

Conceptualizing Marketing Management as Service Quality Capability in Humanitarian Warehousing: A Conceptual Framework and SEM-AMOS Evidence from Sibura Warehouse

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ABSTRACT

Contemporary marketing management increasingly resembles capability management: organizations compete by sensing stakeholder needs, orchestrating service experiences, and safeguarding trust in environments characterized by operational risk and resource constraints. This article offers a conceptual model that positions service quality as an integrative marketing management capability and develops an empirical measurement foundation using covariance-based structural equation modeling (SEM) in an AMOS-aligned procedure. Survey responses from Sibura Warehouse (N = 50; 20 indicators; 5-point Likert) were analyzed using confirmatory factor analysis. Reliability was strong across dimensions (Cronbach's $\alpha = 0.769-0.846$), and convergent validity was supported for most constructs (CR = 0.785-0.856; AVE = 0.487-0.599). A five-factor first-order CFA produced standardized loadings between 0.489 and 0.867. While global fit was constrained under maximum likelihood ($\chi^2/df = 2.87$, CFI = 0.660, TLI = 0.596, RMSEA = 0.196, SRMR = 0.116), a parsimonious second-order model using dimension composites supported a higher-order Service Quality factor with high loadings (0.83-0.93). The paper proposes a research agenda linking service quality capability to stakeholder trust, collaboration intention, and perceived operational effectiveness

INTRODUCTION

Marketing management has evolved from managing discrete elements of the marketing mix toward orchestrating end-to-end value creation systems across stakeholders, channels, and governance constraints. In humanitarian logistics, this evolution is particularly visible because “customers” are heterogeneous – donors, government agencies, non-governmental organizations (NGOs), community representatives, auditors, and operational partners – whose expectations must be met under uncertainty, disruption, and scarcity. Warehouses function as critical nodes that translate upstream donations and procurement into downstream relief outcomes; consequently, how warehousing services are experienced (speed, accuracy, safety, transparency, and fairness) directly shapes stakeholder judgments of organizational competence and legitimacy.

From a capability perspective, marketing management can be conceptualized as the organization’s ability to repeatedly sense stakeholder requirements, align internal processes, and deliver service experiences that reduce perceived risk and strengthen relationships. In service contexts, these routines are often “seen” as service quality: stakeholders infer value from the consistency of operations (reliability), the speed and adequacy of response (responsiveness), the professionalism and credibility of staff and systems (assurance), the degree of care and tailored support (empathy), and the physical and digital evidence of readiness (tangibles). When these dimensions are managed as an integrated capability, service quality becomes more than a satisfaction metric; it becomes a market-facing resource that can protect trust and sustain collaboration even when performance is challenged by emergencies.

Despite the strategic importance of warehousing service quality in humanitarian supply chains, empirical work frequently focuses on operational metrics (e.g., throughput, inventory accuracy) without offering measurement models that connect stakeholder perceptions to marketing-management concepts. This creates a practical gap: managers may know operational indicators, yet lack a validated, stakeholder-centered diagnostic tool to identify capability weaknesses that undermine confidence and coordination. At the same time, researchers need robust measurement foundations to examine how service quality capability relates to stakeholder trust, collaboration intention, and perceived operational effectiveness in humanitarian ecosystems.

This study addresses these gaps in two ways. First, it develops a conceptual framework that positions service quality as an integrative marketing management capability in humanitarian warehousing. Second, it provides measurement evidence from Sibura Warehouse using covariance-based structural equation modeling (SEM) with an AMOS-aligned confirmatory factor analysis (CFA) procedure, validating a SERVQUAL-inspired five-dimension structure with 20 indicators. By establishing this measurement foundation, the paper enables future work to test structural relationships (e.g., service quality → trust → collaboration) and offers a managerial lens for capability development.

The remainder of the paper is organized as follows. Section 2 reviews conceptual foundations and literature relevant to marketing capability and

service quality in logistics services. Section 3 introduces the conceptual model and hypotheses. Sections 4 and 5 detail the methodology and measurement results. Sections 6 and 7 discuss theoretical insights and managerial implications. Section 8 outlines limitations and a forward-looking research agenda.

