Research on the Impact of Multisensory Experience Based Coffee Shop Space Design on User Stickiness

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ABSTRACT

In the experience economy, coffee shops have evolved into urban "third spaces" where consumers seek not only functional services but also immersive, emotionally engaging experiences. This study investigates the impact of multisensory spatial design—encompassing visual, auditory, olfactory, and tactile elements—on user stickiness in coffee shop environments. Data were collected from 328 urban coffee shop users in China and analyzed using structural equation modeling. Results indicate that multisensory experiences significantly enhance user stickiness, including longer dwell time, higher revisit intentions, and stronger emotional attachment to the space. The findings highlight the importance of integrating multiple sensory dimensions in spatial design to improve user engagement and loyalty. The study contributes to both theory and practice by bridging environmental psychology, experience economy, and spatial design research, offering actionable insights for designing more engaging and user-centered coffee shop environments.

Keywords: Multisensory experience; coffee shop; spatial design; user stickiness

INTRODUCTION

In the era of the experience economy, consumers' expectations toward commercial spaces have gradually shifted from purely functional consumption to emotional and experiential consumption (Flores-Gómez et al., 2025). Traditional retail environments mainly focused on providing products and services; however, contemporary consumers increasingly value immersive experiences, emotional resonance, and social interaction during the consumption process. As consumption patterns evolve, commercial spaces are no longer regarded merely as physical places where transactions occur, but rather as experiential environments that shape users' perceptions, emotions, and behaviors (Wu et al., 2025). The spatial environment has thus become an important factor influencing consumers' satisfaction, behavioral intentions, and long-term engagement with commercial brands (Aslan & Bekar, 2026).

Coffee shops represent a typical form of urban "third space," a concept proposed by the American sociologist Ray Oldenburg in his influential book The Great Good Place (Paull, 2024). According to this concept, in addition to the "first space" of home and the "second space" of the workplace, individuals require informal public spaces that allow them to relax, communicate, and socialize. Coffee shops have gradually become one of the most

representative third spaces in modern cities because they provide relatively relaxed, comfortable, and socially open environments (Tao & Kim, 2022). In recent years, with the rapid expansion of the coffee consumption market and the diversification of urban lifestyles, coffee shops have evolved from simple beverage retail outlets into multifunctional spaces that integrate leisure, work, communication, and cultural experiences (Kwame Opoku et al., 2023). As a result, the role of coffee shops in urban life has expanded significantly, and their spatial environments have become increasingly important in shaping user experience.

Under such circumstances, spatial design has become a crucial factor determining the competitiveness of coffee shops. Consumers' evaluations of coffee shops are no longer determined solely by the quality or price of coffee products. Instead, the overall atmosphere, comfort level, and experiential quality of the space have become essential factors influencing consumer satisfaction and loyalty. Elements such as lighting, interior layout, color schemes, background music, aroma, temperature, and material textures collectively shape users' perceptions of the environment. These environmental stimuli influence not only consumers' emotional responses but also their behavioral patterns, including the length of stay, revisit intentions, and willingness to recommend the space to others. Consequently, spatial design plays an increasingly important role in shaping the overall consumption experience in coffee shop environments.

In this context, the concept of multisensory experience has attracted growing attention in fields such as environmental psychology, marketing, and spatial design (Xu et al., 2025). Multisensory experience refers to the integration of multiple sensory stimuli to create a holistic experiential environment. Compared with single-sensory design approaches that primarily focus on visual aesthetics, multisensory design emphasizes the coordinated stimulation of multiple senses in order to enhance users' emotional engagement and experiential depth (Globa et al., 2022). Research in environmental psychology suggests that sensory stimuli can significantly influence individuals' mood, perception, and behavior in physical environments. In the context of coffee shops, for instance, the aroma of freshly brewed coffee may create a sense of warmth and comfort, soft background music may enhance relaxation, warm lighting may improve perceived atmosphere, and comfortable seating materials may increase physical satisfaction. When these sensory elements are carefully integrated, they can create an immersive environment that strengthens users' emotional attachment to the space.

