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Association Between Service Quality Management, Customer Satisfaction and Customer Loyalty: A Systematic Review and Meta-Analysis

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ABSTRACT:

Background & objectives: Service quality, customer satisfaction and customer loyalty are important aspects of service management. This study aimed to evaluate the associations among these variables across service industries.

Methods: A quantitative synthesis of four cross-sectional studies involving 812 participants was conducted. Correlation coefficients were pooled using random-effects meta-analysis with Fisher's z transformation and restricted maximum likelihood estimation. Heterogeneity was assessed using Cochran's Q, I^2 and τ^2 statistics. Sensitivity analysis was performed.

Results: Service quality was positively associated with customer satisfaction (r=0.441, 95% CI: 0.153–0.659; P=0.018) and customer loyalty (r=0.382, 95% CI: 0.207–0.533; P=0.007). Customer satisfaction showed a positive association with loyalty (r=0.505, 95% CI: 0.299–0.665; P=0.006). Substantial heterogeneity was observed (I^2=64.0–83.0%). Sensitivity analysis retained positive associations across all three comparisons.

Conclusions: Service quality and customer satisfaction were positively associated with customer loyalty. However, substantial heterogeneity and the limited evidence base warrant cautious interpretation.

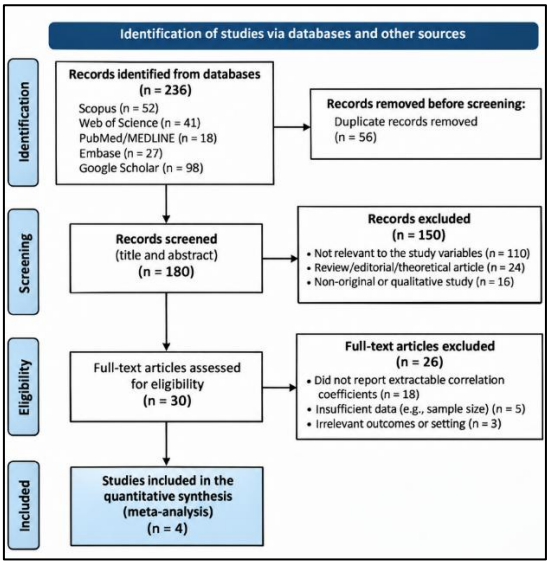
INTRODUCTION

Service quality management is an important aspect of organisational performance, particularly in service industries where customer satisfaction and loyalty contribute to long-term business relationships (1). Effective service delivery requires consistent standards, responsiveness to customer needs and an understanding of customer expectations (2). Perceived service quality reflects customers' evaluations of service performance and is commonly assessed through reliability, responsiveness, assurance,

empathy and tangibility. Customer satisfaction represents an overall evaluation of the service experience, whereas customer loyalty refers to continued patronage, repurchase intentions and willingness to recommend a service provider (3). Although service quality, customer satisfaction and customer loyalty are closely related, they represent distinct constructs. Satisfaction may arise from a particular service encounter, while loyalty reflects a continuing preference for a service provider (4). Their relationships may also be influenced by perceived value, trust, service characteristics and customer expectations. Understanding these associations is important for evaluating service performance and developing customer-oriented management strategies. The assessment of these relationships across service industries presents methodological challenges because service settings, measurement instruments and statistical approaches differ. Such variations may influence the magnitude and consistency of reported associations, making comparisons between individual investigations difficult. A systematic review and meta-analysis can provide a quantitative synthesis of comparable effect estimates while accounting for between-study heterogeneity. Therefore, the present study aimed to examine the associations between perceived service quality and customer satisfaction, perceived service quality and customer loyalty, and customer satisfaction and customer loyalty across service industries.

MATERIALS & METHODS

This systematic review and meta-analysis were designed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines. The literature search covered Scopus, Web of Science, PubMed/MEDLINE, Embase and Google Scholar, targeting English-language, freely accessible original research articles published between January 2015 and November 2026. Search terms included "service quality", "service quality management", "customer satisfaction", "customer loyalty", "SERVQUAL", "SERVPERF", "service performance", "consumer satisfaction"* and *"customer retention", combined using the Boolean operators AND and OR. Original quantitative studies reporting relevant correlation coefficients and sample sizes were considered eligible, while reviews, editorials, theoretical articles, duplicate publications and studies without extractable quantitative data were excluded. Study identification and selection were organised according to the PRISMA 2020 framework (Figure 1). Four cross-sectional studies comprising 812 participants contributed to the current quantitative synthesis. Extracted data included author, publication year, country, service sector, sample size, study design and reported correlation coefficients. Three associations were examined: service quality with customer satisfaction, service quality with customer loyalty, and customer satisfaction with customer loyalty. Correlation coefficients were transformed using Fisher's z transformation, and sampling variances were calculated from the corresponding sample sizes. Random-effects meta-analysis was performed using restricted maximum likelihood estimation, with 95 per cent confidence intervals calculated using the Hartung–Knapp method. Pooled estimates were back-transformed to correlation coefficients. Statistical heterogeneity was evaluated using Cochran's Q, I^2 and τ^2 statistics, and 95 per cent prediction intervals were estimated. Sensitivity analysis was conducted by excluding the study reporting latent-construct correlations. All statistical tests were two-sided, with $P<0.05$ considered statistically significant.



