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Article

The impact of visual and auditory landscapes on coastal tourism experience: Applying the stimulus-organism-response model for social development

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Abstract: Tourism experiences are inherently multisensory, engaging visitors' senses of sight, sound, smell, taste, and touch. This study addresses the gap in literature by investigating the impact of visual and auditory landscapes on tourist emotions and behaviors within coastal tourism settings, using the Stimulus-Organism-Response (SOR) model. Data collected from tourists in Sanya, China, were analyzed using structural equation modeling. The results indicate that both visualscape and soundscape significantly influence tourist emotions (pleasure and arousal) and subsequent loyalty. Pleasure and arousal mediate the relationships between environmental stimuli and tourist loyalty, emphasizing their roles as emotional bridges between the environment and behaviors. These findings highlight the importance of integrating local cultural and community elements into tourism to enhance socio-economic benefits and ensure sustainable development. By fostering a deep connection between tourists and the local environment, these sensory experiences support the preservation of cultural heritage and promote sustainable tourism practices, aligning with the goals of economic development and public policy. The study contributes to the theoretical understanding of multisensory tourism by integrating the SOR model in coastal tourism and emphasizes the roles of visual and auditory stimuli. Practically, it provides insights for tourism managers to improve tourist experiences and loyalty through careful management of sensory elements. This has implications for infrastructure development, particularly in enhancing the quality of soft infrastructure such as cultural and social systems, which are crucial for sustainable tourism and community well-being. Future research could include additional sensory dimensions and diverse destinations for a comprehensive understanding of sensory influences on tourist behaviors and emotions. This research aligns with the broader goals of the policy and development by addressing critical aspects of infrastructure and socio-economic development within the tourism sector.

Keywords: multisensory tourism; visualscape; soundscape; pleasure; arousal; tourist loyalty; social development

1. Introduction

Exploring a location involves a "holistic sensory engagement," which stimulates all our senses, as described by Pan and Ryan (2009). For visitors, the array of activities at a destination engages the senses—vision, hearing, smell, taste, and touch—in a manner that directly influences the overall perception of the tourist experience, as highlighted by Parker et al. (2023). The study of the dynamic interplay between individuals and their surroundings, regardless of the focus on the human or environmental aspects, seeks to understand the intricate connections between people and their environment (Chimisso, 2010). According to Uzzell and Räthzel (2009), people are not isolated beings. Rather, they form a cohesive unit with their

surroundings, where emotions and actions are in constant interaction (Ulrich, 1983). Tourist spots, owing to their unique sensory qualities, offer a richer sensory experience compared to other settings (Brochado et al., 2021). However, the exploration of tourism experiences through a multi-sensory lens is still a nascent field that demands further attention (Buzova et al., 2021).

Among the senses, sight and hearing are paramount. Visual and auditory signals, unlike other sensory inputs, are capable of transmitting information about the environment efficiently over time and space (Qiu et al., 2018). Nonetheless, due to the prevailing focus on visual elements in tourism studies, driven by a "visually-dominant" approach, the importance of multisensory experiences is often overlooked (Agapito and Mendes et al., 2013; Agapito and Pinto et al., 2017; Pan and Ryan, 2009). Contrary to this perspective, tourism experiences are inherently multisensory (Brochado et al., 2021). Porteous (1990) argued that the essence of our world cannot be fully captured through sight alone; elements beyond vision can evoke stronger emotions and behaviors (Imamović et al., 2020). Offering a variety of sensory experiences is key to fostering positive emotional and behavioral responses (Krishna, 2012). Although the distinctiveness of a destination plays a crucial role in attracting tourists (Lu et al., 2022), the auditory aspects of tourism environments have been largely neglected in academic research (He et al., 2019). Studies that consider both the visual and auditory landscape and their impact on the tourism experience are scarce, leaving a gap in understanding their role. This study aims to explore how the tourist experience, shaped by visual and auditory stimuli, can influence emotions and subsequent behaviors.

