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The role of service quality in enhancing brand authenticity through the moderation effect of corporate social responsibility (CSR)

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ABSTRACT

This paper aims to examine the impact of service quality and corporate social responsibility (CSR) on brand authenticity and determine the moderating effects of CSR on the relationship between service quality and brand authenticity. Survey data was collected from 472 customers of Karachi, Pakistan's four major medical diagnostic laboratories, through the convenience sampling technique. The quantitative method was used. To collect information from respondents, a self-administered questionnaire is used. We utilized the partial least squares structural equation modeling (PLS-SEM) technique to analyze data. The results show that CSR, service quality, and brand authenticity are related in medical diagnostic and research laboratories. Research findings indicate that service quality and CSR directly and positively impact brand authenticity. In addition, CSR moderates the effect between service quality and brand authenticity. Managers can see corporate social responsibility as an intangible value that goes along with high-quality services and makes medical diagnostic and research laboratory services more authentic.

1. Introduction

A more commercialized and globalized marketplace has triggered new consumer challenges, like brand authenticity (Hernandez-Fernandez & Lewis, 2019). As a result, people are searching for genuine and relevant brands. Authenticity has risen to the top of the agenda in modern marketing communication due to the increased demand for authentic, honest, and transparent companies (Safeer & Liu, 2022). Park et al. (2022) stated that authenticity could reduce individuals' perceptions of risk and uncertainty and satisfy their psychological need for security. Since authenticity has replaced quality as the most essential element in consumer purchasing decisions, consumers seek greater authenticity in companies (Hernandez-Fernandez & Lewis, 2019). Even though the broader concepts of branding, brand equity, and brand loyalty have received significant attention, relatively

little study has been done on the brand authenticity construct (Hwang et al., 2022; Yang et al., 2021). Marketers seeking to investigate customer preference for authentic products are keen on authenticity, which improves the customer experience in terms of both the customer's subjective experience and their experience concerning the experience of others (H. Kim & Bonn, 2016). Therefore, it is imperative to provide customers with authentic experiences.

Moreover, the study of authenticity has been increasingly popular among researchers for different reasons. Such as, a company's initial stages of implementing corporate social responsibility activities may contain some aspects of fraudulent CSR, particularly in establishing a business culture (Safeer & Liu, 2022). Therefore, the concept of corporate social responsibility is growing with an increasing number of businesses. When buying products, customers consider a business's social responsibility a vital component (Afzali & Kim, 2021). CSR is a multidimensional concept that addresses stakeholders' expectations and requirements, including individuals, society, and the environment (Tiep Le et al., 2021). Previous studies have found that corporations can enhance customer perceptions and establish favorable corporate images and reputations by engaging in corporate social responsibility (Singh, 2021; Tiep Le et al., 2021). According to a recent survey, 75% of consumers are willing to support businesses contributing to social reasons, and more than 70% believe that companies are responsible for addressing severe social problems (Cox, 2019). In the healthcare sector, corporate social responsibility practices constitute an essential domain that has garnered attention and concern. When increasing hospitality demands higher levels of accountability from CSR, healthcare maintains the business's value and stakeholders' goodwill (Hossain et al., 2022). However, the obstacles in the healthcare field are now significantly more complex than they were in the past, despite the fact that research on brand authenticity has been conducted in both developing and developed countries, and despite the identification of various antecedents, such as (Becker et al., 2019; Busser & Shulga, 2019; Carroll & Wheaton, 2019; Guèvremont, 2021; Hernandez-Fernandez & Lewis, 2019; Mazutis & Slawinski, 2015; Safeer & Liu, 2022). The results of empirical studies have proven that a consumer's satisfaction, preferences, and brand loyalty are all influenced by a brand's connection to its authentic essence (Hwang et al., 2022). This implies that brand authenticity is the foundation of contemporary marketing, and customers view these brands beyond commerce (Hwang et al., 2022). Considering the present trend and focus on service quality and CSR, it is worthwhile to investigate whether service quality and CSR enhance brand authenticity.

At the same time, most previous studies mainly used social identity theory and stakeholder theory (Aljarah & Alrawashdeh, 2021). But the information processing theory describes consumer behavior through cognitive activities (Tybout et al., 1981). Unlike earlier approaches, it is not confined to postulating subjective states (traits, attitudes, etc.) as causes of behavior. The theory of information processing seeks a deeper scientific explanation to test and validate behavioral research empirically. Not only what people think about determines their behavior, but also how they cause-effect the association. According to the information processing perspective, incoming information is represented in active memory more or less accurately. This information may encourage the activation (called retrieval) of previously processed object-relevant thoughts (Tybout et al., 1981). Thus, the IPT employed this investigation to comprehend

the factors influencing brand authenticity. Therefore, the current study contributes to the existing literature to address this research gap. As a consequence of this, the purpose of this study is to attempt to address the following questions in order to fill a gap in the current study.

