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Evaluating the Mediating Effect of Empathy on the Relationship Between Service Quality and Customer Satisfaction in Abu Dhabi Public Hospitals

Alya Masood Ghareeb Saeed Alotaiba

Faculty of Technology Management and Business

Universiti Tun Hussein Onn Malaysia, Malaysia

Wan Fauziah Wan Yusoff (Corresponding author)

Faculty of Technology Management and Business

Universiti Tun Hussein Onn Malaysia, Malaysia

E-mail: fauziahy@uthm.edu.my

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Abstract

Integrating empathy into service quality in the healthcare industry enhances client happiness. However, this approach necessitates overcoming significant cultural and organizational barriers and resistance. Given the lack of comprehensive research on the mediating influence of empathy between service quality and customer satisfaction, particularly in the UAE healthcare system, this study aims to assess this relationship in Abu Dhabi Public Hospitals. The study adopted a quantitative approach where the data was collected from 1910 patients across five public hospitals in Abu Dhabi using structured questionnaires. This data was used to develop a PLS-SEM model to analyse the mediating effect of empathy on the relationship between service quality and customer satisfaction, utilizing SmartPLS software. The modelling analysis was conducted at both measurement and structural components to meet the fitness criteria. Additionally, the model was assessed to determine the significance of the path through hypothesis testing. The results from the modelling analysis were then used to develop a comprehensive framework. This framework is structured based on direct relationships, with each dimension having a substantial impact on consumer happiness. Social responsibility has the most negative impact (-0.695), whereas tangibility has the most positive effect (1.000). All facets of indirect relationships have a considerable impact on

customer satisfaction via empathy with a partial mediation effect, except for assurance, which is not statistically significant. Tangibility has the largest negative impact (-1.171), while social responsibility has the greatest positive impact (0.776). This framework highlights the role of service quality attributes and empathy in determining customer satisfaction in the healthcare industry in UAE public hospitals.

Keywords: Empathy, Service Quality, Customer Satisfaction

1. Introduction

Quality of public healthcare services is a multifaceted phenomenon that affects a wide range of stakeholders, including patients, relatives of patients, front-line workers, the government (which organises and funds healthcare), and society (which wants a healthy environment). However, the complex nature of public healthcare service quality evaluation provides significant challenges, demanding ongoing research into developing variables of healthcare service quality (Khambhati, Patel, & Kumar, 2022).

Furthermore, healthcare must be sustainable due to rising demand and limited resources, a worldwide problem that disproportionately impacts developing countries. This has an impact on healthcare organisation performance and patient satisfaction (de Las Heras-Rosas, Herrera, & Rodríguez-Fernández, 2021). Furthermore, due to the nature of services, service quality metrics developed in one culture may not correctly reflect service quality in another (Prodromou & Papageorgiou, 2022).

Despite many Gulf countries, such as the UAE, having state-of-the-art healthcare facilities, Basheti, Qunaibi, Hamadi and Reddel (2014) found that many people in the Middle East seek medicinal solutions in pharmacies rather than visiting healthcare institutions. According to the authors, patients tended to value the advice supplied at pharmacies more than the option of going to a hospital for consultation. This indicates that patients in the Middle East region may be dissatisfied with hospital services in general.

In the case of the UAE, although the General Secretariat of the Executive Council (GSEC) of Abu Dhabi Government has identified healthcare service quality as a priority, many studies have shown that it is below expectations (Koomneef, Robben, & Blair, 2017; Aburayya, Alshurideh, Al Marzouqi, Al Diabat, Alfarsi, Suson, & Salloum, 2020). For example, in their review of data from 2002 to 2016, Koomneef (2017) revealed a lack of evidence regarding the success or failure of the UAE's healthcare reforms. While some researchers concluded that not enough time had passed to determine significant effects, Koomneef (2017) asserted that there was a lack of research investigating this specific question. This is supported by Aburayya et al. (2020), who noted that healthcare service quality in the UAE is still under investigation and requires more effort to evaluate government initiatives.

In addition, various barriers influence service quality in the UAE's healthcare sector, including work processes and low levels of communication (Marodin & Saurin, 2015; Leite, Bateman, & Radnor, 2020). These barriers negatively affect healthcare service quality, leading to dissatisfaction among citizens. One issue is customers' dissatisfaction with healthcare due to slow processes in various UAE hospitals (Aburayya, Alshurideh, Al Marzouqi, Al Diabat, Alfarsi, Suson, & Salloum, 2020). For example, customers often crowd healthcare centres, especially during peak working hours, leading to long wait times. This is particularly problematic for elderly patients or those with serious diseases, as it can cause patient dissatisfaction and harm the hospital's reputation. Additionally, it creates a demanding work environment for healthcare personnel, highlighting the importance of improving service quality in healthcare organizations.

According to reference (Al-Neyadi, Abdallah, & Malik, 2018), patient satisfaction is low in the Emirate of Abu Dhabi, with around a third of all admitted patients being unhappy with the services provided by both public and private institutions. This dissatisfaction raises a red flag, given that Abu Dhabi's hospitals are well-equipped with modern technology and staffed by highly skilled healthcare personnel.

Moreover, many UAE citizens prefer to seek healthcare treatment abroad. Lee (2017) found that many Emirati people choose medical treatment in Korea, with increasing numbers of Emiratis seeking treatment there each year. This preference raises questions about patient satisfaction with healthcare services in the UAE. If patients were satisfied, they would likely opt for healthcare services within the country, avoiding the additional expenses associated with traveling abroad.

Based on these findings, researchers have discussed that service quality is a common issue in the healthcare sector that affects patient satisfaction (Khambhati, Patel, & Kumar, 2022; de Las Heras-Rosas, Herrera, & Rodríguez-Fernández, 2021). Others have noted that the influence of service quality on patient satisfaction is more pronounced in developing countries (Basheti, Qunaibi, Hamadi, & Reddel, 2014; Koomneef, Robben, & Blair, 2017; Marodin & Saurin, 2015; Leite, Bateman, & Radnor, 2020), including the UAE (Aburayya, Alshurideh, Al Marzouqi, Al Diabat, Alfarsi, Suson, & Salloum, 2020). Issues in the UAE, such as long waiting times for patients with serious illnesses (Aburayya, Alshurideh, Al Marzouqi, Al Diabat, Alfarsi, Suson, & Salloum, 2020) and the preference for seeking medical treatment abroad (Lee & Kim, 2017), reflect low patient satisfaction with healthcare service quality (Aburayya, Alshurideh, Al Marzouqi, Al Diabat, Alfarsi, Suson, & Salloum, 2020; Al-Neyadi, Abdallah, & Malik, 2018).

Yu (2022) examines factors that foster empathy in healthcare settings and its effect on patient satisfaction. Similarly, Guidi and Traversa (2021) reviewed the significance of empathy in patient care, detailing its various definitions within the medical field. Furthermore, reference (Howick, Steinkopf, Ulyte, Roberts, & Meissner, 2017) conducted a systematic review and meta-analysis of patient surveys, showcasing the variability in healthcare practitioners' empathy and its correlation with patient health outcomes. However, there is a lack of comprehensive studies examining the mediating role of empathy between service quality and customer satisfaction worldwide, including the UAE healthcare context, making this research timely and relevant (Kerasidou, Bærøe, Berger, & Caruso Brown, 2021).

