BIBLIOMETRIC ANALYSIS IV

Editors

Prof. Dr. Murat DAL

Lecturer İlhami AY

Bibliometric Analysis IV

Editors

Prof. Dr. Murat DAL
Lecturer İlhami AY

© Copyright 2025

GENERAL DISTRIBUTION

Akademisyen Kitabevi AŞ

PREFACE

Based in Ankara in Turkey, the independent academic publisher, Akademisyen Publishing House, has been publishing books for almost 30 years. As the directors of Akademisyen Publishing House, we are proud to publish more than 3800 books across disciplines so far, especially in Health Sciences. We also publish books in Social Sciences, Educational Sciences, Physical Sciences, and also books on cultural and artistic topics.

Akademisyen Publishing House has recently commenced the process of publishing books in the international arena with the "Scientific Research Book" series in Turkish and English. The publication process of the books, which is expected to take place in March and September every year, will continue with thematic subtitles across disciplines

The books, which are considered as permanent documents of scientific and intellectual studies, are the witnesses of hundreds of years as an information recording platform. As Akademisyen Publishing House, we are strongly committed to working with a professional team. We understand the expectations of the authors, and we tailor our publishing services to meet their needs. We promise each author for the widest distribution of the books that we publish.

We thank all of the authors with whom we collaborated to publish their books across disciplines.

Akademisyen Publishing House Inc.

CONTENTS

AUTHORS

**Authors are listed according to their surnames

Beyza Nur AKBAL
Master Student, Department of Interior
Architecture, Interior Architecture Master's
Program, Institute of Graduate Education,
Fatih Sultan Mehmet Vakıf Universitesi

Assoc. Prof. Özge AKÇAY
Munzur University, Department of Computer
Engineering

Phd Mehtap BAYSAL ARTIK
Independent researcher

Lecturer İlhami AY
Ph.D. Hakkari University

Scientist Barış BEKLER
Independent Researcher

Scientist Sema BEKLER
Independent Researcher

Assist. Prof. Dr. Emine Banu BURKUT
Fatih Sultan Mehmet Vakıf University,
Department of Interior Architecture, Faculty

of Art, Design and Architecture

Prof. Dr. Murat DAL
Munzur University

**Assoc.Prof.Dr. İbrahim Halil
EFENDİOĞLU**
Gaziantep University, Faculty of Economics
and Administrative Sciences, Department of
Business Administration

Ress. Assist., Volkan ETEMAN
Munzur University, Faculty of Economics and
Administrative Sciences

Dr. Sümeyye GÖKÇENOĞLU
Erzurum Technical University

Assist. Prof. Dr. Nazende YILMAZ
Fatih Sultan Mehmet Vakıf University,
Department of Interior Architecture, Faculty
of Art, Design and Architecture

Chapter 4

METAVERSE MARKETING AND CONSUMER DYNAMICS: A NEW ERA OF VIRTUAL INTERACTION

İbrahim Halil EFENDİOĞLU[1]

INTRODUCTION

The rapid convergence of physical and digital realities has given rise to the metaverse, a three-dimensional, immersive virtual space where individuals engage and interact through avatars using extended reality (XR) technologies such as virtual reality (VR) and augmented reality (AR) (Mystakidis, 2022). Within this context, the metaverse is increasingly recognized as a socio-technological ecosystem that transforms how users communicate, consume, and experience brands. This transformation has opened new frontiers for marketers, enabling the creation of interactive and immersive brand experiences that blend physical and virtual touchpoints (Dwivedi et al., 2023). As a result, metaverse marketing has emerged as a critical domain where companies experiment with novel ways to engage consumers through digital embodiment, gamification, and virtual co-creation.

Despite its growing commercial and academic relevance, the field of metaverse marketing remains in its formative stage. The research output on this topic has expanded rapidly in recent years, reflecting growing scholarly interest in understanding how consumers behave, interact, and form attachments in virtual spaces (Gao, Chong, & Bao, 2024). However, given the multidimensional and interdisciplinary nature of the metaverse, spanning marketing, technology, psychology, and human-computer interaction, there is a pressing need to map and synthesize the existing body of research systematically. Bibliometric analysis serves this purpose effectively by quantifying publication trends, identifying

[1] Assoc.Prof.Dr., Gaziantep University, Faculty of Economics and Administrative Sciences, Department of Business Administration, efendioglu@gantep.edu.tr, ORCID iD: 0000-0002-4968-375X

influential authors, institutions, and countries, and revealing the conceptual and intellectual structures shaping the field (Linnenluecke, Marrone, & Singh, 2020).

Conducting a bibliometric analysis of metaverse marketing provides several key contributions. First, it helps identify research gaps and potential areas for future exploration, ensuring that theoretical and empirical advancements occur in a structured manner (Passas, 2024). Second, it facilitates the recognition of leading researchers, most-cited works, and dominant keywords, offering insights into how the discourse around metaverse and consumer behavior has evolved. Third, such an analysis enables scholars to track emerging trends and thematic developments, highlighting which dimensions, such as virtual brand experience, NFTs, and consumer engagement, are gaining momentum (Alsharif et al., 2020). Finally, this approach provides a strategic knowledge map that supports both researchers and practitioners in understanding the dynamics of this rapidly evolving digital marketplace.

The aim of the present study is therefore to examine academic publications on metaverse marketing and consumers through a comprehensive bibliometric analysis using data from the Web of Science (WoS) database and the Bibliometrix R package. By analyzing publication patterns, citation structures, and thematic clusters from 2010 to 2024, this study seeks to uncover the intellectual foundations, key contributors, and emerging research streams that define the evolution of metaverse marketing scholarship. In doing so, it addresses three overarching research questions:

RQ1: What are the publication and citation trends shaping the development of metaverse marketing research?

RQ2: Who are the most influential authors, institutions, journals, and countries contributing to this domain?

RQ3: What are the main thematic areas, co-citation structures, and future research directions emerging from the literature?

Through this structured approach, the study contributes to conceptual clarity and knowledge systematization in the emerging field of metaverse marketing. It offers both an academic and a managerial roadmap that clarifies how marketing strategies, consumer engagement, and technological innovation converge in virtual environments. By

highlighting the global, interdisciplinary, and collaborative nature of this research domain, the findings not only enhance theoretical understanding but also inform practitioners on how immersive virtual environments can reshape consumer behavior and brand interactions in the coming digital era.

Literature Review

Conceptual Development of Metaverse Marketing

The metaverse represents a three-dimensional, immersive digital ecosystem that merges physical and virtual realities, enabling social, economic, and experiential interactions through avatars and extended-reality (XR) technologies such as VR and AR (Mystakidis, 2022; Zhao et al., 2022). Its evolution has generated a parallel digital economy in which brands, consumers, and institutions coexist and transact (Hollensen, Kotler, & Opresnik, 2022). As global investments by firms like Meta, Microsoft, and Decentraland indicate, the metaverse is positioned as a new marketing universe that extends beyond conventional digital channels, forming a multisensory arena for branding and commerce (Efendioğlu, 2023).

Marketing within the metaverse entails interactive, experiential, and co-creative consumer–brand relationships (Dwivedi et al., 2023). Scholars have positioned metaverse marketing as an intersection of digital transformation, consumer psychology, and immersive technology, emphasizing its potential to redefine consumer engagement and strategic communication (Cheah & Shimul, 2023). Bilgihan, Leong, Okumus, and Bai (2024) further advanced this discussion with a Metaverse Engagement Model (MEM), underscoring how immersive presence and sensory interaction strengthen emotional bonds and brand loyalty.

Consumer Behavior and Information Adoption

Consumer behavior in the metaverse diverges from traditional digital contexts due to the fusion of information, identity, and sensory experience. Shen et al. (2021) found that presence, interactivity, and enjoyment are primary antecedents of purchase intention in virtual commerce, supporting the Information Adoption Model (IAM), which posits that argument quality and source credibility shape behavioral intention (Sussman & Siegel, 2003). Efendioğlu (2023) extended IAM to the metaverse context,

demonstrating that source credibility and argument quality significantly enhance consumers' purchase intentions, whereas perceived risk negatively affects them. These findings reveal that consumers' decision-making in immersive environments depends strongly on information trustworthiness and risk evaluation, echoing earlier work on e-WOM and online purchase intentions (Cheung, Lee, & Rabjohn, 2008; Erkan & Evans, 2016).

Subsequent studies confirmed these behavioral mechanisms across various metaverse domains. For example, Zhang, Anjum, and Wang (2023) identified trust-building mechanisms, including authenticity cues and age-based moderations, as critical to purchase intention in metaverse shopping. Similarly, Azmi et al. (2023) showed that a virtual atmosphere and enjoyment drive satisfaction and purchasing behavior in metaverse real estate environments. Collectively, these studies highlight that information quality, trust, and emotional engagement form the cognitive–affective foundations of metaverse consumer behavior.

Brand Experience, Engagement, and Loyalty

The immersive nature of the metaverse allows for multisensory brand experiences that blend entertainment, identity, and co-creation. Catherine et al. (2024) and Arya et al. (2024) demonstrated that XR-based gamified marketing enhances consumer-based brand equity (CBBE) by creating interactive narratives and emotional resonance. Similarly, Rather (2023) and Bilgihan et al. (2024) reported that immersive storytelling and personalized experiences foster deeper engagement and loyalty, effectively transforming customers into active participants within brand communities.

Efendioğlu (2023) also emphasized that argument quality and source credibility serve as cognitive antecedents to brand engagement, aligning with the Elaboration Likelihood Model (Petty & Cacioppo, 1986), which posits that persuasive informational cues guide attitude formation. These insights converge on the notion that metaverse marketing transcends transactional promotion, becoming an experiential ecosystem centered on trust, emotional attachment, and participatory engagement.

