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Exploring Sensory Marketing in E-Commerce: The Role of Visual and Auditory Cues on Customer Engagement and Purchase Intention

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ABSTRACT

Objective: This study aims to examine the role of visual cues and auditory cues as part of sensory marketing strategies in influencing customer engagement and purchase intention among Indonesian e-commerce consumers.

Methodology: A quantitative explanatory research design was employed. Data were collected through an online survey of 310 active e-commerce users in East Java. The data were analyzed using Structural Equation Modeling with Partial Least Squares (SEM-PLS) via SmartPLS.

Finding: The results indicate that visual cues significantly affect purchase intention both directly and indirectly through customer engagement. In contrast, auditory cues do not have a significant direct effect but demonstrate a significant indirect influence through engagement. This highlights engagement as a key psychological mechanism linking sensory marketing to purchase intention.

Conclusion: The study extends the application of the Stimulus–Organism–Response (SOR) framework and sensory marketing literature in the digital context of emerging markets. Practically, it provides strategic implications for e-commerce platforms to prioritize visual quality while leveraging auditory elements as emotional enhancers, thereby strengthening consumer engagement and fostering purchase intentions through enhanced customer engagement.

Keywords: Sensory Marketing; Visual Cues; Auditory Cues; Customer Engagement; Purchase Intention.

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INTRODUCTION

Global digital transformation has driven a significant shift in people's consumption behavior (Bagis & Adawiyah, 2022). The growth of e-commerce is one of the main drivers of the world's digital economy, with transaction values reaching trillions of US dollars every year (UNCTAD, 2024). This trend not only contributes to trade efficiency, but is also closely related to the Sustainable Development Goals (SDGs) agenda and SDG 12 on responsible consumption and production (UNCTAD, 2024). In this digital ecosystem, customer experience is a crucial factor in creating business sustainability, where sensory marketing strategies are increasingly viewed as an innovative approach to enhance consumer engagement and support long-term digital commerce development, aligning conceptually with broader sustainability agendas (Nadeem et al., 2025).

This phenomenon is also reflected in Southeast Asia, especially Indonesia, which is one of the largest e-commerce markets in the region. The e-Conomy SEA report (2023) confirms that Indonesia accounts for more than 40% of the total value of the ASEAN digital economy by 2030. The favorable development cannot be separated from certain obstacles, notably the need for digital platforms to continuously engage customers and foster purchase intentions within an environment of growing competition (Nugroho et al., 2025). Changes in Generation Z traits such as their tendency towards impulsive behavior, strong inclination towards experiential consumption, and increased responsiveness to visual and auditory input emphasize the importance of examining sensory cues in the context of online commerce (Tong et al., 2019; Zhang & Huang, 2024).

From a theoretical perspective, the Stimulus-Organism-Response (SOR) model proposed by Mehrabian and Russell (1974) how stimuli such as visual and auditory cues, affect psychological states (e.g., imagination, emotional arousal, or customer involvement) that to lead purchase intentions. Sensory marketing theory further highlights that sensory cues create immersive experiences shaping consumer perceptions and attitudes (Lyu & Huang, 2024; Nadeem et al., 2025), the use of sensory aspects in digital marketing can result in immersive experiences that influence consumer attitudes, feelings, and perceptions (Afif et al., 2024; Susilawati & Adi, 2022). Empirical studies also confirm these links, showing the role of visual presentation and background music in enhancing engagement and purchase intention (Han et al., 2024; Wang et al., 2022).

Although the literature on digital marketing (Afif & Faradina, 2023; Setyawati et al., 2024) is growing rapidly, there are some important research gaps to address. First, most sensory marketing studies in the digital context still focus on visual cues (logos, colors, designs) or trust and certification issues, while studies on the role of auditory cues are relatively limited, especially in the Southeast Asian market (Jiang et al., 2024; Lyu & Huang, 2024). Second, research that integrates visual and auditory cues simultaneously within the SOR framework by considering customer engagement as a mediator is still rare (Guo et al., 2025; Wang et al., 2022). Third, the Indonesian context, despite being one of the world's largest e-commerce markets, is still underexplored in the global literature (Nugroho et al., 2025; Susilawati, 2020).

