

THE METAVERSE TECHNOLOGY AND CUSTOMER SERVICE MANAGEMENT: A PRISMA-INFORMED FOCUSED REVIEW AND CONCEPTUAL RESEARCH FRAMEWORK**Kishore Mahamunkar, Dr. Sajid Alvi and Dr. Manisha Jagtap**

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*Corresponding Author: Kishore Mahamunkar***ABSTRACT**

The rapid evolution of immersive digital environments has generated significant academic and industrial interest in the metaverse. While prior work has examined the metaverse in marketing, gaming and digital commerce, its implications for customer service management remain under-theorised and empirically thin. This paper presents a PRISMA-informed focused review of ten core studies, deliberately curated for their theoretical, methodological and managerial relevance to immersive, AI-mediated customer service. The synthesis identifies seven cross-cutting themes — immersive experience and presence, customer engagement and co-creation, service quality, AI-mediated interaction, trust and privacy, interoperability and governance, and organisational readiness — and maps them to six research objectives. Building on SERVQUAL and service-dominant logic, the study advances an AISAQUAL (Artificial Intelligence Service Agent service QUALity)-anchored conceptual framework linking immersive service environments to customer satisfaction and strategic service outcomes. The review confirms a persistent gap in the empirical evaluation of metaverse-enabled service systems and offers a structured, testable foundation for subsequent fieldwork.

Keywords: *Metaverse; Customer Service Management; Service Quality; Immersive Technologies; Augmented Reality; Virtual Reality; AISAQUAL.*

1. INTRODUCTION

Digital transformation has reshaped how organisations interact with their customers. Advances in virtual reality (VR), augmented reality (AR), artificial intelligence (AI) and spatial computing have converged into the metaverse — a persistent, immersive digital environment in which users interact through avatars across linked virtual worlds. The idea is not new: Dionisio, Burns and Gilbert (2013) surveyed 3D virtual worlds a decade ago and anticipated the technical trajectory — realism, ubiquity, interoperability and scalability — that a mature metaverse would require. Originally associated with gaming and entertainment, the metaverse is increasingly explored as a platform for virtual commerce, product visualisation, collaboration and immersive customer engagement.

Customer service management is central to satisfaction and long-term organisational performance. Traditional channels — call centres, email and web chat — often lack experiential depth. As expectations shift toward personalised, interactive experiences, immersive technologies present a potential means of enhancing service delivery. Within three-dimensional virtual spaces, customers and service representatives can visualise products and processes in real time, supporting collaborative diagnosis and faster resolution.

Despite this promise, existing research concentrates on marketing engagement and technological infrastructure rather than service-management processes. Consequently, there is limited understanding of how immersive technologies influence service-performance outcomes such as responsiveness, reliability and satisfaction. This paper addresses that gap through a structured review organised around the following objectives.

Objective	Description
O1	To conceptualise the role of metaverse and immersive technologies in customer service management.
O2	To identify the constructs that shape customer experience within immersive, AI-mediated service environments.
O3	To examine accessibility, presence and cross-platform continuity in metaverse-based service delivery.
O4	To assess the influence of trust, privacy and security on adoption of metaverse-enabled customer service.
O5	To evaluate organisational readiness and operational efficiency for immersive service deployment.

Objective	Description
O6	To surface data-governance, ethical and interoperability requirements for responsible metaverse service design.

Table 1. Research objectives (O1–O6) guiding the review.

2. REVIEW METHODOLOGY

This study is a PRISMA-informed focused review. It draws on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol to structure identification, screening and eligibility transparently, but it departs from a full systematic review in one deliberate respect: rather than synthesising every record that passes eligibility, it curates a focused core set of ten studies. This design is appropriate to an emerging, fast-moving field in which deep, theoretically anchored synthesis is more informative than exhaustive breadth, and it is reported here transparently so that reviewers can distinguish the approach from a full PRISMA meta-synthesis.

