

## **Impact of B2B Service Quality on Customers' Loyalty in the Egyptian Radiology Imaging Sector: The Mediating Role of Customers' Satisfaction.**

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### **Abstract :**

This research delves into the dynamics of perceived service quality, customer satisfaction, and loyalty in the context of business-to-business (B2B) interactions within the Radiology Domain in Egypt. Adopting a quantitative approach, the study employs structural equation modeling (SEM) for data analysis. The research population comprises B2B customers within the healthcare sector, focusing on radiology imaging centers, hospitals, and medical equipment procurement authorities. Data collection involves structured questionnaires, and the study measures perceived service quality using the INDSERV model and adapts scales for customer loyalty and satisfaction. AMOS software is utilized for statistical analysis. The results affirm positive relationships between perceived service quality and customer loyalty and satisfaction. The study recommends strategies for radiology imaging suppliers, emphasizing service quality enhancement and customer satisfaction initiatives. While the study acknowledges limitations such as industry specificity

and a cross-sectional design, it lays the groundwork for future research directions. The findings contribute valuable insights for B2B interactions within the Radiology Domain and offer practical implications for strategic decision-making in customer-centric approaches.

**Keywords:** Perceived Service Quality, Customer Satisfaction, Customer Loyalty, Business-to-Business (B2B), Radiology Domain.

### الملخص

يتعمق هذا البحث في علاقة جودة الخدمة المقدمة و مدى تأثيرها على رضا العملاء، والولاء في سياق التفاعلات (B2B) بين الشركات و مقدمي الخدمات الطبية من مستشفيات و مراكز أشعة في مجال الأشعة في مصر .  
تم اجراء استبيان شامل لبيان تأثير جودة الخدمة المقدمة على رضا وولاء العملاء و المبني على الأساليب الكمية.  
اعتماد النهج الكمي، وتستخدم الدراسة نموذج المعادلة الهيكلية (SEM) لتحليل البيانات. يتكون مجتمع البحث من عملاء B2B في قطاع الرعاية الصحية، مع التركيز على مراكز التصوير الإشعاعي والمستشفيات وسلطات شراء المعدات الطبية. يتضمن جمع استبيانات منظمة، وتقوم الدراسة بقياس جودة الخدمة المقدمة باستخدام نموذج INDSEV مع استخدام المقاييس لولاء العملاء ورضائهم. يتم استخدام برنامج AMOS للتحليل الإحصائي. وتؤكد النتائج وجود علاقات إيجابية بين جودة الخدمة المقدمة وولاء العملاء ورضائهم. وتوصي الدراسة باستراتيجيات لموردي الأشعة التشخيصية، مع التركيز على تحسين جودة الخدمة ومبادرات ارضاء العملاء. في حين أن الدراسة تعترف بالقيود مثل خصوصية الصناعة والتصميم المقطعي، فإنها تضع الأساس لاتجاهات البحث المستقبلية. تساهم النتائج برؤى قيمة

للتفاعلات بين الشركات في مجال الأشعة وتقدم آثارًا عملية لصنع القرار الاستراتيجي في الأساليب التي تركز على العملاء. الكلمات المفتاحية: جودة الخدمة المقدمة، رضا العملاء، ولاء العملاء، الأعمال التجارية (B2B)، مجال الأشعة التشخيصية.

## I. Introduction

The global business landscape has witnessed a substantial transformation in recent years, characterized by increased competitiveness and dynamic market environments (Porter, 1998; Barney, 2001). In this context, organizations across industries, including the healthcare sector, are compelled to adopt customer-centric strategies to maintain and expand their market share (Grönroos, 2000; Kotler et al., 2012). Notably, the medical equipment industry, operating within the framework of business-to-business (B2B) relationships, plays a pivotal role in the delivery of quality healthcare services (Lusch & Vargo, 2006; Kumar et al., 2011).

This research aims to explore the relationship between B2B service quality and customer loyalty, with a specific focus on medical equipment companies within the healthcare sector in Egypt (Chen & Hsiao, 2012; Cao et al., 2015). As the demand for high-quality medical equipment in the Radiology Domain continues to grow, the need for a deeper understanding of the factors influencing customer loyalty becomes paramount (Sureshchandar et al., 2002; Wang & Zhang, 2012).

The service quality provided by B2B medical equipment

companies is a critical determinant of the overall performance and reputation of healthcare institutions (Bitner et al., 1990; Parasuraman et al., 1988). For these institutions to ensure quality healthcare services, they depend on reliable and consistent suppliers of medical equipment (Ritter et al., 2004). Thus, the relationship between service quality and customer loyalty becomes a central point of inquiry (Spreng & Mackoy, 1996).

Moreover, this research extends its scope to investigate the mediating role of customer satisfaction in the relationship between service quality and customer loyalty (Mittal & Kamakura, 2001; Moorman et al., 1993). This mediating factor is an essential component of customer behavior and loyalty, and understanding its influence is crucial for both healthcare institutions and medical equipment companies.

This study is situated within the broader context of the healthcare sector in Egypt, where the Radiology Domain faces increasing competition and evolving market dynamics (Haksever et al., 2000; Jain et al., 2009). While prior research has often focused on B2C (business-to-consumer) contexts or other industries, the specific B2B relationships between medical equipment suppliers and healthcare institutions in the Radiology Domain remain relatively unexplored (Chen et al., 2009).