Despite the UAE's state-of-the-art healthcare facilities, many Emiratis seek treatment outside the country, indicating dissatisfaction with domestic healthcare services. This dissatisfaction leads to increased expenses for individuals and the country. The government's extensive investments to enhance healthcare services have not met patient expectations, highlighting the need for further investigation into service quality to improve citizen satisfaction with the UAE's healthcare sector (Sayani, Moonesar, Zakzak, & Elsholkamy, 2023).

2. Literature Review

2.1 Service Quality in Healthcare Providers

The mission of the World Health Organization (WHO) is to enhance people's lives by reducing disease and poverty burdens and ensuring everyone has access to high-quality healthcare (Chieh-sheng, 2016). Internationally, healthcare services are more advanced in developed countries compared to those available in developing countries. The goal of the 2016 Healthcare Index is to assess global healthcare procedures, structures, and outcomes (Numbeo, 2016).

One important aspect of healthcare quality is providing better services for the community, which has led to ranking healthcare service quality in countries that serve their communities better. With global development, the role of healthcare service quality has become vital for ensuring better health for the community, including efforts to increase life expectancy. It is anticipated that each person will visit a hospital roughly every 17 years. About 100,000 people die in hospitals each year as a result of medical malpractice and subpar care, with 80,000 of those deaths being hospital-acquired infections, according to the Journal of the American Medical Association. Due to avoidable medical negligence, one in every 370 hospital admissions result in death (Houle & Fleece, 2012). Therefore, improved community health depends on the calibre of services offered to patients.

Because of its connection to market share, profit, and cost savings, service quality is also significant from an economic standpoint. As there is growing agreement that patient satisfaction is a key determinant of healthcare quality, interest in the quality of healthcare services is rising. Through quality improvement initiatives, numerous hospitals are looking for ways to alter the way patient care is delivered (Al-Damen, 2017).

By encouraging sustainable development and equitable economic growth, healthcare systems support social and economic advancement. In order to achieve this, they increase employment opportunities and implement inclusive employment policies, improve social cohesion in underprivileged communities, concentrate investment in underdeveloped areas, strengthen the skill base in regional and local labour markets, and increase the use of micro, small, and medium-sized enterprises (MSMEs) in procurement and purchasing (Boyce & Brown, 2019).

Recent research highlights how crucial empathy is to service quality and how it affects client satisfaction and subsequent service use (Lajante, Del Prete, Sasseville, Rouleau, Gagnon, & Pelletier, 2023). Furthermore, especially in times of emergency, the quality of health services must be a top priority rather than an afterthought. Early COVID-19 disruptions highlight the need for emergency plans and response strategies to specifically address health service quality (WHO, 2023).

2.2 Important of Services Quality on Healthcare Services

A critical aspect of healthcare quality is the provision of better services for the community. This focus has led to the ranking of healthcare service quality based on how well countries

serve their communities. With global development, the role of healthcare service quality has become vital in ensuring better health for the community. Efforts to increase life expectancy are essential, considering that individuals are expected to visit the hospital every 17 years on average (Rauf, Muhammad, Mahmood, & Aftab, 2024). According to the Journal of the American Medical Association, approximately 100,000 individuals die annually in hospitals due to medical negligence and low service quality. Among these, 80,000 deaths are from hospital-acquired infections. One out of every 370 people admitted to a hospital dies due to preventable medical negligence (Houle & Fleece, 2012). Therefore, the quality of services provided to patients is crucial for improving community health (Darzi, Islam, Khursheed, & Bhat, 2023; Al-Assaf, Bahroun, & Ahmed, 2024; Ali, Jusoh, Idris, & Nor, 2024).

Another significant factor to consider is the economic importance of service quality in terms of profit, cost savings, and market share. The need for high-quality health-care services is growing. Patient satisfaction is increasingly seen as an essential indicator of health-care quality, and many hospitals are looking for ways to improve patient care delivery through quality improvement initiatives (Al-Damen, 2017). Health systems contribute positively to economic and social progress by promoting equitable economic growth and sustainable development. They achieve this by, among other things, increasing employment opportunities and enacting inclusive employment policies, strengthening the base of skills in regional and local labour markets, focussing investment in underdeveloped or economically underdeveloped areas, increasing the use of micro, small, and medium-sized enterprises (MSMEs) when purchasing and procuring, and assisting in the improvement of social cohesion in underprivileged communities (Boyce & Brown, 2019).

2.3 Service Quality and Customers Satisfaction in Healthcare Providers

Research in service management has focused on the correlation between customer satisfaction and service quality. Customer satisfaction denotes the degree to which a customer believes that a service fulfils or surpasses their expectations, whereas service quality is typically characterised as the customer's assessment of the overall excellence or superiority of a service. Research has demonstrated a strong correlation between these two constructs, with increased customer satisfaction typically arising from superior service quality. Agbor (2011) found that customer satisfaction is significantly influenced by service quality factors such as responsiveness, empathy, and reliability. Similar to this, Sureshchandar, Rajendran and Anantharaman (2002) contended that customer satisfaction ought to be operationalised using the same criteria as service quality, suggesting that raising service quality is likely to raise customer satisfaction.

Moreover, Ngo's research (Ngo & Nguyen, 2016) in the retail banking sector demonstrated that customer satisfaction and service quality are critical precursors of customer loyalty, with customer satisfaction serving as a mediator in the relationship between service quality and loyalty. This indicates that customer loyalty is indirectly influenced by service quality, which also affects customer satisfaction. This has resulted in a strong correlation between customer satisfaction and service quality. Numerous studies indicate that elevated service quality enhances customer satisfaction, subsequently fostering customer loyalty.

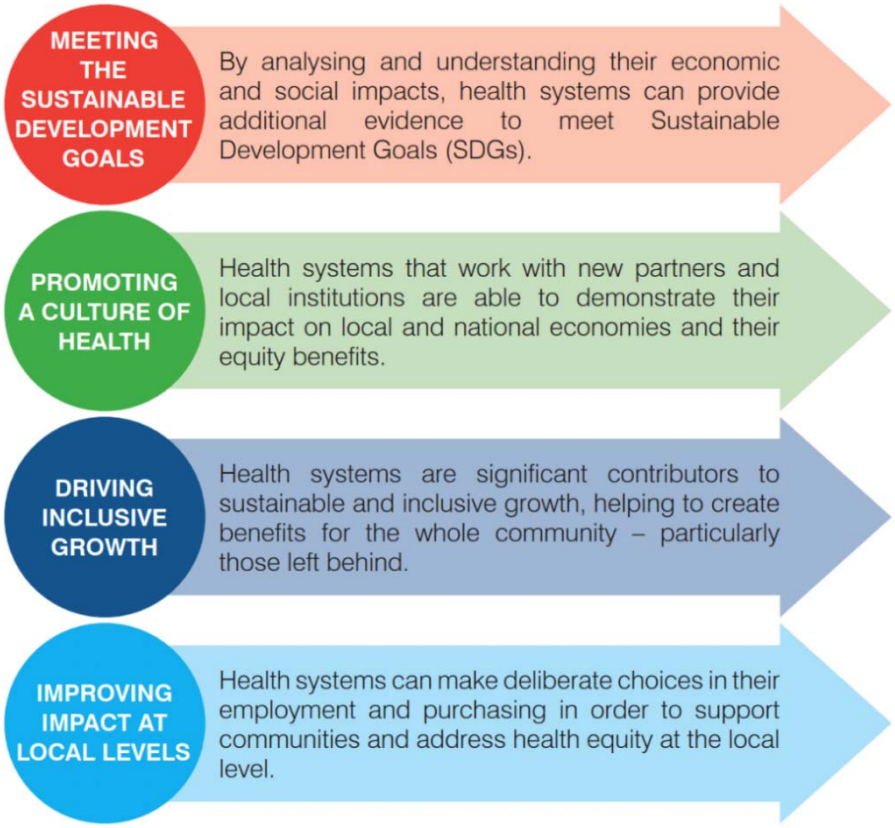

Figure 1. Social and economic advantages of service quality in healthcare systems

Source: Boyce & Brown, 2019.

