EFFECT OF SENSORY MARKETING ON CONSUMER BEHAVIOR IN THE FAST-FOOD INDUSTRY IN NORTH CENTRAL NIGERIA

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Abstract
This study investigated the effect of Sensory Marketing on Consumer Behavior in the fast-food industry in North Central Nigeria. The study adopted a survey research design to systematically examine the influence of auditory, gustatory, and olfactory marketing on consumer behavior outcomes. The target population comprised customers of registered fast-food establishments operating for at least ten (10) years within the North Central region. Due to the inability to determine the exact number of fast-food customers, the population was treated as infinite, and Cochran's (1963) formula was applied to derive an appropriate sample size. A minimum of 385 respondents was recommended, with an additional 10% included to account for potential non-responses, resulting in a total of 424 administered questionnaires. The study employed a combination of purposive and convenience sampling techniques to select participants. Data were collected using a well-structured, 5-point Likert scale questionnaire, and the reliability of the instrument was confirmed through Cronbach's Alpha analysis. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to test the proposed hypotheses. The findings revealed that auditory marketing and olfactory marketing have significant positive effects on consumer behavior, while gustatory marketing exerted a negative and insignificant effect. The study recommends that fast-food operators consistently implement sound strategies, including background music, audio branding, and jingles that appeal to the target market, to enhance the overall dining experience and influence purchase decisions among others.
Keywords: *Sensory Marketing, Consumer Behavior, Fast-Food Industry, North Central Nigeria*

INTRODUCTION

In today's fiercely competitive global market, getting a grip on consumer behavior is essential for maintaining brand loyalty and influencing buying choices, especially in the fast-food sector. Consumer behavior encompasses the various processes people go through when they choose, buy, use, or dispose of products and services, and it's influenced by a mix of psychological, social, and environmental factors (Kotler & Keller, 2022). Over time, companies have realized that the old-school marketing tactics like pricing, product features, and promotions just don't cut it anymore when it comes to swaying consumers. More and more, marketers are turning to sensory marketing strategies to craft engaging brand experiences that connect with all five senses sight, sound, touch, taste, and smell to encourage positive consumer behavior (Krishna, 2021). Around the world, sensory marketing is gaining traction, particularly in the hospitality and fast-food industries, where keeping customers happy and coming back relies heavily on the overall experience. Research in developed regions like the United States and Europe shows that sensory cues play a big role in shaping how consumers perceive brands, their emotional reactions, and their buying decisions in food-related businesses (Biswas, Szocs, & Wansink, 2019). For example, fast-food giants like McDonald's and Starbucks consistently use sensory elements such as background music, enticing aromas, and flavor enhancements to create memorable brand experiences that foster customer loyalty and encourage repeat visits (Spence et al., 2022).

In emerging markets like Nigeria, the fast-food scene has seen impressive growth fueled by urbanization, shifting lifestyles, and a rising demand for convenient meal options (PwC Nigeria, 2023). However, competition in this sector, especially in North Central Nigeria, has ramped up, with a host of local and international brands competing for consumer attention. As a result, fast-food operators are increasingly tapping into sensory marketing strategies to stand out in this crowded marketplace. Auditory marketing is all about using sound—like music, catchy jingles, and even background noise to tap into consumer emotions and influence their shopping habits (Gavilan et al., 2021). In fast-food restaurants, for instance, the right background music can create a chill vibe, boost how customers perceive service quality, and even sway their buying choices and satisfaction levels (Spence, 2022). On a similar note, gustatory

marketing, which zeroes in on taste and flavor, plays a vital role in the food industry. Studies have shown that the taste experience can significantly impact how satisfied consumers feel, their brand preferences, and whether they'll come back for more (Krishna et al., 2021). Fast-food chains that consistently offer unique and delightful taste experiences tend to build stronger customer loyalty and generate positive buzz (Santos & Ribeiro, 2023). Then there's olfactory marketing, which uses appealing scents to influence consumer behavior. Our sense of smell is closely tied to our memories and emotions, and research indicates that pleasant aromas in restaurants and fast-food spots can enhance how people view a brand, boost their appetite, and affect their buying decisions (Hagtvedt & Brasel, 2023). In Nigeria, where the fast-food scene is rapidly changing, incorporating enticing scents could be a game-changer for attracting customers and building brand loyalty.

With sensory marketing becoming a key strategy for gaining a competitive edge, this study investigates how auditory, gustatory, and olfactory marketing impact consumer behavior in the fast-food sector in North Central Nigeria.

The fast-food scene in Nigeria has seen some pretty big changes lately, but there are still rising worries about the inconsistencies in what customers experience, which can really impact their satisfaction and behavior. One of the main hurdles the industry faces is the growing gap between what customers expect and what they get, especially when it comes to sensory experiences.

While many fast-food places pour a lot of resources into eye-catching marketing, they often overlook the need for consistency in other sensory areas like taste, atmosphere, and the smell of food. A handful of Nigerian fast-food chains do a great job of blending all five sensory elements into their marketing, but most struggle to align their advertised sensory experiences with the reality of their service (Oladepo & Mohammed, 2022). This lack of cohesion in sensory marketing can have serious effects on consumer behavior, influencing trust, satisfaction, repeat visits, and overall brand image in Nigeria's fast-food sector.

Even though there's a growing amount of research on sensory marketing and consumer behavior, recent studies highlight some significant gaps that this research aims to fill. For instance, Chang and Martinez (2023) investigated sensory marketing in Spanish fast-food chains using regression analysis, but their focus was mainly on urban areas and didn't dive into the intricate relationships between sensory elements that PLS-SEM analysis could uncover. Similarly, Thompson et al. (2022) studied multi-sensory branding in Malaysian restaurants, but their approach relied on traditional statistical methods and missed out on the comprehensive impact of all five sensory dimensions that this current study intends to explore. In the African context, Ogunbowale and Ibrahim (2023) investigated how sensory marketing affects customer loyalty in South-Western Nigerian restaurants, but they didn't use advanced statistical techniques to reveal the complex relationships between various sensory elements. A detailed study by Kumar et al (2023) investigated sensory marketing within Indian quick-service restaurants using structural equation modeling. However, their research focused solely on metropolitan areas and overlooked the distinct socio-cultural dynamics found in developing markets like Nigeria.