LITERATURE REVIEW

Marketing Management as a Capability System

A capability-based view argues that performance under turbulence depends on repeatable, learnable routines that coordinate resources to accomplish desired outcomes (Ameen, N., & Tarba, 2025). In marketing, capabilities often include sensing market signals, configuring offerings and experiences, and communicating value in ways that are consistent with organizational strategy. Under conditions of volatility—such as humanitarian operations, where demand surges, access constraints, and stakeholder scrutiny are common—capabilities become especially important because they allow organizations to deliver consistent value even when resources are constrained and environments are unstable. Contemporary marketing scholarship highlights that rising stakeholder expectations, digitalization, and intensified accountability demand more adaptive, governance-oriented marketing capabilities to sustain trust and legitimacy over time (Hoekstra, J. C., & Leeftang, 2023); (Vesterinen, M., Mero, J., & Skippari, 2024); (Haverila, M., Haverila, K., Gani, M. O., 2025).

Conceptualizing marketing management as capability management is useful for humanitarian warehousing because it reframes “marketing” from promotion to stewardship: (a) translating stakeholder requirements into service standards; (b) ensuring that operational processes embody those standards; and (c) providing credible evidence that promised service levels are actually delivered. This view aligns with a broader shift toward relationship-based and service-dominant perspectives, in which value is co-created through interactions and institutional arrangements rather than embedded in products alone.

Service Quality Capability in Logistics and Warehousing Services

Service quality is commonly modeled as a multi-dimensional construct capturing stakeholder evaluations of how services are delivered and whether delivery meets expectations. The SERVQUAL tradition operationalizes service quality through five dimensions—tangibles, reliability, responsiveness, assurance, and empathy—which together reflect both process quality (how the service is experienced) and outcome-related cues (whether the service “works” as expected). In logistics and warehousing, these dimensions are particularly salient because service failures propagate: a missed delivery window, an incorrect picking operation, or poor handling can delay relief distribution and erode confidence across the network (Arabelen, G., & Kaya, 2021); (Lin, X., Mamun, A. A., Yang, Q., & Masukujjaman, 2023); (Hui, G., Al Mamun, A., Reza, M. N. H., & Wan Hussain, 2025).

In humanitarian warehousing, service quality also carries moral and institutional significance. Stakeholders not only evaluate functional performance but also infer fairness, transparency, and stewardship of donated resources. Tangibles (facility condition, equipment, digital traceability tools) provide visible

signals of professionalism and preparedness. Reliability (accuracy of records, consistency of procedures, on-time processing) reduces uncertainty in planning. Responsiveness (speed of issue resolution, flexibility in handling urgent requests) enables adaptation during crises. Assurance (competence, integrity, safety compliance) strengthens confidence in risk-laden environments. Empathy (attention to stakeholder constraints, respectful communication) supports relational stability among diverse partners.

Treating these dimensions as a “capability bundle” helps integrate marketing and operations: service quality perceptions become the outward-facing manifestation of internal governance routines (standard operating procedures, training systems, service recovery protocols, and performance monitoring). As argued by recent work on marketing management models under turbulence, organizations must increasingly cultivate agility and credible stakeholder alignment rather than relying on static tactics (Ameen, N., & Tarba, 2025).

Service Quality, Trust, Collaboration, and Perceived Effectiveness

Service quality is expected to influence relationship and performance outcomes through risk reduction and positive experience formation. In contexts where stakeholders face information asymmetries and operational uncertainty, consistent service delivery can function as a trust-building signal: stakeholders interpret reliable, responsive, and assured behavior as evidence that the organization is competent and will act in good faith. Trust, in turn, supports collaboration intention—stakeholders become more willing to share information, align plans, and commit resources—because perceived relational risk is lower. Prior empirical studies across service industries show that experience and satisfaction can translate into trust and loyalty-like behaviors, reinforcing the importance of experience governance (Huddin, M. N., Kurnia, D., Deviyantoro, D., & Nafiudin, 2023)(Prakash, 2025); (Mohammed Zain, R., Mohd Zahari, H., & Mohd Zainol, 2023).