The best way for a healthcare service provider to ensure customer happiness and retain clients is through achieving high levels of patient satisfaction. The biggest challenge for healthcare organizations is competing with other hospitals based on better service quality components and efficient service delivery at a lower cost. Today, people view healthcare services from two perspectives: a holistic social approach and a medical standpoint (Alghamdi, 2014). Patient satisfaction is defined as a value judgment and reaction to stimuli perceived in the health environment just before, during, and after their inpatient stage or clinical visit. Typically, healthcare services refer to customer satisfaction as patient satisfaction (Umoke, Umoke, Nwimo, Nwalieji, Onwe, Emmanuel Ifeanyi, & Samson Olaoluwa, 2020).

Consumers are now more aware of the various medical services available on the market and their quality levels due to increased competition in the healthcare sector. As a result, there is tremendous responsibility to improve service quality to meet customers' expectations (Ampaw, Chai, Liang, Tsai, & Frempong, 2020). Higher perceived satisfaction during treatment can win over a group of devoted patients, who will then be more likely to recommend the same healthcare provider to others and use their services again in the future (Kitapci, Akdogan, & Dortyol, 2014).

Patient satisfaction is a good way to gauge a hospital's effectiveness, especially regarding the timely attention given by doctors and staff in providing patient-centered healthcare. Patient dissatisfaction can be categorized in three ways (Atmojo, Sudaryanto, Widiyanto, Ernawati, & Arradini, 2020). First, from the consumer perspective, service providers' ignorance of service dimensions is significant. Second, there is a failure to comprehend the service dimensions prior to consumer preferences. Third, service providers' ignorance of various service attributes leads to customer dissatisfaction. Customers may occasionally become dissatisfied due to employees' unfavourable behavioural traits (Almomani, Al-Ghdabi, & Banyhamdan, 2020). However, factors like equity, safety, timeliness, and effective patient-centred care can guarantee high-quality services that raise patients' satisfaction levels (Suhail & Srinivasulu, 2021). Research specifically indicates that satisfaction is influenced by service quality (Moreira & Silva, 2015). Factors influencing to adopt AI in healthcare

Decision-makers are more likely to adopt AI if they perceive its benefits over existing systems, as it provides faster and more accurate

2.4 Empathy in Healthcare Service

Empathy in service quality reflects a service provider's attitude of care and emotions (Al-Hawari, 2015). In healthcare, it is defined as the provider's ability to understand and assist patients with the greatest attention (Rashid & Jusoff, 2009). Components of empathy include hospital staff's courteous demeanour and their capacity to listen, comprehend, and provide precise information (Curry & Singlair, 2002).

The significance of empathy in healthcare cannot be overstated. Practitioners with high emotional quotients possess exceptional interpersonal skills, leading to high-quality healthcare and patient satisfaction. Additionally, higher emotional quotients correlate with better job performance and organizational citizenship behaviours (OCBs) (Rafiei, 2017).

Recent studies have emphasized empathy's importance in service quality and its impact on customer satisfaction and future service use. For example, empathy training programs enhance service quality, employee well-being, and customer satisfaction (Lajante, Del Prete, Sasseville, Rouleau, Gagnon, & Pelletier, 2023). Furthermore, empathy significantly impacts customers' perceptions of service quality, satisfaction, and future service use (Fottler, Ford, & Heaton, 2002; Calnan, Katsouyiannopoulos, Ovcharov, & Prokhorskas, 1994). A greater emphasis on empathy enhances consumer loyalty and encourages continued service use (Chen, Pai, & Yeh, 2020). Recent research also validates empathy's role in enhancing corporate image and commitment (Yingfei, Mengze, & Ki-Hyung, 2022). Empathy plays a critical role in service quality within the healthcare industry by fostering better patient-provider interactions, improving patient satisfaction, and encouraging future service use.

2.5 Effect of Empathy Between Service Quality and Customer Satisfaction

Empathy in healthcare settings improves communication, decreases stress, and builds trust, all of which lead to higher patient satisfaction. It also improves health outcomes and increases patient compliance since patients feel truly cared for by their healthcare

practitioners (Elayyan, Rankin, & Chaarani, 2018). As a result, empathic care improves patient-provider relationships, increasing patient loyalty and satisfaction (Kerasidou, Bærøe, Berger, & Caruso Brown, 2021; DiBlasio & Barazandeh, 2010). Given these crucial benefits, several studies have investigated the role of empathy in healthcare. Yu et al. (2022) look into the characteristics that promote empathy in healthcare settings and its impact on patient satisfaction. Similarly, ref (Guidi & Traversa, 2021) examines the importance of empathy in patient care, including its many definitions in the medical industry. Furthermore, Howick, Steinkopf, Ulyte, Roberts and Meissner (2017) perform a comprehensive review and meta-analysis of patient questionnaires, emphasising the heterogeneity in empathy across healthcare practitioners and its relationship to patient health outcomes. Despite these findings, there is a global lack of thorough research on the mediating effect of empathy between service quality and customer satisfaction, including in the UAE healthcare environment, making this study topical and important (Kerasidou, Bærøe, Berger, & Caruso Brown, 2021).

3. Data Collection

The purpose of this study is to assess healthcare service quality in public hospitals in the UAE by developing a relationship model of service quality elements that influence customer happiness, with empathy serving as a mediator. To construct the model, the study used a quantitative research approach, using data collected via a structured questionnaire survey of 1,910 patients from five main public hospitals in Abu Dhabi, UAE. The Abu Dhabi Health Services Company (SEHA) manages the following hospitals: Sheikh Khalifa Medical City (SKMC), Sheikh Shakhbout Medical City (SSMC), Tawam Hospital, Al Ain Hospital, and Healthpoint Hospital. Furthermore, employing a stratified random selection technique, the targeted responders are patients aged 25 to 35 years old. Thus, the allocation of respondents is based on the sizes or patient volumes of the hospitals, as detailed in Table 1.

Table 1. Distribution of the respondents

Hospital	Percentage of respondent	Number of respondents
Sheikh Khalifa Medical City (SKMC)	25%	478
Sheikh Shakhbout Medical City (SSMC)	20%	382
Tawam Hospital	20%	382
Al Ain Hospital	15%	287
Healthpoint Hospital	20%	382
Total	100%	1910

The acquired data was reviewed for missing data, reliability, and normality tests before being utilised to create the model in SmartPLS software. To provide robust and trustworthy results, the model was created using Structural Equation Modelling (SEM) and Partial Least Squares (PLS) approaches.

4. Modeling Analysis and Results

This study's model aims to evaluate the healthcare service quality in five public hospitals in the UAE. It outlines the relationship between service quality factors and customer satisfaction, with empathy serving as a mediator. The collected questionnaire data was used to develop the model in SmartPLS software, utilizing Partial Least Squares (PLS) and Structural Equation Modelling (SEM) techniques.

