Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

Tracing the Evolution of Metaverse Based Shopping: A Bibliometric and Global Research Trend Analysis

Tanmoy Acharjee[1*], Dr. Deepjyoti Choudhury[2], Sonali Jaiswal[3], Hina Sami[4], Prince Kumar[5]
[1]Research Scholar, Department of Business Administration, Assam University, Silchar.*
Email: tanmoyacharjee1996@gmail.com, ORCID ID: https://orcid.org/0009-0004-2317-895X
[2]Assistant Professor, Department of Business Administration, Assam University, Silchar.
Email: choudhurydeepjyoti@gmail.com, ORCID ID: https://orcid.org/0000-0002-9614-3916
[3]Research Scholar, Faculty of Commerce, University of Lucknow, Lucknow.
Email: sonali0101jaiswal@gmail.com, ORCID ID: https://orcid.org/0009-0004-1943-0243
[4]Research Scholar, Shia PG College, University of Lucknow, Lucknow. Email: hinasami5243759@gmail.com, ORCID ID: https://orcid.org/0009-0005-2756-2294
[5]Research Scholar, Faculty of Commerce, University of Lucknow, Lucknow. Email: kushprince0275@gmail.com, ORCID ID: https://orcid.org/0009-0000-2193-0379

ARTICLE INFO

Received: 24 Apr 2024

Accepted: 26 Jun 2024

ABSTRACT

The accelerated development of the metaverse has transformed digital engagement, reshaping consumer behaviour and retail dynamics. This study employs a bibliometric methodology, leveraging Scopus-indexed data and VOSviewer visualization, to map global research trends in metaverse-based shopping. By examining a dataset of 171 publications, the analysis investigates network relationships through keyword co-occurrence, bibliographic coupling, and citation patterns across authors and nations. Findings reveal dominant themes and prominent contributors highlighting the field's evolution and its worldwide scholarly influence. Keywords mapping uncovers interdisciplinary connections and thematic overlaps between immersive technologies and consumer studies, while it was also able to map emerging research frontiers such as blockchain integration and virtual consumer trust. Citation metrics identify seminal works and influential researchers shaping the discourse. The study provides a foundational overview of the field, outlines future research trajectories, and offers insights into the convergence of metaverse innovations and consumer practices, valuable for both academic and industry stakeholders. This study contributes to an initial mapping of this literature, points to future directions for research, and reveals insights into the intersection of metaverse technology and consumer behaviour that will be of interest to academics and practitioners alike.

Keywords: Metaverse, Shopping, Bibliometric Insights, Citation Patterns, Global Research Trends.

1. INTRODUCTION

The Metaverse is a digital space where the physical and virtual worlds come together, allowing for immersive interactions among multiple users through technologies such as virtual reality (VR) and augmented reality (AR) (Mystakidis, 2022). It eliminates physical limitations, enabling users to participate in shared virtual environments (Cao et al., 2024). Shopping in the Metaverse takes this idea further, allowing consumers to browse, try on, and buy digital products and services using either virtual or real-world currencies (Shen et al., 2021). This shift transforms traditional shopping by creating engaging and experiential journeys for consumers. Marketers are leveraging the Metaverse to boost consumer engagement through immersive brand experiences, utilizing VR, AR, and blockchain technology to ensure security and build trust (Murgai, 2022; Rathore, 2023). These innovations are changing consumer behaviour, affecting purchasing choices, and reshaping how brands interact with their audiences (Ritterbusch & Teichmann, 2023).

1.2 Background

The genesis of metaverse shopping can be traced back to early virtual worlds like Second Life (2003), which allowed users to create avatars, interact socially, and engage in virtual economies (Gottschalk, 2010). While rudimentary, these platforms provided early glimpses into the potential of digital spaces for commerce (Bourlakis et al., 2009). The evolution of e-commerce, with its emphasis on online marketplaces and virtual storefronts, laid the groundwork for metaverse shopping. Farshid et al. (2018) studied on advancements in immersive technologies, such as virtual

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/
Research Article

reality (VR) and augmented reality (AR), Kaplan & Haenlein (2010) further fueled this evolution by enabling more realistic and engaging online shopping experiences. Study by Enyejo et al. (2024) highlighted the critical role of immersive technologies such as virtual reality (VR) and augmented reality (AR) in creating seamless shopping environments. Conversely, some researchers proposed a more nuanced perspective, suggesting that metaverse shopping's technological evolution is not solely dependent on VR and AR, but also requires sophisticated blockchain and digital twin technologies to ensure authenticity and consumer trust (Chen et al., 2023; Bilgili et al. 2019). Kim et al. (2021) demonstrated that younger generations, particularly millennials and Gen Z, exhibit higher receptiveness to virtual shopping experiences.

Despite its promise, the metaverse faces significant challenges, including scalability, privacy, and interoperability issues. Research in metaverse shopping is still in its infancy, with significant opportunities for further exploration. Furthermore, understanding the interplay between technological advancements and consumer preferences will be critical for developing practical and sustainable metaverse shopping models. This study employs a bibliometric approach, utilizing Scopus data and VOSviewer tool to examine global research trends, with a focus on keyword connections, bibliographic coupling, and citation patterns across authors and countries. By investigating these aspects, it offers valuable insights into the development and future direction of literature on Metaverse shopping.

1.3 Problem Statement

Shopping on the metaverse, a critical area of this digital evolution, is attracting more and more scholars on the potential to transform customer experiences through immersive and interactive environments (Dwivedi et al., 2023). And even with technological breakthroughs and commercial opportunities, there is limited knowledge of how this field is developing on various levels around the world (Agarwal, 2023; Xi et al., 2023;). Previous works, for instance, some researchers explored topics including the adoption of virtual reality in retail and the effects of immersive technologies on consumer engagement (Sung et al., 2021; Kalender & Guzmán, 2024;). Nonetheless, there is not enough research conducted that synthesize continual bibliometric insights capturing citation records, interdisciplinary linkages and global research trends on metaverse-based shopping (Gao et al., 2024; Al-Ghaili et al. 2023). This gap limits the ability to identify pivotal contributors, tracer tendencies in the field, and define thematic confluences which might critically inform future research directed towards them. This rstudy aims to mitigate the fragmented nature of the current metaverse shopping literature by adopting a bibliometric framework that enables the evaluation of keyword co-occurrence, author citations and geographical distribution of researches done etc.

1.4 Research Questions

1. What has been the annual publication trend of research on metaverse-based shopping from the analyzed bibliographic records?
2. What emerging themes or topics can be identified in the field of metaverse-based shopping?
3. Which keywords occur most frequently in research on metaverse based shopping, and how does the co-occurrence of keywords highlight interdisciplinary linkages in metaverse-based shopping studies?
4. Who are the most influential authors in metaverse-based shopping research and which leading research areas in this domain align with current global trends?
5. Which countries have contributed the most to metaverse shopping research, and what does the geographic distribution reveal about global research trends?

2. METHODOLOGY

This study utilizes a bibliometric analysis to investigate the research trends in metaverse-based shopping. The bibliographic data was extracted from the Scopus database, a widely recognized source for academic literature. The search query included keywords such as "metaverse" and "shopping" to identify the relevant literature. The dataset comprises 171 bibliographic records, which were analyzed using VOS viewer, a software tool for visualizing bibliometric networks (Van Eck & Waltman, 2011). The analysis includes five key components: a) Annual research trend, b) Keyword mapping to identify emerging themes, c) Citation analysis to determine the most influential authors, and d) keyword co-occurrence to reveal interdisciplinary linkages in metaverse-based shopping research. e) Bibliographic coupling of country related data to understand global research trends.

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

2.1 Data Sources

The primary data source for this study was the Scopus database, a widely recognized and comprehensive repository of peer-reviewed academic literature. Scopus offers a vast collection of journals, conference papers, books, and reports, making it an ideal platform for bibliometric analysis. The database was chosen due to its extensive coverage of research publications and its robust tools for bibliographic data extraction. The search focused on publications related to metaverse-based shopping and its associated themes, ensuring relevance to the study's objectives.