In humanitarian ecosystems, these relationship outcomes can translate into perceived operational effectiveness and legitimacy. When stakeholders trust the warehouse and perceive high service quality, they are more likely to view warehousing operations as effective—delivering timely, safe, and accurate flows of goods—and to regard the organization as a legitimate partner worthy of continued cooperation and support. Thus, a capability model linking service quality to trust and collaboration provides a theoretically coherent basis for future structural testing in humanitarian warehousing settings.

3. Conceptual Model and Hypotheses

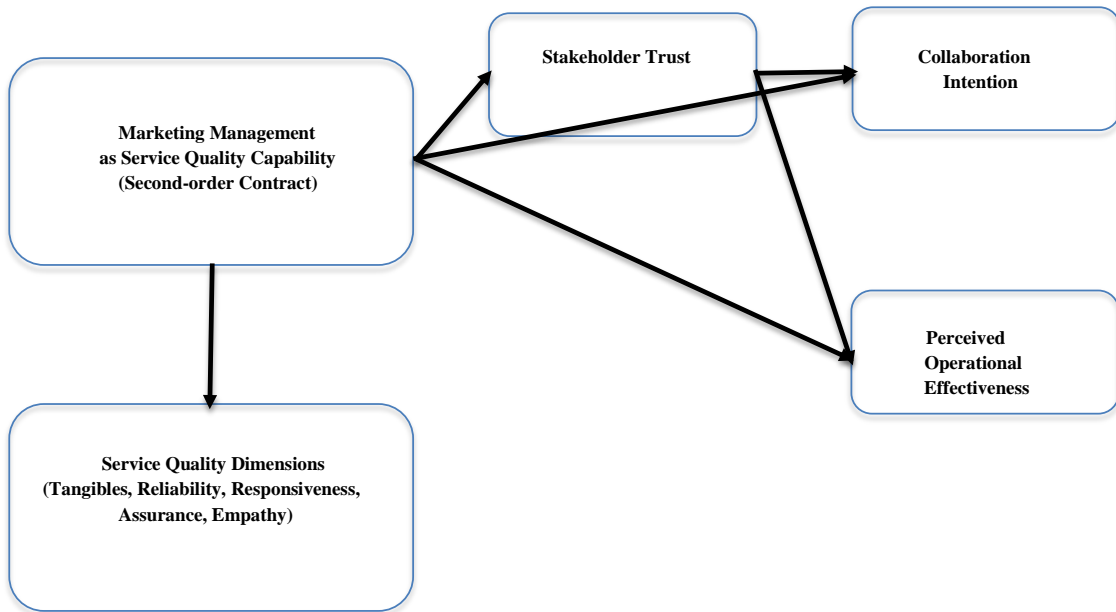


Figure 1. Conceptual Background Framework (Service Quality Capability in Humanitarian Warehousing).

This figure summarizes the study's theoretical logic: the five SERVQUAL dimensions operate as complementary routines that together form an overarching Service Quality Capability, which can later be linked to downstream outcomes such as stakeholder trust, collaboration intention, and perceived operational effectiveness.

The five SERVQUAL-inspired dimensions reflect a higher-order Service Quality Capability. Proposed downstream links to trust, collaboration intention, and perceived operational effectiveness constitute the research agenda for subsequent structural testing.

Figure 1 (conceptual) depicts the proposed model. Service Quality Capability is modeled as a second-order construct reflected by five first-order dimensions (Tangibles, Reliability, Responsiveness, Empathy, Assurance). Downstream, the model posits positive effects on Stakeholder Trust, Collaboration Intention, and Perceived Operational Effectiveness, with Trust as a key mediator. While the present dataset supports the measurement foundation, the structural relationships are proposed for future testing when outcome variables are available.

- ❖ H1a-H1e (Measurement). Tangibles, Reliability, Responsiveness, Empathy, and Assurance are each reflected by their respective indicators.
- ❖ H2 (Second-order structure). The five first-order dimensions load positively on a higher-order Service Quality Capability construct.

