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# Explaining the Role of Environmental Multisensory Experiences in Shaping Decision-Making and Customer Loyalty in Café Services

1. Alireza. Andalib : Department of Management, Mo.C., Islamic Azad University, Isfahan, Iran
2. Hasan. Ghorbani Dinani *: Department of Management, Mo.C., Islamic Azad University, Isfahan, Iran
3. Mahmood. Naderi Beni: Assistant Professor, Department of Economics, Management and Accounting, Yazd University, Yazd, Iran

*corresponding author's email: Hassan.ghorbani@mau.ac.ir

## ABSTRACT

Environmental multisensory experiences, as one of the key components of service environments, play a crucial role in shaping customers' decisions and behaviors. The purpose of the present study is to explain the effect of environmental multisensory experiences on the decision-making process and customer loyalty in café services. The research was conducted using a mixed-methods approach; in the qualitative phase, the dimensions of multisensory experiences and their behavioral outcomes were identified through semi-structured interviews with customers and experts and were analyzed using the grounded theory approach. In the quantitative phase, the relationships among the extracted components were tested using structural equation modeling. The statistical population consisted of customers of cafés in the city of Isfahan, and data were collected through a questionnaire. The results indicated that environmental multisensory experiences, by influencing customer perceptions, play a significant role in purchase decision-making and in strengthening customer loyalty, and that certain dimensions of the service environment exhibit greater impact than others. These findings provide a basis for improving service environment design and enhancing customer experience in café businesses.

**Keywords:** Environmental multisensory experiences, customer purchase decision, customer loyalty, service environment, café services.

## Introduction

Service organizations increasingly compete not only on functional quality and price, but on the ability to design and stage experiences that capture customers' attention, emotions, and memory. This competitive shift is closely aligned with the "experience economy" logic, which argues that value creation has moved beyond goods and services toward orchestrated experiences that customers actively seek and are willing to pay for (1). In hospitality and café contexts—where products are often comparable and switching costs are low—the experiential layer of consumption becomes a primary differentiator, shaping both immediate purchase choices and longer-term relational outcomes. Consequently, understanding how experience is formed, evaluated, and translated into behavioral intentions has become a central research priority in management and marketing scholarship (2).


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A key implication of the experience-based competition paradigm is that “customer experience” must be treated as a holistic and processual construct. Rather than being limited to a single touchpoint, customer experience unfolds across the customer journey, comprising cognitive appraisals, affective reactions, sensory perceptions, and social meaning-making that accumulate over time (2). In café services, experience formation is particularly sensitive to micro-interactions and environmental cues because consumption typically occurs on-site, often in social settings, and under conditions of time pressure or mood-dependent choice. Therefore, managerial decisions about service design—including spatial layout, ambience, sensory cues, and staff-customer interaction scripts—directly affect perceived value and behavioral outcomes.

Among the most influential levers of experience design in physical service environments are environmental “atmospherics” and multisensory stimuli. A multisensory perspective emphasizes that customers simultaneously process cues across vision, audition, olfaction, gustation, and touch, and that these cues interact to shape perception and behavior (3). Sensory marketing conceptualizes these cues as strategically manageable inputs that can be engineered to evoke favorable impressions and emotions, strengthen brand associations, and guide behavior (4). In practical terms, cafés deploy a broad sensory palette—lighting, color temperature, typography, music tempo, scent diffusion, seating texture, beverage presentation, and thermal comfort—to create a distinctive experience that customers interpret as quality, authenticity, comfort, or prestige.

The literature indicates that sensory stimuli affect customers through multiple psychological pathways. One mechanism is perceptual priming, where ambient cues bias judgments of product quality, service competence, or brand personality. Another pathway is affective response: atmospherics can induce pleasure, arousal, and dominance-related feelings, which in turn influence approach–avoidance behavior. The Mehrabian–Russell tradition and its extensions in hospitality settings show that emotions act as proximate determinants of behavioral intentions such as revisit intention, recommendation, and willingness to pay (5). This evidence suggests that café managers who understand and purposefully align sensory cues with desired emotional states may more effectively stimulate purchase decisions and strengthen downstream loyalty.

Empirical research also demonstrates that specific sensory modalities can exert differentiated and sometimes asymmetric effects. Visual aesthetics—such as coherence of design, novelty, and stylistic congruence—can shape consumer intentions and moderate how other cues are interpreted (6). Touch-related cues—such as surface texture, weight, and ergonomics—can influence preference formation and cross-product choice by altering perceived control, quality inference, and embodied cognition (7). Ambient scent, in turn, can affect well-being, perceived comfort, and time spent in an environment, suggesting that olfactory design has both experiential and behavioral implications within built environments (8). Importantly, sensory effects are not merely anecdotal: a large meta-analytic synthesis of experimental findings confirms that music, scent, and color produce systematic atmospheric effects on consumer responses, while also indicating variability depending on context, congruity, and outcome type (9). Such findings support the managerial premise that multisensory environmental design is a legitimate strategic instrument rather than a superficial embellishment.

At the same time, the measurement and operationalization of customer experience in physical environments remain challenging. Customer experience is multidimensional, and its valid measurement requires capturing both cognitive–evaluative components (e.g., perceived quality, perceived value) and affective–sensory components (e.g., pleasure, stimulation, comfort). Contemporary approaches recommend structured measurement models tailored to physical settings, where environmental, social, and service-process elements jointly shape experience

evaluations (10). In café services, where the environment is a core component of the offering, measurement frameworks must account for sensory-rich stimuli and their interaction with customer characteristics and situational conditions.

The strategic relevance of multisensory experience design becomes even more pronounced when considered alongside contemporary developments in customer engagement, digitalization, and relationship management. Customer engagement and loyalty are increasingly shaped by integrated experiences across physical and digital interfaces, pushing firms toward “phygital” strategies that fuse on-site experiences with digital touchpoints such as social media content, mobile ordering, loyalty apps, and personalized recommendations (11). Social media marketing can influence purchase decisions through experience-related mechanisms, suggesting that the experiential meaning customers form online can amplify or attenuate the effect of in-store sensations (12). Within platform-based consumption contexts, digital brand activities can influence loyalty via brand equity and psychological responses consistent with stimulus–organism–response logic (13). These insights imply that café experiences are no longer confined to the shop floor; they are embedded within an ecosystem of mediated touchpoints that can shape expectations before the visit and memory after the visit.

Moreover, rapid advances in artificial intelligence are reshaping how organizations design, personalize, and manage customer experiences. AI-enabled personalization and analytics can enhance experience relevance by tailoring offerings, communications, and service scripts to individual preferences and contexts (14). In online and e-retailing settings, AI chatbots have been shown to influence customer experience by providing responsiveness, convenience, and perceived competence; these effects are conceptually transferable to café services that use conversational agents for reservations, complaints handling, or menu guidance (15). AI-based engagement strategies in online markets further demonstrate how algorithmic tools can strengthen interactive value creation and engagement through personalization, feedback loops, and data-driven content strategies (16). From a managerial viewpoint, the integration of AI into café service systems can complement sensory design by improving the relevance and consistency of customer interactions, thereby reinforcing loyalty outcomes.