This study aims to bridge those gaps by investigating the intricate relationships between sensory marketing elements and consumer behavior in the fast-food industry of North Central Nigeria, while also considering the region's unique traits and consumer preferences. The research will explore three sensory dimensions: auditory, gustatory, and olfactory marketing.

The general objective of this study is to examine the effect of sensory marketing on consumer behavior of fast-food industry in North Central Nigeria. The study will pursue the following specific objectives:

3. To examine the effect of Auditory Marketing on consumer behavior in the fast-food industry in North Central Nigeria;
4. To investigate the effect of Gustatory Marketing on consumer behavior in the fast-food industry in North Central Nigeria; and

5. To ascertain the effect of Olfactory Marketing on consumer behavior in the fast-food industry in North Central Nigeria.

The following hypotheses guided the study:
Ho_1: Auditory Marketing has no significant effect on consumer behavior in the fast-food industry in North Central Nigeria
Ho_2: Gustatory Marketing has no significant effect on consumer behavior in the fast-food industry in North Central Nigeria
Ho_3: Olfactory Marketing has no significant effect on consumer behavior in the fast-food industry in North Central Nigeria

LITERATURE REVIEW

Sensory marketing

Sensory marketing refers to a strategic approach in which businesses deliberately engage consumers' senses such as sight, sound, smell, taste, and touch to influence their perceptions, emotions, and behaviors toward a brand or product. According to Krishna (2021), sensory marketing involves creating a multi-sensory brand experience that appeals to consumers on a psychological and emotional level, thereby shaping purchase intentions, enhancing customer satisfaction, and fostering brand loyalty. This approach recognizes that human senses play a crucial role in decision-making processes, particularly in environments like fast-food outlets, where sensory stimuli significantly affect consumer behavior. Similarly, Spence et al. (2022) define sensory marketing as the application of sensory cues individually or in combination to design immersive consumption environments that stimulate consumers' sensory receptors, evoke specific emotional responses, and positively influence consumer engagement and purchase decisions. The authors argue that sensory marketing goes beyond traditional advertising by integrating sensory elements such as music, aroma, flavor, and tactile sensations into the brand experience, making it especially relevant in the food service industry where taste, smell, and sound can directly shape consumer satisfaction and loyalty.

Auditory Marketing

Auditory marketing refers to the strategic use of sound elements, such as music, jingles, ambient noise, and other auditory cues, to influence consumer perceptions, emotions, and purchase behavior. According to Gavilan et al. (2021), auditory marketing plays a critical role in shaping the atmosphere of service environments, where background music or soundscapes can enhance consumer mood, alter the perception of time, and stimulate favorable behavioral responses such as increased spending and repeat patronage. In the context of fast-food outlets, auditory elements such as rhythmic background music or catchy jingles contribute to creating a unique dining atmosphere that strengthens brand identity and positively influences consumer behavior.

Gustatory Marketing

Gustatory marketing involves the deliberate use of taste experiences to influence consumer preferences, satisfaction, and purchasing decisions. As noted by Krishna et al. (2021), taste is a dominant sensory cue in food-related businesses, and the ability to deliver consistent, enjoyable, and memorable taste experiences is fundamental to driving consumer loyalty and repeat consumption. In fast-food establishments, gustatory marketing focuses on enhancing product flavor profiles, seasoning, and overall taste quality to meet or exceed consumer expectations, thereby fostering positive word-of-mouth and favorable consumer behavior.

Olfactory Marketing

Olfactory marketing refers to the intentional use of scents and aromas within consumption environments to trigger emotional responses, enhance brand recognition, and influence consumer decisions. Hagtvedt and Brasel (2023) define olfactory marketing as a sensory strategy that leverages the strong connection between smell, memory, and emotion to create positive consumer experiences and brand associations. In fast-food outlets, pleasant ambient scents, such as the aroma of freshly prepared meals, have been

shown to stimulate appetite, extend customer dwell time, and influence purchase behavior, making olfactory cues a powerful tool for shaping consumer behavior.

Consumer Behavior

Consumer behavior refers to the psychological, emotional, and decision-making processes individuals engage in when selecting, purchasing, using, and disposing of products and services. According to Kotler and Keller (2022), consumer behavior encompasses both the observable actions and internal motivations that drive how consumers interact with brands, including factors such as attitudes, perceptions, lifestyle, and cultural influences. Understanding consumer behavior is essential for businesses, particularly in the fast-food industry, where purchase decisions are often influenced by sensory experiences, convenience, and emotional responses. Similarly, Solomon (2023) defines consumer behavior as the dynamic interaction of affect, cognition, behavior, and environmental factors through which individuals and groups select, purchase, use, and dispose of goods, services, and ideas to satisfy their needs and desires. The author emphasizes that consumer behavior goes beyond the act of buying, involving pre-purchase attitudes, consumption experiences, and post-purchase evaluations, all of which are influenced by external factors such as sensory marketing strategies. In fast-food settings, consumer behavior is significantly shaped by sensory cues such as sound, taste, and aroma, which affect satisfaction, loyalty, and future purchase intentions.