- ❖ H3 (Trust). Service Quality Capability positively influences Stakeholder Trust.
- ❖ H4 (Collaboration intention). Service Quality Capability positively influences Collaboration Intention.
- ❖ H5 (Mediation). Stakeholder Trust mediates the relationship between Service Quality Capability and Collaboration Intention / Perceived Operational Effectiveness.

METHODOLOGY

Research Design and Context

This study applies a quantitative, cross-sectional survey design to establish a validated measurement model for service quality in humanitarian warehousing. The empirical context is Sibura Warehouse, a humanitarian warehousing facility that interacts with multiple stakeholders involved in relief and support operations. The objective is measurement development and validation (CFA) rather than hypothesis testing of downstream outcomes, enabling subsequent studies to extend the model to include trust, collaboration, and effectiveness constructs.

Sample and Data Collection

Data were obtained from stakeholders who had direct interaction with Sibura Warehouse service processes. The final sample comprised N = 50 valid responses. Given the operational setting, the study prioritizes respondents with experiential familiarity with the warehouse's service processes (e.g., receiving, storage, picking, dispatch, and coordination). The sample size is modest and should be interpreted as suitable for a measurement-focused diagnostic with careful attention to estimation constraints.

Instrument Development and Measures

The questionnaire operationalizes perceived service quality using a SERVQUAL-inspired structure with five first-order dimensions—Tangibles, Reliability, Responsiveness, Empathy, and Assurance—measured by four reflective indicators each (20 indicators in total). All items used a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), where higher scores indicate more favorable evaluations. In humanitarian warehousing, the SERVQUAL dimensions were interpreted as follows:

- ❖ Tangibles: visible evidence of readiness (facility condition, equipment adequacy, cleanliness/organization, and supporting systems).
- ❖ Reliability: consistency and accuracy of service delivery (procedural compliance, correct handling, accurate documentation, and on-time processing).
- ❖ Responsiveness: speed and willingness to help (prompt support, rapid issue handling, and timely updates).
- ❖ Empathy: stakeholder-oriented care (respectful communication, attention to constraints, and individualized support when needed).
- ❖ Assurance: competence and credibility (professionalism, safety, integrity, and confidence in staff).

Data Preparation and Descriptive Assessment

Prior to CFA, construct composite scores were computed as the mean of their indicators to summarize stakeholder evaluations for each dimension. Descriptive statistics (mean and standard deviation) were calculated to provide an overview of perceived performance and to identify potential ceiling effects. Internal consistency reliability was evaluated using Cronbach's alpha (α).

SEM-AMOS Analytic Procedure

A covariance-based SEM procedure aligned with AMOS practice was used to validate the measurement model. The analysis proceeded in stages:

1. First-order CFA at the indicator level, specifying five correlated latent factors and mapping each indicator to its intended dimension.
2. Evaluation of model fit using multiple indices: χ^2 and χ^2/df , Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR).
3. Assessment of convergent validity using Composite Reliability (CR) and Average Variance Extracted (AVE).
4. Estimation of a parsimonious second-order model using dimension composites as indicators of a higher-order Service Quality Capability factor. This step provides an interpretable capability-level diagnostic that is more stable in small-sample settings.

Considerations for Small Samples and Ordinal Indicators

Maximum likelihood estimation in CB-SEM assumes multivariate normality and continuous indicators; however, Likert-scale items are ordinal and the sample size is limited. Therefore, fit indices are interpreted cautiously, and greater emphasis is placed on (a) the theoretical coherence of the loading pattern, (b) reliability and convergent validity evidence, and (c) the stability of the higher-order diagnostic model. These considerations are consistent with reporting guidance for CB-SEM in applied research contexts (Hair, J., Hult, G., Ringle, C., & Sarstedt, 2014).

RESEARCH RESULTS

Descriptive Statistics

Construct-level means were uniformly high (4.23–4.35 on a 5-point scale), suggesting that stakeholders evaluate Sibura Warehouse service quality favorably across all five dimensions. Empathy exhibited the highest mean ($M = 4.350$; $SD = 0.463$), indicating particularly strong perceptions of stakeholder-oriented care and communication. Responsiveness showed the lowest mean ($M = 4.230$; $SD = 0.529$), although still high, implying that speed and agility may offer the most room for incremental improvement. Standard deviations were moderate, reflecting some variability in stakeholder experiences that can guide targeted capability development.

