

**MINISTRY OF EDUCATION AND TRAINING
NATIONAL ECONOMICS UNIVERSITY**

TRAN VIET AN

**THE IMPACT OF SENSORY EXPERIENCES
ON PERCEIVED SERVICE QUALITY
AND CUSTOMER SATISFACTION:
STUDY IN VIETNAM'S HEALTHCARE SYSTEM**

**PHD DISSERTATION
IN BUSINESS ADMINISTRATION**

HANOI - 2026

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Supervisor: DR. NGUYEN THU LAN

HANOI - 2026

DECLARATION

I have read and understood the University's policy on plagiarism. I hereby declare on my honor that this dissertation is my own work and does not violate the regulations on good academic practices.

Hanoi, 24th June, 2026

PhD candidate

Tran Viet An

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CHAPTER 1. INTRODUCTION

1.1. Rationale of the research

The Vietnamese healthcare system is undergoing a pivotal transformation, driven by the 2023 Law on Medical Examination and Treatment and the nation's ambitious goal in the new era of achieving a 90% patient satisfaction rate with public hospitals by 2030, following a previous 90% satisfaction rate with the healthcare system as a whole (Ministry of Health, 2024; Politburo, 2025). Party Resolution No. 72-NQ/TW marked a strong shift towards a patient-centered model and a focus on comprehensive quality care (Politburo, 2025). Although the healthcare network has made significant progress with over 1,665 hospitals nationwide (Ministry of Health, 2024), in reality, the healthcare landscape still faces profound paradoxes and competitive pressures.

In the public sector, severe overcrowding at central and provincial hospitals, which receive up to 60% of the country's patients and frequently operate at over 200% capacity, has led to the degradation of the physical environment (FiinGroup, 2024; International Trade Administration, 2026). This situation largely stems from the fact that patients tend to ignore primary care and go to higher levels due to their trust in expertise and facilities. It a big challenge for immediately expanding infrastructure scale, then patients often face noise pollution, lack of privacy, and stressful waiting areas (Ngo et al., 2023; Tran et al., 2025). Conversely, the private healthcare sector is rapidly emerging and accounts for approximately one-third of outpatient services, reshaping the market structure by providing hotel-like service experiences, emphasizing comfort and sensory amenities (López et al., 2021; Nguyen et al., 2023). This differentiation, coupled with the rising income of the middle class, has transformed Vietnamese patients into more sophisticated consumers of healthcare services. Their choices are no longer limited to the nearest healthcare facility; instead, they are willing to evaluate providers based on a multi-dimensional perspective, from facilities and staff interaction to the care environment (Duc Thanh et al., 2022; Nguyen et al., 2020; Sepehri et al., 2025). In this context, a managerial dilemma arises for hospital administrators, will investing in upgrading the servicescape, such as optimizing lighting, controlling noise, or creating pleasant scents, truly yield a return on investment (ROI) through increased patient satisfaction and loyalty, or are these merely superficial, wasteful expenses? (Berry et al., 2006; Han & Hyun, 2015).

To address this practical problem, viewing healthcare services from the perspective of service marketing theory is crucial. Traditionally, healthcare management

has been strongly influenced by the biomedical model, which assumes that patients are rational individuals seeking only clinical treatment (Grönroos, 1984; Dagger et al., 2007). However, healthcare is inherently a credence service with extremely high levels of stress and information asymmetry (Darby & Karni, 1973; Nelson, 1974). Patients often lack sufficient professional knowledge to independently assess the accuracy of a surgical procedure or treatment plan (Donabedian, 1988). According to signaling theory, under this information asymmetry, patients are forced to use tangible signals from the surrounding service environment as representative measures to infer the professional competence of doctors and safety during examination and treatment (Ugolini et al., 2014; Bove & Benoit, 2020).

This is a precise condition for sensory experiences to unleash their potential. To avoid conceptual confusion between the external strategies of businesses and customer perceptions, this study applies the framework of Wiedmann et al. (2018). Accordingly, sensory experience is not objective marketing activities, but subjective evaluative outcomes within the patients' mind when they receive visual, auditory, olfactory, gustatory, and tactile stimuli (Wiedmann et al., 2018). These stimuli strongly influence the subconscious, overcoming rational defenses to form perceptions of service quality (Krishna, 2012; Hultén et al., 2009).

This pervasive mechanism is explained through the S-O-R model (Stimulus - Organism - Response). The multisensory physical environment of the hospital (stimulus) does not directly create immediate satisfaction, instead, it acts as a prerequisite for patients to decode and form perceived service quality (PSQ) within their perception (organism). Only when this quality assessment exceeds the patients' initial expectations (based on the expectation-disconfirmation paradigm) is it transformed into the final emotional and behavioral response, customer satisfaction (Parasuraman et al., 1988; Lee et al., 2000). Ignoring the measurement of this psychological transformation mechanism makes it difficult to explain how beliefs and satisfaction are formed subconsciously in patients (Bitner, 1992; Berry & Bendapudi, 2007).

However, the psychological transformation mechanism from sensory stimulation (S) to qualitative perception (O) does not occur uniformly, but is governed by and can be strongly influenced and bent by socioeconomic conditions or factors. In Vietnam, the rapid rise of the middle class is fundamentally changing how patients evaluate patients; for example, the increase in financial capacity is driving a shift from prioritizing only curing the disease to demanding high-end, multi-sensory care experiences (Sepehri et al., 2025; Kim et al., 2020). Simultaneously, the coexistence of two healthcare models

(overcrowded public hospitals and hotel-standard private hospitals) creates completely opposing thresholds of acceptance: patients may accept the noise or overcrowding at public tertiary hospitals as an inevitable trade-off for access to good doctors, but are critical when using services at private hospitals (FiinGroup, 2024; Nguyen et al., 2023). This profound divergence in expectations and context raises the issue that the impact of these sensory experiences cannot be assessed purely in the same way, instead, they must be considered through the lens of demographic or socioeconomic variables to clearly see the differences among patient groups.

Although the link between sensory experience, perceived quality, and satisfaction has been widely demonstrated in numerous studies (Ulrich, 1984; Dijkstra et al., 2006; Rauf et al., 2024), the application of this model to the healthcare context in Vietnam still faces certain gaps:

Firstly, there is a lack of an empirically validated model that simultaneously structures all five senses in relation to the mediating mechanisms. Previous studies in Vietnam and worldwide have often adopted a fragmented approach (Yinger & Standley, 2011; Pradika et al., 2021). There has been lack of systematic study simultaneously evaluating all five dimensions (based on subjective structural scale by Wiedmann et al., 2018; combined with healthcare context by Ugolini et al., 2014) to demonstrate that perceived service quality is a crucial psychological interpretive mechanism connecting sensory experience and satisfaction.

Secondly, there is a gap in supporting conditions. In the context of the deeply differentiated Vietnamese healthcare system, differences in financial capacity and service delivery context create entirely different expected frames of reference. The current lack of empirical research on the moderating role of income level and hospital type (public/private) has left a large gap in the literature on service marketing (Kim et al., 2020; Abedi & Abedini, 2017). Without addressing this deficiency, current models cannot explain clearly why the same sensory stimulus, such as a clinical scent or sound level, can produce high satisfaction in one group of patients, but cause severe dissatisfaction in another. Therefore, elucidating the moderating effects of these two factors is not simply an extension of the model, but a vital necessity to accurately decipher patient experiences.

Third, there is a lack of control variables to ensure the robustness of the model. Without controlling for the influence of gender differences or other demographic factors, the true impact of the S-O-R mechanism risks being misjudged.

From the practical issues and research gaps mentioned above, such as the rise of the experience economy, the internal competitive pressures of the Vietnamese hospital system, and the urgent need to shift from a purely curative model to a holistic care model, it can be seen that sensory experience in healthcare services is not only a subjective matter for patients but also a crucial management issue for hospitals in the Vietnamese context. For public hospitals, especially provincial and central hospitals facing overcrowding, identifying sensory factors that impact perceived service quality can help managers determine feasible improvements in the service environment. For private hospitals, in a context where competition increasingly relies on experience and service differentiation. This study provides an empirical basis for policymakers and healthcare administrators to optimize investment budgets for infrastructure and servicescape that can enhance perceived service quality and patient satisfaction. Therefore, researching the impact of sensory experience on perceived service quality and patient satisfaction is necessary both theoretically and practically in terms of management. For these reasons, the author chose the thesis topic: *The impact of sensory experiences on perceived service quality and customer satisfaction: A study in Vietnam's healthcare system*.

1.2. Research objectives

Based on the research gap and the practical urgency identified above, this dissertation aims to achieve the following general and specific objectives:

1.2.1. General research objective

The overarching goal of this study is to measure the simultaneous impact of sensory experience factors on perceived service quality and customer satisfaction within Vietnam's healthcare system. Furthermore, the study examines the moderating effects of income and hospital type (public/private) on these relationships, also the controlling roles of gender, thereby providing a scientific basis for hospital managers to personalize service environments and enhance competitive advantage.

1.2.2. Specific research objectives

To achieve the general research objective, the dissertation focuses on the following specific objectives:

- To systematize the theoretical framework regarding the relationship between sensory marketing, sensory experiences, perceived service quality, and customer satisfaction in the healthcare context;

- To empirically evaluate the impact of five sensory experience factors (sight, sound, smell, touch, and taste) on perceived service quality and customer satisfaction through a large-scale survey of patients at healthcare facilities in Vietnam;
- To examine the mediating role of perceived service quality in the relationship between sensory experiences and customer satisfaction;
- To examine the moderating roles of income level and hospital type in the relationship between sensory experiences and perceived service quality, determining whether sensory sensitivity varies across different patient segments and facility types;
- To examine the control effects of gender on perceived service quality and customer satisfaction, thereby improving the robustness of the proposed research model.

1.3. Research questions

Consistent with the specific research objectives outlined above, this study seeks to answer the following key research questions:

- How can the theoretical framework explain the relationship between sensory marketing, sensory experiences, perceived service quality, and customer satisfaction be systematized in the healthcare context?
- How do the five sensory experience dimensions affect patients' perceived service quality and customer satisfaction in Vietnamese hospitals?
- Does perceived service quality mediate the relationship between sensory experiences and customer satisfaction?
- Do income level of patients and the hospital type (public/private) moderate the relationship between sensory experiences and perceived service quality?
- Does gender have control effects on patients' perceived service quality and customer satisfaction?

1.4. Subject and scope of the research

To ensure clarity, validity, and focus, the object and scope of this research are strictly delineated into specific research issues, subjects, and boundaries regarding space, time, and content.

1.4.1. Research issues

The primary research issue of this dissertation is the theoretical and empirical relationship between sensory experiences, perceived service quality, and customer

satisfaction. The study focuses on investigating the following constructs and mechanisms:

Sensory experience dimensions: the study examines the impact of five specific sensory factors within the hospital servicescape: sight (visual aesthetics, lighting), sound (noise levels, background music), smell (ambient scent, air quality), touch (temperature, comfort of furniture), and taste (food quality, beverages).

Causal mechanisms: the core issue is to determine the degree to which these sensory stimuli act as antecedents that influence patients' judgment of service quality (functional and technical quality) and subsequently drive their overall satisfaction.

Moderating effects: The research also investigates the moderating role of demographic and institutional characteristics, specifically income and hospital type (public/private) to understand how sensory sensitivity varies across different segments.

Control effects: incorporating gender as a demographic control variable to account for potential differences in patients' evaluations of perceived service quality and customer satisfaction, thereby improving the robustness of the proposed model.

1.4.2. Research subjects

The research subjects are patients who have directly utilized healthcare services. To ensure the validity of sensory perception data, the study applies strict inclusion and exclusion criteria:

Target group: the survey target group is patients who have directly used routine medical examination and treatment services at public hospitals, private hospitals, general hospitals or clinics, including periodic medical examinations, treatment of non-emergency conditions or chronic disease management.

Exclusion criteria: the study explicitly excludes patients in emergency situations and those suffering from terminal or life-threatening illnesses (e.g., late-stage cancer, critical trauma).

Justification: this selection criteria is crucial because patients with chronic or non-critical conditions possess the sufficient physical and psychological stability to observe and feel the service environment. In contrast, patients in emergency or critical states prioritize survival and technical efficacy, which significantly diminishes their cognitive capacity to process sensory stimuli (e.g., esthetics, scent, or acoustic comfort).

1.4.3. Spatial scope

This empirical study is conducted within the geographical territory of Vietnam. To ensure representativeness and capture the diverse nature of the healthcare system, the survey encompasses selected healthcare institutions including central-level public hospitals, provincial/city-level public hospitals, general hospitals, private hospitals, and clinics providing routine medical services (both public and private hospitals) representing major provinces and cities across the Northern, Central, and Southern regions (e.g., Hanoi, Da Nang, Ho Chi Minh City). These locations are chosen as they act as key medical hubs and where the dynamics of hospital competition and patient service demands are most evident.

1.4.4. Temporal scope

The research focuses on the contemporary context of the Vietnamese healthcare sector. The primary data collection was conducted during a specific cross-sectional timeframe from September 2025 to April 2026. This period reflects the current operational state of hospitals and patient behaviors following recent policy reforms.

1.4.5. Content scope

Theoretically, the dissertation is confined to the domains of services marketing and consumer behavior within the healthcare context. The content scope is specifically delimited to analyzing the structural relationships within the proposed model, which includes:

Sensory experiences: measuring patients' perceptions of the five external senses (sight, sound, smell, touch, and taste) within the hospital service setting.

Causal mechanisms: investigating the direct and indirect impacts of these sensory experiences on perceived service quality and subsequently on customer satisfaction.

Structural relationships: assessing the mediating role of perceived service quality and examining the moderating effects of specific demographic variables (income) and institutional variables (hospital type) on the relationships.

1.5. Research approach

The study focuses solely on the perspective of the patient (the service receiver) and does not evaluate the technical or clinical quality of medical treatments from a medical professional's perspective.

Distinguishing itself from traditional medical research that prioritizes clinical outcomes, this dissertation adopts a customer-centric service marketing approach, focusing specifically on functional quality rather than technical quality (Grönroos, 1984). The study posits that due to the high information asymmetry in healthcare, patients typically lack the expertise to evaluate medical precision (technical quality) and thus rely heavily on the service environment and staff behavior to infer quality (Donabedian, 1988).

Therefore, this research approaches the hospital not merely as a clinical facility, but as a servicescape, a holistic sensory environment where the service is produced and consumed simultaneously (Bitner, 1992). Within this framework, the study defines perceived service quality at healthcare providers as the patient's subjective, multi-sensory evaluation of the tangible evidence (physical facilities, ambient conditions) and the intangible interaction (staff attitude, empathy) encountered during the care delivery process (Parasuraman et al., 1988; Brady & Cronin, 2001).

By adopting this perspective, the dissertation shifts the evaluative criteria from curing to caring. It investigates how sensory stimuli, such as visual aesthetics, acoustic comfort, and olfactory cues, combined with the compassionate attitude of medical staff, shape the patient's psychological perception of quality, distinct from the biological outcome of the treatment.

1.6. Research methods

1.6.1. Research process and design

To rigorously investigate the complex, multidimensional relationships between sensory experiences, perceived service quality, and customer satisfaction, this dissertation employs a mixed-method research design. The research process is systematically structured into six sequential steps: (1) Theoretical overview and gap identification; (2) Preliminary quantitative research to refine measurement scales; (3) Formal quantitative research via large-scale surveys; (4) Data processing using SPSS and AMOS; (5) Follow-up qualitative research (focus group interviews) to decode the statistical findings; and finally, (6) Discussion and recommendation.

This sequential explanatory approach ensures that the empirical findings are not only statistically significant but also practically meaningful within the culturally specific context of Vietnam's healthcare system.

1.6.2. Scale development and preliminary testing

Because sensory experience is a highly subjective internal response, capturing it requires a robust measurement instrument. This study deliberately adapted formative measurement scales from Wiedmann et al. (2018), which originally assessed the servicescape from a customer's perspective in luxury environments. To contextualize these scales for the healthcare sector, the study integrated insights from the 5-senses ward model proposed by Ugolini et al. (2014) and theoretical foundations from Hultén et al. (2009), Krishna (2012), Jang & Lee (2019), and Kim et al. (2020). All constructs were measured using a 5-point Likert scale, ranging from 1 (Strongly disagree) to 5 (Strongly agree).

To ensure the comprehensibility and psychometric validity of the instrument in the Vietnamese context, a preliminary quantitative study was conducted with 165 observations. The internal consistency of the initial items was evaluated using Cronbach's Alpha and item-total correlations, retaining items that met the standard thresholds (Nunnally & Bernstein, 1994; Trong & Ngoc, 2008). Subsequently, Exploratory Factor Analysis (EFA) using Principal Axis Factoring with Promax rotation was employed to extract factors and eliminate items with cross-loading issues or factor loadings below 0.50 (Hair et al., 2014). Following this iterative refinement process, a robust set of 40 measurement items was retained for the formal survey, ensuring strong preliminary reliability and construct validity.

1.6.3. Formal quantitative research and sample characteristics

For the formal data collection, the study utilized a convenience sampling method, strategically combined with a hybrid online and offline distribution approach to minimize sampling bias. Online questionnaires were disseminated via social networks to reach a broad demographic, while offline paper questionnaires were directly administered to patients at public and private hospitals. This direct approach successfully engaged older adults and higher-income individuals who are less accessible online. The survey was conducted over two months (September to October 2025) across 31 out of 34 provincial-level administrative units in Vietnam, ensuring nationwide representativeness.

Following a rigorous data screening process, a total of 1,313 valid observations were retained. The demographic profile of the sample accurately reflects the contemporary landscape of healthcare service utilization in Vietnam. Specifically, the sample is relatively youthful and working-age dominated, with the largest segments

being 18-25 years old (37.2%) and 41-55 years old (27.9%). The gender distribution leans toward female respondents (60.8%), aligning with the cultural reality that women in Vietnam typically manage healthcare decisions for their families.

Economically, the sample is heavily concentrated in the low-to-middle income brackets, with 32.8% earning under 5 million VND/month and 25% earning between 8 and 15 million VND/month. This income structure is logically consistent with the occupational distribution, which includes a high proportion of students (34.5%) and self-employed individuals (15.6%). Finally, the majority of respondents reside in urban areas (65.7%). This urban concentration is particularly relevant to the research objectives, as urban centers feature a highly competitive healthcare market where patients are increasingly demanding hotel-like sensory environments, forcing both public and private hospitals to differentiate themselves beyond clinical outcomes.

1.6.4. Follow-up qualitative research

A major methodological strength of this dissertation is the incorporation of a sequential explanatory qualitative phase, conducted immediately after the Structural Equation Modeling (SEM) analysis. While SEM effectively confirming the structural relationships, the qualitative phase was designed to answer reason.

Specifically, face-to-face focus group interviews were conducted with 28 patients directly at the healthcare facilities. To capture the moderating effects hypothesized in the model, the participants were purposively divided into a matrix of four distinct groups (7 respondents each): (1) Low-income patients at public hospitals; (2) High-income patients at public hospitals; (3) Low-income patients at private hospitals; and (4) High-income patients at private hospitals.

The primary objectives of this qualitative phase were threefold.

First, to decode the statistical anomaly of why olfactory experience failed to show a significant impact on perceived service quality in the SEM results.

Second, to explore how different income groups and genders construct their expectations and interpret sensory signals (e.g., why noise is tolerated in public hospitals but heavily penalized in private ones).

Third, to validate the underlying psychological mechanisms that convert external physical stimuli into cognitive service evaluations and ultimate emotional satisfaction. This mixed-method triangulation ensures that the study's conclusions are deeply rooted in the lived realities of Vietnamese patients.

1.7. Significance of the study

1.7.1. Theoretical contributions

This thesis aims to contribute to the theory of service marketing, sensory experience, as well as perceived service quality and customer satisfaction in the context of healthcare services, in the following aspects:

Firstly, expanding the theory of sensory experience in healthcare services in Vietnam, alongside previous studies on sensory marketing and sensory experience in fields such as hotels, tourism, food and beverage, and retail, because the role of sensory experience in healthcare services has not yet been systematically examined. The thesis clarifies how patients use sensory signals from the physical environment, as well as the process of service interaction, to form service quality, through approaching the hospital as a multi-sensory servicescape. In this field, patients are in a state of information asymmetry and find it difficult to directly assess the professional and technical quality of healthcare services. Therefore, sensory experience can serve as a tangible signal, helping patients infer the overall quality of service.

Secondly, developing and test a research framework that integrates all five sensory experiences (sight, hearing, smell, taste, and touch) as precursors to perceived service quality, rather than just one or two individual senses in a hospital context. Specifically, the research contributes to clarifying the role of each sense in this context.

Thirdly, the thesis clarifies the mechanism linking sensory experience and customer satisfaction through perceived service quality as a mediating variable. Based on the S-O-R theoretical framework, sensory experience is considered the stimulus, perceived service quality is the patient's internal evaluation state, and the main output response is satisfaction. This mechanism allows for the explanation of sensory signals that not only influence emotions but also transform into assessments of service quality before forming customer satisfaction. Thus, the thesis can contribute to expanding the aforementioned theoretical relationship in healthcare services.

Fourth, the thesis expands the research model by developing influences through moderating and control variables. Income and hospital type are included as moderating variables to clarify the differences between patient groups, as well as in different healthcare contexts, in the relationship from sensory experience to perceived service quality. This approach allows for the assessment of patients' sensitivity to sensory signals when socioeconomic characteristics change. In addition, gender is used as control variables to identify underlying demographic and organizational differences in

patients' evaluations of perceived service quality and satisfaction. The control variables do not serve as the primary mechanism, but rather help to increase the robustness of the research model's results.

In summary, this thesis contribute to the refinement of the application of sensory experience theory in healthcare service research, clarify the mediating role of perceived service quality, and propose a more contextually relevant model to explain customer satisfaction in the Vietnamese hospital system.

1.7.2. Practical implications

In practice, this thesis offers scientific implications for hospital managers, service administrators and policymakers in improving patient service experience, perceived service quality, and satisfaction. Simultaneously, by determining the relative impact of each sensory experience, the study can help hospitals identify priority factors when designing, renovating, and upgrading their service environment effectively and avoid spreading resources too thinly.

Furthermore, by examining the moderating role of income and hospital type, the thesis provides a more practical basis for hospitals to adjust their experience design strategies to suit different patient groups and service delivery contexts. Patients from different income groups may have different expectations, therefore, hospitals should not apply a uniform approach to all patient groups. Gender is included as control variable, allowing managers to better interpret how patients evaluate services.

Overall, the thesis can provide a practical foundation for developing patient-centered healthcare service management strategies based on sensory experience and the hospital context in Vietnam.

1.8. Structure of the dissertation

Excluding the Acknowledgement, Declaration, Abbreviation, Abstract, Conclusion, Appendix, and References, the main body of this dissertation is structured into *five chapters* as follows:

Chapter 1: Introduction. This chapter presents the context and rationale for the study's inception, reflecting an increasing emphasis on patient experience, service quality, and customer satisfaction in the Vietnamese healthcare system. Grounded in the service marketing framework, the chapter defines the research problems, objectives, and scope. It also outlines the research approach and highlights the scientific and practical significance of the study.

Chapter 2: Theoretical background and literature review. This chapter synthesizes the theoretical foundations of sensory experiences, perceived service quality, customer satisfaction. It proceeds to define key concepts and critically reviews previous studies to establish the relationships between sensory experiences, perceived service quality, and customer satisfaction. The chapter concludes by identifying research gaps and proposing the conceptual framework and hypotheses for this dissertation.

Chapter 3: Research methodology. This chapter delineates the research design adopted to test the proposed model. It systematically details the research paradigm, data sources, sampling procedures (sample characteristics, income, hospital type), and data collection instruments (likert scale). Furthermore, it justifies the data analysis techniques and the criteria for assessing reliability and validity in quantitative research. This chapter also presents additional qualitative research through focus group interviews to further clarify and explain the quantitative results.

Chapter 4: Research results. This chapter presents the empirical findings derived from structural equation modeling (SEM). It reports the assessment of the measurement model through construct reliability and validity testing (CFA). Subsequently, the structural model is analyzed to verify the impact of sensory experiences on perceived service quality and customer satisfaction. Crucially, the chapter examines the moderating roles of income and hospital type to investigate variations in these relationships, also the controlling roles of gender. This chapter also presents the results of in-depth interviews to supplement and further explain the quantitative findings.

Chapter 5: Discussion and Recommendation. This chapter discusses the empirical findings in relation to the existing literature. It emphasizes the theoretical contributions to service marketing, sensory marketing and offers practical implications for healthcare managers and policymakers to enhance service quality in Vietnam. Finally, the chapter acknowledges the limitations of the research and suggests directions for future studies.

CHAPTER 2.

THEORETICAL BACKGROUND AND LITERATURE REVIEW

2.1. Sensory marketing, sensory experiences and their impact on consumers

2.1.1. Sensory marketing

To better understand sensory experiences, it's first necessary to understand the emergence and development of sensory marketing. The evolution of marketing models, from mass marketing (marketing 1.0) to relationship marketing (marketing 2.0), laid the foundation for researching the irrational factors influencing human behavior and the formation of marketing 3.0, which is sensory marketing (Hultén et al., 2009). Unlike traditional marketing, which is based on goods logic or services logic, sensory marketing is based on experience logic, where the brand is perceived through an individual's subjective interpretation of their senses.

Table 2.1. Changes in the marketing approach from Hultén's perspective

Criteria	Mass marketing	Relationship marketing	Sensory marketing
Core logic	Goods logic	Service logic	Experience logic
Perspective	Exchange	Relationship	Brand
Strategic goal	Customer acquisition	Customer retention	Customer treatment
Focus	Product-focused	Customer-focused	Sensory-focused
Communication method	One-way communication	Two-way communication	Multidimensional communication
Technology platform	Manufacturing technology	Information technology	Digital technology

Source: Hultén et al. (2009)

The core components of sensory marketing include the five traditional senses. Through the intentional management of servicescape (such as spatial design, surrounding environmental conditions...), sensory marketing is not merely a supporting tool, but a philosophy that places human senses at the heart of all marketing activities. According to

Wiedmann et al. (2018), to differentiate themselves and surpass competitors in the service sector, managers need to shift from conventional sales to providing unique and memorable experiences for customers. This is the key to making sensory marketing central, with the new logic being experiential logic. Sensory stimuli (sight, hearing, touch, smell, and taste) help customers visualize service quality and become an effective experiential mechanism for businesses to concretize and deliver value to customers.

Sensory marketing was first defined by Schmitt (1999) that it is a marketing strategy that stimulates consumers' emotions by engaging the five original human senses including sight, smell, sound, taste and touch instead of judging their reason. In the meanwhile, Lindstrom (2005) uses the idea of holistic selling proposition (HSP) to explain sensory marketing. He believes that sensory marketing is the use of all five senses to get over the constraints of traditional visual and auditory channels, contact customers by using all five senses, and create a brand with "soul" that makes people loyal like religious faith. The main goal of sensory marketing is to produce full and complete sensory experiences that will get people emotionally involved and give the company an advantage over its competitors (Lindstrom, 2005).

Lindstrom (2005) defined the concept of brand sense within the historical framework of brand development, linking it with a changing process: USP, ESP, OSP, MSP. The stages of brand development begin with the unique selling proposition (USP) that no two products are the same. Next is the emotional selling proposition (ESP), which states that products are perceived as different primarily due to emotional connection. Then there's the organizational selling proposition (OSP) and the brand selling proposition (BSP). Most recently, it's the me selling proposition (MSP), where consumers begin to own the brand. The theory of sensory marketing is integrated into the holistic selling proposition (HSP), which is considered the future of branding. A holistic selling proposition refers to brands that not only remain rooted in tradition but also leverage the concept of sensory branding as a comprehensive approach to convey their message, surpassing the MSP model. In this way, the theory of sensory marketing and sensory experiences identifies the antecedent models (USP, ESP, MSP) as the foundation upon which it needs to integrate and enrich itself.

Subsequently, Hultén et al. (2009) approached it from a strategic management perspective, viewing sensory marketing as a strategy to optimize customer experience, create added value, and establish lasting emotional connections between the brand and individuals. Sensory marketing represents a shift from customer acquisition to customer treatment. Based on the theoretical framework of Hultén et al. (2009), sensory marketing is structured through three main interacting components:

- *Sensors*: These are physical entities or technical devices used to transmit stimuli (e.g., air fresheners, sound systems, digital displays) or to receive signals from customer shopping behavior;

- *Sensations*: These are the biochemical and neural reactions that occur when stimuli act upon human sensory organs. Five types of sensations corresponding to the five senses include: *visual*, *auditory*, *olfactory*, *gustatory* and *tactile*;

- *Sensory expressions*: These are specific elements that businesses actively design to clarify their brand identity (e.g., visual examples: design, packaging, style, lighting, color...).

Meanwhile, from a cognitive psychology perspective, Krishna (2012) defines sensory marketing as marketing activities that impact consumers' senses and influence their perceptions, judgments, and behaviors. She emphasized that sensory marketing creates subconscious triggers, helping to shape abstract concepts like quality or sophistication without relying on direct statements from companies or organizations. Sensory marketing is later considered a strategy to attract the combination of different senses of the customer instead of focusing on each individual element (Ghosh & Sarkar, 2015). Meanwhile, Biswas et al. (2021) emphasize the sequential (rather than simultaneous) influence on the senses.

Based on the above approaches, sensory marketing can be understood as an experience-driven strategy wherein businesses deliberately design and manage stimuli that engage the five human senses (sight, hearing, smell, taste, and touch) to elicit favorable emotional, cognitive, and behavioral responses toward the brand. Rather than convincing clients solely via rational arguments or practical details, sensory marketing engages sensory-cognitive processes, primarily subconscious, to influence perceptions of brand quality, value, and essence. Sensory marketing is not only a supplementary communication tool; it is a holistic philosophical approach that incorporates sensory components into brand development and customer experience management tactics. This enables enterprises to establish sustained distinctiveness, enhance emotional involvement, and secure enduring competitive advantages.

From the analysis of the theoretical system of sensory marketing, there is a clear but closely complementary boundary between sensory marketing and sensory experiences. To better understand how customers react and form these subjective perceptions, there is a need to consider the nature and definition of sensory experiences in the following section.

2.1.2. Sensory experiences

To avoid conceptual overlap and ensure measurement validity, this dissertation rigorously distinguishes between three conceptual layers: sensory marketing, sensory stimuli/cues, and sensory experiences. First, sensory marketing is fundamentally a managerial strategy, a collection of methods and tactics that businesses employ to deliberately design the service environment. Second, this strategy produces sensory stimuli (or sensory cues), which are the objective, physical environmental signals (e.g., ambient scent, lighting, background music, spatial layout) transmitted to the customers. Finally, sensory experiences are the internal subjective evaluative outcomes. They are the cognitive, emotional, and psychological responses that occur when patients process these stimuli through their unique experiential logic (Hultén et al., 2009; Krishna, 2012).

In other words, sensory marketing produces sensory stimuli, these stimuli trigger sensation and perception, and sensory experiences are the ultimate subjective evaluative outcomes.

In this context, a brand is no longer just a logo or a name but becomes a brand soul that is felt through the heart and mind. A successful sensory experience is when it reaches the level of a supreme sensory experience, where all senses interact synchronously to create deep empathy and satisfaction for the customer. Sensory experiences are a direct result of sensory marketing strategies. Everyone will have their own unique experience logic, a subjective interpretation process of the brain regarding external stimuli through the interaction of the senses. While Parasuraman et al. (1985), Cronin (1994), and Asubonteng et al. (1996) considered sensory factors as the tangible part of service quality, modern authors (Lindstrom, 2005; Hultén, 2009; Krishna, 2012) view sensory marketing as intangible, an active strategy to capture customers' minds and hearts through supreme sensory experiences.

Sensory experiences have been conceptualized from multiple complementary theoretical perspectives. From the experiential logic perspective, Hultén et al. (2009) define sensory experiences as individuals' reactions arising when brands engage consumers during the purchase or consumption through the stimulation of the five senses. Such experiences are inherently personal and subjective, as everyone possesses a unique experiential logic that governs how sensory stimuli are interpreted. The aim is to create a supreme sensory experience, in which the concurrent activation of all five senses generates a holistic impression capable of deeply influencing consumers' emotions and perceptions. Extending this view, Lindstrom (2005) conceptualizes

sensory experience as an outcome that enables brands to transcend the traditional two-dimensional communication model based on sight and sound, advancing toward a five-dimensional experience involving all five senses. Central to this approach is the notion of sensory synergy, whereby the activation of one sense triggers others, producing memories and emotions that exceed the sum of individual sensory effects. In this sense, sensory experience forms the foundation of the holistic selling proposition (HSP), through which brands are perceived as living entities with distinctive rituals and traditions, fostering deep emotional bonds and irrational loyalty among consumers.

From a behavioral psychology perspective, Krishna (2012) explains sensory experience through the sequence of sensation and perception. Sensation refers to the physiological responses of sensory receptors to stimuli, whereas perception denotes the cognitive interpretation and conscious awareness of sensory information. Sensory experiences are thus largely shaped by subconscious cues, allowing consumers to construct brand attributes and meanings independently, rather than relying solely on explicitly communicated rational information.

In the service context, particularly in healthcare, Ugolini et al. (2014) emphasize that sensory experiences function as a key interpretive mechanism through which patients rely on their five senses to decode physical and psychological cues from the service environment. This process becomes especially critical when professional knowledge is limited, serving as an essential basis for evaluating perceived service quality. Finally, from the perspective of design and intentionality, Velasco & Obrist (2020) conceptualize sensory experiences as impressions derived from specific events in which sensory elements are deliberately designed and crafted. This approach highlights the notion of crafted experience, suggesting that sensory experiences are not spontaneous occurrences but outcomes of systematic design processes. For instance, the experience of a sunflower is not merely visual perception, but a carefully designed synthesis of color, form, texture, and scent that can evoke a vivid impression even in the absence of the physical object.