- Does service quality enhance brand authenticity in the diagnostic and research laboratory?
- Does CSR positively impact brand authenticity?
- Does CSR play a moderating role between service quality and brand authenticity?

2. Theoretical background and literature review

2.1. Service quality

Customers make purchases of services to fulfill various needs (Parasuraman et al., 1988; Zeithaml et al., 1996). They have specific standards and expectations for how a company's delivery of services satisfies those needs; whether consciously or unconsciously, they are aware of such standards and expectations (Parasuraman et al., 1988). A company's ability to deliver services that meet or exceed its customers' expectations constitutes service quality. A firm has excellent service quality when it provides services that meet or exceed the standards set by its customers. When evaluating the quality of service, customers look at the provider along five dimensions called the SERVQUAL scale proposed by (Parasuraman et al., 1988). They are 1) Tangibility, 2) Reliability, 3) Responsiveness, 4) Assurance, and 5) Empathy (Parasuraman et al., 1985, 1988). Tangibles are the physical parts of the service being offered, such as how the building looks, how clean the facilities are, and how the staff looks. Reliability is the ability to do what was promised accurately and reliably. Responsiveness means being willing to help customers and give them service quickly. The staff's knowledge, courtesy, and capacity to build trust and confidence create assurance. Empathy is the firm's courteous, individualized attention to each consumer (Parasuraman et al., 1988).

2.2. Corporate social responsibility

Corporate social responsibility refers to the practice in the corporate world of aligning a company's economic goals and operations with its environmental and social policies (Dahlsrud, 2008; Le, 2022). CSR is a corporate green strategy that strives to preserve the cultural, social, and economic parts of the environment in which an organization works (Dahlsrud, 2008; Kwak et al., 2022). It is predicated on the notion that corporations can lower their negative social and ecological impact on the globe (Dahlsrud, 2008). Additionally, it can refer to any attempt made by a firm to reduce its impact on the environment or its carbon footprint (Le, 2022; Tiep Le et al., 2021). Companies can implement CSR activities as a stand-alone program or as a component of a larger initiative (Afzali & Kim, 2021; Ikram et al., 2020).

2.3. Brand authenticity

Authenticity receives much attention in the academic disciplines of sociology, social psychology, the arts, and the humanities (Afzali & Kim, 2021; Mazutis & Slawinski, 2015). More recently, the concept has been discussed in the literature about business, specifically in marketing, brand, organization and leadership, and strategic communication (Afzali & Kim, 2021). Authentic brands are related to positive behavioral and psychological responses among consumers (Morhart et al., 2015). Consumers seek authenticity for brand consumption; hence, they mainly respond to authentic brands (Safeer & Liu, 2022). Numerous research has demonstrated the favorable psychological effects of brand authenticity on brand attitude (Ewing et al., 2012; Kuchmaner & Wiggins, 2021; Morhart et al., 2015; Safeer & Liu, 2022). With authentic brand perceptions, consumers are expected to engage a brand in various ways because authentic brands improve consumers' interactive and collaborative experiences (Guèvremont, 2021). According to prior research, there are four factors of brand authenticity: continuity, credibility, integrity, and originality (Safeer & Liu, 2022). The continuity dimension represents a brand's historicity, timelessness, and ability to transcend trends. There are also conceptual similarities between continuity and brand heritage; these terms indicate the brand's history and stability over time, its longevity, and the probability that it will continue. The credibility dimension denotes the brands' willingness and capability to deliver on their promises. Participants emphasized how important it is for authentic brands to follow through with what they promise they would do. Customers place a high level of credibility on brands that they perceive to be authentic. Integrity represents perceptions of authenticity and includes a sense of integrity founded on the virtue of the brand's intentions and the beliefs it expresses. Perceived originality is an evaluation of the uniqueness of the brand. It represents that authentic brands are brands that reflect values that the consumers deem essential and that, as a result, contribute to the construction of the consumers' identities (Safeer & Liu, 2022).

