice architecture) differently from the sense of being gently guided toward alternatives (nudging). While both mechanisms may share similar underlying design features, they operate through distinct perceptual pathways. This distinction is particularly relevant in digital environments where consumers may simultaneously recognize the structure of available options while also experiencing varying degrees of subtle behavioral guidance. Distinguishing between perceived choice architecture and perceived nudging, therefore, allows the present study to examine how digital content design simultaneously shapes consumers' interpretation of the decision environment and their experience of contextual behavioral guidance. While perceived choice architecture captures how consumers interpret the structural organization of the decision environment, perceived nudging reflects the experience of being subtly guided within that environment.

Online Content Design and Perceived Nudging

Online content design is closely associated with consumers' experiences of nudging in digital environments, as design elements embedded within content can subtly steer attention, interpretation, and action without explicit persuasion (Verma & Arora, 2025). Behavioral Research indicates that nudges operate through contextual cues such as salience, framing, repetition, and social signals, which influence decision-making by leveraging cognitive heuristics under conditions of bounded rationality (Salah, 2025; Youvan, 2024). In digital marketing contexts, online content design integrates these cues through visual prominence, call-to-action placement, and algorithmically curated exposure, thereby shaping consumers' subjective experiences of being gently guided toward choices (Youvan, 2024).

Recent studies in digital marketing and human–computer interaction further suggest that the perceived effectiveness of nudging depends not on the mere presence of design features, but on how consumers interpret and experience them over repeated interactions (Amati, 2023). Well-designed digital content can normalize certain evaluative frames and behavioral tendencies by continuously reinforcing specific cues within consumers' everyday digital routines (Hettler et al., 2025). As such, online content design is expected to function as an antecedent of perceived nudging, shaping consumers' awareness of subtle guidance embedded in digital decision environments.

H2: Online Content Design positively influences Perceived Nudging.

Perceived Choice Architecture and Value Internalization

Perceived choice architecture is theorized to play a critical role in facilitating value internalization by shaping how individuals cognitively interpret and evaluate consumption-related choices (Meske et al., 2020). Behavioral Research suggests that when decision environments are perceived as structured, coherent, and meaningful, individuals are more likely to engage in reflective evaluation rather than relying solely on automatic or heuristic-based responses (Sharma & Kushwah, 2025). In such contexts, the organization of options and the salience of attributes can repeatedly signal which considerations are socially, morally, or practically relevant, thereby creating conditions under which values embedded in the environment are more likely to be cognitively processed and integrated (Fard Bahreini, 2021).

In digital marketing environments, perceived choice architecture may contribute to value internalization by normalizing specific evaluative frames through sustained exposure to structured content (Warner et al., 2024). When consumers consistently encounter digitally curated choice structures that highlight certain consequences, norms, or priorities such as environmental impacts or sustainable attributes—these cues can gradually become incorporated into their internal evaluative standards (Araujo et al., 2020). Rather than directly prescribing behavior, perceived choice architecture provides a contextual scaffold that supports the gradual alignment between external cues and individuals' internal value systems (Theocharis & Tsekouropoulos, 2025). Accordingly, stronger perceptions of structured choice environments are expected to facilitate the internalization of sustainability-related values.

H3: Perceived Choice Architecture positively influences Value Internalization.

Perceived Nudging and Value Internalization

The literature on digital nudging has broadened the original concept of nudging by highlighting how choice environments structured through interface design and contextual cues can influence not only immediate decisions but also deeper cognitive processes involved in value integration (Atkinson, 2025). Digital nudges—such as salience enhancements, socially framed cues, and algorithmically curated prompts—are designed to subtly guide user attention and interpretation without limiting their freedom of choice (Sadeghian & Otarkhani, 2024). Recent empirical evidence indicates that these nudging elements are particularly effective in sustainability-related domains, where cognitive and affective engagement with environmental considerations is necessary for deeper psychological change (Amiri et al., 2024). By repeatedly exposing consumers to digital nudging cues within structured content, digital marketing environments can create interpretive frames that extend beyond immediate preference shifts toward more enduring value orientations. Perceived nudging operates at the intersection of affective experience and cognitive appraisal, capturing how individuals subjectively experience guidance embedded in digital content rather than focusing solely on the objective design features themselves (Amiri et al., 2024). When consumers perceive nudges as meaningful or relevant to their personal and social contexts, these cues can facilitate reflection and alignment with broader value systems, such as sustainability-related priorities (Amiri et al., 2024; Khalufi, 2025). In this way, digital nudging contributes to the internalization of values by reinforcing evaluative frameworks that emphasize long-term considerations, normative expectations, and personal relevance, rather than simply prompting short-term responses or isolated behaviors. Accordingly, stronger perceptions of nudging are expected to positively influence the degree to which sustainability-related values become internalized within individuals' cognitive structures.

H4: Perceived Nudging positively influences Value Internalization.

Value Internalization and Pro-Environmental Behavior

Value internalization is a fundamental psychological process through which external cultural, social, or informational cues are integrated into an individual's core value system, thereby shaping consistent patterns of thought and action across contexts (Konstantinou et al., 2025). Within environmental and sustainability Research, internalized environmental values are conceptualized as deeply held principles that guide individuals' interpretation of environmental issues and motivate behaviors aligned with ecological preservation, even when such actions involve personal cost or effort (Khalufi, 2025). This perspective emphasizes that the mere presence of attitudes or intentions is insufficient to produce sustained behavioral change unless underlying values have been internalized as part of one's evaluative framework.

