

Development and Validation of the SQ–CVM Scale: Measuring Service Quality in Virtual Brand Communities

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Abstract

This paper develops and validates the SQ–VBC scale, a multidimensional instrument measuring service quality in Virtual Brand Communities (VBCs). Building on SERVPERF’s dimensions, items were adapted to capture platform tangibility, reliability, responsiveness, assurance, and empathy in hybrid brand–peer interactions. Translation/back-translation, pretesting, and PLS-SEM analyses were conducted using data from 1,430 VBC members. Nine items were removed from the original 29-item pool, yielding a purified 22-item model with strong internal consistency, convergent validity, and discriminant validity (Fornell–Larcker, HTMT). SQ–VBC fills a gap in VBC research by providing a context-specific service quality scale and a diagnostic tool for assessing interaction quality and platform performance.

Keywords: *Virtual Brand Communities; Service Quality; Scale Development SQ–VBC.*

Track : **Digital Marketing & Social Media**

1. Introduction

Virtual Brand Communities (VBCs) have become central to interactions between consumers and brands (Casaló et al., 2008; Muniz & O’Guinn, 2001). While research has advanced on engagement, identification, and trust (Dessart et al., 2015; Laroche et al., 2012; Zaglia, 2013), service quality in VBCs remains underexplored. Yet members continuously evaluate platform usability, responsiveness, and support—making service quality a foundational antecedent to satisfaction and loyalty (Cronin & Taylor, 1992; Parasuraman et al., 1985).

Classical service quality models illustrate this relevance. SERVQUAL established the expectations–performance gap model (Parasuraman et al., 1985, 1988) but drew criticism for conceptual instability (Babakus & Boller, 1992; Buttle, 1996; Teas, 1993). SERVPERF addressed these issues with a performance-only approach showing stronger psychometric robustness (Brady et al., 2002; Cronin & Taylor, 1994). Digital variants (Cristobal et al., 2007; Fassnacht & Koese, 2006) focused on transactional settings rather than peer-driven communities. However, these e-service instruments do not capture the relational, socially embedded, and peer-supported dynamics that characterize VBC interactions.

Attempts to adapt these instruments to VBCs yield mixed factor structures (e.g., Kuo, 2003), highlighting the need for a context-specific scale. (Authors, 2026) developed SQ–VBC, adapting SERVPERF’s five dimensions to VBC environments. This paper provides its methodological validation. These divergences further justify grounding SQ–VBC in a performance-only framework rather than adapting expectation-based models.

2. Literature Review

2.1. Service Quality Foundations and Digital extensions

SERVQUAL conceptualizes service quality as expectations–performance gaps (Parasuraman et al., 1985, 1988) but suffers from unstable dimensions (Babakus & Boller, 1992; Buttle, 1996; Teas, 1993). SERVPERF offers a performance-only alternative with superior psychometric properties (Author, 2012; Brady et al., 2002; Cronin & Taylor, 1994; Jain & Gupta, 2004) and underpins the five dimensions used here. Digital extensions such as E-S-QUAL and SITEQUAL adapt service quality to online contexts (Cristobal et al., 2007; Fassnacht & Koese, 2006; Parasuraman et al., 2005), but they focus on transactional websites, and a meta-analysis highlights fragmentation across digital settings (Blut et al., 2015).

2.2. VBCs as Service Environments

A Virtual Brand Community functions as a digitally mediated service system: members evaluate platform usability, information reliability, responsiveness from peers and brand representatives, moderation mechanisms, and interpersonal empathy. These are service experiences, even if embedded in social interaction. Evaluating performance in this environment aligns closely with service quality logic and supports using performance-based frameworks such as SERVPERF.

2.3. Why Not Build a New Scale from Scratch

Adapting SERVPERF maintains theoretical continuity and avoids conceptual drift (Churchill, 1979; DeVellis, 2017; Nunnally & Bernstein, 1994). Moreover, grounding SQ–VBC in an established performance framework ensures comparability with decades of service quality research. The canonical dimensions have demonstrated cross-contextual stability.

2.4. Service Quality in Virtual Communities: Revisiting Kuo (2003)

Kuo adapted SERVQUAL using PCA (Varimax), extracting five context-specific factors (e.g., public mail management). Cronbach's α ranged .62–.87. Methodological limitations—including orthogonal rotation and divergence from SERVPERF's structure—underscore the need for a refined, theory-aligned scale. Engagement and value-creation dynamics in VBCs also differ from traditional service encounters, reinforcing the need for context-specific measures (Brodie et al., 2013). These divergences further justify grounding SQ–VBC in a performance-only framework rather than adapting expectation-based models.

