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Knowledge Mapping and Research Trends of New Media Technology Applications in Exhibition Spaces

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Abstract: With the rapid development of virtual reality, augmented reality, mixed reality, and artificial intelligence, exhibition space design and communication have undergone significant transformations. This study systematically reviews the research progress using the Web of Science Core Collection as the data source. Publications from 2015 to 2025 were analyzed through bibliometric and visualization tools, including R-biblioshiny, CiteSpace, and VOSviewer. The analysis examined annual publication trends, keyword co-occurrence and bursts, thematic evolution, and national and institutional collaboration networks. Results show a steady growth in studies, with peaks in 2018 and 2023, reflecting strong academic interest in immersive exhibition technologies. "Virtual reality" and "augmented reality" remain central themes, while "cultural heritage", "exhibition design", and "user experience" are major application domains. Emerging topics such as "artificial intelligence", "virtual environments", and "data visualization" highlight a shift toward intelligence-driven and experience-centered research. China and the United States lead in output and influence internationally, whereas European countries show regional collaboration. Despite these advances, limitations persist regarding intelligent applications, cross-cultural comparisons, longitudinal research, theoretical development, and sustainability concerns. By mapping knowledge structures and research frontiers, this study offers valuable insights for advancing academic inquiry and guiding innovative practices in exhibition spaces.

Keywords: museum; exhibition space; interactive art; digital art; Scientometrics; knowledge mapping

1. Introduction

In recent years, the rapid development of new media technologies such as virtual reality (VR) [1,2], augmented reality (AR) [3,4], mixed reality (MR) [5,6], immersive environments [7], and artificial intelligence (AI) [8] has profoundly transformed the design, experience, and communication of exhibition spaces. Traditional exhibition spaces dominated by static displays have gradually shifted toward interactive, immersive, and data-driven modes, enabling audiences to engage with cultural heritage, art, and knowledge in entirely new ways [9]. This transformation is evident not only in permanent institutions such as museums and art galleries but also in temporary exhibitions, digital heritage preservation, and the creative industries, reflecting a broader "digital turn" in cultural practice [9,10].

Academic attention to this phenomenon has been steadily increasing over the past decade. Early studies primarily focused on digital modeling, 3D visualization, and virtual reconstruction of cultural heritage scenes [11,12]. With the widespread adoption of VR and AR, research has shifted toward user experience, immersive design, and audience participation [9,13]. Marianna Charitonidou's (2022) study investigated how extended reality technologies and interactive digital interfaces reshape exhibition design, emphasizing the shift from immersion to interactivity and redefining the role of visitors as co-creators within immersive art environments. A study designed and evaluated digital media art displays based on virtual reality and augmented reality, demonstrating that integrating VR/AR technologies enhances user immersion and increases audience satisfaction by 33.6% compared with traditional exhibitions [1].

More recently, the introduction of artificial intelligence, data visualization, and intelligent exhibition systems has indicated a paradigm shift from "technology-driven" to "audience-centered" and "intelligence-oriented" approaches [9,14,15]. Liu and Zhang (2022) designed and validated an interactive image display approach for digital exhibition halls based on artificial intelligence and mixed reality technologies, and demonstrated through a visitor survey at the Shaanxi History Museum that the method is both feasible and effective in enhancing cultural experiences and promoting cultural tourism [5]. Liu and Kim (2025) developed an AI-driven limb-based emotion recognition system for new media art exhibition spaces, demonstrating through experiments that it significantly enhances visitors' immersive experiences by accurately detecting and responding to emotional states [16]. While reviews exist in related domains such as digital heritage and immersive media [4,6,7,17], systematic knowledge mapping specifically targeting new media technologies in exhibition spaces remains limited.

At the same time, several challenges persist. First, research outputs are unevenly distributed. China and the United States dominate publication volume, whereas contributions from other Asian countries, Africa, and Latin America remain comparatively weak. Second, most studies emphasize cross-sectional results, focusing on immediate technological or experiential effects, with limited longitudinal investigations of learning outcomes [18], cultural identity [19,20], and sustainability [21]. Third, theoretical integration across disciplines remains insufficient, with the potential of communication studies [22], cognitive psychology [23], and digital humanities [24,25] yet to be fully realized. These gaps highlight the need for a more holistic approach. Addressing this gap will provide a more comprehensive understanding of the challenges and opportunities posed by new media technologies in exhibition spaces.

In response to these gaps, this study draws on the Web of Science Core Collection [26], selecting relevant publications from 2015 to 2025. Using R-biblioshiny, CiteSpace, and VOSviewer, a systematic bibliometric and visualization analysis was conducted [27]. By examining annual publication trends [28], keyword co-occurrence [29] and bursts [27], thematic evolution [28], and international collaboration networks [29], the study aims to reveal the knowledge structure and research frontiers of the field, while identifying existing gaps and future directions. The findings not only deepen academic understanding of how new media technologies are shaping the future of exhibition spaces but also provide practical insights for practitioners seeking innovation, inclusivity, and sustainability in exhibition design.

2. Materials and Methods

This study utilizes bibliometric and visualization methods to analyze research trends in the field of new media technology in exhibition spaces from 2015 to 2025. The data were obtained from the Web of Science Core Collection, ensuring a comprehensive overview of global scholarly contributions during this period. The search strategy was designed to capture relevant publications using the following query:

> *"new media technology" OR "digital media" OR "interactive media" OR "multimedia" OR "virtual reality" OR "augmented reality" OR "mixed reality" OR "immersive technology" OR "digital interaction" OR "media art") AND ("exhibition space" OR "museum" OR "gallery" OR "exhibition design" OR "display space" OR "exhibition hall" OR "exhibition environment"*

The search was restricted to publications between 2015 and 2025. Initially, 521 records were retrieved. A detailed process of literature screening and refinement followed, as outlined in Figure 1.

The first step in the data cleaning process involved excluding non-English publications, which accounted for 20 records, leaving 501 publications for further review. Next, studies unrelated to the core research theme, such as those in chemistry (10), remote sensing (13), geology (7), and health services (3), were excluded. This resulted in a final dataset of 463 publications, which formed the basis for the analysis.

For data processing, EndNote X9 was used to remove duplicates and efficiently organize the references. Excel was used to standardize and clean the keywords, ensuring consistency across the dataset. Several bibliometric and visualization tools were then employed to perform an in-depth analysis: R-biblioshiny 4.1, CiteSpace 6.1R6, and VOSviewer 1.6.20.