The Stimulus-Organism-Response (SOR) model offers a robust framework for analyzing the effects of environmental stimuli on tourists' emotional states and behaviors (Jiang, 2022), originally proposed by Mehrabian and Russell (1974). The model serves as a theoretical bridge, elucidating the influence of environmental stimuli (S) on individual emotions (O) and, ultimately, behaviors (R) (Chen and Yao, 2018). The relationship between the physical environment and consumer emotions and behaviors has been extensively demonstrated across various contexts using the SOR model (Sun et al., 2021). In tourism research, the SOR model has been applied to explore experiences in settings like theme parks (Chang et al., 2014), natural tourism sites (Min et al., 2019), and virtual tourism environments (Kim et al., 2020). However, the roles of the visual and auditory landscapes as stimuli have been understudied, with few discussions on their impact on tourists' emotions and behaviors.

National policies also underscore the necessity of this study. For instance, China's national tourism policy emphasizes the development of high-quality, immersive tourism experiences that integrate cultural and natural elements to boost socio-economic development (China National Tourism Administration, 2019). This aligns with the study's focus on enhancing tourism experiences through multisensory engagement, making it relevant and timely.

This study raises three research questions (RQs): 1) What impact do the visual and auditory landscapes have on tourists' pleasure and arousal? 2) How do pleasure and arousal affect tourist loyalty? 3) Can pleasure and arousal serve as mediators in this relationship? Hence, the study employs the SOR model by considering the visual and auditory landscapes as stimuli (S), with loyalty as the behavioral outcome (R). It seeks to uncover the potential structural relationships through structural equation

modeling.

This research aims to fill the gap in the study of multi-sensory tourism (Agapito, 2020) by investigating the influence of visual and auditory landscapes in coastal tourism experiences. Specifically, it 1) assesses tourism experiences from both visual and auditory perspectives, offering a novel approach distinct from studies focusing solely on one sensory dimension, thus enriching the tourism literature; 2) validates the significance of visual and auditory landscapes in coastal tourism, unveiling tourists' emotional and behavioral reactions, thereby contributing to the body of knowledge on sensory experiences; and 3) explores the mediating roles of pleasure and arousal, an aspect yet to be examined in previous studies.

2. Literature review

2.1. SOR (Stimulus–Organism–Response) theory

The Stimulus-Organism-Response (SOR) model, introduced by Mehrabian and Russell in 1974, provides a foundational framework for analyzing the effects of the physical environment on tourists' emotional states and behaviors (Liu et al., 2023). This model is structured around stimuli (external environmental factors), mediating variables (the emotional state of individuals), and outcomes (behavioral responses). The theory posits that various environmental stimuli can alter an individual's emotional condition, leading to specific behaviors, a concept supported by numerous studies demonstrating the model's applicability in evaluating environmental influences on consumer emotions and behaviors (Jani and Han, 2015; Vieira, 2013).

In this context, stimuli refer to external environmental influences, like visual, auditory, and taste factors, or the overall atmosphere, that affect an individual's psychological and behavioral reactions (Pan and Ryan, 2009). The term "organism" denotes the internal emotional and psychological processes that occur in response to these stimuli, leading to a final behavioral outcome. The SOR model has gained traction in tourism research, providing insights into the causal relationships influencing tourist experiences and behaviors (Kim et al., 2020; Min et al., 2019). The adoption of the SOR model in this study is based on its ability to clarify the cause-and-effect dynamics driving tourist orientations and behaviors towards different experiences. It frames the analysis of tourists' reactions to prior stimuli and their emotional states during these interactions, facilitating an examination of tourist loyalty within the context of coastal tourism experiences. This model serves as a tool to dissect how environmental stimuli affect tourists' inner psychological states, which in turn influence their overall behavior. This investigation focuses on visualscape and soundscape as key environmental stimuli, areas previously underexamined, utilizing emotional responses (pleasure and arousal) as the mediating organism state (O) and tourist loyalty as the behavioral outcome (R).