2.5. The Need for SQ–VBC

SERVQUAL, by contrast, relies on an expectations–performance gap model that has been criticized for unstable expectations and conceptual ambiguity (Buttle, 1996; Teas, 1993). Because expectations in digital communities are fluid and difficult to operationalize, a performance-only approach is more consistent with the nature of VBC interactions. Moreover, negative service experiences tend to erode loyalty particularly strongly in community environments (Smith et al., 1999).

3. Methodology

3.1. Scale Development Procedure

The development of the SQ-VBC scale followed established procedures for reflective measurement instrument construction (Churchill, 1979; DeVellis, 2017; Nunnally & Bernstein,

1994). The initial pool of 29 items was adapted from the SERVPERF dimensions—tangibles, reliability, responsiveness, assurance, and empathy—based on a conceptual analysis of their relevance to Virtual Brand Communities (Authors, 2026). Items were adapted to reflect platform usability, peer interaction quality, brand responsiveness, and interpersonal support within VBCs.

A translation/back-translation procedure was applied to ensure linguistic equivalence of item wording. Two bilingual experts translated items from English to French, and two independent experts back-translated them into English. Discrepancies were reconciled through committee review. A pretest with 42 VBC users assessed clarity, redundancy, and contextual adequacy. Minor wording adjustments were made for platform-specific expressions.

3.2. Data Collection

Data were collected through an online survey administered to members of multiple active VBCs operating in consumer goods, entertainment, and lifestyle categories. After removing incomplete responses and screening for inattentive participants, **1,430 valid responses** remained for analysis. Respondents varied in demographic profiles and experience levels, consistent with population characteristics of large-scale VBC environments. Participation was voluntary and anonymous.

3.3. Measurement and Analytical Approach

All items were measured on seven-point Likert scales. Because items are reflective and the goal was scale purification, PLS-SEM (SmartPLS 4) was employed (Hair et al., 2017). Measurement evaluation followed indicator reliability, internal consistency, convergent validity, and discriminant validity criteria.

Indicator reliability was assessed using outer loadings, with 0.708 as the guideline threshold. Items failing loading or cross-loading criteria were eliminated. After iterative purification, **nine items**—Res13, Res14, Res15; Ass18, Ass18', Ass19, Ass21, Ass23; and Emp24—were removed, yielding a final **22-item** scale.

Cronbach's α and Composite Reliability assessed internal consistency (threshold > 0.70). Convergent validity was evaluated using AVE (threshold > 0.50). Discriminant validity was assessed via the Fornell–Larcker criterion (Fornell & Larcker, 1981) and the HTMT ratio (Henseler et al., 2015), using a conservative threshold of 0.85.

3.4. Ethical Considerations

The study followed ethical guidelines for online research participation. Respondents were informed of the purpose of the study, provided consent, and were assured of anonymity and confidentiality. No identifying data were collected.

4. Results

4.1. Item Purification

The initial SQ–VBC measurement instrument included **29 items** across the five SERVPERF-based dimensions (Tangibles, Reliability, Responsiveness, Assurance, Empathy). Following iterative purification based on outer loadings, cross-loadings, and AVE criteria, **nine items were eliminated**:

- Responsiveness: Res13, Res14, Res15
- Assurance: Ass18, Ass18', Ass19, Ass21, Ass23
- Empathy: Emp24

Items were eliminated based on loadings below .708, problematic cross-loadings, or conceptual redundancy consistent with scale refinement guidelines. All Tangibles (6 items) and Reliability (5 items) were retained. The resulting measurement model contains 22 items with balanced representation across dimensions.

Table 1. Purification of the SQ–VBC Scale

Dimension	Initial Items	Dropped Items	Retained Items	Count
Tangibles	Tan01–Tan06	–	Tan01–Tan06	6
Reliability	Rel07–Rel11	–	Rel07–Rel11	5
Responsiveness	Res12–Res17	Res13, Res14, Res15	Res12, Res16, Res17	3
Assurance	Ass18–Ass23	Ass18, Ass18', Ass19, Ass21, Ass23	Ass19', Ass20, Ass22	3
Empathy	Emp24–Emp29	Emp24	Emp25–Emp29	5
TOTAL	29	9	22	22

4.2. Reliability and Convergent Validity

All indicators retained in the final model load significantly on their intended constructs (outer loadings > 0.70). Internal consistency (Cronbach's α , Composite Reliability) exceeds recommended thresholds, and Average Variance Extracted (AVE) is above 0.50 for all constructs, confirming convergent validity.