Table 1. Mean and Standard Deviation for Each Construct Composite

Construct	Mean	SD
Tangibles	4.245	0.504
Reliability	4.280	0.519
Responsiveness	4.230	0.529
Empathy	4.350	0.463
Assurance	4.275	0.511

Tangibles (M = 4.245; SD = 0.504); Reliability (M = 4.280; SD = 0.519); Responsiveness (M = 4.230; SD = 0.529); Empathy (M = 4.350; SD = 0.463); Assurance (M = 4.275; SD = 0.511).

Table 1 reports descriptive perceptions of service quality. All means are high (≈ 4.23 – 4.35 on a 5-point scale), suggesting stakeholders generally evaluate the warehouse positively. Empathy is the strongest-rated dimension, while Responsiveness is comparatively the lowest, indicating the most room for improvement may be speed and agility in handling requests.

Reliability and convergent validity

Internal consistency reliability was strong for all constructs ($\alpha = 0.769$ – 0.846), meeting conventional thresholds for exploratory-to-confirmatory research and indicating that items within each dimension cohere well. Composite Reliability (CR = 0.785 – 0.856) further supports reliability under a latent-variable perspective. AVE values ranged from 0.487 to 0.599 : three dimensions exceeded the 0.50 benchmark (Tangibles, Responsiveness, Assurance), while Reliability (0.487) and Empathy (0.501 , marginal) are near or above the guideline. Given small-sample constraints and the applied context, the pattern supports convergent validity overall, with Reliability warranting attention to item refinement in future studies.

Table 2. Internal Consistency and Convergent Validity Metrics

Construct	Cronbach's α	CR	AVE
Tangibles	0.812	0.824	0.542
Reliability	0.769	0.785	0.487
Responsiveness	0.846	0.841	0.571
Empathy	0.784	0.800	0.501
Assurance	0.844	0.856	0.599

Table 2 provides measurement quality evidence. Cronbach's alpha and Composite Reliability indicate good internal consistency across all dimensions. AVE values support convergent validity overall, with Reliability slightly below the 0.50 guideline, implying that future studies may refine items within this dimension to strengthen shared variance.

First-Order CFA (Indicator Level)

The five-factor CFA indicated meaningful relationships between indicators and their intended latent constructs, with standardized loadings ranging from 0.489 to 0.867 . Most indicators loaded above 0.60 , suggesting adequate indicator quality. One Reliability indicator (X7) exhibited a lower

loading (0.489), which may reflect item wording ambiguity, context-specific interpretation differences, or restricted variance due to generally high evaluations. Future refinement may consider rewording or replacing this indicator to strengthen convergent validity for Reliability.

Global fit under maximum likelihood was constrained ($\chi^2(160) = 459.75$; $\chi^2/df = 2.87$; CFI = 0.660; TLI = 0.596; RMSEA = 0.196; SRMR = 0.116). In CB-SEM, poor global fit may arise from (a) limited sample size relative to the number of parameters, (b) ordinal indicators treated as continuous, and (c) potential cross-loadings or correlated errors not specified in the model. Because the study's objective is measurement foundation rather than final model optimization, interpretation emphasizes the theoretically consistent loading pattern and strong reliability metrics, while acknowledging that future work should pursue larger samples and robust estimation strategies.

Table 3. Standardized Factor Loadings (First-Order CFA)

Indicator	Construct	Standardized Loading
X1	Tangibles	0.779
X2	Tangibles	0.620
X3	Tangibles	0.800
X4	Tangibles	0.733
X5	Reliability	0.751
X6	Reliability	0.627
X7	Reliability	0.489
X8	Reliability	0.867
X9	Responsiveness	0.815
X10	Responsiveness	0.640
X11	Responsiveness	0.757
X12	Responsiveness	0.798
X13	Empathy	0.763
X14	Empathy	0.695
X15	Empathy	0.633
X16	Empathy	0.735
X17	Assurance	0.826
X18	Assurance	0.796
X19	Assurance	0.763
X20	Assurance	0.704

Source: Data processed by AMOS (2025)

Table 3 shows standardized indicator loadings for the first-order CFA. Most items load moderately to strongly on their intended dimensions, supporting the proposed five-factor structure. One Reliability indicator (X7) has the weakest loading, suggesting it may be a candidate for rewording, replacement, or further validation in a larger sample.