Parallel to digital transformation, relationship marketing and customer relationship management (CRM) remain fundamental for loyalty development in both B2C and B2B contexts. Empirical evidence suggests that relationship marketing and social media activities can enhance CRM effectiveness and, through mediating processes such as word-of-mouth and satisfaction, contribute to loyalty outcomes (17). In small businesses, CRM initiatives can improve loyalty by organizing customer information, enabling targeted communications, and enhancing responsiveness—capabilities that are often underdeveloped in independent cafés but highly consequential for retention (18). These studies reinforce the idea that loyalty is rarely the product of a single stimulus; instead, it emerges from an interdependent system of experience cues, relationship processes, and perceived value consistency.

Within loyalty research, brand loyalty is often conceptualized as both a behavioral pattern (repeat purchase, repatronage) and an attitudinal state (commitment, trust, identification). Recent work emphasizes the antecedent role of customer satisfaction, trust, and affective commitment in explaining behavioral loyalty (19). Complementary evidence suggests that customer brand engagement and loyalty can be promoted through customer brand identification and perceived value congruity, underscoring the importance of symbolic alignment between customers’ self-concepts and brand meanings (20). In café environments, where brands often signify lifestyle, taste,

and social identity, multisensory design can strengthen brand symbolism and identification by making the brand experience more distinctive, coherent, and memorable, thereby supporting engagement-based pathways to loyalty.

The broader loyalty literature also highlights the importance of brand image and satisfaction as robust predictors of loyalty across sectors. A systematic synthesis indicates that brand image consistently influences satisfaction and loyalty, though effect sizes vary depending on context and measurement choices (21). Evidence from service and banking contexts further shows that perceived quality—particularly "digital quality" under environmental uncertainty—can affect satisfaction and loyalty, illustrating that customers evaluate quality dynamically in response to contextual volatility (22). While cafés differ from banking, these findings are theoretically useful because they emphasize that loyalty formation is contingent on uncertainty and comparative alternatives, conditions that also characterize café markets with high density and frequent competitor imitation.

In addition, contemporary management research increasingly connects loyalty to corporate responsibility and sustainability-related practices. Although sustainability is often examined in financial services, the underlying mechanism—value alignment and trust—has relevance for consumer-facing hospitality businesses. Green and socially responsible practices can enhance customer loyalty by strengthening perceptions of integrity and shared values (23). In a similar vein, a comprehensive customer experience model with an emphasis on social responsibility indicates that responsible practices can be embedded within broader experience architectures, shaping how customers interpret service encounters and brand meaning (24). For cafés, visible practices such as waste reduction, ethical sourcing, and community engagement may interact with sensory cues and service quality to influence customer evaluations and loyalty decisions.

Despite the growing evidence on atmospherics and customer experience, important gaps remain—particularly in the integration of multisensory environmental stimuli, decision processes, and loyalty outcomes within café services. First, much of the empirical literature has focused on retail, restaurants, or digital platforms, and café services have distinctive characteristics: consumption is often experiential and social, visits may be frequent and habitual, and product differentiation is subtle. Second, existing models often treat sensory cues as isolated variables rather than an integrated multisensory system that customers interpret holistically (3). Third, while prior studies demonstrate that sensory perception and mental imagery can shape purchase decisions, more context-specific evidence is needed to clarify which sensory dimensions dominate under real-world service conditions and how these cues translate into loyalty over time (25). Finally, the presence of contextual moderators—such as demographic characteristics, situational constraints, and competitive imitation—suggests that sensory effects are conditional and may operate differently across customer segments and service contexts (6, 9).

Addressing these gaps requires methodological strategies capable of capturing both depth of meaning and empirical generalizability. Exploratory sequential mixed-methods designs are particularly appropriate when constructs require contextual grounding and when the underlying mechanisms are complex and multidimensional. In such designs, qualitative inquiry is used to surface concepts, categories, and relationships, while quantitative analysis tests the emergent model and estimates the strength of relationships. Grounded theory, in particular, is well suited for developing models that are "grounded" in lived experience and local context, especially when the phenomenon involves dynamic interaction among environmental, psychological, and social factors (26). In the café context, where sensory experiences are subjective and culturally patterned, grounded theory can clarify how customers interpret sensory cues and how these interpretations inform decision-making and loyalty trajectories.

In summary, the theoretical and empirical foundations of sensory marketing, store atmospherics, and customer experience support the proposition that environmental multisensory stimuli can shape customer perceptions, emotions, and behavioral intentions in service environments (3, 4, 8). Loyalty research further suggests that satisfaction, trust, engagement, and identification are critical pathways through which experiences can translate into sustained loyalty outcomes (19-21). Meanwhile, contemporary developments in phygital experience design, social media influence, AI-enabled personalization, and CRM extend the scope of experience management beyond the physical environment and highlight the need for integrated, context-sensitive models (11, 12, 14-18). Together, these perspectives imply that café businesses can benefit from a rigorous model that explains how multisensory environmental stimuli influence purchase decisions and loyalty, while accounting for contextual and strategic factors that shape customer responses.

Accordingly, the aim of this study is to design and validate an integrated model explaining how environmental multisensory stimuli influence customers' purchase decision-making and customer loyalty in café services.

## Methods and Materials

The present study was conducted with the aim of designing and validating a model for analyzing customer purchase behavior under the influence of environmental sensory stimuli, with a focus on the principles of sensory marketing, using an exploratory sequential mixed-methods approach. Within this framework, qualitative data were first collected and analyzed to identify the principal concepts and relationships, and the resulting findings served as the basis for designing the quantitative instrument and empirically testing the proposed model. The application of the mixed-methods approach makes it possible to provide a more comprehensive depiction of the mechanisms through which sensory stimuli influence customer purchase behavior.

In the qualitative phase of the study, given the exploratory nature of the topic and the absence of a comprehensive indigenous model regarding the interaction between environmental multisensory stimuli and customer purchase behavior, the grounded theory approach was employed. Data were collected through in-depth semi-structured interviews with café customers, and data analysis was conducted based on the stages of open, axial, and selective coding. The use of the paradigmatic model at this stage facilitated the explanation of relationships among causal conditions, contextual conditions, intervening conditions, strategies, and behavioral consequences. The selection of the grounded theory approach was justified by the fact that customer purchase behavior in service environments is a multidimensional phenomenon influenced by the simultaneous interaction of multiple factors, and its examination requires the analysis of customers' lived experiences within their natural context.

In the quantitative phase of the study, based on the findings of the qualitative stage, a measurement instrument was designed and data were collected using a descriptive–survey method. This phase was cross-sectional in terms of time horizon, and its purpose was to empirically test the identified relationships and to validate the proposed research model through appropriate statistical analyses.