While various scholars have conceptualized sensory experiences from branding, cognitive, and design perspectives, this study relies heavily on the theoretical framework of Haase & Wiedmann (2018) and Wiedmann et al. (2018) to operationalize the construct. Wiedmann et al. (2018) emphasize that sensory experience must be measured as a subjective, internal state rather than the objective presence of physical stimuli. Consequently, in this dissertation, sensory experience is officially defined as patients' subjective sensory, cognitive, and emotional responses to visual, auditory, olfactory,

gustatory, and tactile cues deliberately designed within the hospital servicescape . This conceptualization ensures that the research model evaluates the patients’ internal interpretations of the hospital environment rather than merely auditing the hospital’s marketing activities.

Table 2.2. Comparing perspectives on sensory experiences

Authors	Core approach	View on sensory experiences	Distinctive contribution
Lindstrom (2005)	Brand strategy & sensory branding	Sensory experiences are multi-sensory outcomes that engage all five senses to move branding from 2-D to 5-D communication.	Introduces sensory synergy and frames sensory experience as the basis of the holistic selling proposition (HSP) and irrational loyalty.
Hultén et al. (2009)	Experiential logic & relationship marketing	Sensory experiences are subjective reactions to sensory stimuli shaped by individuals’ experiential logic.	Emphasizes personalization, subjectivity, and the pursuit of a supreme sensory experience.
Krishna (2012)	Behavioral & cognitive psychology	Sensory experiences arise through the sensation to perception, driven largely by subconscious cues.	Clarifies the psychological mechanism underlying sensory influence on judgments and meanings.
Ugolini et al. (2014)	Service marketing (healthcare context)	Sensory experiences function as cues through which patients interpret service quality under information asymmetry.	Highlights the evaluative role of sensory cues in perceived service quality.
Velasco & Obrist (2020)	Design & intentionality	Sensory experiences are impressions intentionally designed and crafted through systematic sensory events.	Introduces the concept of crafted experience, emphasizing intentional sensory design.

Source: Compiled from the author’s research results (2026)

From a strategic standpoint, sensory experiences are holistic and multi-sensory in nature, arising from the interaction and resonance among the senses, which together generate overall impressions, enduring memories, and deep emotional connections with

brands or services. Consequently, examining the distinct role and mechanism of each sensory dimension is essential to understanding how sensory experiences contribute to customers' perceptions of quality, value, and overall experience.

To systematically measure the aforementioned subjective responses, this thesis applies the sensory experience structural framework proposed by Wiedmann et al. (2018) for luxury hotels. However, this framework is suitable for the thesis because it focuses on the subjective evaluation results of consumers rather than the physical technical parameters of the environment. Nevertheless, hospitals differ fundamentally from luxury hotels, they are high-credence and high-pressure environments where patients seek safety and care rather than simply pleasure (Berry & Bendapudi, 2007). To approach this appropriately, the author has adapted the framework by integrating the specific healthcare industry perspective provided by Ugolini et al. (2014). This ensures that the conceptual structure of sensory experience is both theoretically sound and relevant to the practical environment of Vietnamese healthcare.

Factors in sensory experiences

Visual experience refers to customers' subjective impressions formed through visual stimuli such as spatial appearance, design, lighting, color, and visual attractiveness (Wiedmann et al., 2018). It is also the dominant and most influential factor, in which individuals receive, internal response to optical stimuli such as light, color, shape, and size in order to construct their reality of the surrounding environment (Krishna, 2012). The nature of this experience goes beyond the physical act of seeing but rather involves comparing current visual signals with prior accumulated memories and experiences, thereby forming judgments about esthetics, quality, and reliability. By capturing attention and setting the stage, Visual experience helps individuals navigate space, reduce feelings of uncertainty, and create meaningful first impressions for brands, products, or service environments (Hultén et al., 2009).

Auditory experience is the affective and cognitive response evoked by the soundscape, in which an individual transforms from a passive state of hearing to active listening thereby decoding sound signals into meaning, emotions, and psychological states and including pleasant sounds, noise control, music, and voice-related cues (Wiedmann et al., 2018). The nature of this experience is closely tied to the mechanisms of emotional regulation and the perception of time, as sound (including music, voices, and environmental noise) can trigger psychological states such as relaxation, excitement, or anxiety without conscious logical analysis (Lindstrom, 2005; Hultén et al., 2009). Thanks to this, the auditory experience serves as a mood navigator, helping

to connect disparate experiences into a seamless flow of experiences in the customer's mind (Hultén et al., 2009; Krishna, 2012). Auditory experience concerns customers' subjective responses to the soundscape of the service environment, including pleasant sounds, noise control, music, and voice-related cues.

Olfactory experience is a direct and primal evaluative outcome resulting from exposed to airborne odor molecules, triggering the limbic system (the center for processing emotions and memories) almost instantly, and largely bypassing conscious rational control. The nature of this experience is particularly evocative, often described through the Proust effect, where a specific scent can instantly bring back autobiographical memories and deep emotions from the past. (Lindstrom, 2005; Hultén et al., 2009). As a memory retrieval cue and an atmosphere-building element, olfactory experience directly impacts subjective perceptions of safety, comfort, and the quality of the service environment (Hultén et al., 2009; Krishna, 2012). Olfactory experience captures customers' subjective evaluation of ambient scent, fragrance, aroma, and odor pleasantness in the service environment (Wiedmann et al., 2018).

Gustatory experience is the subjective, internal evaluation formed by the synergy of basic tastes (sweet, sour, salty, bitter, umami), olfaction (retronasal aroma), touch (texture and mouthfeel), and even visual cues (Krishna, 2012; Velasco & Obrist, 2020). The nature of this experience is highly pleasurable and social, as taste rarely functions independently but always resonates with other senses to create a complete perception of flavor (Hultén et al., 2009; Velasco & Obrist, 2020). In the context of marketing, gustatory experience represents a deep level of immersion, where abstract brand values are transformed into specific physical sensations within the body, thereby reinforcing memories, emotions, and brand engagement (Hultén et al., 2009). From the view of Wiedmann et al. (2018), gustatory experience reflects customers' sensory evaluation of taste-related elements, particularly food, beverages, and flavor-related service cues.

Tactile experience refers to customers' bodily and touch-based evaluation of material comfort, surface texture, temperature, softness, and physical contact within the service environment (Lindstrom, 2005; Hultén et al., 2009; Wiedmann et al., 2018). The nature of this experience is serving as a truth-checking mechanism, because unlike distant senses like sight or hearing, touch requires direct contact to confirm the quality and authenticity of the object. Through this, touch not only reinforces the perception of reliability but also triggers a sense of psychological ownership, fostering intimate connection and a feeling of safety between the individual and the experienced environment (Hultén et al., 2009; Krishna, 2012).

Table 2.3. Comparing perspectives on sensory experiences

Senses	Sense expression	Role in sensory experiences
Visual (sight)	Design, color, light, interior/exterior	The most dominant sense. Helping customers recognize the tangible signals of the service. It's necessary to create a difference by esthetic elements.
Auditory (sound)	Music, voice, jingle, acoustics	Directly affects mood and emotions. Music can be used to control perceived waiting time or create a relaxing/professional atmosphere.
Olfactory (smell)	Signature scent, intensity, product congruency	The strong sense is directly related to memory and emotion. It can be used to create a unique difference (e.g., eliminate "hospital smell") and enhance relaxation.
Gustatory (taste)	Interplay, setting, knowledge	Although it may not be directly related to the core service (e.g., in healthcare), it can be integrated through the drinks/food served (e.g., waiting areas) to create comfort and a sense of place.
Tactile (touch)	Material, surface, temperature, weight	Three-dimensional perception, creating a sense of quality and comfort. Important in assessing comfort (e.g., seating, hospital beds) and physical interaction (e.g., how staff touch patients).

Source: Compiled from the author's research results (2026)

Drawing on the theoretical synthesis of Lindstrom (2005), Hultén et al. (2009), Krishna (2012), Wiedmann et al. (2018), Velasco & Obrist (2020), the five human senses are reconceptualized not merely as channels of physiological input, but as active perceptual modalities through which customers construct experiential reality. Visual experience plays a dominant role in establishing spatial context and capturing initial attention through aesthetic and design cues. Auditory experience extends beyond passive hearing to regulate mood and shape temporal perception. Olfactory experience functions as the most primal sensory channel, directly linked to the limbic system and capable of evoking autobiographical memories and emotions without conscious cognitive filtering. Tactile experience provides a critical mechanism of physical

verification that fosters trust and psychological ownership, while gustatory experience represents the highest form of multisensory integration, characterized by symbolic and hedonic intensity.

Collectively, these sensory modalities function as distinct peripheral cues, providing perceptual inputs that customers process to form overall attitudinal evaluations of perceived service quality, particularly in service environments characterized by high information asymmetry. As indicated by the theoretical synthesis above, sensory experiences extend beyond simple sensory reactions or momentary perceptions; rather, they operate as a perceptual filter through which customers interpret, position, and evaluate a service brand. With the increasing shift toward experience-oriented logic, sensory experiences emerge as critical antecedents in the formation of abstract value judgments. This role becomes especially salient within the customer's psychological process, which progresses from the reception of sensory stimuli, to evaluative judgments of perceived service quality, and customer satisfaction.

2.2. Perceived service quality and customer satisfaction

2.2.1. Perceived service quality and the relationship between sensory experiences and perceived service quality

2.2.1.1. Perceived service quality

Perceived service quality (PSQ) is a more abstract, difficult-to-define, and measure concept compared to the quality of tangible goods due to the inherent characteristics of services such as intangibility, heterogeneity, inseparability, and perishability (Parasuraman et al., 1985). In research literature, perceived service quality is not viewed as an objective entity but rather as an attitude or overall evaluation related to the superiority of a service (Asubonteng et al., 1996). The core of perceived service quality lies in individual interpretation based on stimuli, where the cognitive process organizes and interprets input information to create meaningful perceptions based on prior experiences, attitudes, and expectations. Because of this, different customers can have different ideas about how good the same level of service is (Gür, 2019). There are many approaches to perceived service quality, some common ones include: the American school (the Gaps model), the Nordic school, and Evaluation properties.

Parasuraman, Zeithaml & Berry (PZB) came up with the most popular method, the American school (the Gaps model), which is based on the expectation-disconfirmation paradigm theory (Parasuraman et al., 1985). According to this perspective, the perception of service quality is the result of a comparison between

expected service (ES), which is the customer's expectation of what the company should provide, and perceived service (PS), which is the perception of the actual results they receive (Parasuraman et al., 1985; Asubonteng et al., 1996). Gaps are the differences between what people expect and how they think things turned out. People think service quality is good when they think it went above and beyond what they expected, and they think it was below what they expected. PZB says that people judge quality using the same standards, no matter what kind of service they are getting. The PZB model (1985) found 10 dimensions. These were later improved into the SERVQUAL model from 1988, which only had 5 dimensions (RATER).

- Reliability: Being able to perform the service that you say you'll do;
- Assurance: Honesty and knowledge, which builds trust;
- Tangibles: The appearance of physical facilities, equipment, and personnel;
- Empathy: Personalized care for each customer;
- Responsiveness: Being ready to help customer right away;

PZB asserts that the SERVQUAL model (P-E) measures both expectation and perception, providing high diagnostic power and helping managers accurately identify areas for improvement (Asubonteng et al., 1996; Jain et al., 2004). However, the problem with SERVQUAL is that the questionnaire is too long and the measurement of expectations is unstable (Mauri et al., 2013).

Another perspective, as illustrated by Cronin & Taylor (1994) and Asubonteng et al. (1996), assessed using SERVPERF (P-only), contending that perceived service quality should be measured exclusively on perceptions of performance, disregarding expectations, since service quality fundamentally represents an attitude and feeling regarding performance, already including expectations. (Jain et al., 2004; Chaudhary & Dey, 2021). The authors argue that perceived performance is a better predictor of service quality than the discrepancy between performance and expectation. This approach is considered methodologically more streamlined and avoids reliability issues when used and has predictive validity.

In contrast to the focus on the properties of PZB, Grönroos (1989) proposed the Nordic school approach, which clearly distinguishes between what and how, includes technical quality and functional quality:

- Technical quality: examines at the real results consumers get from utilizing the service, such the outcomes of clinical treatment in healthcare;

- Functional quality: Focuses on the service delivery process, which is how clients get the technical result (the doctor's attitude or how clean the hospital is). This method implies that customers frequently don't have the technical knowledge to judge technical quality, therefore they depend more on functional quality to decide how good a service is overall.

Meanwhile, Nelson (1974) and Darby & Karni (1973)'s theoretical framework may be used to explain perceived service quality by looking at how well consumers can judge before and after they utilize a service:

- Search properties: characteristics found out before buying (price and color);
- Experience properties: characteristics visible merely after consumption (comfort, dependability);
- Credence properties: characteristics that customers would not be able to judge even after using (medical expertise).

Researchers assert that because services contain few Search properties and many Credence properties, consumers are forced to rely on Experience properties (such as tangible sensory factors) to assess perceived service quality. Especially in environments like hospitals, trust plays a very important role because patients do not have enough information or knowledge, so evidence of quality (such as doctors' qualifications) helps them have more grounds to evaluate the quality of the service.

In recent decades, the theory of perceived service quality has developed in two new directions, Multilevel/Hierarchical models and Sensory marketing integration:

- Multilevel/Hierarchical models: The studies by Dabholkar (1996) and Brady & Cronin (2001) extended perceived service quality vertically. Perceived service quality is no longer a flat measurement dimension but a hierarchical structure where interaction quality, physical environment quality, and outcome quality are the primary dimensions governing the sub-items below (Polyakova & Mirza, 2015);

- Sensory marketing integration: Some modern studies consider sensory factors to be direct precursors of perceived service quality. Krishna (2012) defines sensory marketing as the process of affecting the subconscious to create intangible concepts about the quality of a service. Hultén (2009) emphasizes that the combination of sensors, sensations, and sense expressions creates a holistic experience, fundamentally changing how customers evaluate perceived service quality. In line with the views of Parasuraman et al. (1988) and Wiedmann et al. (2018), this study conceptualizes perceived service

quality as an attitudinal outcome, which is the customer's (e.g., patient in healthcare) evaluation of the superiority of healthcare services, formed because of prior multisensory experience.

The next section will examine the mechanism regarding the role and impact of sensory experiences on perceived service quality.

2.2.1.2. The relationship between sensory experiences and perceived service quality

In the modern service market, characterized by an increasing number of functional qualities, several enterprises have transitioned and continue to transition their emphasis towards the management of multi-sensory experiences as a fundamental strategy for differentiation (Iglesias et al., 2019). Sensory experience is not merely the reception of physical stimuli but also an evaluative outcome that directly influences how customers evaluate perceived service quality and form customer satisfaction (Satti et al., 2021). Because services are intangible and different from each other, customers frequently have difficulty judging their quality (Ugolini et al., 2014). In such situations, sensory signals serve as proxies, assisting consumers in developing specific quality assessments (Ugolini et al., 2014; Lee et al., 2019). For instance, visual factors like the look of an aircraft's fuselage can make people think that the service is safe and efficient, which can improve the overall quality of the service (Lee et al., 2019). In the healthcare sector, cleanliness (tactile) and suitable lighting (visual) decrease anxiety and build trust in treatment expertise, as patients interpret physical (environmental) and psychosocial (staff interactions) cues through their five senses to evaluate perceived service quality (Ugolini et al., 2014). Sensory experiences are a vital part of service quality; when consumers are satisfied with their senses, they tend to rate the company's service very highly (Satti et al., 2021).

Meanwhile, emotional responses often affect the link between sensory experiences and customer satisfaction (Jang & Lee, 2019). Stimuli like music (auditory) or fragrances (olfactory) have a big impact on excitement and pleasure, which are two important parts of satisfaction (Krishna, 2012; Jang & Lee, 2019). In restaurants, smell and touch are the two most important aspects for satisfaction (Silaban et al., 2023). Satisfaction arises not just from the fulfillment of functional requirements but also from the hedonic value derived from sensory experiences (Moreira, 2017; Jang & Lee, 2019). Sensory experiences enriches the customer journey, making them feel more satisfied and willing to pay a higher price for the service (Moreira, 2017).

Additionally, perceived service quality plays an important mediating role in the link between sensory stimuli and satisfaction (Satti et al., 2021). A well-designed service space builds customer trust in quality, leading to sustainable satisfaction. Sensory assessments are still very useful, regardless of a crisis like the COVID-19 epidemic, make consumers feel more certain and keep their trust in services (Kim et al., 2024).

Despite the unique characteristics of each industry, the clear influence of each sense in shaping the experience is a common thread in previous studies.

Visual (sight) is the primary sense, accounting for 80% of the information received (Rafijevas & Razbadauskaite-Venske, 2025). When it's related to airplanes, vision is the first sense that customers use to see the outside of the plane. The design of an airplane's fuselage is not only for looks; it also sends messages about safety, being on time, and being professional. Designs that are consistent with customers' self-image will significantly enhance perceived service quality (Lee et al., 2019). In healthcare settings, clear signage and natural light help reduce anxiety and increase perceptions of care quality (Ugolini et al., 2014). This is the shaping of quality expectations due to the influence of sensory experiences. Meanwhile, color can influence mood and purchase intention; for example, red evokes excitement while navy blue suggests trustworthiness (Hultén et al., 2009). Liu et al. (2018) demonstrate that interior forms (round/angular) in various circumstances could impact customer satisfaction by suggesting the restaurant's "warmth" or "service competence". Nonetheless, in certain circumstances, such as traditional restaurants, vision may not have as significant a direct influence on consumer satisfaction as other senses (Silaban et al., 2023). In the digital world, 3D graphics and lively visuals make people feel more assured, stay focused, immerse themselves in the service, and be happier with it (Violante et al., 2019; Chung et al., 2025).

Auditory (sound) could directly impact customers' emotions and their perception of the service duration (Hultén et al., 2009). Engine noise, the sound of car doors closing, or the startup sounds of technological devices are used by customers as evidence of technical quality and brand sophistication (Lindstrom, 2005; Kato, 2023). In hotels, appropriate background music creates a professional atmosphere and enhances perceived service quality (Iglesias et al., 2019). According to Hultén et al. (2009) and Kumar (2014), slow-tempo music in restaurants can help consumers stay longer and spend 29% more than the service value, whereas fast-paced music can bring in more customers. The acoustics of the eating areas are the second most significant thing that affects how happy visitors are with street food (Hoang & Tučková, 2021). A study on

crossmodal integration that was somewhat interesting looked at how sound and food taste work together. It found that high-pitched sounds were often linked to sweetness and low-pitched sounds were linked to bitterness. This helped restaurant managers change the way people taste food by using “sonic seasoning” (Rodríguez et al., 2023).

Olfactory (smell) is believed to be the sense of memory since it is closely connected to the parts of the brain that deal with memory and emotions. Consequently, it constitutes a significant element in promoting enduring consumer pleasure (Berčík et al., 2025; Krishna, 2012). Smell can boost mood by as much as 40% (Hultén et al., 2009). Olfaction is the most significant factor that affects enjoyment in cooking (Hoang & Tučková, 2021; Silaban et al., 2023). The smell of baked bread brings back good memories and makes people feel warm, which makes them want to come back (Berčík et al., 2025). Signature smells are also used by Singapore Airlines and several high-end hotels to enhance their brand identification. Customers may easily recognize them and feel comfortable, which makes them more loyal (Lindstrom, 2005; Fong, 2023). People could stay away and think less of the quality if the smell is terrible or not right (like the smell of old grease at McDonald’s) (Lindstrom, 2005). When workers aren’t helpful or caring, a good scent and a nice setting can help keep consumers satisfied in the banking business (Iglesias et al., 2019).

Gustatory (taste) is not one sense alone, it’s a combination of many senses. People often think that taste is the most important sign of pleasure in food (Rodríguez et al., 2023; Krishna, 2012). 27% more people are happy and the food tastes better when labels are more detailed (Hultén et al., 2009). (Silaban et al., 2023) states that how fresh the food is is the most important sign of how good the service is. The taste of coffee drinks at coffee places makes people happier and more excited, which makes them more likely to stay (Jang & Lee, 2019). Zhou et al. (2023) indicate that taste is the sense that is hardest to communicate through digital media. This makes it hard for virtual leaders to promote and introduce food and drinks.

Tactile (touch) is considered to be the most basic and long-lasting human sense (Hultén et al., 2009). It was also the first sense to emerge, and customers use it to check the quality of goods (Lindstrom, 2005; Ugolini et al., 2014). Customers are more likely to be happy with a hotel if the beds and towels are soft (Fong, 2023). Customers often think that something is of higher quality and will last longer if it is heavy or has a thick glass (Lindstrom, 2005; Fong, 2023). The comfort of the bed, mattress, and the softness of the towels are tactile factors that determine perceived service quality in the hotel industry (Fong, 2023). Additionally, allowing customers to touch products (such as

opening toilet paper packaging at ASDA supermarkets) can significantly increase sales by fostering a sense of ownership and trust (Lindstrom, 2005). In healthcare, a doctor's professional and gentle touch helps reduce pain and increase patient satisfaction (Ugolini et al., 2014). In a virtual environment, haptic feedback technology is striving to recreate a sense of presence, helping customers "feel" the product and thereby enhancing the online shopping experience (Violante et al., 2019).

Although there is an overall positive relationship, the focus of sensory experiences on perceived service quality and customer satisfaction varies depending on the industry and sector. For example, for the hotel and resort group: prioritize the combination of visual (design), auditory (relaxing music), and olfactory (signature scents) to create sustainable value (Lee et al., 2019; Pelet et al., 2021). After the pandemic, cleanliness (tactile/visual) has become more important than ever (Kim et al., 2024). In the culinary field: all five senses are important, but smell and taste play a central role. In street food, the order of influence is smell, sound, taste, sight, touch (Hoang & Tučková, 2021). The airline industry heavily relies on sight and smell to reduce fatigue and differentiate itself (Lee et al., 2019; Lindstrom, 2005). For highly professional services (banking, healthcare), sensory experience is used to build trust and professionalism. Tactile (cleanliness) and visual (light) stimuli help reduce customer stress in more pressured environments (Iglesias et al., 2019; Ugolini et al., 2014).

2.2.2. Customer satisfaction and the relationship between perceived service quality and customer satisfaction

2.2.2.1. Customer satisfaction

Customer satisfaction (SAT) is not a single concept but a complex psychological construct, understood through various approaches across different stages. Satisfaction is defined as the combination of expectations, actual performance, and the importance of different attributes to everyone (Locke, 1969). From a behavioral psychology perspective, satisfaction is an emotional reaction that arises after a disconfirmation experience (Oliver, 1981), in other words, it is the consumer's response to evaluating the difference between their prior expectations (or a certain standard) and the actual results of the product after use (Day, 1984). In line with previous authors, satisfaction is a person's feeling of pleasure or disappointment resulting from comparing the outcomes received from a product or service with their expectations. Thus, there are two approaches to author satisfaction: the Psychological/Affective approach and the Expectation-Disconfirmation paradigm.

Regarding the Psychological/Affective approach, Locke (1969) emphasized that satisfaction is an emotional reaction following a specific experience or transaction. Parasuraman et al. (1988) cited this view to distinguish satisfaction from attitude: while attitude is a long-term and general emotional orientation, satisfaction is situation-specific (consumption-specific). Meanwhile, the Expectation-Disconfirmation paradigm was analyzed by Oliver (1981), Day (1984), according to which satisfaction is the consumer's response to the discrepancy between prior expectations and the actual results of the product/service after experiencing it. If the results are lower than expected, customers will be disappointed; if they meet expectations, they will be satisfied; and if they exceed expectations, they will be excited or extremely satisfied (customer delight).

When managers evaluate consumer satisfaction before develop marketing plans, they need to think about a few key characteristics, such as:

- Absolute subjectivity: satisfaction is a brain change that happens in reaction to stimuli and is heavily impacted by each customer's own situation, prior experiences, and value system (Grönroos, 2015);

- Zone of indifference: Grönroos (2015) states that satisfaction and the desire to buy again don't necessarily go along. Only consumers who are very satisfied or extremely satisfied (delighted) become customer advocates for the firm; customers who are just satisfied are often in the indifferent zone and can easily switch to buying competitor's items;

- Dependence on expectations: Satisfaction levels depend on more than just the actual results; they also depend on the Value Proposition. Underpromising and overdelivering (making fewer promises and keeping more) is a good way to make people happy (Grönroos, 2015).

- Word-of-mouth: those who are unhappy tend to share bad news much faster and more widely than those who are happy, especially now that social media is so popular (Grönroos, 2015).

In order to make it clearer how to measure customer satisfaction, Giró Manzano (2021) put together and showed different methods, from simple to complex. For example, the Average score (calculated visually based on scales, like 1-5 stars on Google Maps), the CSAT score (the percentage of customers who feel satisfied based on a certain score threshold, like scores 8-10 on a scale of 10), the Net promoter score - NPS (measures the likelihood of recommending a brand to others), the Customer effort score - CES (measures the ease of completing a transaction or resolving an issue, CES has

been proven to be a better predictor of repurchase behavior than both NPS and CSAT), and the American Customer Satisfaction Index - ACSI (a complex econometric model that links expectations, perceived quality, and perceived value to predict customer loyalty). Thus, customer satisfaction can be understood as a temporary emotional response arising from a comparison between actual results and specific expectations regarding goods or services.

Perceived service quality and satisfaction are two distinct but closely related concepts. Perceived service quality is a long-term, cumulative attitude, while pleasure is typically an emotional response to a single event (Lindstrom, 2005). Most researchers agree that perceived service quality is an important antecedent leading to satisfaction. The relationship between perceived service quality and customer satisfaction is often evaluated in a causal sequence, where perceived service quality plays a crucial role as a significant antecedent driving the ultimate level of satisfaction (Gür, 2019). We will examine the concept and approaches to perceived service quality in the next section to evaluate the relationship.

2.2.2.2. The relationship between perceived service quality and customer satisfaction

Via modern marketing studies, it can be affirmed that perceived service quality is an important antecedent that directly and positively impacts customer satisfaction. (Lee et al., 2000; Abdella & Indradewa, 2024). Early conceptual work by Parasuraman et al. (1988) and later by Grönroos (2015) argues that perceived service quality is a long-term attitude, representing an overall evaluative judgment of service excellence, while customer satisfaction is a transaction-specific emotional response to the consumption experience. Building on this basis, Oliver (1993) further explains that the benchmark for perceived service quality is based on what the business should provide, while the benchmark for customer satisfaction is based on what customers think will happen (Spreng & Mackoy, 1996). This difference is very important because it helps managers determine whether the goal is to deliver maximum quality or simply satisfy customers based on their expectations (Spreng & Mackoy, 1996; Lee et al., 2000).

Regarding the measurement model, the use of SERVQUAL and SERVPERF has long been debated in the literature. Cronin & Taylor (1992), followed by Lee et al. (2000), argue that focusing solely on performance (SERVPERF) rather than the expectation-performance gap (SERVQUAL) provides a clearer understanding of customers' perceptions of service quality and their satisfaction. Nevertheless, some scholars, such as Malik & Ullah (2012), continue to support SERVQUAL, emphasizing its diagnostic value in helping managers identify weaknesses within service delivery systems.

Although there have been previous debates about whether satisfaction leads to perceived quality or vice versa, recent empirical evidence across various sectors (such as online services, banking, telecommunications, retail, etc.) favors a causal relationship from perceived service quality to customer satisfaction (Lee et al., 2000). The importance and level of influence of perceived service quality (five influencing factors: tangibles, reliability, responsiveness, assurance, and empathy according to the SERVQUAL model) on customer satisfaction also vary significantly depending on the specific characteristics of each industry and field. Along with trustworthiness as a must (Suryaman & Tukiran, 2025), Nambiar et al. (2019) found that understanding and responsiveness are the most important factors that affect how much a customer values a bank, especially in a digital and personalized setting. Abdella & Indradewa (2024) changed the idea of perceived service quality to e-service quality for the online world. This shows that the e-servicescape and trust in deals are important parts of perceived service quality that lead to satisfaction.

Also, studies done in Dhaka on ride-sharing models show that customer satisfaction is higher when there are reliability, assurance, and empathy. However, tangibles and response have no significant effect (Shetu & Hamid, 2021). This shows that users are more concerned with the safety of the trip and price transparency than the appearance of the vehicle. Reliability is also a top priority in education, as satisfaction is not just the final outcome but an ongoing process, and students expect the training program to be delivered as initially promised (Bwachele, 2023; Suryaman & Tukiran, 2025), along with the responsiveness of the instructors (Iqbal & Inayat, 2022; Suryaman & Tukiran, 2025). In other studies, factors such as hotel personalization (Viswakarma et al., 2025), price fairness, and justice in service recovery in the media sector (Yaqub et al., 2019; Alzoubi et al., 2020) are important criteria for customer satisfaction. In special cases like COVID-19, hygiene, not food quality, is the criterion that customers prioritize more in high-end restaurants (Lim et al., 2022). This also shows how physical experiences can improve how good a service is seen to be and have a long-lasting positive effect on consumer satisfaction (Satti et al., 2021).

In the context of healthcare services, perceived service quality plays a role as the patient's internal information processing state, belonging to the cognitive aspect, after decoding stimuli from the hospital environment, while satisfaction is the output response, belonging to the emotional aspect (Zarei et al., 2015). This transformation confirms that perceived service quality is a direct predictor of satisfaction. Unlike other

fields, healthcare services have a high degree of information asymmetry, patients rarely have sufficient expertise to evaluate the quality of clinical techniques, leading to their internal perception being dependent on their interaction with the environment (Wulandari et al., 2024). Empirical evidence suggests that when patients have positive perceptions of the physical environment, process quality (e.g., wait times), and interaction quality (e.g., physician empathy and communication skills), these translate into overall satisfaction with the healthcare facility (Zarei et al., 2015; Darzi et al., 2023; Wulandari et al., 2024). Furthermore, a good fulfillment of service expectations not only determines satisfaction but also mediates patient loyalty and attachment to the hospital (Wulandari et al., 2024).

The connection between perceived service quality and customer satisfaction isn't necessarily direct. There might be intervening variables or moderating variables that change the relationship. Malik & Ullah (2012) and Abdella & Indradewa (2024) agree that perceived value results in satisfaction just when customers believe the advantages gained justify the costs invested. Customer satisfaction won't be at its best if the quality is great, but the price is too high compared to what they expected. The brand image of a business could reduce the negative consequences of tiny service failures and make the positive benefits of service quality on satisfaction even stronger (Chien & Chi, 2019). It was found by Jiang & Wang (2006) that the setting of a service could either make people feel stronger emotions (like at a singing bar) or help them make smarter decisions (like at a bank). Another thing that customer knowledge (Nambiar et al., 2019) says is that showing understanding and being quick to customers makes them happier. Buzz marketing (Pandey & Dhaliwal, 2025) also adds to a positive feedback loop about how customers feel about the level of service and how satisfied they are with it. Also, the link between how good a service is and how happy a customer is not the same for different consumer groups. Income serves as a determinant for strictness and tolerance, but age influences the service aspects (emotional or functional) that yield the most pleasure (Akinici et al., 2019).

To sum up, the connection between how good a service is seen by customers and how satisfied they are with it is a complex one that is heavily affected by things like the service situation or how much the customers know about it (Jiang & Wang, 2006; Nambiar et al., 2019). However, in today's fiercely competitive environment, merely meeting technical standards or operational procedures is not enough to create sustainable differentiation (Satti et al., 2021). Researchers and managers are gradually shifting their focus to factors that directly impact psychology and emotions through human senses.

These sensory factors have gradually become the core prerequisites for forming perceptions of perceived service quality, thereby fostering a lasting emotional connection between the brand and customers, particularly in healthcare services.

2.3. Healthcare services in Vietnam

In recent years, the Vietnamese healthcare system has achieved many significant milestones in expanding coverage and enhancing the capacity to provide medical examination and treatment services. Health is seen not only as regular medical examination and treatment, but as the foundation for sustainable human development. Vietnam is highly regarded internationally for achieving the United Nations' Sustainable Development Goals related to health, essential health service coverage index is higher than the regional average, and many of population's health indicators are superior to those of many countries with similar levels of development. According to a report by the Department of Medical Examination and Treatment, Ministry of Health (2024), the results of a 2023 survey show that the satisfaction level of outpatient patients at public hospitals reached 96.14%, and inpatient patients reached 95.14%. These results represent a significant improvement over 2022, when 94.83% of outpatients and 93.22% of inpatients were satisfied. The above numbers show a significant improvement, reflecting the efforts of the state and the entire healthcare sector in ensuring people's right to access healthcare services. The capacity to provide medical examination and treatment services is constantly being improved in terms of quantity, quality, scope, and depth (Politburo, 2025).

In 2025, the Communist Party of Vietnam issued Resolution No. 72-NQ/TW, which identifies the people as the central subjects of health policies, prioritizes access to high-quality healthcare services, strengthens preventive and primary healthcare, promotes electronic health records, and reduces the burden of medical expenses through health insurance reform (Politburo, 2025).

However, Vietnam's healthcare system is also facing rapid demographic changes. Vietnam's population is aging rapidly, and the birth rate is declining, leading to an increasing demand for medical services. This includes the burden of non-communicable diseases, which require long-term, repetitive medical care, meaning increased frequency and duration of patient contact with the physical environment of hospitals. Furthermore, it is projected that by 2030, 20% of Vietnam's population will belong to the middle and upper classes (International Trade Administration, 2026), meaning patients will have even higher expectations for a more comprehensive, comfortable, and aesthetically pleasing healthcare environment than currently.

Table 2.4. Levels of professional and technical expertise in Vietnam

Order	Levels of professional and technical expertise	
1	Initial level	Including health stations, polyclinics, regional clinics, and equivalent healthcare facilities.
2	Basic Level	This includes former provincial hospitals and some current district-level hospitals with a total evaluation score below 70.
3	Advanced Level	As the highest level, it includes specialized hospitals, special-grade hospitals, and highly specialized medical facilities.