2.2 Search Technique

A structured search technique was employed to identify and collect relevant bibliographic records. The search query was designed using a combination of most relevant keywords such as "metaverse," "shopping,". Boolean operators (e.g., AND, OR) were applied to refine the search and ensure inclusivity.
Search Query Combination: **"Metaverse" AND "Shopping"**
Filters were applied to exclude unrelated fields and focus on specific disciplines such as business, marketing, and technology. Only publications in the English language were considered, and duplicates were removed during the initial search phase.

2.3 Time Frame

This timeframe was selected to capture the most recent advancements in metaverse-based shopping research while encompassing early foundational studies. The chosen period ensures a balance between historical context and emerging trends in the field.

2.4 Data Collection and Analysis Steps

The initial search yielded 7771 bibliographic records from the Scopus database. Filters were applied to exclude irrelevant documents such as editorials, book reviews, and non-peer-reviewed sources. Publications focusing solely on technical aspects without relevance to shopping or consumer behaviour were also excluded. The filtered dataset retained only articles, conference proceedings, and book chapters directly addressing metaverse-based shopping. The extracted data included bibliographic information such as titles, abstracts, keywords, authors, publication year, and source titles. Citation metrics i.e. number of citations per document to identify influential publications (Pendlebury, 2009). It also included details of contributing authors, their affiliations, and geographic origins.
The extracted dataset was saved in **CSV format** for further processing and analysis.

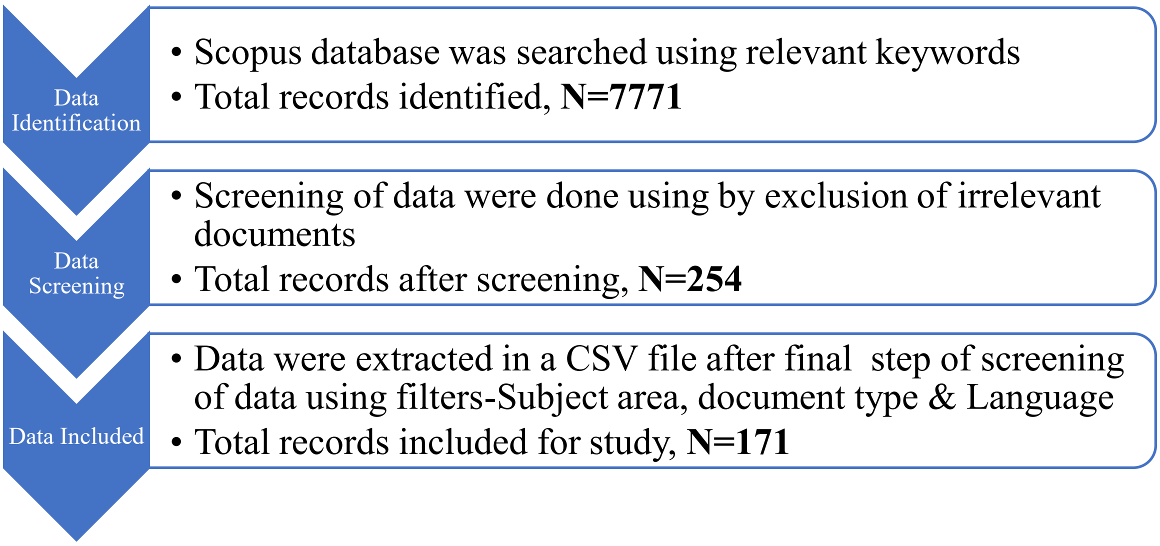

Fig. 1: Data Extraction Process
Source: Authors Own Work

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/
Research Article

2.4.3 Bibliographic Analysis

The bibliometric analysis employed VOSviewer (Van Eck & Waltman, 2010), a robust tool for constructing and visualizing bibliometric networks, to examine research trends and intellectual linkages. First, annual publication trends were analyzed to identify growth patterns and temporal shifts in scholarly output. Keyword co-occurrence analysis, facilitated by VOSviewer's network visualization capabilities (Van Eck & Waltman, 2014), was conducted to uncover predominant keywords, emerging themes, and interdisciplinary connections within recent literature. Citation analysis was integrated to identify highly cited documents and influential authors, offering insights into foundational works and knowledge dissemination pathways (Gundolf & Filser, 2013).

Bibliographic coupling examines connections between nations based on their shared references to key documents, revealing clusters of countries with aligned research priorities and potential collaboration networks (Van Eck & Waltman, 2014; Donthu et al., 2021). Such analysis highlights how regional or global partnerships shape research trajectories, underscoring the interplay between geographic proximity and thematic convergence (Kirby, 2023).

2.4.4 Software Used

The study utilized VOSviewer for bibliometric visualization and analysis. VOSviewer was selected for its ability to generate keyword co-occurrence maps, bibliographic coupling networks, and citations-based visualization (Bukar et al., 2023; Klarin, 2024; Van Eck & Waltman, 2011). Furthermore, Microsoft Excel was used for initial data cleaning, ordering and computing descriptive statistics (Carr, 2008). Collectively, these instruments allowed in-depth analysis of the dataset and enabled precise examination of the metaverse shopping research trends.

3. RESULTS

Publications were minimal, with only 2 publications each in 2015 and 2016, and 1 publication in 2018. This suggests that research on metaverse-based shopping was still in its infancy, with limited exploration and interest. A significant rise occurred in 2022, with 50 publications marking a substantial increase from earlier years. In 2023, there was a slight dip with 46 publications, possibly indicating stabilization or a shift in research focus. 2024 witnessed an exponential surge with 66 publications, reflecting heightened global interest in metaverse-based shopping, likely due to advancements in technology and increased adoption of metaverse platforms.

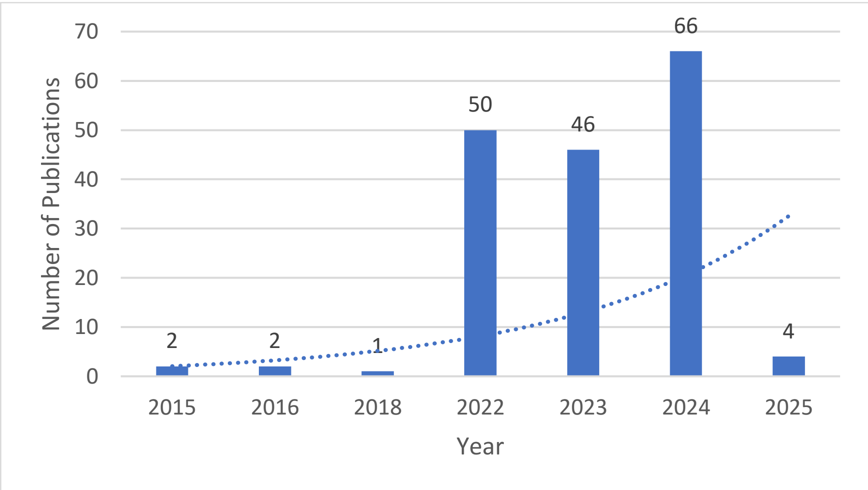

Fig 2: Annual Publication Trend
Source: Author's Own Work

The data indicates an exponential growth trend (Fig. 2) in research, particularly from 2022 onwards. This sharp increase aligns with: Technological advancements in virtual reality (VR), augmented reality (AR), and blockchain technologies. Increased global interest in virtual shopping experiences, especially during and after the pandemic, which highlighted the need for innovative online shopping solutions. Industry participation, as major organizations and countries invest in metaverse-related research and development. The period between 2015 and 2018 highlights the formative phase of metaverse-based shopping research. The exponential growth from 2022 onward reflects increased academic and practical interest, with 2024 being a peak year. The field shows a promising trajectory of growth, suggesting ongoing innovation and interdisciplinary collaboration in metaverse-based shopping studies.