The combination of these tools ensured the comprehensiveness, reliability, and depth of the results, facilitating a thorough exploration of the research landscape in new media technologies for exhibition spaces.

All data used in this study were drawn from a publicly accessible database (Web of Science), and the search strategy employed is entirely replicable. The data files and processing steps have been archived and are available upon reasonable request. Ethical approval was not required, as this study involved only a bibliometric analysis of published literature, without involving human or animal subjects.

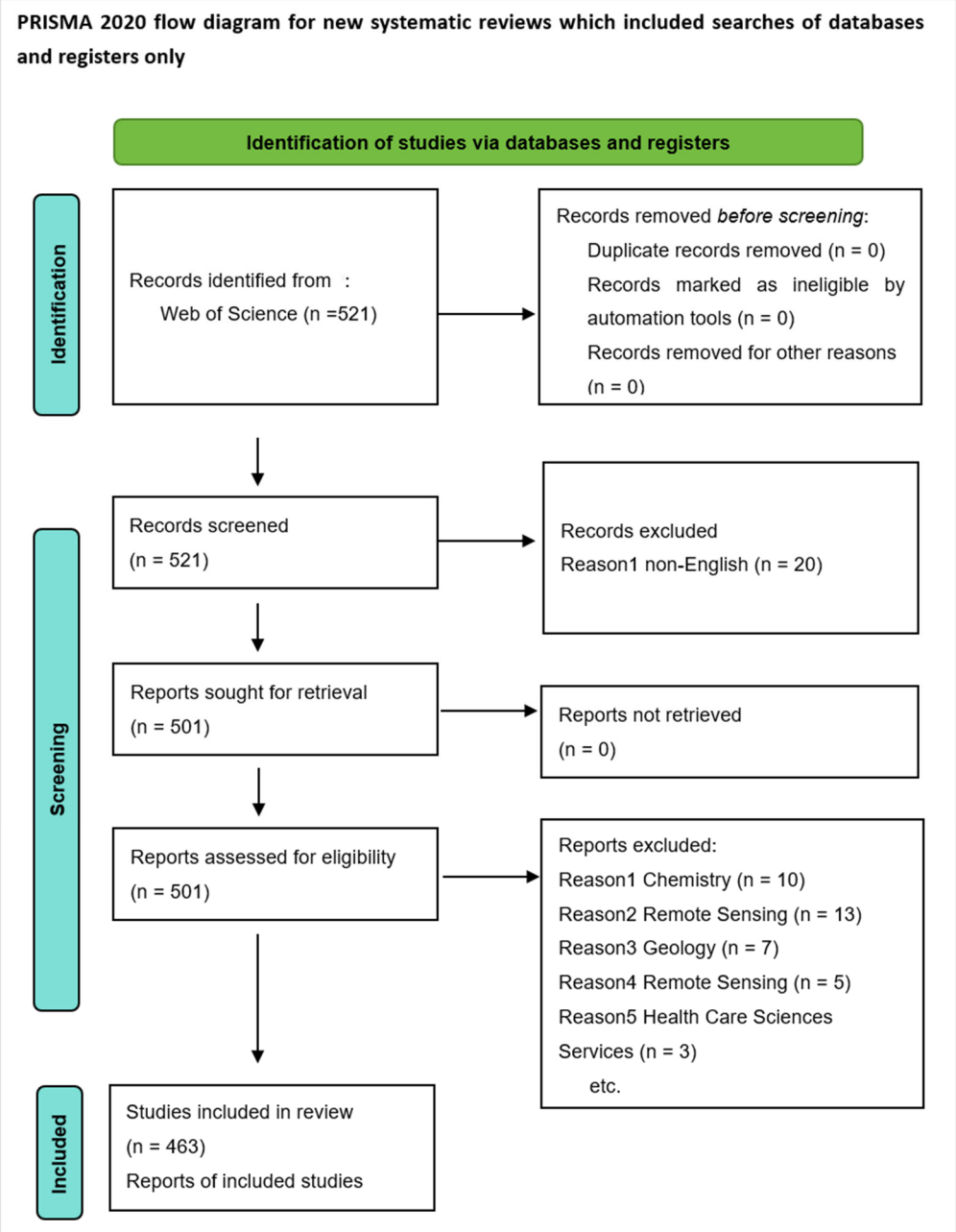

Figure 1. Flowchart.

3. Results

3.1. Basic Information

Table 1 presents the main bibliometric characteristics of research on new media technologies in exhibition spaces from 2015 to 2025. A total of 463 publications were identified, originating from 369 journals or books, indicating a broad distribution of outputs across diverse publications and disciplines. The overall annual growth rate was 6.16%, suggesting steady expansion of the field over the past decade. The average number of authors per paper was 4.56, reflecting a clear trend toward collaborative research. Each publication received an average of 6.79 citations, demonstrating measurable academic influence. The dataset contained 13,409 references, underscoring

scholars' extensive reliance on prior studies and the accumulation of substantial knowledge. Moreover, 388 unique keywords were identified, highlighting the diversity and breadth of research topics. Collectively, these bibliometric results reveal sustained growth in this field, characterized by strong interdisciplinarity, increasing academic impact, and the gradual formation of a rich and well-structured knowledge network.

Table 1. Search Criteria (PICOS).

Describe	Data
Main Information About Data	
Timespan	2015–2025
Sources (Journals, Books, etc.)	369
Documents	463
Annual Growth Rate %	6.16
Document Average Age	4.56
Average citations per doc	6.79
References	13409
DOCUMENT CONTENTS	
Keywords Plus (ID)	388

3.2. Data Analysis

According to the statistics generated by R-biblioshiny (Figure 2), research in this field exhibited a generally upward yet fluctuating trend between 2015 and 2025. In 2015, only about 22 related articles were published, followed by steady annual growth that peaked at 52 publications in 2018. A slight decline occurred between 2019 and 2020, but the number of publications rose again from 2021 onward, reaching the highest level in 2023 with approximately 55 articles. A minor decrease was recorded in 2024, while the publication count for 2025, as of the search date, stood at 40. Overall, these results indicate that the field has attracted sustained scholarly attention over the past decade, and the publication trend suggests that "new media technology and exhibition space" has become an important interdisciplinary research topic.

However, despite the apparent growth in the number of publications, this upward trend masks several critical underlying issues that warrant further consideration. First, the fluctuations in the publication count, particularly the dip observed between 2019 and 2020, may reflect the significant impact of the global COVID-19 pandemic on research activities.