4.1 Measurement Assessment

To determine the adequacy of an instrument, it is essential to consider both reliability and validity. Relying solely on reliability is insufficient; validity ensures the instrument measures what it is supposed to measure (Hair, Black, Babin, & Anderson, 2011). Validity refers to the ability of a scale to accurately measure the intended constructs. The closer the fit between conceptual and operational definitions, the greater the measurement validity (Hair, Black, Babin, & Anderson, 2011). It also relates to the relationship between a construct and its indicators. Kline (2011) defines validity as the degree to which a test accurately measures the research. It is an effective indicator of how well the research resonates with its intended purpose. More specifically, validity pertains to the design and techniques of scientific inquiry, ensuring that study findings accurately reflect the trends and occurrences being investigated. For a construct to be considered valid, three conditions must be met (Hair, Hult, Ringle, & Sarstedt, 2016).

4.1.1 Construct Reliability and Validity

Construct reliability ensures that assessment items consistently capture the underlying construct, which is frequently tested using Cronbach's alpha and composite reliability (CR) (Memon, Rahman, Aziz, & Abdullah, 2013). Validity, on the other hand, assesses whether the measurement items accurately reflect the intended construct and is generally measured using convergent validity, which employs average variance extracted (AVE) (Hair & Alamer, 2022).

Table 2. Results of construct reliability and validity

Constructs	No. items	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
ASSURANCE	5	0.810	0.868	0.571
CUSTOMER SATISFACTION	5	0.757	0.838	0.510
EMPATHY	5	0.816	0.872	0.577
RELIABILITY	4	0.789	0.864	0.614
RESPONSIVENESS	5	0.834	0.883	0.607
SOCIAL RESPONSIBILITY	4	0.800	0.870	0.626
TANGIBILITY	6	0.803	0.859	0.504

The results from Table 2 indicate that for the Assurance construct, the Cronbach's Alpha value is 0.810, the Composite Reliability is 0.868, and the Average Variance Extracted (AVE) is 0.571. For the Customer Satisfaction construct, the Cronbach's Alpha value is 0.757, the Composite Reliability is 0.838, and the AVE is 0.510. In the Empathy construct, the Cronbach's Alpha value is 0.816, the Composite Reliability is 0.872, and the AVE is 0.577. For the Reliability construct, the Cronbach's Alpha value is 0.789, the Composite Reliability is 0.864, and the AVE is 0.614. In the Responsiveness construct, the Cronbach's Alpha value is 0.834, the Composite Reliability is 0.883, and the AVE is 0.607. For the Social Responsibility construct, the Cronbach's Alpha value is 0.800, the Composite Reliability is 0.870, and the AVE is 0.626. Finally, for the Tangibility construct, the Cronbach's Alpha value is 0.803, the Composite Reliability is 0.859, and the AVE is 0.504. Each construct shows acceptable levels of internal consistency and measurement quality. This analysis confirms that these constructs have achieved the reliability and validity of the model measurement component.

4.1.2 Discriminant Validity

Discriminant validity evaluates the distinction between a specific measurement model and alternative models (Memon & Rahman, 2013). It ensures that constructs are distinct from one another and is commonly assessed using the Fornell-Larcker criterion and cross-loadings. These assessments provide a comprehensive review of the measurement model, ensuring that the constructs are both trustworthy and valid (Hair & Alamer, 2022). According to Fornell and Larcker (1981), the square root of each construct's AVE must exceed its correlation with any other construct in the model. This criterion, as detailed by Hair, Hult, Ringle and Sarstedt (2014), was met in the Fornell-Larcker test of the current investigation. The discriminant validity test results are presented in Table 3.

Table 3 indicates strong discriminant validity across all constructs. Assurance has an AVE of 0.955, showing it is distinct from other constructs. Customer Satisfaction has an AVE of 0.844, with notable correlations with Assurance (0.724) and Empathy (0.767). Empathy has an AVE of 0.859, indicating it is distinct, with high correlations with Assurance (0.774) and Tangibility (0.81). Reliability has an AVE of 0.884, showing it is distinct despite correlations with Customer Satisfaction (0.757) and Tangibility (0.745). Responsiveness has an AVE of 0.779, with significant correlations with Assurance (0.769) and Customer Satisfaction (0.784). Social Responsibility has an AVE of 0.891, indicating strong discriminant validity with significant correlations with Assurance (0.749). Tangibility has an AVE of 0.91, showing strong discriminant validity with high correlations with Empathy (0.81) and Customer Satisfaction (0.803). These results confirm that each construct is distinct, ensuring the measurement model's discriminant validity

Table 3. Results of construct reliability and validity

	ASSURANCE	CUSTOMER SATISFACTION	EMPATHY	RELIABILITY	RESPONSIVENESS	SOCIAL RESPONSIBILITY	TANGIBILITY
ASSURANCE	0.955						
CUSTOMER SATISFACTION	0.724	0.844					
EMPATHY	0.774	0.767	0.859				
RELIABILITY	0.688	0.757	0.72	0.884			
RESPONSIVENESS	0.769	0.784	0.665	0.625	0.779		
SOCIAL RESPONSIBILITY	0.749	0.714	0.656	0.658	0.686	0.891	
TANGIBILITY	0.829	0.803	0.81	0.745	0.727	0.715	0.91

4.2 Structural Assessment

In this structural component assessment, bootstrapping (Rahman, Memon, Abdullah, & Azis, 2013) and blindfolding techniques are utilised to determine the model's coefficient of determination, path analysis, and predictive capacity (Fornell & Larcker, 1981). Bootstrapping assesses model parameter precision by producing several subsamples from the data (Wong, 2016). Blindfolding assists in evaluating the model's predictive usefulness by systematically removing and predicting portions of the data (Ringle, Wende, & Becker, 2015).

4.2.1 Coefficient of Determination

The coefficient of determination, quantified by R^2, serves as an indicator of the structural model's quality. R^2 represents the total contribution of exogenous constructs in explaining or predicting the variance of the endogenous construct within the structural model (Memon, Rahman, & Azis, 2013). If the R^2 value approaches 1, it indicates a greater explanation or prediction of the model's variance, correlating with superior model quality and vice versa (Hair, Black, Babin, & Anderson, 2011; Hair, Hult, Ringle, & Sarstedt, 2014; Wong, 2016). Although there are no uniform criteria for establishing an acceptable R^2 value, several academics have proposed recommendations that vary by discipline. An R^2 value of 0.25 is considered low, 0.50 is viewed as moderate, and 0.75 is classified as substantial (Hair, Hult, Ringle, & Sarstedt, 2014; Wong, 2016). Hair et al. (2014) noted that in the realm of consumer behaviour, an R^2 value of 0.2 is considered substantial. The R^2 levels of this study were evaluated according to these guidelines. The R^2 values of the final model are presented in Table 4.

Table 4. Results of construct reliability and validity

Types of constructs	Name of construct	R Square
Dependent construct	CUSTOMER SATISFACTION	0.917
Mediator	EMPATHY	0.978

The R^2 values from Table 4 indicate that the model has strong explanatory power for both constructs. The Customer Satisfaction construct has an R^2 value of 0.917, meaning that 91.7% of its variance is explained by the exogenous constructs. The Empathy construct has an R^2 value of 0.978, indicating that 97.8% of its variance is explained by the exogenous constructs. These high R^2 values suggest that the model effectively predicts and explains the variance in these constructs, demonstrating substantial model quality and predictive accuracy (Hair, Hult, Ringle, & Sarstedt, 2014).

