



Harnessing Metaverse Technology to Foster Cultural Communication

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Abstract

This paper explores research on Metaverse technologies and their impact on enhancing cultural communication, aiming to assess the social relevance of these findings. The results indicate that research on the Metaverse and its connection to cultural communication began in 2005 with limited scope but expanded significantly by 2015, driven by growing interest and acknowledgment. The studies span various fields, including technology adoption, cultural and educational implications, public engagement and accessibility, ideological and cultural influences, as well as organizational and leadership challenges. Most of the research reviewed is qualitative, relying heavily on theoretical models and case studies. Cultural factors and user experiences, particularly analyzed through the lens of Cultural Theory, are key areas of focus. The field of Metaverse and cultural communication research presents a complex, dynamic landscape with both challenges and opportunities. The literature highlights the significance of integrating emerging technologies into cultural and educational contexts, offering valuable perspectives on the multifaceted nature of these developments.

Keywords : Metaverse, Communication, Culture, Artificial Intelligence, Virtual reality, Augmented Reality

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Introduction

The Metaverse has garnered more interest in modern conversations, highlighted by Facebook's change to Meta (Zuckerman, 2021). Microsoft, under the leadership of CEO Satya Nadella, has put forth a visionary outlook on the Metaverse, emphasizing its ability to revolutionize how people see and engage with the world (Nadella, 2021). Likewise, the launch of Omniverse by NVIDIA marks a notable advancement in the realm of the Metaverse, showcasing the worldwide surge in Metaverse innovation and progress (Huang, 2021). This increased level of activity in various industries and academic sectors demonstrates a strong dedication to promoting research and innovation related to the Metaverse. In terms of culture, the Metaverse acts as a lively stage for cultural interaction and the appreciation of unique traits. It introduces a new era of mixing cultures and exploring by maintaining a harmony between adopting worldwide trends and protecting one's cultural identity (Gaurav, 2023). The authors of this paper seek to assess current studies on the impact of the metaverse on culture dissemination. This includes thoroughly examining academic papers, real-life examples, and theoretical models to explore how the metaverse, with its virtual worlds and immersive tech, enables or changes cultural interactions. The research aims to investigate how different elements of the metaverse impact the dissemination and development of cultural norms, beliefs, and objects within diverse societies and areas.

Literature Review

The rise of Metaverse technology has brought about new possibilities for communication through the development of immersive digital environments that go beyond physical boundaries. This review of literature delves into the emerging area of Metaverse technology and its ability to enhance cultural communication.

About Metaverse

Metaverse is a combined virtual shared environment formed by the merging of physical and virtual worlds. It is a platform where individuals can communicate with each other in real-time, frequently using avatars, and interact with digital content. Mystakidis (2022) explains that the Metaverse is a sophisticated digital domain where the boundaries between the physical world and virtual experiences are blended seamlessly. It is an ever-changing collaborative space that combines real-life experiences with interactive digital worlds. This integration depends on the coming together of advanced technologies that enable multisensory interaction with virtual environments and digital objects, such as virtual reality (VR) and augmented reality (AR). Therefore, the Metaverse operates as an intricate system of linked social and immersive platforms, where users engage in continuous, multiuser digital environments (Li, 2022; George, 2021; Ng, 2022; Song, 2022; Haitham et al., 2024; Alzoubi et al., 2024).

Metaverse for Cultural Communication

The metaverse combines augmented physical reality with persistent virtual environments, allowing for immersive cultural experiences to take place. Users have the opportunity to interact with cultural artifacts and environments in a three-dimensional space through virtual museums, galleries, and heritage sites (Mystakidis, 2022). An example of this is the British Museum, which provides virtual tours allowing people worldwide to see its displays (Gaitatzes et al., 2001). Boellstorff (2016) points out that the metaverse enables virtual cultural activities like concerts, festivals, and exhibitions, enabling global involvement regardless of location. These occasions frequently involve interactive elements such as virtual meetings with artists, promoting increased social engagement and exchange of culture. Huggett (2020) argues that maintaining cultural heritage requires virtual reconstructions in the metaverse. By developing precise virtual representations of at-risk locations and objects, these technologies ensure that cultural heritage stays available for upcoming generations (Roussou & Slater, 2017; Snoussi, 2024). The metaverse's capacity for cultural preservation is exemplified through the digital recreation of historic locations such as Palmyra.

Although AI and the metaverse bring about notable progress in cultural communication, they also raise various concerns. Hilbert and López (2011) explain that socio-economic factors could limit access to these technologies, which may exacerbate discrepancies in cultural access. Ethical and privacy concerns make their utilization more complex; Zuboff (2019) highlights the importance of responsibly managing user data to protect privacy. Kashyap (2024) expresses worries regarding the impact of AI-created cultural material on ownership and intellectual rights. Furthermore, the significant computational power required by AI and metaverse technologies presents challenges for their widespread adoption. Lanier (2017) highlights the importance of enhancing hardware and software to achieve lifelike virtual experiences.

In order to comprehend how the Metaverse impacts the spread of culture and evaluate the current research on this subject, it is necessary to carry out a comprehensive literature review. This assessment will include a meta-analysis and qualitative synthesis of academic literature, examining the impact of the Metaverse on cultural dissemination. This thorough review seeks to clarify the effects of immersive technologies and virtual environments on cultural exchange and transformation by analyzing and combining findings from different studies. The examination will investigate previous studies to uncover patterns, trends, and lacunae in the literature, offering a detailed overview of how cultural dynamics influence and are influenced by the Metaverse. This method will not just bring attention to existing knowledge but will also provide clues about areas that need more research, thus furthering our comprehension of how the Metaverse contributes to cultural development.