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Figure 1. PRISMA 2020 flow diagram illustrating the identification, screening, eligibility assessment and inclusion of studies in the systematic review and meta-analysis.

RESULT

Study characteristics

Four cross-sectional studies published between 2020 and 2026 were included in the quantitative synthesis, comprising 812 participants from Oman, Pakistan and Uganda. The studies covered banking, e-commerce, healthcare and financial cooperative services, with sample sizes ranging from 120 to 296. All studies assessed service quality, customer satisfaction and customer loyalty using questionnaire-based data. Three studies employed correlation and regression analyses, while one used partial least square structural equation modelling (PLS-SEM). Study characteristics are presented in Table 1.

Table 1. Characteristics of included studies.

Author (year)	Country	Service sector	Sample (n)	Statistical approach
Fida et al. (2020) (5)	Oman	Islamic banking	120	Correlation and regression
Wattoo & Iqbal (2022) (6)	Pakistan	E-commerce	296	PLS-SEM
Rafiq et al. (2026) (7)	Pakistan	Healthcare	200	Correlation, regression and mediation
Esagala & Ntale (2026) (8)	Uganda	Financial cooperatives	196	Correlation and hierarchical regression
Total	**3 countries**	**4 sectors**	**812**	

Original effect-size extraction

All four studies reported positive associations among service quality, customer satisfaction and customer loyalty. Correlation coefficients ranged from 0.323 to 0.652 for service quality and satisfaction, 0.285 to 0.488 for service quality and loyalty, and 0.388 to 0.602 for satisfaction and loyalty (Table 2).

Table 2. Correlation coefficients extracted from the included studies

Study	n	SQ–CS (r)	SQ–CL (r)	CS–CL (r)
Fida et al. (2020) (5)	120	0.652	0.488	0.602
Wattoo & Iqbal (2022) (6)	296	0.343	0.285	0.388
Rafiq et al. (2026) (7)	200	0.323	0.313	0.421
Esagala & Ntale (2026) (8)	196	0.424	0.462	0.602

SQ, service quality; CS, customer satisfaction; CL, customer loyalty; r, correlation coefficient.

Quantitative meta-analysis

Random-effects meta-analysis identified positive associations between service quality and customer satisfaction (r=0.441, 95% CI: 0.153–0.659; P=0.018), service quality and customer loyalty (r=0.382, 95% CI: 0.207–0.533; P=0.007), and customer satisfaction and customer loyalty (r=0.505, 95% CI: 0.299–0.665; P=0.006). The largest pooled correlation was observed between customer satisfaction and loyalty (Table 3).

Table 3. Random-effects meta-analysis of the associations among service quality, customer satisfaction and customer loyalty

Relationship	Studies (k)	Participants	Pooled r	95% CI	P-value
Service quality–customer satisfaction	4	812	0.441	0.153–0.659	0.018
Service quality–customer loyalty	4	812	0.382	0.207–0.533	0.007

Customer satisfaction–customer loyalty	4	812	0.505	0.299–0.665	0.006

CI, confidence interval; r, pooled correlation coefficient; k, number of studies. Random-effects estimates were calculated using Fisher's z transformation, restricted maximum likelihood estimation and Hartung–Knapp confidence intervals.

Association between service quality and customer satisfaction

Four studies comprising 812 participants were included in the analysis. A significant positive association was observed between service quality and customer satisfaction (pooled r=0.441, 95% CI: 0.153–0.659; P=0.018). Substantial heterogeneity was observed (I^2=83.0%; Q=17.615, df=3; P<0.001; τ^2=0.0329) (Figure 2).