4.2.2 Predictive Relevancy

Cross-validated redundancy is utilized to assess the predictive relevance of the structural model. Geisser's relevance (Q^2) value determines if the data points of all indicators in the outer model of endogenous constructs can be accurately predicted (Wong, 2016). This approach uses the sample re-use methodology, where a segment of the data matrix is excluded, model parameters are estimated, and the excluded segment is forecasted based on these estimates (Hair, Black, Babin, & Anderson, 2011; Hair, Hult, Ringle, & Sarstedt, 2014). For predictive relevance to be achieved, the Q^2 value must be greater than zero (Chin, 1998). To evaluate predictive relevance, the blindfolding method in SmartPLS software is employed to compute cross-validated redundancy (Q^2) (Ringle, Wende, & Becker, 2015). The results of the blindfolding technique are presented in Table 5.

Table 5. Predictive relevance of cross-validated redundancy

Constructs	SSO	SSE	Q^2 (=1-SSE/SSO)
ASSURANCE	1875	1875	
CUSTOMER SATISFACTION - DV	1875	1028.156	0.452
EMPATHY - Mediator	1875	831.907	0.556
RELIABILITY	1500	1500	
RESPONSIVENESS	1875	1875	
SOCIAL RESPONSIBILITY	1500	1500	
TANGIBILITY	2250	2250	

Table 5 displays the cross-validated redundancy of the structural model. All Q^2 values of the endogenous constructions exceed 0. This indicated that the study model possessed a high degree of predictive accuracy (Chin, 1998).

4.2.3 Hypothesis Testing

The hypothesis testing for the PLS-SEM model was conducted using the bootstrapping function in SmartPLS software (Hair, Black, Babin, & Anderson, 2011; Hair, Hult, Ringle, & Sarstedt, 2014; Wong, 2016). Bootstrap samples are created by randomly drawing cases with replacement from the original sample (Rahman, Memon, Aziz, & Abdullah, 2013). Since it is a mediation model, the hypothesis testing assessed both direct and indirect relationships (Hair, Hult, Ringle, & Sarstedt, 2014). Direct relationships refer to the immediate effects of the independent variables on the dependent variable. In contrast, indirect relationships illustrate how the independent variables influence the dependent variable through the mediating variable of empathy. The model resulting from the bootstrapping process is depicted in Figure 2.

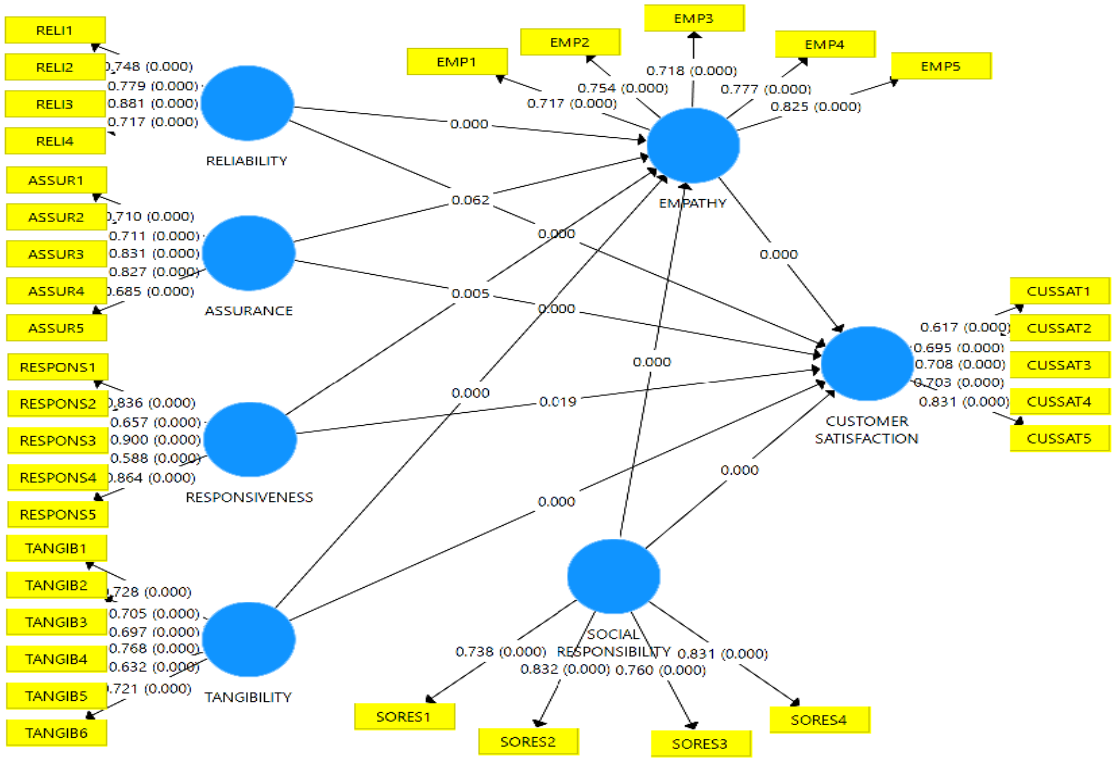

Figure 2. Model of the study

Figure 2 depicts the SEM-PLS model generated after hypothesis testing. The model comprises the independent constructs of reliability, assurance, responsiveness, tangibility, and social responsibility. Empathy acts as a mediator, with customer satisfaction as the dependent construct.

1) Results of direct relationships hypothesis

The hypothesis testing results of the direct relationships in the model are based on the independent

constructs of reliability, assurance, responsiveness, tangibility, and social responsibility with customer satisfaction in Abu Dhabi Public Hospitals, as shown in Table 6.

Table 6. Hypothesis testing results of direct relationship

Hypothesis	Direct relationship	Path strength (beta value)	P Values	Results
H1	RESPONSIVENESS -> CUSTOMER SATISFACTION	-0.076	0.015	Significant
H2	SOCIAL RESPONSIBILITY -> CUSTOMER SATISFACTION	-0.695	0.000	Significant
H3	RELIABILITY -> CUSTOMER SATISFACTION	0.969	0.000	Significant
H4	ASSURANCE -> CUSTOMER SATISFACTION	0.892	0.000	Significant
H5	TANGIBILITY -> CUSTOMER SATISFACTION	1.000	0.000	Significant

Table 6 presents the results of hypothesis testing for the direct relationships between various factors influencing customer satisfaction. The findings indicate that responsiveness positively and directly affects customer satisfaction, with a beta value of -0.076 and a p-value of 0.015. This result suggests that higher responsiveness is associated with lower customer satisfaction. Additionally, social responsibility positively and directly affects customer satisfaction, with a beta value of -0.695 and a p-value of 0.000, indicating that higher social responsibility is also associated with lower customer satisfaction.

Conversely, reliability positively and directly affects customer satisfaction, with a path strength of 0.969 and a p-value of 0.000. This suggests that as reliability increases, customer satisfaction also increases. Assurance positively and directly affects customer satisfaction, with a beta value of 0.892 and a p-value of 0.000, meaning that higher levels of assurance lead to higher customer satisfaction.

Finally, tangibility positively and directly affects customer satisfaction, with a beta value of 1.000 and a p-value of 0.000, indicating that greater tangibility leads to higher customer satisfaction. These findings highlight the complex dynamics of factors influencing customer satisfaction in the UAE public healthcare sector.

2) Results of indirect relationships hypothesis

The hypothesis testing results of the indirect relationships in the model are based on the independent constructs of reliability, assurance, responsiveness, tangibility, and social responsibility with customer satisfaction but through empathy as mediator in Abu Dhabi Public Hospitals, as shown in Table 7.