2.1 Search Strategy and Selection

Databases: Scopus, Web of Science and Google Scholar. **Search string:** (“metaverse” OR “immersive” OR “virtual reality” OR “extended reality”) AND (“customer service” OR “service quality” OR “customer experience”). **Date range:** articles published between January 2013 and May 2026 were considered, a window that spans early conceptual treatments of 3D virtual worlds through to the most recent immersive-service scholarship. The screening and selection process is summarised below.

PRISMA Stage	Outcome
Identification	Records identified through Scopus, Web of Science and Google Scholar using the search string above. Initial pool: 312 records.
Screening	After removing duplicates (n = 71) and screening titles and abstracts, 241 records were reviewed and 198 were excluded as off-topic (pure gaming, hardware engineering, or non-service marketing).
Eligibility	43 full-text articles assessed against inclusion criteria. Excluded: studies with no service-management linkage, non-English texts, and papers lacking a usable construct or instrument.
Core synthesis set	10 core studies retained for in-depth synthesis, selected from the 43 eligible using three explicit curation criteria (see below): theoretical anchoring, construct validation, and direct relevance to AI-mediated customer service.

Table 2. PRISMA-informed selection flow for the core synthesis set.

Curation of the core set (43 → 10). Because this is a focused rather than exhaustive review, the narrowing from 43 eligible articles to 10 was governed by three stated criteria, applied in order of priority: (i) theoretical anchoring — the study supplies a foundational lens or instrument (for example SERVQUAL or service-dominant logic); (ii) construct validation — the study develops or empirically validates an immersive-service construct or scale (for example MVCX or XR customer experience); and (iii) direct relevance — the study addresses AI-mediated or immersive customer service specifically, rather than immersive technology in general. Where several candidate studies were substitutable on the same theme, the most recent and most highly cited was retained. This procedure is transparent and repeatable, though it is not equivalent to full PRISMA meta-synthesis of all eligible records.

2.2 Inclusion and Exclusion Criteria

- **Included:** peer-reviewed studies (and one authoritative standards source) linking immersive/metaverse technology to service quality, customer experience or service management; English language; offering a usable construct, scale or theoretical lens.
- **Excluded:** pure gaming or hardware-engineering studies, non-service marketing, and works without a service-management linkage.

2.3 Data Extraction and Quality Consideration

Each study was coded for author and year, focus, method, key finding and the research gap addressed, with explicit mapping to objectives O1–O6. The resulting extraction matrix (Table 3) constitutes the evidentiary base for the thematic synthesis in Section 3.

In keeping with a focused review, the methodological standing of each source was considered qualitatively rather than through a formal risk-of-bias instrument. Nine of the ten sources are peer-reviewed journal articles or book chapters drawn from established outlets in services marketing, information management and consumer research; the tenth is an authoritative industry standards document (the Metaverse Standards Forum Web of Worlds white paper), included as grey literature for its unique coverage of interoperability and consent-based identity and flagged as such. Empirical sources were preferred where a validated construct or instrument was available. A full quality appraisal using an instrument such as CASP or MMAT is identified as a step for the fuller systematic review that will precede the empirical phase.

3. FINDINGS AND THEMATIC SYNTHESIS

3.1 Data Extraction Matrix

Table 3 presents the ten core studies. The set spans foundational instruments (SERVQUAL), theoretical lenses (service-dominant logic), validated immersive-service constructs (MVCX, XR-CX), empirical evidence on AI-mediated encounters, and the infrastructural conditions for cross-platform service.