3.2 Keyword Mapping Analysis

Table 2 represents data gathered using VOSviewer regarding keyword co-occurrence of all keywords. While analyzing the data, minimum number of occurrences of a keyword was set at 5, in turn a total of 977 keywords were identified by the software. From which 34 keywords met the threshold limit, indicating their significant presence across different studies. In order to eliminate noise from infrequently used keywords and guarantee that only recurrent and significant terms were taken into account, a minimum occurrence threshold was established (Van Eck & Waltman, 2014). The process of keyword selection in bibliometric analysis is crucial for understanding the thematic structure and research trends in a field (Zupic & Čater, 2015). Link strength in VOSviewer is a positive value that represents how strongly two keywords in a network are connected. In a network file, a link's strength is shown as a number in the third column. In order to help users identify the most strongly connected keywords in their data and comprehend the underlying thematic structure of the research field under analysis, "link strength" is used to visually represent the intensity of the relationship between two items (such as keywords or authors) in a network. A stronger link denotes a higher frequency of co-occurrence or co-citation (Van Eck & Waltman, 2011).

Table 2: Keyword Occurrence

Keyword	Occurences	Link Strength	Keyword	Occurences	Link Strength
Metaverse	89	254	Human	6	28
Metaverses	53	204	Competition	5	25
Virtual reality	51	193	e- commerces	6	25
Augmented reality	29	117	Humans	5	25
Electronic Commerce	15	74	e-commerce	6	24
Immersive	16	65	Blockchain	7	23
Sales	14	65	Decision Making	5	23
Retail	14	56	Virtual Shopping	6	23
Online Shopping	11	49	Marketing	6	22
Mixed Reality	12	45	Customer	5	20
Virtual Worlds	10	43	Visualization	5	19
Shopping	11	40	Vr	5	17
Consumer Behaviour	7	38	Artificial Intelligence	5	16
Commerce	6	33	Algorithm	5	14
Block-chain	6	32	Metaverse Retailing	7	13
Extended Reality	8	31	Immersive Technologies	6	12
Virtual	9	30	Purchase Intention	6	11

Note: Keywords are presented in the above table as per highest to lowest number of occurences.
Source: Compiled by Authors based on Data Analysis in VOSviewer

Fig. 3 represents the descriptive statistics of keywords. It is a visualization of keywords with the highest number of occurences in the research field related to metaverse based shopping.

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

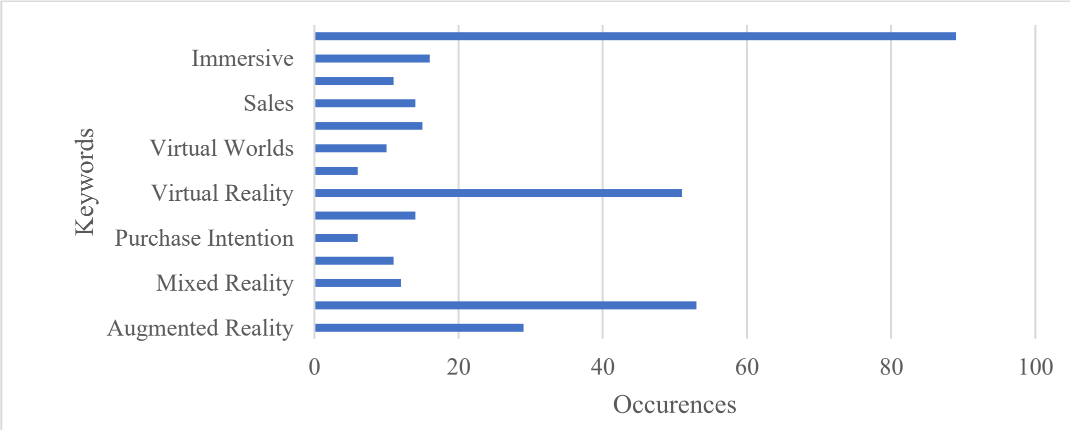

Fig 3: Keyword Occurrence

Source: Author's Own Work

It is evident from Fig. 3 that mostly occurring keywords showcase that metaverse shopping research is driven by a combination of technological innovation, consumer behaviour analysis, and retail business applications, indicating significant interdisciplinary collaborations and potential for growth. Metaverse (Occurrences: 89, Link Strength: 254) is the most dominant keyword in metaverse shopping research, signifying its central role in the domain. Strong connections with terms like virtual reality, blockchain, and online shopping highlight its interdisciplinary relevance across technology, retail, and consumer studies. Metaverses (Occurrences: 53, Link Strength: 204) is related to broader discussions of virtual spaces, emphasizing innovations in immersive technologies and virtual worlds. Virtual Reality (Occurrences: 51, Link Strength: 193) indicates the importance of VR as a technological enabler for metaverse-based shopping experiences. Frequently linked to augmented reality and extended reality, showcasing synergies between these immersive technologies. Augmented Reality (Occurrences: 29, Link Strength: 117) represents key technological advances that make virtual shopping more interactive and personalized. Electronic Commerce (Occurrences: 15, Link Strength: 74) highlights the integration of traditional e-commerce frameworks into metaverse shopping, focusing on consumer behaviour and purchase intention. Retail (Occurrences: 14, Link Strength: 56) & Sales (Occurrences: 14, Link Strength: 65) illustrates how virtual shopping transforms traditional retail strategies, reflecting its implications for business practices and marketing.

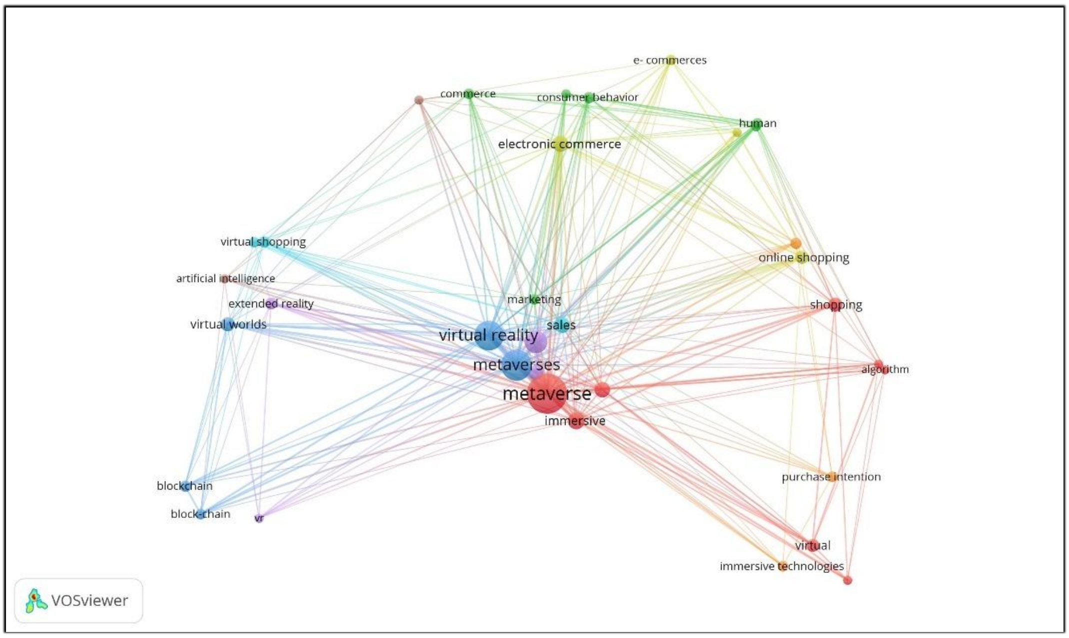

Fig 4: Keyword Co-occurrence Mapping Network Visualization

Source: Extracted from VOSviewer Using Scopus Data

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

3.2.1 Keyword Co-occurence Network Analysis

From network visualization and the tabulated data, it is understood that the co-occurrence of diverse keywords demonstrates the interdisciplinary nature of metaverse shopping research and the emerging themes in the field. Keyword mapping represents a bibliometric network analysis of keywords related to the metaverse, with clusters categorized by different colors.