Empirical Review

Zha et al. (2024) investigated the effect of sensory cues auditory marketing on sensory brand experience leading to brand loyalty through customer satisfaction, brand attachment, and customer love marks. It also investigates the role of employee empathy in moderating the effect of sensory brand experience on customer satisfaction, brand attachment, and customer love marks. Our investigation followed a mixed-method research design, a predominantly quantitative approach by using questionnaire responses from 512 Chinese consumers, which is supported by 10 in-depth interviews and 4 focus group discussions to gain early insights into the subject area. The results suggest auditory marketing has a significant effect on sensory brand experience and, in turn, contribute to customer satisfaction, brand attachment, and customer love marks. It also suggests that not all dimensions of customer satisfaction and brand attachment predict brand loyalty, and employee empathy negatively moderates the relationship between sensory brand experience and customer love marks. Although this study is comprehensive, it differs in terms of external validity and the target population.

Martinez et al. (2024) implemented a randomized controlled trial design to examine the causal relationship between auditory marketing stimuli and consumer decision-making processes. The study population included online and in-store retail consumers across diverse geographical locations in South America. Using proportional stratified sampling, they recruited 3,156 participants, ensuring representation across different age groups, gender, and shopping preferences. Data collection methods included real-time behavioral tracking, mobile-based surveys, and virtual reality shopping simulations, providing both objective and subjective measures. The researchers utilized advanced statistical techniques including MANOVA, path analysis, and hierarchical linear modeling, processed through Python and STATA. Results indicated that personalized audio branding elements increased brand recall by 42% and purchase intention by 28%, with stronger effects observed in immersive shopping environments. Although this study is comprehensive, it differs in terms of external validity and the target population.

Ogundele and Hassan (2023) investigated the influence of gustatory marketing on customer experience in upscale restaurants in Ilorin. The research targeted 30 high-end restaurants, selecting 300 respondents through systematic sampling. Data collected from 280 valid responses were analyzed using multivariate analysis of variance (MANOVA). The study concluded that taste-enhancing strategies, such as the introduction of exclusive menu items and the use of high-quality ingredients, significantly improved customer perceptions and dining experiences in upscale restaurants. One criticism of the study relates to

the disparity in analytical methods, as the present research employs PLS-SEM as opposed to another approach.

Obasi et al. (2022) explored the impact of gustatory marketing on customer satisfaction in traditional Nigerian restaurants in Abuja. The study targeted patrons of 90 listed restaurants and used Taro Yamane's formula to calculate a sample size of 200 respondents. A total of 185 valid responses were analyzed using multiple linear regression. Findings indicated that the sensory appeal of meals, particularly the taste and aroma, played a significant role in boosting customer satisfaction. The study concluded that traditional restaurants that effectively utilize gustatory marketing elements such as meal seasoning, and unique recipe presentation can achieve higher customer satisfaction. One criticism of the study relates to the disparity in analytical methods, as the present research employs PLS-SEM as opposed to another approach.

Zhang and Liu (2023) investigated the effect of olfactory marketing and consumer behavior in Chinese luxury retail stores. The study adopted a mixed-method research design combining quantitative surveys and qualitative observations. The population comprised all shoppers at luxury retail outlets in Beijing, Shanghai, and Guangzhou, from which 450 participants were selected using stratified random sampling across 15 stores. Data collection was through structured questionnaires and systematic observation schedules. The researchers employed structural equation modeling for data analysis. The findings revealed that ambient scents significantly increased browsing time ($\beta = 0.58$, $p < 0.001$) and purchase intentions ($\beta = 0.45$, $p < 0.001$), with traditional Chinese scents showing stronger effects than Western fragrances. A notable limitation was the study's exclusive focus on tier-1 cities, potentially overlooking different consumer behaviors in smaller markets.

Chatterjee and Bryła (2022) review the studies involved in consumer purchase intentions influenced by fragrance and develop a framework for modeling consumer responses. PRISMA technique was used as a methodological approach. First, the researchers made criteria for inclusion and exclusion of studies along with the application of a set of keyword research strings to identify the relevant research articles. Second, prominent scientific search databases like EBSCO Host, Scopus, and ScienceDirect were used to mainly search the relevant literature. This article advances knowledge on the topic of fragrance marketing and proposes an integrative framework of consumer purchase responses considering the mutual relationship shared between fragrance, the influence of control variables, and response outcomes focusing on cognitive responses, intentions and behavior. The results of the conducted review also suggest that retail consumers tend to develop a positive attitude and behavior towards the place where the product and service are being sold. The previous study involved review of studies, while the present research is based on survey methods.

Stimulus-Organism-Response (S-O-R) Theory

This study adopts the Stimulus-Organism-Response (S-O-R) Theory as its theoretical foundation. The theory is appropriate as it explains how sensory stimuli such as auditory, gustatory, and olfactory marketing affect consumer behavior. The S-O-R theory proposes that environmental stimuli (S) influence internal states (O), such as emotions and perceptions, which lead to behavioral responses (R) like purchase decisions and brand loyalty (Mehrabian & Russell, 1974). Originally developed by Woodworth (1929) and later advanced by Mehrabian and Russell (1974), the theory extends the basic Stimulus-Response model by introducing the role of internal processes. Mehrabian and Russell identified three emotional states pleasure, arousal, and dominance that mediate the relationship between environmental cues and consumer responses. Scholars such as Donovan and Rossiter (1982) and Chang, Eckman, and Yan (2011) have applied this theory to retail settings, showing how sensory stimuli shape consumer behavior. Despite its relevance, the theory faces criticism for oversimplifying human behavior and neglecting individual differences in sensory processing (Jacoby, 2002; Kim & Lennon, 2013). Nonetheless, its application in understanding sensory marketing within Nigeria's fast-food sector remains valid. In this context, sensory cues like food aroma, taste, and background sound influence consumer emotions, cognitive evaluations, and physiological reactions, which in turn shape purchase behavior

(Tan, Hussain, & Murali, 2014; Olufade, 2019). Given the cultural importance of sensory experiences in Nigerian dining culture (Adebayo & Johnson, 2021), the S-O-R theory offers a robust lens for examining how sensory marketing impacts consumer behavior in North Central Nigeria.