Research questions

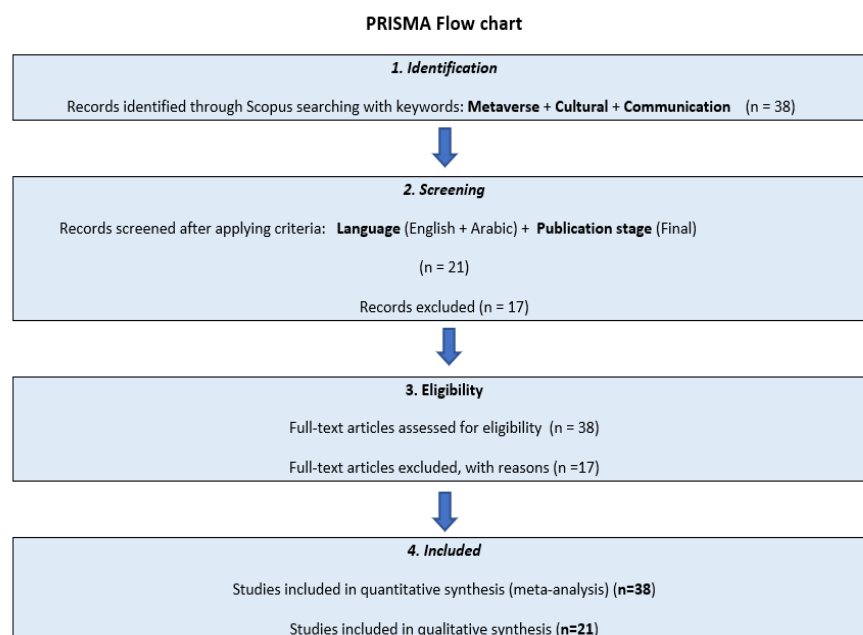
The paper is structured around the following research questions:

1. RQ1: How has research on the metaverse and cultural communication evolved over time?
2. RQ2: What research problems have been addressed in metaverse and cultural communication studies over the years?
3. RQ3: What are the predominant methods employed in metaverse and cultural communication studies?
4. RQ4: What are the most commonly used theories in metaverse and cultural communication research?
5. RQ5: To what extent does the literature on metaverse and cultural communication contribute to enhancing cultural communication practices?

Method

This paper investigates the main subjects in metaverse and cultural communication studies in order to determine the popular areas of research and prominent research methods and theoretical frameworks. The objective is to evaluate the ways in which these components add to the advantages for society. A systematic review was carried out on research from the Scopus database using mixed methods, focusing on the keywords Metaverse + Cultural + Communication. This included meta-analysis for quantitative data and qualitative synthesis for qualitative data. At this point, there were no limitations on the time period, location, language, category, or publication source. The investigation resulted in 38 documents, with the oldest one being published in 2005. The meta-analysis included 38 documents to investigate how research on the metaverse and cultural communication has changed over time. Afterward, two particular standards were utilized to enhance the outcomes for the qualitative summary: (English + Arabic languages; Final publication stage). No document has been published in the Arabic language on this topic yet, which is why the authors opted to address this publication only in English.. Following removal of publications not in English and those not yet completed, the final selection was reduced to 21 documents for qualitative examination addressing issues raised (RQ2), methods utilized (RQ3), theories applied (RQ4), and their impact on improving cultural communication practices (RQ5).

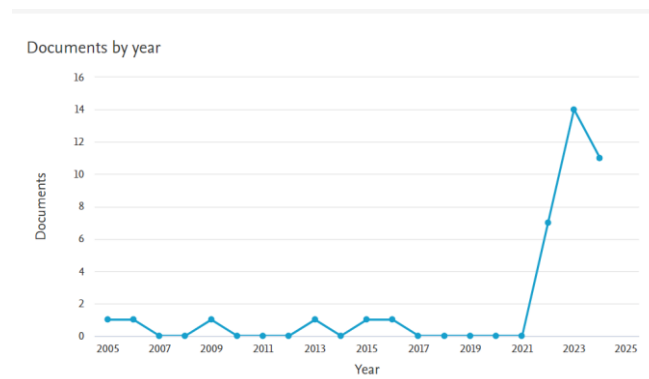
Here is the PRISMA flow chart, originally developed by Liberati et al. (2009), which illustrates the sampling procedure and clarifies the process of information selection and review:



Findings

Evolution of Research on the Metaverse and Cultural Communication (RQ1)

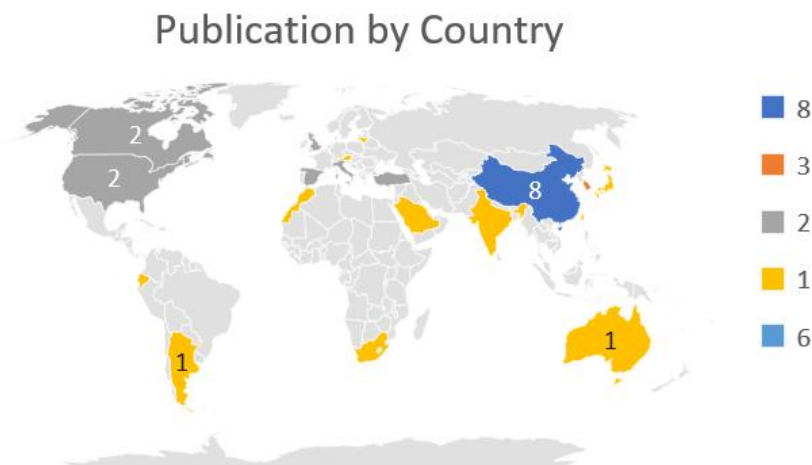
In order to address this research inquiry, a meta-analysis was carried out. Information indicates that articles regarding the metaverse and cultural communication first emerged in 2005, with only a small number published each year until 2015 (typically 1 to 2 per year). From 2015 onwards, there was a marked rise in publications, reaching a notable peak in 2023 with a total of 14 publications.