Table 7. Effect of indirect relationship

Hypothesis	Indirect relationship	Path strength	P Values	Results
H6	RESPONSIVENESS -> EMPATHY -> CUSTOMER SATISFACTION	-0.048	0.006	Significant
H7	SOCIAL RESPONSIBILITY -> EMPATHY -> CUSTOMER SATISFACTION	0.776	0.000	Significant
H8	RELIABILITY -> EMPATHY -> CUSTOMER SATISFACTION	-0.702	0.000	Significant
H9	ASSURANCE -> EMPATHY -> CUSTOMER SATISFACTION	0.042	0.057	Not Significant
H10	TANGIBILITY -> EMPATHY -> CUSTOMER SATISFACTION	-1.171	0.000	Significant

Table 7 presents the hypothesis testing results for the indirect relationships between various factors influencing customer satisfaction through the mediating role of empathy. For indirect relationships, it was found that responsiveness, when mediated by empathy, has a negative significant relationship with customer satisfaction, evidenced by a path strength of -0.048 and a p-value of 0.006. This finding suggests that higher responsiveness, when coupled with empathy, is associated with lower customer satisfaction. Conversely, the study found that responsibility has a positively significant relationship with customer satisfaction when mediated through empathy, with a beta value of 0.776 and a p-value of 0.000. This indicates that higher social responsibility, when combined with empathy, enhances customer satisfaction. Reliability, on the other hand, is negatively significant when mediated by empathy, with a path strength of -0.702 and a p-value of 0.000, implying that higher reliability, when mediated through empathy, leads to lower customer satisfaction. Assurance, however, does not show a significant impact on customer satisfaction when mediated through empathy, as indicated by a beta value of 0.042 and a p-value of 0.057. This suggests that assurance, mediated by empathy, does not significantly affect customer satisfaction. Lastly, tangibility is found to be negatively significant when mediated through empathy, with a beta value of -1.171 and a p-value of 0.000. This result indicates that higher tangibility, when mediated by empathy, is associated with lower customer satisfaction

4.3 Determination the Level of Mediation Effect

The determination of mediation effects in a PLS-SEM model involves contrasting direct and indirect effects to identify the presence and type of mediation (Nitzl, Ringle, & Sarstedt, 2016). This process typically includes bootstrapping to test the significance of the indirect effects (Hair, Hult, Ringle, & Sarstedt, 2017). If both the direct and indirect effects are significant, then the mediation effect is considered partial. Conversely, if only the indirect effect is significant while the direct effect is not, full mediation is indicated. Additionally, if neither the direct nor the indirect effect is significant, it suggests there is no mediation effect (Hair, Hult, Ringle, & Sarstedt, 2017).

Table 8. Status of mediation effect

Direct	Path status	Indirect	Path status	Mediation effect
ASSURANCE -> CUSTOMER SATISFACTION	Significant	ASSURANCE -> EMPATHY -> CUSTOMER SATISFACTION	Not Significant	No effect
RELIABILITY -> CUSTOMER SATISFACTION	Significant	RELIABILITY -> EMPATHY -> CUSTOMER SATISFACTION	Significant	Partial
RESPONSIVENESS -> CUSTOMER SATISFACTION	Significant	RESPONSIVENESS -> EMPATHY -> CUSTOMER SATISFACTION	Significant	Partial
SOCIAL RESPONSIBILITY -> CUSTOMER SATISFACTION	Significant	SOCIAL RESPONSIBILITY -> EMPATHY -> CUSTOMER SATISFACTION	Significant	Partial
TANGIBILITY -> CUSTOMER SATISFACTION	Significant	TANGIBILITY -> EMPATHY -> CUSTOMER SATISFACTION	Significant	Partial

Table 8 demonstrates the mediation impact of empathy in the interactions between five independent constructs which are assurance, reliability, responsiveness, social responsibility, and tangibility and customer satisfaction. The results reveal that empathy has no mediation effect in the relationship between assurance and customer satisfaction. Empathy, on the other hand, acts as a partial mediator in the interactions between reliability, responsiveness, social responsibility, tangibility, and customer satisfaction. Empathy somewhat mediates the links between reliability, responsiveness, social responsibility, tangibility, and customer satisfaction. However, it does not mediate the relationship between assurance and customer satisfaction.

4.4 Framework of Service Quality, Empathy, and Customer Satisfaction

The previously reported hypothesis testing results demonstrate the critical role that each service quality dimensions which are assurance, reliability, responsiveness, social responsibility, and tangibility that plays in fostering customer happiness. These findings emphasise the need of working on these areas to ensure that customers receive high-quality service. Furthermore, the study finds empathy as a significant mediator, emphasising its importance in enhancing the link between service quality and customer pleasure. Based on the hypothesis testing results for both the direct and indirect relationships between service quality, empathy, and customer happiness, this study developed a framework (Figure 3) that depicts how all of these aspects interact and influence one another. The picture shows a visual representation of the framework connection, which helps to improve customer satisfaction in Abu Dhabi healthcare services.

The framework illustrates how service quality affects customer satisfaction with empathy as a mediator in the Abu Dhabi Health Services Company (SEHA). The direct relationships (depicted by red solid arrows) show that all dimensions significantly impact customer satisfaction. Among them, social responsibility has the strongest negative impact with a strength value of -0.695, while tangibility has the highest positive impact with a strength value of 1.000. For indirect relationships (depicted by dashed arrows), all dimensions significantly impact customer satisfaction through empathy, except the assurance dimension, which is not statistically significant. Tangibility has the strongest negative impact with a strength value of -1.171, while social responsibility has the highest positive impact with a strength value of 0.776. This framework highlights the critical roles of service quality dimensions and empathy in shaping customer satisfaction within the healthcare context.

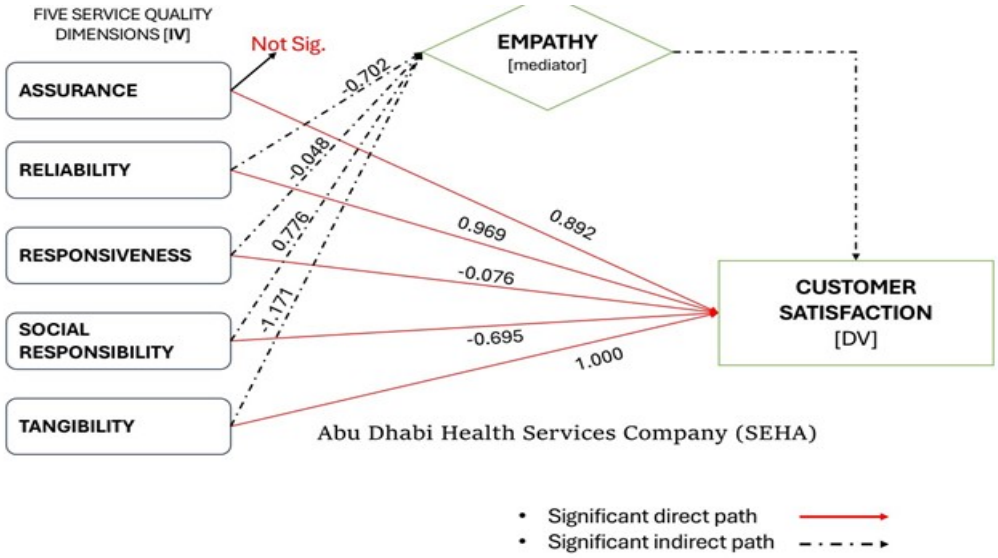

Figure 3. Framework of the study

The framework identifies both direct and indirect interactions that influence consumer satisfaction in the UAE's public healthcare system. In indirect interactions, more responsiveness, mediated by empathy, is associated with poorer customer satisfaction, whereas higher social responsibility, when combined with empathy, increases consumer contentment. Similarly, more dependability mediated by empathy leads to decreased customer satisfaction, but assurance mediated by empathy has no significant effect on satisfaction. Furthermore, increased tangibility, as mediated by empathy, is related with lower consumer satisfaction. In terms of direct interactions, better responsiveness and social responsibility are both associated with poorer consumer satisfaction. Increased reliability, certainty, and tangibility, on the other hand, have a direct impact on customer satisfaction. These findings highlight the complicated processes that affect customer satisfaction in this situation.