2.4. Information processing theory (IPT)

Information processing theory focuses on observable changes and internal information processing (inside), such as entering and utilizing diverse information. According to the IPT, a company should be viewed as an open social system that engages in ongoing informational exchanges with its surrounding environment and uses this information in its day-to-day operations (Song et al., 2020). Scholars have recently used the IPT in various research fields, such as operations management, big data analytics, new product development, international management, and supply chain, which has considerably expanded the IPT's applicability (Song et al., 2020; Yu et al., 2021; Zhu et al., 2018). The information processing theory comprises multiple components, including information storage and cognitive process components. Information storage components include sensory, short-term, and long-term memory (Sternberg, 2008; Woolfolk et al., 2008). Information processing theory says humans process information in various steps: attention, encoding, judging in short-term memory, recording and reasoning in long-term memory, and behavioral action (Miller, 1994; Sudarma & Sukmana, 2022). This theory indicates that consumers process service quality (SQ) and CSR information by paying

attention to it, determining its authenticity, identifying it with the company, and responding to it behaviorally (Tian et al., 2011). Consumers' Service quality, CSR knowledge, trust in CSR, and judgment or attitude toward the organization are all connected with the information processing that occurs in their cognition as they learn about the company and its CSR initiatives (Tian et al., 2011). In other words, customers learn about CSR initiatives, assess the authenticity of those initiatives, and form opinions about the company's credibility (Kwak et al., 2022).

2.5. Hypotheses development

Service quality is now widely acknowledged as an essential component contributing to the successful differentiation of products and services and the establishment of competitive advantage (Park et al., 2015). Many studies have been conducted to explore the effects of service quality on consumer behaviors, such as customer satisfaction, customer loyalty, and behavioral intentions, in addition to the impacts of service quality on firm performance in various service industries (Aljarah & Alrawashdeh, 2021; Bello et al., 2021; Engizek & Yasin, 2017; S.-B. Kim & Kim, 2016). Consumers, especially younger generations, are growing in preference for authentic products and services (Matthews et al., 2020). Authenticity refers to how a product or service is seen as authentic, genuine, and true to itself (Safeer & Liu, 2022). Regarding services, frontline service employees (FSEs) are a significant touch point with the company and the brand. As a result, they are in a position that is both distinctive and central to the provision of authenticity cues to customers. Even though the need for genuineness that consumers have is a primary force behind modern purchasing behavior (Matthews et al., 2020). Park et al. (2022) stated that authenticity reflects a product's quality and the level of trust consumers have in it. Consumers will have greater authenticity in a company and its products and services when the quality of the services the firm offers is better. Authenticity happens when people are satisfied with the quality of service they receive; higher service quality influences product authenticity (Servaes & Tamayo, 2013). As a result, the following hypothesis is developed;

H_1: *Service quality positively influences brand authenticity*

When companies seriously pursue initiatives related to corporate social responsibility, stakeholders are more inclined to trust the organization (Beckman et al., 2009). Researchers, such as company benevolence, integrity, and communication, have investigated multiple antecedents of stakeholder trust in firms. However, it is essential to remember that trust and authenticity are not the same, despite their close relationship (Mazutis & Slawinski, 2015). For instance, in the context of stakeholders' views of corporate social responsibility, the term "trust" refers to the willingness of stakeholders to be visible due to favorable expectations of an organization's CSR initiatives (Fulmer & Gelfand, 2012; Mazutis & Slawinski, 2015). On the other hand, authenticity refers to the question of whether or not corporate social responsibility initiatives are authentic. Through authenticity, we mean whether or not these initiatives are linked to the organization's core values and whether or not they align with society's norms and expectations. In other words,

stakeholders are more inclined to trust a firm's corporate social responsibility initiatives if they view those efforts as authentic (Mazutis & Slawinski, 2015).

When evaluating a firm, customers consider the company's financial performance and other factors linked to CSR activities. These elements influence customers' attitudes toward products, recommendations, and purchases (Brown & Dacin, 1997; Islam et al., 2023; Lee et al., 2019; Sharma et al., 2021). According to studies, consumers anticipate that businesses would uphold ethical principles in their commercial dealings, participate in fair trade, and refrain from deceiving one another (Kwak et al., 2022). In companies engaged in social activities, customers feel more satisfied buying products and services (S. -B. Kim & Kim, 2016). Customers develop a strong connection, identification, and optimistic view toward firms with an excellent corporate social responsibility track record. CSR can potentially affect the company's performance both directly and indirectly through various elements that function as mediators (Yeo et al., 2018). Another body of research demonstrates that consumers' estimations of the true worth of products and services increase customer satisfaction. As a result, customers will have a higher perceived value for products and services that participate in socially related issues (Famiyeh, 2017). A company can acquire the support of its stakeholders by demonstrating that it is capable of behaving responsibly, which will create a powerful and distinctive brand affiliation (Famiyeh, 2017). As a result, the following hypothesis has been developed in light of the earlier discussion.

H₂: Corporate social responsibility (CSR) positively influences brand authenticity.