Graph 1. Publications by year

(Extracted using Scopus analytics)

The data shows that most research on the metaverse and cultural communication comes from China, with a total of eight studies. South Korea comes next with three publications. Canada, Italy, Spain, Turkey, the United Kingdom, the United States, and Argentina are among the countries that have contributed to the research, with each country having two publications. This pattern illustrates a notable focus on research in China and South Korea, with other countries also making meaningful but smaller impacts in the field.

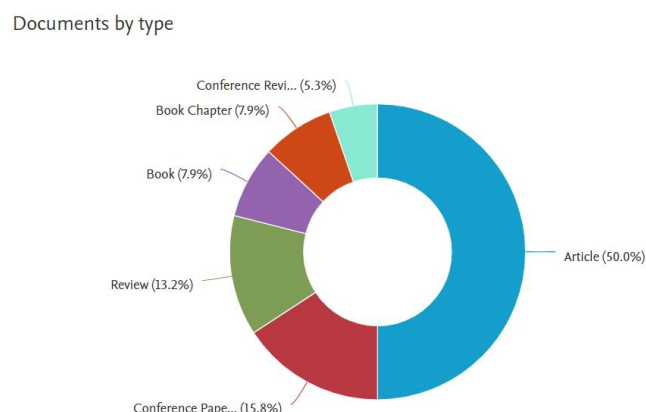


Graph 2. Publications by Country

(Extracted using Scopus analytics)

Half of the publications on the metaverse and cultural communication are made up of journal articles (50%), emphasizing their importance and key role in sharing research in this area. Conference papers make up 16% of the publications, demonstrating their significance in showcasing new research. 13% of the total represents the contribution of reviews in synthesizing and summarizing existing research. Both books and book chapters each make up 8% of the total publications, indicating a strong emphasis on consolidating and summarizing current information. Conference reviews make up 5% of the publications, indicating their

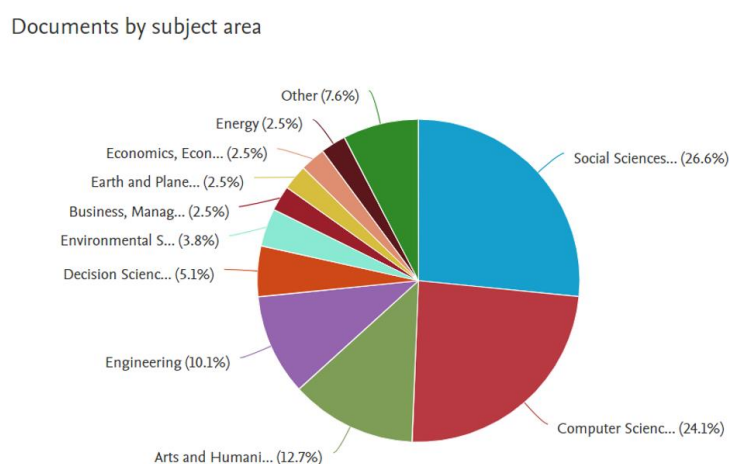
importance in assessing and reflecting on developments shared at conferences. This distribution highlights the various ways research on the metaverse and its impact on culture is disseminated and investigated.



Graph 3. Publications by Type

(Extracted using Scopus analytics)

Articles discussing the metaverse and how it boosts culture mainly concentrate on diverse academic disciplines. Social sciences are at the forefront with more than 26% of the publications, highlighting a significant curiosity in exploring the social and cultural impacts of the metaverse. Computer science closely follows, making up 24.1% of the publications, emphasizing the technological progress and innovations propelling the growth of the metaverse. 12.5% of the publications focus on arts and humanities, showing an interest in the cultural and artistic aspects of the metaverse. Engineering makes up 10% of the publications, with a focus on the technical aspects and infrastructure needed for metaverse applications. Other fields have lower publication rates, indicating a more focused or developing interest in exploring the metaverse's connection to cultural studies. This allocation highlights how research on the metaverse is interdisciplinary, showcasing its wide-ranging influence on culture and technology.



Graph 4. Publications by subject area

(Extracted using Scopus analytics)

In summary, writings on the metaverse and cultural communication started in 2005, with little production until 2015. There was a significant rise in publications afterward, reaching a peak of 14 in 2023. China is in the top spot for the most publications, with South Korea coming in second place. Most of these publications

consist of articles from journals. The study covers various academic disciplines, with social sciences and computer sciences taking the lead, followed by arts and humanities and engineering. Data emphasizes how research in the metaverse involves various fields, including technology and culture. This varied academic involvement demonstrates the intricate relationship between technology and culture, illustrating the metaverse's influence on different aspects of modern life and scholarly research.

A thorough analysis of publications is essential for understanding the scholarly contributions in this field. To achieve this, a qualitative synthesis was applied to English-language research papers published over the years. This evaluation focuses on the subjects addressed, the methods utilized, and the theoretical foundations employed in the research. By focusing on these aspects, the study aims to provide deeper insights into the evolving perspectives and approaches in the field, demonstrating how researchers are overcoming challenges and advancing knowledge of the metaverse's impact on cultural communication.

Main Research problems raised in Metaverse and cultural communication Studies (RQ2)

In order to address research questions 2, 3, 4, and 5, a qualitative synthesis was undertaken. Regarding the key issues discussed in the analyzed data, results validate that the metaverse and cultural communication research field presents an intricate and changing set of difficulties and possibilities. Various studies have exposed the complex process of blending emerging technologies with cultural and educational practices.