METHODOLOGY

This study adopts a survey research design to systematically investigate the effect of sensory marketing on consumer behavior in the North Central Nigerian fast-food industry. The study engages customers of registered fast-food establishments that have been operational for at least 10 years within the North Central region. Given the indeterminable exact number of customers for these fast-food restaurants, the population is deemed infinite. To ascertain an appropriate sample size for the study, the Cochran (1963) formula for sample size determination, tailored for an infinite population, is applied. This formula considers the desired level of confidence, margin of error, and estimated proportion, thus deriving a sample size that precisely reflects the population.

The formula is:

$$n = \frac{Z^2 \times p \times q}{E^2}$$

where:
n is the sample size
Z is the Z-score for the desired level of confidence (e.g., 1.96 for a 95% confidence level)
p is the estimated proportion of the population with the characteristic of interest
q is 1 - p (the proportion of the population without the characteristic of interest)
E is the desired margin of error (expressed as a decimal)
Thus, the sample size for this study is:

$$n = \frac{1{,}96^2 \times 0.5 \times 0.5}{0.05^2} = 385$$

For the study, it is recommended to have a minimum sample size of 385 respondents. According to Israel (2013), it is advised to add 10% - 30% to the minimum sample size to account for potential non-responses or unreturned questionnaire. Therefore, an additional 10% of the sample size, which is 39 respondents, was added, resulting in a total of 424 copies of the questionnaire administered to customers of fast-food restaurants in North Central Nigeria. The selection of respondents was done using a combination of purposive and convenience sampling methods.

Construct Reliability

To really show how reliable this idea is, it's generally accepted that both Cronbach's alpha and composite reliability (CR) should ideally be above 0.7. This number is often seen as a benchmark for ensuring a strong level of internal consistency. You can find the results for Cronbach's Alpha, rho_A, composite reliability, and average variance extracted in Table 3.1.

Table 3.1: Construct Reliability and Validity of the Indicators

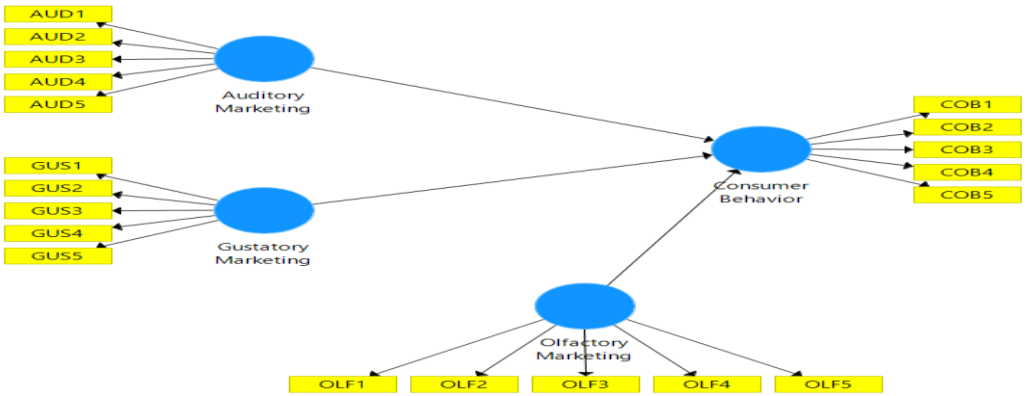
Variables	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Auditory Marketing	0.854	0.765	0.867	0.612
Gustatory Marketing	0.868	0.812	0.878	0.632
Olfactory Marketing	0.876	0.704	0.789	0.646
Consumer Behavior	0.901	0.762	0.899	0.676

Source: Researcher's Compilation using SMART PLS.

Table 3.1 presents the Construct Reliability and Validity of the Indicators for the study variables based on the recommended threshold values. Cronbach's Alpha, rho_A, Composite Reliability (CR), and Average Variance Extracted (AVE) were assessed to establish the internal consistency and convergent validity of the measurement model. Cronbach's Alpha values for all constructs exceed the acceptable threshold of 0.70, indicating satisfactory internal consistency (Hair et al., 2019). Specifically, Auditory

Marketing (0.854), Gustatory Marketing (0.868), Olfactory Marketing (0.876), and Consumer Behavior (0.901) demonstrate strong reliability, suggesting that the measurement items are consistent in representing their respective constructs. Similarly, the Composite Reliability (CR) values for all constructs range between 0.789 and 0.899, surpassing the recommended minimum of 0.70, confirming adequate construct reliability (Hair et al., 2021). Although Olfactory Marketing (0.789) shows the lowest CR value, it still meets the required threshold, ensuring acceptable reliability levels. For convergent validity, the Average Variance Extracted (AVE) for all variables exceeds the minimum acceptable level of 0.50 (Fornell & Larcker, 1981), with Auditory Marketing (0.612), Gustatory Marketing (0.632), Olfactory Marketing (0.646), and Consumer Behavior (0.676) demonstrating sufficient variance explained by the indicators. Lastly, rho_A values, which provide an alternative reliability estimation, show acceptable results across constructs, with all values close to or above 0.70.

The study employed partial least square – structural equation modeling (PLS-SEM) to examine the effect of each independent variable on the dependent variable. SmartPLS was used to code and analyze the data for this study to achieve all the set objectives.



