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INFLUENCE OF IN-STORE SENSORY MARKETING ON CONSUMER DWELL TIME AND PURCHASING BEHAVIOR: THE MEDIATING ROLE OF EMOTIONAL RESPONSE

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Abstract
In-store sensory marketing has become a vital strategy for retailers to differentiate themselves in competitive markets and provide unique shopping experiences that go beyond functional product attributes. Sensory cues such as music, lighting, and scent can influence consumer perceptions, emotions, and behaviors, yet the combined effect of these stimuli and the mediating role of emotional response remain underexplored in the literature. Addressing this gap, the present study investigates how in-store sensory marketing impacts consumers' dwell time and purchasing behavior, with emotional response serving as a mediating mechanism. The population of the study comprised supermarket shoppers in the Colombo metropolitan area, and 683 valid responses were collected using a structured questionnaire administered via Google Forms. Measurement items were adapted from validated scales and analyzed using Covariance-Based Structural Equation Modeling (CB-SEM) through AMOS. The findings reveal that sensory marketing has a positive and significant influence on both dwell time and purchasing behavior. Moreover, emotional response strengthens this relationship, acting as a mediator that translates sensory cues into favorable behavioral outcomes. These insights highlight the importance of designing multisensory retail atmospheres that enhance customer engagement, encourage impulse buying, and extend store visits. Future research can extend

this framework across diverse retail formats and cultural contexts to further validate the role of sensory marketing and emotions in shaping consumer behaviour.
Keywords: Sensory marketing, Emotional response, Dwell time, Purchasing behaviour, Retail environment.

INTRODUCTION

Retailers are facing a continuous challenge in getting attention and stimulating consumer purchasing behaviors in volatile markets where consumers are highly overwhelmed by multiple choices in the market (Rohden & Espartel, 2024; Pan & Li, 2023). Conventional marketing campaigns which recognize functional and informational appeals are not strong enough to attract and maintain consumer attention anymore (Nuweiheda & Trendel, 2023). Modern consumers are expecting different experiences that go beyond just acquisition of goods and services; they expect a superior shopping experience shaped by the overall environment where their consumption happens (Shetty & Pai, 2021). As a result, many retailers have extensively understood and adopted sensory marketing strategies in their retail outlets (Amra & Elma, 2025). Sensory marketing refers to a strategy that involves consumer senses which create or enhance attitudes, perceptions, judgements, and behaviors (Krishna, 2012). This sensory marketing strategy incorporates the deliberate use of sensory appeals to provide memorable and engaged shopper experience (Saluja, 2024). Music, lighting, and scent are some of the leading impetuses that play a significant role in influencing consumers to change their perceptions, emotions and behaviors at the retail stores. These stimuli are recognized as powerful keys in shaping shoppers' moods, pace and time perceptions. Lighting shapes the atmosphere of a retail space, supports not only product visibility but also consumer emotions and comfort levels (Li et al., 2024). Lovely aromas may generate positive store impressions, low stress, and increase the possibility of extended engagement (Morrison et al., 2011). Thus, this study mainly explores the effects of sensory marketing appeals on different angles.

Shopper dwell time has been recognized as one of the significant behavioral outcomes of retail research because it mainly refers to the time spent in a particular store or a section by a consumer. The longer dwell times are highly correlated with the higher level of product searching, browsing, comparisons, evaluations, and unplanned product purchases. Usually, retailers point out that extended dwell time determines the active consumer engagement and store appeal (Cachero-Martínez & Vázquez-Casielles, 2018). Purchasing behavior is also recognized as one of the important outcomes of marketing research which explains the actual or expected buying decisions of consumers. The physical store alone does not determine the purchasing decisions of consumers; the environment also may affect the increase or obstruct the consumers' readiness to purchase at a specific store (Białkowska et al., 2024). Consequently, reviewing how sensory signs stimulate outcomes of dwell time and purchasing behavior is of noteworthy theoretical and managerial significance.

Nevertheless, scholars have stressed that the relationship between sensory marketing and consumer behavior is not always linear or direct. Thus, consumer research scholars argue the necessity of emotional responses as a mediating mechanism to improve the linear relationship of sensory marketing and consumer behavior (Yin & Lu, 2025; Nguyen & Le, 2024). Emotional responses like arousal, pleasure, excitement, comfort and relaxation can translate sensory signals to a meaningful shopping experience (Nguyen & Le, 2024). For instance, gentle rhythm music may upsurge dwell time in a retail store since it encourages feelings of relaxation, comfort, and pleasure, while pleasant aromatic atmosphere increases purchasing intentions by encouraging positive feelings (Cao & Duong, 2021). From this perspective, emotions can be considered as a bridge between externally developed sensory impetus and internally motivated consumer decisions which translate environmental factors into promising behavioral outcomes (Islam & Muthusamy, 2024). From the viewpoint of the mediating role of emotional responses, scholars can deliver a more in-depth understanding of how and why sensory marketing strategies work.