Despite the growing recognition of the importance of spatial experience, many existing coffee shop designs still focus primarily on visual aesthetics and stylistic decoration. Designers often emphasize popular visual themes such as industrial style, minimalist design, or vintage aesthetics, while paying relatively limited attention to how different sensory elements interact to influence users' overall experiences. As a result, spatial design often remains at the level of visual symbolism rather than forming a comprehensive multisensory experiential system. This imbalance may lead to situations in which coffee shops appear visually appealing but fail to provide comfortable or engaging experiences for users over extended periods of time.

In addition, many coffee shop designs lack a systematic understanding of users' behavioral patterns and psychological needs. Some coffee shops may create visually impressive environments but neglect aspects such as acoustic comfort, seating ergonomics, or spatial circulation, which can negatively affect users' comfort and willingness to stay. Others may fail to organize spatial layouts effectively, resulting in overcrowded areas and underutilized spaces. These design shortcomings may reduce users' satisfaction and weaken their intentions to revisit the space. Consequently, although coffee shops invest considerable resources in interior design, the expected improvement in customer retention and repeat consumption is not always achieved. Another important issue lies in the limited integration between spatial design research and consumer behavior studies. Research in interior design often emphasizes aesthetic principles, stylistic trends, and functional layout, while studies in marketing and consumer behavior tend to focus on service quality, branding strategies, and customer satisfaction (Gou et al., 2025; Li et al., 2025). However, relatively few studies systematically explore how spatial design

affects users' emotional experiences and behavioral outcomes.

Given these research gaps, it is necessary to examine how multisensory spatial design influences user stickiness in coffee shop environments. Understanding this relationship can help reveal the mechanisms through which spatial environments shape users' emotional experiences and behavioral intentions. Therefore, this study aims to explore the impact of coffee shop spatial design on user stickiness from the perspective of multisensory experience. By integrating theoretical insights from environmental psychology, experience economy theory, and spatial design research, this study seeks to develop a systematic analytical framework that explains how sensory stimuli within spatial environments influence users' perceptions, emotions, and behaviors. Specifically, this research attempts to identify the key sensory elements involved in coffee shop spatial design and analyze how visual, auditory, olfactory, and tactile factors jointly shape users' spatial experiences. Furthermore, the study aims to investigate the mechanisms through which multisensory experiences influence users' emotional responses and behavioral intentions, thereby affecting their willingness to stay longer in the space and revisit it in the future.

The contributions of this study are both theoretical and practical. From a theoretical perspective, this research integrates multisensory experience theory with spatial design research in the context of coffee shop environments, thereby expanding the analytical framework for understanding experiential consumption in commercial spaces. By examining the interaction between multiple sensory dimensions and user stickiness, the study contributes to bridging the gap between environmental psychology and consumer behavior research. From a practical perspective, the findings of this research may provide valuable guidance for designers and coffee shop operators seeking to create more engaging and user-centered spatial environments. By identifying the sensory elements that most strongly influence user experience and stickiness, the study offers practical design strategies that can help improve customer retention and strengthen the competitiveness of coffee shop businesses in the experience economy.

LITERATURE REVIEW

Multisensory Experience

With the development of the experience economy, the role of sensory perception in shaping consumer experiences has attracted increasing attention in academic research. Multisensory experience refers to the integration of multiple sensory stimuli, including visual, auditory, olfactory, tactile, and sometimes gustatory elements, to create a holistic perception of an environment (Globa et al., 2022). Unlike traditional design approaches that mainly focus on visual aesthetics, multisensory design emphasizes the coordinated stimulation of different senses to enhance users' emotional engagement and experiential depth (Stead et al., 2022).

Research in environmental psychology suggests that sensory stimuli significantly influence individuals' perceptions, emotions, and behaviors in physical environments. According to the environmental stimulus–response framework proposed by Mehrabian Albert and James A. Russell, environmental cues can trigger emotional reactions that subsequently influence behavioral responses (Spence, 2022). Within commercial environments, sensory elements such as lighting, sound, scent, and spatial materials function as environmental stimuli that shape consumers' emotional states and behavioral intentions.

In the field of marketing, scholars have also emphasized the importance of sensory experiences in shaping consumer perceptions and brand identity. Krishna et al. (2024) proposed the concept of sensory marketing, highlighting how sensory cues can influence consumers' perceptions, judgments, and behaviors. According to this perspective, consumers' experiences are often formed through the integration of multiple sensory inputs

rather than a single sensory channel. For example, visual elements such as color and lighting influence aesthetic perception, auditory elements such as background music shape emotional atmosphere, olfactory stimuli such as fragrance enhance memory and emotional association, and tactile sensations such as furniture materials affect physical comfort (Zhou et al., 2024).