2.2. Stimuli: Visualscape and soundscape

The entire environment at tourist destinations, encompassing the landscape, soundscape, temperature, and climate, impacts the psychological experiences of visitors (Lu et al., 2022). Visualscape, derived from visual inputs, represents the spatial

arrangement of physical elements within the environment (Llobera, 2003). It is shaped by the attributes of these elements, such as form, texture, and color (Porteous, 1986). The concept of visualscape aligns with Urry's "tourist gaze" (2002), highlighting the visually driven nature of tourism. The desire for visually appealing and unique landscapes is a key motivator in tourism (Knudsen et al., 2015), leading to a research focus on visual aspects of tourist destinations over other sensory experiences (Xiong et al., 2015).

Soundscape, understood as the acoustic environment from a human perspective, emphasizes the experiential and perceptual aspects of sound (Lu et al., 2022). It encompasses not only the sound itself but also the listener's perception and emotional response, making sound, the listener, and the environment its fundamental components (Buzova et al., 2021). The auditory experience in tourist destinations is recognized for its unique blend of sounds that accompany visitors on their journey, with urban soundscapes comprising natural sounds, human activities, and mechanical noises (Imamović et al., 2020; Qiu et al., 2018; Son and Pearce, 2005). There is a growing academic interest in the auditory aspects of tourism destinations, reflecting a broader understanding of their importance in the tourist experience (He et al., 2019; Min et al., 2019).

2.3. Emotional states: Pleasure and arousal

The emotional condition acts as a mediating variable between external environmental influences and individual actions. Mehrabian and Russell's (1974) model distinguishes individuals' emotional reactions into three fundamental dimensions: pleasure, arousal, and dominance, with these emotions playing a significant role in shaping perceptions and reactions to their environment (Desmet, 2010). Pleasure represents the spectrum of feelings from severe distress to intense joy. This spectrum includes feelings from displeasure to pleasure, dissatisfaction to satisfaction, and sadness to happiness (Cheng and Huang, 2022). Arousal is characterized by the level of alertness and excitement, varying from drowsiness to high excitement. Arousal can range from being excited to calm, relaxed to stimulated, and sleepy to fully awake (Chang et al., 2014). Dominance relates to the extent one feels in control of their emotions and actions, encompassing feelings of influence, control, and independence (Floyd, 1997).

In alignment with previous studies, our research focuses on the emotional states of pleasure and arousal, omitting dominance based on findings that pleasure and arousal sufficiently capture emotional variables without the significant impact of dominance on behavior (Russell and Pratt, 1980). Following Russell's (1980) advice, we modified the original scale to exclude dominance. Consequently, pleasure and arousal have been extensively adopted in recent tourism and consumption research for evaluating emotional states (Kumar et al., 2021; Tsaur et al., 2015), leading to a general agreement on considering emotional states as bi-dimensional (pleasure and arousal) in tourism studies (Jiang, 2022).

Embodied cognition research emphasizes the influence of sensory inputs, particularly visual cues, on environmental perception (Bagdare and Roy, 2016). Visual stimuli are often more impactful than other sensory inputs (Ohly et al., 2016), with

research exploring how visual aspects like shape, color, and texture affect perception (Li and Sullivan, 2016). In natural tourism settings, scenic beauty, including landscapes and historical buildings, triggers positive reactions (Chi and Qu, 2008). The visualscape, as a source of aesthetic pleasure, directly influences pleasure and arousal (Qiu et al., 2018), leading to the formulation of hypotheses:

H1: The perception of visualscape by tourists positively affects emotional pleasure.

H2: The perception of visualscape by tourists positively affects emotional arousal.

Furthermore, consumer marketing research shows that store background music can evoke emotions. Preferred music generally induces positive emotions, while disliked music tends to generate negative emotions (Scherer, 2004). Similarly, the tourism sector has found that pleasure and arousal are significantly impacted by environmental sounds, including music or soundscapes (Min et al., 2019; Jiang, 2022). Positive emotional states of pleasure and arousal are triggered when tourists encounter soundscapes that meet their expectations (Qiu et al., 2018). Therefore, we propose:

H3: The perception of soundscape by tourists positively affects emotional pleasure.

H4: The perception of soundscape by tourists positively affects emotional arousal.