In keyword mapping network (Fig. 4), The network visualization highlights the interdisciplinary nature of metaverse-based shopping, connecting immersive technologies, AI, blockchain, and consumer behaviour. The central cluster (Cluster-I) named as "Immersive Experience" focuses on metaverse, virtual reality, and immersive shopping, emphasizing the role of digital environments. The blue cluster (Cluster II) named as "Technological Innovations" links AI, virtual worlds, and extended reality, etc. showcasing technological advancements. The green cluster (Cluster III) named as "Retail and Commerce" explores consumer behaviour, e-commerce, and sales, etc. reflecting market adoption trends. The yellow cluster (Cluster IV) named as "Consumer Behaviour" highlights online shopping, algorithms, and purchase intention, underlining data-driven personalization. The purple cluster (Cluster V) named as "Emerging Business Model" integrates blockchain and decentralization, signifying secure digital transactions. Strong interlinkages suggest that AI-driven personalization, immersive experiences, and decentralized commerce are shaping future retail strategies.

3.2.2 Emerging Themes & Interdisciplinary Linkages

A number of new topics are revealed by analysing keyword co-occurrence in metaverse-based shopping research. While AI and predictive analytics improve personalisation, technological innovations like AR, VR, MR, and blockchain serve as the foundation for immersive shopping experiences (Mystakidis, 2022; Benaben et al.,). customer-focused themes emphasize the psychological effects of immersive shopping on engagement and loyalty (Hudson, 2022). These topics include customer behaviour, decision-making, and purchase intention related to metaverse based shopping (Kaur et al., 2024; Otopah et al., 2024; Saffari et al., 2023). With a focus on operational effectiveness and sales growth, the metaverse's merger of retail and e-commerce connects traditional commerce with virtual surroundings (Pillai et al., 2024; Jenkins, 2022; Jafar et al.). Human-centered research and ethical and sustainability considerations highlight the wider societal ramifications of metaverse commerce (Mourtzis, 2023; Marcos & Bertolaso, 2024;).

The substantial co-occurrence of blockchain, virtual reality, and the metaverse highlights the technological convergence influencing this sector and leads to interdisciplinary connections (Ersoy & Gürfidan, 2023; Gadekallu et al., 2022). Phrases like mixed reality and immersive technologies denote continuous advancements to improve user experiences (Nicolosi et al., 2024). Additionally, although retail and online buying highlight useful commercial applications, phrases like consumer behaviour and purchase intention highlight the psychological components of immersive shopping (Dawson, 2022; Bratu & Sabău, 2022; Kliestik et al., 2022). The emphasis on virtual worlds and visualisation emphasizes how crucial it is to design interactive and captivating digital retail environments (Zhao et al., 2023). These interrelated themes, which integrate technology, psychology, business, and ethics into a single research environment, demonstrate the dynamic nature of metaverse commerce.

3.3 Mapping Analysis of Top Contributors

A total number of 13,166 authors were identified while performing co-citation analysis of cited authors. To visualize the density of the citation of the authors minimum number of citations per authors were set at 35 and out of 13,166 authors, a total of 30 authors met the threshold limit. Limiting the selection to 30 ensures the inclusion of crucial authors without overcomplicating the network visualization (Aria & Cuccurullo, 2017). Table 3 represents the authors with highest number of citations.

Table 3: Authors with Highest Citations

Author	Citation	Link Strength	Author	Citation	Link Strength
Lazaroiu G.	180	4362	Panda S.K.	42	84
Nica E.	148	3731	Djmiarescu I.	42	1248
Popescu G. H.	116	2702	Klestik T.	43	1235

Dwivedi Y.K.	116	1873	Dutot V.	40	910
Kim J.	81	1559	Rauschnabel P.A.	40	595
Andronic M.	74	2075	Chen J.	39	830
Wang Y.	73	1117	Nar M.	38	800
Hughes L.	75	1484	Iatagan M.	38	1129
Hamari J.	68	1346	Polak M.	38	1117
Dabija D.-C.	66	1875	Valaskova K.	36	1041
Xi N.	61	1145	Hollensen S.	35	833
Stefanescu R.	57	1610	Ribeiro-Navarrete S.	35	776
Buhalis D.	53	1065	Gustafsson A.	35	708
Flavian C.	46	922	Felix R.	35	889
Hinsch C.	44	922	Zvarikova K.	35	1139

Note: Authors are presented in the above table as per highest to lowest number of citations.

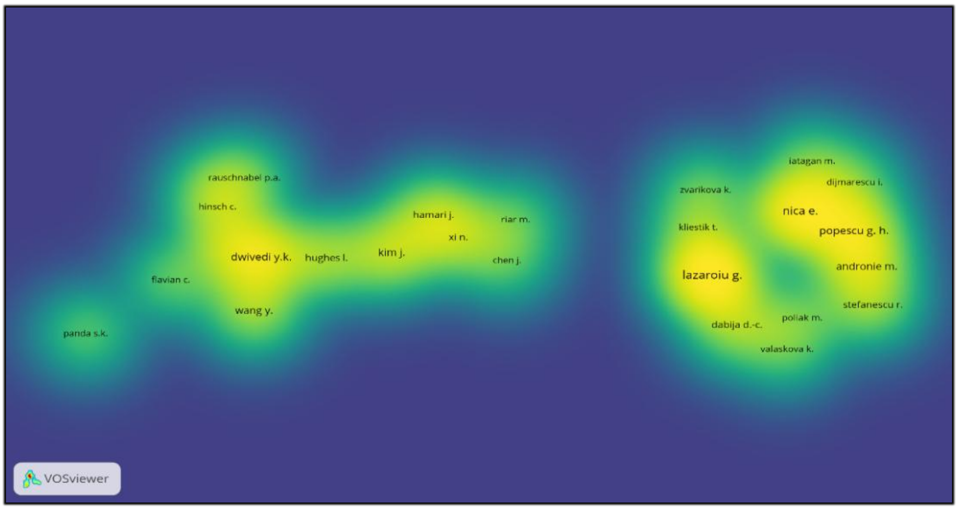

Fig 5: Density Visualization of Co-Citation Analysis of Cited Authors

Source: Extracted from Vosviewer using Scopus Data

The density visualization (Fig. 5) of the co-citation analysis of the cited authors highlights Lazaroiu G. (180 citations, 4362 link strength) and Nica E. (148 citations, 3731 link strength) as the most influential authors, with extensive interdisciplinary connections. Popescu G. H. and Dwivedi Y.K. follow closely, contributing significantly to digital transformation and consumer behaviour research. Hamari J. and Dabija D.-C. show strong influence in metaverse adoption, gamification, and retail marketing innovation, while Kim J. and Andronic M. maintain a moderate impact with notable collaborations. Lower-density authors like Felix R., Hinsch C., and Chen J. contribute to specialized domains with emerging influence. This mapping indicates a strong research focus on digital consumer behaviour, marketing strategies, and metaverse-based shopping, aligning well with technological advancements and emerging virtual economies.

3.4 Subject Area of Documents

Table 4 represents the area of the research of the documents selected for the bibliometric analysis. Area of these reviewed documents reflect a multidisciplinary approach to research on metaverse-based shopping,

Table 4: Subject Area of the Reviewed Documents

Subject Area	Number of Documents	Subject Area	Number of Documents
Computer Science	40	Economics	15
Social Science	22	Decision Science	8
Management	21	Psychology	6

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/
Research Article

Other	17	Mathematics	4
Arts & Humanities	17	Energy	3
Engineering	17	Materials Science	1

Note: Documents are presented in the above table as per highest to lowest number.
Source: Compiled By Authors based on Data Analysis in Vosviewer