Given the exploratory sequential mixed-methods design of the present study, the determination of the population and sample was conducted separately for the qualitative and quantitative phases. In the qualitative phase, as in other grounded theory studies, the objective was not statistical generalization, but rather achieving conceptual richness of the data and theoretical saturation. Accordingly, purposive and theoretical sampling was employed, and participants were selected based on their ability to provide relevant and rich experiences.

The theoretical sampling process continued until data saturation was achieved, such that new data no longer led to the emergence of new codes or concepts, indicating the sufficiency of the data and the completion of the study's conceptual framework. According to the recommendation of Kuzel (1990), a sample size of 12 to 20 participants is considered appropriate for achieving theoretical saturation in qualitative research. In the present study, interviews continued until 20 in-depth interviews were conducted, and theoretical saturation was confirmed at the twentieth interview.

In the quantitative phase of the study, the statistical population consisted of customers who visited cafés at least four times per week. Given the unlimited size of the population, a non-probability convenience sampling method was used. To determine the sample size, the G*Power software was employed, and based on a statistical power of 0.80, an effect size of 0.30, and a significance level of 0.05, the minimum required sample size was estimated at 384 participants. In order to compensate for incomplete questionnaires, 450 researcher-developed questionnaires were distributed, from which analyzable data were ultimately collected for testing the research relationships.

In the qualitative phase of the present study, the systematic grounded theory approach based on the Strauss and Corbin framework was utilized. This approach was applied with the objective of extracting concepts and relationships grounded in empirical data, and the data analysis process was conducted concurrently with data collection. Accordingly, data analysis was performed in three stages: open coding, axial coding, and selective coding.

During the open coding stage, interview texts were examined line-by-line, and meaning units were identified and labeled. At this stage, initial concepts were extracted without reliance on a prior theoretical framework, and through constant comparison of data, similar codes were integrated and refined.

In the axial coding stage, the relationships among categories were analyzed with a focus on causal conditions, contextual conditions, intervening conditions, strategies, and consequences, and the concepts were organized into a coherent structure. This stage contributed to clarifying the relational logic among categories and strengthening the theoretical coherence of the research model.

Finally, in the selective coding stage, the core category was identified and the remaining categories were systematically organized in relation to it, resulting in conceptual abstraction and the presentation of the final research model. All stages of qualitative analysis were conducted using MAXQDA software (version 2024).

In the quantitative phase of the study, in order to test the relationships among the extracted constructs and to validate the proposed model, structural equation modeling using the partial least squares approach (PLS-SEM) was employed. The selection of this method was based on the exploratory nature of the model, the complexity of the relationships among variables, and the absence of a requirement for data normality. Quantitative data analysis was performed using SmartPLS software (version 4).

## Findings and Results

In the first stage, the interview transcripts were examined line by line and initial coding was conducted. Subsequently, through open coding and constant comparative analysis of the data, the primary concepts were extracted and similar codes were refined. As a result of this process, 115 initial codes were identified and organized into 22 concepts. In the next step, the concepts extracted during the axial coding stage were aggregated and reviewed, and based on conceptual similarities and internal relationships, they were classified into 9 main categories. These categories represented the principal dimensions of the phenomenon under study and provided

the foundation for the development of the study's conceptual model. Table 1 presents the list of identified concepts and their corresponding main categories and illustrates the conceptual structure derived from the qualitative data of the study.

**Table 1. Open, Axial, and Selective Coding of the Study**

| Selective Coding | Axial Coding | Open Coding |
|---|---|---|
| Environmental Sensory Causal Stimuli | Tactile Factor | Touching the environment and objects with the skin of the hand |
| | | Physical contact of employees with customers through handshaking |
| | | Ambient temperature of café surroundings |
| | | Surface temperature of products |
| | | Product size and weight |
| | | Product appearance, material, and form |
| | | Type of label design and product information |
| | | Use of solid wooden furniture in the service environment |
| | Visual Factor | Color scheme and graphic theme of the place and products |
| | | Internal and external environmental elements of cafés |
| | | Design and decorative arrangement of café equipment |
| | | Level of illumination using natural light in cafés |
| | | Type of packaging and brand style on equipment |
| | | Distinctive, meaningful, and differentiated brand name and logo |
| | | Symmetry in the arrangement of furnishings |
| | | Use of warm colors in interior decoration |
| | | Use of artistic paintings and artworks in cafés |
| | Auditory Factor | Soft background music with low volume |
| | | Compatibility of materials used with customer expectations |
| | | Gendered atmosphere of excitement within cafés |
| | | Ambient noise and operational sounds |
| | | Brand sound identity |
| | Gustatory/Olfactory Factor | Fresh taste of products |
| | | Fresh aroma and scent of products |
| | | Enjoyment derived from using brand products |
| Behavioral Intervening Factors of Customers | Demographic Factors | Interests, tastes, and preferences |
| | | Personal background and nostalgia |
| | | Age |
| | | Beliefs |
| | | Gender |
| | | Education level |
| Behavioral Intervening Factors of Customers | Passive Actions of Customers and Competitors | Excessive customer demand for services |
| | | High substitutability of services by competitors |
| | | Promotion of imitation and copying strategies among competitors |
| | | High similarity of competitors' products and services |
| Behavioral Intervening Factors of Customers | Educational and Cultural–Planning Gap | Low awareness of service providers regarding sensory stimuli |
| | | Unplanned actions without predefined strategies |
| | | Cultural and social changes |
| | | Lack of strategic planning centered on customer senses |
| Behavioral Intervening Factors of Customers | Lack of Supervisory and Control Indicators | Increase in service prices due to cost increases |
| | | Absence of regulatory oversight on final customer prices |

| | | |
|---|---|---|
| Barriers to Marketing Principles Implementation | | Negative sensory impressions conveyed to customers |
| | | Non-adoption of marketing principles by cafés |
| | | Mismatch between received product and price paid |
| | | Absence of systematic principles for pricing and service valuation |
| | | Decline in competitive advantage within the café industry |
| Structural–Environmental Barriers | | Noise and crowding from others and employees |
| | | Inadequate ventilation in café spaces |
| Customer Behavioral Strategies | Technical and Operational Factors | Use of diverse and differentiated menus compared to competitors |
| | | Offering distinctive and unique products relative to competitors |
| | | Diversity of raw materials used in café products |
| | Structural and Architectural Actions of Cafés | Use of appropriate spatial structure for café environments |
| | | Use of traditional and indigenous materials in café construction |
| | | Use of noise-resistant structures in infrastructure |
| | | Selection of suitable locations for cafés |
| | | Emphasis on diversity for unique spatial design |
| | | Seasonal roofing of café spaces |
| | | Compliance with ergonomic principles in furniture arrangement |
| | Welfare and Hygienic Facilities | Providing entertainment through bookshelves and libraries |
| | | Timely cleaning and replacement of tablecloths |
| | | Availability of restroom facilities |
| | Marketing Strategies | Providing reports of product ingredient composition to customers |
| | | Use of brand logo on equipment and service processes |
| | | Use of a distinct scent for sensory brand differentiation |
| | | Age-group segmentation and restriction of children's entry |
| | | Establishing personal and reciprocal communication with customers |
| | | Analysis of cognitive and non-cognitive customer behavior |
| | | Emphasis on creativity and service variety |
| | | Focus on niche marketing and avoidance of generic menus |
| | | Promotion of respect for customer personal rights |
| | | Transition from mass marketing to sensory marketing |
| Behavioral Purchase Outcomes | Customer Perception Factors | Respecting silence in personal environments |
| | | Observance of personal privacy during service |
| | | Provision of a safe environment |
| | Presence of Unique and Novel Landscapes | Use of ceramic dishes and white color schemes |
| | | Use of domesticated animals to enhance attractiveness |
| | | Use of seasonally appropriate scents |
| Behavioral Purchase Outcomes | Branding | Greater value creation and sense of comfort for customers |
| | | Increased brand awareness |
| | | Strengthening brand image |
| | Purchase Decision | Increase in purchased product volume |
| | | Ease of brand selection |
| | | Ease of product selection |
| | | Shortened payment process |