2.4. Tourist loyalty

The tourism experience involves receiving sensory stimuli through all five senses, significantly impacting the overall tourism experience and tourist loyalty (Agapito and Pinto et al., 2017; Dias et al., 2017). Tourist loyalty, a predictor of future behaviors, is a key concept in tourism research (Cossío-Silva et al., 2019). Every element encountered at a destination impacts tourist satisfaction and loyalty. Despite extensive research, there's no consensus on measuring tourist loyalty (McKercher et al., 2012), generally categorized into attitudinal and behavioral loyalty (Campón-Cerro et al., 2017). Attitudinal loyalty encompasses the intention to buy, recommend, and repurchase, even with price increases, while behavioral loyalty is about the frequency of revisits (Suhartanto et al., 2020). Although intentions are not always reliable predictors of actions, there's a noted gap between attitudes and behaviors in marketing and tourism (Lv et al., 2020). Intention to recommend and revisit are commonly used metrics in loyalty studies (Meleddu et al., 2015).

Emotions significantly affect behaviors, with positive emotions expanding cognitive processes and enhancing connections with the environment, leading to positive behaviors (Salah et al., 2023; Wang et al., 2017). Satisfaction, purchase decisions, and behavioral intentions are all influenced by emotional states (Min et al., 2019). Pleasure and arousal, elicited by stimuli at tourism destinations, contribute to satisfaction and influence revisit intentions (Aziz and Ariffin, 2012). Thus, tourist behaviors can be seen as responses to emotional reactions to environmental stimuli. This "environment—emotion—behavior" pathway plays a crucial role in understanding tourist loyalty (Min et al., 2019), leading to the formulation of hypotheses 5 and 6:

H5: Pleasure positively impacts tourist loyalty.

H6: Arousal positively impacts tourist loyalty.

Evidence indicates that atmospheric cues at destinations enhance tourists' attitudes and behavioral intentions (Shatnawi et al., 2020). Destination ambiance, including visuals and soundscapes, significantly influences perceived quality and emotions (Loureiro and González, 2008; Leri and Theodoridis, 2019), affecting word-of-mouth (Loureiro et al., 2021). Therefore, we hypothesize:

H7: The perception of visualscape by tourists positively influences loyalty.

H8: The perception of soundscape by tourists positively influences loyalty.

2.5. Mediating role of pleasure and arousal

Considering the direct relationships hypothesized earlier, this study also examines the mediating roles of pleasure and arousal in linking environmental stimuli (visualscape and soundscape) to responses (tourist loyalty). In consumer marketing, the mediating effects of pleasure and arousal have been demonstrated between store music (environmental stimuli) and purchasing behavior (Sweeney and Wyber, 2002). Additionally, the link between aesthetic visual stimuli and outcomes like word-of-mouth and revisit intentions has been supported by research (Kumar et al., 2021). While empirical evidence on the mediating role of pleasure and arousal in tourism is scarce, visual, and auditory stimuli significantly influence tourist experiences, emotions, and behaviors (Jiang, 2022; Lu et al., 2022). Thus, we propose:

H9a–b: Pleasure and arousal mediate the relationship between stimuli (visualscape and soundscape) and response (tourist loyalty).

3. Research methodology

This investigation constructs a research framework utilizing the Stimulus-Organism-Response (SOR) theory within the coastal tourism setting (**Figure 1**). In this structure, environmental factors such as visualscape and soundscape serve as the stimuli (S) enhancing the sensory experiences of coastal tourism. Emotional reactions such as pleasure and arousal (O) are measured as the emotional impacts resulting from the visualscape and soundscape, with tourist loyalty identified as the resulting behavior (R).