This study focuses on the retail sector in Sri Lanka, especially modern trading practices like supermarkets and branded stores located in Colombo metro areas. In Sri Lanka, retail has been

extensively popularized due to urbanization, customer lifestyle changes, and increased disposable income. As well as Sri Lankan wholesale and retail sector has contributed around 14.1% to the national GDP (2023) and generated employment opportunities for more than 15% of the workforce. Thus, Sri Lankan retail sector is a critical point to understand the challenging consumer behaviors. The current study proposes new knowledge and insights into how retailers can plan and design store atmosphere to boost customer engagement and overall satisfaction through identifying the effect of sensory marketing appeals on shopper dwell time and purchasing behavior of consumers in Sri Lanka.

The importance of this study goes beyond the academic contributions to practical implications in the retail sector. In a highly volatile and vibrant marketplace where digital market facilities are becoming more challenging, physical retailers need to identify innovative ways to differentiate their products and services to consumers while providing an unforgettable shopping experience. Especially sensory marketing provides a competitive advantage for physical retailers which cannot be gained by online shoppers easily. Thus, developing strategies to create conducive environments in retail outlets to offer more positive and vibrant feelings to consumers, as a result, retailers can enhance the consumer dwell time, stimulate impulse buying, and overall customer satisfaction.

Even though the scholars and practitioners have given an increasing recognition of sensory marketing strategies, there are still some gaps inevitable in the marketplace. In literature, many scholars have been discussing individual effects of lighting, scent, and music and very few have examined the combined effect in an integrated framework (Abdulkhaliq et al., 2023; Sagha et al., 2022; Shetty & Pai, 2021; Suárez & Gumiel, 2014; Spangenberg et al., 2005). Although the emotional response has been discussed in the literature, its mediating effect between internal sensory stimuli and external behavioral changes has not been extensively envisaged (Sung et al., 2024; Sagha et al., 2022; Chen & Lin, 2018). Further, the inconsistencies among the existing findings on the study phenomenon fuel the need for an empirically validated study (Saluja, 2024; Toribio-Tamayo et al., 2024; Abdulkhaliq et al., 2023, Sagha et al., 2022). Underlying the gaps identified above, the study aims to uncover the real effect of in-store sensory marketing on consumers' dwell time and purchasing behavior, with a particular focus on the mediating role of emotional response.

Based on the discussion above, the following are the objectives of the current research. Foremost, it aims to determine how the practices of in-store sensory marketing influence the dwell time and also their consumer purchasing behaviour. It then seeks to reveal the impact of sensory marketing as it affects the emotional response. The research will also aim at assessing the correlations between the emotional response and (i) dwell time, and (ii) purchasing behavior. Lastly, it explores the mediating effect of the emotional response in the relationship among the in-store sensory marketing appeals and dwell time, as well as in-store sensory marketing appeals and purchase behavior.

Overall, this paper has highlighted the importance of sensory marketing appeals as an effective means of complementing consumer purchasing behaviour in retail markets. The study provides a holistic view of how sensory marketing strategies can be optimized in order to gain competitive edge in the modern retail settings by explaining the interdependence between emotional reactions, sensory marketing practices, dwell time and purchasing behaviors.

LITERATURE REVIEW

Sensory Marketing

Retailing is also shifting towards the development of more immersive, multisensory experiences that influence consumer perceptions and attitudes to shape consumer behavior across the retail industry (Krishna & Schwarz, 2014; Pandey & Tripathi, 2024; Worfel et al., 2022). The current literature focuses on three overriding sensory dimensions in retail locations, namely, music, lighting, and scent, which affect consumer emotions, dwell time, and buying behaviour (Jang & Lee, 2019). In other developing countries that have started the process of modernization of retailing like Sri Lanka, it is necessary to know how sensory marketing affects consumer behaviour as it can be applied to promote theoretical and managerial progress (Dissabandara & Dissanayake, 2020; Dodamgoda & Amarasinghe, 2019; Wasantha, 2025).

It has been long known that music in retail has the ability to regulate mood, tempo, and feelings (Jang et al., 2018). Although studies conducted worldwide prove that tempo and genre may influence the

speed and satisfaction of shopping, research in Sri Lanka specially spells out the importance of auditory cues in increasing brand affinity and consumer preference during fast-food and cafe situations (Dissabandara & Dissanayake, 2020; Dodamgoda & Amarasinghe, 2019). Dissabandara and Dissanayake (2020), as an example, noted that auditory stimuli in conjunction with visual and olfactory stimuli have a strong effect on attaching emotions to brands in Sri Lankan fast-food restaurants.

The visual displays like lighting effects and store design are key in establishing a comfortable environment, making product appealing, and progressing impulse buying (Symmank, 2018; Pandey & Tripathi, 2024; Wörfel et al., 2022). Recent findings have shown that the lighting is often the most powerful of the senses when it comes to drivers satisfaction and loyalty (Sagha et al., 2022). Lighting has been demonstrated to enhance impulse purchase in apparel retail in Sri Lanka and the bespoke visual atmospheres in cafes help to create consumer preference and satisfaction (Dodamgoda & Amarasinghe, 2019; Symmank, 2018).