Additionally, the rise in publication volume from 2021 onwards is encouraging. This suggests that the field remains a current research hotspot, with sustained interest in exploring the role of new media technologies in exhibition spaces. The continued growth in publications indicates that scholars are increasingly recognizing the importance of this interdisciplinary area, particularly as technological advancements and evolving audience expectations shape the future of exhibition design.

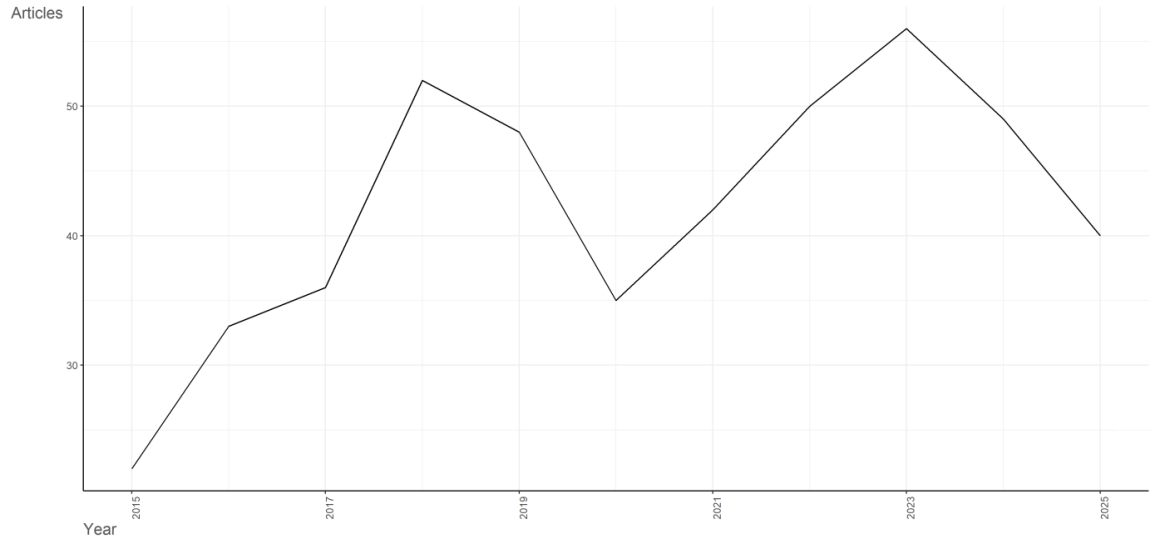

Figure 2. Annual Scientific Production.

Figure 3 presents the results of the country collaboration network clustering analysis generated by VOSviewer. China, the United States, the United Kingdom, and Germany emerge as the core research forces in this field, with larger node sizes indicating their leading publication volume and academic influence. China and the United States dominate the network, underscoring their central roles in both international collaboration and research output. European countries such as the United Kingdom, Germany, Italy, and France, along with Australia, form active cooperative clusters, reflecting strong cross-national collaboration.

However, the analysis highlights a critical imbalance. While the U.S. and China are dominant, many Asian countries, including Japan, Malaysia, and India, exhibit smaller node sizes, indicating their relatively limited research capacity and participation in global collaborations. This reflects a disparity in the distribution of academic resources and expertise. Furthermore, while countries like Canada, Spain, and the Netherlands facilitate connections within the collaboration network, their role as "bridges" suggests they are intermediary players rather than leaders in the field.

The analysis reveals that the field has developed into a multi-centered international collaboration pattern, with the U.S. and China at the core, European countries playing a significant regional role, and Asian countries gradually increasing their academic influence. However, to strengthen the global research landscape, there is a need for more inclusive engagement from underrepresented regions, ensuring more balanced contributions and reducing the dominance of a few countries.

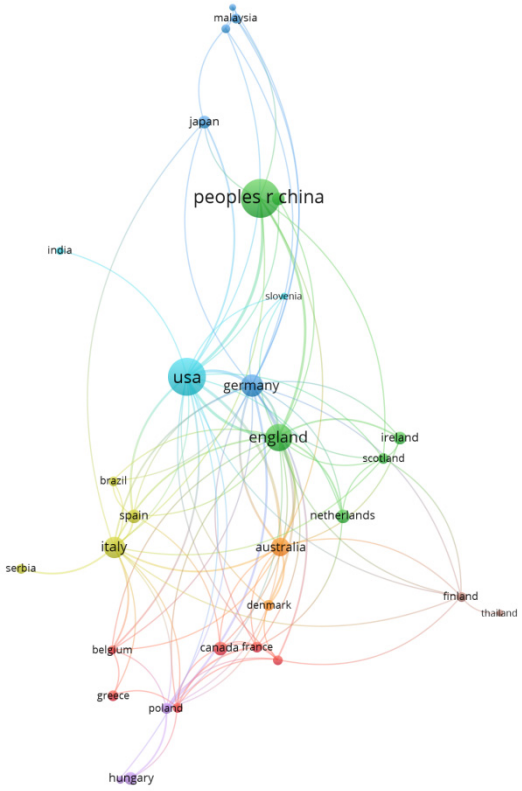

Figure 3. The Country Collaboration Network Clustering.

Figure 4 illustrates the annual publication trends of major countries in new media technology research in exhibition spaces from 2015 to 2025. China and the United States lead in publication output, with China's publications growing steadily since 2015 and reaching over 220 articles by 2025. The United States consistently ranked first until 2023 but was surpassed by China after 2024. The United Kingdom shows steady growth, with approximately 95 publications by 2025, while Germany and Italy have produced fewer studies, though both demonstrate gradual upward trends, with Germany at around 65 and Italy at nearly 60 publications.

The data reveals a multipolar research landscape, with China and the United States at the core, the United Kingdom as a significant contributor, and European countries advancing steadily. However, while the overall expansion of research in this field is encouraging, this trend raises several critical concerns. The dominance of China and the United States in publication output reflects both their academic strength and a potential limitation

in the scope of their research. Given the global reach and impact of new media technologies, it is essential for research in this field to be more internationally inclusive, particularly from regions such as Africa, Latin America, and Southeast Asia, which are underrepresented in the publication data.

While the multipolar structure emerging from the data suggests a global interest in new media technologies in exhibition spaces, it also highlights significant regional imbalances. The field must work toward fostering more global collaboration and addressing the gaps in underrepresented regions to ensure that the research landscape is as diverse and comprehensive as the technologies themselves. Such efforts will not only improve the depth and applicability of research but will also ensure that technological innovations in exhibition spaces are inclusive and globally relevant.