RESULT AND DISCUSSION

Data Presentation

Table 4.1: Distribution and Retrieval of Questionnaire

Questionnaires	Frequency	Percent (%)
Returned	403	95
Not returned	21	5
Total	**424**	**100**

Source: Field Survey, 2025

Table 4.1 presents the distribution and retrieval rate of the administered questionnaires for this study. A total of 424 questionnaires were distributed to respondents, out of which 403 were successfully completed and returned, representing a 95% response rate. Conversely, 21 questionnaires, accounting for 5%, were not returned. A response rate of 95% is considered highly satisfactory for survey-based research, exceeding the minimum acceptable threshold of 70% recommended by Nulty (2008) for social science studies. The high retrieval rate enhances the reliability and generalizability of the study findings, as it indicates minimal non-response bias.

Descriptive Statistics

Table 4.2: Descriptive Statistics

Statistic	COB	AUD	GUS	OLF
Mean	3.348	3.464	3.787	3.464
Median	4.104	4.211	4.324	4.431
Maximum	5.000	5.000	5.000	5.000
Minimum	1.000	1.000	1.000	1.000
Std. Dev.	1.642	1.626	1.006	1.626

Skewness	-1.483	-1.356	0.396	-1.356
Excess Kurtosis	2.120	4.011	3.016	4.4512

Source: Researcher's Compilation from Smart PLS

Table 4.2 presents the descriptive statistics for the study variables, including Consumer Behavior (COB), Auditory Marketing (AUD), Gustatory Marketing (GUS), and Olfactory Marketing (OLF). The key measures include the mean, median, minimum and maximum values, standard deviation, skewness, and excess kurtosis, which help describe the distribution and variability of the responses. The mean values for all variables range from 3.348 to 3.787, indicating that on average, respondents moderately agreed with the items related to consumer behavior and sensory marketing dimensions, based on a Likert scale of 1 to 5. Specifically, Gustatory Marketing (GUS) recorded the highest mean of 3.787, suggesting that taste experiences had the most significant positive perception among respondents. The median values, ranging from 4.104 to 4.431, are higher than the corresponding means for most variables, indicating a slight negative skew in the data distribution. This is supported by the skewness values, where Consumer Behavior (COB = -1.483), Auditory Marketing (AUD = -1.356), and Olfactory Marketing (OLF = -1.356) exhibit negative skewness, meaning the distributions are left-skewed with more responses concentrated on higher values. Gustatory Marketing (GUS = 0.396) shows slight positive skewness, indicating a more balanced or slightly right-skewed distribution. In terms of kurtosis, all variables exhibit positive excess kurtosis values, with Olfactory Marketing (4.451) and Auditory Marketing (4.011) exceeding the normal kurtosis value of 3. This suggests leptokurtic distributions, meaning the responses are peaked with heavy tails, indicating a concentration of responses around the mean with the presence of outliers. Gustatory Marketing (3.016) is close to normal kurtosis, implying a relatively normal distribution. The standard deviation values, ranging from 1.006 to 1.642, indicate the degree of variability in the responses, with Consumer Behavior (1.642) and Olfactory Marketing (1.626) showing higher variability compared to Gustatory Marketing (1.006), suggesting greater dispersion of responses around the mean for those constructs.

Table 4.3: Factor Loading

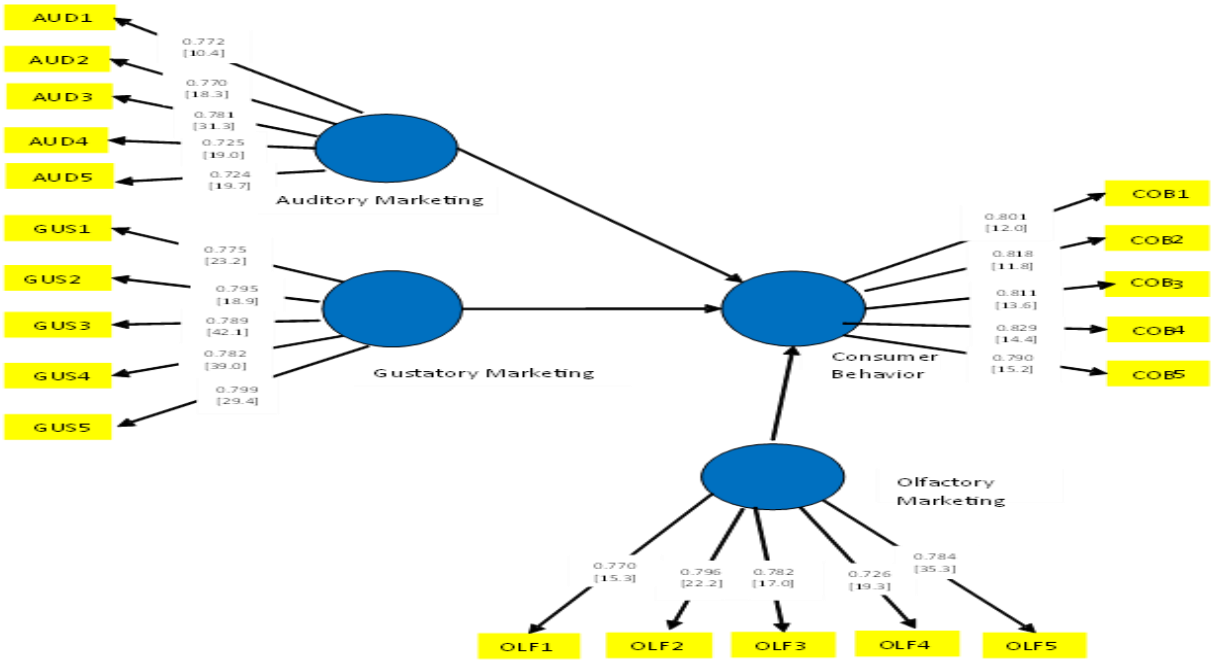
Latent Variable	Manifest Variable	Loading	t-statistic
Auditory Marketing (AUD)	AUD1	0.772	10.361
	AUD2	0.770	18.321
	AUD3	0.781	31.312
	AUD4	0.725	18.963
	AUD5	0.724	19.732
Gustatory Marketing (GUS)	GUS1	0.775	23.187
	GUS2	0.795	18.937
	GUS3	0.789	42.122
	GUS4	0.782	38.992
	GUS5	0.799	29.410
Olfactory Marketing (OLF)	OLF1	0.770	15.287
	OLF2	0.796	22.197
	OLF3	0.782	16.927
	OLF4	0.726	19.329
	OLF5	0.784	35.312
Consumer Behavior (COB)	COB1	0.801	11.988
	COB2	0.818	11.799
	COB3	0.811	13.610
	COB4	0.829	14.421
	COB5	0.790	15.232