Second-Order Service Quality Capability Model

To operationalize service quality as an integrative marketing management capability, a second-order model was estimated using the five dimension composites as indicators. The higher-order factor loadings were strong (0.832–0.934), supporting the interpretation that Tangibles, Reliability, Responsiveness, Empathy, and Assurance jointly form a coherent overarching capability. Fit was improved for the parsimonious model ($\chi^2(5) = 15.76$; CFI = 0.959; TLI = 0.917), while RMSEA remained elevated (0.210). RMSEA is known to be sensitive when degrees of freedom are small, and therefore should be interpreted with caution in short models. Taken together, the second-order results provide credible evidence that a capability-level index can be used for managerial diagnostics and future structural modeling.

Table 4. Second-Order Loadings (Service Quality Capability → Dimensions)

Dimension	Standardized Loading
Tangibles	0.926
Reliability	0.832
Responsiveness	0.863
Empathy	0.934
Assurance	0.916

Summary of second-order loadings: Tangibles (0.926), Reliability (0.832), Responsiveness (0.863), Empathy (0.934), and Assurance (0.916).

Table 4 presents the second-order model results. All five dimensions load strongly on the higher-order Service Quality Capability factor ($\approx 0.83\text{--}0.93$), indicating that the dimensions move together as an integrated capability. Empathy and Tangibles show the highest contributions, reinforcing the importance of stakeholder-oriented coordination and visible preparedness in humanitarian warehousing.

DISCUSSION

This study advances the view that service quality in humanitarian warehousing is not merely an “after-the-fact” satisfaction outcome but a strategic capability that reflects how marketing management is enacted through operations. The CFA results provide initial measurement support for a SERVQUAL-inspired structure in the Sibura Warehouse context, with generally strong loadings and reliability across dimensions. The second-order model further indicates that the five dimensions can be interpreted as mutually reinforcing components of a broader Service Quality Capability—an integrative resource that stakeholders experience as predictable, competent, and caring service delivery.

The findings also highlight practical and theoretical nuances. First, the consistently high mean scores imply that Sibura Warehouse is evaluated positively by stakeholders, suggesting an existing foundation of trust and service professionalism. At the same time, the lower mean for Responsiveness and the lower loading for one Reliability indicator indicate that “speed under disruption” and “consistency under pressure” may represent the most sensitive capability areas, especially during peak demand or emergency escalation. Second, the

constrained global fit of the full indicator-level CFA is consistent with known limitations of CB-SEM when sample sizes are small and ordinal items are modeled with maximum likelihood. Rather than treating fit indices as definitive evidence against the theory, the results suggest that future research should improve design conditions (larger samples, robust estimators, and potential item refinement) to better capture the measurement structure.

Conceptually, framing service quality as a marketing management capability helps bridge marketing and operations in humanitarian settings. Marketing management becomes the discipline of institutionalizing stakeholder promises into routines: service standards, service recovery, transparent communication, and assurance-building governance. This aligns with calls in the marketing literature to strengthen adaptive and accountable marketing capability systems in turbulent environments (Hoekstra, J. C., & Leeflang, 2023); (Ameen, N., & Tarba, 2025). Moreover, as digital transformation and AI-enabled analytics reshape service systems, humanitarian warehousing may increasingly rely on traceability, forecasting, and intelligent decision support to sustain service quality under volatility (Grewal, D., Saturnino, C. B., Davenport, T., & Guha, 2025); (Gilsaura et al., 2020).

Overall, the study's contribution is a validated measurement foundation and an integrative conceptual logic that can be extended to examine how service quality capability shapes stakeholder trust, collaboration intention, perceived effectiveness, and legitimacy in humanitarian logistics ecosystems.