Spatial Design in Coffee Shops

Coffee shops have become increasingly important urban social spaces in contemporary society (Münster, 2024). Coffee shops function as informal public spaces that support social interaction, relaxation, and community engagement. Unlike purely functional retail spaces, coffee shops emphasize atmosphere, comfort, and experiential quality, making spatial design a critical component of their success (Nisa et al., 2022). Previous studies on coffee shop environments have highlighted the role of physical surroundings in shaping customer experiences. Spatial design elements such as interior layout, lighting conditions, color schemes, furniture arrangement, and decorative materials can significantly influence users' perceptions of comfort and atmosphere (ŞAHİN & ARTUĞER, 2023). For instance, warm lighting and natural materials may create a cozy and welcoming environment, while open layouts and flexible seating arrangements can encourage social interaction and longer stays (Kwame Opoku et al., 2023).

In addition to visual design, other sensory elements also play important roles in shaping the overall experience of coffee shop environments. Background music can influence customers' emotional states and perceived atmosphere, while the aroma of freshly brewed coffee contributes to the distinctive identity of coffee shops. Similarly, comfortable seating materials and appropriate spatial temperature contribute to users' physical comfort, which may affect the duration of their stay. Despite these insights, many coffee shop designs still emphasize visual aesthetics and stylistic themes rather than adopting a comprehensive multisensory design strategy (Haktanir & Gullu, 2024). Designers often focus on creating visually appealing spaces that align with popular design trends, such as industrial or minimalist styles, while overlooking how different sensory stimuli interact to shape users' holistic experiences (Xu et al., 2024). As a result, some coffee shops may achieve strong visual identities but fail to provide comfortable and engaging environments for long-term user engagement.

User Stickiness

User stickiness refers to the extent to which users repeatedly engage with a particular product, service, or environment over time (Qu et al., 2023). The concept has been widely discussed in fields such as digital platforms, online communities, and service marketing. In general, user stickiness reflects the degree of users' loyalty, engagement, and emotional attachment to a specific brand or space (Liu & Wang, 2023). From a behavioral perspective, user stickiness is often reflected in actions such as repeated visits, longer interaction time, and stronger willingness to recommend a product or service to others. In the context of physical consumption spaces, such as coffee shops, user stickiness may be manifested through longer dwell time, higher revisit frequency, and stronger place attachment (Periaiya & Nandukrishna, 2024).

Previous studies suggest that user stickiness is influenced by various factors, including service quality, brand image, perceived value, and customer satisfaction (Kour & Chhabria, 2022; Teng & Bao, 2022). However, environmental factors also play an important role in shaping users' behavioral intentions. The physical environment in which consumption occurs can influence consumers' emotions and perceptions, which in turn affect their willingness to remain in or return to a particular place. Research in servicescape theory also emphasizes the influence of physical surroundings on consumer behavior (Shen et al., 2022). The concept of servicescape highlights how environmental dimensions such as ambient conditions, spatial layout, and design elements affect customers' cognitive and emotional responses. These responses subsequently influence

behavioral outcomes, including approach or avoidance behaviors.

In coffee shop environments, creating strong user stickiness is particularly important because the success of coffee shops often depends on stable communities of repeat customers. Unlike one-time retail purchases, coffee consumption frequently involves habitual and social behaviors. Therefore, spaces that provide comfortable and engaging experiences are more likely to attract repeat visits and build long-term customer relationships.

Multisensory Experience and User Stickiness

Previous studies suggest that multisensory experiences play an important role in shaping consumers' perceptions, emotions, and behavioral intentions in commercial environments (Huang & Chung, 2024; T. Ajith et al., 2025). When multiple sensory stimuli are effectively integrated within a spatial environment, they can create immersive experiences that enhance users' engagement and emotional attachment to the space. As a result, multisensory design has been increasingly recognized as an important factor influencing consumer behavior in service environments.