Global Perspectives and Technological Integration

A major problem noted is the prevalence of platforms such as Horizon Worlds and Meta, leading to a biased view of the metaverse that leans towards a US-centric viewpoint. Research like the one on "Global Visions for a Metaverse" suggests that this emphasis restricts the understanding of various worldwide visions and hinders critical involvement with non-Western outlooks. There is a demand for a comprehensive examination of worldwide metaverse advancements to gain a deeper insight into its possibilities and constraints in diverse cultures. Another obstacle arises with the merging of augmented reality (AR) and virtual reality (VR) technologies. Studies like the one on "Exploring the Connection between Users' Behavioral Intentions and Learning Outcomes of VR System" highlight the challenges of aligning these technologies for cultural tourism and heritage conservation. The challenges and restrictions faced in using AR and VR simultaneously demonstrate the technological obstacles that need to be resolved in order to improve interactive experiences in cultural settings.

Holistic Approaches and Technological Fragmentation

The research on "Cyber-physicality" highlights the issue of separate studies on specific technological advancements without considering how they are all connected. As we advance through the fourth industrial revolution, it is essential to grasp how AI, blockchain, and IoT technologies work together in cyber-physical systems to create holistic frameworks that manage their combined effects on business, communication, and education.

Cultural Heritage and Democratization

Incorporating digital visual assets in archaeology and cultural heritage communication presents obstacles in making knowledge more accessible and increasing public involvement. Study on "The Necessity of Digital Visual Assets" emphasizes the importance of enhancing links between culture and tradition using digital and interactive methods. This shows an increasing need for technologies that not just protect, but also enhance accessibility and engagement with cultural heritage for various audiences.

Organizational Culture and Innovative Solutions

The study "Harmonizing Culture in Co-operative Business Ventures" focuses on the challenges of merging diverse organizational cultures. Conventional approaches frequently do not meet expectations, prompting a need for creative strategies to handle and resolve cultural discrepancies successfully.

AI and Human-Computer Interaction

Studies like "Research on the Application of Cultural Information Dissemination Model" focus on the difficulty of assessing the effects of human-computer integration and AI on information dissemination and content creation in digital communities. This shows the importance of gaining a deeper understanding of the impact of AI technologies on cultural communication in digital environments.

Cultural Tourism and Immersive Experiences

Defining concepts, technologies, and application scenarios poses challenges in the emerging cultural tourism metaverse. The research on "Cultural Tourism Metaverse" emphasizes the challenge of combining metaverse technologies with cultural tourism to make immersive experiences that smoothly mix virtual and real-world aspects.

Journalistic Practices and Ideological Influences

The issue of examining how digital architectures impact online journalism is investigated in "Cultures of Digital Architectures." This research examines the impact of technological advancements on journalistic practices and socio-cultural relationships in the media industry, emphasizing the importance of analyzing ideological impacts and socio-cultural dynamics more deeply.

Environmental Awareness and Global Thinking

"Personalizing Environmental Issues" explores the escalating importance of global environmental problems and the insufficiency of conventional methods. This study examines the potential of a virtual museum in the metaverse to encourage global awareness and inspire new behaviors to address environmental issues, proposing a fresh method to promote action and consciousness using immersive technologies.

Educational Inclusivity and Technological Integration

The issue of adjusting educational settings to cater to a variety of student needs is addressed in "Inclusive Learning Using Industry 4.0 Technologies." This research investigates how Industry 4.0 technologies can cater to different learning styles and encourage inclusivity, showing an increasing focus on using technology to meet a range of educational requirements.

Cultural Digitization and Institutional Challenges

Discussion about the importance of having a cultural digitization strategy at a national level and keeping up with technological advancements within libraries can be found in the publication "National Cultural Digitization Strategy." This underscores the difficulties of maintaining a balance between innovation, institutional duties, and governance concerns in the digital era.

Virtual Interactions and Cultural Tensions

The research investigates the effects of cultural and institutional variances on interactions within the Second Life Metaverse. This study highlights the intricacies of cross-cultural communication and collaboration in online settings, underscoring the importance of managing these conflicts efficiently.

Evolving Metaverse and Cultural Industry

Studies like "On Metaverse and Other Demons" explore the impact of the metaverse on communication and the cultural sector. This research discusses the development of the metaverse and how it will affect future studies, stressing the importance of grasping its influence on cultural and communication dynamics.

Mental Health and Virtual Environments

"Impact of Metaverse Cultural Communication on the Mental Health of International Students" delves into how the metaverse affects the mental health of international students. This study focuses on issues around cyberchondria and health anxiety, highlighting the importance of exploring the impact of digital spaces on mental health and intercultural engagements.

Religious Tourism and Digital Transformation

The research on "Examination of European Cathedral Websites" emphasizes the transition from in-person to online religious tourism hastened by the pandemic. It concentrates on creating user-focused interactions in digital environments, mirroring the general shift towards digital transformation in cultural tourism.

Heritage Interpretation and User Experience

"Diving into a Heritage Metaverse" examines how the metaverse can be utilized to enable users to interpret heritage in their own way. The research examines how users engage with a heritage metaverse, demonstrating an increasing preference for immersive and participatory methods in cultural heritage exploration.