Source: Law on Medical Examination and Treatment (2023)

The technical expertise quality of medical services, especially at higher-level hospitals and specialized medical facilities, is increasingly being enhanced thanks to mastering many modern medical techniques and investing in infrastructure. There are four levels of health insurance examination and treatment management: the central level, the provincial and city level, the district, county, town level, and the commune, ward level. From January 1st, 2025, the system of classifying healthcare facilities has been adjusted to categorize into 03 levels of professional and technical expertise.

As Vietnam gradually develops and uses more medical technology, the quality of medical exams and treatments gets better (Phuong, 2025). The healthcare system is also gradually developing in both quantity and quality, with a team of highly skilled doctors and nurses and increasingly modernized infrastructure, especially at the grassroots level (Chau et al., 2024). With the efforts of the entire healthcare system, Vietnam's health outcome indicators have been sustainably improved over the years. The Institute of Health Strategy and Policy in Vietnam also did an independent study and found that public satisfaction levels have slowly gone up over time, from 85.3% in 2016 to 85.8% in 2020, and then to 90.5% in 2024 (Phuong, 2025). These results reflect improvements in the quality of service and operational efficiency of the healthcare system in Vietnam.

Although the percentage of people satisfied with healthcare services exceeds 90% (Ministry of Health, 2025), there is a pressing issue that needs attention: the quality of medical examinations and treatment, and access to healthcare services, still varies significantly across professional levels, regions, and localities. Primary healthcare facilities do not fully provide essential primary healthcare services (Do & Dao, 2022; Nguyen et al., 2024). Efforts to prevent disease, promote health, and ensure food safety

are still limited. There are still issues regarding the way hospitals operate (Phuong, 2025). Healthcare personnel in some localities and healthcare facilities do not meet requirements. The systemic problems are at risk of being exacerbated by structural imbalances. Public hospitals account for 86% of all hospitals nationwide, but are facing prolonged overcrowding (International Trade Administration, 2026). Large public hospitals in major cities (such as Hanoi and Ho Chi Minh City) receive up to 60% of the national patient population, operating at over 200% capacity on a regular basis (International Trade Administration, 2026; FinnGroup, 2024). This is one of the significant causes of deterioration in the physical environment of hospitals, as well as the patient experience (e.g., noise, lack of privacy, or visual chaos due to overcrowding).

Many domestic studies have focused on analyzing the current state of healthcare service utilization and the level of public satisfaction across different levels and regions. Pham (2014) argues that measuring patient satisfaction with service quality has become very important for healthcare providers and points out that the image factor has the strongest impact on satisfaction with service quality.

However, the evaluation of quality and satisfaction mainly relies on easily perceivable signals, such as the experience of interacting with the service environment and stimuli via sensory experiences. Factors in the physical space of the hospital, such as lighting, colors, smells, sounds, cleanliness, and perceived comfort, become important bases for them to infer the quality of service, rather than the in-depth professional factors that healthcare facilities always focus on. Healthcare services are a special type of service due to the significant difference in understanding between the service provider and the service user, where doctors understand technical information and the patient's condition, while patients are completely dependent on the consultation. This characteristic makes patients vulnerable to economic and health impacts if the information is not transparent (Fabes et al., 2022). In the healthcare field, providers offer patients a much wider and more complex range of information compared to many other types of services, because each patient receives different medical care, even if they are the same patient visiting a healthcare facility for the same health issue, but at different times (Do et al., 2025).

In some studies, on the selection of healthcare facilities, researchers agree that service quality plays a crucial role in patients' decisions on where to seek examination and treatment (Victoor et al., 2012; Bahrampour et al., 2018). However, Fiala (2012) found that doctors often focus solely on professional quality, while patients evaluate the quality of hospital services via experiences and interactions, from which they infer

technical quality. Furthermore, medical services pertain to the entire human body, characterized by a high degree of uncertainty regarding service outcomes. Even after the treatment process is completed, patients often face many difficulties in checking or understanding the details in the invoices and treatment procedures from different service providers due to a lack of specialized knowledge. When risks or unsatisfactory outcomes occur, patients often face confusion and difficulty in determining whether it is a professional issue, thereby demanding legal rights (Le, 2021). Due to the inability to accurately assess the professional aspect, patients often place their trust in factors such as modern facilities, new medical equipment, or the professionalism of healthcare staff as evidence of the quality of medical care (Do et al., 2025; Le, 2021). The practice in Vietnam shows that patients tend to have a more positive assessment of service quality at hospitals or healthcare facilities with a modern, comfortable, and friendly physical environment, even when the difference in technical quality compared to public hospitals is not clear (Kim et al., 2017; To, P. H., 2025).

In addition, environmental factors have a strong influence on people's choice of medical services. In urban and plain areas, people tend to choose private clinics or higher-level hospitals when they need medical examination and treatment. The decision to choose is primarily based on trust in professional competence, modern facilities, and the ability to provide high-tech services, especially for complex or chronic conditions (Ngo et al., 2023; Tran et al., 2025). This is also the reason for the overload at upper-level hospitals, long waiting times, and dissatisfaction with infrastructure and service organization, even though the attitudes and abilities of healthcare workers are still highly regarded (Tran et al., 2025). On the other hand, communal health centers in these regions are generally only used for common diseases or short-term health requirements, and they are not used regularly (Ninh et al., 2025). Meanwhile, an estimated 40,000 Vietnamese people spend approximately US\$2 billion annually on overseas medical treatment (International Trade Administration, 2026; FinnGroup, 2024). Domestically, spending on healthcare at private medical facilities is projected to grow at a compound annual growth rate (CAGR) of 7.5% between 2025 and 2030, along with a strategy to increase the proportion of private hospital beds to at least 15% by 2030, according to Decision 201/QĐ-TTg (FinnGroup, 2024). The development of this market forces both public and private hospitals to actively differentiate themselves by providing superior multi-sensory experiences, meeting new standards, even international standards.

Meanwhile, in rural, mountainous, and difficult areas, the behavior of choosing healthcare facilities tends to be significantly different. Commune health stations and

district-level health facilities (under the old model) serve as the most important initial points of access to services, thanks to their advantages of close geographical distance, low cost, and the ability to use health insurance. People in these areas often have higher overall satisfaction levels, even though infrastructure and equipment are limited (Ngo et al., 2023). However, patients still must go to provincial or central levels when they have serious diseases or need a lot of help, which is hard because of transportation, cost, and time (Ninh et al., 2025). This difference shows how important primary healthcare is for ensuring that everyone has equal access to medical services. It also shows how essential it is to invest in improving the skills of primary care professionals, the quality of services, and the infrastructure at the primary level to close the gaps between regions and make the whole healthcare system work more effectively. The above perceptions contribute to the formation of the understanding of perceived service quality and thereby affect customer satisfaction, highlighting the important mediating role of perceived service quality in the relationship between sensory experiences and satisfaction.

Finally, the concept of service quality in the Vietnamese healthcare system has been officially institutionalized. The Vietnam Hospital Quality Criteria (Ministry of Health, 2016), issued through Decision 6858/QD-BYT, clearly defines sensory criteria, such as ensuring clear signage (criterion A1.1), ensuring one bed per patient to avoid overcrowding (criterion A2.1), ensuring clean restrooms (criterion A2.2), maintaining a clean and green environment (criterion A3.1), and providing appropriate nutrition for patients (criterion C7.4). Furthermore, Decision 56/2024/QD-BYT on measuring satisfaction emphasizes that one of the key performance indicators is the comfort of the facilities, aiming to achieve the national goal of 90% patient satisfaction with public hospitals by 2030 (Ministry of Health, 2024). Therefore, the application of sensory marketing is not simply an optional and commercial strategy, but will become a priority strategy, consistent with the national legal framework.

2.4. Theoretical foundation

This thesis constructs a rigorous theoretical framework to explain the mechanisms by which sensory experiences impact perceived service quality and customer satisfaction. Therefore, it does not approach theories in isolation but integrates them into a system of interconnected relationships. The S-O-R (Stimulus - Organism - Response) model plays a central role. Theories such as servicescape theory, signaling theory, and expectation-disconfirmation theory provide deeper explanations of the transformation of S-O-R, specifically as follows:

First, stimulus (S) is defined as multisensory experiences (sight, hearing, smell, touch, taste) perceived by patients from their surrounding physical environment in the hospital. Servicescape theory explains the basis for identifying elements in the hospital space (Ugolini et al., 2014). Simultaneously, signaling theory helps explain why these sensory stimuli have a strong impact on patients in the healthcare environment (Nelson, 1974; Chatterjee, 2020). Because of the complexity and high level of specialization in healthcare (credence services), patients are compelled to rely on sensory experiences, tangible signals, to infer the quality of hospital services. Next, organism (O) is the patient's information processing state, at which point they decode sensory experiences through the variable perceived service quality. At this stage, expectation-disconfirmation theory allows for the identification and clarification of sensory signals, comparing and contrasting them with their initial expectations before arriving at the hospital. Thirdly, response (R) determines patient behavior through the variable customer satisfaction. At this point, S-O-R allows for explaining the relationship between sensory signals and evaluations, comparing them to expectations in perception, and thus creating the patient's attitude and satisfaction level.

In summary, S-O-R is considered central to explaining the process from patient arrival at the hospital, service experience, and ultimately satisfaction. The following sections will present the core content of each foundational theory.

2.4.1. S-O-R and servicescape theories

The Stimulus - Organism - Response theory, S-O-R (SOR), is an important and widely used theory in service and customer behavior research. The SOR model allows researchers to explain how the surrounding environment affects human behavior. Mehrabian & Russell (1974) approach the issue through three steps: stimuli from the external environment will affect the organism's state (via pleasure, arousal, and dominance) and then lead to responses in the direction of approach or avoidance. This approach places humans in the role of processing stimuli from external agents via internal changes, rather than merely being mechanical responses to external agents. Later, Jacoby (2002) further reinforces the S-O-R relationship perspective, stating that there is a close connection between the external environment, the internal self-processing within individuals, and their subsequent behavior. Any characteristics or signals from the external environment are considered stimuli, while human emotions, perceptions, and internal interpretations are regarded as the organism, and their attitudes, intentions, and actual behaviors are the responses.

Meanwhile, based on the foundation of environmental psychology and the logic of the S-O-R theory, Booms & Bitner (1981) argued that factors related to the physical environment act as external stimuli in the S-O-R model, and they systematized the concepts of atmospherics to introduce the term servicescape, which refers to the tangible service environment that occurs during the provision and consumption of services. Servicescape does not focus on service processes or spaces that customers do not interact with (e.g., the store's warehouse). Servicescape includes key components such as ambient conditions; spatial layout and functionality; signs, symbols, and artifacts (Bitner, 1992).

Ambient condition refers to environmental characteristics that affect the senses such as temperature, music, and scent, and have an impact on human emotions (for example, the tempo of music can influence movement speed).

Spatial layout and functionality refer to the arrangement of objects (machines, furniture, shapes, layout...). This factor focuses on the functionality of the service space, an element that helps customers easily achieve their goals quickly and efficiently.

Signs, symbols, and artifacts are forms of direct or indirect communication. Directional signs guide pathways and how to perform specific tasks, while symbols carry specific meanings, conveying the image, perspective, and positioning of an organization and society.

Thus, the S-O-R theory emphasizes the mediating role of internal states of customers in transforming the impact of behavioral responses. Especially, factors related to the servicescape can significantly influence this process. Research related to sensory experiences, where stimuli from the environment via the senses can influence how customers perceive and react, can rely on this theory.

2.4.2. Signaling theory

In the S-O-R model, the transformation of environmental stimuli into customer perception is based on servicescape and signaling theory. Earlier, Bitner (1992), when discussing servicescape theory, pointed out that the environment influences consumer behavior, but for healthcare (credence service), there is a characteristic information asymmetry between patients and doctors, making it difficult for them to directly assess clinical quality. Therefore, signaling theory explains the type of tangible signals that patients use to infer the professional competence, safety, and overall service quality of the hospital.

Signaling theory was developed by Spence (1973) regarding the labor market model, where employers do not know the exact productivity of candidates, leading them to infer it by observable signals about the candidates. This is a branch of research on information asymmetry in the market (in transactions, one party knows more information, while the other party has less information about quality, characteristics, risks... compared to the other external party). A signal is understood as an observable action or attribute that conveys information about quality. The signaling process begins with the signaler, transmitting the signal to the receiver, who then interprets the signal and provides feedback or an assessment. Later, Nelson (1974) also analyzed signaling theory through the lens of advertising.

Table 2.5. Common types of signals in services

Service context	Signal	Inferred quality	Sources
General service quality	Price, certification, warranty, accreditation	High or low level of service quality	Byun & Yang (2019), Chatterjee (2020)
Healthcare	Hygiene signs, sanitization indicators, cleaning procedures	Level of safety, ability to reduce infection risk	Bove & Benoit (2020)
Premium, sustainable services	Sustainability certifications, premium pricing, online branding	Level of luxury, prestige, and credibility	Byun & Yang (2019), Erevelles et al. (2001)
Online services	Pricing level, discount patterns	Expectations of quality and reliability	Chatterjee (2020)

Source: Compiled from the author's research results (2026)

In the context of services, signaling theory is often used to evaluate how service providers convey information about hard-to-observe or assess quality attributes (such as safety, reputation, etc.) to customers in an information asymmetry environment. Because services are intangible and difficult to evaluate in advance, signals play an increasingly important role in helping customers reduce risk or increase satisfaction,

while also bridging the information gap (Erevelles et al., 2001). However, these signals can lose their value if they are easily copied or imitated by competitors, reducing the customer's ability to differentiate. Therefore, customers can base their evaluations on multiple signals to make more accurate assessments (Bove & Benoit, 2020).

Thus, in the context of services, especially healthcare services, signaling theory, combined with credence properties, can serve as a basis for explaining the reasons behind patients' reactions or perceptions of the service environment in hospitals.

2.4.3. Expectation-disconfirmation theory

After the patient's cognitive assessment is established through sensory cues, the transformation to the final behavioral response (R), which is customer satisfaction, is determined by expectation-disconfirmation theory. This theory helps explain the process of forming the relationship between satisfaction after using a product or service and prior expectations about the actual outcomes of the product or service. This theory was developed by Oliver (1980), who constructed a model with core elements including: expectations, perceived performance, disconfirmation, satisfaction.

Specifically, expectations are the initial beliefs or anticipations of customers about the product before consumption. Perceived performance is the actual experiences and evaluations of customers regarding the product or service. Meanwhile, disconfirmation is the extent to which the perception of the effectiveness or performance of a product or service exceeds expectations or fails to meet expectations. Finally, satisfaction is the customer's response through evaluation or attitude after purchasing or using the service. Customers tend to be more satisfied when they experience positive disconfirmation (actual performance exceeding expectations), less satisfied when they experience negative disconfirmation (actual performance falling short of expectations), and if the actual performance meets expectations, it is in a state of confirmation.

In the service sector, where there are unique characteristics such as intangibility, heterogeneity, and inseparability, customers find it difficult to evaluate the service before using it, so they often have certain expectations before using the service. This creates a comparison between expectations and reality. expectation-disconfirmation theory is often used to evaluate both the service process, the surrounding physical environment, and employee responses.

2.5. Research gap

Sensory marketing and sensory experiences have been widely investigated globally across various domains, including retail, hospitality, and healthcare (Ugolini et al., 2014). In Vietnam's hospital service, recent studies predominantly emphasize on general management or just examine a particular facility, there is no system-wide study evaluating the impact of sensory factors on quality perception. Specifically, Vietnam's healthcare sector is facing overcrowding and uneven service quality (Ministry of Health, 2015). Investigating the potential of sensory cues to mitigate pain induced by overload is a novel approach that aligns with the objective of attaining a 90% citizen satisfaction rate by 2025 (Politburo, 2025). Hence, below are the gaps that the research project hopes to address.

Firstly, there is a lack of a comprehensive empirical model that simultaneously examines the five senses associated with psychomediation mechanisms in a healthcare context. For instance, Yinger & Standley (2011) concentrated only on auditory stimuli, whereas Pradika et al. (2021) only looked at the effects of smell and sight at a dental clinic, leading to a deficiency in a framework that simultaneously assesses all five senses (sight, hearing, smell, touch, and taste) to understand their overall interaction. More importantly, these studies often ignore or fail to clarify the core psychointerpretive mechanism of patients. Meanwhile, Wiedmann et al. (2018) suggested a multidimensional construct of sensory experience comprising sight, hearing, smell, taste, and touch, allowing for a more comprehensive study of sensory experience. However, this construct is primarily developed and applied in consumer service and hospitality contexts, and therefore needs to be contextualized when applied to a healthcare environment.

Based on the S-O-R theory and signaling theory, healthcare is classified as a credence service with a very high degree of information asymmetry. Patients rarely have sufficient professional knowledge to independently assess the quality of a doctor's clinical skills. In practice, patients are forced to seek alternative signals from the physical environment to infer professional competence. Therefore, multisensory stimuli from the environment do not generate immediate satisfaction; rather, they act as objective premises for patients to decode and form perceived service quality (Organism) first, which then transforms into emotional and behavioral responses, ultimately leading to satisfaction (Response). The lack of comprehensive empirical testing to demonstrate that perceived service quality is an essential mediating mechanism linking sensory experience to satisfaction in healthcare services is a significant research gap.

Secondly, there is a gap regarding the role of moderating variables. While demographic factors and hospital context have been shown to influence service evaluation in industries such as hospitality or retail, their impact on sensory experience in the healthcare environment remains largely unexplored (Kim et al., 2020). From an income perspective, the rapid rise of the middle class in Vietnam is creating significant differentiation in experiential expectations. However, how income levels alter the intensity of the relationship between sensory experience and perceived service quality requires further research. Similarly, the service delivery context creates entirely different acceptance thresholds. Patients in public hospitals are often prepared to accept spatial inconvenience in exchange for tertiary expertise, while patients in private hospitals apply a stricter frame of reference from the hospitality sector. There are still no controlled experimental studies clarifying the moderating role of hospital type (public/private) on changes in sensory sensitivity to perceived quality.

Third, there is a lack of integration of control variables to ensure the robustness of experimental results. Gender is a fundamental demographic control variable, as men and women are often perceived to differ in sensory sensitivity, privacy needs, and communication expectations. Without controlling for these confounding variables, the true impact of sensory experience on perceived service quality and satisfaction may be misjudged, leading to inaccurate conclusions.

2.6. Proposed research model and research hypotheses

Systematizing existing theories and empirical studies provides a clearer understanding of how multi-sensory experiences shape patients' evaluations of perceived service quality in complex and highly specialized services such as healthcare. In hospital settings, characterized by high information asymmetry (credence services), patients typically lack the professional expertise needed to assess technical quality, such as diagnostic accuracy or surgical effectiveness. Consequently, they tend to unconsciously rely on sensory cues as a primary basis for evaluating service quality, with sensory stimuli functioning as subconscious signals that reduce anxiety and foster trust (Krishna, 2012; Ugolini et al., 2014). Prior research highlights a shift in healthcare from an exclusive focus on clinical outcomes toward the management of patient perceptions. Given the inseparability of healthcare services, patients must be physically present in the service environment, where everything they see, hear, smell, and touch contributes to their quality perceptions (Ugolini et al., 2014). Studies applying the marketing mix framework further demonstrate that the physical environment and service experience are among the most influential factors in hospital choice, particularly in

private healthcare settings, where experiential attributes often outweigh price considerations (Abedi & Abedini, 2017; Ravangard et al., 2020). These findings support Krishna's (2012) argument that sensory stimuli influence patients largely outside conscious awareness, enabling them to construct perceptions of professionalism and service quality beyond traditional informational or promotional cues.

Empirical evidences suggest that different sensory dimensions play distinct roles in shaping perceived service quality. Visual and tactile experience exert the most immediate and salient influence on patients' quality perceptions in hospitals, while olfactory and auditory cues contribute to emotional regulation by alleviating stress and supporting psychological well-being. Although often less salient, gustatory experience remains relevant in inpatient settings by supporting comfort and physical recovery. Building on this logic, sensory experiences can be conceptualized as informational inputs that are filtered through individuals' perceptual processes and subsequently translated into attitudinal evaluations of service quality. For instance, a clean physical environment combined with a mild antiseptic scent may lead patients to infer safety, professionalism, and reliability.

Therefore, hypotheses H1 to H5 presented below are based on the S-O-R theoretical framework, which focuses on S-O. In the context of the healthcare service environment in Vietnam, where hospitals are often crowded, even overloaded, and patients experience information asymmetry, making it difficult for them to assess clinical quality, they tend to rely on multisensory stimuli from the service environment. Therefore, the study assumes that these sensory experiences have a positive influence, generating clear signals that affect patients' perceptions of service quality. Based on the five-domain structure of sensory experience suggested by Wiedmann et al. (2018), this study examines visual, auditory, olfactory, gustatory, and tactile experiences as antecedents of perceived service quality. However, these dimensions are contextualized in the hospital servicescape by drawing on healthcare-specific sensory cues identified by Ugolini et al. (2014) and the practical characteristics of Vietnamese hospitals.

Visual experience refers to the process through which patients receive and interpret visual cues from the hospital environment to form initial impressions of spatial order, clarity, and aesthetic quality. In healthcare settings, visual perception is often influenced by the inherently unfamiliar and clinical nature of medical architecture and equipment, which can intensify feelings of uncertainty or anxiety. Key visual cues include lighting and color schemes (e.g., natural versus cold artificial lighting, neutral colors such as white or blue), wayfinding elements that facilitate spatial orientation (e.g., signage, maps, and departmental layouts), and the observed level of orderliness reflected in medical equipment and staff appearance (Hultén, 2009; Ugolini et al., 2014).

Visual experience is also often considered the most dominant sense (Krishna, 2012; Pradikaa et al., 2021). Research on patients in Vietnam found that visual stimulation had the second-strongest impact on satisfaction (Tran et al., 2025). Modern architecture, colors that match harmoniously on the walls, and clean grounds all provide a very crucial first impression. The experimental investigation conducted by Pradika et al. (2021) in dentistry provides a more certain conclusion: vision is the sole factor that significantly influences intimacy and alleviates dental fear, whereas smell does not provide an obvious impact in a laboratory context. They said that warm colors like red and orange make patients feel more at ease than chilly colors like blue and white, which are frequent in hospital settings.

Furthermore, the expectation that visual experience have a positive impact on perceptible service quality is strongly supported by the legal framework, specifically in The Vietnam Hospital Quality Criteria (Ministry of Health, 2016). Several visual criteria are used to assess hospital quality, such as: providing clear signage (criterion A1.1), maintaining a green, clean, and beautiful environment (criterion A3.1), and ensuring tidy examination rooms (criterion A3.2). These factors are easily observed and perceived by patients, and therefore can be used as signals to infer quality, consistent with signaling theory.

Thus, visual experience captures how patients visually perceive these cues (e.g., brightness, clarity, neatness), whereas perceived service quality reflects what patients subsequently evaluate, such as whether facilities are considered modern, professional, or commensurate with the cost of care. The above arguments suggests that Visual experience operates as an antecedent shaping patients' quality evaluations rather than as a direct assessment of service performance, leading to the following hypothesis:

H1: Visual experience has a positive effect on perceived service quality in healthcare services.

Auditory experience refers to patients' perception of the hospital soundscape, encompassing the presence of ambient noise, acoustic privacy, and vocal characteristics during interpersonal interactions. In healthcare settings, auditory stimuli are often perceived as a major source of stress due to their limited controllability and continuous exposure. Salient auditory cues include background noises generated by medical equipment, carts, footsteps, and doors; the degree of acoustic privacy in conversations related to medical conditions; and the tone, pace, and intonation of healthcare staff's voices, independent of verbal content (Hultén, 2009; Ugolini et al., 2014).

There is a noticeable difference between the authors when it comes to hearing. Yinger & Standley (2011) showed that music therapy helps patients get greater satisfaction levels than those who do not use it. However, Tran et al. (2025) refuted the hypothesis that auditory stimuli affect quality perception in Vietnamese public hospitals, arguing that noise or doctors' voices could be considered signature sounds that patients have implicitly accepted, making them no longer a differentiating factor in quality.

In Vietnam today, large public hospitals in major cities receive approximately 60% of the country's patients, operating at over 200% capacity (FiinGroup, 2025), creating overcrowding and a characteristic environment characterized by loud noise and chaotic sounds. Given this reality, the ability of hospitals to manage noise can significantly alter patients' perceptions of service quality.

Auditory experience captures how patients perceive these acoustic stimuli (e.g., noisy versus quiet, harsh versus soothing voices), whereas perceived service quality reflects evaluative judgments regarding aspects such as staff empathy, assurance, or the overall suitability of the environment for rest and recovery. The above arguments underscore the role of auditory experience as an antecedent influencing service quality perceptions, leading to the following hypothesis:

H2: Auditory experience has a positive effect on perceived service quality in healthcare services.

Olfactory experience refers to patients' detection and cognitive processing of airborne odors within the hospital environment, which directly trigger emotional reactions and memory associations related to cleanliness, safety, and contamination risk. In healthcare settings, olfaction is considered one of the most intrusive senses, as patients cannot consciously block or avoid exposure to ambient smells. Key olfactory cues include clinical odors such as disinfectants and alcohol, biological odors arising from bodily sources or inadequate ventilation, and deliberately introduced ambient scents designed to mask unpleasant smells or induce relaxation (Hultén, 2009; Ugolini et al., 2014).

The "hospital smell" (the smell of disinfection) is typically linked to smell in healthcare, which can make people feel anxious. However, Tran et al. (2025) discovered that aroma might still enhance satisfaction if properly handled, for instance, via deodorizing toilets or employing light essential oils. On the other hand, Pradika et al. (2021) did not discover that fragrance had a statistically significant effect on reducing anxiety, even though the research they mentioned, Lehrner et al. (2000) said that orange flavor helped female patients calm down.

In practice, the odor environment in the Vietnamese hospitals is managed by regulations in The Vietnam Hospital Quality Criteria (Ministry of Health, 2016), through several criteria regarding infection control and waste management (criteria C4.1 and C4.5), and criteria regarding the implementation and monitoring of hand hygiene compliance (criterion C4.3). Ensuring these criteria requires the use of standard medical disinfectants. In the clinical environment of hospitals, ensuring the absence of unpleasant odors and the presence of a “hospital smell” (e.g., disinfectant) becomes a psychological signal of safety, thereby enhancing the perception of service quality.

Therefore, olfactory sensory experience captures how patients perceive these odors (e.g., sharp, lingering, or soothing), whereas perceived service quality reflects patients’ interpretive judgments, such as whether the hospital environment is considered hygienic, safe, or well-controlled in terms of infection prevention. This distinction highlights olfactory experience as a critical antecedent shaping perception of service quality, leading to the following hypothesis:

H3: Olfactory experience has a positive effect on perceived service quality in healthcare services.

Gustatory experience refers to patients’ food-related sensory experiences in hospital settings, encompassing taste, smell, and texture associated with nutritional services. In healthcare contexts, gustatory experience often functions as an indicator of physical recovery and a symbolic reconnection with everyday life beyond the clinical environment. Key gustatory cues include the perceived palatability of hospital meals (e.g., bland versus well-seasoned, warm versus cold) and lingering aftertastes, such as bitterness or dry mouth, which may arise from medication side effects or inadequate food service quality (Hultén, 2009; Ugolini et al., 2014).

Taste is often viewed as the least important factor in general health marketing research. Tran et al. (2025) observed a minimal influence; nonetheless, Mavrommatis (2011) and Ugolini (2014) underscored that hospital food is a contributing element to patients’ restoration to a normal condition. The deterioration of food’s sensory quality during transit from the kitchen to the patient’s bedside, due to temperature fluctuations and condensation, could reduce palatability, thereby influencing recovery rates (Mavrommatis, 2011). Krishna (2012) and Ugolini et al. (2014) both agree that the senses impact emotions (joy, anxiety), which in turn lead to satisfaction. In a different perspective from the research on tobacco products by Talhout et al. (2018), sensory factors such as a smooth design or luxurious packaging can reduce the perception of actual harm.

The OECD's Health at a Glance report (2025) emphasizes the role of nutrition as a crucial non-medical factor affecting health. Unlike service industries such as hotels, hospital food, especially for inpatients, is managed within the framework of national nutrition and dietary guidelines, as seen in criteria C7.4 and C7.5 in The Vietnam Hospital Quality Criteria (Ministry of Health, 2016). Therefore, patients will evaluate the hygiene, variety, flavor, and suitability of hospital food as indicators of clinical care competence, and simultaneously assess the quality of hospital services.

Gustatory experience captures how patients directly perceive food-related sensations, whereas perceived service quality reflects broader evaluations of the reliability and adequacy of nutritional services. This distinction highlights gustatory experience as a meaningful antecedent influencing patients' perceptions of service quality, leading to the following hypothesis:

H4: Gustatory experience has a positive effect on perceived service quality in healthcare services.

Tactile experience refers to patients' physical verification of the healthcare environment through skin contact and thermal perception. In medical settings, tactile experience encompasses both instrumental touch, which occurs during clinical examinations and treatments, and expressive touch, which conveys care, reassurance, and emotional support. Salient tactile cues include the perceived firmness or softness of hospital beds and bedding, the texture of medical instruments, ambient temperature conditions, and the sensory quality of human touch during interactions with healthcare staff (Hultén, 2009; Ugolini et al., 2014).

A surprising but consistent finding in new studies is the leading role of tactile experience. Tran et al. (2025) point out that touch has the strongest impact on patient satisfaction. This includes room temperature, ease of movement, and especially the direct interaction between healthcare professionals and patients. Ugolini et al. (2014) argue that the tactile sense includes not just things but also the methods by which doctors assess patients; a handshake or soft approach during an injection might mitigate a patient's feelings of abandonment or physical discomfort. Krishna (2012) clarifies these phenomena using the notion of grounded cognition, positing that physical warmth (e.g., temperature) is correlated with warmth in social assessment.

Furthermore, patient safety culture, including proper hygiene procedures and handling of physical contact, is a core aspect of healthcare quality (OECD, 2025). In Vietnam, the reality of system overload has led to situations such as sharing hospital beds. The Vietnam

Hospital Quality Criteria (Ministry of Health, 2016) includes a criterion ensuring that inpatients have one bed per person (criteria A2.1) to ensure tactile personal space. In addition, ensuring appropriate temperature and safe physical practices (e.g., healthcare workers wearing gloves) directly affect patients' emotions and perceptions of service quality.

Tactile experience captures how patients physically feel these contacts (e.g., cold, rigid, painful, or comforting), whereas perceived service quality reflects higher-level evaluations such as staff responsiveness, empathy, or the adequacy of facilities. This distinction underscores tactile experience as a fundamental antecedent influencing patients' perceptions of service quality, leading to the following hypothesis:

H5: Tactile experience has a positive effect on perceived service quality in healthcare services.

Next, the causal relationship between perceived service quality and customer satisfaction is explained through the S-O-R model, focusing on the O-R mechanism, and further reinforced by expectation-disconfirmation theory. In the context of healthcare services in Vietnam, patients already have certain expectations when they arrive at the hospital, especially regarding systemic issues or previous experiences. When perceptions of service quality are formed from sensory experiences, meeting, or even exceeding, these expectations will trigger a positive response, thereby bringing customer satisfaction. Moreover, the causal relationship from perceived service quality to customer satisfaction is one of the theoretical foundations that has been repeatedly confirmed in the service sector (Abdella & Indradewa, 2024). In the healthcare field, practicality and reliability are highly valued, so perceived service quality is not only a technical assessment but also a key predictor of patients' emotional responses (Jiang & Wang, 2006). Experimental evidence from healthcare facilities shows that patient satisfaction depends heavily on how services are delivered and the empathy of healthcare staff (Álvarez-García et al., 2019; Nambiar et al., 2019).

Specifically, Álvarez-García et al. (2019) assert that there is an extremely strong correlation between perceived service quality and customer satisfaction in healthcare facilities, with factors such as physical facilities, the interaction of the professional team, and communication processes explaining up to 75.7% of the variation in satisfaction levels. When patients perceive a higher level of expertise, more timely responsiveness, and a more empathetic attitude than initially expected, they will reach a state of satisfaction and even delight, which will promote positive behavioral intentions such as word-of-mouth or returning to that healthcare facility for future examinations or treatment if needed (Setó-Pamies, 2012; Alzoubi et al., 2020).

Results from the Patient-Reported Indicator Surveys (PaRIS) by OECD (2025) indicates that a positive experience of quality care is deeply linked to patient trust and satisfaction. In Vietnam, patient satisfaction is also a key performance indicator of the Ministry of Health (2024), as satisfaction is considered the ultimate outcome of improving service quality. Therefore, the following hypothesis can be put forward:

H6: Perceived service quality has a positive effect on customer satisfaction.

Beyond direct impacts, the S-O-R theoretical framework provides a theoretical foundation for explaining an indirect mechanism where sensory experiences can shape satisfaction. In a healthcare context, multisensory stimuli from the physical environment do not directly generate immediate satisfaction, instead, patients use these signals to trigger processing and interpretation to form perceived service quality. Only when this perceived evaluation meets or exceeds expectations is it transformed into positive emotional and behavioral outcomes, specifically customer satisfaction. Satti et al. (2021) experimentally demonstrated that perceived service quality plays a crucial mediating role; a well-designed sensory environment builds customer confidence in service quality, which then serves as a fundamental prerequisite for subsequent satisfaction. Therefore, perceived service quality acts as a transmission mechanism, converting signals from the environment (sight, smell, hearing, touch, and taste) into overall satisfaction. Based on this argument, the following hypotheses are proposed:

H10a: Perceived service quality mediates the relationship between Visual experience and customer satisfaction.

H10b: Perceived service quality mediates the relationship between auditory experience and customer satisfaction.

H10c: Perceived service quality mediates the relationship between olfactory experience and customer satisfaction.

H10d: Perceived service quality mediates the relationship between gustatory experience and customer satisfaction.

H10e: Perceived service quality mediates the relationship between tactile experience and customer satisfaction.