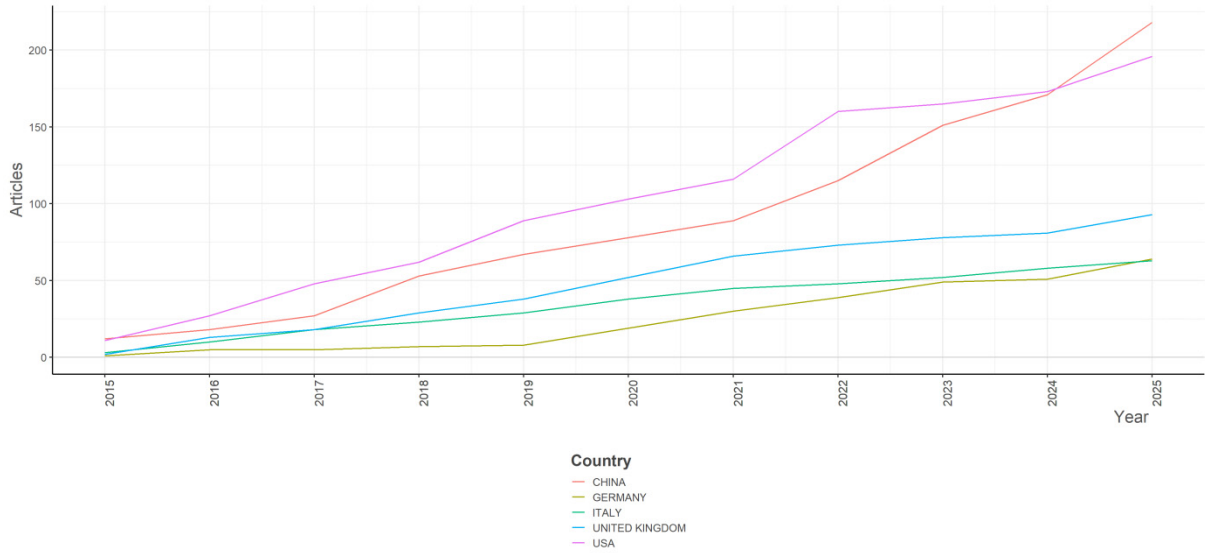

Figure 4. Country Production Over Time.

Figure 5 illustrates the distribution of publications by corresponding authors in this field, distinguishing between Single Country Publications (SCPs) and Multiple Country Publications (MCPs). China leads with nearly 100 papers, predominantly SCPs, indicating a substantial independent research capacity. The United States follows with around 70 publications, with a higher proportion of MCPs, highlighting its central role in international collaboration. The United Kingdom, Italy, and Germany form the second tier, with 20–40 publications each. The United Kingdom stands out for its high international collaboration, positioning it as a European academic hub.

Smaller contributors, such as Australia, Canada, Hungary, South Korea, and Spain, exhibit notable research activity, primarily through cross-national cooperation. Countries such as the Netherlands, Ireland, Japan, and Malaysia, with smaller outputs, demonstrate active participation in global networks via a high proportion of MCPs.

While the figure illustrates the growing internationalization of the field, it also highlights a critical issue: the dominance of China and the United States may limit the diversity of perspectives that shape the research. Despite significant international collaboration, the heavy reliance on China's independent productivity may overshadow contributions from smaller, underrepresented regions. The field's future should focus on enhancing inclusivity and fostering more balanced global engagement to prevent the concentration of research in just a few dominant countries.

Figure 6 presents the institutions with the highest publication output in this field. The University of London leads with 11 articles, followed by the University of Debrecen with 9 publications. Other top contributors include major American public university systems, such as the University of California System, CUNY System, and the University of Wisconsin System, with 6–8 publications each.

Interestingly, as shown in Figure 5, China leads in overall publication output, yet in terms of institutional contributions, the top ten rankings are dominated by U.S. and European universities. This highlights a key contrast: while China excels in total publications, its research is more fragmented across various institutions, lacking the concentrated institutional strength seen in the U.S. and Europe. The prominence of U.S. and European institutions reflects their established role in fostering interdisciplinary collaboration and academic exchange, further solidifying their influence in this field.

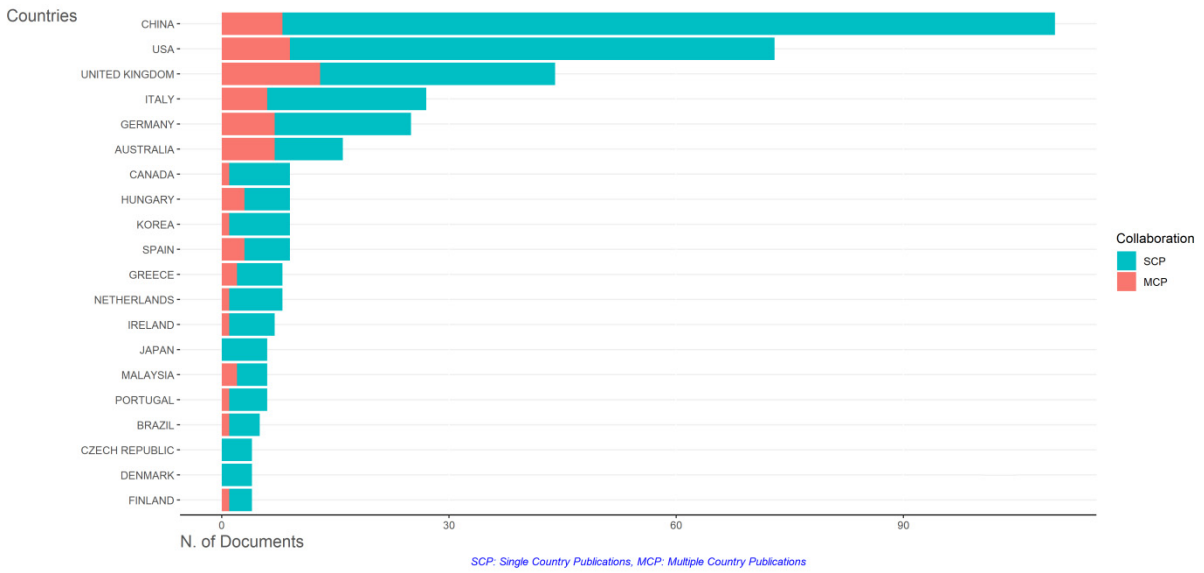

Figure 5. Corresponding Author's Countries.