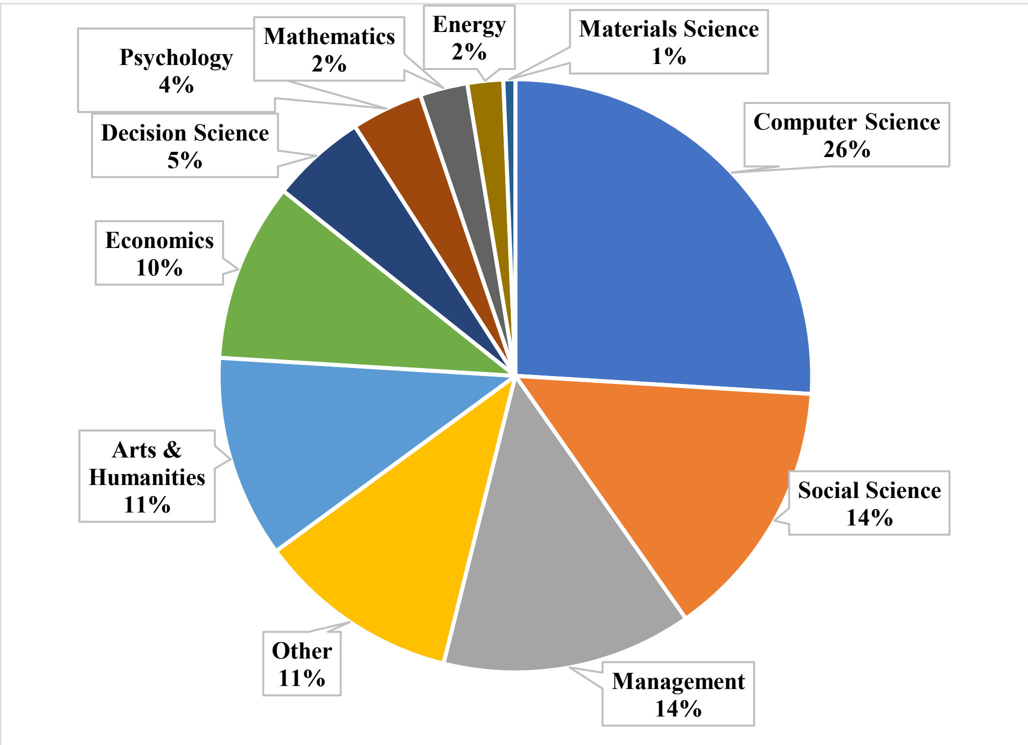

Fig 6: Subject area of the Documents
Source: Author's Own Work

In Fig. 6, we can see that the significant number of research coming from the area of Computer Science, accounting for 23.4% (40 documents), this highlights the technological backbone and computational advancements driving the metaverse. Social Science (13%) and Management (12.4%) follow, indicating interest in human behaviour, societal impacts, and organizational aspects. Arts and Humanities (10.2%), along with Engineering (9.9%) and Economics (8.7%), emphasize creative, technical, and financial perspectives, showcasing the diverse dimensions of metaverse applications. Smaller contributions from Decision Science (4.8%) and Psychology (3.4%) underline a growing focus on decision-making processes and individual behavioural insights. Mathematics (2.5%) and Energy (1.7%) suggest niche explorations into optimization and sustainability within the metaverse. The Other category (10.1%) reflects emerging or less conventional domains that are contributing to the evolving landscape of this research. This distribution emphasizes the interdisciplinary nature of metaverse-based shopping, driven by technological, societal, and economic imperatives.

As far as the future research is concerned, the interdisciplinary nature of research on metaverse-based shopping indicates a significant opportunity for future exploration across various fields. While Computer Science is the leading discipline, reflecting a strong technological foundation, there is an increasing necessity for studies in Social Sciences, Psychology, and Decision Science to better understand consumer behaviour, trust, and decision-making in virtual settings. Furthermore, the relatively lower involvement of Mathematics and Energy points to potential research gaps in areas like optimization, sustainability, and resource management within the metaverse. Future research could aim to integrate artificial intelligence, blockchain technology, and sustainable energy solutions to improve virtual shopping experiences.

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/
Research Article

3.5 Bibliographic Coupling Network Analysis (Countries)

While analyzing the data the minimum number of documents per country was set at 3. A total of 53 countries have gone for research related to metaverse based shopping, from which a total of 20 countries met the threshold. Table 5 represents the top 20 countries with the highest number of studies in the field. Countries with up to atleast 3 documents are being included in the table for bibliographic coupling analysis of countries. A minimum threshold of 3 documents per country was established to avoid noise from countries with insignificant number of studies (Van Eck & Waltman, 2014).

Table 5: Documents By Countries

Country	Documents	Citations	Country	Documents	Citations
India	34	93	Finland	6	288
United States	29	569	Malaysia	6	8
China	23	326	Germany	5	277
Romania	14	346	Hong Kong	5	41
Slovakia	11	336	Australia	4	33
United Kingdom	11	110	Denmark	4	13
Canada	7	57	Portugal	4	60
Czech Republic	7	143	South Africa	4	3
Italy	7	67	United Arab Emirates	4	16
South Korea	7	154	Taiwan	3	18
Spain	7	69	Turkey	3	31

Note: Countries are presented in the above table as per highest to lowest number of documents.
Source: Compiled by Authors based on Data Analysis in VOSviewer

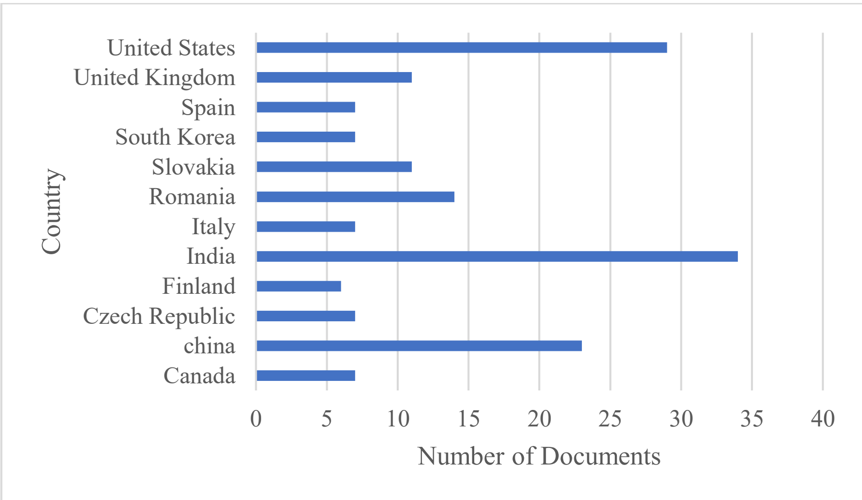

Fig 7: Country origin of Documents
Source: Author's Own Work

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/
Research Article

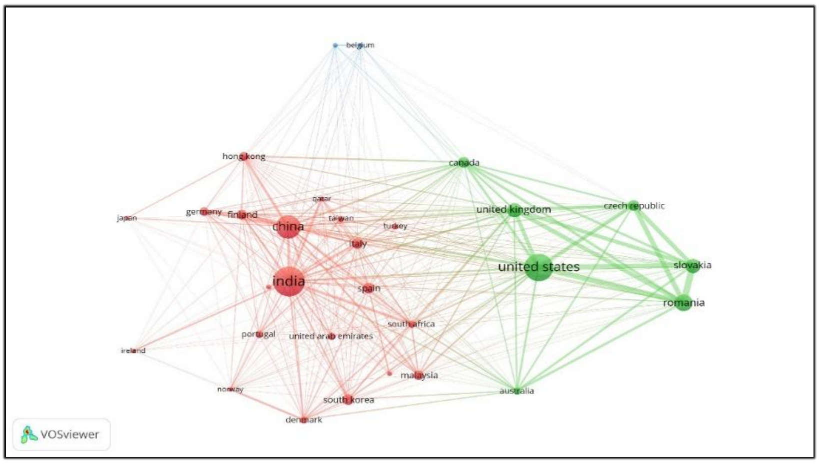

Fig 8: Bibliographic Coupling Network Visualization (Countries)
Source: Extracted from VOSviewer using Scopus Data

The network visualization of countries shows worldwide teamwork on metaverse studies, with two main groups. The red cluster (Cluster I) has India and China at its center, with strong links to Germany, Spain, Italy, South Korea, and South Africa. This points to a big research presence in Asia and some parts of Europe. The green cluster (Cluster II) has the United States, United Kingdom, Canada, and Australia leading the way. They form a connected research network with Romania, Slovakia, and the Czech Republic showing a Western-led research approach. The blue cluster (Cluster III) is represented by Belgium having strong connections with countries like China, Hong-Kong & Canada.