Empirical studies have provided robust evidence that internalized values serve as strong antecedents of actual pro-environmental behavior, surpassing attitudes and intentions in explanatory power in many contexts (Sarid & Goldman, 2021). For example, Research using structural models has shown that individuals with higher levels of internalized environmental values are more likely to engage in environmental actions such as energy conservation, recycling, and sustainable purchasing, even when controlling for social norms and environmental knowledge (Lin et al., 2022). These findings suggest that value internalization captures the motivational foundation that transforms abstract concern into concrete behavioral engagement.

Recent work in sustainability psychology highlights that the digital context itself can strengthen the link between internalized values and behavior by providing platforms for repeated engagement, social reinforcement, and identity expression (Ogunbode et al., 2023). For instance, individuals who have internalized environmental values are more likely to translate those values into online and offline actions when they encounter reinforcing cues through digital environments and communities that support sustainable norms (Rausch & Kopplin, 2021). Such evidence underscores the importance of conceptualizing value internalization not merely as a background disposition but as a central mechanism linking structured environmental cues to consistent pro-environmental behaviors (Han et al., 2021).

Taken together, the theoretical and empirical literature suggests that individuals who have internalized sustainability-related values are more likely to engage in pro-environmental behaviors consistently across situations, even in the absence of external prompts or incentives (Walton & Jones, 2022). Importantly, the present framework deliberately does not assume a direct effect of online content design on pro-environmental behavior (Lima et al., 2024; Mastria et al., 2023). Drawing on behavioral architecture theory, behavioral outcomes are expected to emerge indirectly, as repeated exposure to digitally structured decision environments shapes perceptual processes and facilitates deeper value internalization, rather than triggering immediate stimulus-response reactions (Liao, 2024). Based on this reasoning, the following hypothesis is proposed:

H5: Value Internalization positively influences Pro-Environmental Behavior.

2. METHOD

Research Design

This study employs a quantitative Research design using a cross-sectional survey approach to test the proposed conceptual framework empirically. The Research is explanatory, aiming to examine the structural relationships among online content design, perceived choice architecture, perceived nudging, value internalization, and pro-environmental behavior. A quantitative approach is appropriate given the objective of testing theory-driven hypotheses and estimating the magnitude of relationships among multiple latent constructs within a behavioral architecture framework (C. Zhang et al., 2021). To analyze the proposed model, this study adopts structural equation modeling (SEM), which enables the simultaneous assessment of measurement properties and structural relationships among constructs. This approach is widely used in digital marketing and consumer behavior Research to test complex models involving mediating mechanisms.

A cross-sectional design is appropriate for this study because the objective is to examine theoretically specified structural relationships among latent constructs rather than to model temporal change. Although value internalization is conceptually gradual, the present research focuses on testing the structural mediation mechanisms linking online content design, perceptual processes, and pro-environmental behavior within an established digital exposure context. Cross-sectional survey designs are widely employed in behavioral architecture and consumer research to assess relational patterns among theoretically grounded constructs at a given point in time.

Research Context

The empirical context of this study is West Java, Indonesia, a region characterized by high internet penetration and intensive social media use. West Java is a relevant setting for examining the effects of digital marketing, as consumers in this region are frequently exposed to online marketing content through platforms such as Instagram and TikTok, which serve as dominant digital decision environments. This regional context is particularly well-suited for investigating mechanisms of behavioral architecture, as digital consumption practices are deeply embedded in daily routines while social and collective value orientations remain salient. Examining consumers in West Java, therefore, provides meaningful insights into how structured digital content environments shape value internalization and pro-environmental behavior in an emerging market context.

Sample and Data Collection

The target population of this study consists of active social media users residing in West Java who are regularly exposed to digital marketing content. To ensure relevance to the research context, respondents were required to report routine interaction with marketing-related content on social media platforms. Data were collected using an online, self-administered questionnaire, consistent with the digital nature of the research context and enabling efficient access to geographically dispersed respondents.

A non-probability sampling technique was employed because a comprehensive sampling frame of active social media users exposed to digital marketing content is unavailable. This approach is commonly used in digital marketing and consumer behavior research where the target population is defined by behavioral engagement in online environments rather than by clearly identifiable demographic registers. The use of an online survey also facilitates participation among individuals who are actively engaged with digital platforms, consistent with this study's focus on digitally mediated consumption environments.

A total of 250 valid responses were obtained and retained for analysis. To further assess the adequacy of the sample, a statistical power analysis was conducted using G*Power. Following commonly recommended parameters for behavioral research (effect size $f^2 = 0.15$, significance level $\alpha = 0.05$, statistical power = 0.95, and two predictors corresponding to the maximum number of antecedent constructs in the structural model, namely those predicting value internalization), the analysis indicated that the minimum required sample size was substantially lower than the final number of observations used in this study. Therefore, the sample of 250 respondents provides sufficient statistical power for estimating the structural relationships within the proposed PLS-SEM model.

In addition, prior methodological literature on PLS-SEM indicates that the technique is suitable for estimating complex models involving multiple mediating relationships and performs reliably with moderate sample sizes when the research objective is theory testing and prediction. Accordingly, the final sample is considered adequate for estimating the proposed structural relationships among online content design, perceived choice architecture, perceived nudging, value internalization, and pro-environmental behavior.

Measurement and Instrument Development

All constructs were measured using multi-item reflective scales adapted from established, validated instruments used in prior studies. Measurement items were contextualized to reflect digital marketing and sustainability settings while preserving their original conceptual meaning. Responses were recorded using a five-

point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”) (Bilgin & Çetinkaya, 2025; La Ragione & Risitano, 2026).