2.6. The moderating role of CSR

Numerous studies have revealed a positive link between relations of corporate social responsibility and consumer perceptions of the quality of a company's products or services (Servaes & Tamayo, 2013; Swaen & Chumpitaz, 2008). To expand on the positive image of CSR perceptions, scholars have observed that when customers perceive a company to be ethical and socially responsible, they are strongly likely to have the assurance that this ethicality would be reflected in the quality of the company's products or services. This is because customers believe that a company's ethical and socially responsible reputation would be positively reflected in the quality of those products and services (Boatwright et al., 2008; Chernev & Blair, 2015). Previous research reveals findings and empirical evidence demonstrating that a firm's positive CSR history considerably affects customers' impressions of the company's service quality (S.-B. Kim & Kim, 2016). He and Li (2011) stated that the CSR relationship could be strengthened if service brands are perceived as more capable of offering better service quality Customers base their judgments of a business on factors such as the quality of the service it provides and its commitment to corporate social responsibility (Karem Kolkailah et al., 2012). It has been discovered that perceived service quality has a more significant impact on stakeholders' perceptions than CSR initiatives, even though previous studies have demonstrated the reverse effect to be true (S.-B. Kim & Kim, 2016). Huang et al. (2014) found that

corporate social responsibility positively impacts corporate image, service quality, and buying intentions.

Klein and Dawar (2004) stated that corporate social responsibility has a halo impact on customers' unrelated and mundane judgments, such as their evaluation of new products. CSR activities substantially directly impact customer attribution and, consequently, their perception of the company. CSR activities are a significant component in minimizing customers' negative responses to companies (Islam et al., 2023). CSR involvement reduces customers' negative company perceptions. CSR protects firms from customer-related issues (Cho & Kim, 2012). Godfrey et al. (2009) revealed that a service provider with a strong CSR reputation might be protected from receiving negative customer feedback. Positive CSR efforts may have a halo effect on customers' impressions of firms by reducing unfavorable publicity. CSR mitigates product abuse's impact on brand ratings (Klein & Dawar, 2004). Lin et al. (2011) evaluated customers' perceptions of a company's commitment to social responsibility, mitigated the effect of negative publicity on their willingness to buy a product, and found that perceived CSR moderates the relationship between unfavorable publicity and trust.

CSR protects a firm from negative publicity as well as an emotional attachment to the brand. When a firm does not have any CSR activities, the trust of its customers can be damaged, while a company with a strong reputation for its CSR efforts can withstand negative publicity. CSR can lessen negative effects. This demonstrates that CSR is more effective in challenging circumstances. Albus (2012) stated that adverse circumstances might enhance the influence of CSR. When a customer has a poor encounter with service recovery, good CSR helps to mitigate the negative effects on customer satisfaction and behavioral intention. CSR involvement gives organizations an insurance-like advantage that reduces negative consumer judgments and sanctions (Godfrey et al., 2009). Nikbin et al. (2016) explained that firms that actively establish CSR reputations are protected against missteps. Besides this, the role of CSR as a moderator has been examined with various factors in empirical research, like CSR with corporate governance and profitability (Lu et al., 2021), with corporate image and customer loyalty (Lee et al., 2019), with service failure, trust, and loyalty (Nikbin et al., 2016). Hence the following hypothesis is formed;

> H_3: *Corporate social responsibility moderates the relationship between service quality and brand authenticity.*

The five hypotheses that have been suggested are presented in a conceptual framework in Figure 1.

3. Research methodology

3.1. Data collection/sample size

Medical laboratory technology is one of the most dynamic and constantly expanding scientific disciplines, and the clinical laboratory is indispensable to contemporary medicine (Waheed et al., 2013). Thus, medical laboratory technology has become highly
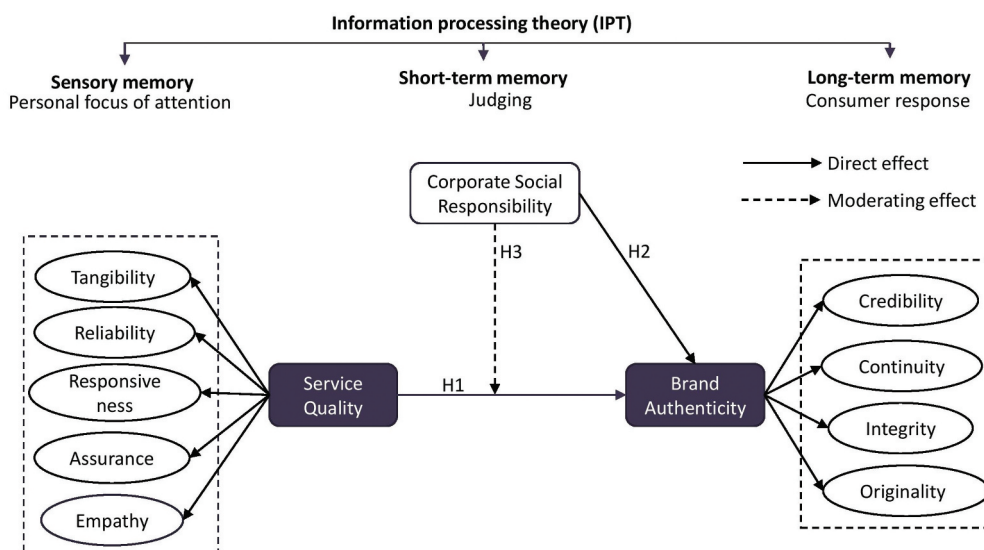
Figure 1. Conceptual model of this study.