By examining the multifaceted relationship between service quality, customer satisfaction, and loyalty within this specialized context, this research endeavors to provide valuable insights and

practical implications for stakeholders within the healthcare and medical equipment sectors, as well as contributing to the academic discourse on B2B relationships and customer loyalty (Narver & Slater, 1990).

## **II. Research Problem**

In the domain of healthcare services, the relationship between service quality, customer satisfaction, and loyalty extends into the realm of business-to-business (B2B) interactions, particularly within the intricate dynamics of radiology imaging suppliers and their clientele, encompassing radiology imaging centers, hospitals, and healthcare facilities. The efficacy of radiology equipment, the quality of maintenance services, and the support rendered by suppliers assume paramount significance in ensuring the seamless functioning and success of these vital healthcare providers.

Despite existing research delving into these relationships within a business-to-consumer (B2C) framework, a discernible gap persists in understanding how service quality and satisfaction intricately influence the loyalty of healthcare providers within B2B interactions, specifically within the healthcare sector in Egypt.

At the heart of this study lies a critical research problem necessitating a nuanced understanding of the relationship between service quality and satisfaction in B2B engagements between radiology imaging suppliers and healthcare providers, including radiology imaging centers and hospitals, in Egypt.

The complexity of this problem stems from the pivotal role that

service quality plays in the operations of healthcare providers, particularly in the radiology domain. Radiology imaging suppliers contribute significantly to the efficiency and success of healthcare institutions by providing essential equipment, maintenance services, and support. The challenge lies in deciphering how variations in service quality impact the satisfaction of healthcare providers, as their contentment is crucial for ensuring the delivery of high-quality healthcare services.

Derived from the stated research problem, the following research questions are formulated to guide the investigation:

- i. What is the relationship between perceived service quality provided by radiology imaging suppliers and the loyalty of customers, i.e., radiology imaging centers and hospitals?
- ii. What is the relationship between perceived service quality provided by radiology imaging suppliers and the satisfaction of customers, i.e., radiology imaging centers and hospitals?
- iii. Does customer satisfaction mediate the relationship between healthcare service quality provided by radiology imaging suppliers and the loyalty of customers, i.e., radiology imaging centers and hospitals?

Given the distinctive nature of B2B contexts, particularly within healthcare services, the focal point of these research questions centers on radiology imaging suppliers and their relationships with radiology imaging centers and hospitals—these entities represent the customers in this B2B dynamic. The exploration of

these questions will serve as a compass guiding the research into the intricate relationship of service quality, customer satisfaction, and their impact on loyalty in B2B interactions within the radiology domain.

### **III. Research Objective**

The central objective of this study is a comprehensive exploration aimed at unraveling the relationship between perceived service quality, customer satisfaction, and customer loyalty within the context of business-to-business (B2B) interactions. The primary focus is on the engagements between radiology imaging suppliers and their esteemed customers, specifically targeting radiology imaging centers and hospitals. These entities stand as crucial stakeholders within the healthcare sector in Egypt, operating in the specialized domain of radiology.

### **IV. Literature Review**

#### **A. Perceived Service Quality (SQ)**

In the realm of business-to-business (B2B) interactions, cultivating enduring and profitable customer relationships has become a central objective, ushering in the era of "relationship marketing" (Webster, 1992; Achrol, 1997). Within this context, the significance of service quality in the relationship between businesses and healthcare providers within the imaging sector is pivotal. Arasliet al., (2005) underscore the abstract and challenging nature of measuring service quality in the B2B context, highlighting the need for precise measuring instruments tailored to the specific elements of financial

services in B2B interactions.

The influence of after-sales service support on customer purchasing decisions cannot be overstated (Agnihotri et al., 2002). Efficient after-sales support fosters and sustains customer relationships, and studies consistently emphasize service quality as a source of competitive advantage and a key differentiator (Parasuraman et al., 1988; Rust et al., 2004). Service organizations, to stand out, must continually enhance their offerings, adding value to their services (Farrel, 2005). Recognized as a primary source of competitive advantage in B2B settings, high-quality services are considered prerequisites for optimal B2B relationships (Roman & Martín, 2008; Crosby et al., 1990).

In the healthcare sector, service quality is particularly significant, directly impacting patient outcomes and satisfaction. Perceived Service Quality (SQ) in B2B interactions, where one organization serves another, plays a critical role in establishing long-term relationships and customer loyalty (Zeithaml et al., 2006). Assessment of service quality in this context involves various dimensions and attributes.

The INDSERV model, introduced by Gounaris (2005), provides a comprehensive framework for evaluating service quality in B2B contexts, encompassing four critical facets: Potential Quality, Hard Quality, Soft Quality, and Output Quality. These dimensions serve as valuable tools for understanding the relationship between service quality and



customer loyalty within the radiology imaging sector in Egypt.

Perceived Service Quality is a multi-dimensional construct, and the INDSERV model identifies four key dimensions: Potential Quality, Hard Quality, Soft Quality, and Output Quality. These dimensions offer a comprehensive framework for understanding and measuring service quality in B2B relationships (Galahitiyawe & Musa, 2016).