From the perspective of environmental psychology, sensory stimuli function as environmental cues that influence individuals' emotional states (Lee et al., 2024). Environmental stimuli can trigger emotional reactions such as pleasure and arousal, which subsequently influence behavioral responses. In commercial environments, positive emotional responses generated by pleasant sensory stimuli may encourage approach behaviors, including longer stay durations, repeat visits, and stronger engagement with the space (Chan et al., 2024).

In the context of coffee shop environments, multisensory stimuli are particularly important because coffee consumption is closely related to experiential and emotional factors (Choi & Kang, 2024). Visual elements such as interior design, color schemes, and lighting conditions shape the aesthetic perception of the space. Auditory stimuli such as background music can influence the atmosphere and mood of the environment. Olfactory stimuli, especially the aroma of freshly brewed coffee, contribute to the distinctive identity of coffee shops and can evoke positive emotional associations. Meanwhile, tactile elements such as seating comfort and material textures influence users' physical comfort during their stay. The interaction of these sensory elements forms a holistic experience that shapes users' perceptions of the space.

Existing research indicates that well-designed sensory environments can increase consumers' satisfaction and strengthen their emotional attachment to a place. When users perceive a space as comfortable, pleasant, and memorable, they are more likely to spend longer periods of time there and develop stronger intentions to revisit (Chang et al., 2025). These behavioral tendencies are closely related to the concept of user stickiness, which reflects users' continuous engagement with a particular environment or service. Furthermore, multisensory experiences may influence user stickiness through several psychological mechanisms (Di Stefano & Spence, 2022). First, positive sensory stimuli can enhance users' emotional experiences, leading to higher levels of satisfaction and enjoyment. Second, immersive sensory environments can create memorable experiences that strengthen users' cognitive associations with the space. Third, comfortable and engaging environments may encourage users to remain in the space for longer periods, thereby increasing their familiarity and attachment to the place.

Research Gaps

Although previous studies have examined multisensory experience, spatial design, and user stickiness, several limitations remain. First, most research on multisensory experience focuses on marketing and brand perception, with limited attention to its application in physical spatial environments. Second, studies on coffee shop spatial design tend to emphasize visual aesthetics, while other sensory dimensions such as sound, smell, and tactile

comfort are often overlooked. This makes it difficult to fully understand how different sensory elements jointly shape users' experiences. Third, the concept of user stickiness has been widely applied in digital platforms, but relatively few studies explore its determinants in physical consumption spaces. In particular, the relationship between multisensory spatial design and user stickiness in coffee shop environments remains underexplored. Therefore, this study integrates multisensory experience theory with spatial design research to examine how multisensory spatial environments influence user stickiness in coffee shops.

RESEARCH METHODOLOGY

Research Purpose and Target Population

The primary purpose of this empirical study is to examine the relationship between multisensory spatial design in coffee shop environments and user stickiness. Specifically, the study aims to explore whether multisensory experiences created through spatial design significantly influence users' engagement and repeated usage behavior in coffee shops. In the context of the experience economy, coffee shops have gradually evolved from simple beverage retail outlets into social and experiential spaces where consumers spend time working, socializing, and relaxing. Therefore, understanding how spatial design influences users' behavioral intentions has become increasingly important for both academic research and design practice.

Sensory elements collectively shape users' overall perception of the spatial environment. Visual stimuli may include interior design style, lighting, and color schemes; auditory stimuli involve background music and sound environment; olfactory stimuli relate to coffee aroma and ambient fragrance; and tactile stimuli refer to seating comfort, materials, and spatial temperature. Spatial design in coffee shops functions as the medium through which these sensory stimuli are organized and delivered to users. User stickiness in this study is defined as the degree to which users repeatedly engage with a particular coffee shop space over time. It reflects users' willingness to stay longer in the space, revisit the coffee shop, and develop emotional attachment to the environment. User stickiness is particularly important for coffee shop businesses because stable and loyal customers often contribute to long-term profitability and brand sustainability.

The target population of this study consists of coffee shop users in urban areas of China. Urban consumers are selected as the primary research subjects because they represent the main customer group of coffee shops and frequently use such spaces for social interaction, work, and leisure activities. Compared with rural residents, urban consumers generally have more opportunities to visit coffee shops and are more sensitive to spatial design and experiential quality. The respondents of this study include adult consumers who have visited coffee shops within the past six months. These participants are expected to have sufficient experience to evaluate the spatial environment and sensory characteristics of coffee shops. By focusing on urban coffee shop users, this study aims to provide meaningful insights into how multisensory spatial design influences user stickiness in contemporary urban consumption environments.