developed, and diagnostic laboratories in modern hospitals are highly sophisticated and automated. In Karachi, various laboratories are in operation. However, the following are credible and well-known:

Aga Khan Laboratory, the South City Lab, Chughtai Lab, Dr. Essa Laboratory & Diagnostic Center, Dow Diagnostic Reference and Research Laboratory (DDRRL), Advanced Laboratories Pvt. Ltd, Diagnostic Laboratories, Hashmanis Hospital Pvt. Limited. Clinical Laboratories Dr. Ziauddin Hospital, Diagnostic, and Research Laboratory LUMHS Karachi. The population of this study is customers of medical diagnostic and research laboratories in the city of Karachi, Pakistan. Individuals over 18 who receive services from one of the country's four major medical research facilities currently operational are included in the target group. The convenience sampling technique of non-probably sampling was used to collect this study's research data. The research was carried out in a completely voluntary manner, participants were not disclosed, and they were not compensated in any way. In addition, before conducting the study, we carried out a pilot survey to evaluate the questions, and the findings showed that respondents comprehended the questions (Lien et al., 2017).

The study was carried out at medical research and diagnostic laboratories, and permission was received from those locations' managers. 20 to 30 observations per latent variable are the recommended sample size for SEM (structural equation modeling) (Nosi et al., 2020). The study was an accomplishment because our research model attained the minimal sample size necessary. After disseminating the data to 530 respondents in a self-administered questionnaire, the data were reviewed and cleaned. A total of 472 responses were deemed suitable for further evaluation. The data were filtered and cleaned, and then a validity check was done to validate the authentic responses. After collecting a total of 472 valid responses, the following step was to analyze the data. This study's respondents were 64% male and 36% female. This means that most lab visitors are men.

3.2. Data analysis

The analysis of the data was done with Smart PLS 4. Hair et al. (2017) suggested that the structural and measurement models be examined separately. Partial least squares structural equation modeling (PLS-SEM) is the best way to find specific constructs and build theories (Sarstedt et al., 2022).

3.3. Construct operationalization

This study incorporated the measures of multiple-item constructs from prior research. The SERVQUAL scale was modified slightly to accommodate regional perspectives. According to Meesala and Paul (2018) items were changed based on the suggestions of industry professionals. Fifteen items of "Service quality" out of 22 items were taken from Meesala and Paul (2018); (Parasuraman et al., 1988), and other items were observed to be irrelevant and or redundant. Four items of "CSR" were adopted from the studies of Brown and Dacin (1997); Moon et al. (2015), and 17 items of brand authenticity were taken from (Bruhn et al., 2012; Morhart et al., 2015; Portal et al., 2019) the questions of brand authenticity were divided into categories like, (originality, continuity, credibility, and integrity). Table 1 shows the final list of statements used in the current study. This study utilized five points Likert Scale, from "1 = strongly disagree" to "5 = strongly agree."

4. Results

4.1. Measurement model

The evaluative model was analyzed concerning its reliability, discriminant, and convergent validity (Hair et al., 2017). The findings shown in Table 2 demonstrate that all indicators and dimensions have achieved reliability and convergent validity because all factor loading values are more than .7. In addition, the average variance extracted (AVE) values were greater than .5. Similarly, composite reliability (CR) values are more than or equal to .70. Based on the findings, it appears that the measurement model satisfies convergent validity and reliability requirements.

The Fornell-Larcker approach was used to assess discriminant validity (DV). The Fornell-Larcker approach is a conventional method requiring the AVE's square root to be greater than correlated values. Table 3 shows the results of Fornell- Larcker's technique, which shows that the model fits the discriminant validity criterion because it can be demonstrated from looking at the square roots of the AVE values that they are higher than the associated values of the constructs. Besides this, in Table 4, the bolded items reflect the factor loadings for each construct, while the cross-loading items represent the rest for the same construct. The table shows that there is a very low number of cross-loading for each construct, which indicates that there is strong discriminant validity. As a result, this study also fits the criteria for discriminant validity.

4.2. Common method bias

When all of the information is obtained simultaneously and perceptually from a single source, there is a possibility that a common technique bias may exist, which would veil the validity of

Table 1. Survey questionnaire items.