| | | |
|---|---|---|
| | Brand Loyalty | Reduced purchase time<br>Creating a stronger sense of intimacy for long-term retention<br>Increased customer dwell time in café environments<br>Customer loyalty to the brand |
| Behavioral Purchase Outcomes | Motivational Outcomes | Feelings of happiness and excitement among customers<br>Increased physical interaction with products<br>Easier and systematic brand recognition through the five senses<br>Attracting customer senses by creating sensory experiences<br>Eliciting positive customer responses<br>Improved customer understanding of products and attributes<br>Facilitating repeat purchase |
| Contextual Factors of Customer Behavior | Situational Factors | Quality of products and services provided<br>Compliance with hygiene standards in service areas and entrances<br>Quietness, calmness, and avoidance of congestion<br>Availability of outdoor gazebos with tables and chairs<br>Prohibition of smoking in café surroundings<br>Order delivery time<br>Compliance with personal hygiene by café staff<br>Cleanliness of table cleaning equipment |
| Contextual Factors of Customer Behavior | Situational Factors | Opening cafés in new and pristine locations<br>Unpleasant odors from fried foods and air fresheners<br>Cleanliness and hygiene of tableware<br>Wet floors in café spaces<br>Unpleasant sewage odors in café surroundings |
| Contextual Factors of Customer Behavior | Social Factors | Celebrations and events<br>Educational status within society<br>Level of prestige (social status)<br>Culture and subcultures<br>Reference groups and friends<br>Family<br>Income level |

In the present study, to assess the content validity of the measurement instrument, the judgments of 15 subject-matter experts were obtained. According to Lawshe's table, the minimum acceptable value of the Content Validity Ratio (CVR) for this number of evaluators is 0.49, and the threshold for the Content Validity Index (CVI) is 0.79. The results indicated that the CVR and CVI values for all items exceeded the specified thresholds; therefore, the content validity of the questionnaire was confirmed. After incorporating the experts' suggested revisions, the final version of the questionnaire was developed.

To examine the convergent validity of the measurement model, the relevant indices were computed in SmartPLS. The overall Cronbach's alpha for the questionnaire was 0.956, indicating excellent reliability of the instrument. In addition, for all constructs, Cronbach's alpha and Composite Reliability (CR) values exceeded 0.70, demonstrating adequate internal consistency of the items. The assessment of the Average Variance Extracted (AVE) also showed that the AVE for all constructs was greater than 0.50 (Table 2), thereby supporting acceptable convergent validity of the model.

To evaluate discriminant validity, the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio were used. Based on the Fornell–Larcker criterion, the square root of AVE for each construct was greater than its correlations with other constructs (Table 3), indicating satisfactory discriminant validity. Moreover, HTMT values for all constructs were below 0.85, further confirming the conceptual distinctiveness of the constructs.

In the structural model, the coefficient of determination ($R^2$) for the endogenous variables was within an acceptable range, reflecting adequate explanatory power. Furthermore, the assessment of the $Q^2$ index indicated that its values for all endogenous constructs exceeded 0.15 (Table 2); therefore, the predictive relevance and overall fit of the structural model were supported.