#	Author (Year) / Source	Focus / Theme	Method	Key Finding	Gap (Objective)
1	Metaverse Standards Forum — Web of Worlds WG (2026), White Paper	Open, interoperable architecture for linked virtual worlds; portable identity and data	Conceptual / standards white paper (grey literature)	An open metaverse needs linkable worlds via a common API plus a User Manifest / wallet giving consent-based control of shared data, reusing standard 3D assets (USD / glTF / X3D)	Interoperability and data-consent layer (O3, O4, O6)
2	Kour, Karim, Venkatesh & Kumar (2025)	Metaverse technology in industrial contexts; human-system interaction	PRISMA review (48 papers, 2021–24) + UX validation (n = 25)	AI (chatbots, NLP, speech) is critical for engagement; UX shows high satisfaction but low learnability; adoption blocked by interoperability, data security and hardware cost	Human-centric framework; thin AI–metaverse integration (O4, O5)
3	Dwivedi, Hughes, Baabdullah et al. (2022) — Int. J. Information Management	“Metaverse beyond the hype”; cross-disciplinary challenges and agenda	Multidisciplinary expert commentary	Maps metaverse impact across marketing, retail, education and health; names trust, privacy, governance and well-being as binding constraints	Trust and privacy as first-order service-design constraints (O4, O6)
4	Buhalis, Lin & Leung (2023) — Int. J. Contemporary Hospitality Management	Metaverse as a driver of customer experience and value co-creation	Conceptual framework	Immersive presence, avatars and interactivity let firms and customers co-create experiential value, reshaping the service encounter	Frames metaverse as a service-experience environment, not just a channel (O2, O3)
5	Gadalla, Keeling & Abosag (2016)	Service-dominant (S-	Conceptual model	Virtual experience varies by interaction	Supplies the S-D logic lens

#	Author (Year) / Source	Focus / Theme	Method	Key Finding	Gap (Objective)
	— Handbook on 3D3C Platforms (Springer)	D) logic applied to the virtual experience economy	development	type and context; classic experience-economy logic needs modification for virtual settings	for value co-creation (theory anchor)
6	Parasuraman, Zeithaml & Berry (1988) — Journal of Retailing	SERVQUAL — multi-item scale for perceived service quality	Scale development and validation (empirical)	Five dimensions — tangibles, reliability, responsiveness, assurance, empathy — modelled as the gap between expectation and perception	Measurement instrument the study adapts to immersive service quality (instrument anchor)
7	Gleim et al. (2024) — Journal of Business Research	Customer experience in the metaverse retail revolution	Systematic review (Theories—Contexts—Methods); nomological network	Builds an antecedents—moderators—mediators—outcomes framework; presence, interactivity and personalisation emerge as dominant CX drivers	Consolidates fragmented immersive-service CX evidence into a testable framework (O1, O2)
8	Rahman, Chowdhury, Bowden & Carlson (2025) — J. Retailing & Consumer Services	Metaverse customer experience (MVCX) — attribute identification and measurement	Multi-phase: PRISMA review + survey + EFA / CFA scale validation	Develops and validates an MVCX scale that predicts key customer outcomes and isolates the platform attributes users value most	Moves MVCX from a conceptual idea to a measurable construct (O2, O5)
9	Ranieri, Di Bernardo & Mele (2024) — J. Service Theory & Practice	Chatbots in the digital service encounter; bright and dark sides of CX	Discourse analysis of 7,167 customer–chatbot conversations over two years	Seven CX themes incl. interaction quality, digital trust and journey completion; AI-mediated outcomes can be positive or negative	Empirically grounds AI-mediated service effects, including digital trust (O4)
10	Dastane, Aggarwal, Jha & Aw (2025) — Journal of Services Marketing	Customer service experience in extended reality (XR)	Multi-method: PRISMA SLR + bibliometrics (892 Scopus papers)	Integrated CX-in-XR model across six customer-journey stages; clusters incl. value co-creation, AI trust and interactivity	Maps XR service-CX antecedents and consequences; sets future agenda (O1, O2)

Table 3. Core synthesis matrix of the ten reviewed studies.

3.2 Cross-Cutting Themes

Synthesising across the matrix yields seven themes that recur throughout the literature. Each is mapped to the objectives it informs and, where relevant, to the wider evidence base.