When compared to previous studies, the finding that higher responsiveness is associated with lower customer satisfaction is consistent with Sayani, Moonesar, Zakzak and Elsholkamy (2023) research, which showed that responsiveness is critical for healthcare service quality but may not always lead to higher satisfaction. The beneficial influence of social responsibility on customer satisfaction is consistent with the findings of Al Hubaishi and Ali (2022), who discovered that social responsibility and empathy are favourably correlated with healthcare service quality and satisfaction in the UAE. The positive association between reliability and consumer satisfaction complements findings from the same study, which revealed that reliability significantly contributes to increased satisfaction in public healthcare services.

Furthermore, the beneficial influence of assurance on customer satisfaction is consistent with the findings of Al Hubaishi and Ali (2022), who discovered that assurance corresponds positively with healthcare service quality and satisfaction. Their findings further corroborate the positive association between tangibility and customer satisfaction, demonstrating that tangibility is associated with higher levels of healthcare service satisfaction and quality. These relationships show the complex dynamics of factors influencing consumer satisfaction in the UAE public healthcare system, and emphasise the need of considering various dimensions when evaluating healthcare service quality

5. Conclusion

This paper presented a study to asses how empathy construct mediates the effect of service quality constructs on customer satisfaction. After designing and evaluating the model, this study provided a framework for service quality and customer satisfaction in the Abu Dhabi Health Services Company (SEHA), with empathy acting as a mediator. The framework's structure was based on direct links, with each dimension having a substantial impact on consumer happiness. Among them, social responsibility has the most negative impact (-0.695), whereas tangibility has the most positive affect (1.000). All facets of indirect relationships have a considerable impact on customer satisfaction via empathy, with the exception of assurance, which is not statistically significant. Tangibility has the largest negative impact (-1.171), while social responsibility has the greatest positive impact (0.776). This framework highlights the role of service quality qualities and empathy in determining customer satisfaction in the healthcare industry.

References

Aburayya, A., Alshurideh, M., Al Marzouqi, A., Al Diabat, O., Alfarsi, A., Suson, R., & Salloum, S. A. (2020). An empirical examination of the effect of TQM practices on hospital service quality: An assessment study in uae hospitals. *Syst. Rev. Pharm*, *11*(9), 347–362.

Agbor, J. M. (2011). *The Relationship between Customer Satisfaction and Service Quality: a study of three Service sectors in Umeå*.

Al Hubaishi, H., & Ali, A. (2022). The effect of public healthcare service quality on residents' satisfaction in the United Arab Emirates (UAE), the case of Ajman Emirate. *Health*, *14*(3), 306–321.

Al-Assaf, K., Bahroun, Z., & Ahmed, V. (2024). Transforming Service Quality in Healthcare: A Comprehensive Review of Healthcare 4.0 and Its Impact on Healthcare Service Quality. *Informatics*, *11*(4), 96.

Al-Damen, R. (2017). Health care service quality and its impact on patient satisfaction "case of Al-Bashir Hospital". *International Journal of Business and Management*, *12*(9).

Al-Hawari, M. A. (2015). How the personality of retail bank customers interferes with the relationship between service quality and loyalty. *International Journal of Bank Marketing*.

Al-Neyadi, H. S., Abdallah, S., & Malik, M. (2018). Measuring patient's satisfaction of healthcare services in the UAE hospitals: Using SERVQUAL. *International Journal of Healthcare Management*, *11*(2), 96–105.

Alghamdi, F. (2014). The impact of service quality perception on patient satisfaction in government hospitals in southern Saudi Arabia. *Saudi Medical Journal*, *35*(10), 1271–1273.

Ali, J., Jusoh, A., Idris, N., & Nor, K. M. (2024). Healthcare service quality and patient satisfaction: a conceptual framework. *International Journal of Quality & Reliability Management*, *41*(2), 608–627.

Almomani, R., Al-Ghdabi, R., & Banyhamdan, K. (2020). Patients' satisfaction of health service quality in public hospitals: A PubHosQual analysis. *Management Science Letters*, *10*(8), 1803–1812.

Ampaw, E. M., Chai, J., Liang, B., Tsai, S. B., & Frempong, J. (2020). *Assessment on health care service quality and patients' satisfaction in Ghana*. Kybernetes.

Atmojo, J. T., Sudaryanto, W. T., Widiyanto, A., Ernawati, E., & Arradini, D. (2020). Telemedicine, cost effectiveness, and patients satisfaction: a systematic review. *J Health Policy Manag*, *5*(2), 103–107.

Basheti, I. A., Qunaibi, E. A., Hamadi, S. A., & Reddel, H. K. (2014). Inhaler technique training and health-care professionals: effective long-term solution for a current problem. *Respiratory Care*, *59*(11), 1716–1725.

Boyce, T., & Brown, C. (2019). *Economic and social impacts and benefits of health systems*.

Calnan, M. R., Katsouyiannopoulos, V., Ovcharov, V. K., & Prokhorskas, R. (1994). Major determinants of consumer satisfaction with primary care in different health systems. *Family Practice*, *11*(4), 468–475.

Chen, S. H., Pai, F. Y., & Yeh, T. M. (2020). Using the Importance–Satisfaction Model and Service Quality Performance Matrix to Improve Long-Term Care Service Quality in Taiwan. *Applied Sciences*, *10*(1), 85.

Chieh-sheng, J. (2016). *World Health Organisation*. Encyclopaedia of public health.

Chin, W. W. (1998). The partial least squares approach to structural equation modelling. *Modern Methods for Business Research*, *295*(2), 295–336.

Cohen, G. (1996), Age and health status in a patient satisfaction survey. *Social Science and Medicine*, *42*(7), 1085–1093.

Curry, A. C., & Singlair, E. (2002), Assessing the quality of physiotherapy services using SERVQUAL. *International Journal of Health Care*.

Darzi, M. A., Islam, S. B., Khursheed, S. O., & Bhat, S. A. (2023). Service quality in the healthcare sector: a systematic review and meta-analysis. *LBS Journal of Management & Research*, *21*(1), 13–29.

de Las Heras-Rosas, C., Herrera, J., & Rodríguez-Fernández, M. (2021). Organisational commitment in healthcare systems: A bibliometric analysis. *International Journal of Environmental Research and Public Health*, *18*(5), 2271.

DiBlasio, A., & Barazandeh, M. (2010). The importance of empathy in patient-physician relationships. *The Journal of Family Practice*, *59*(2), 84–89.

Elayyan, M., Rankin, J., & Chaarani, M. W. (2018). Factors affecting empathetic patient care behaviour among medical doctors and nurses: an integrative literature review. *East Mediterranean Health Journal*, *24*(3), 311–318.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50.

Fottler, M. D., Ford, R. C., & Heaton, C. (2002). *Achieving Service Excellence: Strategies for Health*. Health Administration Press, Chicago.