The next hypotheses are about the moderating variables. The relationship between sensory experiences and perceived service quality is not only direct but is also profoundly moderated by socioeconomic factors (Hasim et al., 2015). Although current studies have not analyzed the moderating role of income and hospital type on the relationship between sensory experiences and perceived service quality, new findings

are entirely possible through the differences in expectations and priorities among customer segments. Specifically, Abedi & Abedini (2017) points out a clear difference in selection criteria: in public hospitals (which typically serve lower-income groups), price is the deciding factor; while in private hospitals, tangible assets and service experience are ranked higher in priority. This suggests that for high-income groups, multi-sensory experiences may be a must-have standard for quality assessment, associated with perceptions of the facility's sophistication and professionalism, and commensurate with the high cost they pay. In another word, in public hospitals, price significantly influences choice, but in private hospitals, service goods and sensory experiences are the primary determinants. Regarding demographic characteristics, Yinger & Standley (2011) show that age and education level influence sensory expectations. Patients with higher education are often more critical when evaluating the physical environment.

Ravangard (2020) found a statistically significant relationship between income and the place factor, while Nuhanović (2025) argued that although all patients have the right to benefit from integrated sensory design, socioeconomic barriers still make these spaces a form of privilege rather than universal. Therefore, income is likely to enhance the impact of sensory experiences on perceived service quality in patients with economic means who are willing to pay for sensory and psychological comfort. Additionally, in public hospitals (in comparison with private hospitals), which frequently face overcrowding and limited budgets, patients may default to accepting standard or less pleasant sensory experiences (such as noise or hospital smells) to ensure clinical quality during their examinations. Moreover, low-income patients often must rely more on sensory cues for evaluation, as they have fewer resources and conditions to assess quality in terms of technical expertise.

In short, the review of studies has established that sensory experiences are no longer considered supporting elements but have emerged as a fundamental aspect in influencing patients' perceptions of quality and happiness within healthcare environments (Ugolini et al., 2014). The authors agree on two key points: the hierarchy of sensory influence in a clinical setting and that sensory experiences do not work independently, but rather through a complex web of relationships to affect customer satisfaction, including perceived service quality. However, current evidence still shows conflicting views on the role of sound and scent, often due to differences in research context. This creates an important premise for a deeper examination of the healthcare context in Vietnam, where overcrowding in public hospitals and the development of private healthcare is creating very different dynamics for sensory marketing strategies. Therefore, the author proposes the hypotheses of the moderating variables.

Further elaborating on the moderating role of income, according to the OECD (2025), lower-income groups have significantly higher rates of long-term chronic diseases compared to higher-income groups. Therefore, lower-income patients may prioritize functional usefulness, basic clinical treatments, or cost-effectiveness when evaluating hospitals. Meanwhile, rising incomes and living standards in Vietnam have created a distinct customer segment with higher demands for comprehensive, multi-sensory service environments, evidenced by their spending on high-end medical tourism abroad, estimated at around US\$2 billion per year (FiinGroup, 2024). Therefore, theoretically, higher-income patients, with their more cognitively and experientially-based standards, will be more sensitive to sensory cues (e.g., visual aesthetics, acoustic privacy) than lower-income patients.

Income within the scope of this study is defined as the patients' income over a month, including wages and other income (if any), from low income to high income. Hypotheses for the moderating role of income:

H7a: Income positively moderates the relationship between Visual experience and perceived service quality.

H7b: Income positively moderates the relationship between auditory experience and perceived service quality.

H7c: Income positively moderates the relationship between olfactory experience and perceived service quality.

H7d: Income positively moderates the relationship between gustatory experience and perceived service quality.

H7e: Income positively moderates the relationship between tactile experience and perceived service quality.

When considering the moderating role of hospital type, particularly in the Vietnamese context, data shows that large central-level public hospitals receive up to 60% of the total number of patients and frequently operate at over 200% of their designed capacity, indicating an impact on the perceived environment. To alleviate this burden, the government has set a target of increasing the number of private hospital beds to 15% by 2030 (FiinGroup, 2025). Currently, private hospitals are competing by providing a significantly more distinct and upscale experience compared to the general standard of the public sector. Therefore, patients may have fundamentally different expectations and perceptions between these two hospital type.

The hospital type is classified based on the entity that establishes and owns the hospital, including two groups: public hospitals (established by the State) and private hospitals (established by organizations or individuals outside the State), the direction varies from public hospitals to private hospitals. Hypotheses for the moderating role of the hospital type:

H8a: Hospital type positively moderates the relationship between Visual experience and perceived service quality.

H8b: Hospital type positively moderates the relationship between auditory experience and perceived service quality.

H8c: Hospital type positively moderates the relationship between olfactory experience and perceived service quality.

H8d: Hospital type positively moderates the relationship between gustatory experience and perceived service quality.

H8e: Hospital type positively moderates the relationship between tactile experience and perceived service quality.

Besides the effects of sensory experiences and the aforementioned regulatory mechanisms, demographic variables and service characteristics were also included in the research model as control variables to ensure robustness. The author proposes gender (male/female) variable to control for the assessment of perceived service quality and customer satisfaction.

Gender, particularly in healthcare services research, has long been considered a crucial demographic variable influencing patient expectations and perceptions. Male and female patients have different standards when it comes to healthcare services, with diverse and multifaceted differences depending on various socioeconomic contexts (Ahmed et al., 2024). This has led to some studies finding that female patients have higher satisfaction levels than male patients (Mini et al., 2025), while others show that men are more satisfied with the responsiveness aspect of healthcare services (Diwakar et al., 2024). Women tend to use healthcare services more frequently but are generally less satisfied than men in terms of accessibility, quality of care, or financial factors (Ahmed et al., 2024).

Gender differences in situations involving information reception, interaction with doctors, or general sensitivity create different psychological responses in each gender. Therefore, using gender as a control variable is necessary to determine whether gender differences impact perceived service quality and customer satisfaction. Based on the above arguments, the author proposes the following hypotheses:

H9a: Male patients perceive higher service quality than female patients.

H9b: Male patients report higher customer satisfaction than female patients.

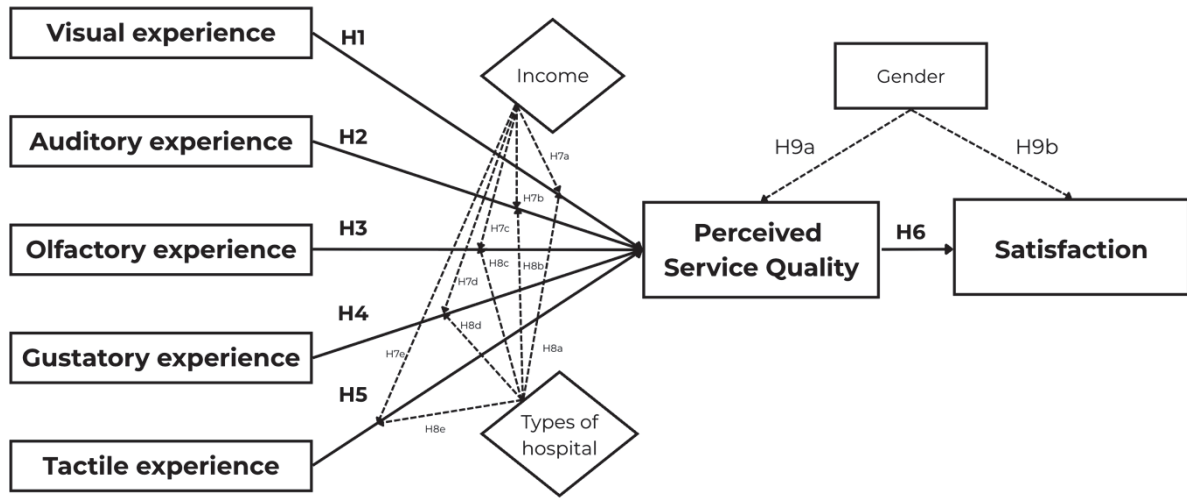


Figure 2.1: Proposed research model

Source: Compiled from the author's research results (2026)

CHAPTER 3. METHODOLOGY

3.1. Research process

The author specifically illustrates the research process of the topic using the following diagram:

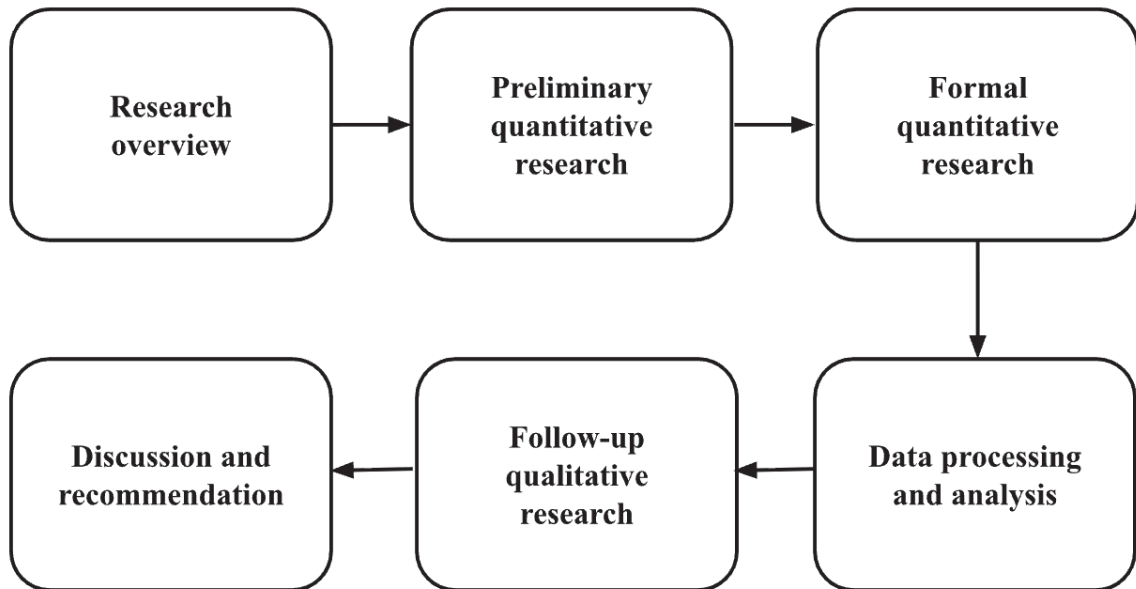


Figure 3.1: Research process design

Step 1: Research overview

With the aim of clarifying the theoretical basis and research overview, the author collected and selected secondary data from reputable domestic and international studies. Based on this, the author conducted a desk study using analysis, evaluation, and synthesis techniques to approach the research problem comprehensively and from multiple perspectives. Based on the results of this study, research gaps were identified, serving as the foundation for building the research model, and preliminary hypotheses and scales were proposed for the variables within the model. Additionally, the preliminary questionnaire was also designed based on secondary data and supplemented with relevant survey questions to ensure valuable data collection.

Step 2: Preliminary quantitative research

Quantitative research used in the preliminary survey stage to re-test the factor scales and adjust the research model to suit the subjects, context, and research questions posed. Simultaneously, the preliminary survey helps determine how well the scale works and reliability of the scale, which makes the main research better.

Step 3: Formal quantitative research

Based on the data collected from the preliminary survey, the author finalized the research model and simultaneously developed a survey questionnaire. Next, large-scale quantitative research was conducted both online and in person; surveys were distributed nationwide at public and private hospitals to ensure the objectivity of the study.

Step 4: Data processing and analysis

Formal quantitative data was categorized, coded, and processed using SPSS 29.0 and Amos 29 software to evaluate the research results.

Step 5: Follow-up qualitative research

After completing the quantitative data processing and analysis, the authors continued with supplementary qualitative research through semi-structured focus group interviews. This phase was not intended to re-test the research model, but rather to further explain some noteworthy quantitative results, as well as to clarify how patients interpret sensory signals in different contexts. The results of the interviews were used to support the discussion.

Step 6: Discussion and recommendation

Based on the results obtained above, the author discusses the research findings and proposes recommendations for relevant stakeholders. The author also analyze and clarify the limitations of the research as well as future research directions.

3.2. Preliminary quantitative research

All constructs in this study were measured using multi-item scales assessed on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). This measurement approach was adopted to capture respondents' subjective evaluations of their healthcare service experiences in a consistent and statistically analyzable manner. The first set of measurement questions was created by doing desk-based research, then improved through a multi-step scale development process that included both qualitative inquiry and initial quantitative testing. The measurement scales were specifically developed and modified based on previous research regarding sensory experience and healthcare service evaluation, particularly referencing the studies of Hultén et al. (2009), Krisna (2012), Ugolini et al. (2014), Jang & Lee (2019) and Kim et al. (2020), and were later refined to fit the context of public healthcare services in Vietnam.

A preliminary quantitative study was conducted to assess the comprehensibility of the survey for respondents and to test the effectiveness of the questionnaire through

analysis of the collected data. Based on this, the author synthesizes the issue, propose solutions, and adjust the scale to create a more suitable and effective official questionnaire, and to minimize unnecessary errors during data collection.

The final measurement scales were derived from established conceptualizations of sensory experiences, perceived service quality, and customer satisfaction, adapted to the healthcare context through qualitative validation. Specifically, sensory experiences was operationalized through five distinct dimensions corresponding to the five human senses: visual, auditory, olfactory, tactile, and gustatory. Each sensory dimension was measured using multiple observed items that reflected patients' direct experiential interactions with the healthcare service environment. Perceived service quality was measured as a unidimensional construct capturing patients' overall evaluations of healthcare service performance, while customer satisfaction was measured through items reflecting affective and cognitive responses to the service experience.

3.2.1. Testing the reliability of the preliminary scale

A pilot quantitative survey was conducted to assess the psychometric qualities of the initial measures. The author used Cronbach's Alpha coefficients and adjusted item-total correlations to check for internal consistency in the reliability analysis, then retained measurement items with Cronbach's Alpha values above acceptable levels and item-total correlations over 0.30, which showed that they were reliable (Nunnally & Bernstein, 1994; Trong & Ngoc, 2008). After that, Exploratory Factor Analysis (EFA) was used to look at the underlying factor structure and check the validity of the hypothesis. The author employed Principal Axis Factoring with Promax rotation and got rid of items with factor loadings below 0.50 or cross-loading problems (Hair et al., 2014). As a result of this iterative process, several items were eliminated or rephrased to improve scale coherence and discriminant clarity. The final set of measuring items used in the official survey showed that they were reliable and had some validity, making sure that each question that was kept added a significant value to its targeted latent variable without being redundant or overlapping with other concepts.

In fundamental tests, research usually avoids looking at a single variable less than 50 observations. The sample size should be at least 100 observations (Hair et al., 2014). In the initial step of quantitative research, the author executed a preliminary survey of 165 observations, fulfilling the minimal criteria. Preliminary data were processed using SPSS 29 software, preliminary scales were tested with Cronbach's Alpha (α) reliability coefficients, and the total variable correlation coefficient was calculated. An alpha coefficient within the range of > 0.8 is a very good scale; > 0.7 is a good scale; > 0.6 is

a scale that meets the conditions (Trong & Ngoc, 2008). Variables with a corrected item-total correlation coefficient ≥ 0.3 meet the requirements (Nunnally & Bernstein, 1994).

Subsequently, Exploratory Factor Analysis (EFA) was employed to examine the underlying factor structure and assess construct validity. Principal Axis Factoring with Promax rotation was used, and items with factor loadings below 0.50 or cross-loading issues were removed (Hair et al., 2014). This iterative procedure led to the removal or rewording of certain components to make the scale more coherent and the discriminant clearer. The final set of measuring items used for the official survey represented constructs that showed good reliability and preliminary validity. This made sure that each item contributed significantly to its intended latent variable without being redundant or overlapping with other concepts.

3.2.2. The validity of the scale

Exploratory Factor Analysis (EFA) was used to assess the validity of the scale. This method assesses the homogeneity of the component items and is expected to have a significant relationship with the same factor. In this case, factors with a factor loading < 0.5 will be excluded. The factor extraction method is the Principal Axis Factoring method with Promax rotation and stopping when extracting factors with an Eigenvalue of 1. The scale is considered acceptable when the total extracted variance is $\geq 50\%$ and the factor loadings are 0.5 or higher (Hair et al., 2014).

After the pilot testing and EFA procedures, a total of 40 measurement items were retained for the survey, distributed across the study constructs. These included items measuring Visual experience, auditory experience, olfactory experience, tactile experience, gustatory experience, perceived service quality, customer satisfaction. All retained items demonstrated acceptable reliability and factor structure, providing a solid empirical foundation for subsequent confirmatory analyses. This systematic scale development process ensured that the measurement instruments were both theoretically grounded and empirically robust, enhancing the credibility and validity of the findings.

Although some observed variables did not meet the standard threshold, the goal of the preliminary testing phase was to provide a basis for presenting a more objective interpretation of the observed variables, aiming to achieve a higher level of correlation when measuring the variables in the research model. The observed variables that did not meet the standard threshold were adjusted to better align with the goal of measuring the variables, while also ensuring objective discrimination based on reinterpreting the scales. The final verification goal, aimed at screening and refining the measurement framework for the variables, will be carried out during the formal quantitative research.

3.2.3. Measurement scales

The goal of the topic is to exploit the patient's perception of the surrounding environment through the senses. Therefore, the author considers using the formative measurement by Wiedmann et al. (2018), developed five aspects of sensory experience which assesses the servicescape directly from the customer's lens, focusing on their subjective feelings and perceptions of surrounding physical stimuli in high-end hotels (e.g., pleasant sounds, delicious food, beautiful space...). In addition, to adapt the context to the healthcare environment, the author refers to the 5 senses ward model by Ugolini et al. (2014). However, since Ugolini's original scales were a self-assessment checklist for managers, the author only explores the characteristic elements of healthcare to adapt the questionnaire of Wiedmann et al. (2018).

Furthermore, the author also reinforcing the theories of Hultén et al. (2009) and Krishna (2012) on sensory perception, as well as the practices of the healthcare context in Vietnam. From these perspectives, the author expects to accurately and objectively measure the impact of service environment factors on patient perception of quality and satisfaction with a Likert-type rating scale.

Through the aforementioned multi-faceted approach, the author explores the elements of servicescape in the healthcare industry across all five sensory experiences. Visual experience includes signage, lighting, facilities, spatial design, and even the evaluation of healthcare staff. Acoustic experience encompasses noise, sounds in common areas, private rooms, medical equipment, music, announcements from hospital loudspeakers, and the voices of healthcare staff. Olfactory experience includes smells, odors in the general space, the room, and especially from restrooms, other patients, or healthcare staff, as well as food odors. Regarding gustatory experience, the thesis primarily focuses on the taste, flavor, and cleanliness of food and beverages perceived by patients. Finally, regarding the tactile experience, this includes the comfort of the seating, equipment, and instruments used during examinations and hospital stays, as well as the room temperature and the way healthcare staff touch the patient.

The scale was constructed through a contextualization process. Wiedmann et al. (2018) was used as a reference basis for the structure of the five sensory groups, while Ugolini et al. (2014), Hultén et al. (2009), Krishna (2012), and Vietnamese hospital practices were used to adjust the content of the observed variables accordingly. Therefore, the observed variables were not transferred exactly from the hotel context, but were adjusted to measure the actual sensory experience of patients in the hospital.

Table 3.1. The explanation of the scale design, inherited from Wiedmann et al. (2018), other references and practices

Codes	Proposed items	Referenced items from Wiedmann et al. (2018)	Explanation & Sources
<i>Visual</i> VE1	Information/recommendation boards are clear and easy to read	V5. Luxury hotels are a real eye-catcher <i>(VE1 and VE2 capture two distinct functions: information clarity and spatial orientation).</i>	Clear signs act as visual eye-catchers that attract attention and provide orientation.
<i>Visual</i> VE2	Direction signs/maps are clear and help me find the correct department/room quickly		Adapts the eye-catcher concept to directional signs, measuring how visual clarity assists in quick orientation and reduces patient anxiety.
<i>Visual</i> VE3	The hospital grounds (corridors, clinics, etc.) are airy, spacious, and clean	V2. Luxury hotels are very nice to look at V6. Luxury hotels have a premium design	Assesses the overall visual appeal of the physical servicescape, reflecting the focus on physical structure, spaces proposed by Ugolini et al. (2014)
<i>Visual</i> VE4	The examination surface, bed, pillowcases appear clean and smooth	V2. Luxury hotels are very nice to look at V6. Luxury hotels have a premium design	Evaluates the visual cleanliness of hospital beds and examination surfaces (Ugolini et al., 2014) as a key visual cue for inferring service quality
<i>Visual</i> VE5	The wall color and decorations look pleasant and consistent	V1. The appearance of luxury hotels is very attractive V3. Luxury hotels have an appealing style V4. Luxury hotels are a feast for the eyes.	Assesses the aesthetic appeal, focusing on the pleasantness of wall colors and decorations (Ugolini et al., 2014) from the patient's subjective view
<i>Visual</i> VE6	The natural light (from the window/opening) where I am sitting/being treated is pleasant		Evaluates visual comfort based on the pleasantness of natural outdoor light sources in the treatment or waiting areas (Ugolini et al., 2014)
<i>Visual</i> VE7	Soft, non-glaring lighting, bright enough for examination and care activities		Assesses subjective evaluation of indoor artificial lighting, shifting from a functional check (Ugolini et al., 2014) to visual comfort

Codes	Proposed items	Referenced items from Wiedmann et al. (2018)	Explanation & Sources
<i>Visual</i> VE8	The staff's appearance and gestures are friendly	Supplemented from Ugolini et al. (2014)	Evaluates the visual cues generated by contact personnel, focusing on the friendliness of staff appearance (Ugolini et al., 2014)
<i>Visual</i> VE9	The staff's examination gestures appear professional and careful	Supplemented from Hultén et al. (2009)	Patients evaluate professionalism by visually observing the manipulation and gestures of doctors, serving as a crucial visual cue (Hultén et al., 2009)
<i>Acoustic</i> AE1	The waiting/examination area is usually quiet and not noisy	A2. The sound scape in luxury hotels is very pleasant A3. The sounds in luxury hotels are wonderful	Evaluates the overall acoustic atmosphere, defining a pleasant soundscape by monitoring the absence of disturbing noise (Ugolini et al., 2014)
<i>Acoustic</i> AE2	I rarely hear screaming or moaning from other patients where I am waiting/being treated	A2. The sound scape in luxury hotels is very pleasant	Assesses acoustic comfort by the absence of distressing sounds, such as hearing others moan in the ward (Ugolini et al., 2014)
<i>Acoustic</i> AE3	The sound from medical devices and instruments doesn't create a feeling of annoyance	A2. The sound scape in luxury hotels is very pleasant	Translates the evaluation of ambient sounds to a medical context, ensuring equipment noise (Ugolini et al., 2014) is not annoying.
<i>Acoustic</i> AE4	The sound from the hospital's public system is easy to hear and doesn't cause any annoyance	Supplemented from Vietnamese practice, supported by servicescape theory (Bitner, 1992; Ugolini et al., 2014; Zhou et al., 2020).	Addresses a specific acoustic element in the Vietnamese healthcare context (public announcement speakers), evaluating its clarity.
<i>Acoustic</i> AE5	Music (background music) in the hospital helps me feel relaxed	A1. The music in luxury hotels is very nice to listen to	Directly inherits Wiedmann's evaluation of background music, measuring its effectiveness in the service provision moments (Ugolini et al., 2014).

Codes	Proposed items	Referenced items from Wiedmann et al. (2018)	Explanation & Sources
<i>Acoustic</i> AE6	The healthcare worker's voice is easy to understand	A4. In luxury hotels, very appealing tones can be perceived Supplemented from Hultén et al. (2009)	Evaluates the acoustic aspect of human interaction. The voice is an element that expresses emotion and transmits empathy (Hultén et al., 2009; Ugolini et al., 2014).
<i>Olfactory</i> OE1	The scent in the examination area and patient rooms is pleasant	O1. In luxury hotels, it smells very nice. O2. The scent in luxury hotels is very pleasant	Evaluates the overall subjective pleasantness of ambient scents and the sources of smells in the hospital environment (Ugolini et al., 2014).
<i>Olfactory</i> OE2	The disinfectant smell is well-handled	O4. The odor in luxury hotels is delightful Supplemented from Ugonili et al. (2014)	A well-handled distinct hospital smell such as disinfectant (Ugolini et al., 2014) contributes to a clean olfactory experience.
<i>Olfactory</i> OE3	The bathroom smell is well-handled	O3. The fragrance in luxury hotels is very appealing. O4. The odor in luxury hotels is delightful	Evaluates the olfactory control of stressful odors (Ugolini et al., 2014) in bathrooms within the Vietnamese healthcare context.
<i>Olfactory</i> OE4	The smell of bedsheets and patients' clothes is pleasant	O3. The fragrance in luxury hotels is very appealing. O4. The odor in luxury hotels is delightful	Assesses the personal pleasantness and freshness of localized scents like bed linen (Ugolini et al., 2014), especially relevant in overcrowded hospitals.
<i>Olfactory</i> OE5	Body odor (in general) is well-managed in hospitals	O3. The fragrance in luxury hotels is very appealing. O4. The odor in luxury hotels is delightful	Adapted from olfactory pleasantness/odor-control domain; contextualized for hospital-specific body-related odors (Ugolini et al., 2014) in hot climates.
<i>Olfactory</i> OE6	Food odors are well controlled and do not intrude into clinical areas	Assesses the pleasantness of hospital food smells (Ugolini et al., 2014) while ensuring they do not negatively intrude into clinical spaces.	Adapted from aroma/olfactory pleasantness domain; contextualized for food-related hospital odors.

Codes	Proposed items	Referenced items from Wiedmann et al. (2018)	Explanation & Sources
<i>Gustatory</i> GE1	The food at the hospital is to my taste	G5. The food in luxury hotels is very tasty	Evaluates the culinary experience based on personal taste preferences for food served by the hospital (Ugolini et al., 2014)
<i>Gustatory</i> GE2	The food at the hospital is diverse and easy to choose from	Supplemented from Hultén et al. (2009)	Assesses gustatory satisfaction through the diversity of choices, a key component of a positive food service experience (Hultén et al., 2009)
<i>Gustatory</i> GE3	The food at the hospital is guaranteed to be hygienic	Supplemented from Krishna (2012)	Evaluates food safety, which is a foundational prerequisite for any positive gustatory evaluation in a healthcare environment (Krishna, 2012)
<i>Gustatory</i> GE4	The food at the hospital is delicious	G1. The meals in luxury hotels are a real culinary delight G2. The meals in luxury hotels are a real pleasure G3. The food in luxury hotels is very delicious G5. The food in luxury hotels is very tasty	Directly measures the overall deliciousness of meals, moving beyond general questions (Ugolini et al., 2014) to subjective gustatory delight
<i>Gustatory</i> GE5	The water at the hospital doesn't taste strange	G4. The beverages in luxury hotels are very delicate Supplemented from Krishna (2012)	Evaluates the basic taste integrity of drinking water, playing a crucial role in the gustatory experience within healthcare (Krishna, 2012)
<i>Tactile</i> TE1	The chairs in the hospital waiting room are soft and comfortable	H1. The materials in luxury hotels feel absolutely good H2. The furnishings in luxury hotels are very nice to touch H5. Luxury hotels offer a cushy comfort	Evaluates haptic comfort by assessing seating in public areas where patients spend significant time, referencing physical comfort (Ugolini et al., 2014)

Codes	Proposed items	Referenced items from Wiedmann et al. (2018)	Explanation & Sources
<i>Tactile</i> TE2	The blankets, sheets, and pillows in the patient's room are soft and comfortable	H1. The materials in luxury hotels feel absolutely good H5. Luxury hotels offer a cushy comfort	Assesses the physical comfort and tactile pleasantness of beds and linen (Ugolini et al., 2014) from the patient's perspective
<i>Tactile</i> TE3	Suitable temperature within the premises and patient rooms	Supplemented from items related to room temperature (Ugonili et al., 2014)	Evaluates the ambient tactile sensation (thermal comfort) of the room temperature on the patient's skin (Ugolini et al., 2014)
<i>Tactile</i> TE4	The floor area is dry and non-slip	H1. The materials in luxury hotels feel absolutely good Supplemented from Hultén et al. (2009)	Assesses the physical environment's surface texture for safety and tactile comfort, translating to a secure physical feel (Hultén et al., 2009)
<i>Tactile</i> TE5	Medical personnel always use gloves and masks when diagnosing/treating	Supplemented from Krishna (2012)	Evaluates tactile safety. The use of physical barriers during touch prevents perceived product contagion (Krishna, 2012)
<i>Tactile</i> TE6	When examining/treating patients, healthcare workers carefully touch (press, feel, manipulate, poke)	Supplemented from items related to health staff (Ugonili et al., 2014)	Translates the concept of physical contact management (Ugolini et al., 2014) into the concrete action of careful and professional touch

Source: Compiled from the author's research results (2026)

As for the scales measuring perceived service quality and customer satisfaction, this thesis inherits and adapts from the studies of Lee et al. (2000), Tam (2004) and Kumar et al. (2013). Table 3.2 below summarizes all valid scales that were adjusted by the author after the preliminary survey process. Based on the new set of scales (observed variables), the author designs the formal questionnaire, the most important information gathering tool used for formal quantitative research.

Table 3.2. The official research scales

Visual experience (VE)	
VE1	Information/recommendation boards are clear and easy to read
VE2	Direction signs/maps are clear and help me find the correct department/room quickly
VE3	The hospital grounds (corridors, clinics, etc.) are airy, spacious, and clean
VE4	The examination surface/bed/pillowcases appear clean and smooth
VE5	The wall color and decorations look pleasant and consistent
VE6	The natural light (from the window/opening) where I am sitting/being treated is pleasant
VE7	Soft, non-glaring lighting, bright enough for examination and care activities
VE8	The staff's appearance and gestures are friendly
VE9	The staff's examination gestures appear professional and careful
Auditory experience (AE)	
AE1	The waiting/examination area is usually quiet and not noisy
AE2	I rarely hear screaming or moaning from other patients where I am waiting/being treated
AE3	The sound from medical devices and instruments doesn't create a feeling of annoyance
AE4	The sound from the hospital's public address system is easy to hear and doesn't cause any annoyance
AE5	Music (background music) in the hospital helps me feel relaxed
AE6	The healthcare worker's voice is easy to understand.
Olfactory experience (OE)	
OE1	The scent in the examination area and patient rooms is pleasant
OE2	The disinfectant smell is well-handled
OE3	The bathroom smell is well-handled
OE4	The smell of bedsheets and patients' clothes is pleasant
OE5	Body odor (in general) is well-managed in hospitals
OE6	Food odors are well controlled and do not intrude into clinical areas

Gustatory experience (GE)	
GE1	The food at the hospital is to my taste
GE2	The food at the hospital is diverse and easy to choose from
GE3	The food at the hospital is guaranteed to be hygienic
GE4	The food at the hospital is delicious
GE5	The water at the hospital doesn't taste strange
Tactile experience (TE)	
TE1	The chairs in the hospital waiting room are soft and comfortable
TE2	The blankets, sheets, and pillows in the patient's room are soft and comfortable
TE3	Suitable temperature within the premises and patient rooms
TE4	The floor area is dry and non-slip
TE5	Medical personnel always use gloves and masks when diagnosing/treating
TE6	When examining/treating patients, healthcare workers carefully touch (press, feel, manipulate, poke)
Perceived service quality (PSQ)	
PSQ1	The overall quality of the hospital's services is good
PSQ2	The quality of medical services provided by the hospital is very impressive
PSQ3	The quality of medical services at the hospital meets high standards
PSQ4	The quality of medical services at the hospital exceeded my expectations
Customer satisfaction (SAT)	
SAT1	I am satisfied with the overall healthcare experience at the hospital
SAT2	I am satisfied with the service environment (space, facilities) of the hospital
SAT3	I am satisfied with the quality of service (staff, procedures) at the hospital
SAT4	Overall, I am satisfied with the aforementioned hospital (as a whole)

Source: Compiled from the author's research results (2026)

3.3. Formal quantitative research

After preliminary quantitative research, the author had additional grounds to proceed with the formal quantitative research process. The goal of this phase is to collect formal data related to sensory factors involved in the healing process and healthcare service experience. Simultaneously, explore the relationship and impact of sensory experiences on perceived service quality and customer satisfaction when experiencing healthcare services in Vietnam through data analysis. The author continued the formal quantitative research phase as follows:

3.3.1. Designing the survey form

Based on the research objectives, research problem, and research questions, the formal survey questionnaire was finalized, translated into Vietnamese (Appendix 1) with four sections:

Part 1: An introduction explaining the research purpose and confidentiality principles: basic information, the purpose and significance of the study, instructions on how to complete the survey, and how to process the information anonymously.

Part 2: Screening questions related to healthcare service experiences: collecting information about respondents' use of medical services through questions about their purpose for visiting the hospital, the hospital type (public/private), the form of medical examination and treatment, as well as information about the hospital and the locality where they received medical care. Additionally, the survey further explores the reasons for choosing, with the questions primarily in multiple-choice format, allowing respondents to select one or more options appropriate for each survey content.

Part 3: First, Measurement items assessing sensory experiences, perceived service quality, and customer satisfaction using a five-point Likert scale: Expectation Assessment: 7 statements surveying respondents' expectations when coming to the hospital. Second, Evaluating the quality of medical services in hospitals: measuring the level of respondents' expectations, agreement, satisfaction, and intention to return regarding the medical services they have experienced, these are the research scales for the independent, mediating, and dependent variables. The evaluations are based on the patient's experiences with several senses, such as sight, sound, smell, taste, and touch.

At the same time, measuring overall service quality, overall satisfaction, and the patient's willingness to return or recommend the hospital to others. The above arguments are rated on a 5-point Likert scale, with (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree, respectively. This makes it possible to count and analyze quantitative data.

Part 4: Demographic data including age, gender, job, income, and the place to live. The data collection method consists of multiple-choice questions or short essay questions, depending on the nature of each question.

3.3.2. Survey samples

Research subjects: This includes individuals who have had direct experiences with healthcare services at hospitals in Vietnam as patients. There are several selection criteria that are used to make sure that the data obtained is useful and relevant.