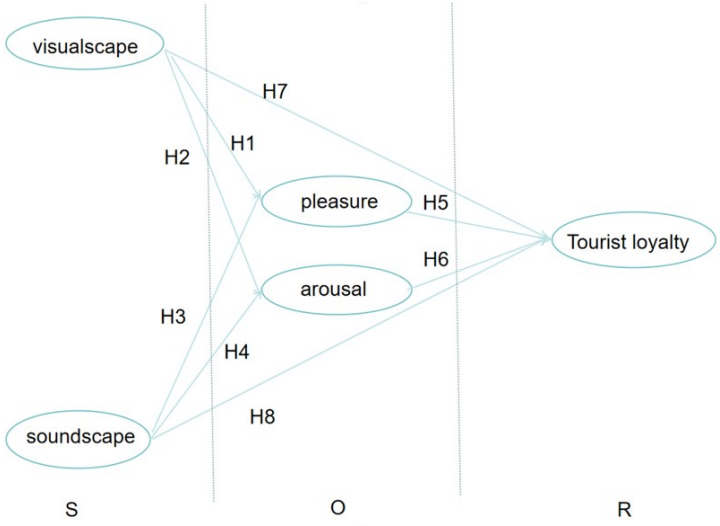

Figure 1. Research model.

3.1. Questionnaire development and preliminary study

The research utilized a questionnaire-based method to collect data. The measurement items were derived from prior literature, specifically, visualscape and soundscape measurements from Buzova et al. (2021), pleasure and arousal from Li et al. (2022), and tourist loyalty from Campón-Cerro et al. (2017). To ensure the validity and reliability of the constructs, a preliminary study was undertaken. In this phase, 97 questionnaires were disseminated among tourists, with 81 successfully returned. After a screening process, 75 were deemed valid. Responses were gauged on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Early analysis, including Cronbach's alpha and exploratory factor analysis, affirmed the constructs' validity and reliability, with Cronbach's alpha values exceeding 0.7 for all constructs.

3.2. Data collection

Sanya, situated at the southern tip of Hainan Province, China, is renowned as a tropical coastal tourist destination. Between 2012 and 2021, its annual tourist count grew from 110.22 million to 216.204 million, with tourism revenue escalating from 19.22 billion yuan to 74.703 billion yuan (source: Sanya Municipal Bureau of Statistics, 2021). Notable for its scenic and cultural attractions, including Yalong Bay Tropical Paradise Forest Park and Tianyahaijiao Resort, Sanya offers a vibrant visualscape and soundscape. Utilizing convenience sampling, tourists in Sanya were invited to complete questionnaires independently from November 20 to November 30, 2023, across five sites. Ultimately, 613 questionnaires were distributed to Chinese tourists, with 522 confirmed as valid.

The sample showed a slight female majority (50.8%) over males (49.2%), with the largest age group being 31–45 years (46.4%), indicating a primary consumer demographic. Tourists under 30 years made up 34.5%, those 46–60 years at 12.1%, and over 60 years at 7.1%, showcasing a broad age range engagement. Occupational diversity among tourists was notable, with a significant portion being corporate employees (41.8%), followed by farmers, government and institutional workers, and other occupations, including self-employed individuals. Demographic details are provided in **Table 1**.

Table 1. Demographic profile of respondents.

Characteristics	Frequency (N)	Percentage (%)	Accumulated percentage
Gender			
Male	257	49.2%	49.2%
Female	265	50.8%	100%
Age			
Under 30	180	34.5%	34.5%
31–45 years old	242	46.4%	80.9%
46–60 years old	63	12.1%	93%
Over 60 years old	37	7%	100%
Education			
Junior high school and below	245	46.9%	46.9%

Table 1. (*Continued*).

Characteristics	Frequency (N)	Percentage (%)	Accumulated percentage
High school	122	23.4%	70.3%
Junior college	148	28.4%	98.7%
Bachelor's degree and above	7	1.3%	100%
Monthly Income			
1000 yuan or less	86	16.5%	16.5%
1001–3,000 yuan	172	33.0%	49.5%
3001–5000 yuan	162	31.0%	80.5%
Over 5001 yuan	102	19.5%	100%
Occupation			
Self-employed	33	6.3%	6.3%
State organ and public institution	79	15.1%	21.4%
Corporate staff	218	41.8%	63.2%
Farmer	128	24.5%	87.7%
Others	64	12.3%	100%
Average Annual Number of Trips			
1 time	28	5.4%	5.4%
2 times	127	24.3%	29.7%
3 times	243	46.6%	76.3%
More than 3 times	124	23.7%	100%
Where are you from			
Hainan Province	277	53.1%	53.1%
Other Provinces	245	46.9	100%
Duration of stay in Sanya			
1 day	25	4.8%	4.8%
2 days	77	14.8%	19.6%
3 days	226	43.3%	62.9%
More than 4 days	194	37.1%	100%
Total	522	100.0%	

4. Results

Before data analysis, preliminary checks were conducted for normality and potential common method bias. SPSS AMOS 24 was then applied for structural equation modeling to test hypotheses and explore potential mediating effects among variables.