Constructs	Label	Statement	Sources
Brand Authenticity (BA)			(Bruhn et al., 2012; Morhart et al., 2015; Portal et al., 2019)
Continuity	BA1	A medical diagnostic and research laboratory with a history	
	BA2	The medical diagnostic and research laboratory is consistent over time	
	BA3	The medical diagnostic and research laboratory stays true to itself	
	BA4	The medical diagnostic and research laboratory offers continuity	
	BA5	The medical diagnostic and research laboratory has a clear concept that it pursues	
Integrity	BA6	The medical diagnostic and research laboratory gives back to its consumers	
	BA7	The medical diagnostic and research laboratory has moral principles	
	BA8	The medical diagnostic and research laboratory is true to a set of moral values	
	BA9	The medical diagnostic and research laboratory cares about its consumers	
Originality	BA10	The medical diagnostic and research laboratory clearly distinguishes itself from other brands	
	BA11	The medical diagnostic and research laboratory stands out from other brands	
	BA12	I think the medical diagnostic and research laboratory is unique	
	BA13	The medical diagnostic and research laboratory makes a genuine impression	
Credibility	BA14	The medical diagnostic and research laboratory will not betray me.	
	BA15	The medical diagnostic and research laboratory is honest	
	BA16	My experience of the medical diagnostic and research laboratory has shown me that it keeps its promises	
	BA17	The medical diagnostic and research laboratory's promises are credible	
Corporate Social Responsibility (CSR)			(Brown & Dacin, 1997; Moon et al., 2015)
	CSR1	The medical diagnostic and research laboratory makes every effort to improve social and community welfare	
	CSR2	The medical diagnostic and research laboratory returns its profit to the society	
	CSR3	The medical diagnostic and research laboratory actively takes responsibility to protect the environment	
	CSR4	The diagnostic and research laboratory actively gives gifts and donations for charity	
Service Quality (SQ)			(Meesala & Paul, 2018; Parasuraman et al., 1988)
Tangibility	SQ1	The medical diagnostic and research laboratory has up-to-date equipment	
	SQ2	The medical diagnostic and research laboratory's physical facilities are visually appealing	
	SQ3	The medical diagnostic and research laboratory's employees appear neat	
Reliability	SQ4	The medical diagnostic and research laboratory provides its services to the patients at the time it promises to do so	
	SQ5	When customers have problems, the medical diagnostic and research laboratory's employees are sympathetic and reassuring	

(Continued)

Table 1. (Continued).

Constructs	Label	Statement	Sources
	SQ6	The medical diagnostic and research laboratory's is accurate in its billing.	
Responsiveness	SQ7	The medical diagnostic and research laboratory employees tell customers exactly when services will be performed	
	SQ8	Customers receive prompt service from the employees.	
	SQ9	Medical diagnostic and research laboratory employees are always willing to help customers.	
Assurance	SQ10	Customers feel safe in their interactions with employees.	
	SQ11	Employees are knowledgeable.	
	SQ12	Employees are polite.	
	SQ13	Employees get adequate support from the management to do their jobs well.	
Empathy	SQ14	The medical diagnostic and research laboratory's employees give customers personal attention.	
	SQ15	The medical diagnostic and research laboratory has customers' best interests at heart.	

the research findings (Podsakoff et al., 2003). Harman's test for a single factor was utilized to evaluate common method bias in our study. The total variance extracted by one factor is 30.254%, which is less than the recommended threshold of 50% (Harman & Harman, 1976). Hence there is no concern with common method bias in this research data.

4.3. Multivariate statistical assumptions

In order to determine the normality of the distribution, we conducted the Kolmogorov-Smirnov test on a single sample. The findings indicate that the data distribution is non-normal, as all p-values are less than .05. Due to the non-normality of the distribution, variance-based structural equation modeling (SEM) of partial least squares (PLS) was chosen as it is more robust against non-normality than covariance-based SEM (Leong et al., 2019, 2020). In order to validate the hypotheses in the study model, we utilized Smart PLS 4 for this purpose (Leong et al., 2020).

In order to rule out the possibility of multicollinearity, the variance inflation factors (VIFs) and tolerance values of the independent variable were analyzed. When VIFs are less than 10 and tolerance, levels are more than .1, multicollinearity may not be a concern. According to the study results, the VIF levels range from 1.71 to 2.97. Hence there is no issue of multicollinearity (Leong et al., 2020).

4.4. The structural model

Table 5 displays the results of direct relationships between service quality, CSR and brand authenticity. The findings indicate that service quality has a significant impact on brand authenticity ($\beta = 0.219$, $t = 5.169$, $p = 0.000$), supporting the acceptance of H_1. Finally, the research indicates that CSR has a significant impact on brand authenticity ($\beta = 0.313$, $t = 6.695$, $p = 0.000$), thereby accepting H_2. The smart PLS 4 and bootstrap tests revealed significant correlations (as illustrated in Figure 2).