- 1) Online Content Design was measured by items capturing respondents’ perceptions of visual structure, framing, and presentation of digital marketing content.
- 2) Perceived Choice Architecture assessed respondents’ perceptions of how choices and information were structured and organized within digital environments.
- 3) Perceived Nudging measured respondents’ subjective experiences of subtle guidance embedded in digital content.
- 4) Value Internalization captured the extent to which sustainability-related values were integrated into respondents’ personal value systems.
- 5) Pro-Environmental Behavior measured self-reported environmentally responsible consumption behaviors.

While self-reported measures may be subject to social desirability bias, they are widely used in sustainability and consumer behavior research, particularly when direct observation of individual consumption practices is not feasible. In this study, the items were designed to capture respondents’ behavioral tendencies rather than objectively verified actions, reflecting the value-driven nature of pro-environmental consumption.

Prior to full-scale data collection, the questionnaire was reviewed to ensure clarity, content validity, and contextual appropriateness. Because pro-environmental behavior was measured using self-reported items, the potential influence of social desirability bias was considered, as respondents may tend to report environmentally responsible actions in ways that reflect socially desirable norms (Zinkevicius, 2024). To mitigate this risk, the questionnaire was administered anonymously, and respondents were informed that their answers would remain confidential and would be used solely for academic purposes. The questionnaire also emphasized that there were no correct or incorrect responses and encouraged participants to report their actual experiences. In addition, the behavioral items were phrased in neutral, behavior-oriented terms to reduce normative pressure. While objective behavioral data (e.g., actual purchase records) could provide additional validation, such data are difficult to obtain in large-scale survey research involving geographically dispersed social media users. Consequently, self-reported measures remain widely used in sustainability and consumer behavior research when examining individual-level pro-environmental behavior.

Data Analysis Technique

PLS-SEM is particularly well-suited to the present mediation-focused framework, as the study examines both parallel and sequential indirect effects among multiple latent constructs. The proposed model specifies that online content design influences pro-environmental behavior through two perceptual pathways—perceived choice architecture and perceived nudging—which, in turn, facilitate value internalization before shaping behavioral outcomes. Such a multi-layered mediation structure requires estimating complex indirect relationships and predictive paths among endogenous constructs, making variance-based SEM particularly appropriate for maximizing explained variance. Moreover, PLS-SEM is robust for prediction-oriented research, does not require multivariate normality, and is well-suited for behavioral models involving reflective measurement specifications.

Common Method Bias

Because this study relies on self-reported survey data collected from a single source at a single point in time, potential common method bias (CMB) was carefully considered. Several procedural remedies were implemented during data collection to mitigate CMB. Respondents were assured of anonymity and confidentiality to reduce evaluation apprehension and social desirability bias. In addition, the measurement items for the predictor and criterion constructs were psychologically separated within the questionnaire, and the scale endpoints were clearly defined to minimize ambiguity and consistency issues.

To statistically assess the presence of common method variance, Harman’s single-factor test was conducted. The results indicated that no single latent factor accounted for most of the variance, as the first unrotated factor explained less than 50% of the total variance. This suggests that common method bias is unlikely to substantially inflate the observed relationships. Furthermore, following (Kock et al., 2021), a full collinearity assessment was performed using variance inflation factor (VIF) values. All full collinearity VIF values were below the conservative threshold of 3.3, indicating that common method bias does not pose a serious threat to the structural estimates. Taken together, both procedural and statistical remedies suggest that common method bias is unlikely to materially affect the findings of this study.

3. RESULT AND DISCUSSION

Sample Characteristics

In line with established guidelines for survey-based Research and structural equation modeling, the dataset was screened to ensure completeness, consistency, and suitability for further analysis prior to hypothesis testing (Oliveri et al., 2021). From the questionnaires distributed, 250 responses met the predefined criteria and were retained as valid observations. This sample size exceeds the minimum recommendations for PLS-SEM applications involving multiple latent constructs and mediating relationships, thereby providing sufficient statistical power for subsequent analysis.

Table 1. Characteristics of the sample

Variable	Categories	Frequency	%
Gender	Male	118	47.2
	Female	132	52.8
Age	20 years or less	42	16.8
	21–30 years	129	51.6
	31–40 years	58	23.2
	41–50 years	21	8.4
Monthly income (IDR)	Less than 2,000,000	76	30.4
	2,000,001–4,000,000	92	36.8
	4,000,001–6,000,000	44	17.6
	6,000,001–8,000,000	22	8.8
	More than 8,000,000	16	6.4
Educational level	High school or less	39	15.6
	Diploma	28	11.2
	Bachelor's degree	158	63.2
	Postgraduate degree	25	10
Social media platform most frequently used	Instagram	112	44.8
	TikTok	96	38.4
	Both equally	42	16.8
Experience following online promotions (years)	Less than 1 year	48	19.2
	1–3 years	111	44.4
	4–5 years	63	25.2
	More than 5 years	28	11.2

Source: Primary data results (2026)

Table 1 presents the demographic profile of the respondents. The gender composition of the sample is presented in Table 1. The demographic profile of the respondents is presented in Table 1. The gender composition of the sample was relatively balanced, consisting of 132 female respondents (52.8%) and 118 male respondents (47.2%). In terms of age, the largest group was 21–30 years old (51.6%), followed by 31–40 years old (23.2%). Respondents aged 20 years or younger accounted for 16.8%, while those aged 41–50 years represented 8.4% of the sample. This distribution reflects a population segment highly engaged with digital technologies and social media platforms, consistent with the study's focus on digital marketing environments.