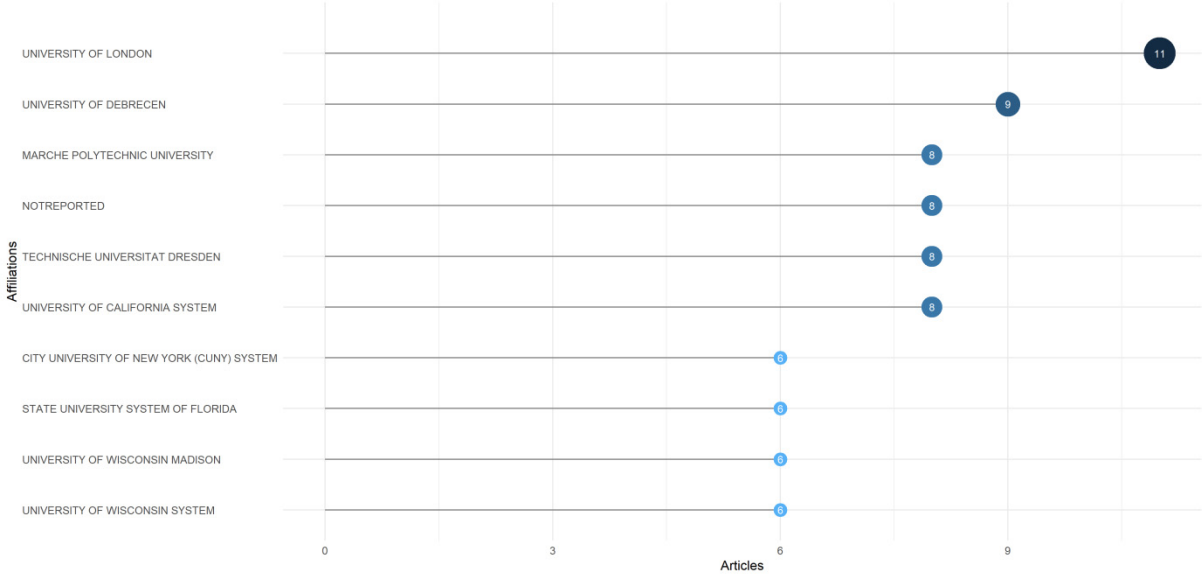

Figure 6. Most Relevant Affiliations.

Figure 7 presents the keyword clustering analysis of new media technology research in exhibition spaces from 2015 to 2025, conducted with CiteSpace 6.1R6. A total of nine major clusters were identified. The largest cluster, #0 "virtual reality", underscores the foundational and enduring role of immersive technologies in this domain. Clusters #1 "augmented reality" and #8 "mixed/augmented reality" suggest an emerging convergence of immersive and interactive approaches. Clusters #2 "cultural heritage" and #3 "exhibition design" reflect the field's emphasis on applying digital technologies to heritage preservation and spatial optimization. Meanwhile, clusters #4 "art gallery" and #7 "art exhibition" highlight art institutions as critical sites for experimentation and innovation. Notably, clusters #5 "artificial intelligence" and #6 "virtual environments" reveal the field's gradual expansion toward intelligence and virtualization, signaling both opportunities for methodological advancement and challenges in balancing technological determinism with user-centered design.

While the clustering analysis reveals significant advancements, it also raises critical questions about the direction of research. The dominance of virtual reality and augmented reality clusters suggests that the field remains heavily invested in technological solutions, with a lesser focus on the social, cultural, and ethical implications of these technologies in exhibition spaces [5,9,14,15]. The convergence of immersive and interactive technologies, while promising, may inadvertently push research toward a technological determinism perspective, where technology is seen as the primary driver of change, overshadowing human-centered design principles [9,13]. Furthermore, while the growing interest in artificial intelligence and virtual environments is a positive sign of methodological innovation, it also presents challenges in ensuring these technologies enhance rather than

overshadow the audience's experience. A deeper exploration of how these technologies can be balanced with broader cultural, social, and ethical considerations is essential for creating more inclusive and sustainable exhibition designs.

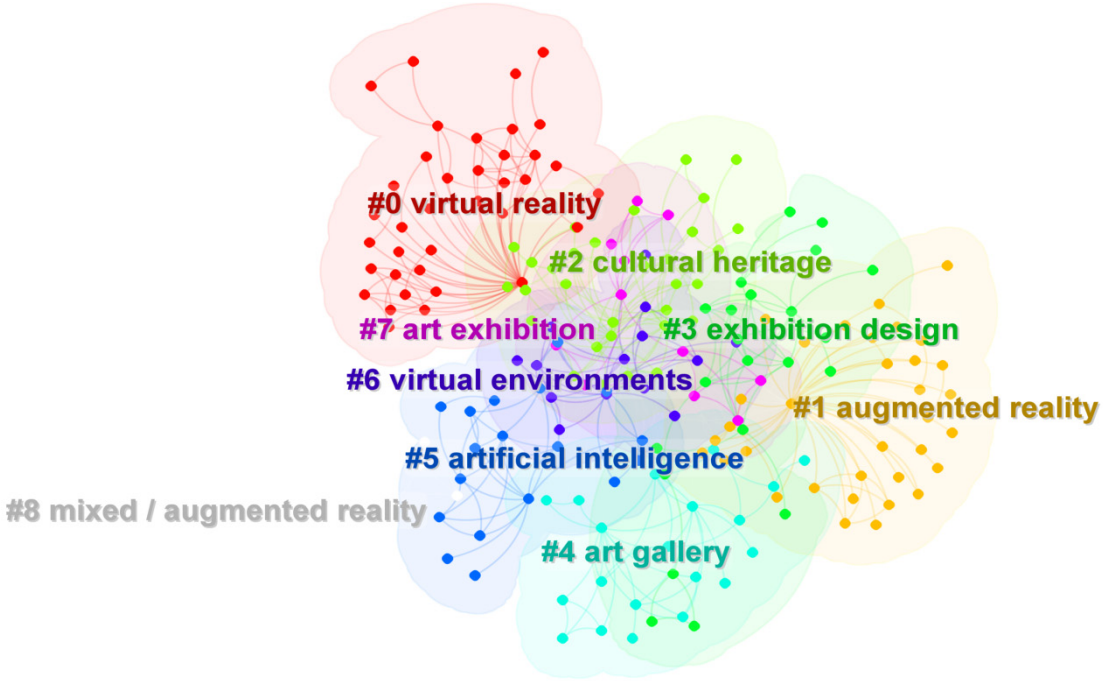

Figure 7. Cluster Analysis.

