

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

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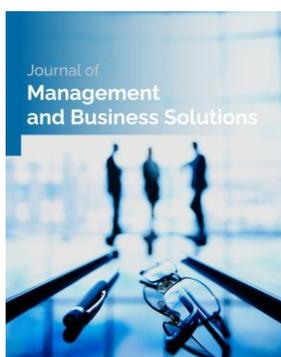
ABSTRACT

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
	Visual Factor	Product appearance, material, and form
		Type of label design and product information
		Use of solid wooden furniture in the service environment
		Color scheme and graphic theme of the place and products
		Internal and external environmental elements of cafés
Auditory Factor	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	
Gustatory/Olfactory Factor	Use of warm colors in interior decoration	
	Use of artistic paintings and artworks in cafés	
	Soft background music with low volume	
	Compatibility of materials used with customer expectations	
	Gendered atmosphere of excitement within cafés	
Behavioral Intervening Factors of Customers	Demographic Factors	Ambient noise and operational sounds
		Brand sound identity
		Fresh taste of products
		Fresh aroma and scent of products
		Enjoyment derived from using brand products
Behavioral Intervening Factors of Customers	Passive Actions of Customers and Competitors	Interests, tastes, and preferences
		Personal background and nostalgia
		Age
		Beliefs
		Gender
Behavioral Intervening Factors of Customers	Educational and Cultural–Planning Gap	Education level
		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	Lack of Supervisory and Control Indicators	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
		Increase in service prices due to cost increases
Behavioral Intervening Factors of Customers	Lack of Supervisory and Control Indicators	Absence of regulatory oversight on final customer prices

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

	Brand Loyalty	<ul style="list-style-type: none"> Reduced purchase time Creating a stronger sense of intimacy for long-term retention Increased customer dwell time in café environments Customer loyalty to the brand
Behavioral Purchase Outcomes	Motivational Outcomes	<ul style="list-style-type: none"> Feelings of happiness and excitement among customers Increased physical interaction with products Easier and systematic brand recognition through the five senses Attracting customer senses by creating sensory experiences Eliciting positive customer responses Improved customer understanding of products and attributes Facilitating repeat purchase Quality of products and services provided
Contextual Factors of Customer Behavior	Situational Factors	<ul style="list-style-type: none"> Compliance with hygiene standards in service areas and entrances Quietness, calmness, and avoidance of congestion Availability of outdoor gazebos with tables and chairs Prohibition of smoking in café surroundings Order delivery time Compliance with personal hygiene by café staff Cleanliness of table cleaning equipment Opening cafés in new and pristine locations
Contextual Factors of Customer Behavior	Situational Factors	<ul style="list-style-type: none"> Unpleasant odors from fried foods and air fresheners Cleanliness and hygiene of tableware Wet floors in café spaces Unpleasant sewage odors in café surroundings Celebrations and events
Contextual Factors of Customer Behavior	Social Factors	<ul style="list-style-type: none"> Educational status within society Level of prestige (social status) Culture and subcultures Reference groups and friends Family 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; R² = coefficient of determination; Q² = 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 ($\sqrt{\text{AVE}}$); off-diagonal elements are inter-construct correlations. Evidence of discriminant validity is supported when $\sqrt{\text{AVE}}$ for each construct exceeds its correlations with other constructs