In the B2B context of the radiology domain, Perceived Service Quality holds paramount importance, influencing customer satisfaction, and loyalty (Huang et al., 2017). Customer satisfaction, crucial for fostering long-term relationships and loyalty, is strongly associated with high Perceived Service Quality (Singh et al., 2023). Radiology imaging suppliers, providing essential services for patient diagnosis and treatment, play a vital role in the healthcare industry. Satisfaction with radiology services enhances the likelihood of continued engagement, leading to loyalty and repeat business. Moreover, in the radiology domain, where patient outcomes and timely diagnoses are critical, the role of Perceived Service Quality in ensuring healthcare provider satisfaction is accentuated (Mulisa et al., 2017; Abuzaid et al., 2023).

Studies affirm that perceived service quality directly influences customer behavioral intentions. Favorable perceptions can lead to positive outcomes, such as continued collaboration, advocacy, and an increased willingness to engage in future business

(Gounaris et al., 2010). This, in turn, would significantly impacts the business outcomes of radiology imaging suppliers, solidifying their position within the healthcare industry.

While the importance of Perceived Service Quality is well-established in B2B contexts, there is a need for specific research on the radiology domain in Egypt. This research aims to address gaps in the existing literature by examining the nuances of Perceived Service Quality within this context. Understanding and measuring Perceived Service Quality in the radiology domain are crucial for building and maintaining successful B2B relationships, enhancing customer satisfaction, loyalty, and commitment. This research seeks to contribute to the body of knowledge by shedding light on the intricacies of Perceived Service Quality in the radiology imaging sector, with implications for enhancing the quality of healthcare services in Egypt. The INDSERV model, specialized for B2B research, serves as a valuable tool in this endeavor.

## **B. Customer Loyalty**

In the landscape of business-to-business (B2B) relationships, the peak of success is often represented by Customer Loyalty. Defined by a spectrum of loyal behaviors, it encapsulates the willingness of customers to sustain business relationships, engage in repeat transactions, and advocate for the supplier among other organizations (Watson et al., 2015).

Customer Loyalty, though multifaceted and subject to varied

interpretations, commonly threads commitment, repeat patronage, and a preference for a specific product or service over alternatives (Tong, 2015). It denotes a customer's inclination to consistently choose and engage with the services of a particular radiology imaging supplier (Kotler et al., 2012; Turner and Wilson, 2006). Loyalty encompasses both behavioral commitment, seen in repeat business, and attitudinal commitment, reflected in positive sentiments held by customers; in this research healthcare providers; towards the supplier (Dick et al., 1994).

Beyond a mere behavioral phenomenon, Customer Loyalty includes attitudinal and emotional components (Hallowell, 1996). The attitudinal dimension involves beliefs and feelings towards the supplier, significantly influencing service utilization decisions. The emotional component reflects the attachment and compassionate sentiments customers hold toward the received services (Turner and Wilson, 2006).

Customer Loyalty, viewed economically, is the frequency with which a customer chooses a specific product or service compared to total available choices, emphasizing its impact on purchasing patterns (Neal, 1999). This loyalty is rooted in both emotional and rational underpinnings, where emotional loyalty is driven by feelings and relationships, and rational loyalty is grounded in cognitive factors like information and evaluations (Gamble et al., 2002).

In addressing contemporary business challenges, Bellizzi and Bristol (2004) emphasize the fundamental role of Customer

Loyalty and retention. It is depicted as a devoted attachment and affection towards a radiology imaging supplier, driven by positive relationships, trust, and a history of successful service provision. In the healthcare-focused radiology domain, loyalty is crucial for improving patient care and outcomes.

Palmer and Mahoney (2005) underscore Customer Loyalty as a central focus in marketing strategy, identifying it as an essential goal for organizations. Loyalty marketing strategies are employed to enhance customer loyalty, aligning with commercial objectives. Consequently, the emphasis on enhancing Customer Loyalty remains pivotal in marketing efforts.

In the radiology imaging services context, Customer Loyalty emerges as a critical and multifaceted concept. Fostering loyalty is fundamental for the long-term success of radiology imaging suppliers, especially in the business-to-business (B2B) sector, where it drives revenue generation and operational viability (Chen et al., 2009).

Loyal customers in the radiology domain are more likely to continue availing imaging services, ensuring a steady stream of business. Casidy et al. (2016) describe Customer Loyalty as a deep and devoted attachment, rooted in feelings of trust, reliability, and a commitment to ongoing collaboration. This loyalty extends beyond financial considerations to encompass emotional and attitudinal dimensions.

Various factors, including brands, positive emotions,

experiential satisfaction, emotional commitment, customer engagement, and experiential quality, influence Customer Loyalty. These determinants play a crucial role in shaping the loyalty of healthcare providers to radiology imaging suppliers, marking essential considerations in this research (Nisar et al., 2016; Bilgihan et al., 2016; Wu et al., 2018; Heo et al., 2016; Thaichon et al., 2016).

Consequently, Customer Loyalty is a multifaceted and critical concept within the radiology imaging services context. It extends beyond transactional relationships, encompassing emotional and attitudinal dimensions. Understanding the components and determinants of Customer Loyalty is vital in the radiology domain, and this research aims to illuminate the role of Perceived Service Quality, Convenience, and Network Quality in achieving and maintaining Customer Loyalty.

The scale used to measure customer loyalty in this research is adapted from Watson et al. (2015). The scale comprised of five items.