First, anyone who answer the questions must be between the ages of 18 and 70. This is the age range that has full legal ability and is conscious of their service experience. *Second*, participants must have had medical treatment in a hospital before, as the study is about how people feel about the quality of care and their overall satisfaction with it. This criterion is meant to make sure that the people answering the questions have enough knowledge and expertise to rate sensory aspects, service procedures, and overall levels of satisfaction. *Third*, only send questionnaires to patients undergoing routine health checkups, common medical examinations (e.g., colds, allergies, soft tissue pain, ultrasound/X-ray/imaging), and day treatments, or those with short-term stays of a few days. The purpose of this selection is to reach patients who are mentally capable of observing and feeling their surroundings, because if they are undergoing treatment for a serious illness, their only focus will be on whether the disease can be cured, or they may be too pained or exhausted to feel anything.

Finally, responders must fill out the entire questionnaire with no missing information to ensure the data is accurate and reliable for the analysis.

Survey period: Data collection took place over two months, from September to October 2025, and was conducted in small batches to ensure sufficient data collection of target groups meeting the requirements, as well as with a blend of online and offline survey methodologies to enhance coverage and respondent variety.

Sample size: 1,313 valid observations. Based on the requirement that the sample size should be at least five times the number of observed variables, and since 40 measurement items were kept after the first quantitative step, the minimum sample size needed was 200 observations.

Survey scope: The survey was done all throughout the country, including provinces and cities run by the central government. It was sorted and coded according to the Vietnamese administrative unit list from July 1st, 2025. This includes 31/34 provincial-level administrative units in the Northern, Central, and Southern regions with

the observations of 789, 268, 256, respectively. The survey was conducted across almost all 34 provincial-level administrative units, thereby ensuring the objectivity and representativeness of the research sample. Although there are still discrepancies in the number of samples between localities and some provinces have not yet collected data, the large sample size and nationwide distribution of the collected data meet the requirements for data analysis in the study.

3.3.3. Data collection and processing

Data collection method

The author uses the convenience sampling method. However, in practice, due to the specific characteristics of the survey subjects, the author could not fully access a comparable number of patients. Therefore, to minimize bias and distortion, the author regularly monitored the number of samples collected and adjusted the sampling locations to ensure relative diversity in the research sample. Specifically, the author focused on controlling respondents based on several important characteristics such as geographical area, age, gender, occupation, income level, residential area, hospital type used, and method of using medical services.

The author also combines online and in-person methods. The online survey was conducted using Google Forms and disseminated across widely used communication channels, including Messenger and Zalo, facilitating quick access for respondents across several provinces. Through referrals from respondents the author contacted initially, the author continued to connect with respondents in provinces and cities across all three regions of Vietnam. For groups of respondents that were difficult to access, the author proactively supplemented the survey with direct visits to hospitals and referrals. This approach helps to increase sample diversity, reduce the risk of over-concentration on a particular group of respondents, and still ensure feasibility in the context of collecting data on a large scale. After identifying eligible respondents as described earlier, the online questionnaire was sent out. At the same time, paper questionnaires were sent directly to specific public and private hospitals and healthcare facilities in major cities and provinces to collect data directly from patients currently staying at these facilities. With this direct approach, respondents were interviewed and answered while using the services, mostly older adults. This mixed-method technique reduced sample bias that comes from using only online responses and attracted more elderly people and those with higher incomes.

There were 1,485 questionnaires submitted. After the data was collected, a thorough process of screening and cleaning the data was carried out to make it better. If respondents chose more than one response when only one was permitted, left large parts of the questionnaire unanswered, gave the same answer to all questions, or demonstrated no prior experience with healthcare services, their answers were eliminated. Ultimately, 1,313 questionnaires remained that met the requirements for analysis.

Data processing

An organized, multi-step data analysis approach was used with SPSS 29.0 and AMOS to carefully look at the proposed study model and evaluate the hypotheses that went along with it. The investigation started with descriptive statistics to encapsulate respondents' demographic characteristics and healthcare consumption trends, including age, gender, occupation, income level, residential area, and visit frequency to public hospitals. The goal of this first phase was to give a general idea of the sample's characteristics and to make sure that the people who answered the questions had enough experience with healthcare services to give relevant feedback on sensory experiences, perceived service quality, and satisfaction.

After the descriptive analysis, Cronbach's Alpha reliability testing was performed to evaluate the internal consistency of all measuring scales pertaining to the five sensory aspects, perceived service quality, and customer satisfaction. In accordance with recognized methodological standards, items exhibiting poor corrected item-total correlations were scrutinized and eliminated as needed to enhance scale reliability (; Nunnally & Bernstein, 1994; Hair et al., 2014). After confirming that the reliability was adequate, Confirmatory Factor Analysis (CFA) was used to check the measurement model. CFA was employed to validate the underlying component structure, examine convergent and discriminant validity, and assess the overall model fit utilizing widely recognized indices such as CMIN/df, CFI, GFI, and RMSEA (Hu & Bentler, 1999). After developing an acceptable measurement model, Structural Equation Modeling (SEM) was utilized to examine the proposed causal links among sensory experience characteristics, perceived service quality, and customer satisfaction. Finally, to examine whether income level and hospital type alters the strength of the relationship between sensory experiences and perceived service quality, a moderation analysis was conducted within the SEM framework using AMOS, enabling a robust assessment of income level and hospital type as the contextual moderator in perceived service quality formation.

The descriptive statistics show that the sample includes a wide range of patients who use healthcare services. Respondents were spread out throughout several age

groups, but most of them were in the working-age group, which is the group that goes to hospitals most often for regular treatment. The gender distribution was very even, which means that the results are not skewed by perceptions that are exclusive to one gender. The many types of jobs included students, paid workers, self-employed people, and retirees. This shows how healthcare services span a wide range of socioeconomic groups. socioeconomic levels were low, middle, and high, which showed that hospitals are accessible service providers for people of all socioeconomic levels. The people who answered lived in both rural and urban area. Furthermore, a significant number of hospital visits was reported, suggesting that respondents had sufficient acquaintance with the hospital setting to accurately assess service quality and satisfaction.

Cronbach's Alpha ratings were higher than the minimum values suggested in Hair et al. (2014), which showed that all ideas had good internal consistency. The CFA results also showed that the measurement model was good enough because the goodness-of-fit scores were high enough. This meant that the suggested theoretical structure fit the data well (Hu & Bentler, 1999). Large factor loadings and Average Variance Extracted (AVE) values that were higher than normal limits showed that the validity was convergent. The discriminant validity has been checked by comparing AVE values with inter-construct correlations. This showed that each construct represented a separate mental area.

It was possible to look at many direct connections within the suggested model at the same time using SEM analysis. This showed how sensory experiences affect service quality and customer happiness. This is the best way to do it because sensory inputs are difficult and how people see the level of service affects how they see them. The comparison study showed how wealth and the hospital type affected patients' physical experiences and how good they thought the service was, considering the different types of patients who gave their opinions. examining the method's feasibility and the model's veracity at this stage. The findings section displays the statistical data and results of the hypothesis test.

3.3.4. Sample description

During the formal data collection process, questionnaires were administered through two survey methods: online self-administered questionnaires and in-person questionnaire. After the data collection and screening process, 1,487 responses were collected (1,267 online, 220 in-person) for the study and there are 1,313 valid questionnaires (1,128 online, 185 in-person). The sample demonstrates a relatively

diverse demographic profile, covering differences in age, gender, residential area, occupation, and income level, thereby capturing multiple perspectives of healthcare service users in Vietnam.

Although people of different ages were tried to be included, the sample is skewed toward younger people. The age group between 18 and 25 makes up the largest share, 37.2% (n = 489). The age group between 41 and 55 comes in second, with 27.9% (n = 366). Generation Z, Millennials, and a big group of middle-aged people make up most of the sample. This means that the sample includes both younger users who are more interested in technology and older users who have used healthcare services more often. A lot of younger people filled it out, which is not a surprise since they are more likely to know how to use online polls and be willing to share their thoughts and experiences.

In terms of gender, even though there were no gender-based criteria in the survey, the data show that more women (60.8%) than men (39.2%) took part. There were 798 valid replies from women and 515 from men. This distribution is in line with the Vietnamese context, where women typically make important decisions about health care for themselves.

According to the National Statistics Office (2026), the average per capita income reached VND 5.4 million/person/month, with the wealthiest households (comprising the top 20% of the population) having an average income of VND 11.8 million/person/month. Income also varies across geographical areas, and is relatively higher in urban and lowland areas. The sample is mostly made up of people with low to intermediate incomes when it comes to monthly income. About 32.8% of those who answered said they earned less than VND 5 million a month, while 25% said they earned between VND 8 million and VND 15 million. Only 5.5% of people earn between VND 25 million and VND 40 million per month, and only 2.9% earn more than VND 40 million per month. This means that higher-income groups are not well represented.

When look at the sample's job structure, this income distribution seems fair. Students make up the largest group of workers, with 34.5%. Self-employed people come next, with 15.6%, and public-sector workers come last, with 12%. The survey also covers people from various job groups, such as highly trained professionals (8.5%), office workers (8.3%), and unskilled laborers (7.6%). The variety of jobs in this sample shows that it is not limited to one social group but rather includes a wide range of people who utilize healthcare services. However, the significant number of students, as well as retirees, housewives, and self-employed individuals, also leads to a considerable number of people in the lower income groups.

Lastly, most of the people who answered (65.7%) live in cities or urban areas (including mountainous provinces), which usually have more healthcare alternatives, both public and private. This urban concentration reflects a competitive healthcare market, where service providers can no longer rely solely on clinical outcomes but must also differentiate themselves through superior service environments and a pleasant service atmosphere to sustain high levels of satisfaction.

Table 3.3. Demographic characteristics and Healthcare utilization patterns

Variables	Categories	Frequency (Percentage)
Age	18-25 years old	489 (37.2%)
	26-40 years old	214 (16.3%)
	41-55 years old	366 (27.9%)
	56-70 years old	244 (18.6%)
Gender	Male	515 (39.2%)
	Female	798 (60.8%)
Income level	≤ 5 million	431 (32.8%)
	> 5 - under 8 million	256 (19.5%)
	8 - under 15 million	328 (25%)
	15 - under 25 million	188 (14.3%)
	25 - under 40 million	72 (5.5%)
	Above 40 million	38 (2.9%)
Living area	Urban area	863 (65.7%)
	Rural area	450 (34.3%)

Source: Compiled from the author's research results (2026)

3.4. Follow-up qualitative research

Qualitative research objectives

Following the quantitative analysis, the author supplemented it with qualitative interviews following a sequential explanatory design. This phase was not aimed at

constructing a new, independent qualitative model, but rather at clarifying some noteworthy quantitative findings, such as differences in the level of sensory impact, the meaningless outcomes of olfaction, and how patients from different income groups and hospital type interpreted sensory signals. Therefore, the qualitative results are supplementary, helping to explain and contextualize the SEM results in the Vietnamese hospital environment. The objectives of this section include:

- *First*, why olfactory experience does not significantly impact patients' perceptions of service quality.

- *Second*, clarifying how patients interpret different sensory signals between public and private hospitals, across different income groups. Gender was recorded and balanced where possible within each group to support interpretation of gender-related control effects.

- *Third*, clarifying the moderating mechanisms of income level and hospital type and income level on patient expectations, the controlling mechanism of gender and hospital type well as the interpretive pathway through which sensory experiences are translated into perceived service quality and satisfaction.

Qualitative research design

- *Research method*: semi-structured focus group interviews.

- *Interview format, location, duration, and approach principles*: interviews were conducted face-to-face with patients at the medical facility, allowing respondents to truthfully reflect their feelings about the surrounding environment. The average interview duration for each group was 60 minutes. The author clarified to respondents from the outset that the interview was not intended to assess the doctor's professional competence or treatment results, but only to understand the service experience from the patient's perspective.

- *Sample size and characteristics*: 28 respondents purposefully selected to maximize variation across income and hospital type, each of four groups included seven respondents. The four groups are:

- (1) Low-income patients at public hospitals;
- (2) High-income patients at public hospitals;
- (3) Low-income patients at private hospitals;
- (4) High-income patients at private hospitals.

The author grouped respondents according to an income threshold of 15 million VND/month, including a group earning less than 15 million VND and a group earning 15 million VND or more. According to the General Statistics Office (2026), the average per capita income is approximately 5.4 million VND/month, while the highest-income household group reaches 11.8 million VND/person/month. Simultaneously, the median income in Vietnam is recorded at approximately 14.9 million VND/month. Therefore, participants with incomes below 15 million VND/month are classified by the author as low and middle income groups, while those with incomes of 15 million VND/month or more are classified as higher income groups for qualitative comparison purposes. This threshold is not intended to represent the official income classification system, but is used to differentiate between patients with limited financial means and those who have the means to choose, compare, and pay for different healthcare services.

Gender was also noted and considered as an additional characteristic within the groups, to capture potential differences in gender-related experiences, each focus group included both gender: male and female. All patients met the demographic and health criteria as outlined in the respondent criteria for the quantitative research method.

Qualitative data processing and analysis method

Qualitative data was collected through focus group discussions aimed at further explaining the results obtained from the quantitative study. The data analysis process was carried out using the thematic analysis method proposed by Braun & Clarke (2006), through four main steps and adapted to the author's research practice.

Step 1: Familiarizing yourself with the data

All focus group discussions were recorded with the consent of the participants. The author read and reviewed the recordings immediately after the session. The author also noted the key ideas, comments, and trends from the participants' statements.

Step 2: Generating initial codes

After completing the recording synthesis process, the data was coded. At this stage, meaningful statements were identified and assigned codes reflecting the core content of those statements. The coding process is performed iteratively to ensure that the codes accurately reflect the content and meaning of the original data.

Step 3: Themes development (searching, reviewing, defining, and naming)

Codes with similar content are grouped into themes at a higher level of generalization to reflect the patterns of meaning that appear in the data. Themes are built

based on the repetition of opinions and the degree of relevance to the quantitative results that need to be interpreted. These themes are reviewed and adjusted multiple times to ensure consistency, representativeness, and the ability to explain the findings from the quantitative study.

Step 4: Writing up

After identifying the themes, the study compares the content between different patient groups to clarify the role of the moderating variables discovered in the quantitative study, including hospital type and income level. Similarly, the topics were compared between low-income and high-income patient groups to explore differences in the interpretation and evaluation of sensory experiences. Finally, the topics were linked to quantitative findings to further explain the relationships tested in the research model. In particular, qualitative results were used to clarify why olfactory experiences did not significantly affect perceived service quality and patient satisfaction, and to explain the moderating role of income level and hospital type in the relationship between sensory experiences and perceived service quality.

CHAPTER 4. RESEARCH RESULTS

4.1. Descriptive statistical insights into sensory experiences and perceived service quality and satisfaction in Vietnamese hospitals

Descriptive statistics consist of numerical measures that are commonly used to provide an overview of a dataset and to reflect key characteristics of the sample, such as central tendency. In this research, these statistical techniques are applied to examine patients' multi-sensory experiences, perceptions, and overall satisfaction with healthcare service quality in Vietnam. The analysis is based on Mean scores obtained from responses measured on a five-point Likert scale. For ease of interpretation, the Mean values are grouped into five ranges: 1.00-1.80 indicates Strongly disagree; 1.81-2.60 represents Disagree; 2.61-3.40 corresponds to Neutral; 3.41-4.20 reflects Agree; and values above 4.20 denote Strongly agree.

Overall, the descriptive results of the thesis show that the dimensions of sensory experience have relatively positive average scores. However, some observed variables have relatively high standard deviations, reflecting that patient evaluations are not entirely uniform. This is acceptable and theoretically significant in this study, given the large and diverse sample size, including patients from various age groups, income levels, and residential areas, as well as those using both public and private hospitals.

In the healthcare context, sensory experience is inherently subjective and can vary depending on the specific hospital environment, service usage situation, and individual patient expectations. Therefore, high standard deviations do not necessarily weaken the descriptive results. On the contrary, they may indicate the existence of differences in patient perceptions. This also reinforces the need for further analyses of moderating and control variables, including income, hospital type, and gender, to more clearly understand how different patient groups assess sensory cues, perceived service quality, and satisfaction.

4.1.1. *Visual experience*

Within the mean scores of visual experience (VE), the average value for this experience at hospitals in Vietnam is 3.91, while the specific items' mean fall within the range from 3.41 to 4.20, which corresponds to the *Agree* category. Such a finding indicates that, in general, patients and their families have a positive perception of visual elements throughout their medical service experience.

Specifically, regarding Visual experience related to the physical environment, respondents provided high average scores for several key indicators: “Soft, non-glaring lighting that is sufficient for examination and care” (3.95); “The hospital premises (corridors, clinics, etc.) are airy, spacious, and clean” (3.94); and “Clear signage/maps that help me find the correct department/room quickly” (3.92). These results indicate that elements such as lighting systems, navigational signage, and spatial design are well-regarded by customers and successfully meet their expectations. Only two indicators, relating to wall colors/hospital decoration (3.77) and natural lighting (3.78), received slightly lower scores compared to the others, even though they remain within the *Agree* range. Consequently, strategic recommendations should focus more heavily on improving these two factors to further enhance the overall patient experience.

Table 4.1. Descriptive statistics for measurement items of Visual experience

Items	Mean	SD
Information/recommendation boards are clear and easy to read	3.93	.837
Direction signs/maps are clear and help me find the correct department/room quickly	3.92	.912
The hospital grounds (corridors, clinics, etc.) are airy, spacious, and clean	3.94	.940
The examination surface/bed/pillowcases appear clean and smooth	3.90	.893
The wall color and decorations look pleasant and consistent	3.78	.922
The natural light (from the window/opening) where I am sitting/being treated is pleasant	3.77	.952
Soft, non-glaring lighting, bright enough for examination and care activities	3.95	.836
The staff's appearance and gestures are friendly	3.91	.902
The staff's examination gestures appear professional and careful	4.11	.820
Average mean	3.91	.890

Source: Compiled from the author's research results (2026)

Regarding Visual experience associated with medical staff, the direct service providers, respondents rated “examination procedures” (4.11) and “appearance and gestures” (3.91) at the *Agree* level. This suggests that patients maintain a positive

perception of the friendliness, attentiveness, and professional competence exhibited by medical personnel during the treatment process.

4.1.2. Auditory experience

The results indicate that the mean score for auditory experience (AE) among patients utilizing medical services in Vietnam is 3.64. This value falls within the range from 3.41 to 4.20, which signifies the *Agree* category. Such a finding suggests that, overall, customers maintain a relatively positive perception of auditory elements throughout their service journey.

Specifically, the statement “The sound from the hospital’s public address system is easy to hear and doesn’t cause any annoyance” recorded the highest average value at 3.82, followed by “The healthcare worker’s voice is easy to understand” with the same result. These results indicate that most customers do not feel bothered and are easy to understand by typical, frequent hospital sounds, such as public announcements or the mechanical noises emitted by equipment during the examination and treatment process.

Table 4.2. Descriptive statistics for measurement items of auditory experience

Items	Mean	SD
The waiting/examination area is usually quiet and not noisy	3.38	1.092
I rarely hear screaming or moaning from other patients where I am waiting/being treated	3.63	1.048
The sound from medical devices and instruments doesn’t create a feeling of annoyance	3.81	.909
The sound from the hospital’s public address system is easy to hear and doesn’t cause any annoyance	3.82	.865
Music (background music) in the hospital helps me feel relaxed	3.35	.973
The healthcare worker’s voice is easy to understand.	3.82	.903
Average mean	3.64	.965

Source: Compiled from the author’s research results (2026)

On the other hand, the statement “Music (background music) in the hospital helps me feel relaxed” received the lowest score of 3.35, falling into the *Neutral* category. This suggests that patients do not have a strong perception of it, because they do not find the music overtly irritating and beneficial either. This neutral rating highlights a

potential misalignment in the selection, arrangement, and operation of music within the hospital environment. If background music is not carefully designed regarding genre, volume, timing, and spatial application, it may become ineffective, fail to induce relaxation, or be drowned out by other ambient noises.

4.1.3. Olfactory experience

The mean score of customers' evaluations of olfactory-related sensory factors (OE) when experiencing healthcare services at public hospitals is 3.54, which indicates that patients generally hold positive perceptions and express favourable evaluations regarding odors within the medical environment.

The item "The bathroom smell is well-handled" obtained the lowest average score of 3.32, reflecting a neutral level. This result implies that respondents neither express clear satisfaction nor strong dissatisfaction with restroom odors. Managing this aspect remains particularly difficult in hospital settings, as these facilities serve large numbers of users and experience constant restroom traffic, which makes the complete control of unpleasant smells challenging.

Table 4.3. Descriptive statistics for measurement items of olfactory experience

Items	Mean	SD
The scent in the examination area and patient rooms is pleasant	3.45	.986
The disinfectant smell is well-handled	3.56	.963
The bathroom smell is well-handled	3.32	1.067
The smell of bedsheets and patients' clothes is pleasant	3.55	.933
Body odor (in general) is well-managed in hospitals	3.51	.935
Food odors are well controlled and do not intrude into clinical areas	3.81	.890
Average mean	3.54	.962

Source: Compiled from the author's research results (2026)

In contrast, odors related to disinfectants, food, bed linens, and clothing were all assessed at the agree level, with mean scores ranging from 3.51 to 3.56. This suggests that patients and their companions generally tolerate and become accustomed to the typical smells present in hospitals, rather than viewing them as disruptive to their overall

service experience. The positive evaluation of these odors indicates that they meet basic expectations regarding cleanliness, hygiene, and environmental order within medical environments.

4.1.4. Gustatory experience

According to the survey, the mean score for gustatory experience (GE) in Vietnamese hospitals reached 3.45, placing it within the *Agree* range. This result indicates that customers generally maintain a positive perception of the quality of food and beverages provided by the hospitals, finding them to be at a satisfactory level during their service experience.

The statement “Drinking water in the hospital has no unusual taste” recorded the highest average value in this category at 3.78, falling within the *Agree* range. In contrast, ratings for food service items fluctuated between 3.22 and 3.78, spanning from *Neutral* to *Agree*. This indicates that while the majority of customers do not highly praise the culinary offerings provided by hospitals, they find them acceptable.

Table 4.4. Descriptive statistics for measurement items of gustatory experience

Items	Mean	SD
The food at the hospital is delicious	3.28	.864
The food at the hospital is diverse and easy to choose from	3.33	.892
The food at the hospital is guaranteed to be hygienic	3.62	.842
The food at the hospital is delicious	3.22	.869
The water at the hospital doesn't taste strange	3.78	.922
Average mean	3.45	.878

Source: Compiled from the author's research results (2026)

This perception can be attributed to the fact that catering is viewed as a secondary or ancillary service in a healthcare setting. Since the main objective of patients is medical treatment, they tend to place less emphasis on the gustatory experience. As a result, hospitals have not yet made significant investments or innovations in their culinary services.

4.2.5. Tactile experience

The findings show that the average rating for patients' assessments of tactile experience (TE) in hospital services is 3.92, which indicates that most respondents have favorable impressions of touch-related elements, including temperature comfort, the quality of seating facilities, floor conditions, and physical contact with healthcare professionals throughout the examination and treatment procedures.

The statement "Medical personnel always use gloves and masks when diagnosing/treating" received the highest mean score at 4.29, corresponding to the *Strongly agree* level. This was followed by the item "When examining/treating patients, healthcare workers carefully touch (press, feel, manipulate, poke)", which achieved a mean value of 4.17. These features indicate that patients highly appreciate factors related to medical staff, particularly the way physical contact during examinations and the strict adherence to hygiene and safety protocols throughout diagnosis and treatment.

Table 4.5. Descriptive statistics for measurement items of tactile experience

Items	Mean	SD
The chairs in the hospital waiting room are soft and comfortable	3.49	1.001
The blankets, sheets, and pillows in the patient's room are soft and comfortable	3.62	.908
Suitable temperature within the premises and patient rooms	3.84	.841
The floor area is dry and non-slip	4.10	.815
Medical personnel always use gloves and masks when diagnosing/treating	4.29	.800
When examining/treating patients, healthcare workers carefully touch (press, feel, manipulate, poke)	4.17	.804
Average mean	3.92	.862

Source: Compiled from the author's research results (2026)

In addition, the proper use of protective medical equipment not only ensures safety but also contributes to a sense of cleanliness, reassurance, and comfort for patients during direct skin contact. The items concerning the comfort of seating in waiting areas and the softness of bed linens recorded average scores that remained within the agree level, at 3.49 and 3.62 respectively. While these ratings are somewhat lower compared to other tactile-related attributes, they nonetheless indicate generally favorable perceptions among patients.

4.2. Common method bias assessment

In this study, the risk of Common method bias (CMB) is considered because both the independent and dependent variables are measured using the same survey tool, which can increase the likelihood of bias and affect the reliability of the results (Das et al., 2022). In addition to designing a data collection process that ensures respondent anonymity and freedom from judgment, and allows for pausing and resuming the survey later (MacKenzie & Podsakoff, 2012), the thesis also conducts a Harman's single-factor test. The results show that the variance extracted from a single factor for the independent variables is 39.36%, when all variables in the model are included in the analysis, it is 40.28%, both below the recommended threshold of 50%. In addition, the study also applied the full collinearity assessment method using SmartPLS as proposed by Kock (2015). The results showed that the Variance Inflation Factors (VIFs) of all latent variables ranged from 1,000 to 2,720, all lower than the threshold of 3.3. Thus, the results provide evidence that CMV is not a significant threat to the reliability and validity of the research results.

Although the results of Harman's single-factor test indicate that common method bias is not a serious issue in this study, this does not mean that the possibility of common method bias can be completely ruled out. This is because the study data are based on patients' evaluations of sensory experience, perceived service quality, and satisfaction, which may be influenced by psychological state, personal expectations, or general impressions of the hospital. Therefore, while the Harman test results alleviate concerns about common method bias, the study's findings still require careful interpretation. This limitation will be further discussed in the section on study limitations and future research directions.

4.3. Reliability analysis of measurement scales

4.3.1. Cronbach's Alpha analysis

The reliability of the measurement scales was assessed using Cronbach's Alpha, was applied to examine the reliability of each sensory experience dimension in relation to perceived service quality and customer satisfaction in Vietnamese healthcare services. This ensures each construct consistently reflects the same underlying concept when patients evaluate their sensory experiences.

Hair et al. (2014) argue that in exploratory studies, a Cronbach's Alpha value of 0.6 or above can be regarded as an acceptable level of reliability. In contrast, Trong and Ngoc (2005) adopt a stricter viewpoint, indicating that coefficients between 0.8 and

close to 1.0 reflect strong and well-developed measurement scales, whereas values from 0.7 to under 0.8 remain adequate and suitable for empirical use. These threshold values provide an essential methodological basis for assessing whether the sensory experience measurement scales applied in this research satisfy the reliability requirements necessary for subsequent statistical procedures.

Table 4.6. Result of Cronbach's Alpha analysis

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item - Total correlation	Cronbach's Alpha if item deleted
VE1	31.27	26.767	.532	.867
VE2	31.29	26.300	.528	.868
VE3	31.27	25.247	.629	.859
VE4	31.30	25.072	.694	.853
VE5	31.43	25.012	.674	.855
VE6	31.44	24.991	.649	.857
VE7	31.26	25.557	.689	.854
VE8	31.30	25.662	.613	.860
VE9	31.10	27.085	.506	.869
AE1	18.42	12.141	.622	.794
AE2	18.17	12.315	.633	.790
AE3	17.99	13.133	.624	.793
AE4	17.98	13.472	.606	.797
AE5	18.46	13.238	.548	.808
AE6	17.99	13.603	.548	.808
OE1	17.75	14.208	.692	.845
OE2	17.64	14.295	.700	.844
OE3	17.88	13.803	.679	.848
OE4	17.65	14.307	.729	.839

Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item - Total correlation	Cronbach's Alpha if item deleted
OE5	17.69	14.267	.733	.838
OE6	17.39	15.986	.498	.876
GE1	13.95	7.729	.726	.797
GE2	13.90	7.659	.710	.801
GE3	13.61	8.138	.648	.818
GE4	14.01	7.655	.738	.793
GE5	13.45	8.554	.474	.865
TE1	20.02	9.964	.508	.813
TE2	19.89	9.585	.670	.773
TE3	19.67	10.079	.635	.782
TE4	19.40	10.153	.647	.780
TE5	19.22	10.710	.540	.802
TE6	19.34	10.700	.538	.802
PSQ1	11.04	5.427	.648	.861
PSQ2	11.31	4.770	.775	.811
PSQ3	11.29	4.647	.768	.813
PSQ4	11.52	4.620	.707	.841
SAT1	11.76	4.703	.800	.876
SAT2	11.87	4.707	.771	.886
SAT3	11.79	4.634	.792	.879
SAT4	11.70	4.845	.797	.877

Source: Compiled from the author's research results (2026)

Nevertheless, overly high Cronbach's Alpha coefficients should be interpreted with care. According to Tho & Trang (2011), values greater than 0.95 may suggest

problems such as item duplication, semantic overlaps, or an insufficient representation of the construct domain. Under these circumstances, despite the appearance of high internal consistency, the scale may suffer from limited conceptual coverage. Thus, an exceptionally high Cronbach's Alpha should not be automatically equated with superior measurement quality, and careful attention must also be given to the content validity of the scale items.

Besides, Cronbach's Alpha emphasizes the degree of interrelatedness among items rather than serving as a definitive criterion for retaining/removing individual observed variables. As argued by Nunnally & Bernstein (1994), item retention decisions should additionally rely on corrected item-total correlation coefficients. Observed variables with item-total correlations below 0.3 are considered weak contributors to the construct and are typically classified as noise variables, which should be eliminated to enhance scale reliability and clarity.

Table 4.7. Result of Cronbach's Alpha analysis by variables

Variables	Cronbach's Alpha	Corrected Item - Total correlation range	Eliminated items
Visual experience (VE)	.874	.506 - .694	0/9
Auditory experience (AE)	.826	.548 - .633	0/6
Olfactory experience (OE)	.871	.498 - .733	0/6
Gustatory experience (GE)	.847	.474 - .738	0/5
Tactile experience (TE)	.821	.508 - .670	0/6
Perceived service quality (PSQ)	.869	.648 - .775	0/4
Customer satisfaction (SAT)	.907	.771 - .800	0/4

Source: Compiled from the author's research results (2026)

A minimum requirement for conducting Cronbach's Alpha analysis is that each latent factor must be measured by at least three observed variables. All constructs included in this study satisfy this condition, thereby meeting the methodological prerequisites for reliability testing. Based on the collected survey data, reliability analysis was conducted using SPSS 29. The results of this analysis provide empirical evidence to confirm whether the sensory experience measurement scales are reliable and suitable for inclusion in the proposed research model, thereby supporting subsequent stages of quantitative analysis.

The statistical analysis indicates that all measurement scales achieved a Cronbach's Alpha coefficient surpassing 0.6. To ensure data integrity, the author conducted an item-total correlation assessment to filter out variables that failed to meet standard requirements. All individual indicators exhibited corrected item-total correlations exceeding 0.3 while remaining consistently lower than the composite Cronbach's Alpha values.

Consequently, these scales meet all necessary criteria for reliability and internal consistency, demonstrating that the data aligns well with the proposed theoretical models. Given these robust results, the study proceeds to the Confirmatory Factor Analysis (CFA) stage.

4.3.2. Confirmatory factor analysis

Confirmatory factor analysis (CFA) is employed to validate the factor structure and assess the overall compatibility of the research model with empirical data. This method enables researchers to refine observed variables based on their capacity to explain specific latent constructs, intentionally excluding the relationships between indicators of one latent variable and another. Consequently, CFA demands a rigorous theoretical framework; every proxy variable must have a clear conceptual justification before undergoing statistical testing. In this study, CFA serves as a pivotal validation stage to determine if the proposed measurement scales are appropriate for evaluating the influence of sensory experience on perceived service quality and customer satisfaction within the context of hospitals in Vietnam. Grounded in a five-sense model and supported by established theory, the analysis first evaluates the Model fit of the research framework against the collected dataset. Since each indicator was pre-identified as an independent, mediating, or dependent variable, the question is examined that how effectively these proxies represent the characteristics of their designated constructs. The assessment criteria included Composite reliability (CR), Convergent validity, and Discriminant validity.

Table 4.8. Model fit indices

Fit Index	Obtained Value	Recommended Threshold (Hair et al., 2019)
CMIN/df	4.738	Acceptable (≤ 5.00)
GFI	0.901	Good (≥ 0.90)
CFI	0.937	Good (≥ 0.90)
TLI	0.928	Good (≥ 0.90)
RMSEA	0.053	Good (≤ 0.08)

Source: Compiled from the author's research results (2026)

Regarding Model fit measures, the research follows the indices recommended by Hu & Bentler (1999) and Hair et al. (2019), including Chi-square (CMIN), degrees of freedom (df), Tucker-Lewis index (TLI), Comparative fit index (CFI), Goodness of fit index (GFI), and Root mean square error of approximation (RMSEA). Generally, a model is considered a good fit if $TLI \geq 0.90$; $GFI \geq 0.90$; $CFI \geq 0.90$; $CMIN / df \leq 5.00$; and $RMSEA \leq 0.08$. However, studies by Doll et al. (1994) and Baumgartner & Homburg (1996) indicate that GFI is highly sensitive to sample size and model complexity; therefore, a $GFI \geq 0.8$ is often deemed acceptable in practical research scenarios. The results demonstrated that the indicators for the independent variables successfully converged into five sensory experience factors. To achieve stronger model fit statistics, standardized residual covariances were examined, leading to the removal of five items and a reduction of the measurement scale from 40 to 34 indicators. The excluded items, TE5, TE6, VE1, AE1, AE2, AE5 belonged to the tactile, visual and auditory factors. In alignment with the criteria established by Hair et al. (2019), the current dataset, following the removal of specific items, retains 34 observed variables (> 30) and 1,313 valid responses (> 250). With a $CFI = .937 (\geq .90)$, the results indicate that $RMSEA = .053 (< .08)$ represent a high-quality fit. These statistical indices confirm that the discrepancy between the theoretical research framework and actual market conditions is negligible.