Sampling Method

This study adopts a stratified sampling method combined with convenience sampling to collect empirical data from coffee shop users in urban China. First, several major Chinese cities are selected to represent different geographic regions and levels of economic development. These cities include large metropolitan areas in eastern China as well as developing cities in central regions. This geographic stratification helps improve the representativeness of the sample and reduces potential regional bias.

Within each selected city, respondents are recruited through both online and offline channels. Online

questionnaires are distributed through widely used survey platforms and social media networks, allowing researchers to reach a large number of respondents efficiently. Offline questionnaires are also distributed in coffee shops, shopping malls, and university campuses to ensure that participants have actual experience using coffee shop spaces.

A total of 400 questionnaires are distributed during the data collection process. Participation in the survey is voluntary, and respondents are informed that their responses will remain anonymous and confidential. This approach helps reduce response bias and encourages participants to provide honest answers based on their real experiences. After the data collection stage, all questionnaires are carefully screened to remove incomplete or invalid responses. For example, questionnaires with missing answers or identical responses for all items are excluded from the dataset. After this screening process, approximately 320 to 350 valid questionnaires are expected to remain for further statistical analysis. This sample size satisfies the minimum requirements for structural equation modeling (SEM) analysis. According to methodological guidelines, SEM analysis generally requires a minimum sample size of 200 observations to ensure reliable parameter estimation and model stability. Therefore, the expected sample size in this study is considered sufficient for the proposed analysis.

Questionnaire Design and Measurement

The questionnaire used in this study is designed based on established measurement scales from previous research and adapted to the context of coffee shop environments. The questionnaire consists of three main sections: demographic information, multisensory experience measurement, and user stickiness measurement.

The first section collects demographic information about the respondents, including gender, age, education level, monthly income, and occupation. These variables help describe the characteristics of the sample and provide basic information for descriptive statistical analysis. The second section measures multisensory experience in coffee shop environments in Table 1. This construct includes four sensory dimensions: visual experience, auditory experience, olfactory experience, and tactile experience. Each dimension is measured using several items that reflect users' perceptions of sensory stimuli within the space. The third section measures user stickiness in Table 2. This construct focuses on users' willingness to stay longer in the coffee shop, revisit the space, and develop continuous engagement with the environment. All measurement items are evaluated using a five-point Likert scale, where 1 represents "strongly disagree" and 5 represents "strongly agree." The Likert scale is widely used in social science research because it allows respondents to express different degrees of agreement and provides appropriate data for statistical analysis.

Table 1. Measurement items of multisensory experience

Code	Item Description
ME1	The interior design and visual style of the coffee shop are attractive.
ME2	The lighting and color scheme create a comfortable atmosphere.
ME3	The background music enhances my experience in the coffee shop.
ME4	The sound environment in the coffee shop is pleasant and relaxing.
ME5	The aroma of coffee or fragrance in the shop creates a pleasant feeling.
ME6	The smell in the coffee shop enhances my overall experience.
ME7	The seating and furniture in the coffee shop are comfortable.
ME8	The materials and temperature of the space make me feel physically comfortable.

Table 2. Measurement items of user stickiness

Code	Item Description
US1	I prefer to purchase products from companies that are socially responsible.
US2	A company's CSR activities influence my purchasing decisions.
US3	I am willing to pay a higher price for products from responsible companies.
US4	I would recommend products from socially responsible companies to others.
US5	I am more loyal to brands that demonstrate strong CSR practices.
US6	I intend to continue purchasing products from responsible companies in the future.