Table 2. Reliability and Convergent Validity of SQ-VBC

Construct	Retained Items (Loadings)	α	CR	AVE
Tangibles	Tan01 (.82), Tan02 (.84), Tan03 (.81), Tan04 (.79), Tan05 (.83), Tan06 (.85)	0.90	0.93	0.70
Reliability	Rel07 (.83), Rel08 (.85), Rel09 (.80), Rel10 (.82), Rel11 (.84)	0.88	0.91	0.68
Responsiveness	Res12 (.81), Res16 (.83), Res17 (.79)	0.82	0.88	0.65
Assurance	Ass19' (.733), Ass20 (.794), Ass22 (.849)	0.81	0.87	0.61
Empathy	Emp25 (.83), Emp26 (.81), Emp27 (.84), Emp28 (.82), Emp29 (.85)	0.87	0.91	0.66

4.3. Discriminant Validity (Fornell–Larcker)

The square root of AVE for each construct exceeds all inter-construct correlations, confirming discriminant validity.

Table 3. Fornell–Larcker Criterion

Construct	Tangibles	Reliability	Responsiveness	Assurance	Empathy
Tangibles	0.84				
Reliability	0.56	0.82			
Responsiveness	0.53	0.57	0.81		
Assurance	0.50	0.54	0.55	0.78	
Empathy	0.59	0.62	0.60	0.58	0.81

4.4. Discriminant Validity (HTMT)

All Heterotrait–Monotrait (HTMT) ratios are below the conservative 0.85 threshold, further supporting discriminant validity.

Table 4. HTMT Ratios

Construct Pair	HTMT
Tangibles – Reliability	0.64
Tangibles – Responsiveness	0.61
Tangibles – Assurance	0.59
Tangibles – Empathy	0.68
Reliability – Responsiveness	0.67

Construct Pair	HTMT
Reliability – Assurance	0.65
Reliability – Empathy	0.70
Responsiveness – Assurance	0.69
Responsiveness – Empathy	0.73
Assurance – Empathy	0.72

4.5. Latent Constructs and Retained Indicators

- **Tangibles:** Tan01, Tan02, Tan03, Tan04, Tan05, Tan06
- **Reliability:** Rel07, Rel08, Rel09, Rel10, Rel11
- **Responsiveness:** Res12, Res16, Res17
- **Assurance:** Ass19', Ass20, Ass22
- **Empathy:** Emp25, Emp26, Emp27, Emp28, Emp29

All constructs are modeled reflectively. Double-headed arrows indicate correlations between latent variables.

5. Discussion

5.1. Summary of Findings and Contributions

This study developed and validated the SQ–VBC scale, a performance-based instrument capturing perceived service quality in Virtual Brand Communities. Starting from 29 SERVPERF-inspired items, an iterative purification process produced a stable 22-item structure across five reflective dimensions—Tangibles, Reliability, Responsiveness, Assurance, and Empathy. All constructs demonstrated satisfactory reliability, convergent validity, and discriminant validity (Fornell–Larcker, HTMT). These results confirm that the SERVPERF framework can be meaningfully adapted to peer-supported, digitally mediated community settings.

The study makes three contributions. First, it provides a **dedicated VBC service quality scale**, addressing the lack of context-specific instruments in community research, which often relies on partial or ad hoc indicators. Second, it clarifies which classical service quality attributes are most salient in VBCs, showing that Responsiveness, Assurance, and Empathy

carry particular evaluative weight in community interactions. Third, the scale offers a methodological foundation for examining how service performance shapes satisfaction, engagement, trust, and loyalty in community ecosystems. In addition, the SQ–VBC dimensions can serve as building blocks for predictive models linking digital interactions, community engagement, and downstream loyalty outcomes.

5.2. Managerial Implications

SQ–VBC offers managers a diagnostic framework for improving platform and interaction quality. Tangibles highlight the continuing importance of interface clarity and professional design. Reliability underscores the need for accurate information, consistent processes, and predictable community management. Responsiveness emphasizes timely reactions from moderators and community members. Assurance points to the role of competence, transparency, and security mechanisms in reducing uncertainty. Empathy stresses the value of supportive communication and relational sensitivity. Together, these dimensions provide actionable levers for enhancing member experience and sustaining community vitality.

5.3. Limitations and Future Research

This study is limited by its cross-sectional design and by data drawn from specific VBC categories, which may affect generalizability. Future research could examine longitudinal effects to assess how SQ–VBC evolves with member tenure, test measurement invariance across cultures and platforms, and evaluate the scale’s predictive power for behavioral outcomes such as participation, advocacy, and retention. The scale also provides a foundation for studying AI-mediated moderation, automated service responses, and hybrid human–machine interaction quality in digital communities.

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