Theme	Synthesis	Objectives
Immersive Experience & Presence	Telepresence, avatars and interactivity create psychological immersion that reshapes the service encounter; the affective quality of immersion is now recognised as a distinct experiential driver (Buhalis et al., 2023; Gleim et al., 2024; Flavián et al., 2019).	O1, O3
Customer Engagement & Co-creation	Service-dominant logic positions customers as active co-creators of value in virtual settings (Gadalla et al., 2016; Buhalis et al., 2023).	O2
Service Quality (AISAQUAL)	SERVQUAL's five dimensions are extended to AI- and immersion-specific qualities, forming the study's measurement backbone (Parasuraman et al., 1988; Rahman et al., 2025).	O2, O5
AI-Mediated Interaction	Chatbots, NLP and intelligent agents drive engagement but produce both positive and negative service outcomes (Ranieri et al., 2024; Kour et al., 2025).	O2, O4
Trust, Privacy & Security	Trust and consent-based data handling are first-order constraints on adoption, not afterthoughts; trust is also shaped by how users perceive and actualise the affordances of the environment (Dwivedi et al., 2022; Shin, 2022; MSF Web of Worlds, 2026).	O4, O6
Interoperability & Governance	Open architecture, identity portability and standard assets underpin cross-platform service continuity (MSF Web of Worlds, 2026; Dastane et al., 2025).	O3, O6
Organisational Readiness	Infrastructure, skills and leadership commitment determine whether immersive service can be operationalised (Dwivedi et al., 2022; Kour et al., 2025).	O5

Table 4. Cross-cutting themes mapped to research objectives.

4. PROPOSED CONCEPTUAL FRAMEWORK

Integrating the seven themes, the study proposes a conceptual framework anchored in AISAQUAL — an AI- and immersion-extended adaptation of SERVQUAL. The framework treats immersive service environments as the antecedent layer, a set of service-quality and experiential constructs as the mediating layer, and customer satisfaction leading to strategic service outcomes as the consequent layer.

Antecedents → Mediating Constructs → Outcomes

- **Antecedents (immersive environment):** immersive experience and presence; AI-mediated interaction; interoperability and accessibility.
- **Mediating constructs:** service quality (AISAQUAL dimensions); customer engagement and co-creation; trust, privacy and security; organisational readiness.
- **Outcomes:** customer satisfaction, leading to competitive advantage and customer retention.

The framework is intentionally testable: the AISAQUAL dimensions provide the measurement instrument, the antecedents provide manipulable design variables, and the outcomes provide the dependent measures for the empirical phase of the doctoral programme. Figure 1 depicts these three layers and their hypothesised paths.

A Conceptual Framework for Metaverse Impact on Customer Service Management (CSM)