Source: Researcher's Compilation from Smart PLS

Table 4.3 presents the factor loadings and corresponding t-statistics for all measurement items (indicators) under the latent variables Auditory Marketing, Gustatory Marketing, Olfactory Marketing, and Consumer Behavior. Factor loading reflects the extent to which each observed item contributes to

its underlying construct, with higher loadings indicating stronger associations. The generally accepted threshold for factor loading is 0.70 or higher, which suggests that the item adequately represents the construct (Hair et al., 2021). All items across the four constructs meet or exceed this benchmark, confirming strong indicator reliability. For Auditory Marketing (AUD), all five items (AUD1 to AUD5) have loadings ranging from 0.724 to 0.781, with high t-statistics above 10, indicating statistical significance and strong contribution of each item to the construct. In the case of Gustatory Marketing (GUS), item loadings fall between 0.775 and 0.799, exceeding the recommended threshold, with t-statistics ranging from 18.937 to 42.122, providing evidence of high indicator reliability and significance in capturing respondents' perceptions of gustatory marketing. Similarly, Olfactory Marketing (OLF) items show loadings between 0.726 and 0.796, with all t-statistics above 15, confirming the robustness and validity of the indicators for measuring olfactory marketing practices. For Consumer Behavior (COB), all five items load between 0.790 and 0.829, with corresponding t-statistics above 11, further supporting strong construct validity.

Figure 4.1: PLS Algorithm (Item Loadings and t-statistics)



Note: t-statistics are in square brackets, [].

Source: Researcher's Construction from Smart PLS, 2025.

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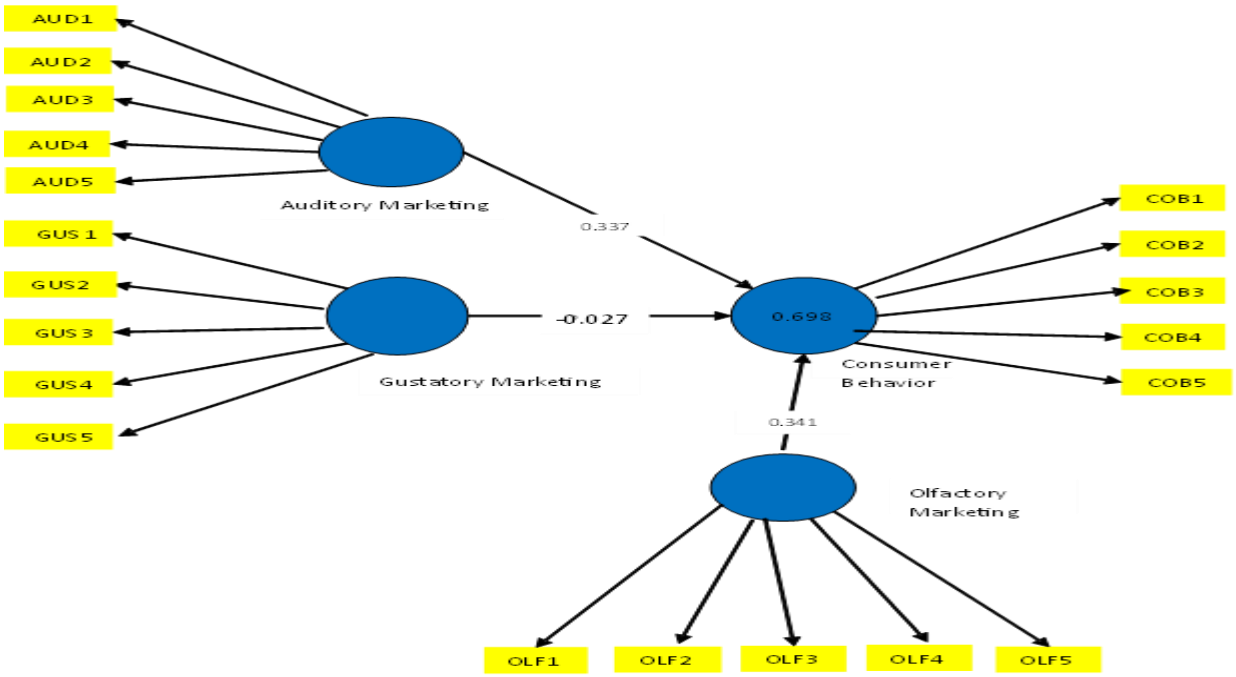
Figure 4.2: Structural Model (Path Coefficients and R^2)



Figures 4.1 and 4.2 illustrate that the independent variables—auditory marketing, gustatory marketing, and olfactory marketing—play a significant role in predicting consumer behavior in the fast-food industry in North Central Nigeria. It is important to highlight that each of these variables demonstrates statistical significance, as evidenced by the t-values and probability values obtained from the analysis. Additionally, a detailed assessment of these latent variables requires the use of component scores derived for each construct based on the measurement scales. To provide a solid foundation for hypothesis testing, it is essential to establish the relationships between the latent variables, with specific attention to the expected influence of the three sensory marketing dimensions on consumer behavior. A deeper exploration of these connections will offer valuable insights into how auditory, gustatory, and olfactory marketing collectively shape consumer behavior within the fast-food sector in North Central Nigeria.