Ambient smell has an effect on emotional response and a perceived experience of the retail space, which in turn regulates consumer behavior (Baltezarevic, 2020; Dissabandara & Dissanayake, 2020; Worfel et al., 2022). The practical presence of fast-food restaurants and cafes in Sri Lanka proves that impressions connected with smell are positively correlated with more brand loyalty and preference among consumers (Dissabandara & Dissanayake, 2020; Dodamgoda & Amarasinghe, 2019). They correlate with other global statistics that find pleasant olfactory sensations can extend the dwell time and influence purchase-spur of the moment (Baltezarevic, 2020; Worfel et al., 2022).

Emotional Response

The affective response explains how the sensory stimulating stimulus is converted into the consumer behaviour, an activity often operationalised within the Pleasure-Arousal-Dominance (PAD) model (Mehrabian & Russell, 1974). Pleasure reflects comfort and satisfaction, thus creating positive assessments and loyalty (Jang & Lee, 2019). Arousal refers to excitement and stimulation and it can be enhanced through high-energy music and energetic lighting, and therefore, encourages impulse purchase and longer time to spend (Mattila & Wirtz, 2001; Sagha et al., 2024). Dominance sums up feelings of control and freedom, thus stimulating exploration and increasing the time spent at visiting (Donovan and Rossiter, 1982). Empirical evidence shows that sensory input and behavioural outcomes are inter-connected through the mediating effect of the emotions (Nguyen & Le, 2024; Yin, 2025). Installing sophisticated and culture-aware aesthetics into the retail experiences provides arousal and pleasure, and thus, helps to establish the connection between sensory responses and the shopping experience in Sri Lankan retail environments (Dissabandara & Dissanayake, 2020; Dodamgoda & Amarasinghe, 2019; Worfel et al., 2022).

Dwell Time

Dwell time is a time that a consumer spends in a retail setting and is a relevant sales performance metric (Biswas, 2019; Kim et al., 2021; Worfel et al., 2022). Wi-Fi surveillance and video analytics are examples of technology that can precisely measure this metric (Donovan & Rossiter, 1982; Roschk & Hossein, 2019). The study of retail in Sri Lanka supports the idea that interventions based on sensory marketing can increase dwell time in various categories of consumers (Shaminda & Thilina, 2022). Specifically, visual and olfactory senses come in handy to increase the time that buyers spend in-store and in arousing both planned and impulse purchases (Lakshika & Chathuranga, 2019; Kahaduwa & Rasanjalee, 2021; Wijenayake & Rathnayake, 2024).

Purchasing Behaviour

Purchasing behaviour entails buying, repeat purchases, word of mouth intentions (Abdulkhaliq et al., 2023; Toribio-Tamayo et al., 2024). The appeal and involvement in purchases are increased because sensory congruency boosts products and emotions, which promotes planned and impulse purchasing (Dodamgoda & Amarasinghe, 2019; Sachitra & Konara, 2023; Toribio-Tamayo et al., 2024). The positive effects of pleasant lighting and pleasant scent on the actual purchasing decisions are more powerful in the Sri Lankan market where competition exists between organised supermarkets and informal retailers (Dissabandara & Dissanayake, 2020; Perera & Nishadi, 2024). In addition, peer and family pressure in the

collectivistic culture of Sri Lanka strengthens the impact of good store experiences on the purchase behaviour (Wasala et al., 2021).

Theoretical Framework

There are four key theories used to describe the effect of sensory marketing in consumer behaviour. According to the Stimulus Organism Response (SOR), the model assumes that the consumers react to external environmental factors (music, lighting and the smell) by their internal processes (emotional reaction), which in turn influence behaviours (dwell time and buying) (Rodriguez-Ulcuango et al., 2025; Sagha et al., 2022; Sharma et al., 2025). The Pleasure-Arousal- Dominance (PAD) model is a well-organized approach to the evaluation of emotional states, indicating the relationship between pleasure and arousal with approach behaviour or avoidance behaviour (Mehrabian & Russell, 1974; Wu et al., 2025). The Affective Primacy Theory argues that sensory perception is able to elicit pre-cognitive emotional responses that can result in consumer behaviour and thus emphasizes the primacy of affect in consumer behaviour (Forethought, 2023; Sagha et al., 2022). Lastly, the Multisensory Congruence Theory suggests that congruence between two or more sensory signals enhances positive affective and behavior responses (Biswas et al., 2019; Fong et al., 2022; Sagha et al., 2022).

Hypotheses Development

H1: Sensory marketing has a significant positive effect on dwell time.

Empirical studies show that pleasant sensory cues encourage consumers to spend more time in retail environments by enhancing comfort and creating a more inviting atmosphere (Behera et al., 2021). The fast or slow tempo of music, the level of intensity of light, and the smell of the air all are variables that can adjust the pace of shopping and exploratory behaviour making the environment more interactive (Counttrack, 2025). Multi-sensory settings that combine two or more stimuli are more effective than single-sensory cues at increasing the dwell time, reducing the perceived waiting time, and encouraging casual browsing (Abdulkhaliq et al., 2023; Sagha et al., 2022).

H2: Sensory marketing has a significant positive effect on purchasing behavior.