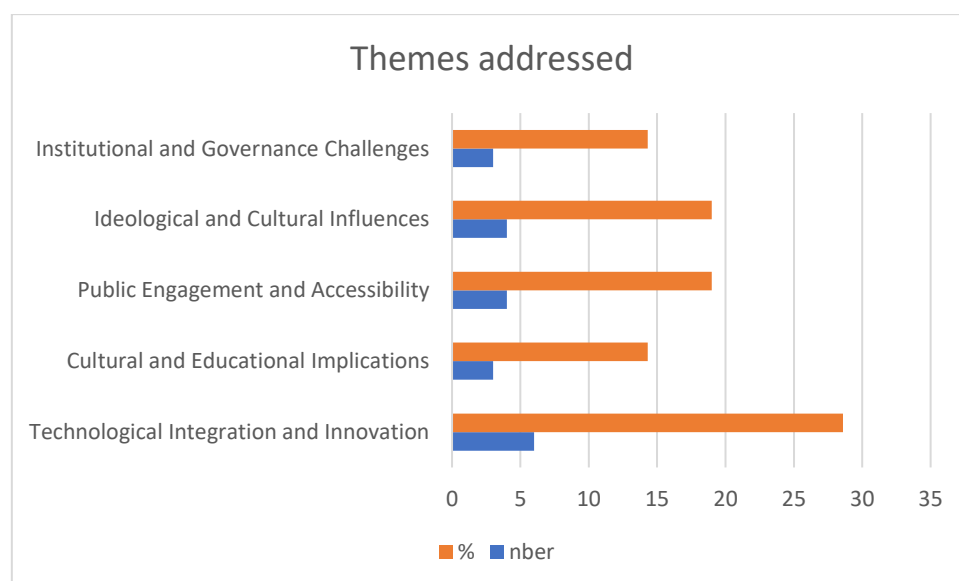
Digital Consumption and Technological Impact

Ultimately, "The Routledge Handbook of Digital Consumption" offers a thorough examination of the influence of digital progress on different parts of life such as consumer behavior, communication, and privacy. It emphasizes the advantages as well as the dangers linked to digital consumption, providing understanding into its wider societal impacts.

The problems identified in the studies can be grouped into broader themes to give a clearer outline of the key issues concerning the metaverse and cultural communication. This thematic analysis has led to the identification of five different themes as outlined below:

1. *Technological Integration and Innovation*: Challenges in integrating and advancing technologies within the metaverse and related fields.
2. *Cultural and Educational Implications*: Impacts on cultural practices, educational environments, and the broader social implications of technological adoption.
3. *Public Engagement and Accessibility*: Issues related to enhancing public access to cultural heritage and improving user experiences.
4. *Ideological and Cultural Influences*: The effects of technological advancements on cultural practices, media, and communication.
5. *Institutional and Governance Challenges*: The need for effective strategies in managing technological and cultural changes within institutions and governance frameworks.

This thematic categorization underscores the varied and interrelated problems encountered in researching the metaverse and cultural communication, stressing the importance of thorough and intricate strategies to tackle these difficulties.



Graph 5. Themes addressed in the sample

(Self-elaboration)

Methods employed in Metaverse and cultural communication Studies (RQ3)

The Table 1. shows different research methods used in research on how the metaverse is used in cultural contexts, focusing on literature reviews and case studies.

Table 1: Methods used in the literature on metaverse and cultural communication

Method	Count	Percentage
Literature Review	5	23.81%
Case Study	3	14.29%
Theoretical Framework	4	19.05%
Empirical Testing	3	14.29%
Qualitative Experimental Methods	3	14.29%
Content Analysis	2	9.52%
Interviews	2	9.52%
Platform Research	1	4.76%
Strategic Guidance	1	4.76%
Virtual Ethnography	1	4.76%
Critical Reflection and Scoping	1	4.76%
Qualitative Data Extraction	1	4.76%
Multi-Disciplinary Approach	1	4.76%
<i>13 different methods in 21 studies</i>		

Acknowledging that the data illustrates a range of techniques employed in various studies is crucial. The variety of research approaches mirrors the interdisciplinary character of the field, with theoretical analysis, experimental verification, and real-world use all having important functions. Furthermore, qualitative approaches are prevalent in research studies.

- Literature Review
- Case Study
- Theoretical Framework
- Interviews
- Platform Research
- Strategic Guidance
- Virtual Ethnography
- Critical Reflection and Scoping
- Content Analysis (Can be both, but often qualitative)

The quantitative methods are limited, appearing only in

- Empirical testing,
- Qualitative experimental methods,
- Qualitative Data Extraction are limited.

Five distinct techniques are commonly found in the sample being examined, leading to a targeted evaluation of their significance and efficiency.

Literature Review and Desk Research

The most commonly utilized method for exploring the impact of Metaverse technologies on cultural communication is the literature review. The above-mentioned papers focused on conducting a literature review and desk research to synthesize current knowledge and offer a curated overview of the field, including National Cultural Digitization Strategy, Library Metaverse, digital consumption, art, culture, and design in the digital age. Document analysis is frequently combined with these techniques. The authors believe that the reason for selecting literature reviews is because they are essential for creating the foundation and background for metaverse studies, along with pinpointing gaps in existing research and preparing for new investigations and discoveries.

Critical Reflection and Conceptual Frameworks

The research in the sample focused on the conceptual frameworks. Research articles such as Global visions for a metaverse, Cyber-physicality, Cultural tourism metaverse use critical analysis, outlining, and conceptual framework creation to investigate theoretical foundations and international viewpoints. Understanding the wider impact of the metaverse on culture, society, and technology is essential. It is important to note that critical reflection enables researchers to recognize new themes and redirect studies to a broader and more encompassing viewpoint. Conceptual frameworks play a crucial role in forming a systematic grasp of how the metaverse connects with cultural occurrences.

Empirical Testing and Qualitative Methods

Data indicates that many papers in the sample made extensive use of empirical testing and qualitative methods. Some studies that have employed this approach include Examining the Connection between Users' Behavioral Intentions and Learning Outcomes of VR System for Sustainable Tourism Growth, Delving into a Heritage Virtual Reality World, and Influence of Virtual Reality Cultural Communication on the Psychological Well-being of Foreign Students in China. These research projects employ structured tests, interviews, group discussions, and analysis of data. The utilization of PLS multigroup structural models and thematic analysis is prevalent in these methodologies.