4.1. Common method bias

Following Kline's guidelines (1998), initial analyses of skewness (−0.33) and kurtosis (−0.88) fell within acceptable ranges, indicating data suitability for further analysis. Harman's single factor test was utilized to assess common method bias, revealing that a single factor accounted for 37.04% of the variance, well below the 50%

threshold, suggesting the absence of significant common method bias (Baumgartner et al., 2021).

4.2. Measurement reliability and validity

The assessment of measurement reliability and validity was thoroughly conducted. Specifically, the factor loadings exceeded the threshold of 0.60, surpassing the minimum acceptable standard of 0.50 (refer to **Table 2**) (Hair et al., 2010). The composite reliability (CR) scores for all constructs were above 0.70, and the average variance extracted (AVE) exceeded the 0.50 benchmark (refer to **Table 3**), affirming both internal consistency and convergent validity. Moreover, the correlations between constructs were less than the square root of the AVE (Fornell and Larcker, 1981), establishing discriminant validity (refer to **Table 3**). The AVE values, ranging from 0.527 to 0.763, indicate substantial interpretative strength and construct robustness. Discriminant validity was further validated through HTMT analysis (threshold < 0.85, refer to **Table 4**) (Henseler et al., 2015).

Table 2. The results of reliability.

Construct and indicators	Measurement items	Factor Loadings
Visualscape (Buzova et al., 2021)	The architecture of the destination (e.g. buildings, monuments, ornaments) is attractive.	0.804
	The natural landscape of the destination (trees, flowers, sky, etc.) is beautiful.	0.879
	The seafront of the destination is attractive.	0.847
	The destination has a wide variety of things to see.	0.749
Soundscape (Buzova et al., 2021)	The sound of the nature in the destination (e.g. birdsong, wind, trees, waves) is pleasant.	0.707
	The music you can hear in the destination (e.g. street musicians, concerts, local songs) is nice to listen to.	0.653
	The voices of people on the street, bars, squares, etc. allow to perceive the local ambience.	0.705
Pleasure (Li et al., 2022)	I felt pleased.	0.770
	I felt content.	0.600
	I felt hopeful.	0.657
	I felt relaxed.	0.813
	I felt happy.	0.658
Arousal (Li et al., 2022)	I felt stimulated.	0.760
	I felt frenzied.	0.649
	I felt jittery.	0.685
	I felt awake.	0.685
	I felt aroused.	0.674
Tourist loyalty (Campón-Cerro et al., 2017)	I consider myself a loyal visitor.	0.678
	I will visit it on my next coastal tourism trip.	0.728
	I will visit the Sanya again in the future.	0.567
	I will recommend it to people who ask my advice.	0.586
	I will tell other people positive things about Sanya.	0.664

Table 3. Validity and reliability analysis.

	AVE	CR	Visualscape	Soundscape	Pleasure	Arousal	Tourist loyalty
Visualscape	0.763	0.928	0.874				
Soundscape	0.527	0.77	0.356	0.726			
Pleasure	0.617	0.889	0.363	0.385	0.786		
Arousal	0.61	0.886	0.342	0.412	0.508	0.781	
Tourist loyalty	0.549	0.858	0.379	0.424	0.416	0.422	0.741

Table 4. HTMT analysis.