NFTs, Virtual Assets, and New Business Models

The tokenization of virtual goods through non-fungible tokens (NFTs) has redefined ownership, authenticity, and value creation. Sung, Kwon, and Sohn (2023) illustrated how blockchain-verified NFTs enhance luxury

brand marketing by granting consumers symbolic status and digital self-expression. Periyasami and Periyasamy (2022) similarly discussed how fashion brands leverage NFTs and virtual stores to establish platform-based business models, generating both financial and reputational capital.

From a strategic standpoint, this digital transformation echoes the findings of Vidal-Tomás (2022) and Rauschnabel et al. (2022), who observed that metaverse-linked tokens and immersive commerce represent a new wave of digital asset monetization. As Efendioğlu (2023) notes, such models require consumers to assess risk, argument quality, and source trustworthiness before engaging in virtual investment or purchase, underscoring the interplay between technological innovation and behavioral intention.

Community Building and Social Interaction

The metaverse facilitates collective brand engagement through social presence and community co-creation. Rane, Choudhary, and Rane (2023) observed that virtual communities cultivate loyalty by enabling collaborative experiences and social interaction. Patil, Bharathi, and Pramod (2022) further demonstrated that hedonic and social gratifications mediate youth consumers' purchase intentions within retail metaverse environments. Similarly, Hollensen et al. (2022) argued that metaverse marketing will evolve toward community-based brand ecosystems, where users' avatars embody social identities and extend consumer loyalty into shared digital spaces.

Theoretical Integration and Research Gaps

Despite growing scholarly attention, metaverse marketing remains conceptually fragmented across technological, psychological, and managerial dimensions (Gao, Chong, & Bao, 2024). The existing literature underscores the need for theoretical integration combining Information Adoption Model (IAM), Technology Acceptance Model (TAM) (Davis, 1989), and Elaboration Likelihood Model (ELM) frameworks to better capture how consumers process information and make purchase decisions in immersive contexts (Efendioğlu, 2023; Sussman & Siegal, 2003).

Bibliometric analyses (Donthu et al., 2021; Linnenluecke, Marrone, & Singh, 2020; Passas, 2024) show that research clusters predominantly revolve around consumer trust, virtual experience, NFTs, and cross-cultural engagement, yet gaps remain regarding ethical concerns, privacy,

and cultural variability. Future work should address these gaps through cross-disciplinary and cross-cultural designs, integrating psychological constructs (risk perception, authenticity, enjoyment) with strategic marketing outcomes (brand equity, community engagement, innovation adoption).

Methodology

Research Design

This study adopts a bibliometric research design, which systematically quantifies and maps the scientific production within a defined knowledge domain (Donthu et al., 2021; Linnenluecke, Marrone, & Singh, 2020). The goal is to identify publication trends, influential authors, core journals, institutional collaborations, and thematic clusters shaping the field of metaverse marketing and consumer research. The bibliometric approach enables an objective assessment of the structure, development, and intellectual foundations of the literature, revealing how the topic has evolved and where new research frontiers are emerging.

To complement previous conceptual works (Dwivedi et al., 2023; Bilgihan et al., 2024), the current analysis uses the RStudio environment with the Bibliometrix and Biblioshiny interfaces, enabling advanced visualization and quantitative mapping of the dataset.

Data Source and Search Strategy

The bibliographic data were collected from the Web of Science (WoS) Core Collection, given its comprehensiveness and reliability for high-quality academic indexing (Donthu et al., 2021). The search was conducted in October 2024, covering the timespan 2010–2024, to include the earliest conceptual discussions of virtual worlds and the recent proliferation of metaverse-related marketing studies.

The following Boolean search query was applied:

TS = ("metaverse" OR "virtual reality" OR "extended reality" OR "XR") AND ("marketing" OR "consumer" OR "brand experience" OR "purchase intention")

This query ensured inclusion of studies addressing metaverse-driven marketing, consumer behavior, brand experience, or purchase intention within virtual ecosystems. The initial search yielded 118 records, which

were filtered to 103 peer-reviewed journal articles and conference papers after excluding non-English and non-marketing publications.

All records were downloaded in BibTeX format, containing full metadata (authors, titles, abstracts, keywords, sources, and references), and subsequently imported into R Studio for bibliometric analysis.

Data Cleaning and Preparation

Before analysis, we implemented a structured normalization workflow to maximize reliability and comparability across records. Author identities were disambiguated by merging spelling variants and initials (e.g., "Dwivedi, Y. K." with "Dwivedi, Yogesh K."), using DOIs, ORCIDs (when available), and co-authorship patterns to resolve homonyms. Source titles were standardized to canonical forms (e.g., "Journal of Business Research" vs. "J Bus Res"), with Unicode and punctuation harmonization. A significant part of our data cleaning process involved the removal of duplicates and incomplete entries (missing title/author/DOI), ensuring the highest data quality. We also consolidated "early access" with final versions where metadata matched. Affiliation strings were cleaned to unify institutional variants (campus/department spellings). Keywords were harmonized via lowercasing, de-hyphenation, stemming/lemmatization, and synonym mapping so that semantically identical terms converged (e.g., "metaverse marketing," "metaverse-marketing," "marketing in metaverse"). Common stopwords were removed; domain-relevant multi-word expressions (e.g., "virtual brand experience," "purchase intention") were preserved as bigrams. This end-to-end cleaning ensured accurate counts for authors, institutions, and sources, and improved the fidelity of co-word, co-citation, and collaboration network analyses.

Bibliometric Indicators and Analytical Procedures

Aligned with established guidance for science-mapping (Donthu et al., 2021) and workflow checklists for bibliometric studies (Passas, 2024), we computed a comprehensive set of indicators covering production, impact, structure, and themes. Descriptively, we quantified annual scientific output, total and mean citations, and concentration of contributions across authors, institutions, countries, and sources, and applied Bradford's Law to delineate the journal core. At the source/author level, we identified the most relevant outlets (e.g., Psychology & Marketing, Journal of Business Research, Journal of Consumer Behaviour) and calculated

impact/productivity metrics (h-index, g-index, fractionalized counts), while assessing author productivity distributions via Lotka's Law. To uncover the intellectual structure, we generated co-citation networks for authors and references (Small, 1973) and mapped collaboration networks at the author and country levels to characterize international co-authorship patterns. We produced a historiography to trace the chronology of knowledge flows and key turning points. Conceptually, we performed co-word analysis using both Authors' Keywords and Keywords Plus, and detected clusters with the Louvain algorithm; the resulting themes consistently grouped around (i) consumer behavior and purchase intention, (ii) virtual brand experience and loyalty, (iii) NFTs and blockchain-based marketing, and (iv) community engagement and immersive storytelling. We then triangulated these clusters against prior conceptual syntheses (Dwivedi et al., 2023; Gao et al., 2024) to ensure convergence between quantitative structures and theoretically coherent topic boundaries.

Visualization and Mapping Techniques

To maximize interpretability and ensure transparent science-mapping, we employed a suite of visual analytics within the Bibliometrix/Biblioshiny environment in R. Temporal dynamics were depicted with line graphs for annual production and citation trajectories (2010–2024), while Bradford and Lotka distributions summarized core-journal concentration and author productivity laws. A country collaboration map illustrates the global co-authorship structure, particularly the ties among the USA, UK, China, India, and South Korea, complemented by co-citation networks (authors/sources) and keyword co-occurrence maps that expose the field's intellectual foundations and thematic interconnections. Historiograph plots traced knowledge evolution and turning points, highlighting seminal contributions (e.g., Dwivedi et al., 2023; Gao et al., 2024) and their downstream influence. All figures were generated via Bibliometrix R functions with documented parameters, facilitating reproducibility and future extension.

Integration with Theoretical Context

This bibliometric design aligns methodologically with Efendioğlu (2023), who examined information quality, source credibility, and perceived risk within metaverse consumer behavior frameworks. The current study extends this line of research from a micro-level experimental to a macro-level bibliometric perspective systematically mapping how

these constructs are discussed across the global scholarly discourse. This integrative approach situates the present analysis as both exploratory and confirmatory, bridging individual behavioral models (IAM, ELM, TAM) with the broader research structure in metaverse marketing.

Findings

Annual Scientific Production

The corpus comprises 103 publications on metaverse marketing and consumer behavior over 2010–2024. Annual counts are 2010 = 1, 2011–2021 = 0, 2022 = 10, 2023 = 31, and 2024 = 61 (Figure 1). Thus, 99.0% of documents were published after 2021; 2024 alone accounts for 59.2% of the corpus. The cumulative series is 2010: 1, 2022: 11, 2023: 42, 2024: 103. Year-on-year growth ratios are 2022→2023 = 3.10× and 2023→2024 = 1.97×; the reported annual growth rate across the period is 34.13%.

Descriptively, the dataset spans 73 sources and contains 6,151 references. The document mix is: articles = 65, early access = 18, proceedings papers = 10, reviews = 9, editorial = 1. The average citations per document equals 18.28, the average document age is 0.631 years, and the keyword inventory includes 292 Keywords Plus and 417 author keywords.

Authorship and collaboration indicators show 334 authors, with 11 single-authored documents. The co-authors per document average is 3.63, and international co-authorship represents 36.89% of publications. Overall, production is heavily concentrated in 2022–2024, following a dormant interval during 2011–2021.
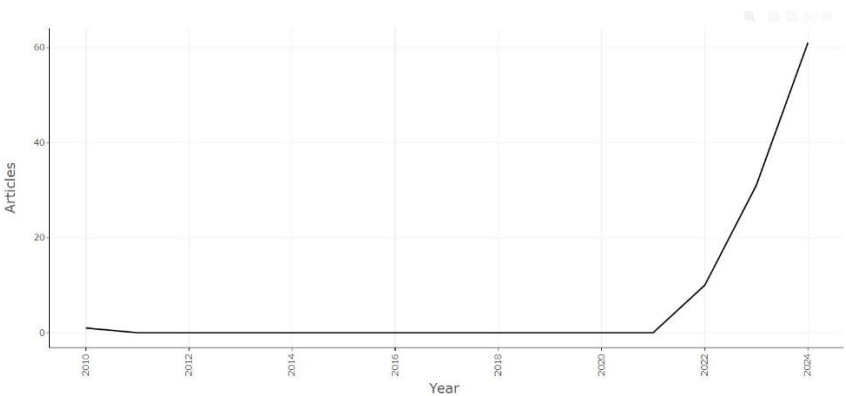
Annual Citations per Year

The citation trend parallels the field's publication dynamics, showing a gradual build-up followed by a notable increase after 2021 (Figure 2). The mean total citations per article (MeanTCperArt) were 3.00 in 2010, rising sharply to 38.80 in 2022 and 39.35 in 2023, before dropping to 4.46 in 2024 due to citation lag for newly published works.