### **C. Customer Satisfaction**

In the realm of marketing, Customer Satisfaction stands as a pivotal metric intricately interlinked with Perceived Service Quality, playing a significant role in the success of the radiology imaging sector. A satisfied customer is not only more likely to increase business engagement and recommend services but also exhibits lower price sensitivity and remains loyal, as evidenced in various

studies (Anderson et al., 2004; Homburg et al., 2005; Kim et al., 2004). High levels of customer satisfaction are essential for securing present business and ensuring future revenue through increased customer retention (Anderson et al., 2004). Highly satisfied customers are less influenced by competitive pricing and temporary incentives (Jones and Sasser, 1995).

Evanschitzky et al. (2012) underscore the importance of customer satisfaction, asserting that a company's performance is tied to customer satisfaction. While various definitions of satisfaction exist, it is generally understood as a customer's emotional response derived from comparing perceptions with expectations (Kotler, 2012). Meeting or exceeding customer expectations leads to satisfaction, resulting in repeat purchases, positive word-of-mouth, and loyalty. Conversely, falling below expectations can lead to dissatisfaction. Satisfaction is described as a pleasurable fulfillment response, while dissatisfaction is the opposite (Buttle, 2006).

In contemporary management theory, customer satisfaction is considered a key driver of long-term business success. This shift in strategic thinking is based on the premise that high customer satisfaction leads to elevated customer loyalty. Countless studies have highlighted the positive relationship between customer satisfaction and loyalty (Bolton 1998; Mittal et al. 2001). Satisfied customers tend to be less price-sensitive, spend more on products, and have lower costs associated with acquiring new

customers (Homburg et al. 2005, Yu et al. 2001).

Customers, when assessing satisfaction, might not always consider process aspects but focus primarily on the outcome (Parker et al. 2001). Satisfaction is defined as a response that includes emotional and cognitive aspects. It is the outcome of a holistic evaluation that encompasses product or service performance and the entire experience, occurring within a distinct time frame post-purchase (Swan et al., 1985; Oliver et al., 1989; Cronin et al., 1992; Bearden et al., 1983; Johnson & Fornell, 1991).

Historically, the literature on customer satisfaction has predominantly relied on uni-dimensional models (Anderson et al., 2000). One widely used framework is the expectation disconfirmation paradigm, positing that customers assess perceived performance against a reference standard. Satisfaction is achieved when performance exceeds expectations, while dissatisfaction occurs when performance falls short (Homburg, 2008; Foscht et al., 2005). Identifying the determinants of customer satisfaction is crucial for discerning which service attributes add value and enhance satisfaction.

Homburg et al.'s (2011) scale is an example of a uni-dimensional approach, focusing on evaluating overall customer satisfaction. This scale has been widely employed in marketing and business research, providing a single measure that encompasses various facets of the customer experience to assess overall satisfaction with a product or service.

The scale used to measure customer satisfaction in this research is adapted from Homburg et al. (2011). The scale comprises four items, providing a structured approach to systematically evaluate customer satisfaction in the radiology context. Surveys and questionnaires are employed to capture customer evaluations regarding different facets of the service experience, including the performance of radiology equipment, the reliability of imaging services, and the effectiveness of maintenance services. This measurement approach allows for a comprehensive understanding of how customers perceive the radiology services they receive.

#### **D. The relationship between Perceived Service Quality and Customer Loyalty**

Understanding how Perceived Service Quality (SQ) impacts customer loyalty is paramount in contexts where customer satisfaction and loyalty play pivotal roles in sustained business success. The dynamic relationship between Perceived SQ and customer loyalty has been extensively explored in prior research, providing valuable insights into this crucial interplay.

Numerous studies have delved into the relationship between Perceived SQ and customer loyalty, consistently affirming its significance. For instance, Ifediora et al. (2022) focused on the Nigerian telecommunication sector, establishing that Perceived SQ dimensions, including assurance, reliability, tangibility, empathy, and responsiveness, strongly predict customer loyalty. Similar positive associations between Perceived SQ and



customer loyalty were observed in studies by Clemes et al. (2014), Lee (2013), and Bhatti et al. (2016). These findings collectively underscore that Perceived SQ is a key driver of customer behavioral intentions, encompassing repeat purchases and positive word-of-mouth recommendations.

Moreover, So et al. (2016) and Schirmer et al. (2018) emphasized the positive impact of Perceived SQ on customer loyalty, demonstrating that satisfied customers are more inclined to exhibit loyalty. The concept of retention with attitude, as articulated by Knox and Walker (2003), aligns with the notion that Perceived SQ significantly influences customers to remain committed to a specific radiology imaging provider.

Dabholkar et al. (2000) and Kotler (2003) further contributed to this understanding by highlighting that SQ serves as a cognitive aspect of customer satisfaction. Higher SQ is associated with greater customer satisfaction, consequently fostering loyalty.

Research by Alemadi et al. (2021) in Qatar revealed that attributes like ease of use, information content, responsiveness, and security significantly influenced customer satisfaction and, in turn, customer loyalty. Similarly, Kalia et al. (2021) investigated Indian telecom services, establishing that service quality dimensions significantly impacted customer commitment and trust, both influential factors in determining customer loyalty. Tarkang et al. (2021), focusing on the mobile telecom sector in Cameroon, highlighted a positive relationship between service

quality dimensions and customer loyalty. Collectively, these studies emphasize the importance of maintaining high service quality standards, particularly in dimensions such as assurance, responsiveness, empathy, and tangibility, to enhance customer loyalty in the dynamic radiology imaging sector.