CONCLUSIONS & RECOMMENDATIONS

Viewing service quality as a capability enables managers to move from ad-hoc improvements to a structured capability-building roadmap. The following actions translate the measurement dimensions into operational and stakeholder-facing initiatives.

1. Build reliability routines ("error-proof consistency")
 - Standardize receiving, put-away, picking, and dispatch procedures through clear SOPs, checklists, and role-based training.
 - Implement simple quality gates (e.g., double-check points for documentation, labeling, and quantities) to reduce downstream errors.
 - Track a small set of reliability KPIs (e.g., inventory record accuracy, order accuracy, on-time processing, damage rate) and review them in short weekly cycles.
2. Strengthen responsiveness capacity ("speed with control")
 - Establish escalation pathways for urgent requests (who decides, within what time, and with what documentation).
 - Use queue visibility (manual boards or digital dashboards) so stakeholders receive predictable updates on request status.
 - Conduct short simulations or drills to practice surge handling, ensuring responsiveness does not compromise safety or documentation quality.
3. Signal assurance and safety ("competence and credibility")
 - Maintain visible compliance artifacts (safety signage, audit schedules, equipment maintenance logs, and staff certification records).

- Communicate process integrity to stakeholders through brief service charters or operating guidelines that clarify lead times, cut-off times, and service recovery steps.
 - Reinforce a “zero tolerance” culture for integrity breaches (e.g., unauthorized access, undocumented movements), which is critical for donor and auditor confidence.
4. Manage tangibles as evidence of preparedness (“visible professionalism”)
- Ensure facility layout, cleanliness, and equipment readiness consistently reinforce stakeholder perceptions of professionalism.
 - Where feasible, invest in low-cost traceability improvements (barcode labels, standardized location coding) that increase transparency and reduce search time.
 - Treat digital artifacts (emails, status updates, documentation clarity) as part of tangibles because they are “visible evidence” of service quality in modern service systems.
5. Institutionalize empathy and relationship governance (“stakeholder-centered coordination”)
- Define communication norms (response-time targets, tone guidelines, and meeting cadence) to reduce misunderstandings across organizations.
 - Encourage frontline staff to practice “constraint awareness,” recognizing that partners may face transport, security, or community constraints that require flexible coordination.
 - Use short feedback loops (post-transaction feedback or periodic stakeholder check-ins) to detect pain points early and prevent trust erosion.
- As a practical diagnostic tool, the five-dimension model can be used for periodic service quality audits: managers can monitor dimension scores over time, relate them to operational KPIs, and prioritize capability development where the gap between expectations and perceptions is largest.

FUTURE RESEARCH

Future research can extend and strengthen this work through several directions:

1. Expand the nomological network. Integrate constructs such as stakeholder trust, relationship quality, collaboration intention, perceived operational effectiveness, and legitimacy, and test mediation pathways (e.g., service quality capability → trust → collaboration/effectiveness).
2. Improve estimation and data design. Collect larger samples across multiple warehouses and apply estimators more appropriate for ordinal data (e.g., robust approaches) to obtain more stable fit and standard errors.
3. Validate discriminant validity and invariance. Assess discriminant validity between the five dimensions and test measurement invariance across stakeholder groups (donors vs. implementing partners; internal vs. external users) and across time (pre-crisis vs. crisis response periods).
4. Incorporate objective operational performance. Link perception-based capability measures to operational indicators (lead time, accuracy, damage rates, capacity utilization) and examine whether the “perception-

performance” relationship is strengthened by transparency and communication.

5. Explore boundary conditions and capability configurations. Examine how digital traceability, staffing levels, governance structures, and risk exposure moderate service quality effects, and whether certain dimension configurations (e.g., high assurance + high responsiveness) are especially critical under emergency surge conditions.
6. Use mixed methods for richer explanation. Qualitative interviews and process tracing can clarify why particular indicators underperform (e.g., a low-loading reliability item) and can identify context-specific dimensions (e.g., equity/fairness or accountability) that may complement SERVQUAL in humanitarian settings.

Together, these directions can develop a robust theory and measurement platform for understanding humanitarian warehousing as a service system where marketing management capability and operational excellence jointly shape stakeholder trust and humanitarian impact.

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