The mean citations per year (MeanTCperYear) likewise increased from 0.20 in 2010 to 12.93 in 2022, 19.68 in 2023, and 4.46 in 2024. The citable years column (15 for 2010, 3 for 2022, 2 for 2023, 1 for 2024) confirms that older works had more time to accumulate citations, while recent publications are still in the early citation window.

Overall, the pattern indicates a steady rise in academic attention to metaverse marketing research, with a marked peak in 2023. The decline in 2024 is attributable to the short exposure period rather than decreased relevance, reflecting a strong upward trajectory in scholarly impact across the period.
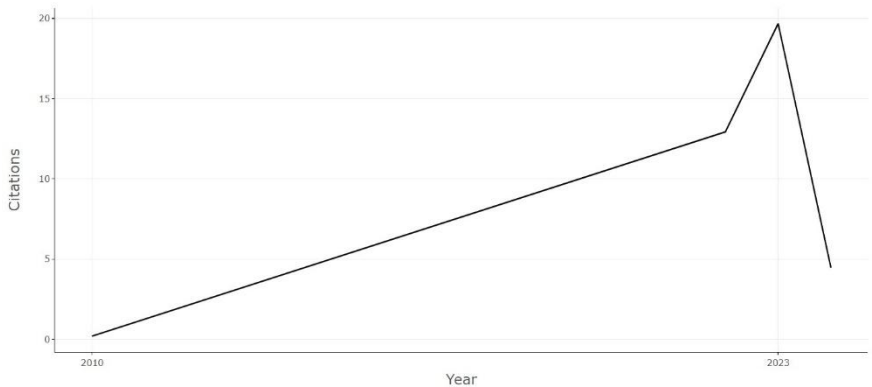

Figure 2. Annual Citations per Year

Sources: Productivity, Impact, and Core Journals

Most Relevant Sources

The bibliometric analysis identifies 73 publication sources on metaverse marketing and consumer research between 2010 and 2024. The

most productive journals are Journal of Retailing and Consumer Services (7 articles), Journal of Global Fashion Marketing (4), and Psychology & Marketing (4), which serve as core interdisciplinary outlets. A second group with three articles each includes Asia Pacific Journal of Marketing and Logistics, IEEE Consumer Electronics Magazine, Internet Research, Journal of Business Research, and Journal of Consumer Behaviour. A third tier with two articles each features journals such as Computers in Human Behavior, Cyberpsychology, Behavior and Social Networking, International Journal of Information Management, Journal of Consumer Marketing, and Journal of Consumer Psychology. More than 50 additional journals contribute a single article, underscoring the field's rapid, interdisciplinary diffusion across marketing, management, tourism, information systems, and psychology.
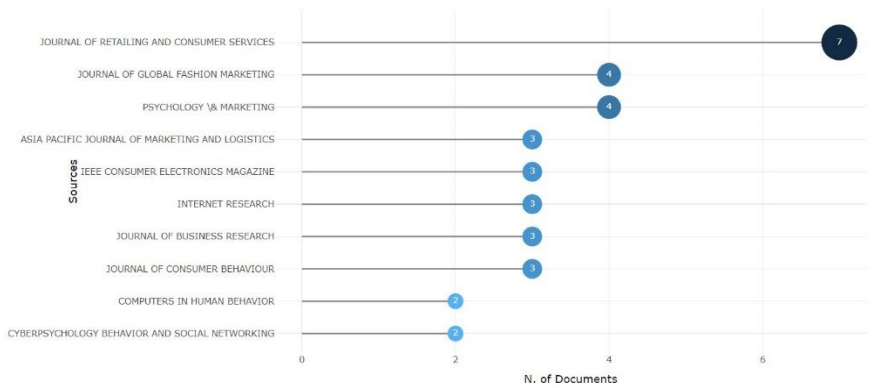

Figure 3. Most relevant publication sources (2010–2024)

Most Locally Cited Sources

Within-corpus (local) citations concentrate in a small set of mainstream marketing and consumer/behavioral outlets (Figure 4). The top ten cited sources are: Journal of Business Research (301 local citations), Journal of Retailing and Consumer Services (214), Journal of Consumer Research (167), Computers in Human Behavior (165), Psychology & Marketing (152), Journal of Marketing (115), International Journal of Information Management (100), Journal of the Academy of Marketing Science (90), Tourism Management (78), and Journal of Interactive Marketing (63).

These outlets spanning marketing, consumer psychology, and information-systems/HCI constitute the core citation backbone for

metaverse marketing, indicating that the field builds on established theories of consumer behavior and technology-mediated experience while interfacing closely with digital/immersive contexts.
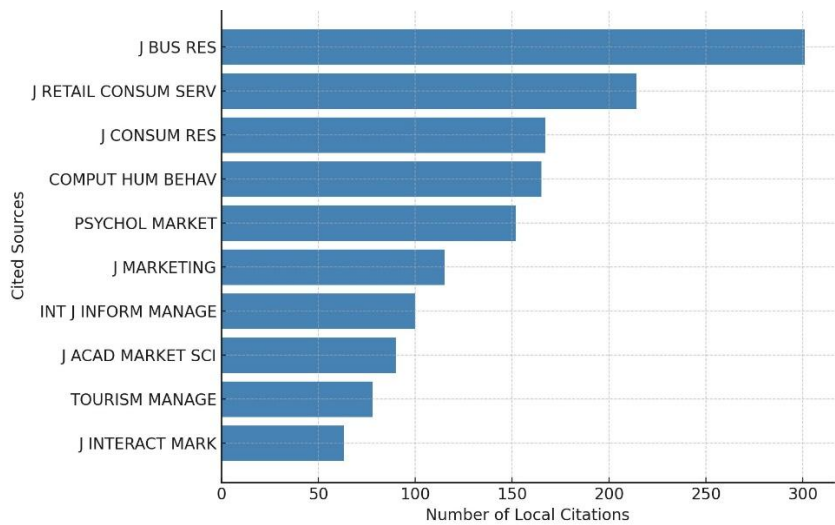

Figure 4. Most Locally Cited Sources (2010–2024)

Bradford's Law

Applying Bradford's zoning to the 103 documents yields three concentric zones with near-equal loads of articles (see Figure 5):

Zone 1 (Core; 10 journals, 34 articles; 33.0%) Journal of Retailing and Consumer Services (7), Journal of Global Fashion Marketing (4), Psychology & Marketing (4), Asia Pacific Journal of Marketing and Logistics (3), IEEE Consumer Electronics Magazine (3), Internet Research (3), Journal of Business Research (3), Journal of Consumer Behaviour (3), Computers in Human Behavior (2), and Cyberpsychology, Behavior and Social Networking (2). This compact nucleus concentrates the field's foundational conceptual and review work and anchors much of the citation traffic.

Zone 2 (Peripheral ring I; 30 outlets, 36 articles; 35.0%) a broad set spanning marketing, IS/HCI, psychology, tourism, and conference proceedings (ranks 11–40, cumulative frequency 34→70). These venues diffuse metaverse topics into adjacent domains and often publish method extensions and applied studies. Zone 3 (Peripheral ring II; 33 outlets, 33

articles; 32.0%）a long tail of journals (ranks 41–73, cumulative 70→103) capturing sectoral applications (e.g., hospitality, sport, fashion), policy/legal perspectives, and early exploratory contributions. Overall, the distribution conforms to Bradford's law: a small core supplies a disproportionate share of the literature and influence, while successive, expanding rings accommodate the rapid thematic diversification typical of a new, fast-organizing research domain.
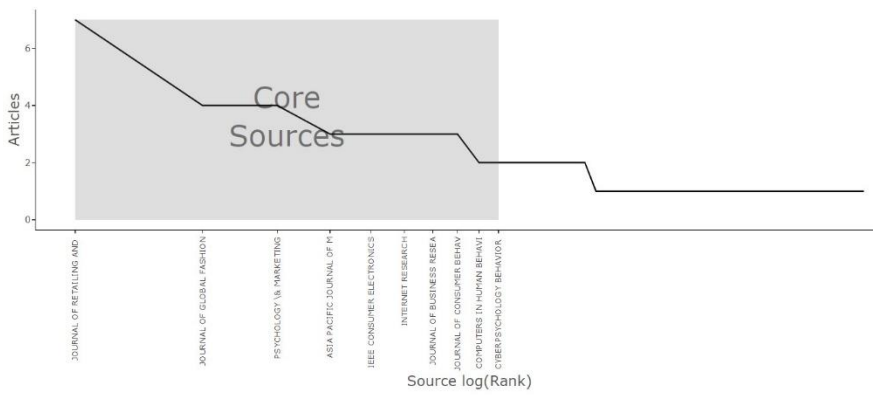