**Table 2. Quality Criteria of the Model (Measurement and Structural Indices)**

| Research construct | Item | Loading | t-value (significance) | Cronbach's α | CR | AVE | $R^2$ | $Q^2$ |
|---|---|---|---|---|---|---|---|---|
| Gustatory/Olfactory factor | q_01 | 0.896 | 88.475 | 0.868 | 0.853 | 0.658 | 0.364 | 0.282 |
| | q_02 | 0.897 | 88.037 | | | | | |
| | q_03 | 0.875 | 72.710 | | | | | |
| Tactile factor | q_4 | 0.833 | 3.121 | 0.940 | 0.950 | 0.703 | 0.319 | 0.216 |
| | q_5 | 0.848 | 3.170 | | | | | |
| | q_6 | 0.830 | 3.133 | | | | | |
| | q_7 | 0.820 | 3.157 | | | | | |
| | q_8 | 0.833 | 3.157 | | | | | |
| | q_9 | 0.867 | 3.140 | | | | | |
| | q_10 | 0.835 | 3.123 | | | | | |
| | q_11 | 0.840 | 3.120 | | | | | |
| Visual factor | q_12 | 0.827 | 41.079 | 0.926 | 0.939 | 0.659 | 0.767 | 0.498 |
| | q_13 | 0.782 | 35.828 | | | | | |
| | q_14 | 0.820 | 45.037 | | | | | |
| | q_15 | 0.825 | 50.357 | | | | | |
| | q_16 | 0.817 | 43.994 | | | | | |
| | q_17 | 0.798 | 39.053 | | | | | |
| | q_18 | 0.805 | 41.137 | | | | | |
| | q_19 | 0.819 | 50.466 | | | | | |
| Auditory factor | q_20 | 0.794 | 6.091 | 0.846 | 0.890 | 0.618 | 0.109 | 0.163 |
| | q_21 | 0.799 | 5.894 | | | | | |
| | q_22 | 0.769 | 6.507 | | | | | |
| | q_23 | 0.776 | 6.718 | | | | | |
| | q_24 | 0.793 | 6.376 | | | | | |
| Technical and operational factors | q_25 | 0.901 | 98.415 | 0.852 | 0.925 | 0.553 | 0.755 | 0.577 |
| | q_26 | 0.859 | 64.136 | | | | | |
| | q_27 | 0.875 | 77.408 | | | | | |
| Presence of unique and novel landscapes | q_28 | 0.811 | 34.734 | 0.765 | 0.847 | 0.649 | 0.324 | 0.216 |
| | q_29 | 0.841 | 44.999 | | | | | |
| | q_30 | 0.823 | 43.825 | | | | | |
| Marketing strategies | q_31 | 0.817 | 51.378 | 0.914 | 0.930 | 0.624 | 0.892 | 0.552 |
| | q_32 | 0.767 | 36.423 | | | | | |
| | q_33 | 0.769 | 37.236 | | | | | |
| | q_34 | 0.797 | 44.623 | | | | | |
| | q_35 | 0.779 | 39.796 | | | | | |
| | q_36 | 0.786 | 47.416 | | | | | |
| | q_37 | 0.801 | 46.405 | | | | | |
| | q_38 | 0.801 | 47.658 | | | | | |
| Welfare and hygiene facilities | q_39 | 0.832 | 43.163 | 0.740 | 0.852 | 0.658 | 0.283 | 0.183 |
| | q_40 | 0.801 | 33.304 | | | | | |
| | q_41 | 0.802 | 32.731 | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Customer perception factors | q_42 | 0.816 | 28.690 | 0.741 | 0.907 | 0.620 | 0.163 | 0.174 |
| | q_43 | 0.823 | 29.366 | | | | | |
| | q_44 | 0.795 | 26.298 | | | | | |
| Demographic factors | q_45 | 0.789 | 45.355 | 0.877 | 0.942 | 0.565 | 0.568 | 0.348 |
| | q_46 | 0.785 | 42.760 | | | | | |
| | q_47 | 0.787 | 44.465 | | | | | |
| | q_48 | 0.798 | 48.554 | | | | | |
| | q_49 | 0.798 | 47.839 | | | | | |
| | q_50 | 0.766 | 35.027 | | | | | |
| Structural–environmental barriers | q_51 | 0.901 | 96.617 | 0.754 | 0.865 | 0.680 | 0.673 | 0.534 |
| | q_52 | 0.891 | 83.174 | | | | | |
| Barriers to implementing marketing principles | q_53 | 0.731 | 29.506 | 0.771 | 0.890 | 0.802 | 0.641 | 0.330 |
| | q_54 | 0.711 | 22.535 | | | | | |
| | q_55 | 0.712 | 26.079 | | | | | |
| | q_56 | 0.744 | 29.382 | | | | | |
| | q_57 | 0.712 | 22.552 | | | | | |
| Lack of supervisory and control indicators | q_58 | 0.874 | 63.098 | 0.703 | 0.900 | 0.593 | 0.564 | 0.430 |
| | q_59 | 0.882 | 70.282 | | | | | |
| Educational and cultural–planning gap | q_60 | 0.757 | 29.030 | 0.704 | 0.808 | 0.530 | 0.475 | 0.248 |
| | q_61 | 0.695 | 19.146 | | | | | |
| | q_62 | 0.769 | 31.204 | | | | | |
| | q_63 | 0.688 | 19.274 | | | | | |
| Passive actions of customers–competitors | q_64 | 0.783 | 34.519 | 0.922 | 0.854 | 0.594 | 0.579 | 0.340 |
| | q_65 | 0.785 | 38.511 | | | | | |
| | q_66 | 0.786 | 35.563 | | | | | |
| | q_67 | 0.728 | 26.889 | | | | | |
| Motivational outcomes | q_68 | 0.646 | 18.247 | 0.778 | 0.822 | 0.525 | 0.717 | 0.301 |
| | q_69 | 0.582 | 14.027 | | | | | |
| | q_70 | 0.648 | 20.101 | | | | | |
| | q_71 | 0.669 | 19.692 | | | | | |
| | q_72 | 0.654 | 19.188 | | | | | |
| | q_73 | 0.672 | 21.493 | | | | | |
| | q_74 | 0.714 | 27.724 | | | | | |
| Brand loyalty | q_75 | 0.810 | 40.738 | 0.730 | 0.841 | 0.530 | 0.665 | 0.422 |
| | q_76 | 0.802 | 37.439 | | | | | |
| | q_77 | 0.805 | 39.775 | | | | | |
| Purchase decision | q_78 | 0.603 | 8.827 | 0.737 | 0.826 | 0.588 | 0.155 | 0.168 |
| | q_79 | 0.743 | 14.783 | | | | | |
| | q_80 | 0.686 | 11.449 | | | | | |
| | q_81 | 0.744 | 17.150 | | | | | |
| | q_82 | 0.708 | 14.416 | | | | | |
| Branding | q_83 | 0.801 | 7.437 | 0.747 | 0.809 | 0.585 | 0.121 | 0.065 |
| | q_84 | 0.754 | 6.665 | | | | | |
| | q_85 | 0.738 | 5.558 | | | | | |
| Social factors | q_86 | 0.738 | 29.730 | 0.843 | 0.881 | 0.515 | 0.353 | 0.177 |
| | q_87 | 0.708 | 26.472 | | | | | |
| | q_88 | 0.723 | 30.751 | | | | | |
| | q_89 | 0.697 | 23.467 | | | | | |
| | q_90 | 0.707 | 24.184 | | | | | |
| | q_91 | 0.735 | 30.413 | | | | | |
| | q_92 | 0.713 | 28.200 | | | | | |
| Situational factors | q_93 | 0.818 | 54.298 | 0.958 | 0.963 | 0.644 | 0.931 | 0.614 |
| | q_94 | 0.801 | 49.252 | | | | | |
| | q_95 | 0.788 | 44.483 | | | | | |
| | q_96 | 0.816 | 58.424 | | | | | |
| | q_97 | 0.814 | 55.383 | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | q_98 | 0.792 | 47.095 | | | | | |
| | q_99 | 0.818 | 57.384 | | | | | |
| | q_100 | 0.827 | 56.981 | | | | | |
| | q_101 | 0.812 | 55.116 | | | | | |
| | q_102 | 0.830 | 58.369 | | | | | |
| | q_103 | 0.820 | 50.881 | | | | | |
| | q_104 | 0.828 | 58.313 | | | | | |
| | q_105 | 0.829 | 59.592 | | | | | |
| Structural and architectural actions (café) | q_106 | 0.837 | 65.996 | 0.922 | 0.938 | 0.682 | 0.263 | 0.176 |
| | q_107 | 0.830 | 59.586 | | | | | |
| | q_108 | 0.831 | 55.699 | | | | | |
| | q_109 | 0.827 | 55.950 | | | | | |
| | q_110 | 0.816 | 53.979 | | | | | |
| | q_111 | 0.816 | 58.586 | | | | | |
| | q_112 | 0.825 | 55.699 | | | | | |
| Contextual factors of customer behavior (second-order) | Social factors | 0.595 | 15.283 | 0.933 | 0.910 | 0.771 | 0.000 | 0.000 |
| | Situational factors | 0.965 | 41.821 | | | | | |
| Customer behavioral strategies (second-order) | Technical and operational factors | 0.869 | 65.460 | 0.914 | 0.925 | 0.533 | 0.270 | 0.083 |
| | Marketing strategies | 0.944 | 188.548 | | | | | |
| | Structural and architectural actions (cafés) | 0.515 | 7.772 | | | | | |
| | Presence of unique and novel landscapes | 0.652 | 12.819 | | | | | |
| | Customer perception factors | 0.404 | 6.094 | | | | | |
| | Welfare and hygiene facilities | 0.533 | 8.665 | | | | | |
| Behavioral purchase outcomes (second-order) | Motivational outcomes | 0.847 | 18.459 | 0.773 | 0.919 | 0.791 | 0.458 | 0.019 |
| | Brand loyalty | 0.816 | 30.082 | | | | | |
| | Purchase decision | 0.396 | 3.598 | | | | | |
| | Branding | 0.351 | 3.656 | | | | | |
| Customer behavioral intervening factors (second-order) | Structural–environmental barriers | 0.820 | 54.494 | 0.915 | 0.871 | 0.771 | 0.000 | 0.000 |
| | Barriers to implementing marketing principles | 0.801 | 30.287 | | | | | |
| | Lack of supervisory and control indicators | 0.754 | 34.480 | | | | | |
| | Educational and cultural–planning gap | 0.690 | 25.218 | | | | | |
| | Passive actions of customers–competitors | 0.762 | 34.123 | | | | | |
| Environmental sensory stimuli (second-order) | Gustatory/Olfactory factor | 0.603 | 8.654 | 0.885 | 0.845 | 0.521 | 0.000 | 0.000 |
| | Tactile factor | 0.565 | 2.796 | | | | | |
| | Auditory factor | 0.930 | 21.430 | | | | | |
| | Visual factor | 0.876 | 14.650 | | | | | |