Conceptually, the relationship between variables can be understood through the stimulus–response pathway mediated by consumer involvement. Powerful visual cues, such as interface design and product representation, are able to stimulate mental imagery that evokes emotional engagement, while auditory cues such as background music or sound effects create an atmosphere that reinforces the consumer's psychological proximity to the platform (Han et al., 2024; Zhang & Huang, 2024). This engagement in turn serves as an important mechanism that bridges sensory stimuli with buying intent (Wu et al., 2025; Wang et al., 2022). Cross-cultural research shows that

there is variation in sensory responses between markets (Lyu & Huang, 2024; Ngo et al., 2024), so that the integration of visual and auditory cues in models with the role of engagement mediation in the Indonesian context is still an unanswered research gap.

Despite the rapid growth of sensory marketing research in digital commerce, several important gaps remain unaddressed. First, most existing studies in e-commerce predominantly focus on visual cues such as interface design, color schemes, and product imagery, while the role of auditory cues remains relatively underexplored, particularly in online shopping environments. Second, prior research tends to examine visual and auditory stimuli in isolation, resulting in limited understanding of how multiple sensory cues operate simultaneously within a single theoretical framework. Third, empirical evidence from emerging markets, especially Indonesia as one of the largest and fastest-growing e-commerce ecosystems in Southeast Asia, is still scarce in the global literature. These gaps indicate the need for integrative research that simultaneously examines visual and auditory cues and clarifies the psychological mechanisms through which they influence consumer behavior in an emerging market context.

Based on the identified research gaps, this study seeks to examine how visual cues influence customer engagement and purchase intention in the e-commerce context. It also investigates whether auditory cues affect purchase intention both directly and indirectly through customer engagement. Furthermore, this study explores the mediating role of customer engagement in explaining the relationship between sensory cues (visual and auditory) and consumers' purchase intention in e-commerce.

This study contributes theoretically by extending the Stimulus-Organism-Response (SOR) framework in digital commerce through the simultaneous examination of visual and auditory cues with customer engagement as a mediating mechanism, particularly within an emerging market context.

Practically, this study provides insights for e-commerce platforms by highlighting the dominant role of visual cues in driving purchase intention and the complementary role of auditory cues in strengthening customer engagement, offering guidance for designing more engaging online shopping experiences.

LITERATURE REVIEW

Stimulus-Organism-Response (SOR) Model

The Stimulus-Organism-Response (SOR) theory developed by Mehrabian and Russell (1974) has become the dominant framework for understanding consumer behavior in various marketing contexts. This model explains that external stimuli from the environment (S) can trigger an internal reaction of the consumer (O), both cognitively and affectively, which then results in a specific behavioral response (R). In the context of e-commerce, the organismic element is represented by the consumer's affective state, arousal level, or mental image, while the stimulus is conveyed through features such as interface aesthetics, color palette, page layout, and auditory components. The subsequent response can be a purchase intention or actual consumption behavior. Recent studies have shown that the SOR framework is highly effective for understanding online consumer behavior, especially in face-to-face commerce and sensory-oriented shopping environments (Guo et al., 2025; Wang et al., 2022).

Sensory Marketing: Visual and Auditory Cues

The principle of sensory marketing leverages multisensory stimulation as a means to guide consumer perception, affective responses, and decision-making (Nadeem et al., 2025). Visual factors including layout design, color schemes, font choices, and product imagery, play a crucial role in shaping evaluations of product attractiveness and perceived quality (Zhang & Huang, 2024). Research evidence shows that these visual signals not only enhance buying intentions but also reinforce brand reputation (Wu et al., 2025). Conversely, auditory elements such as background music, rhythmic patterns, or sound effects can promote emotional engagement, thereby increasing users' sense of connection to the digital platform (Han et al., 2024; Zhang & Huang, 2024). However, research on auditory influences in online commerce remains limited compared to the extensive research on visual factors (Jiang et al., 2024; Lyu & Huang, 2024). This underscores the importance of integrating both sensory dimensions into research frameworks to address this gap.