Figure 5. Bradford's Law

Local Source Impact & Production Over Time

Source-level impact metrics and temporal trends show that marketing and consumer behavior journals began publishing metaverse-focused research mainly after 2021, with sharp growth in 2023–2024. Leading outlets by impact include Psychology & Marketing (h = 4, TC = 307), Journal of Retailing and Consumer Services (h = 4, TC = 80), IEEE Consumer Electronics Magazine (h = 3, TC = 75), Journal of Business Research (h = 2, TC = 310), and International Journal of Contemporary Hospitality Management (TC = 164). These journals act as key conceptual and empirical hubs for studies on metaverse adoption, XR-based engagement, and virtual consumer interaction. Time-series patterns indicate almost no activity before 2021, followed by rapid expansion from 2022 onward, with especially steep increases in 2023–2024 in outlets such as Journal of Retailing and Consumer Services, Journal of Global Fashion Marketing, and Psychology & Marketing. Figure 6 visualizes this rapid post-pandemic diffusion and the growing recognition of metaverse marketing as a legitimate research subfield.
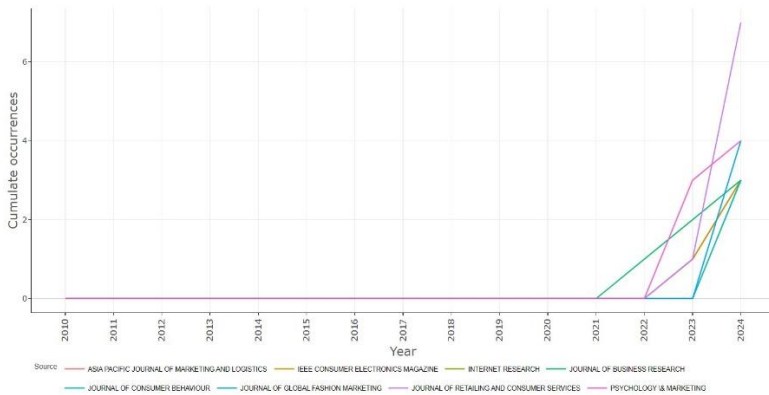
Figure 6. Source-level impact and publication trends over time

Authors: Productivity, Impact Profiles, and Laws

Most Relevant Authors

Analysis of 334 authors shows a broad, decentralized authorship pattern, consistent with the interdisciplinary and still-emerging nature of metaverse marketing. A small group of scholars stands out as key contributors (Figure 7): P. A. Rauschnabel (4 articles) and D. Buhalis, R. Felix, H. Kumar, K. H. Kwon, J. Lee, and E. Mogaji (3 articles each). Their repeated publications in outlets such as Journal of Retailing and Consumer Services, Psychology & Marketing, and Journal of Business Research indicate an influential research network focused on immersive consumer experience, metaverse branding, and virtual consumer–brand relationships. Beyond this core, a long tail of single-contribution authors reflects extensive experimentation and cross-disciplinary interest from information systems, HCI, psychology, hospitality, and communication. Together, this dispersion and the rise of recurrent contributors signal a shift from a scattered exploratory phase toward a more coherent, networked research ecosystem.
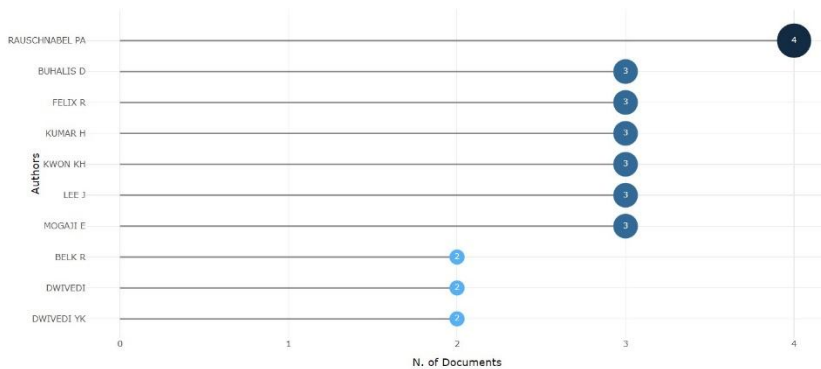
Figure 7. Most productive authors

Most Locally Cited Authors

Local citation counts cluster around a small set of agenda-setting scholars. Barrera K.G. (27 local citations) and Shah D. (27) lead the field, followed by Buhalis D. (13), Leung D. (13) and Lin M. (13). A second tier includes Gursoy D. (12) and a group tied at eleven citations Belk R., Brouard M., Dhir A., and Humayun M. (Figure 8). These authors predominantly contributed integrative or framework-oriented studies during 2022–2024 and are repeatedly referenced across the corpus, indicating their papers function as common touchpoints for subsequent empirical work in metaverse marketing and consumer research.
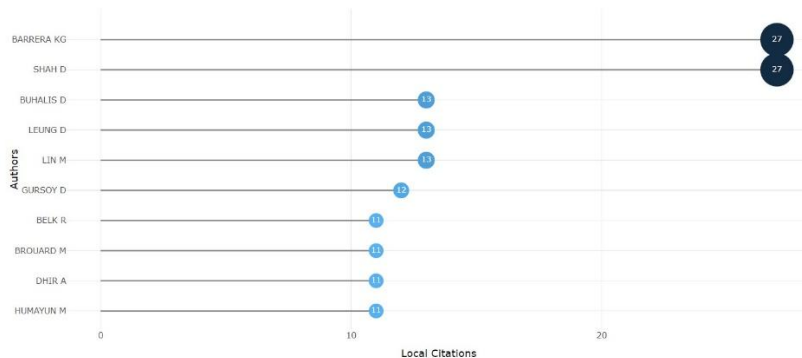

Figure 8. Most Locally Cited Authors

Authors' Production Over Time

Temporal productivity patterns (Figure 9) reveal distinct author entry waves beginning in 2022, followed by a period of consolidation through 2023–2024. Scholars such as Rauschnabel P.A., Buhalis D., Felix R., Kumar H., Kwon K.H., and Lee J. exhibit sustained engagement, publishing multiple studies in consecutive years.

This continuity suggests the formation of core research programs around topics including XR-based branding, immersive customer experience, AI-driven personalization, and NFT/digital ownership behavior. Meanwhile, one-time contributions from emerging authors in 2023–2024 highlight the expansion and diversification of the field, with interdisciplinary links between marketing, information systems, and consumer psychology becoming more visible.
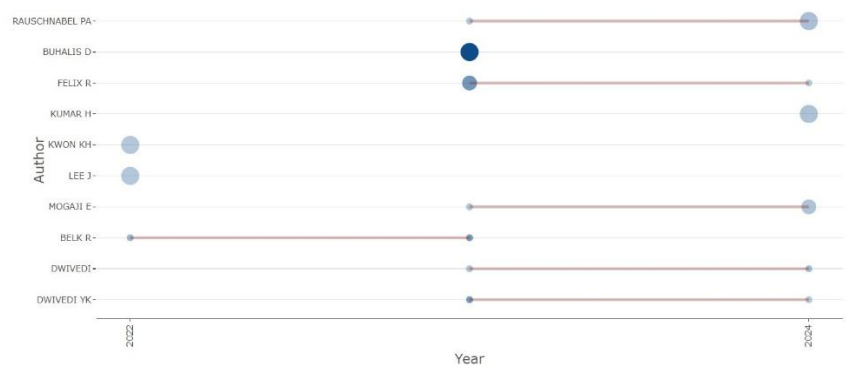

Figure 9. Authors' publication trends

Lotka's Law

The author productivity distribution (Figure 10) clearly adheres to Lotka's inverse-square law, where a large majority of contributors publish only one paper, and progressively fewer authors produce multiple works. Out of 334 total contributors, 302 authors (90.4%) wrote a single article, 25 (7.5%) authored two, 6 (1.8%) authored three, and only 1 author (0.3%) produced four papers.

This steep decline confirms a high participation diversity a characteristic of an emerging interdisciplinary domain that attracts scholars from marketing, information systems, psychology, and communication

studies. Over time, as the field matures, such dispersion is expected to evolve toward a more stable, programmatic concentration, with leading researchers producing longitudinal and theory-building contributions.
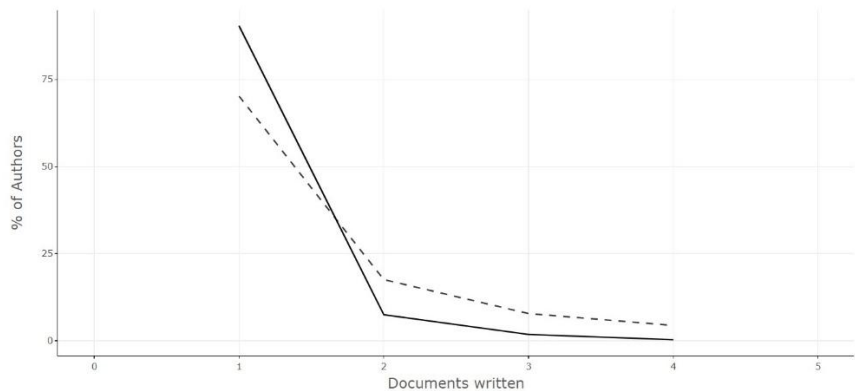

Figure 10. Lotka's Law distribution of author productivity

Authors' Local Impact

Based on local citation counts within the corpus (2010–2024), Rauschnabel P.A. attains the highest local h-index = 4, followed by a compact group at h = 3 Buhalis D., Felix R., Kwon K.H., Lee J., and Mogaji E. A third tier registers h = 2, including Belk R., Dwivedi (S./K.), Dwivedi Y.K., and Flavián C. (Figure 11). This rank order mirrors the 2022–2024 publication wave: authors who coupled multiple outputs with agenda-setting conceptual or synthesis papers accumulated citations quickly and, hence, higher local h values. Given the short citation window of recent years, these h/g metrics should be read as early impact signals rather than ceiling effects; they will likely rise as the cohort's 2023–2024 articles continue to accrue citations.
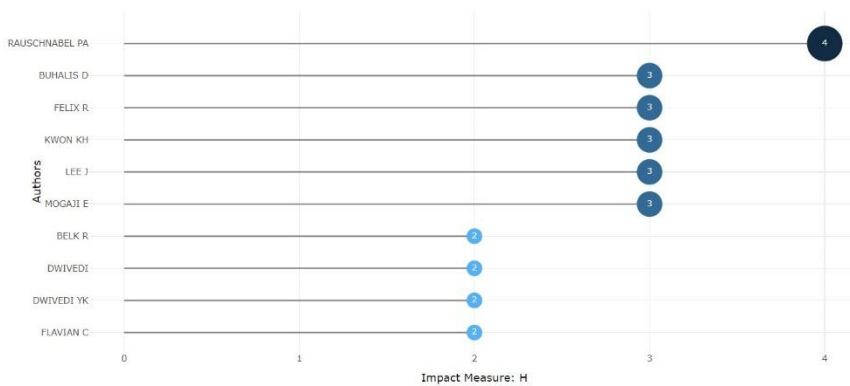
Figure 11. Authors' Local Impact

Affiliations: Institutional Concentration and Temporal Dynamics

Most Relevant Affiliations

The output is concentrated in a compact set of universities with established marketing–technology groups (Figure 12). Swansea University and the University of the Bundeswehr Munich lead with 9 publications each (≈8.7% apiece of the 103-paper corpus). Yonsei University follows with 8 (≈7.8%). A second tier comprises Khalifa University, Kookmin University, and Kyung Hee University (6 each; ≈5.8% per institution). A third tier Bournemouth University, Mahidol University, the University of Manchester, and the University of Tennessee contributes 5 papers each (≈4.9%).