Sensory marketing boosts consumer buying behaviour by increasing emotional involvement, attractiveness to products and the entire shopping experience (Abdulkhaliq et al., 2023; Sagha et al., 2022; Toribio-Tamayo et al., 202). The congruence of senses, including matching music and scents with the store brand or its products, makes the consumer feel the coherence and satisfaction stronger, which leads to an increased probability of planned purchases and impulses (Kim et al., 2021; Sagha et al., 2022). The use of well-constructed sensory furnished environments reduces cognitive barriers to purchasing and make purchasing decisions more natural and enjoyable.

H3: Sensory marketing has a significant positive effect on consumers' emotional response.

Consumer emotions are a response to the environmental stimuli, and the neurological mechanisms linking the sense receptors with the brain are causing this response (Rodriguez-Ulcuango et al., 2025). Pleasure and arousal increase with the help of music, light, and scent, either separately or in combination with each other (Biswas et al., 2019; Gao et al., 2024; Sagha et al., 2022). The matching music and pleasant odours also amplify the emotional reactions and thus influence future behaviours (Gao et al., 2024; Sagha et al., 2022). The effect of multisensory stimulation is a more powerful emotional reaction, which is in compliance with affective primacy theory (Duong et al., 2022; Sagha et al., 2022).

H4: Emotional response has a significant positive effect on dwell time.

The presence of emotional reactions, especially pleasure and arousal, also becomes one of the important elements of prolonged dwell time in the retailing environment (Sagha et al., 2022; Wu et al., 2025). Customers who feel positive emotions will tend to visit the store more often, touch the products, and communicate with the displays, which will turn them into prolonged visits (Beambox, 2025; Sagha et al., 2022). Time perception is also also positively influenced by positive emotions and browsing becomes faster and more comfortable (A Pepper Designs, 2025). As a result, emotional response is one of the significant predictors of in-store engagement.

H5: Emotional response has a significant positive effect on purchasing behavior.

Emotions have a strong impact on the choices to purchase, as they lead to a greater enhancement in positive perceptions, intentions to buy, and actual buying behaviour (Gao et al., 2024). Whenever consumers become pleased and excited by sensory stimuli, they tend to indulge in both planned and unplanned purchases (Elliott et al., 2021; Sagha et al., 2022; Wu et al., 2025). The positive emotional experiences lead to less cognitive effort to work on decisions, the purchase might seem safer, and product review would be more favourable (Sharma et al., 2025). Based on this, emotional response plays a major role in determining consumer buying behaviour.

H6: Emotional response mediates the relationship between sensory marketing and dwell time.

The S-O-R model presupposes that the role of emotional response is an intermediate effect between the stimuli in the environment and the behavioural outcome (Wu et al., 2025). Evidence shows that sensory signals impact the dwell time mainly by their ability to affect emotions (Rodriguez-Ulcuando et al., 2025). The positive emotional reactions that are initially elicited by sensory-rich environment then increase consumer engagement, stimulate browsing, and increase time in-store (Behera et al., 2021; Sagha et al., 2022). The presence and congruence of the elements of sensation has been explained in terms of emotional mediation, where dwell time is more strongly influenced by the presence and the congruency of stimuli.

H7: Emotional response mediates the relationship between sensory marketing and purchasing behavior.

The effect of sensory marketing on purchasing behaviour has been identified through the emotional states it produces (Sagha et al., 2022; Gao et al., 2024; Toribio Tamayo et al., 2024). Emotions that negative reactions cause positive reactions towards sensory information lower the purchase resistance, positively modify product ratings, and attitude to interact with brands (Elliott et al., 2021; Gao et al., 2024). It has been empirically established that emotions are the key channel through which sensory experiences can be translated into actual buying behaviour, which confirms the mediating role of emotional response in the linkage between sensory marketing and consumer buying behaviour (Elliott et al., 2021; Sagha et al., 2022).

METHODS

A quantitative research design was applied in this study using an explanatory research design to examine the direct and indirect relationship between the in-store sensory marketing (SM) and the dwell time (DT) and the purchasing behaviour (PB) through an emotional response (ER) mediator. The target population was the customers who visited the retail outlets of the selected supermarkets located in the Colombo metropolitan region. The two screening questions were used to select the respondents. First, they were asked about the supermarket they usually visit. The study considered only customers who visit Cargills, Keells, Laughs, and SPAR, based on their physical presence and popularity. Second, the respondents were asked whether the purchase they made was an in-store purchase or an online purchase. Participants who had only made in-store purchases were selected for the study. After identification of the eligible respondents, a structured questionnaire, which was to be filled using a Google Form, was sent through WhatsApp.

The research instrument comprised with two parts. The first section was gathered in terms of demographic variables (age, gender, educational attainment and frequency of visiting the store). Section

two included items of measurement that related to sensory marketing, emotional response, dwell time, and purchasing behaviour based on previously tested scales and rated on a five-point Likert scale. The non-probability convenience sampling method was used in this survey as the systematic sampling method could not be applied to it due to the nature of the survey and the difficulty of defining an exact sampling frame. This sample size was adequate to meet the minimum criteria of Covariance -Based Structural Equation Modelling (CB-SEM) of at least ten respondents per estimated parameter according to the recommendations provided by Hair et al. (2019). The questionnaire was first sent to 874 people out of which 683 full responses were received. The 683 responses were all saved to be analyzed since no data was lost or unfinished through Google Form.