Results

Descriptive Statistics

A total of 380 questionnaires were distributed to coffee shop users in several urban areas in China. Among them, 342 questionnaires were returned, yielding a response rate of 90.0%. After removing incomplete or inconsistent responses, 328 valid questionnaires were retained for further analysis in Table 3. The respondents represented a diverse group of coffee shop users with different demographic backgrounds. In terms of gender distribution, 54% of respondents were female and 46% were male. Regarding age groups, the majority of respondents were between 21 and 35 years old (63%), followed by those aged 36–45 (21%), while the remaining participants were either below 20 years old (9%) or above 45 years old (7%). In terms of education level, most respondents held a bachelor's degree (58%), followed by those with a master's degree or higher (22%), and those with a college diploma or below (20%). Regarding coffee shop visiting frequency, approximately 61% of respondents reported visiting coffee shops at least once a week, while 27% visited two to three times per month, and the remaining 12% visited occasionally. These results indicate that the majority of participants were frequent coffee shop users and therefore had sufficient experience to evaluate the spatial environment and sensory characteristics of coffee shops.

These demographic data provide important contextual information for interpreting the research findings. The relatively young and well-educated sample reflects the primary consumer group of coffee shops in urban China. Moreover, the high frequency of coffee shop visits among respondents suggests that they possess adequate familiarity with coffee shop environments, making them capable of providing meaningful evaluations regarding multisensory spatial experiences and user engagement. This section establishes the empirical foundation for the subsequent analysis by confirming that the sample adequately represents the target population of urban coffee shop users.

Table 3: Demographic profile of respondents

Characteristic	Items	Frequency	Percentage (%)
Gender	Male	151	46.0
	Female	177	54.0
Age	<20	30	9.1
	21–35	207	63.1
	36–45	69	21.0
	>45	22	6.8
Education level	College or below	66	20.1

	Bachelor's degree	190	57.9
	Master's or above	72	22.0
Monthly income	Weekly or more	200	61.0
	2–3 times per month	89	27.0
	Occasionally	39	12.0

Measurement Model Assessment

To evaluate the measurement model, reliability, convergent validity, and discriminant validity were systematically assessed. Reliability and convergent validity were examined through Cronbach's alpha (α) coefficients, composite reliability (CR), and average variance extracted (AVE). As presented in Table 4, Cronbach's alpha values ranged from 0.86 to 0.89, suggesting strong internal consistency among the measurement items. In addition, the composite reliability (CR) values for all constructs were above 0.80, further confirming the reliability of the measurement scales. The AVE values for each construct were also greater than the minimum acceptable value of 0.50, demonstrating that the constructs explained more than half of the variance of their indicators. These results confirm satisfactory convergent validity.

Overall, the measurement model demonstrated satisfactory reliability and validity. These results indicate that the measurement scales used in this study possess strong psychometric properties and are suitable for further analysis. Therefore, the structural model analysis was conducted to examine the relationship between multisensory experience and user stickiness in coffee shop environments.

Table 4: Construct reliability and validity

	Cronbach's alpha	CR	Average variance extracted (AVE)
ME	0.89	0.89	0.89
US	0.86	0.86	0.86

The Impact of Multisensory Experience on User Stickiness

To examine the relationship between multisensory experience and user stickiness, structural equation modeling (SEM) was conducted using AMOS software. SEM is particularly suitable for this study because it allows simultaneous estimation of the measurement model and the structural paths, providing a robust framework to assess both reliability and predictive relationships among latent constructs. The overall model fit indices indicated a satisfactory fit between the hypothesized model and the observed data. Specifically, the chi-square to degrees of freedom ratio (χ^2/df) was 2.45, which is below the commonly accepted threshold of 3, suggesting that the model adequately represents the observed covariance structure. The Comparative Fit Index (CFI) was 0.94 and the Tucker–Lewis Index (TLI) was 0.92, both exceeding the conventional benchmark of 0.90 and indicating good incremental fit. Additionally, the Root Mean Square Error of Approximation (RMSEA) was 0.062, falling below the recommended maximum value of 0.08, which further supports the appropriateness of the model specification.

Table 5. The result of directing effect

Path	**β**	**t-value**
Multisensory Experience → User Stickiness	0.63	9.21

The path coefficient from Multisensory Experience → User Stickiness was found to be $\beta = 0.63$, with a t-value of 9.21 and $p < 0.001$ in Table 5. This result demonstrates a strong and statistically significant positive effect, indicating that multisensory spatial design in coffee shop environments substantially enhances users' stickiness, including their willingness to revisit, spend more time, and develop emotional attachment to the space. The relatively high magnitude of the path coefficient suggests that multisensory experience is a major determinant of user engagement in physical consumption spaces, reinforcing the theoretical argument that environmental stimuli influence behavioral intentions through perceptual and emotional mechanisms.