Table 4.9. Composite reliability results

Construct	CR	AVE
Visual experience (VE)	.874	.539
Auditory experience (AE)	.868	.524
Olfactory experience (OE)	.806	.511
Gustatory experience (GE)	.746	.495
Tactile experience (TE)	.855	.549
Perceived service quality (PSQ)	.872	.631
Customer satisfaction (SAT)	.907	.710

Source: Compiled from the author's research results (2026)

Regarding master validity measures, Composite reliability (CR), Convergent validity, and Discriminant validity were further assessed, as the proposed measurement scales were synthesized from various sources and certain observed variables might not effectively represent their underlying constructs. Composite reliability (CR) is a statistical measure used to evaluate the internal consistency of indicators within a scale

(Netemeyer et al., 2003). Similar to Cronbach's Alpha, CR values range from 0 to 1, where higher values, approaching 1, signify superior reliability. According to Nunnally & Bernstein (1994), a CR value > 0.7 is generally required for acceptance. As illustrated in Table 4.12, the CR indices for all latent constructs in this study range from 0.745 to 0.907, thereby confirming high levels of reliability across the model.

The assessment subsequently focused on Convergent validity and Discriminant validity among the variable groups. During the validation process, indicators VE2 and VE9 were removed due to low reliability coefficients to maintain the integrity of the scales. The remaining items were all retained as they showed no signs of weakness in their measurement properties and demonstrated a strong capacity to represent their respective latent constructs effectively.

Table 4.10. Factor correlation matrix

		1	2	3	4	5	6	7
VE	1	0.734						
AE	2	0.842***	0.715					
OE	3	0.761***	0.785***	0.724				
GE	4	0.639***	0.652***	0.552***	0.741			
TE	5	0.771***	0.739***	0.771***	0.515***	0.703		
PSQ	6	0.684***	0.700***	0.706***	0.579***	0.644***	0.794	
SAT	7	0.689***	0.751***	0.727***	0.526***	0.713***	0.883***	0.843

***: $p < 0.001$

Source: Compiled from the author's research results (2026)

Most constructs met the recommended AVE threshold; GE was slightly below .50 but acceptable given $CR > .70$ and theoretical justification, confirming Convergent validity. Although the AVE for the gustatory experience (GE) construct was slightly below .5 (.494). In some cases, an average variance extracted (AVE) value lower than the recommended threshold of 0.5 may still be acceptable if other reliability indicators meet the requirements. Specifically, in this study, the AVE of the gustatory experience (GE) variable reached 0.495, slightly lower than the recommended threshold. However, according to Fornell & Larcker (1981), AVE is a rather conservative indicator in assessing convergent validity, and in the case of high composite reliability (CR),

researchers can still conclude that the scale has acceptable convergent validity. In fact, the CR of the gustatory experience (GE) variable reached 0.746, exceeding the standard threshold of 0.6, indicating that the intrinsic reliability of the scale is assured.

Notably, more recent studies in the field of business and management such as Lam (2011) also support this view, accepting an AVE of around 0.4 in the context of a CR of 0.71. Therefore, although the AVE is not yet ideal, combined with a high CR, this result still allows us to conclude that the gustatory experience (GE) scale can be accepted in terms of convergent validity in the research model.

Finally, Discriminant validity was evaluated using the Fornell-Larcker criterion. This requires that the square root of the AVE for each construct (the bold diagonal values) be greater than the correlation coefficients between that construct and any other constructs in the model. There are strong correlations between variables (some reaching 0.885), but they do not exceed the square root of the AVE, confirming that each construct is distinct from the others. All correlations were statistically significant at the $p < 0.001$ level, further validating the robustness of the measurement framework.

The results of the Confirmatory factor analysis (CFA) led to the exclusion of eight substandard indicators, retaining 32 valid observed variables. These remaining items demonstrate a robust capacity to explain the characteristics of the seven latent constructs while strictly adhering to all statistical requirements. The comprehensive evaluation of model fit and validity confirms that the proposed research framework, centering on sensory experiences across five distinct dimensions, is perfectly aligned with both established theoretical foundations and the collected empirical data. This successful validation demonstrates that the measurement scales for the five senses experiences are reliable and structurally sound within the context of the study. Consequently, this includes testing the research hypotheses and performing a detailed assessment of the causal pathways between sensory experience, perceived service quality, and overall satisfaction using Structural equation modeling (SEM).

4.4. Measurement model validation

In addition to examining each sensory component that forms a multi-sensory healthcare experience, it is necessary to empirically test the proposed hypotheses to determine the extent to which these sensory elements influence patients' perceptions and overall satisfaction. Initial assessments of the measurement model, using Cronbach's Alpha and Confirmatory factor analysis (CFA), indicate that the measurement scales exhibit strong reliability and statistical validity. The findings further

suggest an acceptable model fit, thereby providing a credible basis for conducting more sophisticated multivariate analyses.

To gain deeper insight into these interrelated mechanisms, the present study applies SEM as the primary analytical approach. SEM is well-suited for examining complex, multidimensional relationships, particularly those linking the five sensory experience dimensions to satisfaction with perceived service quality serving as a mediating construct.

All statistical analyses are performed at a 95% confidence level ($p < 0.05$) to ensure the robustness and reliability of the estimated path coefficients. The use of SEM allows for the simultaneous assessment of both direct and indirect relationships within a unified structural framework, thereby offering a holistic view of how sensory-based marketing elements influence patient-related outcomes in public hospital settings. Detailed results of the structural model are presented in the subsequent sections.

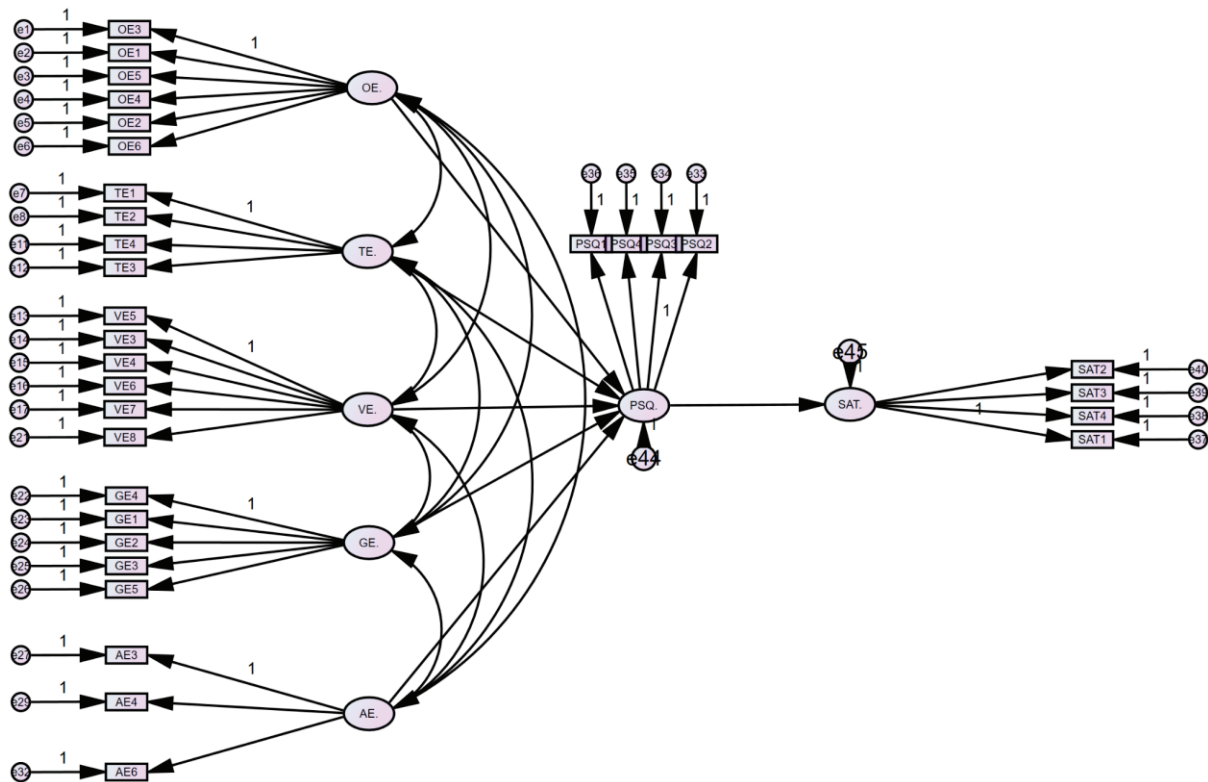


Figure 4.2. Structural Equation Model

Source: Compiled from the author's research results (2026)

4.4.1. The explanatory power of the model and structural relationships

The robustness and interpretative strength of the proposed research framework are thoroughly assessed using squared multiple correlation values. These indicators play

a pivotal role in evaluating how effectively the sensory-related independent variables explain variations in both the mediating and outcome constructs, specifically PSQ and SAT. The empirical results indicate a notably high level of explanatory capacity, highlighting the significant role of sensory marketing practices in shaping patient perceptions and satisfaction within Vietnam's healthcare sector.

In particular, the combined influence of the five sensory dimensions accounts for 64.9% of the variation in perceived service quality. This substantial proportion suggests that patients' judgments of service excellence are largely shaped by their multisensory experiences within the hospital setting. Furthermore, the model demonstrates an even more significant predictive capability regarding the ultimate outcome variable, explaining 84.1% of the factors contributing to customer satisfaction. In this framework, perceived service quality functions as a vital mediating mechanism, bridging the gap between initial sensory stimuli and long-term satisfaction. The remaining variance could be attributed to external factors outside the scope of this specific model, such as individual patient demographics, prior medical history, or unobserved random errors. Nevertheless, the squared multiple correlation values obtained far exceed the standard thresholds for social science research, confirming that the sensory marketing framework is exceptionally robust.

These results not only prove the strong correlation between the mediating and dependent variables but also highlight the strategic importance of sensory management in enhancing the overall healthcare experience.

4.4.2. Hypothesis testing

The structural equation modeling (SEM) results provide a robust statistical foundation for evaluating the proposed theoretical framework. The analysis reveals that the P-values for the majority of the hypothesized paths are less than .01, indicating that these relationships are statistically significant at a 99% confidence level. Consequently, the empirical data provides strong evidence that the independent variables exert a meaningful influence on the dependent constructs. However, the path corresponding to Hypothesis H3 yielded a P-value of .279, which fails to meet the required significance threshold. As a result, H3 is statistically rejected, while hypotheses H1, H2, H4, H5, and H6 are fully supported by the model.

Table 4.11. Summary of direct effect testing indicators

Hypothesis		Standardized estimate	P-Value (Sig)	Decision
H1	Visual experience (VE) → PSQ	.297	****	Supported
H2	Auditory experience (AE) → PSQ	.159	.002	Supported
H3	Olfactory experience (OE) → PSQ	.062	.279	Unsupported
H4	Gustatory experience (GE) → PSQ	.128	****	Supported
H5	Tactile experience (TE) → PSQ	.259	****	Supported
H6	PSQ → Satisfaction (SAT)	.913	****	Supported

Source: Compiled from the author's research results (2026)

Regarding the nature of these influences, the Unstandardized regression estimates for all accepted paths are positive. This positive directionality confirms that the independent variables, specifically the sensory experience factors, have a direct, favorable impact on both the mediating variable and the ultimate dependent variable. This suggests that as the quality of sensory marketing increases, there is a corresponding improvement in both perceived service quality and overall satisfaction. Regarding the strength of effects, the regression coefficients provide a basis for ranking the influencing factors. The findings reveal that Visual experience (VE) and tactile experience (TE) are the most influential determinants, showing the strongest associations with perceived service quality. This result emphasizes the significance of physical setting and direct, tangible interactions within healthcare environments. In addition, the results highlight the importance of the mediating construction, as perceived service quality accounts for 94.3% of the variation in customer satisfaction. Such a substantial level of explanatory power indicates that service quality serves as the primary foundation of customer satisfaction in the surveyed public hospitals, underscoring the need for healthcare managers to focus on improving service quality to enhance overall patient experiences.

The results of the tests in Tables 4.10 and Table 4.11 have fully outlined the causal mechanism of the research model. Considering the direct impact (Table 4.10), the data confirms that 4 out of 5 sensory experiences have a positive influence on perceived service quality (PSQ), with Visual experience playing a leading role. Furthermore, the perceived service quality variable itself shows a very strong direct influence on customer satisfaction (SAT) with a coefficient of 0.913 ($P < 0.001$).

Table 4.12. Summary of indirect effect testing indicators

	Hypothesis	Standardized estimate	P-Value (Sig)	Decision
H10a	Visual experience (VE) → PSQ → SAT	.271	.002	Supported
H10b	Auditory experience (AE) → PSQ → SAT	.145	.026	Supported
H10c	Olfactory experience (OE) → PSQ → SAT	.056	.349	Unsupported
H10d	Gustatory experience (GE) → PSQ → SAT	.117	.001	Supported
H10e	Tactile experience (TE) → PSQ → SAT	.237	.002	Supported

Source: Compiled from the author's research results (2026)

It is precisely from this strong direct link that the analysis of indirect impacts (Table 4.11) firmly confirms the important mediating role of perceived service quality. The data shows that the indirect relationships from visual, auditory, gustatory, tactile experience to customer satisfaction through perceived service quality are all supported with high reliability ($p\text{-value} < 0.05$). The magnitude of indirect impact was also completely consistent with direct impact: Visual and tactile sensations continued to generate the strongest indirect leverage (coefficients of 0.271 and 0.237, respectively), significantly outperforming auditory (0.145) and gustatory (0.117).

Conversely, consistent data completely refuted the presence of the olfactory experience (OE) variable at both direct ($p = 0.279$) and indirect ($p = 0.349$) impact levels. Thus, the statistics objectively demonstrated the S-O-R decoding mechanism: environmental stimuli (especially visual and physical contact) do not directly generate satisfaction, but must be transformed into final attitudinal outcomes by the patient through the perceived service quality perspective.

4.5. Examining the moderating role and controlling role

4.5.1. Examining the moderating role of income

The following analysis details the moderation effects of income levels on the relationship between sensory experiences and perceived service quality, based on the provided empirical results. The multi-group structural equation modeling was conducted to examine how different income brackets moderate the influence of sensory marketing on perceived service quality (PSQ). In this phase, olfactory experience (OE) was

excluded from the analysis due to its lack of statistical significance in prior testing. Consequently, the analysis focuses on the remaining four sensory dimensions: visual (VE), auditory (AE), gustatory (GE) and tactile (TE) experiences.

A notable characteristic of the sample is the predominance of respondents with a monthly income below 5 million VND, which provides a significant baseline for understanding the sensitivity of lower-income groups to sensory stimuli in a healthcare context. The moderation analysis reveals varying degrees of significance across the tested paths. The relationship between auditory experience (AE) and perceived service quality shows the highest level of statistical confidence (.072), with a p-value of .002. This indicates that income levels significantly moderate how patients perceive sound environments; specifically, for the majority lower-income group, acoustic comfort in public hospitals plays a vital role in their quality assessment. Similarly, the visual experience (VE) to perceived service quality path is significantly moderated by income ($p = .013$), suggesting that aesthetic elements and visual clarity are prioritized differently across income segments.

Table 4.13. Summary of moderating result indicators of income

Hypothesis		Standardized estimate	P-Value (Sig)	Decision
H7a	VE.INCOME → ZPSQ (Visual experience)	.053	.013	Supported
H7b	AE.INCOME → ZPSQ (Auditory experience)	.072	.002	Supported
H7d	GE.INCOME → ZPSQ (Gustatory experience)	.029	.217	Unsupported
H7e	TE.INCOME → ZPSQ (Tactile experience)	.047	.033	Supported

Source: Compiled from the author's research results (2026)

Furthermore, the impact of tactile experience (TE) on perceived service quality is also moderated by income levels, achieving significance at the .05 level ($p = .033$). This implies that the physical touchpoints and tangible comfort of hospital facilities are particularly influential for respondents in the lower-income bracket.

In contrast, the moderation analysis indicates that gustatory experience (GE) was excluded because its interaction effect with income yielded a p-value of .217, failing to reach statistical significance. In contrast, the relationships for visual, auditory, and tactile experience were successfully moderated. The results demonstrate that as income levels rise, the positive influence of these sensory experiences on perceived service quality is further amplified. Consequently, while lower-income groups form the majority, higher-income patients exhibit a stronger sensitivity to sensory stimuli, suggesting that increasing financial capacity intensifies the impact of sensory marketing on service evaluation.

4.5.2. Examining the moderating role of the hospital type

The following analysis examines the moderating effect of hospital choice on the relationship between sensory experiences and perceived service quality (PSQ), based on the provided multi-group structural equation modeling results.

In this phase of the study, hospital type, specifically the preference for private hospitals (1 equals to public; 2 equals to private), was analyzed as a moderating variable. Following the exclusion of olfactory experience (OE) due to its lack of statistical significance in prior structural models, the analysis focused on four key sensory dimensions: visual (VE), auditory (AE), tactile (TE), and gustatory (GE) experiences.

Table 4.14. Summary of moderating result indicators hospital type

	Hypothesis	Standardized estimate	P-Value (Sig)	Decision
H8a	VE.LHBV → ZPSQ (Visual experience)	-.003	.894	Unsupported
H8b	AE.LHBV → ZPSQ (Auditory experience)	.043	.071	Supported (90%)
H8d	GE.LHBV → ZPSQ (Gustatory experience)	.060	.011	Supported
H8e	TE.LHBV → ZPSQ (Tactile experience)	-.014	.550	Unsupported

Source: Compiled from the author's research results (2026)

The moderation results indicate distinct differences in how hospital type influence the impact of sensory stimuli on quality perception. The most significant finding relates to gustatory experience, where hospital choice exerts a strong moderating influence. The path for gustatory experience (GE) has a p-value of .011 and a positive beta of .060. Additionally, auditory experience (AE) was found to be moderated at a 90% confidence level, with a p-value of .071 and an estimate of .043. This suggests that private hospital users are more sensitive to the acoustic environment, where quieter, more professional soundscapes directly enhance perceived service quality.

Conversely, the moderating effects for visual experience (VE) and tactile experience (TE) were unsupported, returning high p-values of .894 and .550, respectively. This implies that while visual and tactile elements are important, their influence on perceived service quality does not significantly fluctuate based on whether the patient chooses a private or public hospital. Thus, the preference for private hospitals acts as a powerful catalyst for the effects of auditory and gustatory experience. As patients shift toward private hospitals, their expectations for high-quality sensory, such as superior food services and a refined acoustic atmosphere, become critical drivers of perceived service quality.

4.5.3. Examining the controlling role of gender

The results for the roles of control variables are presented below. Regarding gender, the empirical data support hypothesis H9a (p-value = .030 < 0.05; estimate = 0.044), confirming that male patients tend to rate perceived service quality higher than female patients. However, hypothesis H9b is rejected (p-value = 0.266), showing that overall satisfaction levels do not differ statistically between men and women.

Table 4.15. Summary of controlling result indicators gender

Hypothesis		Standardized estimate	P-Value (Sig)	Decision
H9a	Gender → PSQ	.044	.030	Supported
H9b	Gender → Satisfaction (SAT)	-.019	.266	Unsupported

Source: Compiled from the author's research results (2026)

In conclusion, the inclusion of control variables in the model demonstrated the robustness of the study. Factors related to gender may differ at different stages of the model, the inclusion of control variables does not materially alter the main structural relationships, suggesting that the sensory experiences, perceived service quality, satisfaction mechanism remains stable.

4.6. Follow-up qualitative research results

The qualitative results in this section are intended to explain and contextualize the quantitative results presented in the preceding sections.

4.6.1. *General experience at hospital*

The results of in-depth interviews with 28 respondents revealed a clear differentiation in their mindsets. Patients' experiences are not simply a series of medical examinations and treatments, but are strongly shaped by their initial expectations and financial constraints.

The low-income group at public hospitals: the medical experience is viewed pragmatically. Respondents travel from provinces to Hanoi, therefore they consider fatigue, crowds, and complex administrative procedures as inevitable consequences in exchange for advanced medical expertise. A respondent shared that going for a check-up is more of a necessity than a comfort-seeking experience, thus valuing the doctor's reputation more than the surrounding environment. This group's experience often involves physical fatigue due to long waits, but they rarely complain unless the inconvenience directly hinders the examination process.

High-income group at public hospitals: this group is more rational and demanding. They choose public hospitals because of their absolute trust in expertise and modern equipment, but feel exhausted by overcrowding. Despite being busy and able to pay well, they still accept public hospitals in exchange for peace of mind regarding medical care. However, they are particularly concerned about service issues such as unclear pathways, chaotic announcement systems, and staff communication attitudes. For example, a respondent evaluated the experience based on the discipline and organization of the medical facility, as well as administrative procedures.

Low-income group at private hospitals: this group's experience is a selective investment. They don't choose private hospitals as a regular habit, but rather to save time or seek peace of mind in other aspects. A respondent is concerned with the speed of scheduling appointments, the availability of tests, and the transparency of the work process. Paying an amount exceeding their average monthly income leads this group to evaluate the experience based on a comparison of value for money. The overall experience is also driven by staff courtesy, a comfortable environment, and ease of managing the procedures.

High-income group at private hospitals: for this group, the hospital experience is considered a holistic service journey, similar to high-end service industries like airlines or hotels. They expect convenience and integration from scheduling, reception, examination, to payment. Privacy, personalization, and consistency in the service environment were core aspects of their experience. A respondent evaluated not only clinical outcomes but also considered wait times, staff coordination, and the surrounding physical space. Any minor inconsistency in the process was perceived as a substandard service experience.

4.6.2. Evaluation of the four significant sensory dimensions

Qualitative data shows that the senses of sight, hearing, touch, and taste play different roles in forming signals about perceived service quality, with certain differences between patient groups.

Visual experience: this is the first element all receive signals from, but with completely different ways of using the information. For low-income groups in public hospitals, vision mainly serves the function of navigation. Signs, room names, and lighting are only meaningful if they help them find the right place. Meanwhile, high-income groups in public hospitals consider signals such as modern equipment, tidy spaces, and staff uniforms as evidence of the hospital's expertise and professionalism. In contrast, low-income groups in private hospitals consider clean lobbies and clear pathways as factors that help reduce anxiety and increase confidence in the service. In particular, for high-income groups in private hospitals, high-end design and aesthetics are considered mandatory standards.

Auditory experience: reactions to sound reveal the tolerance and expectations of each group. Low-income groups in public hospitals accept the noise from crowds and loudspeakers calling names as a characteristic of healthcare services in Vietnam. Meanwhile, high-income groups in public hospitals feel that noise increases fatigue and appreciate hospitals with well-designed announcement systems. In private hospitals, low-income groups are more concerned with the clarity of instructions from staff rather than absolute silence. Conversely, high-income groups demand a truly quiet acoustic environment, calm communication from staff, and absolute privacy.

Tactile experience: touch directly affects the physical state of patients. Low-income patients from provinces attending public hospitals reported that discomfort from hard seats or cramped corridors became more pronounced due to their fatigue after the long journey. For overnight patients, room temperature, bed quality, and mattress quality

directly impacted their comfort. In the high-income group, comfortable seating, clean contact surfaces, and especially the careful and gentle touch and examination by doctors were tactile details that strongly reinforced the value of healthcare services.

Gustatory experience: Most outpatient respondents (day-visit) considered taste to be unimportant. However, for cases requiring short-term or overnight stays, the quality of food and drink became a significant factor. For the group staying at private hospitals, palatable and condition-appropriate food was noted as a detail that increased comfort and supported physical recovery.

4.6.3. Evaluation of olfactory experience

The sense of smell was the only sense that did not show significant differences in shaping perceived service quality between groups, although reactions to odors did vary. Overall, none of the groups considered smell as a primary measure of clinical competence in healthcare facilities.

Low-income group at public hospitals: The smell of disinfectants, chemicals, or crowds was noticed but was subtle in the evaluation process. Some respondents considered these smells simply as hospital smells. The presence of medicine did not make them believe the doctor was better, and vice versa.

High-income group at public hospitals: This group considered smell a basic indicator of environmental hygiene. The absence of foul odors was a minimum requirement, and a pleasantly scented space could improve mood, but this scent could not replace the quality of procedures or the doctor's competence. Poor restroom odors would be a major drawback in terms of service.

Low-income group at private hospitals: This group expects a clean and odor-free environment because they have to pay higher than average. A respondent shared that a pleasant scent helps reduce anxiety while waiting, but ultimately, the perceived service quality still depends on how the doctor explains the patient's condition. Any unpleasant odor present in a private hospital would create much greater disappointment than in a public hospital.

High-income group at private hospitals: This group considers well-controlled scents as a default part of a high-end service environment. Some respondents do not value a medical facility solely for its pleasant scent, but emphasize that the presence of any unpleasant odors risks disrupting service standards and reducing overall satisfaction.

Focus group interviews revealed that patients were aware of hospital smells, but the majority did not consider smell as a primary criterion for evaluating service quality or professional competence. Some respondents, particularly in the public hospital group, viewed the smell of disinfectants, chemicals, or crowds as familiar hospital smells. Therefore, in this context, the sense of smell tended to act as a background signal of minimal hygiene and safety, rather than a factor that creates a positive experience and enhances perceived service quality. This helps explain why olfactory experience did not have a statistically significant impact in the quantitative model.

4.6.4. Evaluation of perceived service quality and customer satisfaction

At public hospitals, low-income groups perceive service quality entirely based on the doctor's reputation, the accuracy of the diagnosis, and the treatment outcome. Their satisfaction levels are generally high if treatment is affordable, despite the potentially physically tiring environment. Meanwhile, high-income groups consider perceived service quality to include both professional competence and the professionalism and convenience of the examination process. Their satisfaction is mixed: they trust the expertise, but their satisfaction is dampened if the hospital is overcrowded or the service lacks attentiveness.

At private hospitals, low-income groups assess perceived service quality through the speed of service, clarity of instructions, and transparent costs. For them, if comfort does not compensate for high costs or unclear examination results, satisfaction will significantly decrease. For high-income groups, perceived service quality is a unified whole encompassing clinical expertise, safety, seamless processes, and a premium environment. Their satisfaction is only high when the entire service journey feels worthwhile, secure, and free from any administrative bottlenecks.

4.6.5. Evaluation related to hospital type

Respondents presented completely different standards when evaluating public and private hospitals. *In public hospitals*, patients tend to prioritize treatment for difficult or serious cases, or specialized consultations. Therefore, they often overlook shortcomings in the service environment. A respondent shared that the crowds, noise, and long wait times in public hospitals are inevitable and acceptable in order to be examined by leading doctors.

However, *in private hospitals*, the evaluation standards are based on a frame of reference similar to the hospitality or banking industries. Private hospitals are expected to be faster, cleaner, and more courteous because patients are directly paying a

significant amount for those amenities. Some respondents asserted that a minor procedural error, a disorganized waiting area, or a staff member speaking loudly, things easily overlooked in public hospitals, becomes an unacceptable service failure.

4.6.6. Evaluation related to income

Low-income group: limited by budget, chooses healthcare services with careful consideration of cost. For them, savings or family support are factored into their ability to pay for healthcare. While they recognize and desire a pleasant space, comfortable seating, or cool air, they are willing to trade these sensory comforts for cost savings or to prioritize core healthcare effectiveness. For low-income individuals choosing private clinics, spatial comfort is primarily valued for its ability to alleviate certain anxieties.

High-income group: stable and high financial capacity gives this group more choices, making them more discerning about experiences. This group pays attention to comfort details such as privacy, design consistency, wait times, and empathetic communication. A respondent emphasized that the sensory quality of the environment, such as rooms, quietness, and the quality of beds and rooms, is part of the value of the service they paid for, whether for a day visit or a hospital stay.

4.6.7. Gender differences

Female patients: showed particular sensitivity to factors such as respect for privacy, empathy in communication with doctors, and general hygiene. Female frequently mentioned feeling reassured by gentle guidance, discreet examination rooms, and clean restrooms. Especially for female inpatients, the comfort of the hospital bed, a quiet space for rest, and respect for personal space were the top priorities.

Male patients: tended to approach the healthcare experience rationally, focusing on speed, efficiency, and workflow. Time and work pressures made long waits or complicated procedures the most frustrating for low-income male respondents, rather than seating inconveniences. Meanwhile, older male patients tend to view physical environmental discomfort as an inevitable part of life, reflecting personal resilience rather than constantly complaining about minor sensory details.

The results of the focus group interviews suggest that gender may create some differences in how patients interpret their hospital experience, but these should not be interpreted as fixed differences between men and women, these are only the trends observed in the interview sample. The results are consistent with quantitative analysis where gender has a limited influence and does not alter the underlying mechanisms between sensory experience, perceived service quality, and satisfaction.

CHAPTER 5: DISCUSSION AND RECOMMENDATION

5.1. Conclusions on key research findings

5.1.1. The impact of sensory experience on perceived service quality and satisfaction with healthcare services in Vietnamese hospitals

Based on the results of the structural equation modeling (SEM) analysis in section 4.4, it is shown that there are four sensory experiences, including Visual experience, tactile experience, auditory experience, and gustatory experience, which are, in order, factors that positively influence perceived service quality. In addition, the mediating variable perceived service quality also plays a significant role in increasing customer satisfaction with hospitals in Vietnam, with a large degree of influence.

Visual experience

Among the components that make up a patient's sensory experience, Visual experience is the most influential factor in their perception of service quality, with an impact level of 28.6%. This result underscores the dominant role of visual cues in shaping initial evaluations and emotional responses within healthcare service environments, and once again reinforce the views of previous scholars who believe that vision plays a dominant role in marketing activities, as the majority of information humans receive from their surroundings is processed through sight (Esther & Ángel, 2017). Patients in public hospitals show increased sensitivity to visual aspects such as lighting, wall colours, architectural layout, and the general status of physical facilities. Well-lit environments, appealing colour palettes, and a consistent spatial arrangement all help to increase perceptions of cleanliness, professionalism, and organisational competence. Dim lighting, antiquated interiors, or visually congested environments, on the other hand, may cause confusion or uneasiness prior to any human engagement with medical personnel. The findings show that people implicitly correlate modern architectural style and high-quality physical infrastructure with higher medical knowledge and service dependability. Furthermore, the hospital complex itself plays an important role in promoting visual happiness. Furthermore, the hospital complex itself plays an important role in promoting visual happiness. Clean, roomy, and well-maintained surroundings communicate a sense of care, safety, and respect for patients, increasing their trust in the healthcare provider. A visually appealing atmosphere can also help to relieve anxiety and stress, especially in patients who are already in sensitive psychological states due to health concerns. This emotional regulatory effect reinforces the relationship between visual stimuli and overall enjoyment.

Based on the results of the SEM analysis, the authors found that when people positively evaluate the facilities, comfort level, architectural style, and the openness and cleanliness of the hospital grounds, their satisfaction level tends to increase significantly. This aligns with the findings of Kim et al. (2020), who argued that initial visual cues serve as a cognitive foundation, helping patients form preliminary assessments and inferences about service quality and the surrounding environment they are experiencing. Beside factors related to infrastructure, elements concerning the communication style and eye gestures of healthcare staff also create important visual cues during the examination and treatment process, thereby reflecting their service attitude and level of care for patients (Ugolini et al., 2014). These perceptions are considered important in the context of healthcare services, where customers must continuously engage and interact with the service environment for a certain period (Berry & Bendapudi, 2007). Thus, the visual experience directly affects their perception of the quality of medical services and plays an essential groundwork for a series of subsequent senses to be perceived. Visual experience (VE) appears to serve as a fundamental sensory layer upon which other sensory and cognitive judgements are constructed. Positive visual impressions might enhance the perceived quality of later experiences, such as contacts with medical personnel or evaluations of service efficiency. Negative visual cues, on the other hand, may lead patients to give a more critical assessment of the entire service process. As a result, visual stimuli's great explanatory power emphasizes their importance as strategic predictors of patient happiness in public healthcare settings, rather than simply aesthetic additions.

Tactile experience

Tactile experience has the second greatest influence on customers' perceived service quality and satisfaction when utilizing healthcare services, with an impact coefficient of 25.1%. This study emphasizes the importance of physical and bodily interactions in influencing patients' overall service ratings, especially in settings where people are often physically weak and emotionally sensitive. tactile experience appears several times along the healthcare service journey, from the moment patients enter the hospital to their interactions with medical staff and physical facilities. Air circulation, room temperature, chair comfort, ease of mobility through hospital hallways, and the texture and cleanliness of medical equipment all have a direct impact on patients' physical comfort. When these tactile conditions are perceived as appropriate and well-managed, patients are more likely to experience a sense of ease, safety, and care, which positively reinforces their satisfaction with the service received. Conversely,

uncomfortable temperatures, overcrowded spaces, or poorly designed layouts may intensify feelings of stress, fatigue, or dissatisfaction, even if clinical outcomes remain unchanged. Beyond ambient factors, tactile engagement includes human touch and physical proximity, especially in interactions between medical professionals and patients. Gentle, polite, and professional physical contact, such as during examinations, movement help, or routine care, can communicate empathy, attentiveness, and reassurance. These nonverbal touch cues frequently convey strong emotional significance and can have a major impact on how patients perceive the quality of medical care. As a result, tactile cues serve both functional and relational purposes, increasing trust and emotional comfort throughout healthcare visits.

Experimental data indicate that patients and their families tend to form positive evaluations when experiencing tactile factors associated with the service environment, including experiences related to room temperature, comfort in seating areas, as well as the safety and dryness of hospital floors. These findings reinforce the results of previous studies such as Alahakoon & Randiwela (2017) and Ugolini et al. (2014). According to these authors, the physical environment in hospitals provides important tactile cues (temperature, seating, hospital beds, etc.) that patients use to decode their experiences while using services and form corresponding emotional responses. When these tactile elements are effectively managed and provide a positive experience, patients tend to rate the quality of hospital services higher.