Indeed, researchers use empirical techniques to assess how the metaverse affects user behavior, learning results, and mental well-being. These methods offer solid data backing theoretical assertions and aid in comprehending user interactions in the metaverse.

Case Studies

Similar to Empirical Testing and Qualitative Methods, case studies are utilized to offer thorough examination of particular occurrences involving the intersection of metaverse technologies and cultural practices. This approach frequently includes examining documents, conducting interviews, and observing participants. In this example, they are being utilized to a great extent. Studies on contact zones of heritage diplomacy, the impact of the metaverse on Silk Road tourism, and culturally generated tensions in the second life metaverse have all utilized this approach. Case studies are well known for providing in-depth understanding of how metaverse applications are being used in cultural environments, showcasing achievements, obstacles, and experiences gained.

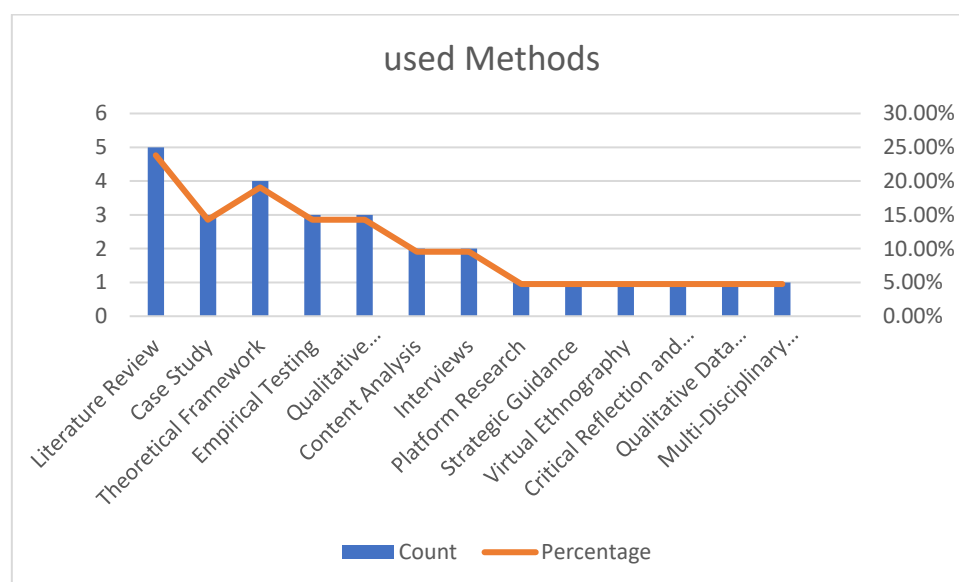
Collaborative and Partnership-Based Research

Collaborative research was observed in various papers such as ArcheoVerso: a cultural metaverse for improvement, Research on the Use of Cultural Information Dissemination Model in Digital Smart Community, and Harmonizing culture in cooperative business ventures. These studies highlight the

importance of forming partnerships and collaborating among academic institutions, private sectors, and cultural organizations. Developing prototypes and practical applications of metaverse technologies in cultural contexts is the main focus. Many researchers view collaborative research as essential for grounding metaverse applications in real-world needs and benefiting from diverse expertise, which may warrant its use. This method also helps with the practical execution of cultural initiatives in the metaverse.

In brief, Studies on the metaverse use various methods that are customized to the specific focus of each research. Critical analysis and scoping examinations delve into worldwide viewpoints, whereas systematic assessments and interviews evaluate user interactions in VR tourism systems. Qualitative methods support collaboration and prototype development in cultural metaverse studies. The utilization of transdisciplinary frameworks and theoretical inquiries aids in comprehending the influence of digital innovations in the field of journalism. Research on immersive experiences and inclusive education stresses the importance of Industry 4.0 technologies, with a focus on content analysis and virtual ethnography in understanding cultural heritage communication and mental health.

It should be noted that the range of approaches in metaverse studies represents the different research priorities. Furthermore, the methodology chosen impacts the results and conclusions of every research project. Empirical studies provide specific insights into user behavior, while conceptual studies offer more theoretical implications.



Graph 6. Methods used in the sample

(Self-elaboration)

Theories employed in Metaverse and cultural communication Studies (RQ4)

Data indicates that multiple theories are utilized in research focusing on the metaverse within cultural contexts. These theories provide structures to comprehend the intricate relationships among digital environments, cultural practices, and societal consequences.

Table 2: Theories used in the literature on metaverse and cultural communication

Theory	Count	Percentage
Cultural Theory	5	23.81%
User Experience Theory	3	14.29%

Theory	Count	Percentage
Digital Transformation Theory	2	9.52%
Metaverse Theory	2	9.52%
Global Thinking Theory	2	9.52%
Behavioral Intentions Theory	1	4.76%
Service Design Theory	1	4.76%
Visual and Interactive Communication Strategy	1	4.76%
Hypervisual World Theory	1	4.76%
Phygital World Concept	1	4.76%
Network Society Theory	1	4.76%
Immersive Experience Theory	1	4.76%
Overview Effect Theory	1	4.76%
Inclusive Education Theory	1	4.76%
Technological Integration Theory	1	4.76%
Personalized Learning Theory	1	4.76%
Strategic Guidance Theory	1	4.76%
Digital Ecology Theory	1	4.76%
Cultural Digitization Theory	1	4.76%
Cyberchondria and Healthcare Anxiety	1	4.76%
Digital Consumption Theory	1	4.76%
21 Theories used in 21 papers		

The information demonstrates the variety of theoretical approaches used in grasping the metaverse and related digital phenomena, focusing particularly on cultural and user experience viewpoints.