Hypotheses Testing

Table 4.4: Path Coefficient of the Model for Hypotheses Testing

Hypothesis	Beta	t-value	p-value	Decision	f^2
H_{o1}: Auditory Marketing → Consumer Behavior	0.337*	6.731	0.000	Rejected Ho	0.422
H_{o2}: Gustatory Marketing → Consumer Behavior	-0.027	-1.751	0.115	Accepted Ho	0.012
H_{o3}: Olfactory Marketing → Consumer Behavior	0.341*	6.726	0.000	Rejected Ho	0.451

*Notes: *indicates significance at 5% significance level.*
Source: Smart-PLS Results

Hypothesis One

Ho_1: Auditory Marketing has no significant effect on consumer behavior in the fast-food industry in North Central Nigeria.

The results of the path coefficient analysis presented in Table 4.4 reveal that Auditory Marketing has a positive effect on consumer behavior in the fast-food industry in North Central Nigeria. This is

demonstrated by the coefficient value of 0.337, indicating that a 1% increase in auditory marketing practices, such as background music and sound cues, is associated with a 33.7% increase in positive consumer behavior, including purchase decisions and likelihood of return visits. Furthermore, the associated probability value of 0.000, which is less than the 5% significance level, confirms that the effect of auditory marketing on consumer behavior is statistically significant. The f-squared (f^2) statistic, which measures the effect size of the independent variable on the dependent variable, yields a value of 0.422 for auditory marketing. Based on Cohen's (1988) guidelines—where f^2 values of 0.02, 0.15, and 0.35 represent weak, moderate, and strong effects, respectively—this result reflects a strong effect size, suggesting that auditory marketing substantially contributes to explaining consumer behavior. Given these findings, the result of the t-statistic and probability value provides sufficient evidence to reject the first null hypothesis, which states that auditory marketing has no significant effect on consumer behavior in the fast-food industry in North Central Nigeria. Consequently, the study concludes that auditory marketing exerts a significant positive effect on consumer behavior in the study area.

Hypothesis Two

Ho_2: Gustatory Marketing has no significant effect on consumer behavior in the fast-food industry in North Central Nigeria

The results presented in Table 4.4 indicate that Gustatory Marketing exerts a negative effect on consumer behavior in the fast-food industry in North Central Nigeria, as evidenced by the path coefficient of -0.027. This suggests that a 1% increase in gustatory marketing activities, which relate to taste experiences and food flavor, is associated with a corresponding 2.7% decrease in consumer behavior outcomes, such as purchase intentions or brand loyalty. Although unexpected, this finding may be attributed to inconsistencies in taste experiences across outlets, which can lead to dissatisfaction and affect consumer decisions negatively. Further analysis shows that the associated probability value of 0.115, alongside a t-statistic of -1.751, exceeds the 5% significance threshold, indicating that the effect of gustatory marketing on consumer behavior is statistically insignificant at the 5% level. This implies that within the context of the study, variations in taste-related marketing efforts do not significantly influence consumer behavior. Additionally, the f-squared (f^2) value of 0.002 reflects a negligible effect size, based on Cohen's (1988) classification, where values below 0.02 indicate weak or trivial influence. Considering these findings, the study accepts the second null hypothesis, which states that gustatory marketing has no significant effect on consumer behavior in the fast-food industry in North Central Nigeria, while the alternative hypothesis is rejected. This outcome highlights the need for further investigation into the consistency and quality of taste experiences provided by fast-food operators in the region.

Hypothesis Three

Ho_3: Olfactory Marketing has no significant effect on consumer behavior in the fast-food industry in North Central Nigeria

The results of the path coefficient analysis presented in Table 4.4 reveal that, consistent with expectations, Olfactory Marketing has a positive effect on consumer behavior in the fast-food industry in North Central Nigeria, as indicated by the coefficient value of 0.341. This implies that a 1% increase in olfactory marketing practices, such as the strategic use of pleasant food aromas and scents, leads to a 34.1% increase in positive consumer behavior, including purchase decisions, satisfaction, and likelihood of repeat patronage. The strength of this effect is further highlighted by the f-squared (f^2) statistic value of 0.451, which, according to Cohen's (1988) classification, represents a large effect size, suggesting that olfactory marketing is a major predictor of consumer behavior in the fast-food sector. In addition, the corresponding t-statistic of 6.726 and probability value of 0.000, which is well below the 5% significance threshold, confirm that the effect of olfactory marketing on consumer behavior is statistically significant at the 5% level. Based on these findings, the study rejects the third null hypothesis, which states that olfactory marketing has no significant effect on consumer behavior in the fast-food industry in North Central Nigeria and accepts the alternative hypothesis. This outcome underscores the critical role of olfactory marketing in shaping consumer behavior within the region's fast-food establishments.

Table 4.5: R^2 of the Model

Dependent Variable	R^2
Consumer Behavior	0.698

Source: Researcher's Computation from Smart-PLS.

The result presented in Table 4.5 shows an R^2 value of 0.698, indicating that 69.8% of the variation in consumer behavior within the fast-food industry in North Central Nigeria can be explained by the combined influence of auditory marketing, gustatory marketing, and olfactory marketing. This suggests that sensory marketing practices included in the model have substantial explanatory power in predicting consumer behavior. The remaining 30.2% of the variation is attributed to other factors not captured within the model, as well as potential measurement errors or external influences affecting consumer behavior beyond the scope of the study.