Beside factors related to the service environment, the professional procedures performed by doctors during examination and treatment, such as touching, pressing, or manipulating, when carried out gently, standardly, and respectfully toward patients, also play an important role in shaping positive perceptions of overall service quality. This finding supports previous research (Ugolini et al., 2014; Hultén, 2020), which suggests that tactile experience is frequently received and evaluated by patients on an unconscious level, but have a significant impact on how they perceive service quality and overall satisfaction.

Auditory experience

The study's findings suggest that auditory experience is the third factor with a positive effect on perceived service quality and satisfaction with healthcare services, with an influence level of 16.6%. This discovery demonstrates that the auditory setting in hospitals has a significant impact on patients' service experiences, albeit not as powerful as visual or tactile inputs. In the context of healthcare services, patients are often in a sensitive, nervous, or pained state of mind, and auditory experience can

considerably enhance or lessen their overall perception of service quality. Unwanted sound variables, such as noise from crowded examination and treatment areas, sounds from medical equipment and supplies, or the sounds of other patients shouting and moaning, can all induce tension and worry in patients and have a poor impact on their psychological well-being. Auditory stimuli in hospitals encompass a wide range of sounds, including background noise, medical equipment alerts, public announcements, conversations among staff, and interactions between healthcare professionals and patients. When these auditory elements are well managed, they can contribute to a calm, organized, and professional atmosphere, thereby enhancing patients' perceptions of service quality. Clear and polite verbal communication from medical staff, for instance, not only facilitates information exchange but also helps patients feel informed, respected, and reassured throughout the care process. The decreased influence of auditory stimuli compared to visual and tactile variables may reflect patients' preference for physical comfort and environmental aesthetics when evaluating service quality in healthcare settings. This finding aligns with the previous research results of Ugolini et al. (2014), who stated that auditory signals are one of the sensory factors that directly impact how patients interpret and evaluate their healthcare service experience.

Additionally, patients' auditory experience is also shaped by the way healthcare professionals interact and converse with them. Small details like the doctor's and nurses' voices, tone, and expressions during reception, examination, and consultation play an important role in building a sense of reassurance and trust for both patients and their families. Clear, gentle, and supportive dialogs will not only help patients receive information more effectively but will also contribute to improving their perception of the quality of medical services. This discovery by the author has expanded understanding of the role of hearing in the Sensory experience model, while also providing a practical basis for hospitals in Vietnam to design healthcare service environments that are more comprehensively patient-centered.

Nonetheless, the 16.6% impact level suggests that auditory experience continue to play an important role, particularly in reinforcing or counteracting the impacts of other sensory dimensions. Auditory cues frequently combine with visual and tactile stimuli, influencing patients' overall perceptions of the service environment.

Gustatory experience

Based on the research results from the previous chapter, gustatory experience is the factor with the lowest impact on people's satisfaction when using healthcare services in Vietnam, with an impact level of 11.5%. Unlike studies on sensory experience in

service industries such as restaurants or hotels, where taste is frequently crucial to shaping experience and satisfaction, the role of taste in healthcare is less significant. This can be explained by the fact that in a highly specialized service industry like healthcare, patients do not place a great value on the quality of hospital cuisine. Their key concerns are usually the success of treatment, the level of safety, and the medical staff's experience.

This relatively modest effect can be explained by the specific nature of healthcare services, in which taste-related stimuli are not considered a core component of the service experience. In hospitals, gustatory stimuli are often confined to food and beverages offered to patients, such as meals during inpatient care or hospital snacks. While these characteristics contribute to overall comfort, they are frequently viewed as peripheral rather than central in evaluations of medical service quality. Patients and citizens prioritise functional and outcome-oriented aspects of healthcare, such as diagnostic accuracy, treatment effectiveness, medical staff professionalism, and service delivery efficiency. As a result, taste experiences have a secondary impact on overall perceptions. Furthermore, in the Vietnamese healthcare setting, hospital meals are frequently standardised, nutritionally orientated, and budget-constrained, limiting their ability to provide memorable or emotionally engaging gustatory experience. Consequently, citizens are less likely to associate taste-related factors with service excellence or satisfaction. During medical treatment, patients' physical and emotional conditions, such as pain, anxiety, or illness, may reduce sensitivity to or concern for gustatory stimuli. In such circumstances, sensory cues linked to sight, touch, and sound become more salient in shaping comfort, trust, and reassurance, whereas taste remains relatively inconsequential.

Although not a strong factor influencing perceived service quality, taste experience can still play an important supporting role in improving the quality of accompanying services, especially for patients who are frequently hospitalized. Focusing on the taste and quality of meals for patients and their families during long-term treatment in the hospital can help improve the patient's psychological state, thereby contributing to a more complete overall service experience. This finding also supports the argument of Ugolini et al. (2014), who suggest that taste can be considered an important supporting factor in patients' recovery after treatment. Therefore, if public hospitals pay more attention to the quality of food service, the overall patient experience can be improved in a more positive direction.

Descriptive statistical results for the variable Gustatory experience also reveal that people currently rate the quality of food provided by hospitals in Vietnam as acceptable. This could stem from the fact that patients and their families often don't have high expectations for hospital food services, or in many cases, they may prepare their own meals throughout the treatment process, especially for medical services that don't require a long stay.

Olfactory experience

Among the sensory experience factors in the research model, olfactory experience is the only factor that did not show a statistically significant impact on perceived service quality and satisfaction. This result differs somewhat from previous studies, where scholars suggested that positive perceptions of scent in a hospital environment could enhance customer satisfaction and improve service quality ratings (Jang & Lee, 2019; Chua et al., 2019). This finding also contradicts previous research by Ugolini et al. (2014) and Mavrommatis et al. (2011), which found that pleasant ambient scents can reduce patient anxiety, improve emotional comfort, and create a more positive healthcare experience for both patients and their companions during medical visits. The differences between the current findings and previous studies can be explained by the practical and cultural environment of Vietnam's public healthcare system. Patients in Vietnamese hospitals have grown acclimated to common hospital odours such as disinfectants, antiseptics, and drugs. Instead, then being seen as unpleasant or stressful, these familiar odours are frequently implicitly connected with hygiene standards, medical professionalism, and patient safety. Consequently, such olfactory cues may function as signals of clinical reliability rather than as experiential elements that enhance perceived service quality or satisfaction.

This can be explained by the practical context of the healthcare system in Vietnam, where fragrance is not typically designed as an experience-creating tool, but is primarily functional, related to hygiene, disinfection, infection control, and disease prevention. Therefore, patients or their families may consider the "hospital smell" as an obvious characteristic, rather than a criterion for evaluating service quality. Therefore, when initial expectations for the gustatory experience are not high, the impact of this factor on the overall perception of service also becomes less pronounced.

Additionally, some previous studies have also suggested that the characteristic hospital disinfectant smell in many cases does not evoke negative emotions, but rather brings a sense of reassurance and cleanliness, especially during examinations and treatment (Mavrommatis et al., 2011). In this case, the fragrance serves as a signal of

hygiene and safety, rather than an emotional stimulant to improve perception and increase satisfaction. This can partially explain why olfactory experience did not have a significant impact on perceived quality and satisfaction in the research model.

Perceived service quality and satisfaction

The research results show that customer satisfaction is strongly influenced by perceived service quality, with an impact level of up to 94.3%, reflecting the central role of this mediating variable in the research model.

The robustness of this relationship is well supported by prior research. For instance, Rust & Oliver (1994, as cited in Lenka et al., 2009) conceptualized customer satisfaction as a composite outcome of both cognitive evaluations and affective reactions arising from service encounters. Besides, Cronin & Taylor (1992) expressly stated that these conceptions are logically separate, while having similar evaluative underpinnings. Specifically, contentment and perceived service quality derive from consumers' comparisons of actual service performance to an expectation-based reference standard. However, the nature of these expectations varies. Satisfaction is mostly determined by predictive expectations, which reflect what customers feel will happen during a particular service contact. Conversely, service quality is affected by ideal or normative expectations, which represent what customers believe a service should produce under ideal conditions (Parasuraman et al., 1988; Zeithaml et al., 1990). Although perceived service quality has often been considered one of many factors contributing to satisfaction in previous studies (Cronin & Taylor, 1992; Rust & Oliver, 1993), the findings of this study have further highlighted the crucial role of this factor, particularly in the context of healthcare services in Vietnam.

Reimann et al. (2008) offered additional insight into this relationship by introducing an integrative formula: the gap between perceived service performance and prior service expectations determines perceived service quality, which in turn leads to customer satisfaction. This framework clearly explains how service evaluations translate into satisfaction outcomes and underscores the practical significance of managing both expectations and perceptions. The results of this study also clearly confirmed the causal relationship between perceived service quality and customer satisfaction, thereby reinforcing and expanding on previous findings by Dabholkar et al. (2000), and Ahmed & Samreen (2011) in different service contexts.

While perceived service quality and customer satisfaction represent separate theoretical constructs, the model demonstrates that they are tightly connected and

can be simultaneously shaped through effective service design and delivery decisions. Accordingly, the SEM findings indicating a strong linkage between the mediating construct and the outcome variable are both theoretically consistent and supported by empirical evidence.

Model explanatory power

In the field of SEM, the coefficient of determination, or R square value, is an important parameter for evaluating the model's predictive accuracy. The study of perceived service quality (PSQ) produces a R square value of 0.649, indicating that the independent variables, principally the multiple dimensions of sensory experience, account for 64.9% of the variance in how patients perceive the quality of medical services. This significant amount indicates a major shift in the patient evaluation process; it signifies that approximately two-thirds of a patient's judgement of quality is based not just on clinical outcomes, but also on the facility's climatic and sensory inputs. From a management perspective, this high explanatory power highlights that sensory cues, such as the cleanliness of the environment, the ambient noise levels, and the professional visual aesthetic, act as powerful surrogates for technical competence. When a healthcare provider optimizes these sensory touchpoints, they are effectively managing the majority of the patient's quality perception. This deep connection underscores that in modern healthcare, the environment is the message where a well-designed sensory journey significantly reduces the perceived risk and enhances the perceived reliability of the medical service.

Moving further down the causal chain, the model reveals an even more significant impact on satisfaction, with an R square value of 0.841. This extraordinarily high value demonstrates that the model explains over 84% of the fluctuations in satisfaction levels. This suggests that perceived service quality, as driven by sensory experiences, is the overwhelming determinant of whether a patient leaves a facility feeling satisfied. In the context of healthcare services, the R^2 value of 0.841 indicates that the model is capable of significantly explaining satisfaction. This result suggests that perceived service quality, partly shaped by sensory experience, plays a crucial role in enhancing satisfaction. However, due to the cross-sectional data collection based on self-reported responses and the close conceptual relationship between perceived service quality and satisfaction, this result should be interpreted cautiously, rather than as absolute proof of causality.

Qualitative evidence, psychological mechanisms explaining the empirical results

The results from the SEM model confirm the existence of the S-O-R mechanism. All four senses (sight, touch, hearing, taste) have a positive impact on perceived service quality. Furthermore, perceived service quality explains 94.3% of the variation in customer satisfaction. However, a notable finding of the study is that the olfactory variable (OE) is completely rejected, and the gustatory variable (GE) is statistically significant (the weakest impact) because taste is generally considered not very important in the healthcare service sector.

First, why was the olfactory variable (OE) excluded? According to signaling theory, patients do not use scents to infer the clinical competence of a hospital. The smell of disinfectants or chemicals has become an essential baseline of hospitals. When a factor is considered self-evident, the brain automatically disables its use as a criterion for evaluation. Furthermore, health anxiety overshadows olfactory perceptions, causing patients to tend to ignore surrounding smells (cognitive avoidance). Moreover, Vietnamese hospitals rarely design scents with specific intentions; this lack of differentiation means the olfactory variable does not achieve statistical significance.

Secondly, why is the taste experience (GE) variable statistically significant? Taste has the weakest impact due to the specifics of the healthcare services. Typically, patients tend to allocate weights in evaluating service quality to signals related to expertise, safety, or other visual cues, while food and drink are considered supplementary services. However, taste is still statistically significant because it acts as a signal reflecting physical recovery (for inpatients). Furthermore, ensuring food safety and hygiene, appropriate nutrition, and the absence of strange tastes in drinking water are considered by patients as evidence of the comprehensive care provided by the hospitals, thus contributing to the perceived service quality through the taste experience.

The above results are consistent with the low-to-middle-income patient group, because for them, sensory experience is not about luxury, but rather about signals of cleanliness, safety, order, accessibility, and respect.

Looking at the overall picture of the Vietnamese healthcare system, the results of this study reflect the current state and characteristics of a healthcare system undergoing transformation but still facing severe overcrowding. The fact that visual and tactile factors had the strongest impact, while olfactory factors were not statistically significant, shows the psychological adaptation of Vietnamese patients. In a context where top-tier hospitals frequently operate at over 200% capacity (FiinGroup, 2024), patients are forced to prioritize core safety signals, such as the cleanliness of the space and the

carefulness of the doctor's examination. Conversely, they consider hospital smells or noise as inevitable trade-offs to access medical expertise. However, the impact of these factors would likely change significantly if the study were conducted in advanced Western healthcare systems. In developed countries, where overcrowding is controlled and hospital design adheres to strict high standards of space, visual cleanliness and basic tactile standards are default conditions. Therefore, Western customers' expectations for quality experience are often higher and more sophisticated. In such contexts, deeply emotional stimuli such as relaxing scents or high-quality cuisine are likely to play a key role and have a much greater impact on differentiating service quality than in Vietnam.

5.1.2. The moderating role of income and hospital type in the relationship between sensory experiences and perceived service quality

The moderating role of income

The analysis results show that patients' income plays a statistically significant moderating role in the relationship between sensory experiences (visual, tactile, olfactory) and perceived service quality (PSQ). Specifically, the degree of impact of sensory factors on PSQ varies by income group, indicating differences in service evaluation among customer segments. This reflects the heterogeneity in the perception and experience of healthcare services, as individuals with different income levels tend to be differently sensitive to sensory experience factors. Specifically, regarding the visual experience, individuals with higher incomes often exhibit greater sensitivity to factors related to facilities, spatial design, modernity, and the esthetics of the hospital; while the lower-income group may be less affected by these factors. This is also true for the other two senses. For example, with touch, high-income customers tend to have higher expectations regarding comfort related to temperature, waiting space, seat quality, hospital beds, and direct physical interactions with medical staff.

Previous studies have also shown that vision, touch, and smell are innate and highly sensitive senses (Alahakoon & Randiwela, 2017; Hultén, 2017) to the living standards and consumption norms of customer groups. Factors such as space design, the comfort level of the facilities, thermal comfort, materials, or the sophistication of scent control are often associated with high-investment services. Therefore, high-income customer groups often form greater expectations regarding these sensory cues and use them as comparison criteria when evaluating service quality. Conversely, for lower-income groups, these factors are often considered ancillary, having less impact on their overall assessment of service quality compared to core factors like cost and service accessibility.

The income structure of the sample needs to be considered when interpreting the research results also. The results mainly reflect the perspective of the low-income and middle-income customer group, a large proportion in the Vietnamese context. For this group, sensory factors are often perceived as signals of cleanliness, safety, convenience, and the care provided by the hospital, rather than factors related to luxury or aesthetics. This helps explain the positive impact of visual, tactile, auditory, and gustatory experiences on perceived service quality. At the same time, the relatively small moderating effect of income suggests that income does not fundamentally alter the relationship between sensory experience and perceived service quality, but primarily influences the level of expectation and sensitivity to each sensory factor. However, if the research sample had a higher proportion of high-income groups, the elderly, or rural residents, the impact of sensory factors might differ. Therefore, the research findings are most relevant to hospitals serving the mass market in Vietnam and suggest that sensory experience design strategies should be tailored to each customer segment.

The moderating role of hospital type

The study results also show that the hospital type patients use (public/private) plays a regulatory role in the relationship between taste and auditory experience and perceived service quality. This finding by the author reflects the differences in service experiences between different healthcare delivery models. Specifically, regarding taste experience, the relationship between the quality of food and beverages and the perception of service quality becomes clearer for patients using services at private hospitals, which are oriented toward more personalized service development. For this hospital type, food service is considered an integral part of the overall experience, especially for inpatients. Conversely, in public hospitals, where resources are limited and patients often have low expectations for food service, the impact of taste on perceived service quality becomes less prominent.

Regarding the auditory experience, the regulatory role of the hospital type shows that the sound environment has different effects depending on how the hospital organizes and manages its services. In fact, private hospitals often have better noise control, more private admission processes, and a gentle communication style, making hearing an important factor in shaping perceptions of service quality. Meanwhile, in public hospitals, where patient density is high and noise is quite difficult to control, patients tend to accept this reality as an inevitable characteristic, reducing the role of auditory experience in assessing service quality.

The regulatory role of hospital type also needs to be considered in the context of differences in Vietnam. Bach Mai Hospital receives approximately 8,000-10,000 patient visits per day, significantly higher than before (Phung Nguyen, 2025), while at Viet Duc Hospital, patients often have to arrive very early to get a number for examination, and the waiting area is frequently overcrowded (Trang & Tuyet, 2022). In this case, sensory factors in public hospitals mainly act as signals reflecting cleanliness, safety, and operational efficiency rather than creating a premium experience. Factors such as clear signage, suitable waiting areas, noise control, restroom hygiene, and the professional image of medical staff help patients assess service quality. This is especially important when overcrowding and limited resources can increase stress and a feeling of being out of control. The International Trade Administration report (2026) also shows that many public hospitals in Vietnam are still under pressure from overcrowding and need to upgrade their infrastructure and equipment.

Conversely, private hospitals often compete with modern facilities, international standards, privacy, and customer-oriented services. Many Vinmec facilities have achieved JCI certification, while FV Hospital also continuously maintains this certification as a competitive advantage in patient quality and safety (Vinmec, 2025; FV Hospital, 2025). Therefore, the same sensory factor can have different meanings depending on the type of hospital. For public hospitals, the sensory environment helps reduce stress, create a sense of order, and enhance the perception of service quality. Meanwhile, in private hospitals, these factors contribute to reinforcing a high-end image, increasing the perception of professionalism, and promoting patient loyalty.

The above results are new findings of the research topic, helping to expand understanding of the role of moderating variables in the sensory experience model. They show that the impact of sensory experience on perceived service quality is not universal but depends quite heavily on customers' individual characteristics and the service delivery context. This is an important theoretical contribution, and it also suggests valuable management implications for designing healthcare service experiences tailored to each customer segment and hospital type.

5.1.3. The controlling roles of gender on perceived service quality and satisfaction

Besides the impact mechanism of multisensory experience and findings on the role of moderating variables, the study also revealed some findings on the role of control variable: gender.

SEM analysis showed that gender had a statistically positive impact on perceived service quality ($p = 0.030$), supporting hypothesis H9a, in which male patients tend to rate perceived service quality higher than female patients. However, gender did not create a statistically significant difference in customer satisfaction (hypothesis H9b was rejected, $p = 0.266$). The difference between perceived service quality and customer satisfaction can be explained through qualitative research data. Male and female patients have different frames of reference when decoding signals in the service environment.

Male patients tend to approach the medical examination and treatment process from a rational, pragmatic perspective and focus on completing the task. Male respondents were more concerned about the speed of examinations, diagnostic results, and time efficiency. Older men had a higher tolerance for negative aspects of the physical environment (especially noise and crowds). Therefore, men tended to overlook minor details and rated perceived service quality higher.

Meanwhile, female patients were more sophisticated and sensitive to service details. Female respondents consistently emphasized the importance of respect for privacy, empathy in the doctor's tone during communication, and especially the cleanliness (such as restrooms). Due to their stricter requirements for seamlessness and emotional connection in the process, women's perceived service quality ratings were generally more critical and lower than men's. Nevertheless, when the final treatment outcome meets core expectations, satisfaction levels between both sexes converge to a similar level, explaining why H9b was rejected.

In summary, incorporating control variable into the model, combined with qualitative explanations, confirmed the robustness of the S-O-R mechanism. Multisensory signals do not operate independently but are always influenced by the psychological filter of gender and the expected standards of healthcare service model.

5.2. Research contributions

5.2.1. Theoretical contribution

The study selectively inherited scales synthesized from previous research, added new scales, and successfully applied this scale system in the practical context of Vietnam. In the context of limited research on sensory experience in the healthcare service sector in Vietnam, the author adopted an interdisciplinary approach by adapting validated scales from other service sectors with some similarities in customer experience, such as restaurants, tourism, or hotels, while also adding new scales suitable for the research context. Based on the test results, all 32 observed variables belonging

to the five proposed independent variables met the requirements, and no observed variables were eliminated. Next, confirmatory factor analysis (CFA) showed that the measurement model fit well with Vietnamese market data based on the Model Fit indices. The scales also ensure composite reliability, convergent validity, and discriminant validity according to standard thresholds. Through this, the study contributes a valuable measurement system, serving as a reference for subsequent research on Sensory Marketing in the healthcare service sector as well as other service industries in the Vietnamese market.

This study also helps to confirm and strengthen the theoretical foundation of sensory marketing and sensory experience proposed by Hulten et al. (2009), Krishna (2010), and Hulten (2020), as well as to expand the theoretical framework related to perceived service quality and customer satisfaction perspective within the context of service experience. By incorporating sensory experience aspects into the research model, the author's findings added theoretical support to the relationship between sensory experience, perceived service quality, and customer satisfaction. In addition, this study offered a theoretical contribution by expanding and developing previous methodologies of Tran et al. (2025), Maria Ugolini et al. (2014), Moreira et al. (2017), Jang & Lee (2019), Satti et al. (2021), Kim et al. (2020), Hulten (2020), and Hoang & Tučková (2021). The study emphasizes that considering the five sensory stimuli in service marketing requires a holistic approach that includes two core components: (1) physical cues associated with the service delivery space and environment, and (2) sensory signals conveyed through service providers' behavior, attitudes, and interactions. This technique helps to refine and clarify the theoretical framework of sensory experiences in healthcare, while also providing the groundwork for future research into constructing and testing theoretical models relevant to customer experience.

In addition, the study reveals that two variables, person characteristics and service context, including income and hospital type, play a moderating effect in the association between sensory sensations and perceived service quality. Specifically, the study found that customer income had a strong moderating effect on the link between tactile, visual, and aural sensations and perceived service quality. Meanwhile, hospital type plays a regulatory role in the relationship between auditory and gustatory experience and perceived service quality. This finding expands the theoretical frameworks of Sensory marketing and service quality, which have primarily focused on direct impact relationships without fully considering the role of moderating variables. Including income variables and hospital type in the research model shows that the

effectiveness of sensory stimuli is not uniform across customer groups and different service contexts. This provides a new theoretical perspective for subsequent studies in the fields of Sensory experience and service quality management.

This study also clarifies the comprehensiveness and superior explanatory power of the sensory experience model in the healthcare service sector. The findings indicate that the study model may explain up to 81.8% of the variation in perceived service quality and 94.3% of the variation in customer satisfaction. This high level of explanation not only indicates the model's compatibility with the research data, but it also confirms the importance of sensory experiences in molding consumer impressions of service. From a theoretical standpoint, this discovery helps to broaden the application reach of sensory experience models, which were previously tested largely in consumer service industries such as restaurants, tourism, and retail. By demonstrating that sensory stimuli can explain a significant portion of the variance in perceived service quality and satisfaction within the healthcare service context, a highly specific field strongly influenced by professional factors and perceived risk, the study has enriched the theoretical foundation of service experience. At the same time, the study provides a new theoretical framework for evaluating service quality and customer satisfaction based on human's original senses. This approach shows that service evaluation depends not only on functional or technical criteria but is also strongly influenced by sensory experiences throughout the service delivery process. This research also contributes to opening new avenues for developing service evaluation models in highly specialized fields such as healthcare.

5.2.2. Managerial implications

With a systematic research process and highly representative research data collection, the topic systematically reflects the current state of service delivery in Vietnamese hospitals through the multi-sensory perceptions of customers. These findings offer significant practical value to policymakers, healthcare facilities, and relevant management units at various levels, helping them better understand market characteristics as well as customer needs and expectations, not only on a rational level but also at the deep sensory perception level. Understanding customers from a multi-sensory perspective also contributes to creating an important foundation for healthcare organizations to identify existing limitations in service delivery, thereby developing improvement plans that are appropriate for practical application.

Additionally, this study has identified sensory stimuli that can create a positive perception of healthcare service quality, thereby enhancing customer satisfaction. Because they are extracted from the perspective of service recipients, these results help stakeholders better understand customers' true expectations, the evaluations that are not only expressed verbally but also formed from unconscious sensory experiences. The author believes that listening to and understanding customers on a deep emotional level will help hospital administrators make appropriate adjustments in the context of increasingly high and demanding public needs. As society shifts strongly toward personalization in all types of products and services, applying the Sensory experience model has the potential to create positive sensory experiences and minimize negative psychological emotions during the healing process. From this, it can become a strategic direction to differentiate the healthcare service experience. Additionally, the discovery of the regulatory role of income and hospital type provides important practical insights for managers to design practical solutions tailored to different customer segments and service delivery contexts.

Through this study, the author hopes to help management at all levels and researchers use the test results as a basis for policy direction and the development of research in general service types, and specifically in healthcare services, in the future. At the same time, the findings of this study can serve as a basis for promoting research with the same factors and target groups but developed in a specific direction.

5.3. Recommendation

The empirical results of this study need to be considered from the practical perspective of the Vietnamese healthcare system, where top-tier public hospitals frequently face severe overcrowding, along with significant limitations in physical space and budget. For solutions to improve perceived service quality through sensory experience to be feasible, the recommendations need to be highly practical and designed in alignment with the breakthrough strategic direction outlined in Resolution No. 72-NQ/TW of the Politburo. The policy recommendations for hospitals are as follows:

5.3.1. Macro-level policy recommendations for the government

Firstly, there is a need to prioritize land allocation and apply tax incentives to promote private healthcare, shifting medical tourism activities towards domestic operations. The results of testing the moderating variables (H7, H8) show that high-income patients who seek treatment at private hospitals have very demanding requirements regarding the experiential space (especially auditory and visual).

Meanwhile, Vietnamese people are currently spending about 2 billion USD annually on overseas treatment because domestic healthcare does not yet provide sufficient high-end, multi-sensory care services (FiinGroup, 2025). To achieve the goal of increasing the proportion of private hospital beds to 15% by 2030, the Government needs to strengthen the concretization of Resolution 72-NQ/TW. Specifically, priority should be given to allocating clean land, allowing flexible conversion of land use purposes to land for healthcare; and at the same time, not collecting land use fees or reducing land rent for domestic non-profit medical facilities. Only with ample physical space can private investors design healthcare complexes that meet international standards.

Secondly, reform the procurement mechanism for medical equipment towards value-based procurement. Tactile experience (safety, minimally invasive) and auditory experience (noise control of equipment) strongly impact perceived quality. However, Vietnam's current bidding laws and public procurement mechanisms often overemphasize the lowest price criterion, creating barriers to accessing innovative and comfortable medical equipment. The government needs to facilitate the shift to a value-based procurement mechanism (AmCham Vietnam, 2024). Accordingly, technical parameters related to patient comfort (such as low-noise machines, minimally invasive pain-reducing technology) should be included as important scoring criteria in bidding documents, instead of competing solely on price while causing noise pollution.

5.3.2. Macro-level policy recommendations for health authorities

Firstly, tighten the supervision and evaluation of hospitals based on existing physical quality standards. Instead of applying new financial mechanisms, the Ministry of Health needs to resolutely use the Vietnamese hospital quality criteria (Ministry of Health, 2016) and the Basic quality standards for hospitals (Ministry of Health, 2024) as mandatory metrics. Many sensory touchpoints have been codified in these criteria. For example, the regulatory body needs to strictly check physical criteria: clear signage and directional diagrams (criterion A1.1) to reduce visual clutter; resolutely ensure each patient has a separate bed in public hospitals (criterion A2.1) to protect the tactile experience; and maintain clean restrooms (criterion A2.2). Completing these foundational standards is a prerequisite for achieving the target of 90% public satisfaction with public health services by 2030 (Ministry of Health, 2024).

Secondly, focus on strengthening primary healthcare to streamline patient flow and free up physical space for higher-level facilities. The root cause affecting the auditory and Visual experience in public hospitals is the overcrowding concentrated at

the central and provincial levels. Provincial/city Departments of Health need to decisively implement breakthrough solutions according to Resolution 72-NQ/TW on improving the capacity of the primary healthcare system (Politburo, 2025). By successfully streamlining primary healthcare patients to lower-level facilities, larger hospitals can reduce patient density, thereby restoring physical space to more proactively implement sensory marketing strategies.

5.3.3. Micro-level policy recommendations for hospitals

Based on the results, the study propose a system of strategic solutions, including: (1) orienting the approach and integrating sensory marketing into hospital management and operations; (2) strategically planning the application of sensory marketing to create positive multi-sensory experiences in hospital spaces; and (3) proposing tactical solutions to improve the quality of healthcare services and enhance customer satisfaction through effective management of multi-sensory stimuli.

Due to differences in operating conditions and patient expectations between public and private hospitals, the implementation of activities related to sensory experiences needs to be appropriately designed by healthcare facilities.

For public hospitals, especially central and provincial hospitals that frequently face overcrowding and resource constraints, priority should be given to solutions that improve basic but impactful sensory experiences. These solutions include clearer signage, more intuitive navigation, better organization of waiting areas, reduction of unnecessary noise, improved restroom hygiene and air quality, adequate seating, ensuring clean examination and treatment surfaces, and enhanced friendly communication between healthcare staff and patients. Furthermore, when implementing these solutions, public hospitals should consider patient characteristics such as age, education level, and frequency of service use. For example, elderly patients often have higher demands for visual guidance systems, accessibility of space, and staff support, while frequent patients may be more sensitive to factors related to waiting times, noise, and convenience in the examination and treatment process. The goal of these solutions is not to transform public hospitals into high-end service environments, but rather to reduce patient stress, improve order in the examination and treatment process, and reinforce the feeling of trust and care from the hospital within the available resources.

For private hospitals, creating service differentiation and positioning based on experience should be focused. Because patients at private hospitals often have higher expectations regarding comfort, privacy, convenience, and service environment, private

hospitals need to systematically invest in a cohesive service space, including sophisticated interior design, quiet and private waiting areas, professionally controlled acoustics, personalized guidance, high-quality catering services, comfortable equipment and furnishings, and a consistent image and service style of staff. In this context, sensory experience should not only be considered a supporting factor for service quality but also a strategic tool to help hospitals differentiate themselves, enhance their market position, and increase patient loyalty. High-income patients or those with high expectations for service quality tend to be more discerning about sensory factors related to privacy, aesthetics, comfort, and personalization. Furthermore, factors such as hospital size, target market segment, level of competition, and brand positioning strategy should also be considered when designing sensory experience management programs.

Therefore, while both public and private hospitals need to improve sensory touchpoints in the patient experience journey, public hospitals should prioritize functional, cost-effective solutions that help reduce feelings of overload, while private hospitals should focus on designing integrated, differentiated experiences that aim for high-quality service tailored to the characteristics of patients and the specific operating context of each healthcare facility.

From the perspective of each sensory element, the author proposes the following specific recommendations.

Visual experience

First and foremost, to improve the perception of service quality and enhance customer satisfaction, hospitals need to focus on color coordination and lighting systems to create a friendly and comfortable environment for people visiting for examinations and treatment. To alleviate tension, the hospital can pick warm, neutral, and bright wall paint colors, while blending white light in corridors, waiting areas, or high-traffic areas with soft yellow light in patient rooms to create a comfortable and calming environment. During hospital construction or remodeling, optimizing the use of natural light through windows, skylights, or open spaces should be prioritized, as this contributes to patients' psychological well-being and positive moods. However, the lighting system must be dispersed fairly to avoid excessive or glaring light, so providing favorable conditions for patients to relax and recuperate.

Hospitals should strive for an open campus design that generates a welcoming atmosphere from the moment patients arrive. Optimizing empty spaces, streamlining waiting areas, corridors, and functional rooms will help reduce the feeling of

overcrowding, one of the factors that often causes discomfort for patients and their families when they come to the hospital. Large hospitals with a high volume of patients require a signage system that is large, clear, easy to read, consistent in color and symbols, and placed in easily visible locations to assist patients and their families in moving around the facility, minimizing wasted time and confusion during their visit.

Hospitals must pay close attention to the communication style, gestures, eye contact, and professional abilities of the medical team during the examination and treatment procedure. To increase overall quality, hospitals should provide regular training and coaching programs in communication skills, service attitude, and professional behavior. This will help to create the image of a dedicated medical staff, encouraging a sense of security for patients. During the interaction, doctors, nurses, and other healthcare staff need to maintain a polite and professional attitude, avoid harsh expressions, and strive to provide encouragement and support to patients to help them reduce stress and anxiety during treatment. Therefore, hospitals can have patients participate in surveys to evaluate doctors, while also establishing clear mechanisms for evaluating, rewarding, and disciplining medical staff and employees. Specifically, recognizing and rewarding individuals with positive attitudes, communication styles, and behaviors, who are highly valued by patients and the management board, will create momentum for spreading good service standards throughout the entire system.

Specifically, the study also shows the moderating role of income in the relationship between visual experience and customers' service quality evaluation. This result shows that high-income customer groups are often more sensitive to details of design, consistency, and overall esthetic appeal. Therefore, hospitals may consider investing in modern, sophisticated treatment spaces that offer privacy and create service packages tailored to the needs of each customer group.

Auditory experience

For the auditory experience, hospitals need to focus on controlling various types of sounds and noise to create a comfortable medical examination and treatment space for patients. Firstly, the space and traffic flow should be designed and organized rationally to avoid overcrowding in any one area, hence reducing noise caused by movement, exams, and information exchange within the hospital. Furthermore, clinics and treatment rooms for dangerous or painful disorders, as well as inpatient rooms, must be provided with appropriate soundproofing materials. This is done to maintain a peaceful environment, allowing patients to avoid exposure to unwanted sounds such as

other patients' shouting and weeping, which can have a negative impact on their psychological state, raising tension and bad emotions while in treatment.