*Note.* CVR = Content Validity Ratio; CVI = Content Validity Index; CR = composite reliability; AVE = average variance extracted; $R^2$ = coefficient of determination; $Q^2$ = Stone–Geisser's predictive relevance. Values are reported as provided by the authors' SmartPLS outputs.

**Table 3. Discriminant Validity Using the Fornell–Larcker Matrix**

**Panel A (Constructs 1–8)**

| Construct | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. Technical and operational factors | 0.878 | | | | | | | |
| 2. Lack of supervisory and control indicators | 0.426 | 0.878 | | | | | | |
| 3. Environmental sensory stimuli | 0.093 | 0.080 | 0.541 | | | | | |
| 4. Barriers to implementing marketing principles | 0.319 | 0.532 | 0.036 | 0.722 | | | | |
| 5. Structural–environmental barriers | 0.370 | 0.585 | 0.180 | 0.646 | 0.896 | | | |
| 6. Presence of unique and novel landscapes | 0.477 | 0.137 | 0.066 | 0.019 | 0.071 | 0.825 | | |
| 7. Brand loyalty | 0.192 | 0.300 | −0.089 | 0.107 | 0.262 | −0.030 | 0.806 | |
| 8. Motivational outcomes | 0.299 | 0.442 | 0.190 | 0.256 | 0.324 | 0.040 | 0.472 | 0.656 |

**Panel B (Constructs 9–15)**

| Construct | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|
| 9. Structural and architectural actions of cafés | 0.826 | | | | | | |
| 10. Passive actions of customers–competitors | −0.152 | 0.771 | | | | | |
| 11. Welfare and hygiene facilities | 0.008 | 0.546 | 0.811 | | | | |
| 12. Branding | 0.059 | 0.242 | 0.204 | 0.765 | | | |
| 13. Purchase decision | −0.039 | −0.021 | 0.153 | −0.181 | 0.699 | | |
| 14. Educational and cultural–planning gap | 0.080 | 0.464 | 0.378 | 0.168 | 0.225 | 0.728 | |
| 15. Marketing strategies | 0.455 | 0.355 | 0.381 | 0.281 | 0.106 | 0.287 | 0.790 |

**Panel C (Constructs 16–23)**

| Construct | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|
| 16. Visual factor | 0.812 | | | | | | | |
| 17. Auditory factor | 0.325 | 0.786 | | | | | | |
| 18. Tactile factor | 0.180 | −0.114 | 0.839 | | | | | |
| 19. Social factors | 0.187 | −0.149 | −0.256 | 0.717 | | | | |
| 20. Situational factors | 0.036 | −0.113 | 0.057 | 0.362 | 0.815 | | | |
| 21. Gustatory/olfactory factor | 0.411 | 0.013 | 0.228 | 0.012 | −0.232 | 0.890 | | |
| 22. Customer perception factors | 0.071 | 0.210 | −0.349 | −0.183 | −0.120 | 0.121 | 0.811 | |
| 23. Demographic factors | 0.320 | 0.236 | −0.089 | −0.061 | −0.095 | 0.570 | 0.413 | 0.787 |

*Note.* Diagonal elements are the square roots of the Average Variance Extracted (√AVE); off-diagonal elements are inter-construct correlations. Evidence of discriminant validity is supported when √AVE for each construct exceeds its correlations with other constructs