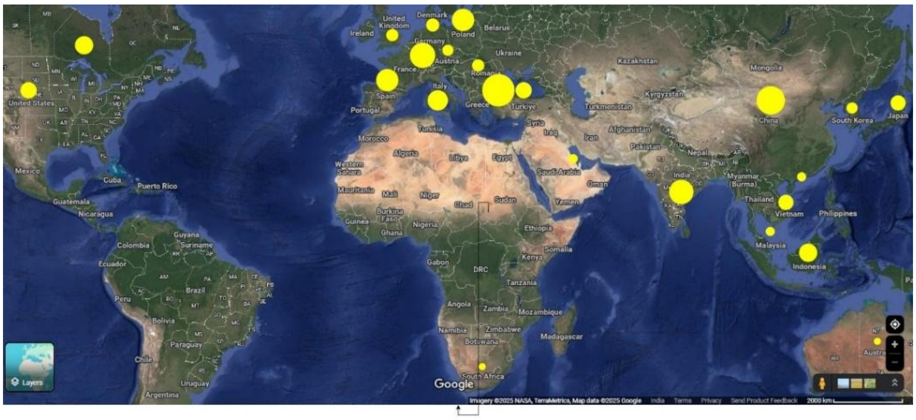

Fig 9: Geographical Locations of the Documents
Source: Compiled by Authors

The United States leads metaverse shopping research with 29 publications and a remarkable number of citations with 569. This highlights the country's dominance in technological innovation and its strong research ecosystem focusing on emerging technologies like the metaverse. China follows closely with 23 publications, reflecting its rapid advancements in digital commerce and immersive technologies. Countries like Romania (14 publications) and Slovakia (11 publications) have made substantial contributions. Their significant link strength demonstrates active collaboration and knowledge-sharing within the European research community. Other European nations like Finland (6, 288) and Germany (5, 277) further emphasize Europe's commitment to exploring metaverse applications in commerce and beyond. India leads the Asia-Pacific region with 34 publications and 93 citations, showcasing its emerging interest in metaverse-based commerce and consumer studies. South Korea (7, 154) and Hong Kong (5, 41) are also notable contributors, underlining the region's focus on technological integration and innovation. The United Kingdom (11, 110) and Canada (7, 57) represent strong contributions from the English-speaking world, leveraging their advanced research infrastructure. Meanwhile, Italy (7, 67) and Spain (7, 69) contribute insights from Southern

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/
Research Article

Europe, focusing on consumer behaviour and retail applications. Smaller contributors like Australia (4, 33), Malaysia (6, 8), and the United Arab Emirates (4, 16) reveal growing interest in the metaverse, albeit on a smaller scale.
The results clearly show a study deficit or research gap concerning the sixth objective (geographic distribution of metaverse retail research). Africa and Latin America are under-represented in metaverse shopping research, despite the fact that the analysis identifies major contributors such as the United States, China, India, and European countries. In order to comprehend how various economic, cultural, and technological settings impact the acceptance and growth of metaverse commerce, this gap restricts global inclusivity (Jang, 2022; Kim, 2023; Wider et al., 2024). There is also little research on cross-regional collaborations and how they influence global metaverse shopping trends, despite the identification of collaborative research clusters (such as the Asia-Europe and Western-led networks) (Dwivedi et al., 2022; Sharma & Bansal, 2023). Smaller economies like Malaysia and the United Arab Emirates are also emerging contributors, according to the data, but their research effect is still weak in terms of citations, suggesting a possible gap in their influence on the literature on metaverse trade. In order to fill these gaps and guarantee a more thorough worldwide view of metaverse-based shopping, future studies should concentrate on increasing geographical representation, encouraging collaborative research frameworks, and examining regional differences in metaverse adoption (Li & Li, 2024).

4. FINDINGS AND DISCUSSIONS

The bibliometric analysis reveals a consistent upward trajectory in the number of publications related to metaverse-based shopping. Early discussions were conceptual, focusing on defining the metaverse and its implications for digital commerce. However, in recent years, the research landscape has expanded significantly, reflecting increased interest in virtual retail spaces, consumer experiences, and technological integration. Notably, 2021-2023 witnessed a surge in publications, aligning with global advancements in immersive technologies and AI-driven virtual shopping environments. Key thematic clusters have emerged, emphasizing consumer engagement, immersive brand experiences, virtual reality (VR) commerce, and blockchain-driven transactions. Frequent keywords include “virtual reality,” “augmented reality,” “blockchain,” “Metaverse,” “consumer behaviour,” and “Electronic Commerce” etc. Co-occurrence network analysis suggests interdisciplinary connections between technology adoption models, consumer psychology, and marketing frameworks. The metaverse's shopping ecosystems exemplify a cross-disciplinary fusion, intertwining immersive technologies like virtual reality and blockchain with behavioural insights into consumer decision-making. This nexus bridges technological innovation, psychological inquiry into user engagement, and practical retail strategies, illustrating how digital advancements and human-centric research converge to redefine commerce, further showcases the convergence of digital marketing, human-computer interaction, and retail innovation. Prominent authors like Lazaroiu G., Nica E., and Dwivedi Y.K. have made significant contributions, particularly in understanding the behavioural and technological aspects of metaverse commerce.
The research is predominantly published in business, marketing, and information systems domains, with a mix of empirical studies, conceptual frameworks, and systematic reviews. Countries like the United States, China, the United Kingdom and South Korea are at the forefront of metaverse shopping research, driven by technological infrastructure, policy support, and corporate investments in virtual retail. The research distribution highlights a Western and East Asian dominance, with emerging contributions from India, Germany, and Australia, showcasing a growing global interest in the field.

4.1 Managerial Implications

The changing scene of metaverse-based shopping opens up big chances for companies to reshape how customers experience their brand. Store managers need to bring in technologies that pull you in, like AR and VR, to get shoppers more involved and make online shopping feel like being in a real store. Research shows that when businesses use personal avatars let people try products in a fun way, and use AI to suggest things, customers end up happier and more loyal. Also, shops need to make sure their payment systems work and use blockchain to keep things safe and clear. This builds trust when people buy things in virtual worlds. What's more, companies need to teach consumers about shopping in the metaverse to make them more comfortable with the technology. As digital strategies take the lead, brands must create plans that connect physical and virtual stores to stay competitive. We can't stress enough

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/
Research Article

how important data analysis is for understanding what consumers want helping companies tailor their marketing plans. Teaming up with metaverse platforms can also help brands reach more people and get noticed. To keep up, managers should always keep an eye on new tech, changes in rules, and what consumers expect. This field is growing fast, so leaders need to be flexible and work across different teams to make sure their businesses can respond to changes brought on by the metaverse.

4.2 Policy Implications

The growth of metaverse shopping calls for well-rounded rules to manage online purchases, protect buyers, and keep personal information safe. Governments must spell out tax duties for companies doing business in the metaverse. This ensures fair sharing of money while helping online businesses grow. Also, laws need to state how to protect brands and makers' rights to stop others from copying virtual items without permission. We need to broaden consumer protection laws to include metaverse deals. These laws should stress clear refund rules, ways to solve disagreements, and make service terms the same for everyone. For instance, Platforms like Zepeto and Roblox must adhere to national tax laws after South Korea imposed a 10% VAT on digital commodities, including virtual assets (Lee, 2016). Also, like cryptocurrencies, the U.S. Internal Revenue Service (IRS) views metaverse transactions as digital property and taxes virtual assets (Behrendt, 2023). The European Union's General Data Protection Regulation (GDPR) offers a framework for protecting user data, guaranteeing that businesses like Meta (previously Facebook) and Decentraland adhere to stringent rules for the gathering, storing, and processing of data (De Magalhães, 2020). We also need to think about making metaverse shopping easy for people with disabilities. Worldwide teamwork between rule makers, tech creators, and business heads is key to make rules work together and create a safe fair, and new virtual market. Getting ahead with making rules will build trust in the metaverse economy and help digital business grow for a long time.