Furthermore, the hospital's public address system must be clear, simple to hear, and at a reasonable volume. The content of announcements in a hospital setting should be concise, coherent, avoid excessive repetition, and not be broadcast at an excessively loud volume. Controlling the frequency and intensity of notification sounds also helps maintain order and focus on a medical environment.

During the process of welcoming, exchanging information, and communicating with patients, the doctors and medical staff need to pay attention to their voice, volume, and way of expressing themselves. Using gentle, clear language with an appropriate tone will help patients feel respected, reassured, and more receptive to information related to their condition. At the same time, limiting loud, tense, or imposing exchanges in the examination and treatment area will help create a positive sound environment, effectively supporting the treatment and recovery process of patients.

The research results also show that income and hospital type also moderate the relationship between the sound environment and perceived service quality. Customers with higher incomes will also tend to have higher expectations for quietness, privacy, and the quality of communication. Therefore, hospitals need to pay more attention to noise reduction solutions, soundproofing spaces, and the gentle, standardized communication style of medical staff toward different customer groups to ensure it is appropriate. Furthermore, the regulatory role of this sort of hospital emphasizes patients' sensitivity to aural experiences and the variations in healthcare service delivery environments. Patients in private hospitals have higher expectations for quiet, private spaces as well as professional, gentle communication styles; thus, noise control solutions, soundproofing patient rooms, limiting unnecessary announcement sounds, and standardizing medical staff communication tone must be prioritized. Meanwhile, at public hospitals, where patient density is generally higher, clear and audible information delivery, as well as noise reduction measures where applicable, are critical for boosting perceived service quality.

Gustatory experience

Regarding taste experience, during the examination and treatment process, especially for inpatients and their families, hospital food services play an important role in shaping perceptions of overall service quality. Therefore, hospitals need to pay special attention to food hygiene and safety throughout the entire process of food preparation,

storage, and service, to build trust and reassure service users. Beside hygiene requirements, menu construction and adjustment need to be diverse to ensure nutritional balance and suitability for each patient group, especially for long-term treatment cases.

Hospitals may also try categorizing menus based on health needs, medical conditions, or service levels to better satisfy the expectations of various client groups. Furthermore, the quality of the hospital's drinking water should be considered to improve the flavor experience. Providing clean, safe, and easily accessible water sources in waiting areas, patient rooms, and treatment areas will help patients and their families have a positive service experience.

The study's findings also reveal that the hospital type that patients frequently pick for inspection and treatment (public/private) has a substantial regulatory effect in the association between taste experiences and perceived service quality. To improve satisfaction at private hospitals, where patients frequently have higher expectations for service quality, variables such as flavor, menu diversity, food presentation, and the capacity to modify meals based on nutritional needs should be prioritized.

Meanwhile, at public hospitals, guaranteeing food hygiene and safety, affordable costs, adequate quantities, and meeting the basic nutritional requirements of patients plays an important role in shaping good opinions of service quality. Adjusting the taste experience management strategy to suit each hospital type will help optimize resources and improve patients perceived quality of service when seeking medical care.

Tactile experience

To improve the tactile experience, hospitals should invest in waiting room seating arrangements that provide comfort and convenience, particularly during extended wait times. Improving rest circumstances for patients and their families during exams and treatment not only reduces physical weariness but also helps to decrease unpleasant emotions that emerge during wait times.

Blankets, sheets, and pillows in the hospital room should be made of acceptable, soft, and user-friendly materials to provide a comfortable environment and help the patient's rest and healing process. Controlling the temperature in the patient's room is particularly crucial because it can have a direct impact on the patient's psychological state and health recovery process. Hospitals should consider installing two-way air conditioning systems or other appropriate temperature regulation solutions to ensure that the patient room environment remains comfortable, avoiding overheating in the summer and excessive cold in the winter, which can cause discomfort or stuffiness for both

patients and families. Furthermore, the flooring in patient rooms and waiting spaces must be constructed and maintained to provide dryness, cleanliness, and security. The use of slip-resistant, easy-to-clean materials not only improves the perception of the service environment, but it also reduces the danger of falls, particularly among the elderly and patients with restricted observation and mobility.

Throughout the examination and treatment process, healthcare staff need to pay special attention to how they make direct contact with the patient's body, including actions such as touching, pressing, kneading, or assisting with movement, to ensure the patient feels reassured and comfortable. Performing professional procedures gently, standardly, and with clear explanations will help reduce anxiety and enhance the patient experience during their use of medical services. In addition, strict adherence to hygiene and safety regulations, such as using medical gloves, when necessary, is also a factor that patients are concerned about and highly appreciate. These practices not only meet professional requirements but also play a crucial role in shaping positive perceptions through touch, thereby contributing to improving the perceived service quality.

The research results also show that customer income moderates the relationship between tactile experience and perceived service quality. Therefore, hospitals need to design elements related to tactile experience in a flexible manner, suitable for different customer segments. For customer groups with higher incomes, their requirements for comfort, cleanliness, and the quality of directly contacted materials (such as hospital beds, bedding, waiting chairs, handrails, and medical equipment surfaces) are often higher. Therefore, patient rooms serving this demographic will need to be comprehensively invested in terms of materials, softness, and a sense of safety upon contact. This income-based stratification approach helps hospitals optimize investment resources while improving the perceived service quality for different customer groups.

5.4. Limitations of the study and future research directions

5.4.1. Limitations

Although the thesis was conducted with a rigorous process and methodology and achieved its objectives, the study still has certain limitations, which are important for future academic research directions.

First, regarding sampling approach. The study used convenience sampling, distributing surveys both online and in person. As a result, the collected sample showed a certain bias towards some demographic groups, particularly focusing on the young population (37.2% aged 18-25), women (60.8%), urban residents (65.7%), and low-to

middle-income groups. The study also lacked adequate access to patients in rural and remote areas, or demographic groups with very high incomes, who have access to modern medical facilities and whose expectations regarding sensory experiences may vary greatly. Because the sample is skewed towards those under 15 million, young people, women, and urban areas, the results cannot be generalized to the entire Vietnamese population. If the sample included more elderly people, rural residents, and those with very high incomes, the results might be different.

Second, regarding survey data and risk of error. The study is based on cross-sectional data self-reported by respondents. Although Harman's single-factor test was performed and showed that the risk of common methodological error (CMB) is not serious (extracted variance < 50%), this risk cannot be completely eliminated because the independent, mediating, and dependent variables are all evaluated simultaneously by the same respondent in a single questionnaire. Therefore, causal inferences drawn from the structural equation modeling (SEM) results need to be evaluated cautiously.

Third, limitations in the discriminativeness of construct distinctiveness. Experimental results show a very high correlation between perceived service quality and satisfaction. This may be due to the conceptual closeness between these two concepts in the specific context of healthcare services, where patients' perceived evaluations of the service are closely intertwined with their emotional satisfaction responses. While theoretically plausible and statistically acceptable, this high degree of correlation still acts as a boundary condition for the model's discriminant validity.

Fourth, limitations on controlled variables. Although the study successfully expanded the theoretical framework by incorporating income and hospital type as moderating variables, and using gender as a control variable to enhance the model's robustness, the thesis still doesn't cover all potential influencing factors. Other important variables such as patient age, educational level, health insurance coverage, or specific disease types were not included in the current model's control. These unexplored variables could significantly impact sensory sensitivity and service evaluation processes, opening up substantial opportunities for further research in the future.

Finally, this study is contextually specific. The results directly reflect the picture of a developing healthcare system with unique characteristics of overcrowding and a clear public-private divide. Therefore, the model's effects may not accurately reflect patient behavior in Western countries, where expectations for healthcare services and standards of care vary significantly.

5.4.2. *Future research directions*

The author proposes several directions for expanding future research:

First, broaden the geographical scope and adjust the sampling method. To overcome the limitations of convenient sampling, future studies should apply stratified random sampling to encompass a wider variety of demographic groups. In particular, expanding the survey to include patients in rural areas, remote regions, or healthcare facilities with limited resources will help to more comprehensively reflect the picture of sensory experiences. Furthermore, designing research focused on a specific locality, geographical region... will help propose solutions that closely match the infrastructure and organizational model of each location.

Second, explore new moderating and controlling variables. Although current research has demonstrated the moderating role of income, hospital type, further studies could expand the model by examining the other variables such as age, gender, education level, or disease type. Clarifying these variables will help provide deeper insights and more detailed micro-recommendations for specific customer segments.

Third, shift the research lens to the service provider. Further studies could expand the data collection to include the group of healthcare service providers, including hospital directors, doctors, and medical staff. Applying qualitative research methods (such as in-depth interviews, expert panel discussions) to this group would help assess the feasibility, relevance, and barriers to implementing multi-sensory experience management strategies from a practical perspective.

Fourth, apply objective measurement tools in neuromarketing. To thoroughly address the risk of common method error (CMB) arising from self-reported data, future studies should integrate neuromarketing-based approaches. The use of biometric tools (eye-tracking technology, heart rate monitoring, or skin reaction sensors...) will help objectively measure patients' subconscious physiological and emotional responses to hospital stimuli. This approach not only enriches the theoretical foundation of consumer behavior but also enhances the explanatory power of sensory marketing models when applied to the healthcare field.

Finally, future studies should conduct cross-cultural assessments or comparisons between healthcare systems in developing and developed countries. Examining how the impact of sensory experiences, particularly smell and taste, increases as patient expectations are higher in Western countries will provide profound theoretical contributions to the S.O.R theory in the field of global healthcare.

**LIST OF WORKS RELATED TO THE DISSERTATION
THAT THE PHD CANDIDATE HAS PUBLISHED**

1. Tran, V.A. and Nguyen, T.L. (2026), ‘How patients experience care through their senses: Sensory experiences, perceived service quality, and patient satisfaction in Vietnamese hospitals’, *Multidisciplinary Reviews*, Vol. 9, Article e2026555. <https://doi.org/10.31893/multirev.2026555>.
2. Tran, V.A. (2026), ‘Patient experience at the public vs. private hospitals in Viet Nam’, *Vietnam Economic & Financial Review*, Vol. 2 No. 2, pp. 157-160.

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APPENDIX 1. THE SURVEY QUESTIONNAIRE (ENGLISH)

SURVEY QUESTIONNAIRE SATISFACTION WITH HEALTHCARE SERVICES IN VIETNAM

Dear Respondent,

Patient satisfaction is a key indicator of the effectiveness of medical examination and treatment services. However, Vietnam's healthcare system still faces certain limitations. Given limited resources, identifying ways to improve healthcare service quality and enhance public satisfaction remains an important concern for relevant stakeholders. Your responses will provide valuable evidence for this study.

If you have used healthcare services within the past three months for routine health check-ups, same-day examination for minor/common conditions, or short inpatient stays (excluding emergency cases or severe illnesses), please share your experience by answering the questions below and ticking (✓) the most appropriate option. The information you provide will be used solely for research purposes. The aggregate findings will be translated into recommendations for improving healthcare service quality in Vietnam.

Thank you very much for your cooperation.

A. CURRENT USE OF HEALTHCARE SERVICES



1. On your most recent hospital visit, what was your purpose?

- ☐ Medical examination
☐ Treatment
☐ Both medical examination and treatment



2. Which type of hospital did you visit on that occasion?

- ☐ Public hospital
☐ Private hospital



3. What type of healthcare service did you use there?

- ☐ Medical examination/treatment covered by health insurance
☐ Self-paid medical examination/treatment (without health insurance)
☐ Both of the above



4. If possible, please provide the following information:

Hospital name _____

Province/city _____



5. Why did you choose that hospital? Please tick the applicable reason(s).

- ☐ Hospital reputation
☐ Doctors' reputation
☐ Reasonable service costs
☐ Convenient location
☐ Simple administrative procedures
☐ Health insurance coverage
☐ Modern facilities and medical equipment
☐ Attention and care provided by healthcare staff
☐ Quality of medical examination/treatment services
☐ Other reason _____

B. EVALUATION OF HEALTHCARE SERVICE QUALITY AT THE HOSPITAL MOST RECENTLY VISITED

Please indicate your level of agreement with each of the following statements regarding your experience at the hospital. For each statement, please select one response on the following five-point scale:

- 1** **2** **3** **4** **5**
Strongly Disagree Neutral Agree Strongly agree

6. VISUAL EXPERIENCE



- | | | | | | | |
|-----|--|---|---|---|---|---|
| VE1 | Information/recommendation boards are clear and easy to read | ① | ② | ③ | ④ | ⑤ |
| VE2 | Direction signs/maps are clear and help me find the correct department/room quickly | ① | ② | ③ | ④ | ⑤ |
| VE3 | The hospital grounds (corridors, clinics, etc.) are airy, spacious, and clean | ① | ② | ③ | ④ | ⑤ |
| VE4 | The examination surface/bed/pillowcases appear clean and smooth | ① | ② | ③ | ④ | ⑤ |
| VE5 | The wall color and decorations look pleasant and consistent | ① | ② | ③ | ④ | ⑤ |
| VE6 | The natural light (from the window/opening) where I am sitting/being treated is pleasant | ① | ② | ③ | ④ | ⑤ |
| VE7 | Soft, non-glaring lighting bright enough for examination and care activities | ① | ② | ③ | ④ | ⑤ |
| VE8 | The staff's appearance and gestures are friendly | ① | ② | ③ | ④ | ⑤ |
| VE9 | The staff's examination gestures appear professional and careful | ① | ② | ③ | ④ | ⑤ |

7. AUDITORY EXPERIENCE



- | | | | | | | |
|-----|---|---|---|---|---|---|
| AE1 | The waiting/examination area is usually quiet and not noisy | ① | ② | ③ | ④ | ⑤ |
| AE2 | I rarely hear screaming or moaning from other patients where I am waiting/being treated | ① | ② | ③ | ④ | ⑤ |
| AE3 | The sound from medical devices and instruments doesn't create a feeling of annoyance | ① | ② | ③ | ④ | ⑤ |
| AE4 | The sound from the hospital's public address system is easy to hear and doesn't cause any annoyance | ① | ② | ③ | ④ | ⑤ |
| AE5 | Music (background music) in the hospital helps me feel relaxed | ① | ② | ③ | ④ | ⑤ |
| AE6 | The healthcare worker's voice is easy to understand | ① | ② | ③ | ④ | ⑤ |

8. OLFACTORY EXPERIENCE



- | | | | | | | |
|-----|---|---|---|---|---|---|
| OE1 | The scent in the examination area and patient rooms is pleasant | ① | ② | ③ | ④ | ⑤ |
| OE2 | The disinfectant smell is well-handled | ① | ② | ③ | ④ | ⑤ |
| OE3 | The bathroom smell is well-handled | ① | ② | ③ | ④ | ⑤ |
| OE4 | The smell of bedsheets and patients' clothes is pleasant | ① | ② | ③ | ④ | ⑤ |
| OE5 | Body odor (in general) is well-managed in hospitals | ① | ② | ③ | ④ | ⑤ |
| OE6 | Food odors are well controlled and do not intrude into clinical areas | ① | ② | ③ | ④ | ⑤ |

9. GUSTATORY EXPERIENCE



GE1	The food at the hospital is to my taste	1	2	3	4	5
GE2	The food at the hospital is diverse and easy to choose from	1	2	3	4	5
GE3	The food at the hospital is guaranteed to be hygienic	1	2	3	4	5
GE4	The food at the hospital is delicious	1	2	3	4	5
GE5	The water at the hospital doesn't taste strange	1	2	3	4	5

10. TACTILE EXPERIENCE



TE1	The chairs in the hospital waiting room are soft and comfortable	1	2	3	4	5
TE2	The blankets, sheets, and pillows in the patient's room are soft and comfortable	1	2	3	4	5
TE3	Suitable temperature within the premises and patient rooms	1	2	3	4	5
TE4	The floor area is dry and non-slip	1	2	3	4	5
TE5	Medical personnel always use gloves and masks when diagnosing/treating	1	2	3	4	5
TE6	When examining/treating patients, healthcare workers carefully touch (press, feel, manipulate, poke)	1	2	3	4	5

11. PERCEIVED SERVICE QUALITY (PSQ)



PSQ1	The overall quality of the hospital's services is good	1	2	3	4	5
PSQ2	The quality of medical services provided by the hospital is very impressive	1	2	3	4	5
PSQ3	The quality of medical services at the hospital meets high standards	1	2	3	4	5
PSQ4	The quality of medical services at the hospital exceeded my expectations	1	2	3	4	5

12. CUSTOMER SATISFACTION



SAT1	I am satisfied with the overall healthcare experience at the hospital	1	2	3	4	5
SAT2	I am satisfied with the service environment (space, facilities) of the hospital	1	2	3	4	5
SAT3	I am satisfied with the quality of service (staff, procedures) at the hospital	1	2	3	4	5
SAT4	Overall, I am satisfied with the aforementioned hospital (as a whole)	1	2	3	4	5



13. In your opinion, which sensory-related factors should hospitals further improve to enhance the satisfaction of people receiving medical examination and treatment?



Visual factors _____

Auditory factors _____

Olfactory factors _____

Tactile factors _____

Gustatory factors _____

C. PERSONAL INFORMATION (All personal information will be analyzed anonymously and reported only in aggregate form)

14. Age	☐ 18-25	☐ 26-40	☐ 41-55	☐ 56-70	19. What is your average monthly income? (Unit: VND)
15. Gender	☐ Male 	16. Which area are you from?			
	☐ Female 	☐ Urban area	☐ Rural area		
17. Occupation	_____				
18. Which province/city are you from?	_____				☐ Below 5,000,000 ☐ From 5,000,000 to under 8,000,000 ☐ From 8,000,000 to under 15,000,000 ☐ From 15,000,000 to under 25,000,000 ☐ From 25,000,000 to under 40,000,000 ☐ From 40,000,000 and above

Questionnaire No: _____



THANK YOU VERY MUCH FOR TAKING THE TIME TO COMPLETE THIS SURVEY!



APPENDIX 2. THE SURVEY QUESTIONNAIRE (VIETNAMESE)

PHIẾU KHẢO SÁT SỰ HÀI LÒNG ĐỐI VỚI DỊCH VỤ Y TẾ TẠI VIỆT NAM

Kính chào Quý vị,

Sự hài lòng của người bệnh là chỉ báo then chốt phản ánh hiệu quả dịch vụ khám, chữa bệnh. Tuy nhiên, hệ thống y tế Việt Nam hiện nay còn những hạn chế nhất định. Với nguồn lực có hạn, làm thế nào để cải thiện chất lượng dịch vụ y tế, nâng cao mức độ hài lòng của người dân là câu hỏi mà các bên liên quan luôn muốn tìm câu trả lời. Chia sẻ của Quý vị sẽ là căn cứ quan trọng nhất.

Nếu Quý vị sử dụng dịch vụ y tế trong vòng 3 tháng gần đây (cho việc khám sức khỏe định kỳ, thăm khám các bệnh lý đơn giản trong ngày, hoặc lưu trú ngắn ngày, không phải trường hợp cấp cứu hay bệnh nặng), vui lòng chia sẻ trải nghiệm đó bằng cách trả lời các câu hỏi dưới đây (tích ✓ vào phương án phù hợp nhất). Thông tin Quý vị cung cấp sẽ chỉ được dùng cho mục đích nghiên cứu. Kết quả tổng hợp sẽ được chuyển hóa thành khuyến nghị nâng cao chất lượng dịch vụ y tế tại Việt Nam.

Xin chân thành cảm ơn!

A. THỰC TRẠNG SỬ DỤNG DỊCH VỤ Y TẾ

1. Lần gần đây nhất, Quý vị tới bệnh viện với mục tiêu là:

- ☐ Khám bệnh
- ☐ Điều trị bệnh
- ☐ Khám và điều trị bệnh

2. Lần đó, Quý vị đã tới bệnh viện nào dưới đây?

- ☐ Bệnh viện công
- ☐ Bệnh viện tư nhân

3. Ở đó, Quý vị đã sử dụng loại hình khám chữa bệnh nào?

- ☐ Khám chữa bệnh bằng BHYT
- ☐ Khám chữa bệnh tự nguyện (không dùng BHYT)
- ☐ Cả hai loại hình trên

4. Nếu có thể, hãy cho biết:

Tên bệnh viện _____

Tỉnh/thành phố _____

5. Quý vị chọn tới bệnh viện đó là vì lý do nào dưới đây?

- ☐ Uy tín của bệnh viện
- ☐ Uy tín của bác sĩ
- ☐ Địa điểm thuận lợi
- ☐ Chế độ bảo hiểm
- ☐ Chi phí dịch vụ hợp lý
- ☐ Quy trình, thủ tục đơn giản
- ☐ Chất lượng dịch vụ khám/chữa bệnh
- ☐ Cơ sở vật chất và trang thiết bị y tế hiện đại
- ☐ Sự quan tâm, chăm sóc người bệnh của nhân viên y tế
- ☐ Lý do khác _____

B. ĐÁNH GIÁ CHẤT LƯỢNG DỊCH VỤ Y TẾ TẠI BỆNH VIỆN MÀ QUÝ VỊ ĐÃ TỚI LẦN GẦN NHẤT

Hãy cho biết mức độ Đồng ý của Quý vị đối với các nhận định dưới đây khi khám/chữa bệnh ở bệnh viện?

Với mỗi nhận định, hãy chọn mức độ đồng ý của mình trên thang điểm:

1

Rất không
đồng ý

2

Không
đồng ý

3

Trung lập

4

Đồng ý

5

Rất
đồng ý

6. TRẢI NGHIỆM THỊ GIÁC



- VE1 Bảng thông tin/khuyến cáo trình bày rõ, dễ đọc
- VE2 Biển chỉ dẫn/sơ đồ rõ ràng, giúp tôi tìm đúng khoa/phòng nhanh
- VE3 Khuôn viên bệnh viện (hành lang, phòng khám...) thông thoáng, rộng rãi, sạch sẽ
- VE4 Bề mặt nơi khám/giường/ga gối nhìn sạch sẽ, phẳng phiu
- VE5 Màu tường và trang trí nhìn dễ chịu, nhất quán
- VE6 Ánh sáng tự nhiên (từ cửa sổ/khoảng mở) tại nơi tôi ngồi/điều trị dễ chịu
- VE7 Đèn chiếu sáng dịu, không chói, đủ sáng cho hoạt động khám và chăm sóc
- VE8 Vệ bề ngoài, cử chỉ của nhân viên thân thiện
- VE9 Thao tác thăm khám, chẩn đoán thành thạo

- | | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |

7. TRẢI NGHIỆM THÍNH GIÁC



- AE1 Khu chờ/khám bệnh thường yên tĩnh, không ồn ào
- AE2 Ít khi nghe tiếng la hét hay rên rỉ từ bệnh nhân khác tại nơi tôi chờ/điều trị
- AE3 Âm thanh từ thiết bị, dụng cụ y tế không tạo nên cảm giác khó chịu
- AE4 Âm thanh từ loa thông báo của bệnh viện dễ nghe, không gây khó chịu
- AE5 Âm nhạc (nhạc nền) trong bệnh viện giúp tôi cảm thấy thư thái
- AE6 Giọng nói của nhân viên y tế dễ nghe

- | | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |

8. TRẢI NGHIỆM KHÚU GIÁC



- OE1 Mùi hương trong khu khám, phòng bệnh dễ chịu
- OE2 Mùi thuốc khử trùng được xử lý tốt
- OE3 Mùi nhà vệ sinh được xử lý tốt
- OE4 Mùi ga giường, quần áo bệnh nhân dễ chịu
- OE5 Mùi cơ thể (nói chung) tại bệnh viện được xử lý tốt
- OE6 Mùi đồ ăn dễ chịu và không tràn vào khu khám

- | | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |
| 1 | 2 | 3 | 4 | 5 |

9. TRẢI NGHIỆM VỊ GIÁC



GE1	Đồ ăn tại bệnh viện hợp khẩu vị	①	②	③	④	⑤
GE2	Đồ ăn tại bệnh viện đa dạng, dễ chọn	①	②	③	④	⑤
GE3	Đồ ăn tại bệnh viện đảm bảo vệ sinh	①	②	③	④	⑤
GE4	Đồ ăn tại bệnh viện có vị ngon	①	②	③	④	⑤
GE5	Nước uống tại bệnh viện không có vị lạ	①	②	③	④	⑤

10. TRẢI NGHIỆM XÚC GIÁC



TE1	Ghế ngồi ở phòng chờ bệnh viện êm ái, thoải mái	①	②	③	④	⑤
TE2	Chăn, ga, gối trong phòng bệnh êm ái, thoải mái	①	②	③	④	⑤
TE3	Nhiệt độ trong khuôn viên, phòng bệnh phù hợp	①	②	③	④	⑤
TE4	Khu vực sàn nhà khô ráo, không trơn trượt	①	②	③	④	⑤
TE5	Cán bộ y tế luôn sử dụng găng tay, khẩu trang khi chẩn đoán/điều trị	①	②	③	④	⑤
TE6	Khi khám/chữa bệnh, cán bộ y tế tiếp xúc (ấn, chạm, nắn, chọc) một cách cẩn thận	①	②	③	④	⑤

11. CẢM NHẬN VỀ CHẤT LƯỢNG DỊCH VỤ



PSQ1	Chất lượng dịch vụ tổng thể của bệnh viện tốt	①	②	③	④	⑤
PSQ2	Chất lượng dịch vụ y tế được cung cấp bởi bệnh viện rất ấn tượng	①	②	③	④	⑤
PSQ3	Chất lượng dịch vụ y tế tại bệnh viện đạt tiêu chuẩn cao	①	②	③	④	⑤
PSQ4	Chất lượng dịch vụ y tế tại bệnh viện vượt mong đợi của tôi	①	②	③	④	⑤

12. SỰ HÀI LÒNG



SAT1	Tôi hài lòng khi trải nghiệm dịch vụ y tế (tổng thể) tại bệnh viện	①	②	③	④	⑤
SAT2	Tôi hài lòng với môi trường dịch vụ (không gian, cơ sở vật chất) của bệnh viện	①	②	③	④	⑤
SAT3	Tôi hài lòng với chất lượng phục vụ (nhân viên, quy trình) của bệnh viện	①	②	③	④	⑤
SAT4	Nhìn chung, tôi hài lòng với bệnh viện kể trên (một cách tổng thể)	①	②	③	④	⑤



13. Theo Quý vị, các bệnh viện cần tập trung cải thiện thêm những yếu tố tác động vào giác quan nào dưới đây để cải thiện sự hài lòng của người dân đến khám chữa bệnh tại bệnh viện?



Về thị giác _____
 Về thính giác _____
 Về khứu giác _____
 Về xúc giác _____
 Về vị giác _____

C. THÔNG TIN CÁ NHÂN

(Mọi thông tin cá nhân của Quý vị sẽ được phân tích theo nguyên tắc bất định danh)

14. Độ tuổi ☐ 18-25 ☐ 26-40 ☐ 41-55 ☐ 56-70

15. Giới tính ☐ Nam ☒ Nữ

16. Quý vị đến từ khu vực nào? ☐ Thành thị ☐ Nông thôn

17. Nghề nghiệp _____

18. Quý vị đến từ tỉnh/thành phố nào? _____

19. Mức thu nhập trung bình của Quý vị (tính theo tháng, đơn vị tính: đồng)?

- ☐ Dưới 5,000,000
☐ Từ 5,000,000 - dưới 8,000,000
☐ Từ 8,000,000 - dưới 15,000,000
☐ Từ 15,000,000 - dưới 25,000,000
☐ Từ 25,000,000 - dưới 40,000,000
☐ Từ 40,000,000 trở lên

Phiếu số: _____



CẢM ƠN QUÝ VỊ ĐÃ DÀNH THỜI GIAN THỰC HIỆN CUỘC KHẢO SÁT NÀY!



APPENDIX 3. THE FOCUS GROUP INTERVIEW GUIDELINES

Interview topic: The impact of sensory experiences on perceived service quality and customer satisfaction in Vietnam healthcare system.

Purpose of the interview: The interview is conducted to gain a deeper understanding of patients' actual experiences at hospital, particularly how patients perceive and interpret sensory elements in the hospital environment. The focus of the interview is to clarify the role of smell in hospitals in shaping patients' perceptions of service quality and satisfaction, while also exploring differences in perceptions across patient groups by hospital type, income level and gender.

Interview implementation conditions: The interview is conducted face-to-face at the hospital, after the researcher has made a brief observation of the general situation at the facility, including the space, level of crowding, sound, smell, cleanliness, waiting area, examination/patient room, and other relevant environmental factors. This brief observation helps the researcher understand the actual context of the healthcare facility and provides a basis for comparing it with patients' perceptions during the interview.

Interview format: Semi-structured, face-to-face focus group interview.

Duration: 60 minutes per group.

Number of respondents: 28 respondents (07 respondents per group).

Respondents were pre-selected based on their place of healthcare use, hospital type (public/private), income group and gender to ensure consistency with the study's sampling strategy and research methodology.

INTRODUCTORY SCRIPT

Thank you very much for agreeing to participate in this interview. I am conducting a study on the impact of sensory experiences on perceived service quality and customer satisfaction in Vietnam healthcare system. Today's discussion aims to understand your actual perceptions of the service process, the hospital environment, service quality, and your level of satisfaction.

The interview is not intended to evaluate the medical expertise of doctors or treatment outcomes, but rather focuses on the service experience from the patient's perspective. There are no right or wrong answers; please share your experiences and thoughts as honestly as possible. The information collected will be anonymized and used solely for research purposes. Shall we begin?

GENERAL INFORMATION AND EXPERIENCE CONTEXT

1. What hospital type service did you use: outpatient examination, follow-up visit, periodic health check-up, short-term treatment, or inpatient treatment?
2. How long did you stay at the hospital?
3. Before going to the hospital, what did you expect most from the examination/treatment? Was that expectation more related to professional expertise, procedures, cost, service attitude, or the hospital environment?

GENERAL EXPERIENCE AT THE HOSPITAL

4. Could you describe your experience at the hospital? Which area or moment left the strongest impression on you?
5. In the overall experience, what made you most satisfied or dissatisfied? Did that perception mainly come from the medical service, staff, procedures, or hospital environment?

VISUAL EXPERIENCE

6. How did you perceive the visual elements in the hospital? Did you pay attention to signage, space, lighting, colors, cleanliness, or the appearance of healthcare staff?
7. How did those visual elements affect your overall evaluation of the hospital? Which of these elements left the strongest impression on you?

AUDITORY EXPERIENCE

8. How did you perceive the sounds in the hospital? Did you pay attention to people's voices, loudspeaker announcements, number-calling sounds, medical equipment sounds, sounds from other patients, or the voices of healthcare staff?
9. How did those sounds affect your overall experience? Did they make you feel comfortable, uncomfortable, neutral, or did they have little effect?

GUSTATORY EXPERIENCE

10. Did you use food or drinking water at the hospital? If not, did you observe or have any impression of the eating/drinking area?
11. How did the experience of food or drinking water affect your overall evaluation of the hospital? Was this factor very important, somewhat important, or insignificant in your experience?

TACTILE EXPERIENCE

12. How did you perceive the direct-contact elements in the hospital? Did you pay attention to seating, hospital beds, bed linens, room temperature, floors, or how it felt to move around?

13. How did these contact-related elements affect your overall evaluation of the hospital? Did you associate them with cleanliness, safety, or their care for patients?

OLFACTORY EXPERIENCE

14. Did you notice any smell in the hospital? What smell do you remember most clearly, or if you did not pay much attention to it, why not?

15. In which area or at what point during the service process did those smells usually appear? Compared with other hospitals you have visited, was the smell in this hospital clearly different?

16. What perceptions of the hospital did those smells evoke for you? Did you consider the smell to be normal in a hospital, a minimum requirement, a positive point, or an unpleasant factor?

17. When evaluating hospital service quality, do you use smell as a cue for evaluation? If so, does smell help you infer more about hygiene, safety, the service environment, or the professional expertise/skills of doctors?

18. If two hospitals were considered the same in terms of doctors, equipment, cost, and procedures, but differed in smell, how would you evaluate them? Would the difference between “no unpleasant smell” and “a mild pleasant scent” change your evaluation of service quality?

PERCEIVED SERVICE QUALITY

19. In your opinion, what makes a hospital considered to have good service quality? Among the factors you mentioned, which one is the most important and why?

20. When you cannot fully evaluate medical expertise yourself, what cues do you usually rely on to evaluate the hospital’s quality? Do you rely on reputation, facilities, cleanliness, communication, procedures, or other people’s reviews?

SATISFACTION

21. Overall, were you satisfied with your experience at the hospital? What affected your level of satisfaction or dissatisfaction the most?

22. Would you be willing to return to or recommend this hospital to others? Is that decision based more on the quality of medical examination/treatment, cost, service attitude, procedures, or the hospital environment?

DIFFERENCES BY HOSPITAL TYPE

23. In your opinion, how do experiences at public hospitals and private hospitals differ? Are the differences more evident in professional expertise, procedures, cost, people, or the hospital environment?

24. When evaluating public and private hospitals, do you use the same standards? Is there anything you can easily accept in a public hospital but find difficult to accept in a private hospital, or vice versa?

25. In your opinion, do perceptions of smell and cleanliness play different roles in public and private hospitals? In which hospital type does these factors more strongly influence your evaluation?

DIFFERENCES BY INCOME

26. In your opinion, does income level affect how patients choose and evaluate hospitals? Are such differences more evident in cost, professional expertise, amenities, waiting time, or the hospital environment?

27. In your opinion, what different expectations might people with higher ability to pay have regarding hospital experiences? Are those differences related to space, privacy, quietness, cleanliness, smell, or comfort?

28. In your opinion, what might people with lower ability to pay prioritize or accept when using hospital services? Might they prioritize cost, insurance, doctors, distance, procedures, or access to services?

CLOSING QUESTION

29. In your opinion, might male and female patients differ in how they pay attention to or evaluate the hospital environment? Are such differences more related to cleanliness, comfort, privacy, communication, or sensory cues such as smell, sound, and visual elements?

30. Is there anything important in your experience that the above questions have not addressed, or that a standard survey questionnaire may not fully capture?

Thank you very much for taking the time to share your thoughts. Your opinions are highly valuable for this study. Best regards.