Compared to visual cues, auditory cues in e-commerce remain relatively underexplored, particularly in emerging market contexts (Jiang et al., 2024). While visual elements such as layout, color, and imagery have been widely examined as primary drivers of online purchase intention, auditory elements including background music, sound effects, and audio narration are more closely associated with shaping consumers' emotional atmosphere and psychological engagement (Nadeem et al., 2025). Rather than functioning as direct predictors of purchase decisions, auditory cues primarily enhance customer engagement by creating immersive and affective online experiences, which subsequently influence purchase intention.

Customer Engagement

Customer engagement has been emphasized in marketing literature as a pivotal construct, encompassing consumers' psychological bonds with a brand or digital platform as well as their observable behaviors (Brodie et al., 2011; Wu et al., 2025). This engagement spans cognitive, emotional, and behavioral dimensions, which are reflected in consumers' attention, involvement, and active participation. Previous studies have shown that auditory cues enhance the affective component of engagement, while visual cues can enhance engagement by strengthening mental imagery (Han et al., 2024; Wang et al., 2022). Therefore, engagement is seen as a potential mediator in the relationship between sensory cues and purchase intention.

Purchase Intention

Ajzen (1991), purchase intention is a customer's tendency or intention to purchase a product or service based on their emotional and cognitive evaluations of it. The quality of sensory cues perceived by customers when interacting with a digital platform impacts their purchase intention in an e-commerce context (Zhang & Huang, 2024). Although constructs like engagement or mental imagery play an intermediary role in clarifying the process of influence, existing evidence demonstrates that visual and auditory stimuli significantly enhance consumers' purchase intentions (Lyu & Huang, 2024; Wu et al., 2025).

HYPOTHESIS DEVELOPMENT

Visual Cues and Customer Engagement

Interface design, layout, color application, typography, and product visuals are among the visual cues in e-commerce that play a crucial role in shaping consumer perception (Zhang & Huang, 2024). In the SOR model, these cues represent external stimuli that provoke internal responses such as attention, arousal, and psychological engagement (Mehrabian & Russell, 1974). From the sensory marketing perspective, visual elements can create engaging and immersive experiences that strengthen emotional ties with customers (Nadeem et al., 2025). Empirical findings reinforce this perspective: Wu et al., (2025) identified that the quality of visual displays significantly influences customer engagement in online shopping. Ngo et al., (2024) further revealed that consistent and coherent interface designs enhance users' attention and interaction, while Zhang & Huang (2024) found that visual cues not only increase engagement but also strengthen perceptions of product quality.

H1: Visual cues positively influence customer engagement in e-commerce.

Auditory Cues and Customer Engagement

Auditory cues in digital environments may take the form of background music, narration, or sound effects, all of which are intended to evoke strong emotional reactions. Within the SOR framework, such auditory inputs operate as stimuli that trigger affective responses and heighten psychological involvement (Han et al., 2024). Insights from sensory marketing further suggest that sound components contribute to richer brand experiences by fostering emotional connections (Nadeem et al., 2025). Furthermore, although this is still relatively understudied, Jiang et al., (2024) confirmed that auditory cues have tremendous potential to increase engagement in the Southeast Asian market.

H2: Auditory cues have a positive effect on customer engagement in the context of e-commerce.