As discussed in the above literature, a substantial body of research, spanning various industries and regions, consistently affirms the positive influence of Perceived SQ on customer loyalty. These studies collectively underscore the significance of focusing on Perceived SQ to enhance customer loyalty in the radiology imaging sector. Based on the above literature, the first hypothesis is developed as:

**H1: Perceived Service Quality (SQ) of radiology imaging suppliers in Egypt is positively related to Customer Loyalty.**

### **E. The relationship between Perceived Service Quality and Customer Satisfaction**

Numerous recent studies have delved into the relationship between service quality and customer satisfaction across diverse sectors, shedding light on the pivotal role played by various dimensions of service quality in shaping customer perceptions, loyalty, and satisfaction.

Ifediora et al. (2022), in their study within the Nigerian telecommunication sector, identified assurance, reliability, tangibility, empathy, and responsiveness as key predictors of customer loyalty. A parallel investigation by Alemadi et al. (2021) in

the Qatar telecommunications sector emphasized factors such as ease of use, information content, responsiveness, and security as significant contributors to customer satisfaction and loyalty.

The hotel business, examined by Bhuian (2021), highlighted the importance of service quality dimensions, including empathy, reliability, tangibles, responsiveness, and service assurance, in shaping customer satisfaction. In a similar vein, Kalia et al. (2021) revealed that responsiveness, assurance, and empathy significantly influenced commitment and trust, ultimately impacting loyalty, with moderating factors such as gender, marital status, and connection type identified.

Sharma et al. (2021) explored online service quality's impact on customer satisfaction and commitment in online banking customers, emphasizing dimensions such as responsiveness, empathy, and tangibility. Sukendi et al. (2021) focused on e-service quality, customer experience, engagement, and loyalty in B2C e-commerce, revealing the influence of e-service quality and customer engagement on customer experiences and loyalty.

In the hotels sector in the UAE, Alketbi et al. (2020) uncovered the significant effect of service quality on satisfaction, trust, and commitment, ultimately leading to customer retention and loyalty. Chee et al. (2020) examined the effects of service quality, satisfaction, and loyalty on customer retention in the Malaysian telecommunication industry, establishing a significant relationship between customer satisfaction and loyalty. Boadi et

al. (2019) explored service quality dimensions in Ghanaian private hospitals, identifying empathy, tangibility, reliability, and responsiveness as crucial factors affecting patient satisfaction.

By incorporating these diverse studies into the discussion, a more comprehensive understanding of the nuanced relationship between service quality, customer satisfaction, and loyalty across different industries emerges. Collectively, these studies underscore the profound significance of service quality and its multifaceted dimensions in shaping customer perceptions, satisfaction, and loyalty. The second hypothesis is formed as follows in light of the material mentioned above:

**H2: Perceived Service Quality (SQ) of radiology imaging suppliers in Egypt is positively related to Customer Satisfaction.**

#### **F. The Mediating Role of Customer Satisfaction**

The mediating role of customer satisfaction has been a focal point in understanding the intricate dynamics between service quality, customer satisfaction, and loyalty across diverse industries. Several studies provide valuable insights into this mediation process:

Yum and Yoo (2023) conducted a study on mobile social media, emphasizing the mediating role of customer satisfaction. Their findings indicate that convenience, usefulness, design, and security significantly impact customer satisfaction, which, in turn, positively affects customer loyalty (Yum & Yoo, 2023).

In the healthcare setting, AlOmari and A. Hamid (2022) explored strategies to improve patient loyalty, with a specific focus on the mediating role of patient satisfaction. The study revealed that patient satisfaction plays a crucial mediating role, suggesting that satisfied patients are more likely to exhibit loyalty and medication adherence (AlOmari & A. Hamid, 2022).

Nguyen et al. (2021) delved into the impact of service quality on in-patient satisfaction and loyalty in a developing country's healthcare context. The study demonstrated that service quality positively influences in-patient satisfaction, contributing to perceived value and, ultimately, customer loyalty (Nguyen et al., 2021).

Examining the sustainability of health institutions, Addo et al. (2020) investigated how service quality and patient satisfaction influence patient loyalty. The study revealed that service quality significantly impacts patient satisfaction, and in turn, patient satisfaction contributes to patient loyalty, emphasizing the importance of these factors in the long-term sustainability of healthcare institutions (Addo et al., 2020).

Meesala and Paul (2018) focused on hospitals, exploring the relationships among service quality, consumer satisfaction, and loyalty. The study found that service quality significantly impacts patient satisfaction, which, in turn, plays a pivotal role in fostering patient loyalty (Meesala & Paul, 2018).

These studies collectively underscore the mediating role of customer satisfaction in the relationship between service quality

and customer loyalty across various industries, providing valuable insights into the nuanced mechanisms that contribute to sustained customer loyalty. The third hypothesis is constructed as follows in light of the literature mentioned above:

**H3: The relationship between Service Quality and Customer Loyalty is mediated by Customer Satisfaction.**

## V. Method

The research adopts a quantitative and deductive approach to investigate the relationships among Perceived Service Quality (SQ), Customer Loyalty (CL), Customer Satisfaction (CS), and Customer Commitment (CC). The deductive strategy, guided by existing theories, aims to test and validate hypotheses. Perceived Service Quality is measured based on the INDSERV model by Gounaris (2005), encompassing four dimensions: Potential Quality, Hard Quality, Soft Quality, and Output Quality. Customer Loyalty is gauged using a scale adapted from Watson et al. (2015), while Customer Satisfaction is assessed through a scale adapted from Homburg et al. (2011). Data is collected through structured questionnaires, utilizing a cross-sectional method for a snapshot view of variables. The questionnaire, consisting of 44 questions, is distributed in-person and electronically. Pretesting ensures data quality. The key statistical analysis involves Structural Equation Modeling (SEM) using AMOS software.