Figure 8 shows the timeline analysis of keyword clusters based on CiteSpace for 2015–2025. The overall network has a modularity Q value of 0.5378 (>0.3), indicating a clear clustering structure, and a mean silhouette S value of 0.8413 (>0.7), suggesting high reliability of the clustering results.

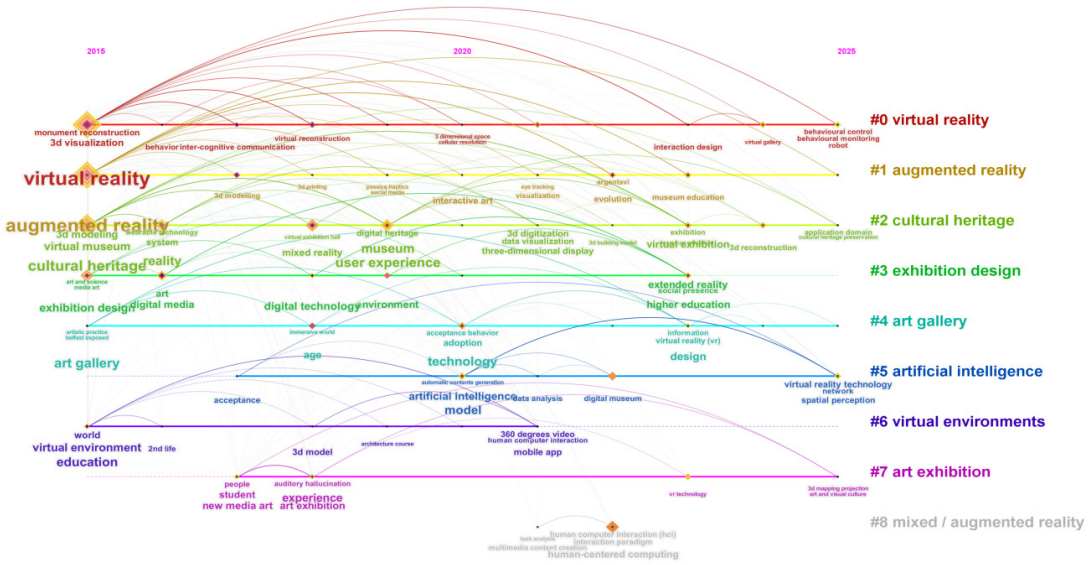

Figure 8. Keyword Timeline.

The temporal evolution of keyword clusters reveals a shift from a technology-oriented phase to an application-expansion phase, and finally to a frontier-integration phase. Early studies (2015–2017) focused primarily on virtual reality (#0 "virtual reality"), emphasizing 3D visualization and virtual reconstruction as the

foundation of new media exhibition research. From 2018 to 2020, the research shifted toward augmented reality (#1 “augmented reality”) and cultural heritage (#2 “cultural heritage”), with frequent keywords such as “virtual museum” and “digital heritage”, highlighting the application of immersive technologies in cultural display. After 2020, exhibition design (#3 “exhibition design”), with a focus on “user experience” and “virtual exhibition”, gained prominence, reflecting growing academic interest in audience engagement and experience.

However, this trajectory raises questions about the balance between technological innovation and the human experience. While the shift from VR to augmented reality and exhibition design demonstrates the increasing integration of immersive technologies, there is a tendency for research to remain heavily technology-driven. The more recent prominence of artificial intelligence (#5 “artificial intelligence”) and virtual environments (#6 “virtual environments”) suggests a focus on technological solutions, such as “data visualization” and “personalized recommendation”, without a corresponding exploration of the ethical and social implications of these advancements. As research advances toward AI and virtual environments, there is a risk that user-centered design may be overshadowed by technological determinism, which prioritizes innovation over cultural and societal considerations. Future research must strike a balance, ensuring that the integration of new media technologies remains aligned with the needs and values of diverse audiences, while also addressing the ethical dimensions of technological advancement in exhibition spaces.

Figure 9 presents the results of a burst keyword analysis of new media technology research in exhibition spaces from 2015 to 2025, identifying the 25 keywords with the highest burst strength.

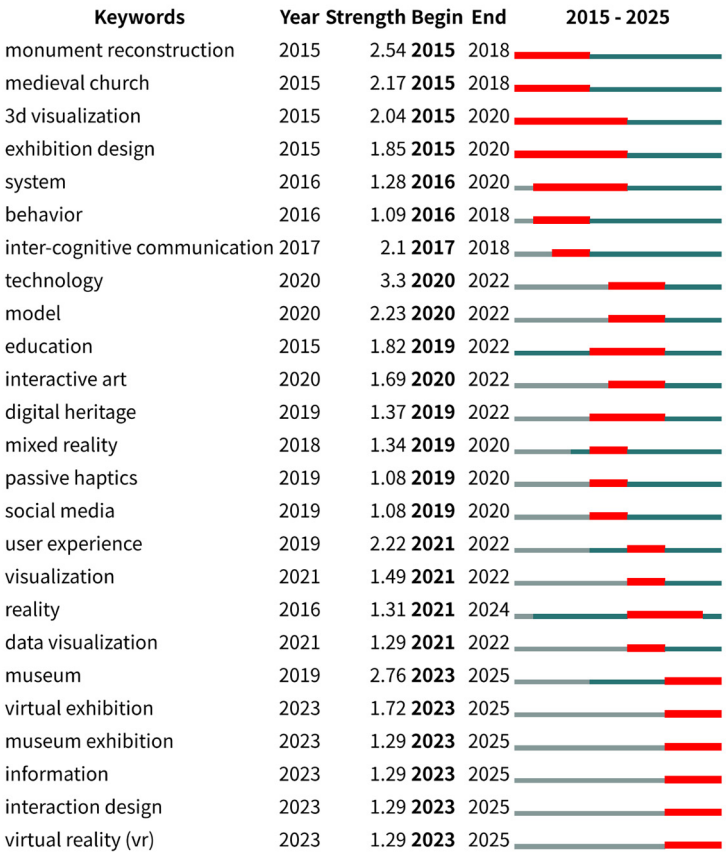

Figure 9. Top 25 Keywords with the Strongest Citation Bursts.