Taken together, the top 3 institutions account for 26 papers (≈25.2%), while the top 10 reach 64 papers (≈62.1%), indicating notable institutional concentration. Geographically, leaders span the UK (Swansea; Manchester; Bournemouth), Germany (Bundeswehr Munich), South Korea (Yonsei; Kookmin; Kyung Hee), the United Arab Emirates (Khalifa), Thailand (Mahidol), and the USA (Tennessee), reflecting a Europe–East Asia–North America axis in metaverse-marketing research.
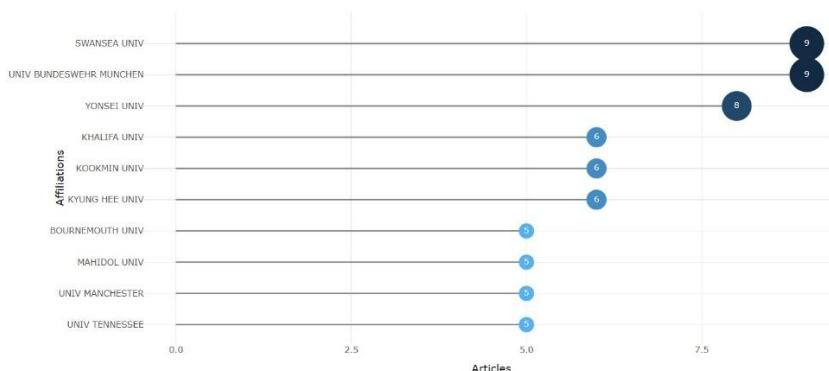
Figure 12. Most Relevant Affiliations

Affiliations' Production Over Time

The temporal analysis of institutional productivity (Figure 13) shows asynchronous entry and acceleration patterns among leading universities. Early engagement was initiated by Kookmin University, which maintained a steady publication trajectory from 2020 to 2023. In contrast, Swansea University, University of the Bundeswehr Munich, and Yonsei University exhibited sharp growth between 2023 and 2024, coinciding with the broader surge of metaverse-related marketing research.

Meanwhile, Khalifa University and Kyung Hee University followed a similar upward trend, reflecting growing research alignment in the Middle East and East Asia. The slope convergence observed in 2024 suggests that institutional participation is becoming more globally distributed, moving from isolated research clusters toward an interconnected academic network focusing on digital consumer behavior and immersive marketing technologies.
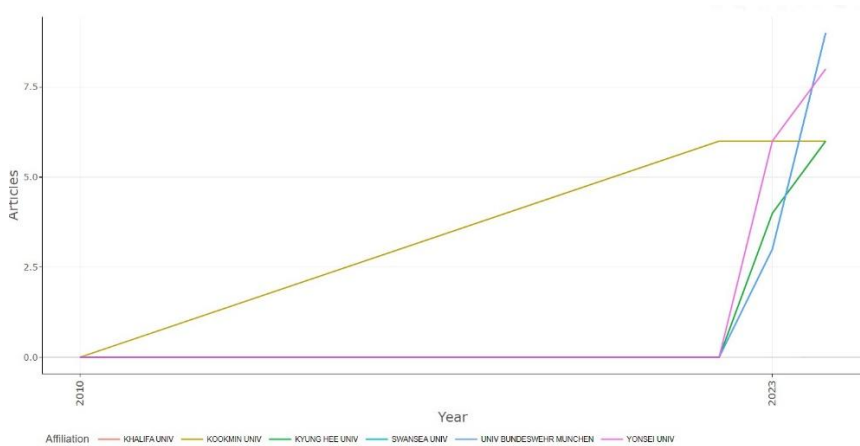
Figure 13. Affiliations' Production Over Time

Countries: Output, Citation Impact, and Collaboration Modes

Corresponding Authors' Countries & Country Production

As shown in the bar chart (MCP/SCP) and the world map, research output is broadly international but concentrated in a handful of hubs. The United States is the most prolific contributor, followed by China, South Korea, the United Kingdom, and India; a second tier comprises Spain, Germany, Italy, France, Australia, Canada, and Japan. Collaboration patterns vary by region: Anglophone and Western European countries show a high share of multi-country publications (MCP), while several Asian producers (e.g., China, Korea, India) combine strong single-country efforts (SCP) with selective international teaming. Emerging contributors from the Middle East (e.g., UAE, Lebanon) and Scandinavia typically appear through collaborative papers, underscoring the field's growing global reach (Figure 14).

As illustrated in Figure 15, the United States, China, South Korea, and the United Kingdom lead in research output, with varying balances between single-country and multi-country collaborations. This reflects the evolving global research network around metaverse marketing, where cross-border collaboration is particularly strong in Western and Asian contexts.
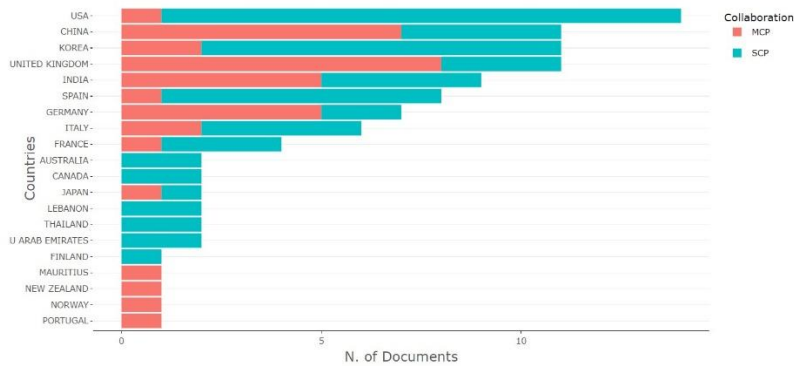
Figure 14. Country Productivity and Collaboration Patterns

As illustrated in Figure 15, the geographical distribution of publications reveals a global research network led by the United States, China, South Korea, and the United Kingdom, with expanding collaboration clusters across Europe, Asia, and the Middle East.
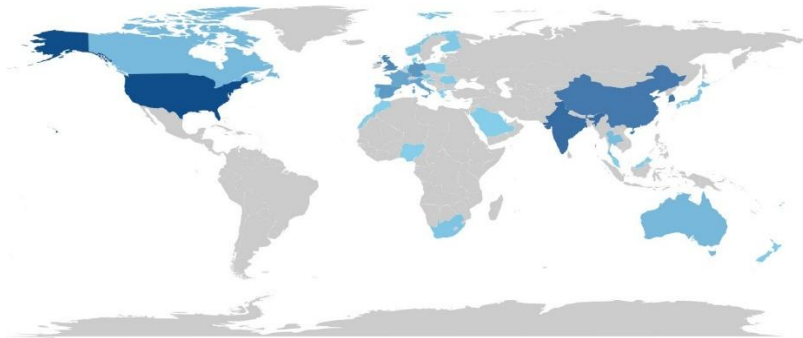
Figure 15. Global Distribution and Collaboration Patterns

Most Cited Countries

Global citation impact is highly concentrated. As shown in Figure 16, the United Kingdom (475 citations) and the United States (382) lead by a clear margin. They are followed by India (243), Norway (194), Canada (155), and South Korea (104), with additional contributions from Germany (72), United Arab Emirates (70), China (28), and Spain (25). This distribution mirrors the collaboration footprint reported above and the placement of influential, agenda-setting papers in high-visibility journals.
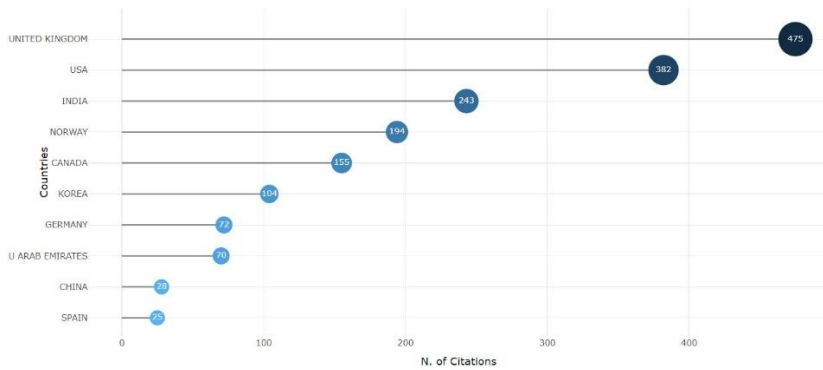
Figure 16. Most Cited Countries

Most Globally Cited Documents

Figure 17 visualizes the global citation impact of the top 10 documents shaping the metaverse marketing domain. Citation leaders include Dwivedi et al. (2023) and Buhalis (2023), whose conceptual and integrative works established foundational research agendas linking immersive technologies, consumer experience, and marketing strategy. These early, high-impact studies catalyzed subsequent empirical research into consumer behavior, brand loyalty, and digital presence dynamics.