Regarding socioeconomic characteristics, most respondents reported monthly incomes in the lower- to middle-income ranges, with 36.8% earning IDR 2,000,001–4,000,000 and 30.4% earning less than IDR 2,000,000. Higher-income categories were underrepresented in the sample. In terms of educational attainment, many respondents held a bachelor's degree (63.2%), followed by those with high school education or less (15.6%), diploma-level education (11.2%), and postgraduate degrees (10%). Regarding digital behavior, Instagram was the most frequently used social media platform (44.8%), followed by TikTok (38.4%), and 16.8% reported using both

platforms equally. In addition, most respondents (44.4%) indicated 1–3 years of experience following online promotional content, suggesting sustained exposure to digital marketing messages relevant to the study context.

The demographic profile of the sample indicates that a substantial proportion of respondents hold a bachelor's degree and belong to younger age groups that are highly active in digital environments. This composition reflects the characteristics of social media users in West Java who are frequently exposed to digital marketing content. Prior studies on digital platform engagement suggest that younger, more highly educated individuals are more digitally connected and therefore experience greater exposure to curated online content.

At the same time, education may influence environmental awareness and the formation of values. Respondents with higher levels of education are often more exposed to sustainability discourse and environmental information, which may shape their value orientations. Consequently, the observed level of value internalization among respondents in this study should not be interpreted solely as a direct outcome of digital marketing exposure. Instead, education may act as a contextual factor that interacts with digitally mediated decision environments.

However, the primary objective of the present study is to examine the structural relationships among online content design, perceptual mechanisms, value internalization, and pro-environmental behavior rather than to estimate population-level environmental attitudes. Within the structural equation modeling framework, the focus lies on the relational mechanisms among constructs. Future research may further extend this work by explicitly examining the moderating role of education or by comparing samples with different educational backgrounds to better isolate the influence of digital behavioral architecture mechanisms.

Measurement Model Assessment

The measurement model was evaluated to assess indicator reliability, internal consistency reliability, and convergent validity, following established guidelines for PLS-SEM analysis (Russo et al., 2021). Indicator reliability was assessed by examining the standardized outer loadings for each item. As shown in Table 2, all indicators exhibited loadings above the recommended threshold of 0.70, indicating that each item adequately reflects its respective latent construct.

Table 2. Reliability analysis and factor analysis test

Variable	Code	LF	CA	CR	AVE
Online Content Design			0.792	0.864	0.615
The content I see provides information that helps me make better choices.	OCD.1	0.772			
The content does not merely promote products but helps me understand how to choose wisely.	OCD.2	0.809			
The content presents messages that clearly highlight better options.	OCD.3	0.746			
The content feels educational rather than purely promotional.	OCD.4	0.807			
Perceived Choice Architecture			0.849	0.898	0.688
The way the content is presented seems to structure the choices I can make.	PCA.1	0.804			
I feel guided toward certain options through the way the message is delivered.	PCA.2	0.818			
The presentation of the content makes one option appear more prominent.	PCA.3	0.859			
The content influences how I evaluate available choices.	PCA.4	0.835			
Perceived Nudging			0.864	0.907	0.708
The content subtly encourages me without feeling forceful.	PN.1	0.801			
I feel gently pushed to act after seeing the content.	PN.2	0.864			

The message influences me without direct pressure.	PN.3	0.867			
The content provides a small but noticeable encouragement to act.	PN.4	0.833			
Value Internalization			0.864	0.901	0.646
The sustainability message in the content aligns with my personal values.	VI.1	0.849			
Environmental issues feel more personally important to me after seeing such content.	VI.2	0.843			
The values communicated in the content feel personally meaningful to me.	VI.3	0.799			
I feel a personal sense of responsibility toward the issues presented.	VI.4	0.836			
Pro-Environmental Behavior			0.852	0.9	0.692
I tend to choose products that are more environmentally friendly.	PEB.1	0.841			
I try to reduce the use of products that harm the environment.	PEB.2	0.788			
I pay attention to environmental impact before making purchases.	PEB.3	0.756			
I attempt to change my consumption habits to be more environmentally friendly.	PEB.4	0.784			
I am willing to put extra effort into choosing more sustainable products.	PEB.5	0.847			

Note(s): LF= Loading Factor, CA= Cronbach's Alpha, CR= Composite Reliability, AVE= Average Variance Extracted

Source: Primary data results (2026)

Internal consistency reliability was assessed using Cronbach's alpha (CA) and composite reliability (CR). The results indicate satisfactory reliability for all constructs, with Cronbach's alpha values ranging from 0.792 to 0.864 and composite reliability values ranging from 0.864 to 0.907, both exceeding the minimum acceptable level of 0.70. These findings confirm that the indicators within each construct consistently measure the same underlying concept (Hair et al., 2019).

Convergent validity was evaluated using the average variance extracted (AVE). As reported in Table 2, all constructs achieved AVEs above the recommended threshold of 0.50, ranging from 0.615 to 0.708, indicating that each construct explains more than half of its indicators' variance. Taken together, these results demonstrate that the measurement model exhibits satisfactory reliability and convergent validity, supporting its suitability for subsequent structural model analysis.

Discriminant Validity

Discriminant validity was examined to confirm that each construct in the model is empirically distinct and captures a unique aspect of the underlying phenomena. Following established recommendations in variance-based structural equation modeling, discriminant validity was assessed using the Fornell–Larcker criterion and the heterotrait–monotrait ratio (HTMT).