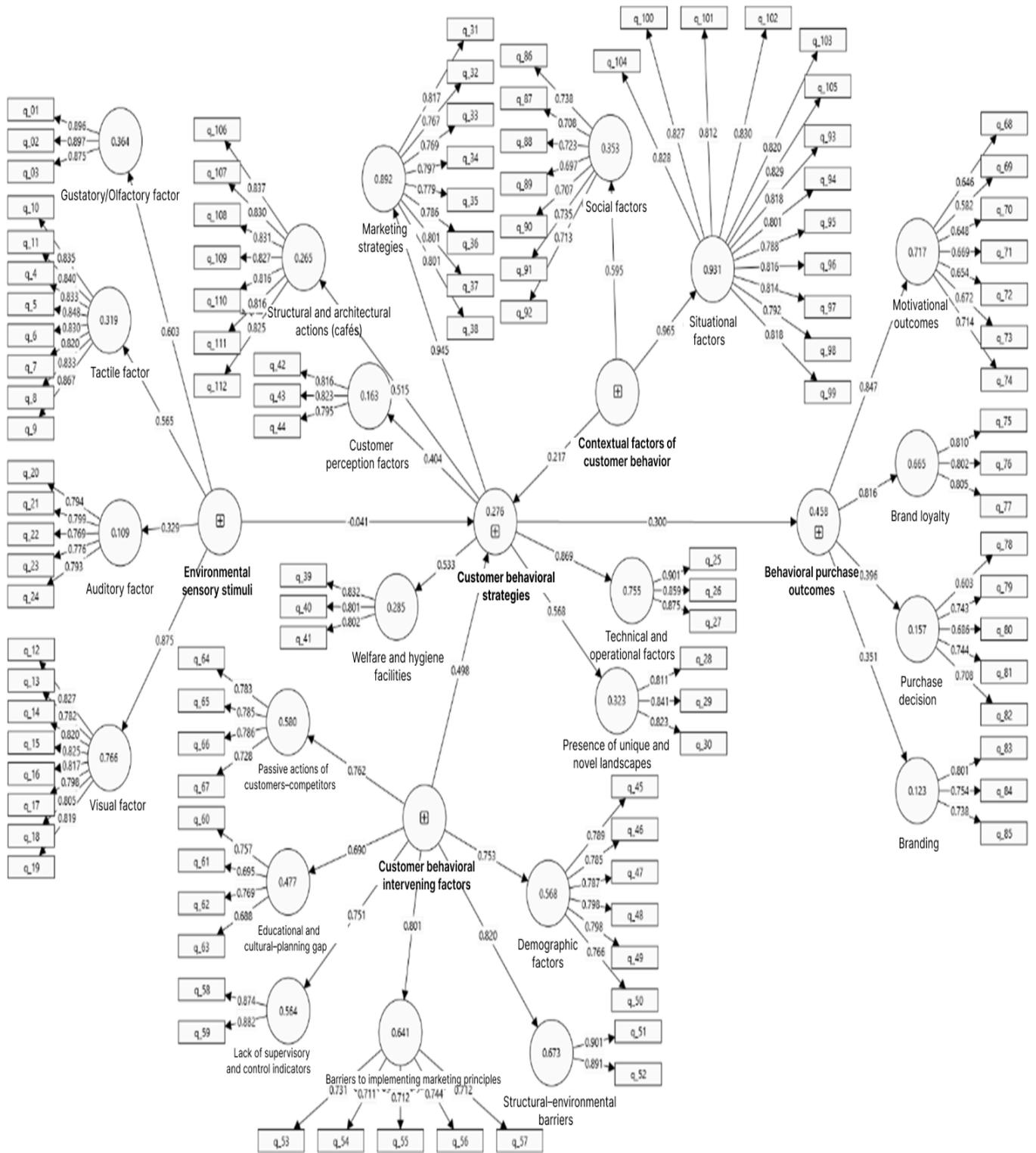


Figure 1. The study's conceptual model with factor loadings and path coefficients.

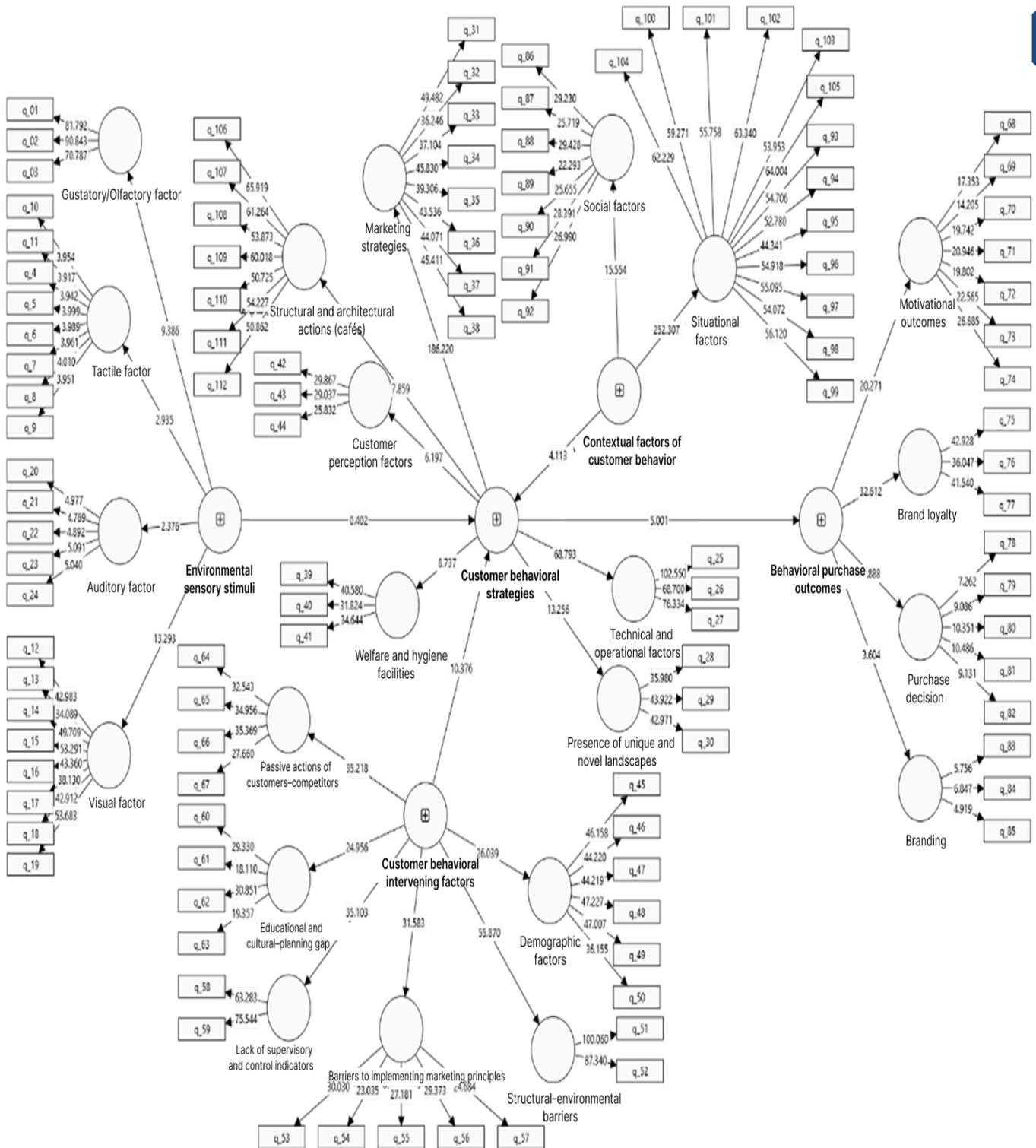


Figure 2. The study's conceptual model with t-values (significance values).

As shown in Table 3, the square root of the Average Variance Extracted (\sqrt{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 adhered 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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