Figure 17. Most Globally Cited Documents

Most Locally Cited References

As shown in Figure 18, the most locally cited works cluster around three key intellectual foundations:

Technology adoption and information-processing theories (e.g., TAM, IAM, ELM) emphasizing consumer acceptance and cognitive evaluation of immersive systems.

Experiential and engagement frameworks focusing on emotional immersion, interactivity, and brand experience.
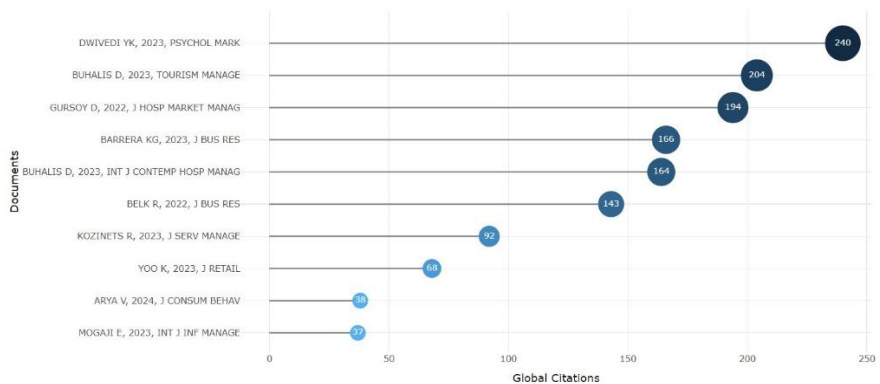
Platform-economy paradigms highlighting blockchain authentication, NFT-based ownership, and digital community governance.

Together, these pillars form the conceptual backbone of metaverse marketing research, anchoring theoretical integration across behavioral and technological perspectives.
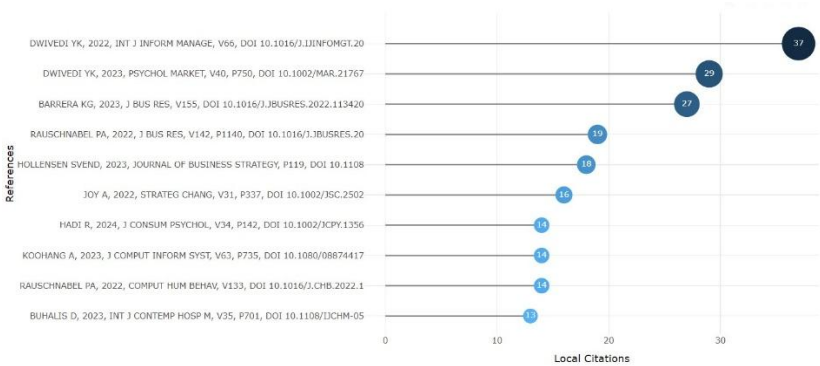
Figure 18. Most Locally Cited Documents

Reference Spectroscopy

The spectroscopy curve in Figure 19 illustrates the historical accumulation and acceleration of cited references within the metaverse marketing corpus. A sharp escalation is visible after 2019, peaking between 2020 and 2023, coinciding with the mainstream diffusion of extended reality (XR), blockchain/NFT ecosystems, and AI-driven immersive marketing applications. This surge indicates a rapid consolidation of theoretical and empirical interest, marking the transition of the field from conceptual exploration to data-rich, interdisciplinary research.
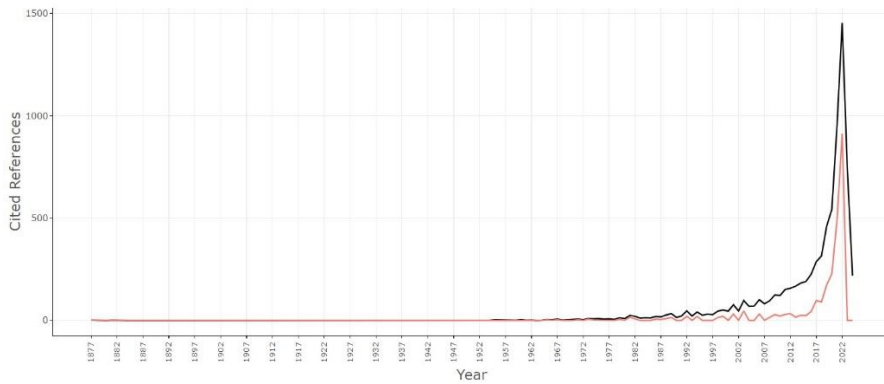
Figure 19. Reference Spectroscopy

Conceptual and Thematic Structure

Most Frequent Words, Word Cloud, and Treemap

As shown in Figure 20, the conceptual and thematic structure of metaverse marketing research reveals a dual orientation connecting technological enablers and consumer-centered mechanisms. The most frequent keywords such as impact, virtual reality, technology, experience, and model highlight the field's dominant conceptual anchors. Word cloud and treemap analyses show that these terms co-occur with others like trust, satisfaction, engagement, authenticity, gamification, and NFTs, forming two major thematic clusters. The first cluster emphasizes psychological and behavioral aspects of consumer experience, including perception, presence, and loyalty. The second cluster centers on technological infrastructures that enable immersive environments, such as augmented and virtual reality, blockchain, and gamified brand interactions. Together, these clusters indicate that metaverse marketing has evolved from a purely technology-driven discourse to a more balanced framework integrating digital infrastructure with consumer experience theory.

Figure 20. Word Cloud

Thematic Map (Motor, Basic, Niche, Emerging)

The thematic map indicates a field organized around a dominant motor cluster impact virtual reality technology with high centrality and density, signalling a mature, well-connected research program that anchors work on immersive consumer experiences and XR-enabled branding (Figure 21). Adjacent, two basic clusters consumption future authenticity and media–responses–technologies exhibit high centrality but moderate density, functioning as foundational pipelines where studies translate XR capabilities into purchase intention, loyalty, and brand equity outcomes. On the upper-right quadrant, attitude performance adoption forms a well-developed subtheme that frequently operationalizes technology-acceptance constructs in XR contexts. By contrast, the niche zone contains focused but less central topics such as decision-making/personality and information-technology apps/travel, which develop depth within narrower communities. The emerging/declining quadrant gathers digital fashion/self, market, and blockchain themes that are either nascent (e.g., NFT-based ownership and provenance) or episodically explored. Peripheral topics like anxiety online involvement underscore boundary conditions (e.g., discomfort, overload) that moderate XR effects and may migrate toward the basic core as measurement stabilizes. The co-citation density landscape reinforces this structure, with seminal agenda-setting

works (e.g., synthetic frameworks and early XR marketing applications) forming the hottest region and radiating influence toward application-specific streams in retail, tourism, and services.
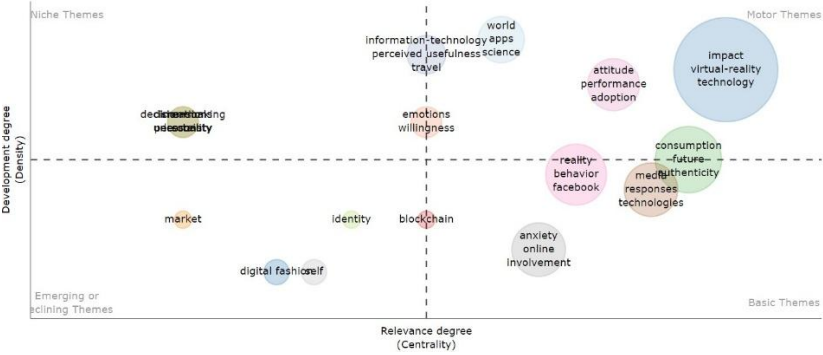

Figure 21. Thematic Map

Networks: Co-citation, Historiograph, and Collaboration

Co-citation Network

The co-citation network in Figure 22 reveals three main intellectual streams shaping metaverse marketing. The first cluster centers on consumer psychology and behavior, focusing on trust, risk, enjoyment, and presence, and drawing heavily on TAM, UTAUT, and experiential marketing frameworks. The second cluster links technology-mediated branding with XR adoption, bringing together work on VR, AR, and gamification that views XR platforms as experiential arenas for identity expression and emotional brand bonding. The third cluster reflects managerial and strategic perspectives on platform-based ecosystems, connecting digital transformation, service innovation, and omnichannel strategy with the metaverse's commercial potential. The densest part of the network lies at the intersection of these three streams, indicating a post-2021 convergence of psychological, technological, and managerial insights and marking the maturation of metaverse marketing into a more unified research domain.
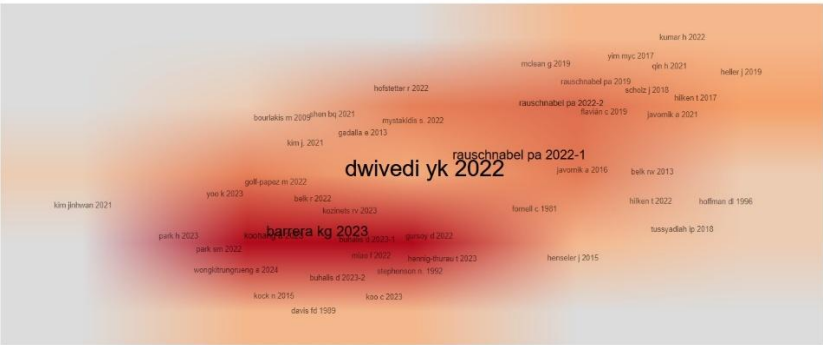
Figure 22. Co-citation Network