In the early stage (2015–2018), burst keywords such as “monument reconstruction”, “medieval church”, and “3D visualization” reflected a focus on the 3D reconstruction of cultural relics. From 2016 to 2018, terms like “system”, “behavior”, and “inter-cognitive communication” indicated a shift toward interactivity and audience behavior, moving beyond simple visualization.

Between 2019 and 2022, keywords like “digital heritage”, “mixed reality”, and “interactive art” signaled the integration of immersive experiences with heritage preservation. The rise of terms like “social media” and “user experience” reflected the growing importance of audience engagement and social dissemination. However, this shift raises concerns: while interactivity and user experience are emphasized, there remains a potential over-reliance on technology at the expense of deeper cultural or ethical considerations in these interactions.

Following 2020, terms such as “technology”, “model”, “data visualization”, and “visualization” indicate a shift toward data-driven approaches and multi-technology integration in exhibition spaces. This phase highlights a trend toward technological convergence, but it may risk sidelining the human-centered aspects of exhibition design, such as accessibility and cultural relevance.

In the most recent phase (2023–2025), the prominence of keywords such as “museum”, “virtual exhibition”, “museum exhibition”, “interaction design”, and “virtual reality (VR)” indicates a focus on museum contexts and enhanced audience experiences. While this shift is promising, it highlights a growing emphasis on technical innovation, which may potentially overshadow the broader societal and educational impacts of these technologies.

The burst keyword analysis reveals an evolutionary trajectory, progressing from 3D reconstruction to immersive experiences, and ultimately to interactive innovations in museums and virtual exhibitions. This path, while marked by technological advances, may benefit from a more balanced approach that places equal emphasis on cultural, social, and ethical dimensions in the design of future exhibition spaces.

Figure 10 presents a strategic diagram based on theme centrality (importance) and development maturity (density), dividing research on new media technologies in exhibition spaces into four thematic categories.

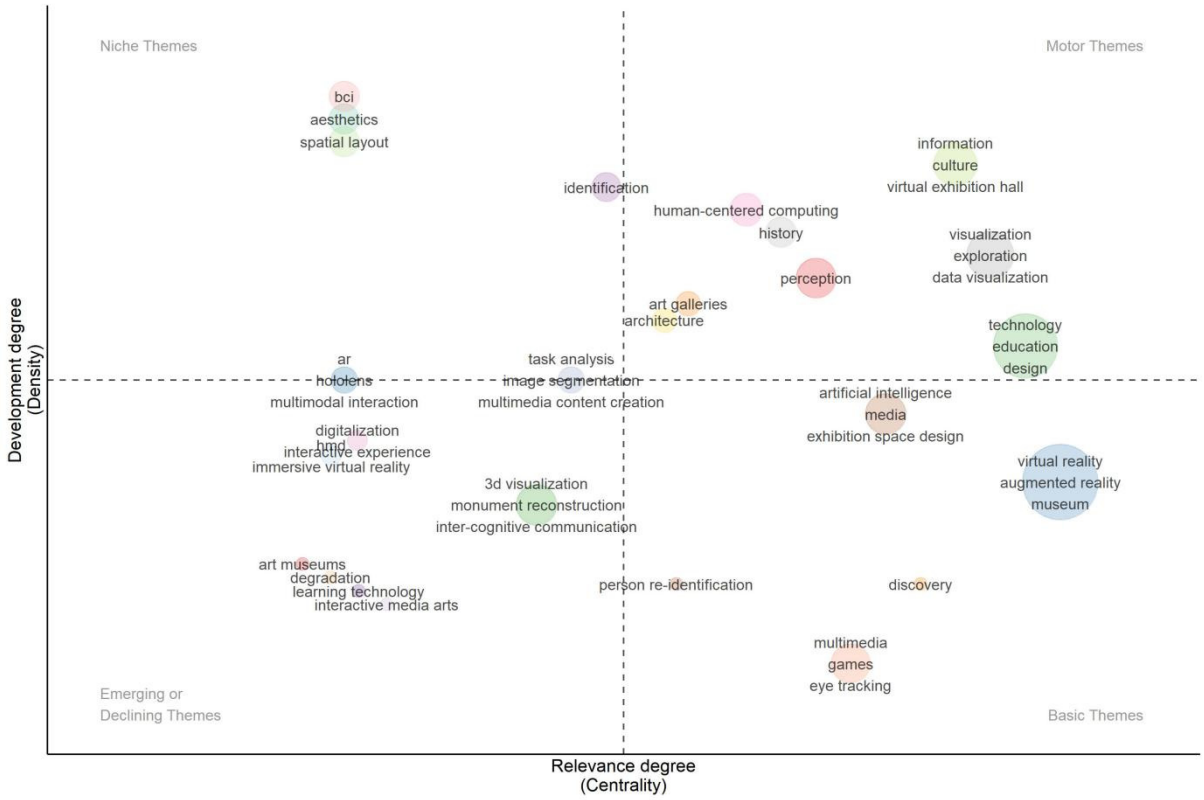

Figure 10. Strategic Coordinate Diagram of Theme Importance (Centrality) and Development Maturity (Density).

In the lower-right quadrant, basic themes such as “virtual reality”, “augmented reality”, and “museum” are crucial yet still developing, marking them as foundational to the field. However, the dominance of immersive technologies and museum applications raises concerns about the potential overemphasis on technology-driven approaches, which often neglect the socio-cultural contexts and broader ethical implications of their use in exhibitions.

In the upper-right quadrant, Motor Themes such as “data visualization”, “visualization”, “technology”, “design”, and “education” exhibit both high importance and maturity. These themes represent the driving forces of the field, yet their dominance may indicate a shift toward a more utilitarian approach to exhibition design, where technology solutions are prioritized over visitor engagement or cultural preservation. The growing focus on “education” and “design” could also risk overlooking the more experiential aspects of exhibitions.

The Niche Themes in the upper-left quadrant, such as “brain–computer interface” and “affordance”, reflect specialized research areas with considerable depth but limited influence. These niche areas may hold potential for breakthroughs, but their marginal position on the diagram suggests they lack broader academic or practical applications at present.

The diagram reveals a landscape where immersive technologies are foundational, but the field’s future direction requires careful consideration of how emerging technologies, user experience, and cultural contexts are

integrated. The over-reliance on technological advancements must be balanced with a focus on inclusivity, ethics, and visitor engagement to ensure sustainable progress.

4. Discussions

4.1. Technological Development and Privacy Protection

Based on the data analysis in the previous chapter, current research largely remains at the technical application level, with limited systematic exploration of personalized audience experiences and behavioral prediction [30]. While immersive technologies such as virtual reality (VR) have demonstrated their potential in enhancing user engagement, studies still tend to focus on isolated technical aspects rather than comprehensive, personalized experiences.