Table 3. Assessment of discriminant validity using HTMT and Fornell–Larcker Criterion

Fornell–Larcker Criterion					
Construct	OCD	PCA	PN	PEB	VI
Online Content Design	0.784				
Perceived Choice Architecture	0.225	0.83			
Perceived Nudging	0.246	0.082	0.842		
Pro-Environmental Behavior	0.153	0.16	0.064	0.804	

Value Internalization_	0.158	0.28	0.351	0.252	0.832
HTMT Ratio Matrix					
Construct	OCD	PCA	PN	PEB	VI
Online Content Design	—				
Perceived Choice Architecture	0.268	—			
Perceived Nudging	0.295	0.112	—		
Pro-Environmental Behavior	0.175	0.187	0.097	—	
Value Internalization_	0.19	0.321	0.399	0.284	—

Source: Primary data results (2026)

As reported in Table 3, the square roots of the average variance extracted (AVE) for all constructs exceed their corresponding inter-construct correlations. Specifically, the diagonal values for Online Content Design (0.784), Perceived Choice Architecture (0.830), Perceived Nudging (0.842), Value Internalization (0.832), and Pro-Environmental Behavior (0.804) are higher than the correlations with other constructs. Although moderate correlations were observed between Perceived Nudging and Value Internalization (0.351) and between Perceived Choice Architecture and Value Internalization (0.280), these values remain substantially lower than the respective AVEs, indicating that the constructs retain sufficient empirical distinctiveness.

The HTMT ratio analysis provided additional evidence for discriminant validity. As shown in Table 3, all HTMT values fall well below the conservative threshold of 0.85, ranging from 0.097 to 0.399. The highest HTMT value was observed between Perceived Nudging and Value Internalization (0.399), which remains comfortably within acceptable limits. These findings suggest minimal construct overlap and adequate discriminant validity across all constructs.

Collinearity Assessment

Before evaluating the structural relationships, collinearity diagnostics were conducted to ensure that path coefficient estimates were not adversely affected by multicollinearity among indicators. In line with established recommendations for PLS-SEM, collinearity was assessed using the variance inflation factor (VIF) (Hair et al., 2019). As reported in Table 4, all indicator-level VIF values ranged from 1.519 to 2.329, remaining well below the conservative threshold of 3.3, thereby indicating an absence of critical collinearity concerns.

Table 4. Collinearity statistics (VIF)

Indicators	VIF
OCD1	1.550
OCD2	1.591
OCD3	1.519
OCD4	1.621
PCA1	1.816
PCA2	1.846
PCA3	2.095
PCA4	1.949
PEB1	2.024
PEB2	1.878
PEB3	1.730
PEB4	1.791
PEB5	2.110
PN1	1.824
PN2	2.329
PN3	2.013
PN4	2.113
VI1	2.156

VI2	2.012
VI3	1.840
VI4	1.811

Source: Primary data results (2026)

More specifically, the indicators of Online Content Design exhibited VIF values between 1.519 and 1.621, while those of Perceived Choice Architecture ranged from 1.816 to 2.095. Indicators associated with Perceived Nudging showed slightly higher, but still acceptable, VIF values, ranging from 1.824 to 2.329. In contrast, the Value Internalization and Pro-Environmental Behavior indicators ranged from 1.811 to 2.156 and 1.730 to 2.110, respectively. These values suggest that the indicators contribute unique explanatory information and that redundancy among measurement items is minimal. Consequently, the structural estimates derived from the model can be interpreted with confidence, as they are unlikely to be distorted by multicollinearity effects.

Structural Model Assessment

The explanatory capacity of the structural model was evaluated using the coefficient of determination (R^2) alongside predictive relevance (Q^2). As shown in Table 5, the model exhibits varying levels of explanatory power across endogenous constructs, reflecting the staged, process-oriented nature of the proposed behavioral architecture framework.

Table 5. Coefficient of Determination (R^2) and Predictive Relevance (Q^2)

	R Square	Q^2 (=1-SSE/SSO)
Perceived Choice Architecture	0.050	0.033
Perceived Nudging	0.061	0.040
Pro-Environmental Behavior	0.063	0.035
Value Internalization	0.187	0.119

Source: Primary data results (2026)

The model accounts for 18.7% of the variance in Value Internalization ($R^2 = 0.187$), indicating that perceived choice architecture and perceived nudging jointly shape the cognitive integration of sustainability-related values into individuals' evaluative systems. This result supports the conceptualization of value internalization as a central mediating mechanism through which digitally structured environments influence downstream outcomes.

The explanatory power for Pro-Environmental Behavior is relatively limited ($R^2 = 0.063$). Rather than indicating a weakness of the model, this result is theoretically consistent with the distal and context-dependent nature of sustainable consumption behavior. In the present framework, online content design is not positioned as a direct behavioral trigger, but as an upstream contextual influence that shapes how individuals perceive and interpret their digital decision environments. These perceptual processes—captured through perceived choice architecture and perceived nudging—subsequently facilitate value internalization, which represents the most proximal determinant of pro-environmental behavioral tendencies within the model.

From this perspective, the model is intentionally specified to capture a specific indirect mechanism rather than to maximize predictive accuracy for behavioral outcomes. Pro-environmental behavior, as widely recognized in prior research, is shaped by a broad constellation of factors, including situational constraints, economic considerations, habitual patterns, and social norms, many of which fall outside the scope of the present study. Accordingly, the relatively low R^2 should be interpreted as reflecting the model's parsimonious, mechanism-focused design rather than as a limitation of its theoretical contribution.

Additional support for the model's relevance is provided by the predictive relevance (Q^2) values obtained through the blindfolding procedure. All endogenous constructs exhibit Q^2 values greater than zero (Perceived Choice Architecture = 0.033; Perceived Nudging = 0.040; Value Internalization = 0.119; Pro-Environmental Behavior = 0.035), indicating that the model retains predictive capability across constructs. Notably, the highest Q^2 value is observed for Value Internalization, further reinforcing its role as the central mediating construct within the behavioral architecture framework.