Table 01
Operationalisation

Latent Construct	Dimension	Items	Source	α
Sensory Marketing	Music	M1: The volume of the music in the outlet is comfortable.	Jang & Lee (2019)	0.944
		M2: The type of music in the outlet is pleasant.		
		M3: The music in the outlet enhances my shopping experience.		
		M4: The music playing at the outlet gives me pleasure.		
		M5: The volume of music in the outlet is appropriate.		
	Lighting	L1: The lighting in the store is bright enough to see products clearly.		0.946
		L2: The lighting of the outlet is pleasing to the eye.		
		L3: The lighting feels warm and welcoming.		
		L4: The lighting complements the overall atmosphere of the store.		
		L5: The interior of the outlet is balanced.		
		L6: The contrast/illumination in product display areas is appealing.		
		L7: I find the scent in the outlet is relaxing.		
	Scent	S1: The scent intensity of the outlet is appropriate.		0.864
		S2: The outlet has a pleasant aroma.		
		S3: The smell of the outlet fits the overall atmosphere of the outlet.		
		S4: I like the smell of the outlet.		
		S5: The smell of the outlet soothes me.		
Emotional Response	Pleasure	P1: I feel satisfied by my visit to the outlet.	Jang & Lee (2019)	0.793
		P2: I feel happy when I visit the outlet.		
		P3: I feel pleasure when I visit the outlet.		
		P4: I feel comfortable in this outlet.		
		P5: I enjoy spending time here.		
		P6: This outlet puts me in a good mood.		
	Arousal	A1: I feel energetic when I visit the outlet.	Jang & Lee (2019)	0.853
		A2: I feel excited when I visit the outlet.		
		A3: I feel a sense of arousal when I visit the outlet.		

		A4: The outlet atmosphere makes me feel lively.		
		A5: I feel stimulated when I am in this outlet.		
		A6: Being in this outlet makes me feel awake.		
		A7: This outlet feels energizing.		
		A8: I feel more active here than in other outlet.		
	Dominance	D1: I feel confident when choosing products in this outlet.	Jang & Lee (2019)	0.802
		D2: I feel free to explore the outlet as I wish.		
		D3: I am fully free at the atmosphere of the outlet.		
		D4: I feel that the outlet layout allows me to act comfortably.		
		D5: I feel that I have control over my shopping experience here.		
		D6: I feel calm and not overwhelmed by the outlet environment.		
Dwell Time		DT1: I felt that I spent a long time in this outlet.	Cachero-Martínez & Vázquez-Casielles (2018)	0.837
		DT2: Compared with what I expected, the time I spent in outlet felt longer.		
		DT3: Spending more time in this outlet is a good idea.		
		DT4: If I had more time I would extend my stay in this outlet.		
		DT5: The time I've spent in this outlet has been worth it.		
		DT6: Overall, the time I spent in this outlet matched my expectations.		
Purchasing Behavior	Likelihood to buy	L1: I am likely to buy products from this outlet every day.	Jang & Lee (2019); Spears & Singh (2004)	Jang & Lee report CFI ≈ .96, RMSEA ≈ .046
		L2: I plan to choose this outlet over other stores for my purchase.		
		L3: I will purchase multiple products from this outlet if given the chance.		
		L4: I am willing to pay a higher price for products from this outlet compared to alternatives.		
	Re-visit intention	RV1: I will revisit this outlet soon.	Jang & Lee (2019); Spears & Singh (2004)	
		RV2: I would consider this outlet as my first-choice next time I need similar products.		
		RV3: I am likely to return to this outlet even if other stores are available.		
		RV4: I will continue to shop at this outlet regularly.		
	Recommendation	RE1: I will recommend this outlet to my friends or family.	Jang & Lee (2019); Spears & Singh (2004)	
		RE2: I am likely to talk positively about this outlet to others.		
		RE3: I will encourage others to buy from this outlet.		

		RE4: I would rate this outlet highly to others based on my shopping experience.		

The reliability and the validity were determined using Cronbach alpha, Composite Reliability (CR) and Average Variance Extracted (AVE); the discriminant validity was supported using the Fornell-Larcker criterion. The SPSS was used to perform descriptive statistics and reliability tests, and AMOS was used to perform the measurement and structural model tests. Confirmatory Factor Analysis (CFA) was performed to evaluate model fit, using indices such as χ^2/df, CFI, TLI, RMSEA, and SRMR, which met recommended thresholds (χ^2/df < 3, CFI and TLI > 0.90, RMSEA < 0.08). The structural model analysis allowed testing of hypotheses and the mediation effects were analyzed by bootstrapping procedures to provide the statistical significance of indirect pathways. This rigorous methodology ensured the robustness of the findings and allowed for a comprehensive evaluation of the hypothesized relationships.