Visual Cues and Purchase Intention

Visual cues, such as interface design, layout, and product representation, are stimuli that affect consumers' cognitive evaluation of a product or service (Zhang & Huang, 2024). Visual stimuli can directly shape behavioral responses without having to go through psychological mediators when consumer perceptions are strong enough to prompt action (Mehrabian & Russell, 1974). Sensory marketing theory also emphasizes that consistent visual aspects improve information clarity, reduce perceptual risk, and directly increase purchase intent (Nadeem et al., 2025). Empirical findings support this relationship. Wu et al., (2025) show that the visual quality of the interface directly increases purchase intention in fashion e-commerce. Zhang & Huang (2024) emphasized that the representation of high-quality products strengthens consumers' purchase intent directly. Ngo et al., (2024) also found that the consistency of visual elements increases trust and purchase intent on digital platforms.

H3: Visual cues have a positive effect on purchase intention in the context of e-commerce.

Auditory Cues and Purchase Intention

Auditory cues, such as background music or sound effects, create an emotional atmosphere that can directly affect consumer behavior. Within the SOR framework, sound acts as a stimulus that can elicit behavioral responses without going through complex cognitive mechanisms, especially when creating a positive mood that drives purchasing decisions (Han et al., 2024).

Sensory marketing theory also states that music and auditory elements are capable of creating strong emotional associations that influence preferences and purchase intent (Nadeem et al., 2025). Previous research has shown consistent support. Zhang & Huang (2024) found that background music in live commerce increases consumer purchase intent directly. Han et al., (2024) assert that auditory cues contribute to purchase intention by creating a pleasant emotional atmosphere. Jiang et al., (2024) also confirmed that audio elements can affect purchase intention in consumers in the Southeast Asian market.

H4: Auditory cues have a positive effect on purchase intention in the context of e-commerce.

Customer Engagement and Purchase Intention

Customer engagement is the level of cognitive, emotional, and behavioral involvement of consumers in interacting with brands or digital platforms (Brodie et al., 2011). In the SOR framework, engagement is seen as an internal reaction (organism) that bridges sensory stimuli with consumer behavior (response). The higher the engagement, the greater the psychological commitment and purchase intention of the consumer (Wu et al., 2025). Empirical research reinforces this argument. Wang et al., (2022) found that emotional engagement in live streaming commerce significantly increases purchase intent. Tong et al., (2019) show that Gen Z consumers with high engagement levels are more impulsive in purchasing decision-making. Similarly, Guo et al., (2025) confirm that engagement is the main predictor in driving purchase intention in the context of multi-sensory digital marketing.

H5: Customer engagement has a positive effect on purchase intention in the context of e-commerce.

Mediating Role of Customer Engagement: Visual Cues and Purchase Intention

The relationship between visual cues and purchase intent is not always direct, but is often mediated by psychological factors such as engagement. According to the SOR framework, visual cues as a stimulus trigger consumer involvement (organism), which in turn increases purchase intent (response). In the context of sensory marketing, a strong visual presentation creates mental imagery that deepens engagement, thus having an impact on purchase intent (Nadeem et al., 2025). Empirical findings support this. Wu et al., (2025) prove that visual cues increase purchase intention through engagement. Wang et al., (2022) also show that mental imagery from visual presentations encourages engagement that mediates purchase intent. Ngo et al., (2024) added that consistent visual interfaces not only increase engagement but also reinforce the desire to buy through emotional engagement.

H6: Customer engagement mediates the influence of visual cues on purchase intent.

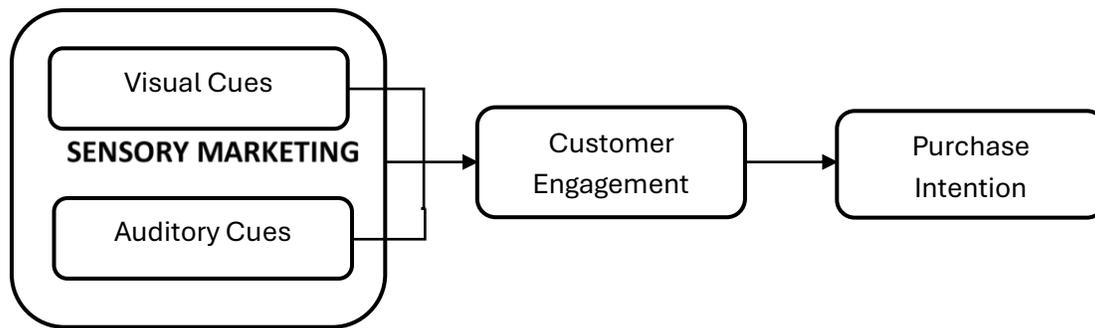
Mediating Role of Customer Engagement: Auditory Cues and Purchase Intention