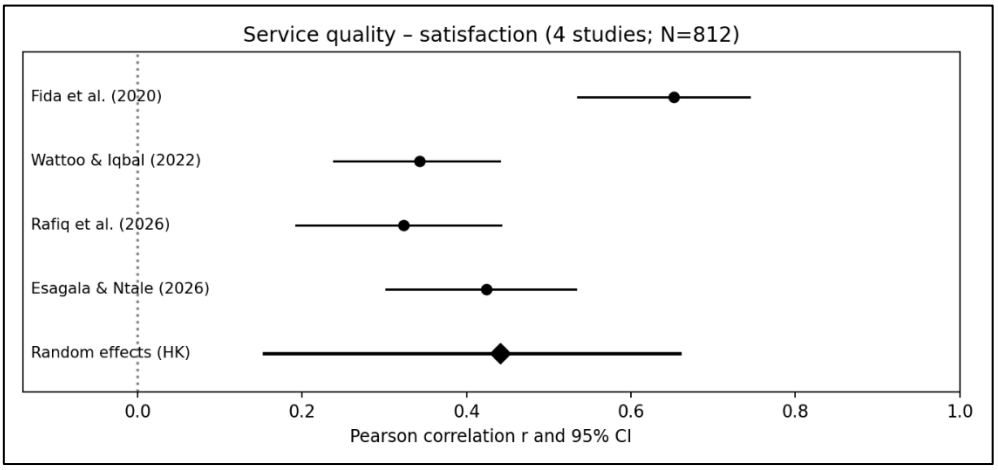


Figure 2. Forest plot of the association between service quality and customer satisfaction.

Association between service quality and customer loyalty

Four studies involving 812 participants were included in the analysis. A significant positive association was observed between service quality and customer loyalty (pooled r=0.382, 95% CI: 0.207–0.533; P=0.007). Between-study heterogeneity was substantial (I^2=64.0%; Q=8.333, df=3; P=0.040; τ^2=0.0092) (Figure 3).

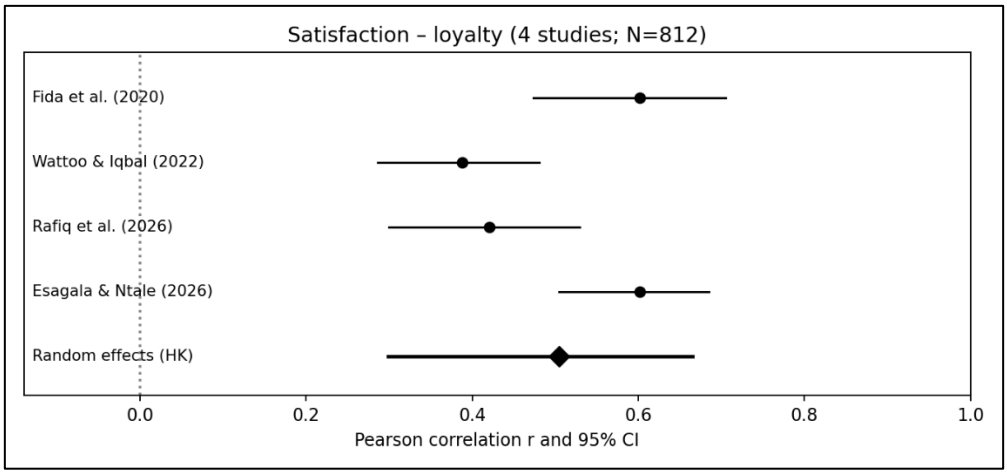


Figure 3. Forest plot of the association between service quality and customer loyalty.

Assessment of heterogeneity and prediction intervals

Significant heterogeneity was observed across all three associations (I^2=64.0–83.0%; P≤0.040), with the highest heterogeneity for service quality and customer satisfaction. All 95% prediction intervals included zero, indicating uncertainty in the expected associations across different service settings (Table 4).

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Table 4. Heterogeneity statistics and 95% prediction intervals

Relationship	Q	df	P-value	I^2 (%)	τ^2	95% prediction interval
Service quality–satisfaction	17.615	3	<0.001	83.0	0.0329	−0.391 to 0.876
Service quality–loyalty	8.333	3	0.040	64.0	0.0092	−0.085 to 0.712
Satisfaction–loyalty	14.125	3	0.003	78.8	0.0189	−0.124 to 0.844

Q, Cochran's heterogeneity statistic; df, degrees of freedom; I^2, proportion of variability attributable to heterogeneity; τ^2, estimated between-study variance. Prediction intervals are approximate and should be interpreted cautiously because only four studies were included.

Sensitivity analysis

Exclusion of Wattoo and Iqbal (2022), which reported latent-construct correlations, increased the pooled estimates for all three associations. The direction of the associations remained positive (Table 5).