## VI. Results

Structural equation modelling (SEM) is the statistical measure used in this study to test hypotheses. Structural equation modelling (SEM) is a family of statistical models that seek to explain the relationships among multiple variables. In doing so, it examines the structure of interrelationships expressed in a series of equations, similar to a series of multiple regression equations. These equations depict all of the relationships among constructs (the dependent and independent variables) involved in the analysis. Fig. 1 provides the structural model (final Result), while Table I shows the model fit summary.

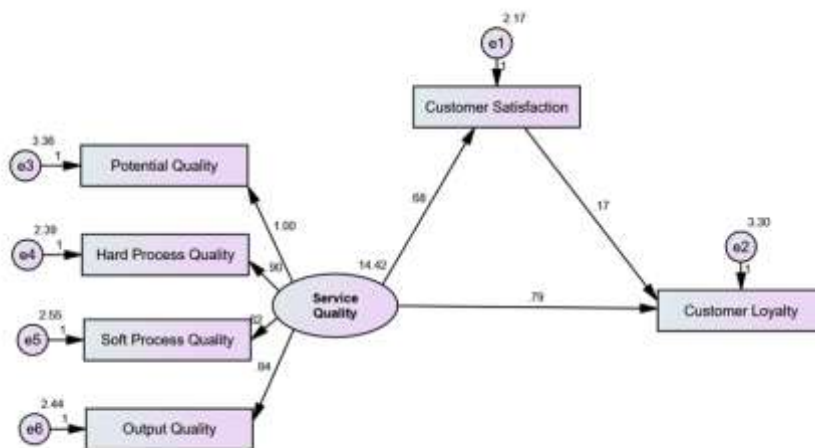


Fig. 1. Structural Model (Final Result).

### ***A. Research Population and Sample***

The research focuses on B2B customers in the healthcare sector in Egypt, excluding radiology imaging suppliers, and including radiology imaging centers, hospitals, and medical equipment procurement authority with a population of 2708 entities identified by the Egyptian Ministry of Health. A combination of convenience and snowball sampling methods is employed for the study. Convenience sampling is chosen due to the lack of a comprehensive customer list in the Radiology Domain in Egypt, involving readily accessible and willing participants. Snowball sampling expands the participant pool by having initial participants recommend others. The calculated sample size is 357 respondents, determined using Steven Thompson's equation. The sampling procedure begins with identifying initial participants through convenience sampling and continues with a chain referral process until the target sample size is reached, ensuring a diverse and representative sample of B2B customers in the Egyptian healthcare sector.

### ***B. Measures***

In the Measures section, data collected from participants were analyzed using AMOS software after being transferred from Excel. Data cleaning involved removing surveys with missing or erroneous data.

The results of structural' model using the AMOS software, shows that DF was 8 (it should be more than 0), Chi2 /DF has a



value of 1.442, that is less than 2.0 (it should be less than or equal 2.0). The RMSEA was 0.038 (it should be less than 0.08). The CFI was 0.998, IFI was .998, GFI was .988 which are very close to 1.0 (a value of 1.0 indicates perfect fit). All indices are close to a value of 1.0 in CFA, indicating model fit.

**TABLE I: MODEL FIT SUMMARY**

Goodness of Fit Measure	Index Name	Model Result	Remark
Chi-Square	Chi2	11.537 p=0.173	accepted
Degrees of Freedom	DF	8	accepted
Chi-Square/ Degrees of Freedom	Chi2 /DF	1.442	accepted
Comparative Fit' Index	CFI	0.998	accepted
Incremental Fit Index	IFI	0.998	accepted
Goodness of Fit	GFI	0.988	
Root Mean' Square Error of Approximation	RMSEA	0.038	accepted

### ***C. Regression Weights***

The findings presented in Table II offer valuable insights into the relationships within the final Structural Equation Model. The path from Service Quality to Customer Loyalty demonstrates a highly significant relationship (Estimate = 0.785, S.E. = 0.071, C.R. = 11.114,  $p < 0.001$ ), indicating a robust impact of Service Quality on Customer Loyalty. This result aligns with the study's hypothesis (H1) and supports the idea that higher levels of Service Quality positively influence Customer Loyalty.

Moving to the relationship between Service Quality and Customer Satisfaction, the path shows a highly significant

relationship (Estimate = 0.681, S.E. = 0.030, C.R. = 22.521,  $p < 0.001$ ). This robust relationship underscores the pivotal role of Service Quality in fostering Customer Loyalty, this result supports the acceptance of H2, indicating that Service Quality contributes positively to Customer Satisfaction.

**TABLE II: HYPOTHESIZED PATH OF THE FINAL STRUCTURAL EQUATION MODEL**

Hypothesized path		Estimate	S.E.	C.R.	P
Customer Satisfaction	<-- Service Quality	.681	.030	22.521	***
Customer Loyalty	<-- Customer Satisfaction	.171	.084	2.029	.042
Customer Loyalty	<-- Service Quality	.785	.071	11.114	***

#### ***D. Direct and Indirect effects***

Table III reveals the nature of the mediating effect between service quality, customer satisfaction, and customer loyalty in the default model. Specifically, it showcases both the direct and indirect relationships, shedding light on whether the mediating effect is full or partial.