Guidi, C., & Traversa, C. (2021). Empathy in patient care: from 'Clinical Empathy' to 'Empathic Concern'. *Medicine, Health Care and Philosophy*, *24*, 573–585.

Hair, J., & Alamer, A. (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics*, *1*(3), 100027.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2011). *Multivariate Data Analysis*. Pearson.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modelling* (PLS-SEM). Thousand Oaks: Sage.

Houle, D., & Fleece, J. (2012). *Why one-third of hospitals will close by 2020*. KevinMD. com, March, 14.

Howick, J., Steinkopf, L., Ulyte, A., Roberts, N., & Meissner, K. (2017). How empathic is your healthcare practitioner? A systematic review and meta-analysis of patient surveys. *BMC Medical Education*, *17*, 1–9.

Kerasidou, A., Bærøe, K., Berger, Z., & Caruso Brown, A. E. (2021). The need for empathetic healthcare systems. *Journal of Medical Ethics*, *47*(12), e27.

Khambhati, R., Patel, H., & Kumar, S. (2022). A performance evaluation and comparison

model for urban public healthcare service Quality (Urbpubhcservqual) By fuzzy TOPSIS Method. *Journal of Nonprofit & Public Sector Marketing*, *34*(3), 291–310.

Kitapci, O., Akdogan, C., & Dortyol, İ. T. (2014). The impact of service quality dimensions on patient satisfaction, repurchase intentions and word-of-mouth communication in the public healthcare industry. *Procedia-Social and Behavioral Sciences*, *148*, 161–169.

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling*. Guilford Press.

Koomneef, E., Robben, P., & Blair, I. (2017). Progress and outcomes of health systems reform in the United Arab Emirates: a systematic review. *BMC Health Services Research*, *17*(672), 2–13.

Lajante, M., Del Prete, M., Sasseville, B., Rouleau, G., Gagnon, M.-P., & Pelletier, N. (2023). Empathy training for service employees: A mixed-methods systematic review. *PLOS ONE*, *18*(8), e0289793.

Lee, D., & Kim, K. K. (2017). Assessing healthcare service quality: a comparative study of patient treatment types. *International Journal of Quality Innovation*, *3*, 1–15.

Leite, H., Bateman, N., & Radnor, Z. (2020). Beyond the ostensible: an exploration of barriers to lean implementation and sustainability in healthcare. *Production Planning & Control*, *31*(1), 1–18.

Marodin, G. A., & Saurin, T. A. (2015). Classification and relationships between risks that affect lean production implementation: a study in Southern Brazil. *Journal of Manufacturing Technology Management*, *26*(1), 57–79.

Memon, A. H., & Rahman, I. A. (2013). Analysis of cost overrun factors for small scale construction projects in Malaysia using PLS-SEM method. *Modern Applied Science*, *7*(8), 78.

Memon, A. H., Rahman, I. A., & Azis, A. A. (2013). Assessing causal relationships between construction resources and cost overrun using PLS path modelling focusing in Southern and Central Region of Malaysia. *Journal of Engineering and Technology* (JET), *4*(1), 67–78.

Memon, A. H., Rahman, I. A., Aziz, A. A. A., & Abdullah, N. H. (2013). Using structural equation modelling to assess effects of construction resource related factors on cost overrun. *World Applied Sciences Journal*, *21*(01), 6–15.

Moreira, A. C., & Silva, P. M. (2015). The trust-commitment challenge in service quality-loyalty relationships. *International Journal of Health Care Quality Assurance*.

Ngo, M. V., & Nguyen, H. H. (2016). The relationship between service quality, customer satisfaction and customer loyalty: An investigation in Vietnamese retail banking sector. *Journal of Competitiveness*.

Nitzl, C., Ringle, C. M., & Sarstedt, M. (2016). Mediation analysis in partial least squares structural equation modelling (PLS-SEM). *Industrial Management & Data Systems*, *116*(7), 1849–1864.

Numbeo. (2016). *Healthcare index for countries 2016*.

Prodromou, M., & Papageorgiou, G. (2022). Assessing organizational culture in public mental healthcare service organizations. *Journal of Health Organization and Management*, *36*(1), 24–37.

Rafiei, M. (2017). *The effect of emotional quotient on the organizational citizenship behavior in some Iranian hospitals*. Kybernetes,

Rahman, I. A., Memon, A. H., Abdullah, N. H., & Azis, A. A. A. (2013). Application of PLS-SEM to assess the influence of construction resources on cost overrun. *Applied Mechanics and Materials*, *284*, 3649–3656.

Rahman, I. A., Memon, A. H., Aziz, A. A. A., & Abdullah, N. H. (2013). Modelling causes of cost overrun in large construction projects with partial least square-SEM approach: contractor's perspective. *Research Journal of Applied Sciences, Engineering and Technology*, *5*(06), 1963–1972.

Rashid, W. E. W., & Jusoff, K. (2009). Service quality in health care setting. *International Journal of Health Care Quality Assurance*.

Rauf, A., Muhammad, N., Mahmood, H., & Aftab, M. (2024). Healthcare service quality: a systematic review based on PRISMA guidelines. *International Journal of Quality & Reliability Management*, ahead-of-print.

Ringle, C. M., Wende, S., & Becker, J. M. (2015). SmartPLS 3. SmartPLS GmbH, Boenningstedt. *Journal of Service Science and Management*, *10*(3).

Sayani, H., Moonesar, I. A., Zakzak, L., & Elsholkamy, M. M. (2023). Factors Affecting Patient Satisfaction in the UAE's Healthcare Sector. *Health*, *15*(11), 1232–1250.

Suhail, P., & Srinivasulu, Y. (2021). Perception of service quality, satisfaction, and behavioral intentions in Ayurveda healthcare. *Journal of Ayurveda and Integrative Medicine*, *12*(1), 93–101.

Sureshchandar, G. S., Rajendran, C., & Anantharaman, R. N. (2002). The relationship between service quality and customer satisfaction–a factor specific approach. *Journal of Services Marketing*, *16*(4), 363–379.

Umoke, M., Umoke, P. C. I., Nwimo, I. O., Nwalieji, C. A., Onwe, R. N., Emmanuel Ifeanyi, N., & Samson Olaoluwa, A. (2020). Patients' satisfaction with quality of care in general hospitals in Ebonyi State, Nigeria, using SERVQUAL theory. *SAGE Open Medicine*, *8*, 2050312120945129.

WHO. (2023). *Advice for the public: Coronavirus disease* (COVID-19). Retrieved from https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public?adgroupsurvey={adgroupsurvey}&gad_source=1&gclid=Cj0KCQiAgdC6BhCgARIsAPWNWH2lNYGAj5dRQ9Tjgh8T03MVxlHX_evILuMI59IohpwYcIG7o2vrkNsaAtO-EALw_wcB

Wong, K. K. K. (2016). Mediation analysis, categorical moderation analysis, and

higher-order constructs modeling in Partial Least Squares Structural Equation Modeling (PLS-SEM): A B2B Example using SmartPLS. *Marketing Bulletin*, *26*(1), 1–22.

Yingfei, Y., Mengze, Z., & Ki-Hyung, B. (2022). The Nexus of Service Quality, Customer Experience, and Customer Commitment: The Neglected Mediating Role of Corporate Image. *Frontiers in Psychology*, *13*, 917284.

Yu, C. C., Tan, L., Le, M. K., Tang, B., Liauw, S. Y., Tierney, T., … Low, J. A. (2022). The development of empathy in the healthcare setting: a qualitative approach. *BMC Medical Education*, *22*, 245.

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