4.3 Future Research Agenda

Future study should examine the economic, infrastructural, and socio-cultural aspects influencing metaverse retail in emerging economies in order to better understand regional adoption patterns and address the geographical research imbalance in metaverse commerce. International partnerships between top research centres and under-represented areas will promote knowledge sharing and capacity building, assisting in the inclusion of a range of viewpoints in the global conversation. Furthermore, investigating localised branding and rising economy-specific marketing techniques can guarantee that metaverse purchasing fits with a range of customer habits, increasing its uptake in various markets. It will be easier to identify obstacles to the growth of metaverse retail and provide tactical solutions for promoting digital transformation if regulatory and policy frameworks in emerging countries are examined. The results show that research is heavily concentrated in North America, Europe, and some regions of Asia, with Africa and Latin America contributing very little. By investigating infrastructure issues in under-represented markets, creating region-specific marketing plans, and encouraging cooperative research and knowledge-sharing projects amongst institutions globally, future research should fill these gaps. In addition to fostering a more thorough and inclusive understanding of the development of virtual retail, broadening the geographic reach of metaverse commerce research will help companies successfully deploy metaverse-based shopping solutions across a range of economic environments.

5. SIGNIFICANCE OF THE STUDY

The rapid proliferation of the metaverse has disrupted traditional commerce paradigms by introducing immersive shopping experiences that blend physical and digital realities (Ritterbusch & Teichmann, 2023). By employing bibliometric analysis, this research provides a systematic mapping of the intellectual structure and evolution of metaverse shopping literature, addressing the critical need for comprehensive field analyses. While existing research explores aspects such as virtual reality's role in retail and blockchain's contribution to consumer trust, a comprehensive bibliometric analysis capturing global research trends, interdisciplinary linkages, keyword co-occurrences, and citation patterns in metaverse-based shopping is missing (Kaplan & Haenlein, 2010; Zhang et al., 2024). This gap in synthesizing current literature hinders the identification of influential contributors, interdisciplinary linkages, and emerging research directions critical to advancing the field (Chen et al., 2023; van Eck & Waltman, 2014). The bibliometric approach offers valuable insights into collaboration patterns (Hassan & Duarte, 2024) and research impacts across different geographical regions also. This study addresses these issues by employing a bibliometric framework to map the evolution of metaverse-based shopping literature, offering valuable insights into how technological advancements and consumer behaviour intersect. The findings provide a foundational understanding of the global trend of the metaverse shopping related research, paving the way for future research and practical applications.

6. LIMITATIONS OF THE STUDY

Reliance on Scopus excludes potentially relevant works from Google Scholar, Web of Science, IEEE Xplore, or non-indexed platforms, potentially skewing coverage. The exclusion of non-English publications may underrepresent contributions from non-Anglophone regions. Bibliometric analysis emphasizes quantitative metrics (e.g., citation counts) over qualitative insights, potentially overlooking nuanced theoretical advancements and also the exclusion of non-English publications may underrepresent contributions from non-Anglophone regions. The focus on metaverse-based shopping excludes adjacent domains like virtual tourism or gaming economies, limiting interdisciplinary connections. On the other side this study prioritizes academic publications, omitting grey literature (e.g., industry reports, whitepapers), which may offer practical insights into commercial metaverse applications.

7. CONCLUSION

Emerging research on metaverse-driven commerce underscores its transformative potential in reshaping consumer interactions and retail infrastructure. By integrating artificial intelligence for personalized experiences, blockchain for secure transactions, and immersive virtual environments for dynamic product engagement, this domain is poised to redefine traditional paradigms of trade. Academic inquiry increasingly intersects with industry practices, exploring how adaptive algorithms influence purchasing decisions, how decentralized platforms alter supply chains, and how hyper-realistic simulations bridge physical and digital retail spaces. For sustainable adoption, future advancements must prioritize ethical frameworks for data governance, equitable access to virtual marketplaces, and cross-sector collaboration to harmonize innovation with user-centric design. Such interdisciplinary efforts—spanning computer science, behavioural economics, and policy design—will determine how seamlessly these hybrid ecosystems evolve, balancing technological ambition with societal trust and inclusivity.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Agarwal, A., & Alathur, S. (2023). Metaverse revolution and the digital transformation: intersectional analysis of Industry 5.0. Transforming Government: People, Process and Policy, 17(4), 688-707.
[2] Al-Ghaili, A. M., Kasim, H., Al-Hada, N. M., Hassan, Z. B., Othman, M., Tharik, J. H., ... & Shayea, I. (2022). A review of metaverse's definitions, architecture, applications, challenges, issues, solutions, and future trends. Ieee Access, 10, 125835-125866.
[3] Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. Journal of informetrics, 11(4), 959-975.
[4] Bamberger, B., Reinartz, W., & Ulaga, W. Navigating the future of B2B marketing: The transformative impact of the industrial metaverse. Journal of Business Research, 188, 115057.
[5] Behrendt, P. (2023). Taxation of the New Age: New Guidance for the World of Digital Assets. Journal of Tax Practice & Procedure, 25(2).
[6] Benaben, F., Congès, A., & Fertier, A. A prospective vision of the evolution of immersive technologies: Towards a definition of metaverse. Technovation, 140, 103154.

[7] Bilgili, B., Özkul, E., Koç, E., & Ademoğlu, M. O. (2019). An investigation of augmented reality applications from the perspectives of brand trust and purchase intentions of customers. In Contemporary issues in behavioral finance (pp. 53-64). Emerald Publishing Limited.
[8] Bourlakis, M., Papagiannidis, S., & Li, F. (2009). Retail spatial evolution: paving the way from traditional to metaverse retailing. Electronic commerce research, 9, 135-148.
[9] Bratu, S., & Sabău, R. I. (2022). Digital commerce in the immersive metaverse environment: cognitive analytics management, real-time purchasing data, and seamless connected shopping experiences. Linguistic and Philosophical Investigations, 21, 170-186.
[10] Bukar, U. A., Sayeed, M. S., Razak, S. F. A., Yogarayan, S., Amodu, O. A., & Mahmood, R. A. R. (2023). A method for analyzing text using VOSviewer. MethodsX, 11, 102339.
[11] Cao, Y., Qu, X., & Chen, X. (2024). Metaverse application, flow experience, and Gen-Zers' participation intention of intangible cultural heritage communication. Data Science and Management, 7(2), 144-153.
[12] Carr, N. T. (2008). Using Microsoft Excel® to calculate descriptive statistics and create graphs. Language Assessment Quarterly, 5(1), 43-62.
[13] Chen, J., Xiao, H., Hu, M., & Chen, C. M. (2023). A blockchain-based signature exchange protocol for metaverse. Future Generation Computer Systems, 142, 237-247.
[14] Dawson, A. (2022). Data-driven consumer engagement, virtual immersive shopping experiences, and blockchain-based digital assets in the retail metaverse. Journal of Self-Governance and Management Economics, 10(2), 52-66.
[15] de Magalhães, S. T. (2020). The european union's general data protection regulation (gdpr). In Cyber Security Practitioner's Guide (pp. 529-558).
[16] 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.
[17] Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., ... & Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management, 66, 102542.
[18] 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.
[19] Enyejo, J. O., Obani, O. Q., Afolabi, O., Igba, E., & Ibokette, A. I. (2024). Effect of Augmented Reality (AR) and Virtual Reality (VR) experiences on customer engagement and purchase behavior in retail stores. Magna Scientia Advanced Research and Reviews, 11(2), 132-150.
[20] Ersoy, M., & Gürfidan, R. (2023). Blockchain-based asset storage and service mechanism to metaverse universe: Metarepo. Transactions on Emerging Telecommunications Technologies, 34(1), e4658.
[21] Farshid, M., Paschen, J., Eriksson, T., & Kietzmann, J. (2018). Go boldly!: Explore augmented reality (AR), virtual reality (VR), and mixed reality (MR) for business. Business horizons, 61(5), 657-663.
[22] Fauzi, M. A., Cheng, J. K., Kamaruzzaman, Z. A., Mustapha, M. R., Mohd Aripin, N., Musa, R., & Sadun, A. S. E-commerce and the metaverse: present and future trends of consumers' adoption. The International Review of Retail, Distribution and Consumer Research, 1-21.
[23] Gadekallu, T. R., Huynh-The, T., Wang, W., Yenduri, G., Ranaweera, P., Pham, Q. V., ... & Liyanage, M. (2022). Blockchain for the metaverse: A review. arXiv preprint arXiv:2203.09738.
[24] 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.
[25] Gottschalk, S. (2010). The presentation of avatars in second life: Self and interaction in social virtual spaces. Symbolic interaction, 33(4), 501-525.
[26] Gundolf, K., & Filser, M. (2013). Management research and religion: A citation analysis. Journal of Business Ethics, 112, 177-185.
[27] Hassan, W., & Duarte, A. E. (2024). Bibliometric Analysis: A Few Suggestions. Current Problems in Cardiology, 102640.