In addition to visual cues, auditory cues also have the potential to increase purchase intention through an engagement mediation mechanism. In the SOR framework, sound acts as a stimulus that elicits a consumer's emotional response, which then encourages deeper engagement and leads to purchase intent (Han et al., 2024). Sensory marketing theory asserts that sound has the power to create emotional associations that influence purchasing decisions (Nadeem et al., 2025). Empirical studies show consistent evidence. Han et al., (2024) found that auditory cues increase purchase intention indirectly through engagement. Zhang & Huang, (2024) assert that background music in live commerce influences moods that increase engagement, which ultimately drives purchase

intent. Jiang et al., (2024) also found that the role of auditory cues on purchase intent was strengthened when engagement became an intermediate variable.

H7: Customer engagement mediates the influence of auditory cues on purchase intent.

Figure 1. Conceptual Framework



RESEARCH METHOD

This study employed a quantitative explanatory design to test the causal relationships among visual cues, auditory cues, customer engagement, and purchase intention within the Stimulus–Organism–Response (SOR) framework. The context was e-commerce consumers in East Java, one of Indonesia’s largest digital economy hubs, focusing on active users of platforms such as Shopee, Tokopedia, and Lazada. Purposive sampling was applied with criteria: domiciled in East Java, ≥ 18 years old, recent e-commerce transactions within the last three months, and experience with visual and auditory elements. Based on power analysis for SEM (Hair et al., 2021), with ~ 30 indicators, a minimum of 150–300 respondents was required, and ≥ 300 were targeted for validity.

Data were collected through an online survey using a structured questionnaire. Constructs were measured on a 5-point Likert scale adapted from prior studies. Four main constructs were measured using a 5-point Likert scale adapted from previous research: visual cues (Zhang & Huang, 2024), auditory cues (Han et al., 2024), customer engagement (Wu et al., 2025), and purchase intention (Wang et al., 2022). Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS. Hypothesis testing was conducted through bootstrapping with 5,000 resamples, applying a 95% confidence interval and one-tailed significance testing. The analysis followed a two-stage procedure, including the assessment of the measurement model and the structural model.

Common Method Bias Assessment

Given that the data were collected through a self-reported, single-wave survey, the potential risk of common method bias (CMB) was considered. Procedural remedies were applied by ensuring respondent anonymity, emphasizing the absence of right or wrong answers, and using clear and unambiguous measurement items.

In addition, Harman’s single-factor test was conducted, and the results showed that no single factor accounted for the majority of the variance, indicating that common method bias was unlikely to significantly affect the study’s findings.

RESULTS AND DISCUSSION

Respondent Description

Descriptive analysis was conducted to understand the profile of the research respondents. This information is important because demographic characteristics can influence digital consumption patterns, particularly in responding to sensory stimuli on e-commerce platforms. Respondents were predominantly female (58%) and aged 18–25 (65%), the most active digital native segment in e-commerce. The majority shopped 2–4 times per month, with Shopee as their primary platform (62%). This data reinforces the relevance of research focusing on sensory experiences, as younger generations have been shown to be more responsive to visual and auditory elements (Tong et al., 2019; Zhang & Huang, 2024).

Measurement Model Evaluation (Outer Model)

Outer model analysis was used to test the validity and reliability of the instrument.