	Visualscape	Soundscape	Pleasure	Arousal	Tourist loyalty
Visualscape	-				
Soundscape	0.421	-			
Pleasure	0.402	0.469	-		
Arousal	0.377	0.499	0.574	-	
Tourist loyalty	0.429	0.528	0.479	0.486	-

4.3. Examination of the structural model

The investigation began by evaluating the direct effect hypotheses (H1–H8), with the model's fit indices aligning with accepted benchmarks (χ^2/df = 3.017, RMSEA = 0.062, CFI = 0.941, PCFI = 0.814, GFI = 0.91, NFI = 0.914, TLI = 0.932). Analysis of the structural paths supported the initial hypotheses (see **Table 5**), demonstrating significant relationships between visualscape and pleasure (H1), arousal (H2), and tourist loyalty (H7); soundscape and pleasure (H3), arousal (H4), and tourist loyalty (H8). Additionally, pleasure (H5) and arousal (H6) were shown to significantly influence tourist loyalty. The model accounted for 29.6% of the variance in pleasure, 21.4% in arousal, and 20.7% in tourist loyalty (**Figure 2**). Moreover, the results highlighted the mediating roles of pleasure and arousal, indicating that pleasure mediates the impact of visualscape on tourist loyalty, while arousal mediates the influence of soundscape on tourist loyalty (see **Table 6**).

Table 5. Result of structural model.

X	*Y*	*β*	SE	*p*
Visualscape	Pleasure	0.259	0.037	0.000
Visualscape	Arousal	0.224	0.039	0.000
Visualscape	Tourist Loyalty	0.177	0.029	0.000
Soundscape	Pleasure	0.293	0.040	0.000
Soundscape	Arousal	0.333	0.042	0.000
Soundscape	Tourist Loyalty	0.221	0.033	0.000
Pleasure	Tourist Loyalty	0.177	0.032	0.000
Arousal	Tourist Loyalty	0.184	0.031	0.000

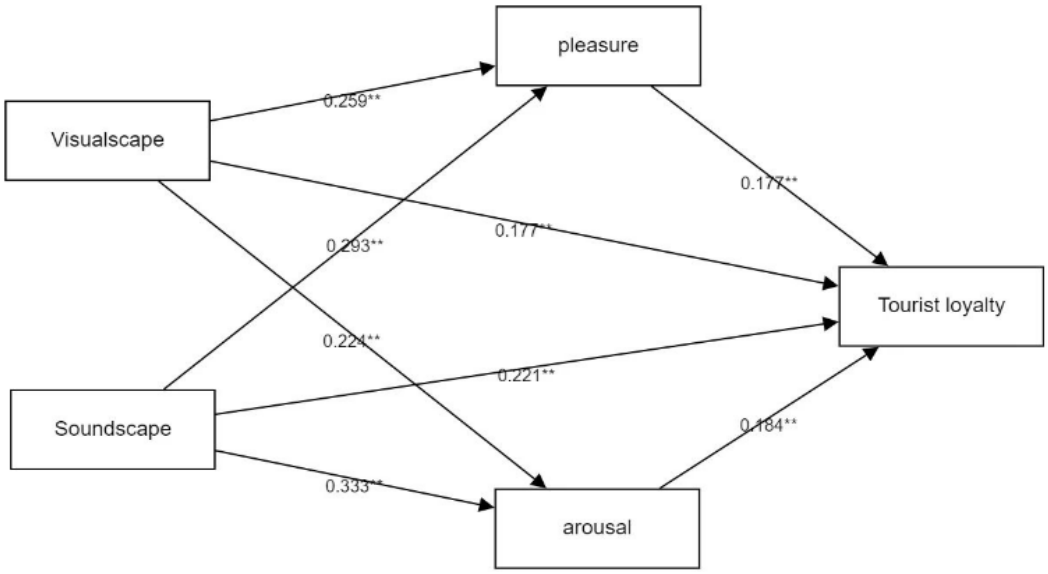

Figure 2. Results of the research model.

Table 6. Results of mediation analysis.

Path	Total effect	Direct effect	Indirect effect	VAF
Soundscape→Pleasure →Tourist loyalty	0.184**	0.123**	0.032	17.39%
Soundscape→Arousal →Tourist loyalty	0.184**	0.123**	0.029	15.76%
Soundscape→Pleasure →Tourist loyalty	0.253**	0.167**	0.039	15.42%
Soundscape→Arousal →Tourist loyalty	0.253**	0.167**	0.046	18.18%

*$p < 0.05$, **$p < 0.01$.