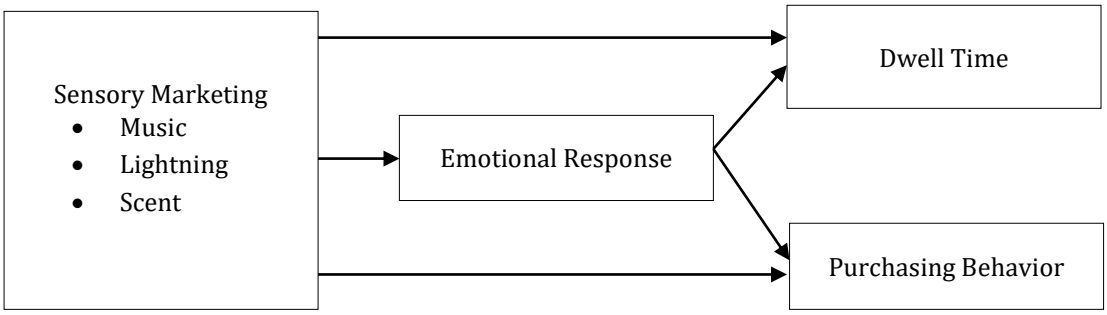

Figure 1. Conceptual Framework

RESULTS

The profile of respondents is summarized in Table 2, has displayed the demographic profile of the respondents that has outlined age, gender, educational attainment, and frequency of purchase visits. As shown, over 70% of the primary data were obtained among the participants who are above 30 years of age. The sample was estimated to be almost 69% female and 31% male. The reliability and relevance of the information are also justified by the fact that almost 60% of the respondents had enrolled in the GCE Advanced Level of education or higher. In addition, Table 2 shows that about 76 percent of the respondents frequent the chosen food retail outlet/s.

Table 02
Profile of Respondents

Variable		Frequency	Percentage
Age	<20	54	7.9
	21-30	146	21.3
	31-40	192	28.1
	41-50	123	18.0
	51-60	72	10.5
	>60	96	14.0
Gender	Male	212	31.1
	Female	471	68.9
Educational Level	Never schooling	12	1.7
	Up to grade 11	107	15.6
	Passed GCE O/L	144	21.0
	Passed GCE A/L	171	25.0
	Diploma	104	15.2
	Graduate	78	11.4
	Postgraduate	67	9.8
Purchase Visit Frequency	Rarely	24	3.5
	Seldomly	36	5.2

	Occasionally	95	13.9
	Frequently	204	29.8
	Very Frequently	324	47.4

Initially, descriptive statistics are presented to provide an overall understanding of the respondents' attitudes toward the study constructs. The mean (M) and standard deviation (SD) values of the latent constructs are shown in Table 3. As illustrated in Table 3, the mean values of the study constructs range from 3.51 to 3.87, indicating that respondents tend to score the study variables above the midpoint, reflecting a positive inclination toward SM, ER, DT, and PB. Furthermore, the SD values, ranging from 0.52 to 0.66, indicate a moderate dispersion around the mean values within the given range.

Table 03
Descriptive Statistics

Latent Constructs	Mean (M)	Standard Deviation (SD)
Sensory Marketing (SM)	3.65	0.59
Emotional Response (ER)	3.87	0.66
Dwell Time (DT)	3.51	0.52
Purchasing Behavior (PB)	3.55	0.55

Following that the study was performed measurement model evaluation and structural model evaluation as recommend by Hair et al. (2006; 2010; 2017). Later, the structural model was developed to test the direct and indirect hypotheses of the study.

Measurement Model Evaluation

The measurement model was designed in such a way that it assesses appropriateness of the conceptual framework of the study (Hair et al., 2006). The validity and reliability assessment is necessary to support the sufficiency of the research model. A Confirmatory Factor Analysis (CFA) of the study constructs in terms of reliability, validity, and other measures of fitness was performed on AMOS as a part of a structural equation model (Hair et al., 2010). The statistics achieved with AMOS are presented in Table 4 and prove and demonstrate the reliability, validity, and fit of the measurement model. Therefore, the goodness-of-fit of the study was checked with the help of the indices CMIN/DF, Comparative Fit Index (CFI), Goodness-of-Fit Index (GPI), Normed Fit Index (NFI), Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA).

In the CFA, composite reliability and Cronbach were calculated, and the value above 0.70 is necessary to determine the construct reliability (Hair et al., 2017). At the same time, the CFA was used to determine the convergent validity of the measurement model. Convergent validity was tested with the help of three indicators such as item reliability (factor loadings), construct reliability, and the average variance extracted (AVE); an AVE of 0.50 and above is needed (Hair et al., 2006). Table 4 information shows that all the reliability and validity standards are met satisfactorily. All the constructs have AVEs exceeding 0.50 (Hair et al., 2010) and, thus, the validity of the measurement model is justified (Table 4). According to Fornell and Larcker (1981), to verify convergent validity, the factor loading should be more than 0.50. A factor loading is the relationship of a latent variable to its indicator and all of the loadings should be significant. Table 4 indicates that the standard factor loading values are all above 0.50 and the lowest is 0.709, which determines the convergent validity of the model.