Table 1. Outer Loadings, AVE, and Convergent Validity

Construct (Dimensions)	Indicator	Loading	AVE	Information
Sensory Marketing – Visual Cues (X1)	VC1: Color clarity	0.742		Valid
	VC2: Product layout	0.815		Valid
	VC3: Image quality	0.853		Valid
	VC4: Clarity of information	0.781	0.62	Valid
Sensory Marketing – Auditory Cues (X2)	AC1: Background music	0.734		Valid
	AC2: Sound effects	0.784		Valid
	AC3: Audio narration	0.865	0.64	Valid
Customer Engagement (M)	CE1: Cognitive	0.745		Valid
	CE2: Affective	0.812		Valid
	CE3: Enthusiasm	0.882		Valid
	CE4: Active participation	0.776	0.67	Valid
Purchase Intention (Y)	PI1: Purchase intent	0.762		Valid
	PI2: Recurring desires	0.871		Valid
	PI3: Recommend	0.835	0.65	Valid

All indicators had loadings >0.70 and AVE >0.50 , meeting convergent validity requirements (Hair et al., 2021b). The indicators with the highest loadings were product image quality (VC3 = 0.853) and audio narration (AC3 = 0.865). This indicates that sharp visual quality and clear auditory narration are the most influential sensory stimuli on consumer experience. These results are consistent with Zhang & Huang (2024) for visual aspects and Han et al., (2024) for auditory aspects.

Table 2. Construct Reliability

Construct	Cronbach's Alpha	CR	Information
Visual Cues (X1)	0.81	0.88	Reliabel
Auditory Cues (X2)	0.84	0.90	Reliabel
Customer Engagement (M)	0.86	0.91	Reliabel
Purchase Intention (Y)	0.83	0.89	Reliabel

The Cronbach's Alpha and Composite Reliability values were all >0.70, indicating excellent internal consistency of the instrument (Fornell & Larcker, 1981). Thus, all constructs can be used for further analysis.

Discriminant validity was assessed using the Fornell–Larcker criterion. The results indicate that the square root of the Average Variance Extracted (AVE) for each construct exceeded its correlations with other constructs, confirming adequate discriminant validity. This finding demonstrates that all constructs are empirically distinct and measure different conceptual domains.

Structural Model Evaluation (Inner Model)

The results show that 52% of the variation in engagement and 61% of the variation in purchase intention, which is considered moderate (Cohen, 1988). This indicates that the sensory marketing construct can substantially explain consumer behavior.

Table 3. Hypothesis Test Results (Bootstrapping SEM-PLS)

Hipotesis	Jalur	β	t-stat	p-value	Result
H1	Visual Cues → Engagement	0.34	4.21	0.000	Accepted
H2	Auditory Cues → Engagement	0.28	3.72	0.000	Accepted
H3	Engagement → Purchase Intention	0.47	6.12	0.000	Accepted
H4	Visual Cues → Purchase Intention	0.19	2.45	0.014	Accepted
H5	Auditory Cues → Purchase Intention	0.12	1.95	0.052	Rejected
H6	Visual Cues → Engagement → PI	0.16	3.11	0.002	Accepted
H7	Auditory Cues → Engagement → PI	0.13	2.84	0.005	Accepted

The results show that Visual Cues (H1, H6) significantly influence purchase intention both directly and indirectly through customer engagement, confirming hypotheses H1 and H6. This finding reinforces the dominance of visual elements such as image quality, layout, and color in shaping consumer perceptions. The results indicate that visual cues have a significant influence on purchase intention both directly and indirectly through customer engagement, confirming their dominant role in shaping consumer responses in e-commerce (Jiang et al., 2024; Lyu & Huang, 2024). In contrast, auditory cues do not have a significant direct effect on purchase intention. However, auditory cues demonstrate a significant indirect effect through customer engagement, indicating that their primary role lies in enhancing emotional involvement rather than directly triggering purchasing decisions. These findings suggest that auditory cues function as experiential and atmospheric stimuli that strengthen engagement, which subsequently translates into higher purchase intention. This pattern reinforces the importance of customer engagement as a key mediating mechanism within the Stimulus-Organism-Response (SOR) framework (Mehrabian & Russell, 1974).