Discussion of Findings

Auditory Marketing and consumer behavior in the fast-food industry in North Central Nigeria

The first objective of this study examined the effect of Auditory Marketing on Consumer Behavior in the fast-food industry in North Central Nigeria. The results in Table 4.4 revealed that auditory marketing has a positive and significant effect, with a path coefficient of 0.337, a t-statistic of 7.882, and a probability value of 0.000, below the 5% significance level. This suggests that sound-related marketing strategies—such as background music, jingles, and sound cues—meaningfully influence consumer decisions, satisfaction, and engagement within fast-food outlets in the study area. This finding aligns with Zha et al. (2024), who found that auditory marketing enhances sensory brand experience, contributing to customer satisfaction and brand attachment among Chinese consumers. Similarly, Martinez et al. (2024) demonstrated that personalized audio branding increased brand recall and purchase intention in South America, particularly in immersive retail settings. Although these studies differ in context, they support the conclusion that auditory marketing is an effective sensory tool for shaping consumer behavior. The present study provides industry-specific evidence within the fast-food sector in Nigeria, reinforcing the broader relevance of auditory marketing in influencing consumer responses across diverse environments.

Gustatory Marketing and consumer behavior in the fast-food industry in North Central Nigeria

The second objective of this study examined the effect of Gustatory Marketing on Consumer Behavior in the fast-food industry in North Central Nigeria. The results presented in Table 4.4 revealed a negative and statistically insignificant effect of gustatory marketing on consumer behavior, with a path coefficient of -0.027, a t-statistic of -1.751, and a probability value of 0.115, which exceeds the 5% significance level. This suggests that taste-related marketing efforts, such as food flavor and seasoning, did not significantly influence consumer behavior in the study area. This finding contrasts with Ogundele and Hassan (2023), who reported that taste-enhancing strategies significantly improved customer experience in upscale restaurants in Ilorin. Their study emphasized the role of high-quality ingredients and exclusive menu items in shaping positive dining experiences. Similarly, Obasi et al. (2022) found that taste and sensory appeal significantly boosted customer satisfaction in traditional Nigerian restaurants in Abuja. Both studies support the positive influence of gustatory marketing, though differences in context, such as the focus on upscale and traditional restaurants versus fast-food outlets, may explain the disparity. Additionally, the use of different analytical approaches (PLS-SEM in the present study) could contribute to varying outcomes.

Olfactory Marketing and consumer behavior in the fast-food industry in North Central Nigeria

The third objective of this study examined the effect of Olfactory Marketing on Consumer Behavior in the fast-food industry in North Central Nigeria. As presented in Table 4.4, the results show a positive and significant effect, with a path coefficient of 0.341, a t-statistic of 6.726, and a probability value of 0.000, which is below the 5% significance threshold. This indicates that pleasant ambient scents and food aromas significantly influence consumer behavior, including purchase decisions and likelihood of return visits within fast-food outlets. This finding aligns with Zhang and Liu (2023), who reported that ambient scents in Chinese luxury retail stores significantly increased both browsing time and purchase intentions. Their study emphasized the power of culturally relevant fragrances in shaping consumer behavior, similar

to how food-related scents influence dining experiences in this study. Likewise, Chatterjee and Bryła (2022), through an extensive literature review, established that fragrance marketing positively affects consumer attitudes, cognitive responses, and purchase intentions across retail settings.

CONCLUSION AND RECOMMENDATIONS

This study examined the effect of Sensory Marketing specifically, Auditory Marketing, Gustatory Marketing, and Olfactory Marketing on Consumer Behavior in the fast-food industry in North Central Nigeria. The results revealed that auditory marketing and olfactory marketing both exert significant positive effects on consumer behavior, highlighting the importance of sound and scent-related strategies in enhancing customer experiences and influencing purchase decisions. However, gustatory marketing was found to have a negative and statistically insignificant effect on consumer behavior, suggesting that taste-related marketing efforts in the fast-food sector may be inconsistent or insufficient to significantly influence consumer outcomes. The study concludes that Sensory Marketing has a significant effect on Consumer Behavior in the fast-food industry in North Central Nigeria. These findings are consistent with prior studies that emphasize the importance of sensory marketing in shaping consumer perceptions and behavior. The study contributes to existing knowledge by providing industry-specific evidence from the Nigerian fast-food context, reinforcing the relevance of sensory cues in influencing consumer behavior.

Based on the findings of this study, the following recommendations are provided:

i. Fast-food operators consistently implement sound strategies, including background music, audio branding, and jingles that appeal to the target market, to enhance the overall dining experience and influence purchase decisions.
ii. Fast-food outlets should improve the consistency and quality of taste-related marketing efforts, such as using unique recipes, quality ingredients, and standardized food preparation methods to ensure that consumers' taste expectations are consistently met.
iii. Fast-food businesses strategically leverage appealing food aromas and ambient scents, ensuring that pleasant, consistent fragrances are present within outlets to positively influence customer satisfaction and repeat patronage.

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S/N	Auditory Marketing (AUD)	SA	A	N	D	SD
AUD1	The background music is pleasant					
AUD2	The volume level of music is appropriate					
AUD3	The restaurant's ambient sounds are not disturbing					
AUD4	The music suits the restaurant's atmosphere					
AUD5	The overall acoustic environment enhances my dining experience					
	Gustatory Marketing (GUS)					
GUS1	The food tastes as good as it looks					
GUS2	The restaurant maintains consistent food taste					
GUS3	The flavors are well-balanced					
GUS4	The food temperature is appropriate					
GUS5	The taste meets my expectations					
	Olfactory Marketing (OLF)					
OLF1	The aroma of food is enticing					
OLF2	The restaurant has a pleasant ambient scent					
OLF3	The smell of food makes me hungry					
OLF4	There are no unpleasant odors in the restaurant					
OLF5	The food's aroma matches its taste					
	Consumer Behavior (COB)					
COB1	I often make unplanned purchases at this fast-food restaurant					
COB2	I spend more time in this fast-food restaurant than I initially planned					
COB3	I frequently revisit this fast-food restaurant					
COB4	I recommend this fast-food restaurant to others					
COB5	I choose this fast-food restaurant over others in the area					