Historiograph

The historiograph visualizes the intellectual lineage of metaverse marketing research, connecting foundational works on virtual commerce and avatar presence (pre-2016) with successive phases of XR adoption and trust/risk exploration (2016–2020). The 2021–2022 period marks the infusion of blockchain and NFT-based platformization, while 2023–2024 clusters highlight the dominance of experience-driven and consumer-psychology-oriented models (Figure 23). The evolutionary pattern underscores a paradigmatic shift from technology-centric narratives to frameworks emphasizing human experience, perception, and governance in immersive marketing ecosystems.
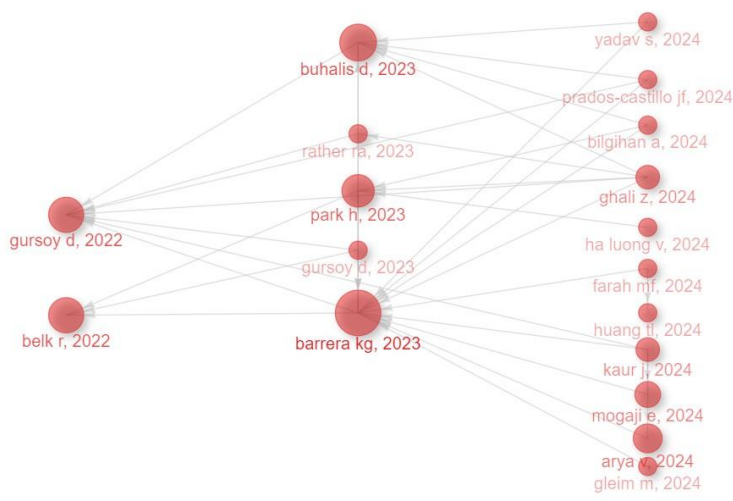
Collaboration Network and World Map

The collaboration network illustrates an increasingly interconnected structure among key authors and institutions in metaverse marketing research. Dense co-authorship clusters form around leading figures such as Buhalis D., Felix R., Wirtz J., and Belk R., representing the field's central knowledge brokers (Figure 24).

.
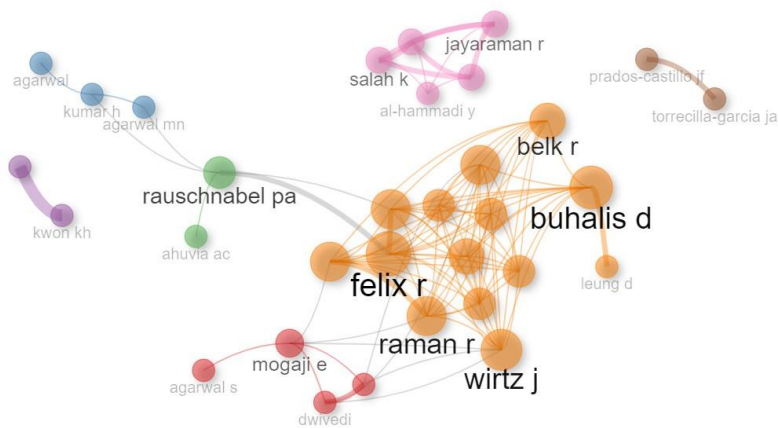
Figure 24. Collaboration Network

Cross-regional collaborations particularly between the UK, US, China, India, and South Korea reflect a multi-polar scientific landscape where Europe–Asia linkages play a pivotal integrative role. Peripheral yet emerging regions (e.g., the Middle East and parts of Southeast Asia) are becoming progressively embedded through shared datasets and interdisciplinary co-authorships, underscoring the globalization of metaverse-related marketing scholarship (Figure 25).
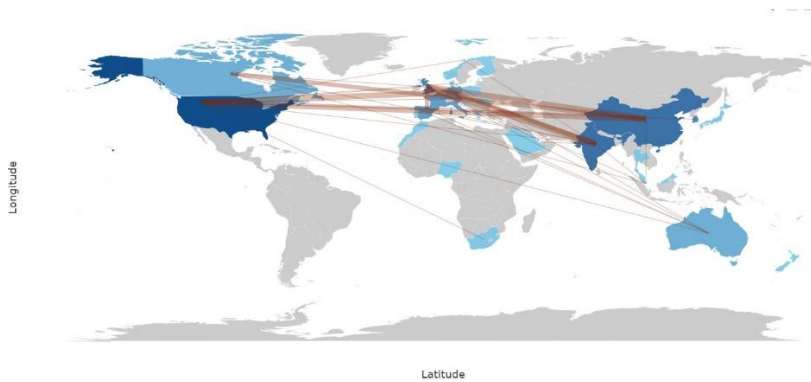
Figure 25. Collaboration World Map

Conclusion

The present bibliometric study provides a comprehensive and systematic mapping of the emerging field of metaverse marketing and consumer behavior. Spanning the period 2010–2024 and based on data retrieved from the Web of Science Core Collection, this research contributes to conceptual clarification, theoretical integration, and empirical systematization of the domain. The analysis reveals that metaverse marketing has rapidly evolved from a niche topic to a globally recognized research frontier, characterized by interdisciplinary collaboration and theoretical convergence between marketing, information systems, psychology, and digital communication.

From a descriptive perspective, the findings demonstrate an exponential rise in scholarly production after 2021, with nearly 99% of all publications appearing between 2022 and 2024. This temporal clustering aligns with the technological mainstreaming of XR, VR, AR, blockchain, and AI-driven consumer experiences, indicating that academic inquiry closely follows innovation diffusion in the digital marketplace. Citation dynamics mirror this trend, with 2023 emerging as the field's most influential year, and conceptual works by authors such as Dwivedi, Buhalis, Rauschnabel, and Gao serving as key intellectual anchors. The distribution of sources adheres to Bradford's Law, where a small core of high-impact journals including Journal of Retailing and Consumer Services, Psychology & Marketing, and Journal of Business Research concentrates scholarly influence, while an extended periphery accommodates diverse, application-oriented studies.

In terms of authorship and institutional dynamics, the study identifies a networked yet hierarchically structured scholarly community. While over 90% of authors have contributed only once consistent with Lotka's inverse-square law a select group of recurrent contributors has emerged as the field's intellectual nucleus. Institutions such as Swansea University, the University of the Bundeswehr Munich, and Yonsei University dominate production, reflecting a strong tri-continental axis (Europe–Asia–North America). Country-level analyses further confirm this globalized pattern: the United States, United Kingdom, China, South Korea, and India collectively shape the research landscape, with increasing contributions from the Middle East and Southeast Asia signaling geographic diversification. The collaboration maps reinforce this trend, revealing dense inter-regional co-authorships and multi-polar integration rather than single-hub dominance, which indicates the field's growing inclusivity and internationalization.

From an intellectual and conceptual standpoint, the co-citation, historiographic, and thematic analyses uncover three major research streams that define the evolution of metaverse marketing:

(1) Consumer psychology and behavioral mechanisms, focusing on trust, risk, presence, and enjoyment as precursors to consumer acceptance and engagement in immersive settings.

(2) Technology-mediated branding and experience design, emphasizing how XR, VR, and AR technologies create emotional, symbolic, and experiential value for consumers.

(3) Managerial and strategic perspectives, linking metaverse adoption with digital transformation, service innovation, and platform-based ecosystems.

The intersection of these streams represents a post-2021 theoretical convergence, marking the field's transition from fragmented conceptual discussions to an integrated paradigm that connects micro-level consumer behavior with macro-level marketing strategy.

The thematic evolution reinforces this integrative trajectory. Early research centered on technological feasibility and user acceptance (TAM, IAM, ELM frameworks), but recent clusters emphasize experiential consumption, authenticity, and emotional engagement. The thematic map identifies "impact–virtual reality–technology" as a mature motor theme,

supported by adjacent clusters such as "consumption–future–authenticity" and "attitude–performance–adoption." Simultaneously, emergent areas like digital fashion, blockchain, and NFTs illustrate the field's responsiveness to technological and cultural innovation. Notably, niche themes concerning ethics, privacy, and identity are moving toward the research core indicating that human-centered governance and responsibility will define the next phase of metaverse marketing inquiry.

From a methodological and strategic viewpoint, the study confirms that bibliometric techniques offer a rigorous means of assessing knowledge evolution in newly forming domains. By mapping citation flows, co-word associations, and thematic interconnections, this research provides an evidence-based foundation for understanding how the metaverse reshapes marketing theory and practice. The integration of behavioral models (IAM, ELM, TAM) with immersive technology frameworks suggests a fertile ground for hybrid theoretical models that can better capture the sensory, cognitive, and affective dimensions of consumer experience in virtual environments.

In managerial terms, the results hold important implications for practitioners. As immersive technologies mature, firms must shift from technology-centric experimentation toward experience-centered value creation, emphasizing trust, authenticity, and consumer co-creation. The emergence of NFTs, virtual assets, and community-driven ecosystems underscores the need for transparent governance, data ethics, and long-term engagement strategies. Brands that successfully integrate psychological drivers (e.g., enjoyment, presence, emotional connection) with technological affordances (e.g., personalization, gamification, interactivity) will be better positioned to build loyalty and differentiation in the metaverse economy.

Finally, the limitations and future research directions of this study warrant attention. Although the bibliometric dataset from WoS provides a comprehensive snapshot, expanding the analysis to include Scopus, IEEE Xplore, and SSRN databases could capture additional cross-disciplinary contributions. Future studies should also employ longitudinal topic modeling or social network analysis to trace evolving discourse patterns in real time. Moreover, integrating bibliometric findings with qualitative content analysis could enrich understanding of how conceptual depth and thematic coherence develop as the field matures.

In conclusion, this bibliometric synthesis positions metaverse marketing as a rapidly consolidating yet dynamically evolving research frontier. It bridges technology, psychology, and strategic management, forming a cohesive knowledge ecosystem that reflects both scholarly and practical innovation. As immersive environments increasingly shape how consumers perceive, interact, and form attachments to brands, metaverse marketing will continue to serve as a critical nexus of technological evolution and human experience guiding the next generation of digital marketing theory, research, and practice.