Discussion

The findings of this study consistently support the Stimulus–Organism–Response (SOR) framework (Mehrabian & Russell, 1974), where visual and auditory cues, as sensory stimuli, have been shown to influence customer engagement as a psychological organism, ultimately driving purchase intention as a behavioral response. This emphasizes that sensory marketing strategies are highly relevant in the e-commerce context, not only in physical environments such as offline retail, but also on digital platforms that rely on immersive experiences. Specifically, the results indicate that visual cues (H1, H6) have a significant direct and indirect influence on purchase intention. Thus, hypotheses H1 and H6 are accepted. These findings align with research by Zhang & Huang, (2024) and Wu et al., (2025), which emphasized the dominance of visual elements such as color, layout, and image quality in creating perceived quality and attracting consumer attention on digital platforms. In the Indonesian context, this is even more relevant because young consumers have been shown to be more responsive to attractive and informative visual designs (Nugroho et al., 2025).

Unlike visual cues, auditory cues (H2, H7) did not have a significant direct effect on purchase intention, thus rejecting hypotheses H2 and H7. However, the influence of auditory cues was proven to be significant indirectly through customer engagement (H4, H5), thus accepting this mediation hypothesis. This indicates that sound elements, such as background music and narration, play a greater role in building emotional atmosphere and strengthening consumer engagement with the platform, rather than directly driving purchase intention. This finding is consistent with Han et al., (2024) who stated that auditory elements function as mood enhancers, and Ngo et al., (2024) who emphasized that the influence of auditory cues on purchase intention is more complementary than primary. Thus, this study broadens the understanding of the role of auditory cues in the e-commerce ecosystem, which was previously limited.

Furthermore, customer engagement (H3) was shown to have a significant effect on purchase intention, thus accepting this hypothesis. Thus, engagement acts as a key psychological mechanism that bridges the influence of sensory cues on purchase intention, strengthening the arguments of Wu et al., (2025) and Wang et al., (2022) who position engagement as a key predictor of digital consumer behavior. In other words, without active consumer involvement, sensory stimuli are not fully effective in driving behavioral responses. The novelty of this study lies in the simultaneous testing of visual and auditory cues in a single model with engagement as a mediator in the Indonesian e-commerce context, something that is still rare in the global literature. Theoretically, this study contributes by expanding the application of SOR and sensory marketing theory to the realm of digital commerce in developing countries. These results confirm that SOR remains relevant to explaining consumer behavior in the digital era, with engagement as a key psychological variable. Practically, this study suggests that e-commerce platforms in Indonesia should place more emphasis on visual quality (e.g., product image resolution, interface design) while optimizing auditory cues (music, narration) to enhance the emotional experience. This kind of multisensory strategy is expected to increase consumer engagement, strengthen loyalty, and encourage sustainable e-commerce transaction growth.

CONCLUSION

This study confirms that sensory marketing plays a significant role in shaping consumer behavior in Indonesian e-commerce. Visual cues exert both direct and indirect effects on purchase intention through customer engagement, while auditory cues influence purchase intention indirectly by strengthening engagement. These findings highlight customer engagement as a key psychological mechanism linking sensory stimuli to behavioral responses within the SOR framework. Although sustainability-related outcomes were not explicitly measured as constructs in this study, the findings offer managerial implications for supporting long-term consumer–platform relationships through engagement-oriented sensory strategies.

Thus, sustainability should be understood as a conceptual and practical implication rather than an empirical outcome of this research. This study has several limitations. First, the sample was limited to e-commerce users in East Java, which may restrict the generalizability of the findings to other regions. Second, the use of a cross-sectional, self-reported survey design limits causal inference. Future research is encouraged to employ experimental or longitudinal designs, expand geographical coverage, and explicitly incorporate sustainability-oriented constructs to further validate and extend the present findings.

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