5. Conclusion

5.1. Conclusion

This study delved into the underexplored domains of visual and auditory stimuli within coastal tourism, investigating their impacts on tourist emotions and behaviors through the Stimulus-Organism-Response (SOR) model. The findings underscore the significance of visualscape and soundscape in shaping tourists' emotional experiences—specifically pleasure and arousal—and their subsequent loyalty. The structural equation modeling results demonstrate that both visualscape and soundscape have significant direct effects on tourist emotions and behaviors, highlighting the essential roles these environmental factors play in coastal tourism. Furthermore, the study reveals the mediating effects of pleasure and arousal, confirming that these emotional responses act as critical bridges linking environmental stimuli to tourist loyalty. This investigation enriches our understanding of how the physical environment influences tourist behavior and emphasizes the necessity of considering multiple sensory dimensions to enhance tourism experiences.

5.2. Implications

This research offers several theoretical and practical implications. For theoretical implications, 1) Advancement of SOR Theory in Tourism: By integrating the SOR model into coastal tourism research, this study provides a comprehensive framework that explicates how environmental stimuli (visualscape and soundscape) influence tourist emotions and loyalty. This integration offers novel insights, expanding the application of SOR theory beyond its traditional confines. 2) Multisensory Tourism Research: The study responds to calls for more inclusive multisensory tourism research, moving beyond the dominant visual focus to include auditory elements. This shift challenges the existing literature's visual-centric paradigm, emphasizing the profound impact of soundscapes on tourism experiences. 3) Emotional Mediation: The identification of pleasure and arousal as mediators between environmental stimuli and tourist loyalty contributes to the sensory experience literature. This finding underscores the complexity of tourist experiences and the multifaceted nature of sensory inputs. 4) Comparative Analysis: The comparative analysis of the effects of visualscape and soundscape provides a nuanced understanding of their relative influences. This approach enriches tourism studies by highlighting the distinct and combined roles of different sensory dimensions in shaping tourist experiences. For practical implications: 1) Tourism Management: The findings suggest that tourism managers should strategically manage both visual and auditory environments to enhance tourist satisfaction and loyalty. This involves curating visually appealing landscapes and ensuring pleasant soundscapes to create a more holistic and enjoyable tourism experience. 2) Sensory Experience Optimization: By recognizing the critical roles of sight and sound, tourism practitioners can develop targeted strategies to optimize sensory experiences. This might include the thoughtful design of visual elements and the careful selection of ambient sounds to mitigate negative perceptions and enhance overall tourist enjoyment. 3) Policy Development: The study's insights can inform policy development, encouraging the integration of sensory considerations into tourism planning and infrastructure development. Policymakers can use these findings to promote sustainable tourism practices that prioritize the sensory well-being of tourists.

5.3. Limitation and future research

Despite its contributions, this study acknowledges several limitations that open avenues for future research: 1) Expansion of Sensory Dimensions: Future research could explore additional sensory stimuli such as taste, smell, and touch, and their collective impact on the tourism experience. This would provide a more holistic view of how different sensory dimensions influence tourist emotions and behaviors, offering a richer understanding of multisensory tourism. 2) Geographical Scope: The study's focus on Sanya may limit the generalizability of the findings. Future studies should include a diverse range of destinations with varying visual and auditory environments to validate and extend the results. Comparative studies across different cultural and geographical contexts could significantly enhance the understanding of sensory influences on tourist behaviors. 3) Longitudinal Studies: Conducting longitudinal studies could offer deeper insights into how sensory experiences

influence tourist behaviors over time. This approach would help in understanding the long-term effects of sensory stimuli on tourist loyalty and satisfaction. 4) Technological Integration: Future research could also investigate the role of emerging technologies, such as virtual and augmented reality, in simulating sensory experiences. This could provide valuable insights into how technology can enhance or replicate real-world tourism experiences, offering innovative ways to engage tourists. By addressing these limitations, future research can build on the foundations laid by this study, further advancing the field of multisensory tourism and contributing to more effective tourism management and policy development.

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