Table 2. Construct reliability & convergent validity.

Constructs	Items	Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Brand Authenticity (BA)	BA1	.835	**.948**	**.953**	**.543**
	BA2	.824			
	BA3	.780			
	BA4	.713			
	BA5	.740			
	BA6	.766			
	BA7	.736			
	BA8	.714			
	BA9	.703			
	BA10	.700			
	BA11	.700			
	BA12	.738			
	BA13	.707			
	BA14	.710			
	BA15	.716			
	BA16	.708			
	BA17	.721			
Corporate Social Responsibility (CSR)	CSR1	.773	**.835**	**.835**	**.670**
	CSR2	.830			
	CSR3	.860			
	CSR4	.807			
Service Quality (SQ)	SQ1	.738	**.946**	**.954**	**.568**
	SQ2	.774			
	SQ3	.728			
	SQ4	.764			
	SQ5	.778			
	SQ6	.758			
	SQ7	.736			
	SQ8	.765			
	SQ9	.744			
	SQ10	.732			
	SQ11	.783			
	SQ12	.759			
	SQ13	.740			
	SQ14	.747			
	SQ15	.757			

Table 3. Discriminant validity analysis (Fornell larcker).

	Constructs	AVE	Cronbach's Alpha	1	2	3
1	BA	.543	.948	**.737**		
2	CSR	.67	.835	.352	**.818**	
3	SQ	.568	.946	.274	.199	**.754**

CSR = corporate social responsibility; SQ = service quality; BA = brand authenticity.

4.5. Moderation analysis

The moderating role of CSR was also tested. Table 6 shows that the moderating role of corporate social responsibility was significant, $\beta = 0.093$, $t = 2.05$, $p < 0.05$, confirming the acceptance of H_3, as shown in Figure 2 and Table 6.

5. Discussion and conclusion

This study showed that CSR and service quality affect brand authenticity in medical diagnostic and research laboratories. Service quality and corporate social responsibility are essential to a brand's authenticity. The relationship between

Table 4. Items loadings and cross-loadings (discriminant validity).

Constructs	Items	BA	CSR	SQ
Brand Authenticity (BA)	BA1	*.835*	.347	.254
	BA2	*.824*	.367	.262
	BA3	*.780*	.288	.200
	BA4	*.713*	.375	.246
	BA5	*.740*	.323	.225
	BA6	*.766*	.267	.202
	BA7	*.736*	.306	.179
	BA8	*.714*	.216	.223
	BA9	*.703*	.221	.232
	BA10	*.700*	.217	.174
	BA11	*.700*	.188	.116
	BA12	*.738*	.173	.170
	BA13	*.707*	.156	.222
	BA14	*.710*	.169	.143
	BA15	*.716*	.229	.123
	BA16	*.708*	.132	.160
	BA17	*.721*	.142	.169
Corporate Social Responsibility (CSR)	CSR1	.301	*.773*	.189
	CSR2	.277	*.830*	.157
	CSR3	.294	*.860*	.136
	CSR4	.278	*.807*	.167
Service Quality (SQ)	SQ1	.281	.225	*.738*
	SQ2	.289	.166	*.774*
	SQ3	.194	.211	*.728*
	SQ4	.220	.071	*.764*
	SQ5	.199	.190	*.778*
	SQ6	.209	.090	*.758*
	SQ7	.176	.099	*.736*
	SQ8	.157	.087	*.765*
	SQ9	.147	.183	*.744*
	SQ10	.126	.096	*.732*
	SQ11	.218	.163	*.783*
	SQ12	.190	.211	*.759*
	SQ13	.207	.081	*.740*
	SQ14	.089	.163	*.747*
	SQ15	.201	.168	*.757*

Table 5. Direct effect coefficients.

Path	coefficients	t value	p values	Results
CSR -> BA	.313	6.695	.000	Supported
SQ -> BA	.219	5.169	.000	Supported

CSR = corporate social responsibility; SQ = service quality; BA = brand authenticity.