The Total Effect column encompasses the overall impact of service quality on customer satisfaction and customer loyalty. For customer satisfaction, the total effect is 0.681, indicating the complete influence of service quality, including both the direct and mediated effects through customer satisfaction. Simultaneously, the total effect on customer loyalty is 0.902, considering both the direct and mediated effects through

customer satisfaction.

The breakdown into Direct and Indirect Effects allows for a more nuanced understanding of the mediation process. The Direct Effect column represents the direct impact of service quality on each variable. With a direct effect of 0.681 on customer satisfaction and 0.785 on customer loyalty, it is evident that service quality has a direct positive relationship with both constructs.

The Indirect Effect column isolates the mediated influence through customer satisfaction. In this context, the indirect effect on customer satisfaction is 0.171, indicating the portion of the influence mediated by customer satisfaction in the relationship between service quality and customer loyalty. Similarly, the indirect effect on customer loyalty is 0.116, signifying the mediated impact of customer satisfaction in linking service quality to customer loyalty.

**TABLE III: STANDARDIZED INDIRECT EFFECTS**

	Variables	Service Quality	Customer Satisfaction
Total Effect	Customer Satisfaction	0.681	0.000
	Customer Loyalty	0.902	0.171
Direct Effect	Customer Satisfaction	0.681	0.000
	Customer Loyalty	0.785	0.171
Indirect Effect	Customer Satisfaction	0.000	0.000
	Customer Loyalty	0.116	0.000

The significance of the path coefficients has been analyzed using one-tailed significance ( $p < 0.05$ ). It shows that all the hypothesized paths were supported by the result and significant

at 5% significance level.

These results suggest a partial mediating effect of customer satisfaction in the relationship between service quality and customer loyalty. While service quality has a direct impact on both customer satisfaction and loyalty, a significant portion of its influence on customer loyalty is mediated by the intermediary role of customer satisfaction. This nuanced understanding adds depth to the conceptual framework, highlighting the intricate interplay of variables within the radiology imaging sector in Egypt.

The previous results support the acceptance of hypothesis H3: The relationship between Service Quality and Customer Loyalty is mediated by Customer Satisfaction.

## **VII. Discussion**

### ***A. Relationship between Perceived Service Quality and Customer Loyalty***

In examining the first hypothesis (H1) asserting a positive relationship between perceived service quality and customer loyalty, our study robustly supports this claim. Our empirical evidence reveals a strong association, indicating that heightened service quality from radiology imaging suppliers is intricately linked with increased customer loyalty. This aligns seamlessly with established literature emphasizing the pivotal role of service quality in fostering and sustaining customer allegiance (Cronin and Taylor, 1992; Gounaris, 2005). Our results resonate with contemporary studies, echoing the enduring significance of

service quality in engendering customer loyalty, as seen in the works of Yum and Yoo (2023), Gontur et al. (2022), and AlOmari F, A. Hamid AB (2022). This alignment with broader academic discourse not only substantiates our study's robustness but also contributes to cumulative knowledge in the field. The congruence with theoretical frameworks, such as the Service Quality model proposed by Cronin and Taylor (1992), further strengthens the applicability and relevance of our findings in the B2B context of radiology imaging in Egypt. Overall, our study enhances the generalizability and significance of the service quality-customer loyalty relationship in this specific industry.

### ***B. Relationship between Perceived Service Quality and Customer Satisfaction***

Addressing Hypothesis H2, asserting a positive influence of perceived service quality on customer satisfaction, our research unequivocally supports this proposition. Our findings reveal a compelling correlation, indicating that heightened levels of perceived service quality significantly enhance customer satisfaction. This resonates with the established consensus in the service quality literature, consistently emphasizing the profound impact of quality perceptions on customer contentment (Parasuraman et al., 1988; Brady and Cronin, 2001). Our results align with contemporary studies, reinforcing the robustness of our findings. The work of Vanckavičienė et al. (2022), Nguyen et al. (2021), Bhuian, (2021), and Addo et al. (2020) corroborates

the positive association between perceived service quality and customer satisfaction, transcending diverse industries. The consistency of our results with studies across different cultural and business contexts underscores the universal nature of customer expectations regarding service quality. This research not only upholds Hypothesis H2 but also contributes to the cumulative understanding of the intrinsic link between perceived service quality and customer satisfaction, substantiating the generalizability and relevance of our findings in the specific context of radiology imaging suppliers in Egypt.

### ***C. Mediating Role of Customer Satisfaction***

Our findings affirm Hypothesis H3, shedding light on the mediating role of customer satisfaction in the dynamic interplay between perceived service quality and customer loyalty. This revelation attests to the substantive impact of customer satisfaction as a pivotal mediator, fortifying the connection between service quality and customer loyalty. Our results align with the findings of Yum and Yoo (2023), AlOmari F, A. Hamid AB (2022), and Meesala, A., & Paul, J. (2018), corroborating the established literature on the mediating role of customer satisfaction in the service quality-customer loyalty continuum. The congruence across diverse studies, including those conducted in different cultural and business contexts, accentuates the robustness and universality of the identified mediation. The concordance with Yum and Yoo (2023), AlOmari F, A. Hamid

AB (2022), and Meesala, A., & Paul, J. (2018) underscores the enduring relevance of the service quality-satisfaction-loyalty paradigm in contemporary business landscapes. Several factors contribute to this alignment. Firstly, the theoretical underpinnings of this mediation, as articulated by Cronin and Taylor (1992) and Homburg et al. (2011), emphasize the intrinsic link between positive service experiences, heightened satisfaction, and subsequent customer loyalty. Our findings, consistent with these foundational theories, underscore the enduring validity of these conceptual frameworks. Secondly, the congruence across studies conducted in different years and diverse cultural contexts suggests that the mediation role of satisfaction is not confined to specific temporal or cultural circumstances. Instead, it manifests as a persistent and cross-cultural phenomenon, reinforcing its fundamental role in shaping customer loyalty.