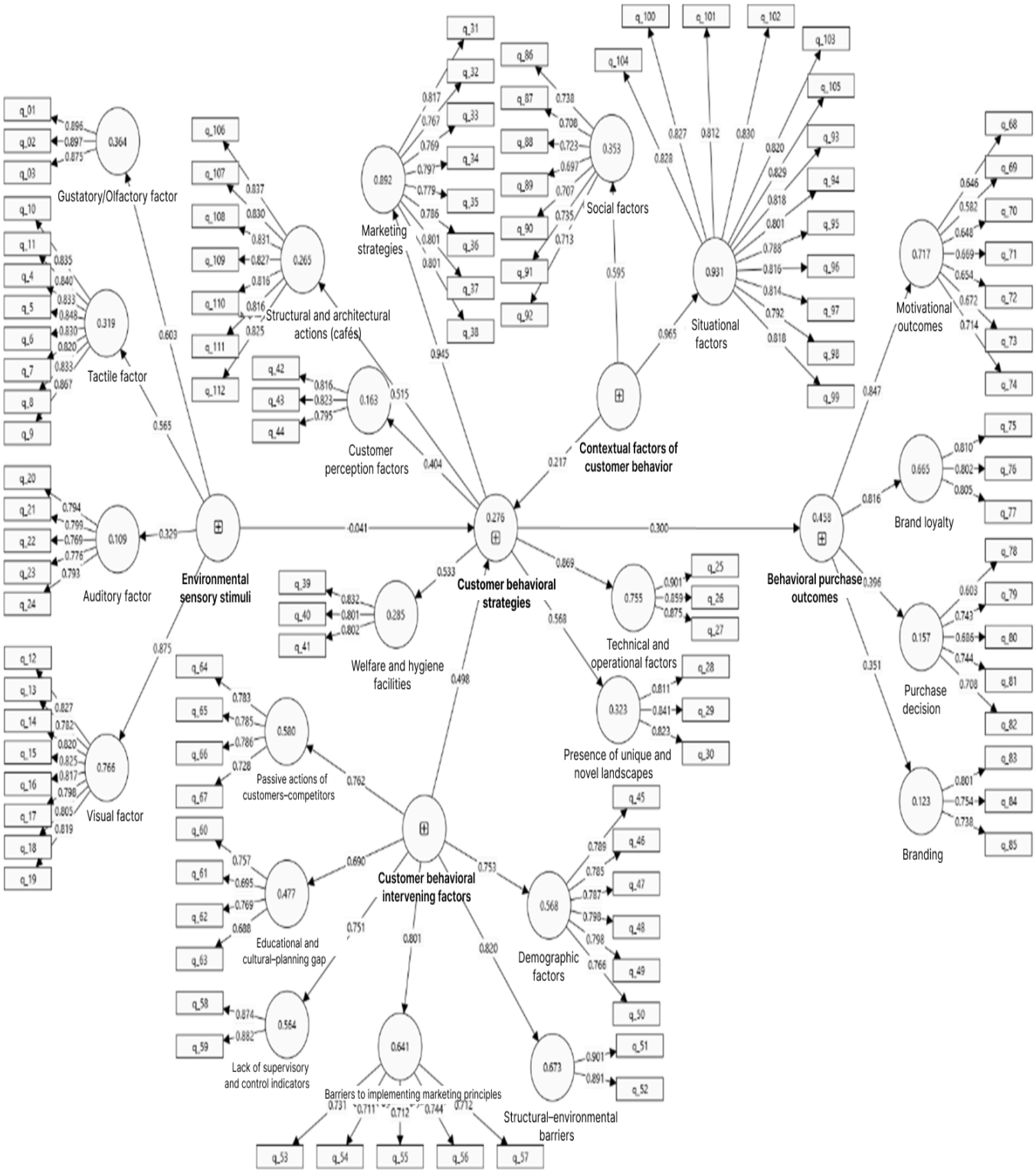


**Figure 1. The study's conceptual model with factor loadings and path coefficients.**

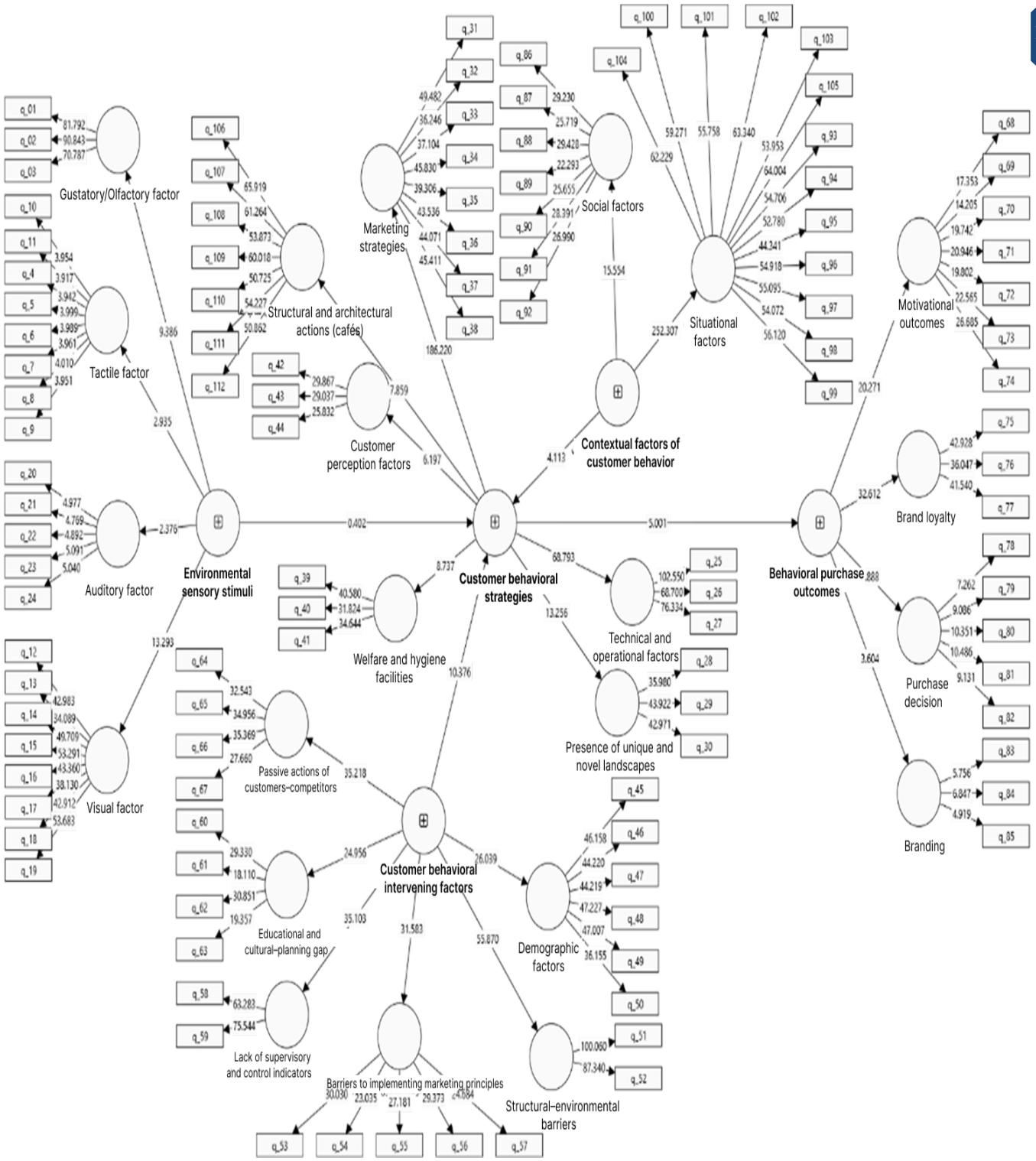


**Figure 2. The study's conceptual model with t-values (significance values).**

As shown in Table 3, the square root of the Average Variance Extracted (√AVE) for each latent construct is greater than its correlations with the other latent constructs, indicating adequate discriminant validity of the measurement model based on the Fornell–Larcker criterion (Fornell & Larcker, 1981).

Next, to assess construct validity within the confirmatory factor analysis framework, the significance of the factor loadings was examined. The results of the structural equation modeling analysis indicated that the factor loadings of all items on their corresponding constructs were positive and statistically significant, and their t-statistics were all

greater than the critical value of 1.96 at the 0.05 error level. These findings indicate that the items measure the conceptual constructs of the study with satisfactory precision.

Moreover, consistent with Figure 2 and Table 2, all items exhibited acceptable and statistically significant factor loadings, thereby confirming construct validity and the adequacy of the measurement instrument.

## Discussion and Conclusion

The findings of the present study provide robust empirical support for the central proposition that environmental multisensory stimuli exert a significant and multidimensional influence on customers' purchase decisions and brand loyalty in café services. The structural model demonstrated strong explanatory power, with satisfactory coefficients of determination for key endogenous variables and meaningful predictive relevance. In particular, the results confirmed that visual, auditory, tactile, and gustatory–olfactory stimuli jointly shape customers' perceptual evaluations, emotional responses, and motivational outcomes, which in turn influence both immediate purchase decisions and longer-term loyalty formation. These findings are highly consistent with the experiential logic of service consumption, which emphasizes that value creation increasingly resides in orchestrated experiences rather than in the functional attributes of products alone (1, 2).