corporate social responsibility and financial performance and social performance has been studied in past research (Al-Ghamdi & Badawi, 2019; Ikram et al., 2020). But the current study found the research and suggested a conceptual framework to examine corporate social responsibility in medical diagnostic and research laboratories context. The significance of brand authenticity, service quality, and CSR in the diagnostic research laboratory is supported by our findings, which agree with those of earlier studies (Afzali & Kim, 2021; Aljarah & Alrawashdeh, 2021; Bello et al., 2021; Ghaffar et al., 2023; Guèvremont, 2021; Islam et al., 2021). Based on these findings, this study proposed a theoretical expansion of variables like brand authenticity, CSR, and service quality in research.
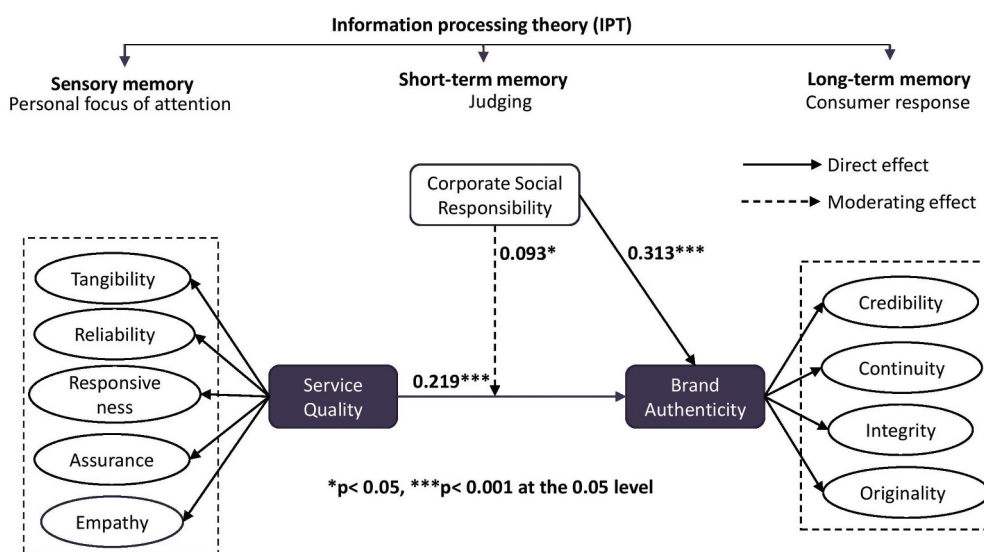
Figure 2. Results of research model test.

Table 6. The results of the moderating effect of corporate social responsibility.

Path	ß	t	p	LLCI	ULCI	Moderation
H3: SQ -> BA	.093	2.051	.040	.005	.185	Yes

ß = standardized regression weight, t = t value, LLCI = Lower limit of confidence interval, ULCI= Upper limit of confidence interval, SQ = service quality; BA = brand authenticity.

Moreover, the diagnostic and research laboratory choice was based on several factors. First, there is an exceptionally high brand involvement in diagnostic and research laboratory brands. Second, the quality of the service provided is a factor that should not be neglected in diagnostic and research institutes. Third, diagnostic and research laboratories must understand how to manage their brands' trust and authenticity. In addition, this research contributes substantially to the existing body of literature on marketing by presenting empirical evidence on the interactions between the impacts of CSR on service quality and brand authenticity. Earlier researchers have hypothesized a connection between the authenticity of a brand and a range of antecedents, and they have discovered evidence to support this notion (Becker et al., 2019; Guèvremont, 2021; Portal et al., 2019; Södergren, 2021; Wymer & Akbar, 2019; Yang et al., 2021). No analysis of specific service quality and brand authenticity can be found with the moderating effect of corporate social responsibility in the medical diagnostic and research laboratory context.

6. Research implications and limitations

6.1. Theoretical implication

This research makes various theoretical implications to the extant literature in multiple ways. First, this research broadens the past literature by empirically testing and validating the underlying mechanism through service quality influencing brand authenticity. Second, our study examined the CSR moderating effect between service quality and brand

authenticity and contributes to the past literature that sustainable initiatives and service quality increase brand authenticity (Kwak et al., 2022; Yang et al., 2021). Third, this research advances the literature on CSR and service quality in the developing countries context (Le, 2022; Safeer & Liu, 2022). High service quality and sustainable initiatives are required to improve brand authenticity even in the context of developing countries because the literature on sustainability is limited to the context of developed countries.

6.2. Practical implication

The brand authenticity scale lets marketing professionals, who are investing more and more in giving their brands an authentic image, keep track of how customers see how authentic a brand is. Further, this research provides initial guidelines concerning enhancing brand authenticity. Consumers consider the company's service quality and CSR activities in their authenticity assessments. Regarding the model, the influence of CSR as a moderator is statistically significant between service quality and brand authenticity and as a determinant of brand authenticity. Therefore, as a result, managers ought to manage resources in linking all variables to achieve brand authenticity. Findings directly affect health service providers; they are encouraged to monitor and maintain healthcare service quality and CSR activities to establish authenticity.

6.3. Limitations and future directions

Data were collected in Karachi, Pakistan, for this study. The results of this study could have been different if the model had been retested in a different context or cultural environment. In the future, researchers should do additional research to evaluate and validate our findings in various cultural environments and contexts. The current study is cross-sectional. As medical research and diagnostic laboratories are dynamic in their development, future research can use a longitudinal design to identify the roles and effects of service quality and CSR perceived by consumers in medical diagnostic and research laboratories.

Disclosure statement

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