### **VIII. Empirical Implications**

Our empirical findings offer valuable insights that can inform practical strategies for radiology imaging suppliers in the B2B context within the Radiology Domain in Egypt. These recommendations are grounded in the evidence derived from our study, aligning with the research objectives and hypotheses.

Firstly, our study robustly establishes a positive relationship between perceived service quality and customer loyalty. Radiology imaging suppliers should prioritize continual enhancement of service quality to foster and sustain customer

loyalty. Regularly assessing and addressing service gaps can be pivotal in meeting customer expectations and building lasting relationships.

Secondly, acknowledging the mediating role of customer satisfaction, radiology imaging suppliers should invest in initiatives that directly impact and improve customer satisfaction levels. Proactive measures, such as soliciting feedback, personalized service offerings, and swift issue resolution, can contribute to heightened customer satisfaction and, consequently, loyalty.

Thirdly, the dynamic nature of customer preferences and market conditions necessitates continuous monitoring. Radiology imaging suppliers should adopt a proactive stance, staying attuned to evolving customer needs and industry trends. Regular adaptation of strategies based on real-time feedback and market shifts can ensure sustained success in maintaining customer loyalty.

Fourthly, acknowledging the frontline role of employees in delivering service quality, investing in employee training and engagement is crucial. Well-trained and motivated staff can significantly contribute to positive customer experiences. This, in turn, positively influences satisfaction, commitment, and ultimately, customer loyalty.

Lastly, recognizing the cross-contextual validity of our findings, industry-wide initiatives that foster collaboration among radiology imaging suppliers can be beneficial. Shared best practices, benchmarking, and collaborative efforts to elevate



service quality standards can create a collective positive impact on customer loyalty across the Radiology Domain.

These empirical recommendations derive strength from the evidence presented in our study. Radiology imaging suppliers, by strategically incorporating these recommendations into their operational frameworks, can cultivate and sustain customer loyalty within the B2B context in the Radiology Domain in Egypt.

### **IX. Limitations and Future Research**

While our study contributes valuable insights, it is essential to acknowledge certain limitations that may influence the interpretation and generalization of the findings. Firstly, the research focused specifically on B2B interactions within the Radiology Domain in Egypt, and caution should be exercised when attempting to generalize findings to other industries or regions. To address this, future research could extend the investigation to various industries beyond radiology imaging to assess the generalizability of the proposed relationships. Secondly, the study adopted a cross-sectional design, capturing a snapshot of relationships at a specific point. Longitudinal studies could provide a more dynamic understanding of the interactions over time. Future research endeavors could conduct longitudinal studies to track changes in customer perceptions and behaviors, providing a more nuanced understanding of the dynamics.

Thirdly, the reliance on self-reported data in our study introduces the potential for response bias. To enhance the

robustness of future research, incorporating objective measures or third-party assessments could provide a more comprehensive evaluation of the relationships between service quality, satisfaction, commitment, and loyalty. Fourthly, although the study sample was representative, it may be considered relatively small. Expanding the sample size in future research could enhance the robustness and generalizability of the findings. Lastly, the mediation analyses employed in this study simplified the relationships. Future research could delve into more intricate models, considering additional mediators or moderators. To address this, future research could undertake comparative analyses across different regions or countries to identify cultural nuances influencing customer perceptions and behaviors, providing a more comprehensive understanding of the complexities involved.

## **X. Conclusion**

This research has conducted a comprehensive examination of the dynamics surrounding perceived service quality, customer loyalty, and customer satisfaction within the context of business-to-business (B2B) interactions in the Radiology Domain in Egypt. The robust empirical analysis has confirmed the formulated hypotheses, establishing positive relationships between perceived service quality and customer loyalty and satisfaction. The mediation analyses have shed light on the crucial role played by customer satisfaction in the service quality-customer loyalty nexus. It is crucial to note the

contextual specificity of the study, primarily focusing on the Radiology Domain in Egypt. Future research endeavors should diversify industries and regions to enhance the generalizability of the conclusions.

The mediation mechanisms uncovered in this study emphasize the importance for organizations to prioritize the delivery of quality services while also cultivating positive customer experiences. Practical implications abound for radiology imaging suppliers and similar B2B entities, suggesting strategies to enhance customer loyalty and contribute to organizational success. Despite the insightful findings, the study acknowledges its limitations, including the cross-sectional design and industry specificity, paving the way for future research directions. Recommendations include longitudinal approaches, exploration of diverse industries, and delving into more complex mediation models.

The journey of understanding the nuanced relationships between service quality and customer outcomes continues, beckoning future research endeavors to explore, refine, and expand upon the insights uncovered in this study.

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