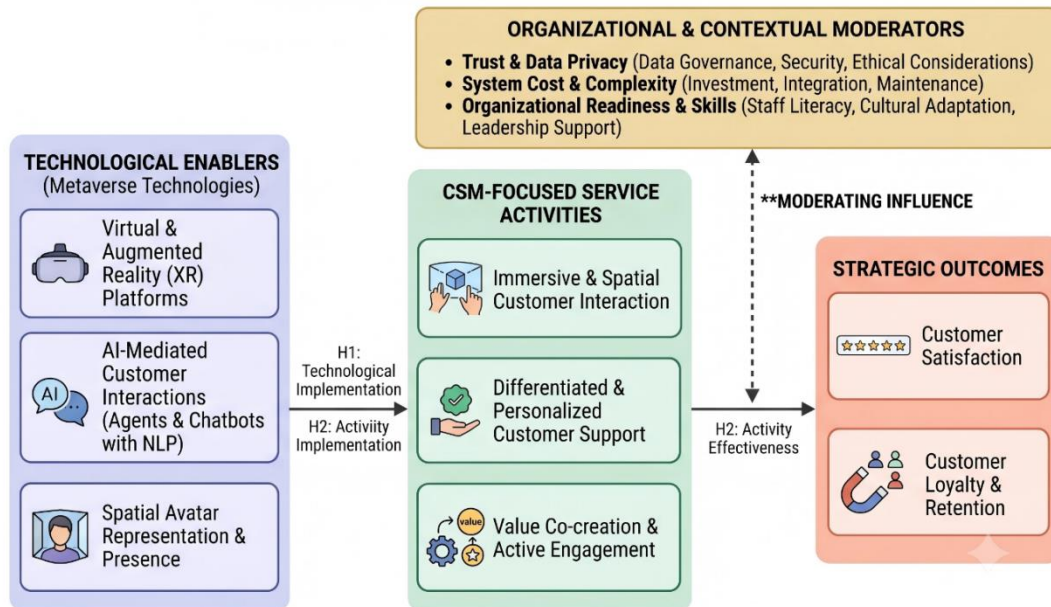


Figure 1. Conceptual framework of metaverse-enabled customer service (AISAQUAL-anchored).

5. DISCUSSION

The synthesis indicates that immersive technologies can transform traditional service systems into interactive digital environments in which customers and representatives visualise complex products, simulate processes and collaborate on resolution in real time. These capabilities may improve efficiency and satisfaction — for example, by allowing customers to interact with virtual product models during troubleshooting, reducing diagnostic time.

These findings can be read through the lens of the experience economy. Pine and Gilmore (1999) argued that value increasingly derives from staged, memorable experiences rather than goods or services alone; the metaverse extends this logic into a fully immersive register, where the service encounter itself becomes an experiential product. Gadalla et al. (2016) show, however, that the classic experience-economy model must be modified for virtual settings, because interaction type and context alter how value is created. Flavián et al. (2019) sharpen this further by distinguishing how virtual, augmented and mixed reality each shape the customer experience differently — a distinction directly relevant to service design, since the appropriate immersive modality depends on the service task.

Several constraints temper this promise. Trust, privacy and data-governance concerns emerge consistently as first-order design constraints rather than peripheral risks; the standards literature shows that interoperability and consent-based identity are infrastructural pre-conditions for cross-platform service continuity. Trust is not only a matter of data handling but of perception: Shin (2022) argues that users must actualise the affordances of an immersive environment for it to be experienced as trustworthy and usable, which implies that service designers must make immersive affordances legible, not merely available. Evidence on AI-mediated encounters is double-edged: chatbots and intelligent agents can both elevate and degrade experience depending on interaction quality and digital trust (Ranieri et al., 2024). Finally, organisational readiness — infrastructure, skills and leadership commitment — conditions whether any of this can be operationalised.

Taken together, the discussion suggests that the metaverse does not merely add a channel to customer service; it changes the nature of the service encounter, raising the experiential ceiling while introducing new trust, governance and readiness conditions that determine whether that ceiling is reached. This tension between demonstrated potential and enabling conditions is the central issue the proposed framework is designed to test.

6. RESEARCH GAPS AND FUTURE DIRECTIONS

1. **Empirical scarcity:** few studies quantify the operational or financial impact of metaverse-enabled service systems on responsiveness, reliability and satisfaction.

2. **Instrument development:** AISAQUAL requires validation as an immersion- and AI-specific service-quality scale beyond its SERVQUAL and MVCX origins.
3. **Cross-platform service:** the interoperability and data-consent layer is theorised but rarely tested against real service journeys.
4. **Context breadth:** most evidence is drawn from retail and hospitality; industrial and public-service contexts are under-represented.
5. **Methodological maturation:** this focused review should be extended into a full systematic review with formal quality appraisal (CASP / MMAT) before the empirical phase, to consolidate the evidence base and satisfy higher-tier reporting standards.

These gaps motivate the next phase of this doctoral research: pilot validation of the AISAQUAL-based instrument, followed by full-scale data collection and structural analysis (regression / SEM) across fashion, retail and consumer-product sectors.

7. CONCLUSION

This focused review consolidates a high-relevance evidence base on the relationship between metaverse technology and customer service management. The findings suggest that immersive technologies can enhance engagement, service interaction and operational efficiency, while trust, privacy, interoperability and organisational readiness govern whether that potential is realised. The proposed AISAQUAL-anchored framework offers a structured and testable foundation for empirical work, positioning the subsequent phases of this research to measure — rather than merely assert — the service impact of the metaverse.

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