Limitations and Future Directions

This review is bounded by several methodological and contextual constraints. First, the dataset was drawn exclusively from the Web of Science Core Collection and limited to 2010–2024. Although WoS offers high-quality coverage, excluding Scopus, IEEE Xplore, ACM, SSRN and discipline-specific repositories may omit relevant IS/HCI, computer graphics, communication, and management studies. Second, an English-language focus introduces linguistic bias and likely underrepresents research conducted in Chinese, Korean, Japanese, Spanish and other languages where XR ecosystems are highly active. Third, bibliometric indicators are sensitive to time: the steep post-2021 surge means citation counts for 2023–2024 are depressed by exposure lag, while earlier works benefit from longer citable windows. Fourth, standardization steps (author disambiguation, keyword stemming, source harmonization) reduce noise but cannot fully eliminate errors caused by homonyms, affiliation changes, or inconsistent indexing; results using Bradford/Lotka/co-citation thresholds are also sensitive to parameter choices (e.g., clustering algorithm, edge cut-offs). Fifth, the use of corresponding-author country can misstate true multi-country contributions, and fractional counting cannot perfectly apportion credit across large teams. Sixth, document-type composition (e.g., "early access" and proceedings) may inflate short-term volume without comparable peer-review maturity. Finally, the metaverse itself is a moving target: hype cycles, rapid platform evolution, and shifting standards (interoperability, privacy, tokenization) mean any snapshot risks partial obsolescence.

Building on these constraints, several avenues can advance the field substantively:

Broader, multilingual evidence bases. Extend coverage to Scopus/IEEE/ACM/SSRN and incorporate non-English corpora; use cross-lingual retrieval to surface regional insights from East Asia, MENA, and LATAM.

Dynamic, text-rich analytics. Complement citation networks with full-text NLP (e.g., transformer topic modeling, BERTopic), semantic embeddings, and altmetrics to capture practice diffusion (developer blogs, platform docs, patents) and to track concept drift in real time.

Stronger causal designs. Move beyond cross-sectional surveys toward pre-registered experiments and field tests inside VR/AR platforms; exploit platform rollouts, A/B tests, geo-expansions, or instrumented "virtual labs" for quasi-experimental identification of presence, embodiment, trust, and authenticity effects on persuasion and loyalty.

Longitudinal and cross-cultural panels. Follow users across cohorts and cultures to study habit formation, switching, and community attachment; assess moderating roles of culture, age, accessibility needs, and digital literacy.

Measurement refinement. Validate and adapt scales for presence, co-presence, avatar identification, authenticity, and virtual ownership (NFTs/digital goods); develop standardized metrics for immersive CX, brand equity in XR, and governance trust.

Strategy and economics. Model ROI of metaverse initiatives (cost of content, creator economies, pricing, tokenomics), multi-sided platform dynamics, and interoperability strategies; examine complements/substitutes with social media, mobile, and GenAI-enhanced channels.

Governance, ethics, and risk. Advance frameworks for privacy, safety, IP/consumer protection, dark-pattern mitigation, and accessibility; study bias in AI agents/avatars, identity portability, and community moderation at scale; quantify environmental impacts of computing/ledger choices.

Creator and community ecosystems. Investigate co-creation, user-generated assets, and social influence (parasocial ties with avatars, social proof in virtual venues); map roles of influencers, guilds, and DAOs in brand meaning and value capture.

Open science and reproducibility. Release cleaned bibliographic/keyword networks and synthetic XR datasets; encourage replication across platforms (e.g., Roblox, Fortnite, Horizon, Spatial) and verticals (retail, tourism, health, education).

Methodological transparency. Report clustering parameters, disambiguation rules, and inclusion criteria; triangulate bibliometrics with qualitative synthesis (scoping/systematic reviews) to enrich theory building.

Pursuing these directions will move the field from rapid descriptive growth to cumulative, theory-driven knowledge about how immersive technologies reshape consumer psychology, brand strategy, and market design while ensuring ethical, inclusive, and durable value creation in the metaverse.

Keywords: Metaverse Marketing, Consumer Experience, Consumer Engagement

REFERENCES

Alsharif, A. H., Salleh, N. Z. M., & Baharun, R. (2020). Research trends of neuromarketing: A bibliometric analysis. *Journal of Theoretical and Applied Information Technology, 98*(15), 2948–2962.

Arya, V., Sambyal, R., Sharma, A., & Dwivedi, Y. K. (2024). Brands are calling your AVATAR in Metaverse – A study to explore XR-based gamification marketing activities & consumer-based brand equity in virtual world. Journal of Consumer Behaviour, 23(2), 556–585.

Azmi, A., Ibrahim, R., Ghafar, M. A., & Rashidi, A. (2023). Metaverse for real estate marketing: The impact of virtual reality on satisfaction, perceived enjoyment, and purchase intention. Preprint, https://doi.org/10.21203/rs.3.rs-2584882/v1

Bilgihan, A., Leong, A. M. W., Okumus, F., & Bai, J. (2024). Proposing a metaverse engagement model for brand development. *Journal of Retailing and Consumer Services*, 78, 103781.

Catherine, S., Kiruthiga, V., & Gabriel, R. (2024). Effective brand building in metaverse platform: consumer-based brand equity in a virtual world (CBBE). In *Omnichannel Approach to Co-Creating Customer Experiences Through Metaverse Platforms* (pp. 39-48). IGI Global Scientific Publishing.

Cheah, I., & Shimul, A. S. (2023). Marketing in the metaverse: Moving forward – What's next? *Journal of Global Scholars of Marketing Science, 33*(1), 1–10.

Cheung, C. M., Lee, M. K., & Rabjohn, N. (2008). The impact of electronic word-of-mouth: The adoption of online opinions in online customer communities. *Internet Research, 18*(3), 229-247.

Davis, F. D. (1989). Technology acceptance model: TAM. Al-Suqri, MN, Al-Aufi, AS: *Information Seeking Behavior and Technology Adoption, 205*(219), 5.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296.

Dwivedi, Y. K., Hughes, L., Wang, Y., Alalwan, A. A., Ahn, S. J., Balakrishnan, J., ... & Wirtz, J. (2023). Metaverse marketing: How the metaverse will shape the future of consumer research and practice. *Psychology & Marketing, 40*(4), 750–776.

Efendioğlu, İ. H. (2023). The effect of information about metaverse on the consumers' purchase intention. *Journal of Global Business and Technology, 19*(1), 63–77.

Erkan, I., & Evans, C. (2016). The influence of eWOM in social media on consumers' purchase intentions: An extended approach to information adoption. *Computers in Human Behavior*, 61, 47-55.

Gao, H., Chong, A. Y. L., & Bao, H. (2024). Metaverse: Literature review, synthesis and future research agenda. *Journal of Computer Information Systems, 64*(4), 533–553.

Hollensen, S., Kotler, P., & Opresnik, M. O. (2022). Metaverse – the new marketing universe. *Journal of Business Strategy. 44*(3), 119-125. https://doi.org/10.1108/JBS-01-2022-0014

Linnenluecke, M. K., Marrone, M., & Singh, A. K. (2020). Conducting systematic literature reviews and bibliometric analyses. *Australian Journal of Management, 45*(2), 175-194.

Mystakidis, S. (2022). Metaverse. *Encyclopedia, 2*(1), 486–497.

Passas, I. (2024). Bibliometric Analysis: The Main Steps. *Encyclopedia*, *4*(2),1014-1025.
https://doi.org/10.3390/encyclopedia4020065

Periyasami, S., & Periyasamy, A. P. (2022). Metaverse as future promising platform business model: Case study on fashion value chain. *Businesses, 2*(4), 527–545.

Patil, K., Bharathi, V. S., & Pramod, D. (2022). Can metaverse retail lead to purchase intentions among youth? ICETSIS 2022, *Bahrain*, 314–320.

Petty, R. E., & Cacioppo, J. T. (1986). Message elaboration versus peripheral cues. In *Communication and persuasion: Central and*

peripheral routes to attitude change (pp. 141-172). New York, NY: Springer New York.

Rane, N., Choudhary, S., & Rane, J. (2023). Metaverse for enhancing customer loyalty: Effective strategies to improve customer relationship, service, engagement, satisfaction, and experience. http://dx.doi.org/10.2139/ssrn.4624197

Rather, R. A. (2025). Metaverse marketing and consumer research: Theoretical framework and future research agenda in tourism and hospitality industry. *Tourism Recreation Research, 50*(1), 189-197.

Rauschnabel, P. A., Felix, R., Hinsch, C., Shahab, H., & Alt, F. (2022). What is XR? Towards a framework for augmented and virtual reality. *Computers in Human Behavior*, 107289.

Shen, B., Tan, W., Guo, J., Zhao, L., & Qin, P. (2021). How to promote user purchase in metaverse? A systematic literature review on consumer behavior research and virtual commerce application design. *Applied Sciences, 11*(23), 11087.

Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. *Journal of the American Society for information Science, 24*(4), 265-269.

Sung, E., Kwon, O., & Sohn, K. (2023). NFT luxury brand marketing in the metaverse: Leveraging blockchain-certified NFTs to drive consumer behavior. *Psychology & Marketing, 40*(11), 2306–2325.

Sussman, S. W., & W. S. Siegal (2003). Informational influence in organizations: an integrated approach to knowledge adoption. *Information Systems Research, 14*(1), 47–65. https://doi.org/10.1287/isre.14.1.47.14767

Vidal-Tomás, D. (2022). The new crypto niche: NFTs, play-to-earn, and metaverse tokens. *Finance Research Letters*, 47, 102742.

Zhang, L., Anjum, M. A., & Wang, Y. (2024). The impact of trust-building mechanisms on purchase intention towards metaverse shopping: the moderating role of age. *International Journal of Human–Computer Interaction, 40*(12), 3185-3203.

Zhao, Y., Jiang, J., Chen, Y., Liu, R., Yang, Y., Xue, X., & Chen, S. (2022). Metaverse: Perspectives from graphics, interactions, and visualization. *Visual Informatics, 6*(1), 56–67.