Critical and Embodied Global Perspectives

This perspective on the metaverse focuses on global aspects, highlighting the value of varied socio-cultural creation and questioning conventional perceptions of the metaverse as solely a platform. It emphasizes the importance of critically examining how the metaverse can depict different cultural identities and viewpoints, highlighting the necessity of reassessing worldwide narratives in virtual environments.

Service Design Theory, Behavioral Intentions Theory, Learning Effects Theory

These theories together investigate the development, user approval, and educational effects of AR and VR technologies in cultural heritage settings. It is important to note that Service Design Theory is utilized to improve cultural communication, while Behavioral Intentions Theory looks at user acceptance. Learning Effects Theory evaluates the educational results by offering a comprehensive perspective on how technology impacts cultural heritage interactions.

Onlife' Concept & Phygital World Concept

These concepts explore the integration of digital and physical worlds, specifically in the communication of cultural heritage and involvement of the public. Luciano Floridi (2019) introduced the 'Onlife' concept and the Phygital World Concept to investigate how the fusion of these realities can enrich cultural experiences, providing fresh approaches to interacting with heritage across virtual and physical environments.

Cyber-physical Systems Theory & Transdisciplinary Framework

These theories investigate how technology interacts with the physical world, underlining the importance of taking interdisciplinary approaches to comprehend the effects of the metaverse. Indeed, the Theory of Cyber-physical Systems studies the interaction of technology with the physical world, while the Transdisciplinary Framework advocates for incorporating perspectives from various fields to understand the metaverse's impact on cultural and social transformations.

Hyper-visual World Theory & Visual and Interactive Communication Strategy

These theories investigate how visual and interactive tools contribute to communicating cultural heritage in a modern technological setting. It should be noted that the Hyper-visual World Theory emphasizes the growing significance of visual communication, whereas the Visual and Interactive Communication Strategy investigates how these tools can improve public interaction with cultural heritage.

Organizational Culture Theory, Behavior Modification Theory & Education and Learning Theories

These theories investigate the cultural aspects within organizations and the application of simulations for influencing behavior and learning. It is crucial to understand the subtle difference that Organizational Culture Theory focuses on managing cultural aspects within organizations, while Behavior Modification Theory and Education and Learning Theories explore how simulations and serious games can impact behavior and improve learning.

Ternary-Subject Structure Theory, Digital Ecology Theory & Artificial Intelligence Generated Content (AIGC)

These theories examine how digital entities, AI, and digital environments affect the spread of cultural information. Ternary-Subject Structure Theory explores how avatars, AI, and users interact, while Digital Ecology Theory looks at the wider digital context. AIGC examines how AI is involved in creating and sharing content.

Metaverse Conceptual Framework

This framework investigates the cultural tourism metaverse by combining virtual and real-world activities as a subsystem. Understanding how cultural tourism can be improved through the use of metaverse technologies requires a grasp of the Metaverse Conceptual Framework, which opens up new possibilities for cultural interaction and engagement.

Ideological Incorporation Theory, Digital Architecture Theory & Network Society Theory

These theories analyze how elite ideologies influence media messages, the effects of technological advancements on journalism, and the collaboration between journalists and technologists. The Ideological Incorporation Theory examines how elite ideologies are replicated, whereas Digital Architecture Theory and Network Society Theory examine the impact of technology and society on journalism in the digital era.

Global Thinking Theory, Immersive Experience Theory & Overview Effect Theory

These theories examine the potential impact of virtual reality on worldwide cognition, compassion, and understanding of environmental problems. Global Thinking Theory stresses the significance of having a global viewpoint on environmental matters, while Immersive Experience Theory and Overview Effect Theory examine how virtual experiences can increase empathy and awareness.

Inclusive Education Theory, Technological Integration Theory & Personalized Learning Theory

These theories center around how technology can aid varied learning requirements and advance fairness in schooling. It is crucial to mention that Inclusive Education Theory focuses on fair learning environments, whereas Technological Integration Theory and Personalized Learning Theory examine the use of technology in creating customized educational experiences.

Cultural Digitization Theory, Metaverse Theory, Governance, and Institutional Change Theory & Web 3.0 Integration Theory

These theories lead the strategic implementation of cultural digitization, library metaverse creation, and institutional change in reaction to Web 3.0. It should be noted that these theories together discuss the difficulties and advantages of converting cultural material to digital format and adjusting to technological progress in libraries and cultural institutions.

Intercultural Communication Theory, Virtual Interaction Theory, Cultural and Institutional Constructs Theory & Pedagogical Theory

These theories focus on the difficulties of cross-cultural communication, virtual interactions, and the impact of wider cultural and institutional elements. Intercultural Communication Theory examines communication dynamics among diverse cultural groups, while Virtual Interaction Theory and Cultural and Institutional Constructs Theory investigate the wider context of these interactions in virtual settings.

Communication Theory, Cultural Industry Theory & Technological Determinism

These theories examine how the metaverse affects communication, the cultural industry, and the role of technology in shaping future trends. Communication Theory analyzes how the metaverse affects communication processes, while Cultural Industry Theory and Technological Determinism focus on the wider cultural and economic consequences of technological progress.

Cultural Communication Theory, Cyberchondria and Healthcare Anxiety & Virtual Reality Theory

These theories investigate how the metaverse affects cross-cultural communication, mental health, and the well-being effects of virtual reality. Cultural Communication Theory studies how virtual environments enable cross-cultural interactions, while Cyberchondria and Healthcare Anxiety examine the psychological effects. The Theory of Virtual Reality investigates the wider effects of metaverse technologies on mental well-being.