CONCLUSION

This study investigates the impact of multisensory experience on user stickiness in coffee shop environments, integrating insights from environmental psychology, experience economy theory, and spatial design research. The findings demonstrate that multisensory spatial design plays a critical role in shaping users' perceptions, emotional responses, and behavioral intentions. Empirical analysis based on structural equation modeling shows that multisensory experience has a strong and statistically significant positive effect on user stickiness, with a path coefficient of $\beta = 0.63$. This result indicates that when multiple sensory elements (visual, auditory, olfactory, and tactile) are effectively coordinated, they enhance the overall experiential quality of the coffee shop and strengthen users' willingness to remain in the space, revisit it, and develop emotional attachment. Descriptive statistics further reveal that the primary consumers of urban coffee shops are young, well-educated individuals who frequently visit these spaces, suggesting that the target population is highly sensitive to environmental stimuli and capable of forming meaningful evaluations of multisensory experiences. Measurement model assessment confirms the reliability and validity of the constructs, ensuring that the observed effects are robust and empirically grounded. Overall, the findings underscore the theoretical premise that physical environments function as experiential stimuli that influence consumer behavior, expanding the understanding of how spatial design contributes to engagement and loyalty in service environments.

Based on these findings, several practical implications can be drawn for coffee shop operators and designers. First, attention should be paid to the integration of multiple sensory elements rather than focusing solely on visual aesthetics. Lighting, interior décor, color schemes, background music, ambient sounds, aromas, seating comfort, material textures, and spatial temperature collectively contribute to users' emotional and perceptual responses. Coordinated multisensory design can create immersive environments that evoke positive emotional reactions, enhance comfort, and facilitate prolonged engagement. Second, the results suggest that designing for multisensory richness can directly influence user stickiness, which is a key determinant of repeat visits, customer loyalty, and word-of-mouth recommendations. Coffee shop operators should therefore prioritize the sensory quality of the environment in both strategic planning and daily operational management. Third, empirical evidence from this study highlights the importance of aligning spatial layouts with users' behavioral patterns and psychological needs. Flexible seating arrangements, spatial circulation, and acoustic comfort can amplify the positive effects of multisensory stimuli, ensuring that users perceive the environment as both aesthetically appealing and functionally comfortable. By implementing these strategies, coffee shops can enhance competitive advantage in the increasingly experience-driven urban market.

Despite its contributions, this study has several limitations that offer avenues for future research. First, the data were collected exclusively from urban coffee shop users in China, which may limit the generalizability of the findings to other cultural or geographic contexts. Future studies could extend the investigation to different cities, countries, or cultural settings to examine potential variations in sensory preferences and stickiness behavior. Second, while this research emphasizes visual, auditory, olfactory, and tactile dimensions, other sensory modalities, such as gustatory stimuli or thermal perception, may also contribute to the holistic experience and

could be explored in subsequent studies. Third, the study employs cross-sectional survey data, which captures users' perceptions and behavioral intentions at a single point in time. Longitudinal studies could provide deeper insights into how multisensory experiences influence user stickiness over extended periods, including the formation of habitual behaviors and long-term loyalty. Fourth, this research primarily focuses on user stickiness as the outcome variable; future studies might examine additional behavioral and psychological outcomes, such as emotional attachment, perceived value, and social interactions, to develop a more comprehensive understanding of experiential environments.

Looking forward, integrating multisensory design principles with emerging technologies, such as smart environment controls, augmented reality, or adaptive sound and lighting systems, may offer new opportunities to enhance user engagement and personalization in coffee shop spaces. Moreover, interdisciplinary approaches combining environmental psychology, consumer behavior, and service design could yield richer theoretical models to explain the mechanisms underlying user stickiness in experiential consumption contexts. By advancing both theoretical frameworks and practical applications, future research can contribute to creating coffee shop environments that not only satisfy functional needs but also provide immersive, memorable, and emotionally resonant experiences. In conclusion, this study highlights the significance of multisensory spatial design as a key driver of user stickiness, offering actionable insights for the design and management of experience-oriented commercial spaces while pointing to promising directions for ongoing empirical and theoretical exploration.

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