Taken together, these findings suggest that the proposed model offers meaningful insight into how digitally mediated environments contribute to sustainability-related behavior through indirect, value-based pathways, even when the overall variance explained in behavioral outcomes remains modest.

Path coefficients/ Hypothesis testing

The structural model was assessed to examine the hypothesized relationships among the latent constructs using a bootstrapping procedure. Consistent with established guidelines for variance-based structural equation modeling, the evaluation focused on path coefficients, t-statistics, and associated p-values to determine the

significance of the proposed relationships. The results of the structural model assessment are summarized in Table 6.

Table 6. Hypothesis Testing Results

Effects	Mean	Standard Deviation	T Statistics	P Values	Result
OCD -> PCA	0.226	0.069	3.250	0.001	Accepted
OCD -> PN	0.251	0.062	3.987	0.001	Accepted
PCA -> VI	0.255	0.053	4.760	0.001	Accepted
PN -> VI	0.334	0.060	5.516	0.001	Accepted
VI -> PEB	0.263	0.061	4.109	0.001	Accepted

Source: Primary data results (2026)

The findings indicate that Online Content Design has a positive and statistically significant effect on Perceived Choice Architecture ($\beta = 0.226$, $t = 3.250$, $p < 0.01$). This result suggests that the way digital content is structured and presented plays a meaningful role in shaping how consumers perceive the choices available in online environments. In addition, Online Content Design also exerts a positive and significant influence on Perceived Nudging ($\beta = 0.251$, $t = 3.987$, $p < 0.001$), indicating that content design contributes to consumers' awareness of subtle guidance embedded in digital marketing messages.

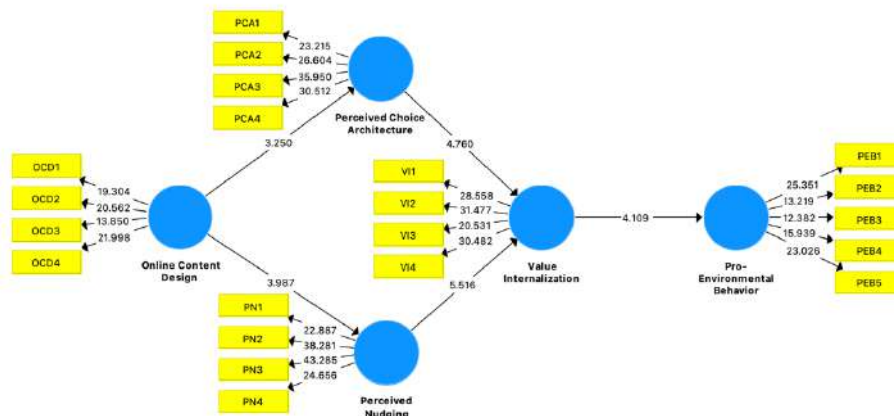


Figure 1. Bootstrapping Result

To further examine the nature of the proposed relationships, the direct path from Online Content Design to Pro-Environmental Behavior was also tested. The results indicate that this direct effect is not statistically significant, thereby supporting a full mediation structure in which the influence of online content design on pro-environmental behavior operates indirectly through perceived choice architecture, perceived nudging, and value internalization.

Furthermore, both mediating constructs were found to significantly influence Value Internalization. Specifically, Perceived Choice Architecture positively affects Value Internalization ($\beta = 0.255$, $t = 4.760$, $p < 0.001$), while Perceived Nudging demonstrates a stronger positive effect ($\beta = 0.334$, $t = 5.516$, $p < 0.001$). These results are consistent with prior behavioral Research suggesting that structured decision environments and subtle nudging mechanisms facilitate deeper cognitive and value-based processing rather than mere surface-level persuasion.

Value Internalization shows a positive and significant effect on Pro-Environmental Behavior ($\beta = 0.263$, $t = 4.109$, $p < 0.001$). This finding supports the view that when sustainability-related values are integrated into individuals' personal value systems, they are more likely to be translated into consistent behavioral outcomes, particularly in consumption contexts (Hair et al., 2019). Taken together, the results provide empirical support for the proposed behavioral architecture framework linking digital content design, perceptual mechanisms, value internalization, and pro-environmental behavior.

Effect size (f^2)

The relative contribution of each exogenous construct to the endogenous variables was assessed using the effect size (f^2). Following established guidelines for PLS-SEM, f^2 values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively (Hair et al., 2019).

Table 7. Effect size (f^2)

	Online Content Design	Perceived Choice Architecture	Perceived Nudging	Pro-Environmental Behavior	Value Internalization
Online Content Design		0.053	0.065		
Perceived Choice Architecture					0.078
Perceived Nudging					0.133
Pro-Environmental Behavior					
Value Internalization				0.068	

Source: Primary data results (2026)

The results indicate that Online Content Design exerts a small effect on both Perceived Choice Architecture and Perceived Nudging. These findings suggest that while digital content design contributes to shaping consumers' perceptions of digitally structured decision environments, such perceptions are also influenced by a broader set of contextual and cognitive factors present in digital consumption settings. Similarly, Perceived Choice Architecture demonstrates a small effect on Value Internalization, whereas Perceived Nudging exhibits a comparatively stronger influence on Value Internalization, although still within the small effect size category. This pattern suggests that subtle behavioral cues embedded within digital environments may play a relatively more salient role in facilitating the integration of sustainability-related values. Finally, Value Internalization shows a small effect on Pro-Environmental Behavior. This finding indicates that while internalized values contribute to environmentally responsible consumption behavior, such behavior is typically shaped by multiple psychological, social, and contextual determinants beyond those captured in the present model (Hosta & Zabkar, 2021; Steg & Vlek, 2009). Taken together, the effect size results suggest that the proposed behavioral architecture mechanisms provide incremental explanatory influence within a complex behavioral system rather than functioning as sole determinants of sustainable consumption behavior.