Cultural Tourism Theory, Digital Transformation Theory & User Experience Theory

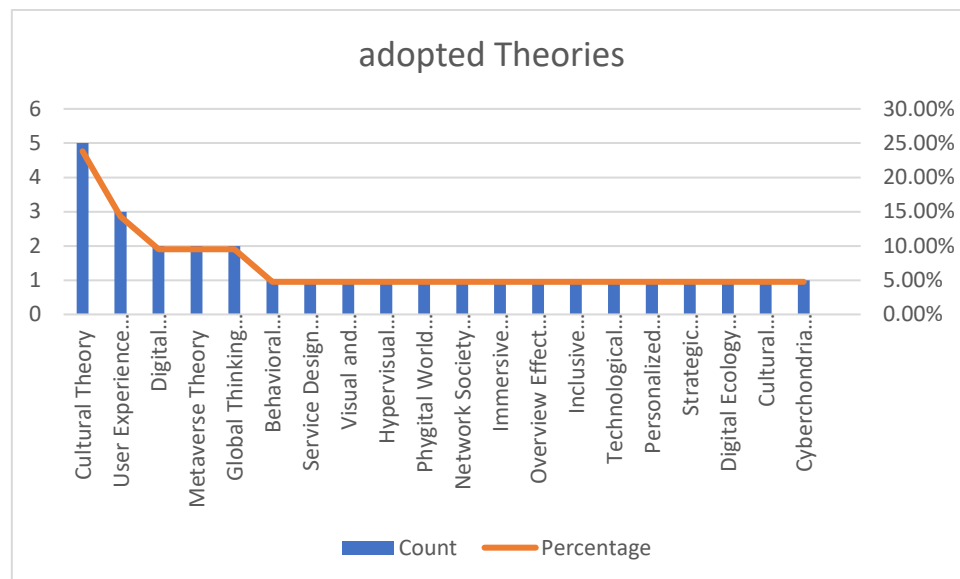
These theories analyze how digital transformation affects cultural tourism and user experiences within the metaverse. The focus of Cultural Tourism Theory is the utilization of heritage resources for tourism purposes. Meanwhile, Digital Transformation Theory and User Experience Theory discuss the transition to virtual environments and the importance of focusing on user-centered design.

User Experience Theory, Heritage Interpretation Theory & Participatory Design Theory

These theories investigate how user experience, heritage interpretation, and participatory design influence virtual heritage environments. emphasize subtle distinctions; User Experience Theory is centered on the user's engagement in digital environments, whereas Heritage Interpretation Theory and Participatory Design Theory investigate the preservation of heritage.

In conclusion, the emphasis on cultural aspects and user experience is prominent in metaverse studies, with Cultural Theory being the most commonly utilized. Considerable focus is also placed on User Experience and Digital Transformation theories, which emphasize the interaction between users and

digital environments. The global impact of the metaverse is emphasized by theories such as Metaverse Theory and Global Thinking Theory. Though utilized less often, theories like Behavioral Intentions, Service Design, and Visual and Interactive Communication offer important perspectives on various aspects of the industry.



Graph 7. Theories used in the sample

(Self-elaboration)

Contribution of Metaverse Literature to Enhancing Cultural Communication Practices (RQ5)

The metaverse and cultural communication literature are crucial for expanding our knowledge of how new technologies can improve cultural communication methods. Through analyzing how VR, AR, and digital environments intersect with cultural contexts, these studies provide important information on developing immersive and interactive experiences that go beyond physical limitations.

An important aspect of this collection of research is its investigation into the ways the metaverse can aid in promoting worldwide cultural interaction. One example is how virtual museums and galleries enable people from various locations to discover cultural artifacts and heritage locations in a 3D environment, enhancing their understanding of different cultures. The democratization of cultural experiences helps connect people from different locations and economic backgrounds, allowing cultural heritage to be enjoyed by people worldwide. Furthermore, the literature underscores the capability of the metaverse in protecting endangered cultural heritage. By generating digital replicas or virtual recreations of cultural sites and artifacts, scholars and professionals can guarantee the preservation of these important cultural resources for future research and exploration. The preservation of culture is significantly crucial, especially when considering threats like conflict, climate change, and urbanization.

Alongside technological advancements, the literature also highlights the significance of grasping user experience and cultural implications in the metaverse. Research that centers on user engagement, behavior change, and the merging of digital structures offer a detailed understanding of how people and groups interact within the metaverse. These findings are essential when creating metaverse applications that are culturally aware, easy to use, and successful in reaching their desired objectives. Nevertheless, the literature also discusses various obstacles that must be considered in order to improve cultural communication practices successfully. Access to metaverse technologies is often restricted by socio-economic factors, which can worsen existing inequalities, so the digital divide continues to be a major concern. Moral concerns, like safeguarding data privacy and determining ownership of AI-generated content, are vital aspects that must be dealt with to guarantee ethical use of these technologies. Metaverse applications may face obstacles in gaining widespread adoption due to technical limitations such as the

requirement for powerful computational resources and advanced hardware. These obstacles emphasize the need for ongoing research and innovation to address these hurdles and fully unlock the metaverse's potential in cultural communication.

Conclusion

Studying the metaverse and its influence on cultural communication offers a detailed structure for grasping how new technologies are changing the ways cultures communicate and interact. These researchers examine how the metaverse could improve cultural communication by providing more immersive, interactive, and accessible experiences among various communities. By exploring the advantages and obstacles of these technologies, the study adds to a wider discussion on how technology influences cultural experiences. It emphasizes the metaverse's ability to provide equal access to cultural content, connect people across distances and social barriers, and promote international cultural interchange. Simultaneously, the study examines the challenges and possible drawbacks, including concerns about digital divide, cultural assimilation, and safeguarding cultural heritage. By conducting a thorough investigation, these researches highlight the significance of making sure that everyone has access to the advantages of the metaverse, while also protecting the variety and wealth of cultural representations.

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