Table 04
Measurement Model and Structural Model Evaluations

Variable	Latent Construct	Items	Standard Factor Loading (SFL)	Composite Reliability (CR)	Cronbach's Alpha	Average Variance Extracted (AVE)
Sensory Marketing	Music	M1	0.771	0.724	0.722	0.601
		M2	0.725			

		M3	0.713			
		M4	0.734			
		M5	0.709			
	Lighting	L1	0.727	0.774	0.765	0.612
		L2	0.766			
		L3	0.741			
		L4	0.734			
		L5	0.764			
		L6	0.771			
		L7	0.725			
	Scent	S1	0.713	0.735	0.741	0.611
		S2	0.734			
		S3	0.719			
		S4	0.727			
		S5	0.766			
Emotional Response	Pleasure	P1	0.741	0.763	0.765	0.613
		P2	0.734			
		P3	0.764			
		P4	0.771			
		P5	0.725			
		P6	0.713			
	Arousal	A1	0.744	0.701	0.714	0.604
		A2	0.791			
		A3	0.821			
		A4	0.802			
		A5	0.758			
		A6	0.850			
		A7	0.784			
		A8	0.796			
	Dominance	D1	0.753	0.799	0.788	0.576
		D2	0.744			
		D3	0.791			
		D4	0.821			
		D5	0.802			
		D6	0.758			
Dwell Time		DT1	0.850	0.745	0.751	0.621
		DT2	0.784			
		DT3	0.813			
		DT4	0.754			
		DT5	0.739			
		DT6	0.747			
Purchasing Behavior	Likelihood to buy	LH1	0.741	0.772	0.755	0.613
		LH2	0.721			
		LH3	0.728			
		LH4	0.714			
	Re-visit intention	RV1	0.813	0.791	0.784	0.644
		RV2	0.754			
		RV3	0.709			
		RV4	0.747			
	Recommendation	RE1	0.741	0.755	0.731	0.611
		RE2	0.721			
		RE3	0.728			
		RE4	0.714			
N	683					
X^2/df	2.126					
CMIN/DF	2.321					

CFI	0.897
GFI	0.825
NFI	0.889
TLI	0.905
RMSEA	0.078
PNFI	0.632
Sig- value	0.000

The Fornell and Larcker criterion was used to assess the measurement model's discriminant validity. By proving the uniqueness of its items, this approach confirms that each construct is empirically distinct (Hair et al., 2006). The square root of the Average Variance Extracted (√AVE) for every construct was compared to the inter-construct correlations, following the recommendation made by Fornell and Larcker (1981). Discriminant validity was established because all √AVE values were greater than the corresponding inter-construct correlations, as shown in Table 5.

Table 05
Discriminant Validity

	M	L	S	P	A	D	DT	LH	RV	RE
M	0.793									
L	0.410	0.862								
S	0.572	0.546	0.824							
P	0.454	0.557	0.536	0.752						
A	0.478	0.671	0.635	0.624	0.721					
D	0.478	0.671	0.635	0.624	0.671	0.677				
DT	0.541	0.572	0.546	0.546	0.572	0.410	0.730			
LH	0.643	0.454	0.557	0.557	0.454	0.572	0.546	0.722		
RV	0.578	0.478	0.671	0.671	0.671	0.454	0.557	0.536	0.728	
RE	0.661	0.478	0.671	0.546	0.572	0.478	0.671	0.635	0.624	0.790

Structural Model Evaluation

The model fit indices indicated an acceptable overall model fit. The chi-square to degrees of freedom ratio was within the recommended range (X^2/df = 2.035; CMIN/DF = 2.146), suggesting a reasonable model–data fit (Hair et al., 2010). The comparative fit index (CFI = 0.921), normed fit index (NFI = 0.901), and Tucker–Lewis index (TLI = 0.925) all exceeded the recommended threshold of 0.90, confirming good incremental fit (Hair et al., 2017). The goodness-of-fit index (GFI = 0.842) was slightly below the conventional 0.90 cut-off, but still within the acceptable range for complex models (Hair et al., 2010). The root mean square error of approximation (RMSEA = 0.074) indicated an acceptable level (Hair et al., 2010) of approximation error (below 0.08), and the parsimony normed fit index (PNFI = 0.644) reflected satisfactory model parsimony (Khan et al., 2021). The chi-square test was statistically significant ($p < 0.001$), but such an outcome is not unique to large sample sizes (N = 300) and does not, on its own, indicate poor model fit. Cumulatively, the indices show that the measurement model is of satisfactory and statistically acceptable fit to the data.

Direct and Indirect Effects

The structural model was tested with the help of CB-SEM (AMOS) and the hypotheses of the study were tested. Table (6) indicates the statistical output of AMOS. The results indicate that each of the hypothesized directions is positive and significant ($p < 0.001$), thereby supporting H1–H7. The direct impacts of in-store sensory marketing (SM) on dwell time (DT) (β = 0.627), purchasing behavior (PB) (β = 0.682), and emotional response (ER) (β = 0.637) are also notable, highlighting that it is a key to providing more meaningful customer experience and resulting in a behavioral change. In addition, ER has a significant positive impact on DT (β= 0.789) and PB (β= 0.756), which supports the significance of creating positive emotional reactions in the retail setting. Importantly, the mediation analysis (H6 and H7) proves that ER

plays an important role in mediating the correlations between SM and both DT (β =0.745) and PB (β=0.721). These findings indicate that SM has a stronger effect on DT and PB when its effect is mediated by ER, and thus the essentiality of emotional reactions as a process through which the sensory marketing has the most significant impact on the duration of customers stay and their decision to buy a product.