Bootstrapped Indirect Effects

To further examine the mechanisms through which digital content design influences pro-environmental behavior, indirect effects were evaluated using the bootstrapping procedure. The results indicate that several mediation pathways are statistically significant.

Table 8. Indirect Effects

Effects	Mean	Standard Deviation	T Statistics	P Values	Result
PCA_ -> VI -> PEB	0.068	0.023	2.795	0.005	Accepted
OCD -> PCA_ -> VI -> PEB	0.015	0.007	2.024	0.043	Accepted
PN_ -> VI -> PEB	0.088	0.028	2.996	0.003	Accepted
OCD-> PN_ -> VI -> PEB	0.022	0.009	2.194	0.029	Accepted
OCD -> PCA_ -> VI	0.057	0.020	2.831	0.005	Accepted
OCD -> PN_ -> VI	0.084	0.027	3.062	0.002	Accepted

Source: Primary data results (2026)

The mediation results indicate that digitally structured decision environments influence pro-environmental behavior primarily through value internalization processes. Both perceived choice architecture and perceived nudging contribute indirectly to pro-environmental behavior by fostering the integration of sustainability-related values within individuals' evaluative frameworks. These findings suggest that the structural organization of digital decision environments can shape behavioral outcomes not through direct behavioral triggers but through psychological processes that reinforce value-based motivations.

Taken together, the results support the proposed behavioral architecture framework, indicating that the influence of digital content design on sustainable consumption operates primarily through perceptual mechanisms and value internalization processes. In digitally mediated environments, the way information is structured and presented may shape how individuals interpret available choices and evaluate consumption alternatives (Kozyreva et al., 2020).

This finding highlights the importance of value internalization as a psychological mechanism through which digitally mediated environments may influence sustainable consumption. The findings are consistent with interpreting digital marketing environments as structured decision contexts rather than merely persuasive messages. In behavioral decision research, such processes are typically gradual, emerging through repeated exposure to contextual signals that subtly frame desirable courses of action (Rosário & Dias, 2025). On digital platforms, the organization of content, visual emphasis, and contextual framing may therefore serve as cues that prompt individuals to evaluate consumption decisions through sustainability-related value lenses (Horrich et al., 2025).

The absence of a direct effect of online content design on pro-environmental behavior further supports the view that behavioral change in sustainability contexts rarely occurs through immediate persuasive exposure. Instead, sustainable consumption tends to emerge through cumulative cognitive and evaluative processes in which individuals gradually align their actions with internalized values. This pattern is consistent with research in the sustainable consumption literature, which suggests that environmentally responsible behavior is typically mediated by internal value structures rather than driven by short-term persuasive stimuli (Vermeir et al., 2020). Consequently, digitally structured choice environments may contribute to sustainable consumption not by directly altering behavior but by reinforcing value-based motivations that guide decision-making over time.

Theoretical Implications

This study contributes to the literature on digital marketing, behavioral decision-making, and sustainable consumption by positioning online content design as a contextual element of digitally mediated choice environments. Rather than functioning solely as a persuasive communication tool, digital content design may influence how decision contexts are structured and interpreted by consumers. While prior research has largely emphasized engagement, personalization, and conversion outcomes in digital marketing environments, the present findings suggest that digital content may also shape consumers' perceptions of how choices are organized and evaluated within online settings.

By empirically linking online content design to perceived choice architecture and perceived nudging, the study extends choice architecture research into digitally mediated consumption environments. Importantly, the empirical results indicate that these mechanisms exert incremental rather than dominant influences on consumer perceptions and behavioral outcomes, consistent with the complex, multi-determined nature of sustainable consumption behavior.

The study further contributes to value-based theories of behavior by highlighting the role of value internalization as a mediating psychological mechanism linking digital decision environments and pro-environmental behavior. Previous research has often conceptualized value formation as a process shaped primarily by socialization or attitudinal development outside market contexts (Gupta & Mukherjee, 2022). The present findings suggest that digitally mediated consumption environments may also provide contextual cues that support the gradual reinforcement and alignment of sustainability-related values.

The study offers an integrative perspective by bridging insights from digital marketing, behavioral economics, and sustainability research. Rather than conceptualizing digital nudging as a short-term behavioral intervention, the findings suggest that digitally structured choice environments may contribute to incremental value reinforcement processes that support environmentally responsible consumption behavior over time.

Importantly, the theoretical contribution of this study should be understood independently of the overall variance explained in behavioral outcomes. Given the distal and context-dependent nature of pro-environmental behavior, models focusing on specific psychological and contextual mechanisms are unlikely to account for a large proportion of behavioral variance. Instead, the present study contributes by isolating a theoretically grounded pathway through which digitally structured environments shape value internalization, which in turn relates to pro-environmental behavioral tendencies. In this sense, the contribution lies not in predictive breadth but in explanatory depth regarding how digital environments function as behavioral architecture.