[28] Hudson, J. (2022). Virtual immersive shopping experiences in metaverse environments: Predictive customer analytics, data visualization algorithms, and smart retailing technologies. Linguistic and Philosophical Investigations, (21), 236-251.
[29] Jafar, R. M. S., Jabeen, M., Hussain, S., Niu, B., Sham, R., & Al-Adwan, A. S. Cyber Shopping Beyond Boundaries: The Metaverse Revolution in e-Commerce and Consumer Behavior. Human Behavior and Emerging Technologies, 5559234.
[30] Jang, P. S. (2022). Analysis of international research trends in metaverse: focusing on the publications in Web of Science indexed journals. Journal of the Korea society of computer and information, 27(10), 155-162.
[31] Jenkins, T. (2022). Immersive virtual shopping experiences in the retail metaverse: Consumer-driven E-commerce, blockchain-based digital assets, and data visualization tools. Linguistic and Philosophical Investigations, (21), 154-169.
[32] Kalender, Y., & Guzmán, F. (2024). What Drives Consumers to Engage in Immersive Technologies? A Consumer Metaverse Engagement Motivation Model. Psychology & Marketing.
[33] Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. Business Horizons, 53(1), 59-68.
[34] Kaur, J., Mogaji, E., Paliwal, M., Jha, S., Agarwal, S., & Mogaji, S. A. (2024). Consumer behavior in the metaverse. Journal of Consumer Behaviour, 23(4), 1720-1738.
[35] Kim, H. (2023). An analysis of domestic and international research trends on metaverse. Journal of the Korean Society for Library and Information Science, 57(3), 351-379.
[36] Kim, J. H., Kim, M., Park, M., & Yoo, J. (2021). How interactivity and vividness influence consumer virtual reality shopping experience: the mediating role of telepresence. Journal of Research in Interactive Marketing, 15(3), 502-525.
[37] Kirby, A. (2023). Exploratory bibliometrics: using VOSviewer as a preliminary research tool. Publications, 11(1), 10.
[38] Klarin, A. (2024). How to conduct a bibliometric content analysis: Guidelines and contributions of content co-occurrence or co-word literature reviews. International Journal of Consumer Studies, 48(2), e13031.
[39] Kliestik, T., Novak, A., & Lăzăroiu, G. (2022). Live shopping in the metaverse: Visual and spatial analytics, cognitive artificial intelligence techniques and algorithms, and immersive digital simulations. Linguistic and Philosophical Investigations, 21, 187-202.
[40] Lee, H. C. (2016). Can electronic tax invoicing improve tax compliance? A case study of the Republic of Korea's electronic tax invoicing for value-added tax. A Case Study of the Republic of Korea's Electronic Tax Invoicing for Value-Added Tax (March 7, 2016). World Bank Policy Research Working Paper, (7592).
[41] Li, H., & Li, B. (2024). The state of metaverse research: a bibliometric visual analysis based on CiteSpace. Journal of Big Data, 11(1), 14.
[42] Liu, T., & Jeong, H. Standard human-centric metrics for interpersonal Metaverse. In Human-Centered Metaverse (pp. 235-250). Morgan Kaufmann.
[43] Marcos, A., & Bertolaso, M. (2024). Technological Humanism & Sustainable AI. In Digital Environments and Human Relations (pp. 187-204). Springer, Cham.
[44] Mourtzis, D. (2023). The Metaverse in industry 5.0: A human-centric approach towards personalized value creation. Encyclopedia, 3(3), 1105-1120.
[45] Murgai, A. (2022). Metaverse Marketing--Redefining Marketing Strategies in the Digital Era. International Journal of Recent Research in Commerce, Economics and Management.
[46] Mystakidis, S. (2022). Metaverse. Encyclopedia, 2(1), 486-497.
[47] Nicolosi, F., de Laurentis, C., Giussani, C., Marcus, H. J., Spena, G., & Ammar, A. (2024). Mixed Reality and Metaverse. In Ethical Challenges for the Future of Neurosurgery (pp. 141-159). Cham: Springer Nature Switzerland.
[48] Otopah, A. A., Dogbe, C. S. K., Amofah, O., & Ahlijah, B. (2024). Digital marketing and purchase intention of bank services: the role of trust and engagement. International Journal of Bank Marketing, 42(7), 1920-1945.
[49] Pendlebury, D. A. (2009). The use and misuse of journal metrics and other citation indicators. Archivum immunologiae et therapiae experimentalis, 57, 1-11.

Journal of Information Systems Engineering and Management
2024, 9(2)
e-ISSN: 2468-4376
https://www.jisem-journal.com/

Research Article

[50] Pillai, R., Sivathanu, B., Rana, N. P., & Struweg, I. (2024). Assessing the determinants of metaverse adoption for e-commerce retailing. Journal of Computer Information Systems, 1-20.
[51] Rafique, W., & Qadir, J. (2024). Internet of everything meets the metaverse: Bridging physical and virtual worlds with blockchain. Computer Science Review, 54, 100678.
[52] Rathore, B. (2023). Digital transformation 4.0: integration of artificial intelligence & metaverse in marketing. Eduzone: International Peer Reviewed/Refereed Multidisciplinary Journal, 12(1), 42-48.
[53] Ritterbusch, G. D., & Teichmann, M. R. (2023). Defining the metaverse: A systematic literature review. IEEE Access, 11, 12368-12377.
[54] Saffari, F., Kakaria, S., Bigné, E., Bruni, L. E., Zarei, S., & Ramsøy, T. Z. (2023). Motivation in the metaverse: A dual-process approach to consumer choices in a virtual reality supermarket. Frontiers in Neuroscience, 17, 1062980.
[55] Sharma, A., & Bansal, A. (2023). Digital marketing in the metaverse: Beginning of a new era in product promotion. In Applications of Neuromarketing in the Metaverse (pp. 163-175). IGI Global.
[56] 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.
[57] Sung, E. C., Bae, S., Han, D. I. D., & Kwon, O. (2021). Consumer engagement via interactive artificial intelligence and mixed reality. International Journal of Information Management, 60, 102382.
[58] Van Eck, N. J., & Waltman, L. (2011). VOSviewer manual. Manual for VOSviewer version, 1(0), 1-27.
[59] Van Eck, N. J., & Waltman, L. (2014). Visualizing bibliometric networks. In Measuring scholarly impact: Methods and practice (pp. 285-320). Cham: Springer International Publishing.
[60] Van Eck, N., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. scientometrics, 84(2), 523-538.
[61] Wider, W., Jiang, L., Lin, J., Fauzi, M. A., Li, J., & Chan, C. K. (2024). Metaverse chronicles: a bibliometric analysis of its evolving landscape. International Journal of Human--Computer Interaction, 40(17), 4873-4886.
[62] Xi, N., Chen, J., Gama, F., Riar, M., & Hamari, J. (2023). The challenges of entering the metaverse: An experiment on the effect of extended reality on workload. Information Systems Frontiers, 25(2), 659-680.
[63] 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.
[64] 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.
[65] Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. Organizational research methods, 18(3), 429-472.