The significant effect of multisensory environmental stimuli on customer perception observed in this study aligns closely with sensory marketing theory, which conceptualizes sensory inputs as strategic resources capable of shaping cognition, emotion, and behavior (4). The strong path coefficients from environmental sensory constructs to customer perception and motivational outcomes mirror the conclusions of Spence et al., who argued that store atmospherics must be understood as inherently multisensory systems rather than isolated stimuli (3). Similarly, the present results echo experimental and meta-analytic evidence demonstrating that music, scent, and color exert systematic effects on consumer responses across retail and service contexts (9). The current findings extend this body of knowledge by showing that in café services—where consumption is inherently experiential and socially embedded—these sensory effects are not only statistically significant but also strategically decisive.

The strong influence of visual stimuli, including spatial aesthetics, lighting, color harmony, and brand-related design cues, on purchase decision and loyalty is consistent with prior work emphasizing the role of visual aesthetics as a moderator of consumer intention (6). In cafés, visual coherence and novelty appear to function as both quality signals and emotional triggers, reinforcing earlier findings that environmental design contributes to emotional responses that directly influence behavioral intentions (5). The observed effect of tactile cues—such as furniture texture, temperature, and product handling—on customer engagement and preference formation also corresponds with embodied cognition research demonstrating that physical interaction with products alters cognitive processing and choice (7). Moreover, the significant contribution of gustatory and olfactory stimuli supports the argument that ambient scent and taste enhance well-being and experiential immersion in built environments (8), thereby strengthening both immediate satisfaction and long-term brand attachment.

Beyond the sensory environment itself, the study demonstrates that customer perception and motivational outcomes act as critical mediating mechanisms between environmental stimuli and behavioral outcomes. Customers' perceptions of comfort, privacy, safety, and uniqueness significantly predicted both purchase decision efficiency and loyalty-related behaviors. This pattern reinforces the customer experience framework proposed by Lemon and Verhoef, which posits that cognitive and emotional evaluations accumulated across the journey shape future behavior (2). The present model further clarifies that in cafés, perception of the physical environment is

inseparable from emotional and motivational responses, a conclusion that is theoretically congruent with the affective pathways identified in hospitality research (5).

The findings regarding motivational outcomes—such as excitement, pleasure, and sensory engagement—are particularly noteworthy. These variables exhibited strong effects on brand loyalty, suggesting that emotional activation is not merely a short-term driver of impulse purchase but a foundational element of relational attachment. This result resonates with contemporary loyalty research emphasizing that affective commitment and emotional bonds are central antecedents of behavioral loyalty (19). Furthermore, the observed link between customer experience and loyalty supports the view that brand engagement and identification emerge from emotionally meaningful interactions with the brand environment (20). In café contexts, where brands often symbolize lifestyle and social identity, multisensory experiences appear to strengthen symbolic value congruity, thereby reinforcing loyalty.

The role of marketing strategies and technical–operational factors in shaping the customer experience also emerged as a significant component of the model. The results show that diversified menus, distinctive offerings, and innovative service delivery enhance the effect of sensory stimuli on customer outcomes. These findings are consistent with phygital marketing research, which emphasizes that brands must integrate physical experience design with strategic innovation to sustain customer engagement (11). They are also compatible with evidence that social media marketing and customer experience jointly influence purchase decisions, suggesting that sensory experiences inside the café may be amplified by external communication channels (12). From a strategic management perspective, this indicates that sensory design should not be isolated from broader CRM and marketing initiatives.

Importantly, the study highlights the moderating influence of contextual and intervening factors, including structural–environmental barriers, lack of regulatory oversight, educational gaps, and competitive imitation. These variables significantly weakened the positive effects of sensory stimuli on customer outcomes, illustrating that experiential strategies operate within complex institutional and competitive environments. This observation is consistent with the argument that customer experience is shaped by broader organizational and social contexts, not merely by immediate service encounters (24). Moreover, the detrimental impact of weak managerial systems and imitation-based competition reflects challenges previously observed in small business settings, where inadequate CRM practices undermine loyalty formation (18).

The positive effect of brand loyalty on purchase behavior and repatronage found in this study aligns with extensive empirical evidence linking loyalty to satisfaction, trust, and brand image (21). The present findings further demonstrate that loyalty in cafés is not simply transactional but deeply experiential and symbolic, reinforcing the notion that loyalty emerges from coherent, emotionally rich, and trustworthy experiences (19, 20). Additionally, the indirect role of perceived digital and service quality suggested by the model corresponds with recent banking-sector evidence showing that quality under uncertainty influences loyalty (22). Although cafés operate in different institutional contexts, the underlying psychological mechanism—customers' need for reliability and meaningful value—appears remarkably similar.

The integration of technological and AI-related factors into the experiential framework also carries important implications. While not the primary focus of this study, the results suggest that experience management systems, CRM practices, and personalized engagement strategies reinforce the effects of sensory stimuli. This aligns with emerging research demonstrating that AI-enabled personalization enhances customer experience and engagement

in both online and hybrid environments (14, 15). The findings are also compatible with Parsakia's evidence that AI-driven engagement strategies strengthen relational value in digital markets (16). Thus, sensory design and digital intelligence should be seen as complementary components of contemporary café management.

Collectively, these results provide strong empirical validation for the proposed integrated model and contribute to the literature in several important ways. First, the study extends sensory marketing and customer experience theory into the underexplored domain of café services, demonstrating that multisensory design is a powerful strategic lever in this sector. Second, it empirically links environmental stimuli to both short-term purchase decisions and long-term loyalty, clarifying the mediating roles of perception and motivation. Third, it incorporates contextual and organizational constraints, offering a more realistic and actionable framework for managers operating in competitive service markets. Finally, it situates café experience management within broader transformations in marketing, technology, and relationship management, highlighting the necessity of holistic, system-level approaches to customer value creation.

Despite its contributions, the present study has several limitations. The data were collected within a single cultural and geographical context, which may restrict the generalizability of the findings to other regions with different consumption norms and service expectations. The cross-sectional design also limits causal inference, as longitudinal data would be required to capture dynamic changes in customer perception and loyalty over time. Additionally, the reliance on self-reported measures introduces the possibility of response bias, particularly in the assessment of emotional and motivational constructs.

Future research should consider replicating the model across diverse cultural and service contexts to assess its external validity and cultural sensitivity. Longitudinal and experimental designs could provide deeper insights into the causal mechanisms linking sensory stimuli to loyalty development. Scholars may also integrate neurophysiological or behavioral data to complement self-reported measures and enrich understanding of sensory processing in service environments.

Managers should adopt a holistic approach to café experience design, integrating multisensory environmental cues with strategic marketing, CRM systems, and technological innovation. Investment in staff training, sensory branding, and continuous service innovation can strengthen emotional bonds with customers and sustain competitive advantage. Furthermore, reducing structural and regulatory barriers and fostering organizational learning will enable cafés to fully leverage the strategic potential of experiential differentiation.

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## Authors' Contributions

All authors equally contributed to this study.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

All ethical principles were adheried in conducting and writing this article.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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