Limitations and Future Research

While this study provides theoretical and empirical insights into the relationship between digital content design, behavioral architecture, and sustainable consumption, several limitations should be acknowledged. They may suggest promising directions for future research. First, the use of a cross-sectional survey design restricts the ability to capture the dynamic and cumulative nature of value internalization processes over time. While the

findings demonstrate structural relationships among online content design, perceived choice architecture, perceived nudging, value internalization, and pro-environmental behavior, they do not permit causal inferences regarding the temporal evolution of these mechanisms. Future research should consider longitudinal, panel, or experience-sampling designs to investigate how repeated exposure to digitally structured decision environments contributes to the gradual formation, reinforcement, and stabilization of sustainability-related values.

Second, an important limitation relates to the conceptualization and measurement of digital behavioral architecture. In the present study, choice architecture and nudging are operationalized through consumers' subjective perceptions of digitally mediated decision environments rather than through direct observation of the structural features of digital platforms. This perceptual approach is theoretically consistent with behavioral decision research, where the influence of contextual cues depends on how individuals interpret and experience their choice environment. However, it does not capture the objective configuration of digital content architecture itself.

As a result, the findings primarily reflect users' perceptions of the organization and behavioral guidance within digital environments, rather than identifying specific design elements such as interface layout, algorithmic recommendation systems, default settings, or content presentation mechanisms that constitute the underlying digital architecture. Future research should address this limitation by integrating perceptual measures with objective assessments of digital interface design, platform analytics, or behavioral tracking data. These approaches would facilitate a more precise examination of how structural features of digital environments translate into perceived choice architecture and subsequent behavioral outcomes.

Third, because the key constructs in this study were measured via self-reported survey data, the results may be subject to common-method bias. Although procedural remedies—such as assuring respondent anonymity and minimizing evaluation apprehension—were implemented, future research could strengthen causal inference by employing multi-source data, behavioral observation, or experimental designs that capture actual consumer responses within digitally mediated environments. While this limitation should be acknowledged, self-reported measures remain appropriate for capturing internalized, value-driven tendencies, particularly in contexts where pro-environmental behavior is closely linked to personal value integration rather than directly observable actions. Accordingly, the findings are best interpreted as reflecting behavioral tendencies rather than objectively verified consumption behavior.

Fourth, the empirical context of this study is situated in West Java, Indonesia, an emerging digital market characterized by high social media penetration and frequent exposure to online marketing content. These contextual conditions provide a relevant setting for examining how digitally structured environments shape consumer perceptions and value-related processes. Accordingly, the findings are most applicable to digitally intensive consumption contexts in which individuals are regularly exposed to platform-mediated content and socially embedded decision cues. In such environments, digital content design is more likely to function as behavioral architecture, shaping perceived choice structures and value internalization processes.

However, the generalizability of the findings may be limited in contexts where digital engagement is less pervasive, where consumer decision-making is less influenced by platform-based interactions, or where institutional and regulatory frameworks play a more dominant role in shaping sustainable consumption behavior. Future research could extend this work by examining the proposed model across diverse cultural, institutional, and technological settings to better understand how variations in digital maturity, regulatory environments, and socio-cultural norms influence the effectiveness of digitally mediated behavioral architecture.

Finally, future research may extend the proposed framework by examining how additional psychological and contextual mechanisms interact with behavioral architecture and value internalization processes. Factors such as habit formation, social identity, perceived algorithmic transparency, or trust in digital platforms may operate as moderating or complementary mechanisms that influence the effectiveness of digitally structured decision environments. Exploring these extensions would further advance theoretical understanding of how digital environments shape long-term consumer behavior beyond immediate decision situations.

4. CONCLUSION

This study investigated the influence of digitally mediated marketing environments on pro-environmental consumption by conceptualizing digital marketing as an element of a broader behavioral architecture within online decision environments. Rather than focusing exclusively on persuasive messaging, the findings indicate that the structural organization of digital content shapes how consumers perceive and interpret available choices. Specifically, the results demonstrate that online content design is associated with consumers' perceptions of choice architecture and nudging mechanisms, which are subsequently linked to value internalization processes and pro-environmental behavioral tendencies.

The results should be interpreted with caution due to the cross-sectional nature of the data and the modest effect sizes observed in the structural model. These findings do not imply a deterministic causal transformation of consumer values or behavior. Rather, they suggest that digitally structured decision environments may incrementally reinforce and shape sustainability-related values in everyday consumption contexts.

This study also underscores an important conceptual consideration. Although digital marketing environments can be theorized as forms of behavioral architecture, the experiential boundary between subtle nudging mechanisms and persuasive communication may remain indistinct from the consumer's perspective. Consequently, the present findings primarily reflect how users perceive and interpret digitally mediated decision environments, rather than providing direct evidence regarding the objective structural properties of digital platforms.

Despite these limitations, the study provides several practical implications. For marketers and platform designers, the results suggest that sustainability-oriented digital communication is more effective when integrated within thoughtfully structured choice environments rather than relying solely on persuasive messaging. Features such as transparent information presentation, responsible recommendation systems, and carefully designed default options can help create digital environments that support environmentally responsible decision-making without resorting to manipulative persuasion.

For policymakers and platform regulators, the findings underscore the increasing importance of ethical digital choice architecture in shaping consumer behavior. As digital platforms play a larger role in structuring everyday consumption decisions, regulatory discussions should consider how interface design, algorithmic recommendations, and content curation practices influence sustainability-related behavior. Developing guidelines for transparent and responsible digital choice environments represents a significant opportunity to support sustainable consumption in digitally intensive markets. In summary, this study contributes to ongoing discussions on sustainable consumption and digital platform governance by suggesting that the behavioral influence of digital marketing resides not only in persuasive communication but also in the structural framing of consumer decision contexts within digital environments.

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