Table 06
Hypotheses Testing

Hypotheses	Path	Coefficient	P-value	Remarks
H1	SM-DT	0.627	0.000	Supported
H2	SM-PB	0.682	0.000	Supported
H3	SM-ER	0.637	0.000	Supported
H4	ER-DT	0.789	0.000	Supported
H5	ER-PB	0.756	0.000	Supported
H6	SM-ER-DT	0.745	0.000	Supported
H7	SM-ER-PB	0.721	0.000	Supported

DISCUSSION

The empirical evidence shows that the appeals of sensory marketing have a decisive effect on consumer dwell time and purchase behavior in the food retail environment. The positive and statistically significant correlation among ER, SM, DT, and PB shows that the in-store sensory stimuli (lights, music, and scent) are not accidental but strategic and intentional. This is consistent with the recent studies that the multisensory stimuli have a significant positive effect on the customer experience, behavioral loyalty, and store engagement (Sagha et al., 2022; Kim et al., 2021; Vieira et al., 2022).

The strong direct relationship between SM and ER (β = 0.643) shows that the sensory stimuli induce important emotional states of arousal, pleasure and dominance, which, in turn, affect consumer choice. These findings are consistent with the stimulus-organism-response (SOR) paradigm (Mehrabian & Russell, 1974) and are in line with the recent results that ER mediate the existence of the relationship between environmental strategies and consumer behaviour (Sagha et al., 2022; Toribio-Tamayo et al., 2024). In addition, the outcomes of the mediation (H6, H7) indicate that emotional response is a critical pathway by which sensory stimuli enhance their influences on dwell time and purchasing behaviour, not only as a consequence of sensory stimuli. This observation aligns with the current literature that emphasizes the role of affective engagement to achieve long-term customer retention and high levels of repurchase intentions (Biswas, 2019; Gosal et al., 2021; Helmefalk, 2019; Kim et al., 2021; Vieira et al., 2022).

It is empirically proved that ER is a major performance driver in retail based on the important standardized path coefficients (ER → DT: β = 0.789, ER → PB: β = 0.756). The model is sufficiently robust as the indices of its satisfactory fit are (CFI = 0.921; TLI = 0.925; RMSEA = 0.074). The Goodness-of-Fit Index (GPI) can still be deemed acceptable even though it is somewhat shorter than the traditionally accepted 0.90 value, given the intricacy of the model and the size of the sample (Hair et al.,2017). Based on these results, it is possible to state that managers can invest in a properly designed sensory environment to achieve a favourable atmosphere, enhance emotional experience, and ultimately, spend more time in store and willingness to purchase among customers. These insights are a necessity to food retailers aiming to achieve differentiation in what are becoming increasingly competitive markets (Sagha et al., 2022; Toribio-Tamayo et al., 2024).

CONCLUSION

The theoretical postulation that sensory marketing has a meaningful direct and indirect effect on consumer dwell time and purchase behaviour via emotional response is supported by the empirical findings. These findings highlight the value of creating emotionally arousing retailing spaces that have well-thought sensory prompts which elicit positive emotional responses. Finally, the research concludes that SM positively affects PB, DT, and ER. ER enhances the effect of SM on behavioral outcomes, thus making an essential mediating factor furthermore, the study concludes that a well-planned sensory environment can

become an essential tool in the process of customer satisfaction and store performance improvement. These findings would give a strong argument on why sensory marketing strategies should be adopted in food retail environments to promote sales, dwell-time and create emotional appeal.

Recommendations

As per the results, the following suggestions can be made by food retailers: in order to create an emotionally resonant shopping experience, retailers should use lighting, music, and fragrances that align with the brand image and consumer preferences (Vieira et al., 2022). As the SM-PB interaction is mediated by ER, retailers have been advised to employ the tools to monitor and measure the emotional reaction in shoppers such as in-store surveys, biometric or AI-powered sentiment analysis. It can be done through the design of welcoming and engaging areas with seating facilities, pleasant smells, and correct lighting to raise DT, which is positively correlated with sales (Goswami et al., 2024). To prevent novelty loss and sensory fatigue, it will be beneficial to use data analytics to modify sensory stimuli depending on the time of the day, seasonality, or customer traffic (Biswas, 2019; Sagha et al., 2022). Employees also have the ability to contribute to the physical environment by using service behaviours that strengthen the consumer experience as long as they are empowered with knowledge on how sensory signals relate to the psychology of the customers.

Future research directions

Although this study offers insightful information, several directions for future research are suggested, including a replication of the study in various retail settings (such as supermarkets, shopping centers, and convenience stores) and geographical areas to evaluate generalizability. Future studies can look at how sensory marketing interventions affect lifetime value and customer loyalty over the long run. Additionally, the ways in which digital technologies can supplement or improve conventional sensory stimuli can be investigated. An important addition to the current body of knowledge may come from examining the ways in which demographic variables (age, gender, and cultural background) mitigate the effects of sensory marketing and emotional response.

Research ethics statement

This article is the author's own original work, which has not been previously published elsewhere.

Author contribution statement

Introduction and literature review were done by Punchihewa and methods, results and latter part were completed by Jayampathi. Overall study conceptualization was done by both scholars.

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