Table 5. Sensitivity analysis excluding latent-construct correlations

Relationship	Overall pooled r (k=4)	Sensitivity pooled r (k=3)
Service quality–satisfaction	0.441	0.475
Service quality–loyalty	0.382	0.418
Satisfaction–loyalty	0.505	0.544

r, pooled correlation coefficient; k, number of studies.

Mediation-related findings

Rafiq et al. (2026) reported an indirect association between service quality and patient loyalty through customer satisfaction (β=0.2128, 90% bootstrap CI: 0.0611–0.4832). Esagala and Ntale (2026) examined customer perception as a mediator and reported a reduction in the service quality–loyalty regression coefficient from 0.424 to 0.230 following mediator adjustment. The studies examined different mediating constructs.

Methodological characteristics

All four studies employed cross-sectional survey designs. Differences were observed in service sectors, measurement instruments and statistical approaches. Wattoo and Iqbal (2022) reported latent-construct correlations, whereas the remaining studies reported conventional correlation coefficients. The influence of this difference was examined through sensitivity analysis.

DISCUSSION

The present meta-analysis demonstrated positive associations between service quality, customer satisfaction and customer loyalty. The pooled association was highest between customer satisfaction and loyalty (r=0.505), followed by service quality and satisfaction (r=0.441) and service quality and loyalty (r=0.382). These findings suggest that satisfaction is an important correlate of customer loyalty, although the overlapping confidence intervals do not establish a statistically significant difference between the three associations. The findings are consistent with **Borishade et al. (2021)** (9), who reported a significant relationship between service quality and student loyalty, with satisfaction acting as a mediator in Nigerian higher education. **Agarwal and Dhingra (2026)** (10) similarly identified positive relationships among service quality, satisfaction and loyalty among cloud service users in India, including a partial mediating role of satisfaction. These observations support the relevance of satisfaction in the relationship between service quality and loyalty across different service environments. However, the findings are not uniform across industries. **Hassan and Salem (2022)** (11) reported significant positive associations of service quality with

satisfaction (β=0.462) and loyalty (β=0.162) among airline passengers. In contrast, the adjusted association between satisfaction and loyalty was not significant (β=−0.031; P=0.542), while airline image remained positively associated with loyalty. This difference suggests that customer loyalty may also depend on service-specific factors beyond satisfaction. Substantial heterogeneity was observed across the three pooled associations (I^2=64.0–83.0%). Differences in service characteristics, customer expectations and measurement approaches may have contributed to this variation. Although sensitivity analysis retained positive associations, the synthesis was limited by the small number of studies and their cross-sectional designs. The inclusion of latent-construct correlations alongside conventional Pearson correlations also requires caution when interpreting the pooled estimates. The findings indicate that perceived service quality and customer satisfaction are positively associated with customer loyalty, but the strength of these relationships varies across service settings. For service management, the results emphasise the relevance of evaluating customer satisfaction alongside service performance rather than treating service quality alone as an indicator of loyalty. Further research using comparable measurement instruments and longitudinal designs is needed to establish the consistency and temporal direction of these relationships.

CONCLUSION

The present meta-analysis identified positive associations between service quality, customer satisfaction and customer loyalty, with the strongest pooled correlation observed between satisfaction and loyalty. Substantial heterogeneity indicated variation across service settings. These findings highlight the importance of customer satisfaction in service quality management and customer retention strategies. However, the limited number of studies and cross-sectional designs warrant cautious interpretation. Further research using standardised measures and longitudinal designs is needed to strengthen the evidence.

Declarations

- **Ethical approval:** This study involves a systematic review and meta-analysis of previously published research and does not involve direct recruitment of human participants or collection of identifiable personal data.
- **Consent to participate:** Not applicable.
- **Consent for publication***:* Not applicable.
- **Funding:** No specific funding was received for this study.
- **Conflicts of interest:** The authors declare no conflicts of interest.
- **Data availability:** The study-level data used in the quantitative synthesis were extracted from publicly available research articles.
- **Authors' contributions: V.V.:** Conceptualization, study design, methodology, supervision, and manuscript review and editing. **P.G.:** Literature search, study selection, data extraction, and preparation of the original manuscript draft. **A.K.:** Methodology, data validation, interpretation of findings, and manuscript review and editing. **S.:** Literature screening, data extraction, statistical analysis, and preparation of tables and figures. **D.T.:** Data curation, statistical analysis, interpretation of results, and manuscript review and editing. All authors reviewed and approved the final manuscript and agree to be accountable for the integrity and accuracy of the work.

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