For instance, a study comparing mobile-VR and wearable-VR tours in a museum context (n = 80) found statistically significant differences in immersion and motion sickness ($t = 3.49$, $p < 0.001$), with the wearable VR format proving superior in terms of user experience [31]. Similarly, an empirical investigation into VR exhibitions revealed that factors such as entertainment, escapism, and aesthetics positively influenced user interaction and immersion, ultimately enhancing satisfaction [32]. These findings demonstrate the potential of immersive technologies to engage users; however, they primarily address short-term experiences without exploring the personalized or long-term behavioral impacts in depth.

Recent developments are beginning to expand the role of immersive technologies beyond individual experiences. Muñoz (2025) showed that novel XR systems in cultural heritage exhibitions can enhance engagement and foster a stronger sense of social presence, thus extending the potential of these technologies to collective participation [33]. Furthermore, AI-driven approaches are being explored to personalize and optimize user experiences. For example, Winter (2022) developed a low-power machine learning system for pose estimation and gesture recognition in a heritage museum, demonstrating that AI-driven interactions can enhance visitor engagement without specialized hardware. Similarly, Lei (2025) applied reinforcement learning to dynamically optimize museum exhibit layouts based on visitor trajectory data, illustrating how AI-driven spatial adaptation can significantly enhance visitor engagement and experience [34].

While these studies are promising, they remain exceptions rather than the norm. There is a pressing need for broader implementation and a stronger theoretical grounding in how these technologies can be used systematically to enhance personalized audience experiences and predict behavior.

At the same time, the increasing integration of artificial intelligence in exhibition environments raises growing concerns about data privacy, algorithmic transparency, and ethical governance. Many AI-driven systems rely on the collection of visitor data, such as facial expressions, movement trajectories, and emotional responses, to personalize interactions and optimize spatial design. Yet, few studies address how such sensitive behavioral data are stored, processed, or anonymized. The absence of robust privacy frameworks not only exposes users to potential data misuse but also risks undermining public trust in intelligent exhibition systems. Moreover, without clear ethical guidelines, AI-driven personalization may inadvertently reproduce bias or surveillance-like conditions in cultural spaces, challenging the inclusive and participatory values central to museum and exhibition design. Future research must therefore engage more deeply with ethical AI and privacy-by-design principles, ensuring that technological innovation is balanced with accountability, transparency, and respect for user autonomy.

4.2. Expanding Research Areas of New Media Technologies in Exhibition Spaces

Despite notable advances in research on new media technologies in exhibition spaces, several critical gaps persist, particularly in cross-cultural and regional research comparisons. Scholarship in this field is heavily concentrated in well-resourced regions, namely China, the United States, and Europe, with much less representation from developing countries and areas such as Africa, Latin America, and Southeast Asia. This regional imbalance is rooted in structural inequalities, including limited research funding, uneven access to advanced technologies, and restricted participation in global academic networks [35–37]. Such disparities raise concerns about the universality and applicability of current findings, as the predominant focus on research from a few resource-rich countries risks limiting the relevance of outcomes to diverse cultural and societal contexts. To address this gap, there is an urgent need to foster more inclusive global collaboration, ensuring that research reflects a broader range of perspectives and is applicable across various geographical and cultural settings.

Another significant issue is the lack of longitudinal tracking and long-term effect evaluations in the field. While much of the research emphasizes immediate user engagement and technological novelty, there is a significant under-exploration of the sustained impacts of these technologies on cultural identity, learning effectiveness, and broader social outcomes. For instance, Sylaiou et al. (2010) conducted a longitudinal study on

the use of virtual reality in cultural heritage education, finding that while VR environments initially increased engagement, their long-term effect on knowledge retention and cultural identity was limited [38]. This highlights a fundamental shortcoming in the existing body of research: a focus on short-term user experience without a deeper understanding of the lasting effects of immersive technologies. Future studies should prioritize long-term evaluations that track the influence of new media technologies on cultural engagement, learning outcomes, and their broader societal impact over extended periods.

Additionally, interdisciplinary integration and theoretical development in this field remain underdeveloped. Despite significant advances in technological applications, many studies still lack a strong theoretical framework that draws on interdisciplinary insights. Digital humanities, cognitive psychology, and communication studies provide valuable perspectives that can enrich our understanding of how new media technologies impact visitor engagement and cultural experiences. Mortara et al. (2014) demonstrated the benefits of an interdisciplinary approach by combining cognitive psychology and digital heritage studies to evaluate serious games for cultural heritage, showing that these integrated frameworks not only enhanced visitor engagement but also improved knowledge retention and interpretive depth [39]. Yet, such interdisciplinary approaches are still relatively rare in the literature. To drive meaningful advancements, future research must expand beyond technology-centric perspectives and adopt a more comprehensive, multidisciplinary approach that integrates insights from multiple fields to explore the broader implications of new media technologies in exhibition spaces.

In summary, while significant technological innovations have been made in the field of new media technologies for exhibition spaces, there remains a need for more inclusive, longitudinal, and interdisciplinary research [40]. These gaps in the current literature point to a broader challenge: as new media technologies continue to advance, it is essential that research in this field also evolves to address the complex cultural, social, and ethical dimensions that accompany their application.

5. Conclusions

This study maps the knowledge structure and evolution of new media technology research in exhibition spaces from 2015 to 2025. The analysis reveals steady growth in the field, with significant peaks in 2018 and 2023, driven by advancements in immersive technologies and the digital transformation of cultural institutions. While VR and AR remain central, emerging trends in AI, virtual environments, and data visualization signal a shift toward experience-driven and intelligence-oriented approaches.

However, several key issues persist. The rapid technological experimentation in the field has not been matched by corresponding theoretical advancements, leading to a fragmented body of work that often prioritizes novelty over cultural and social value. Research remains geographically imbalanced, with dominant contributions from China, the United States, and Europe, while many regions, especially in the Global South, remain underrepresented. Additionally, there is a lack of longitudinal studies to assess the long-term cultural, educational, and societal impacts of these technologies.

To move the field forward, future research must go beyond technical demonstrations and embrace a more holistic, interdisciplinary approach. Integrating insights from fields such as digital humanities, cognitive psychology, and communication studies will enable a more comprehensive understanding of how new media technologies impact the broader cultural and societal landscape. Furthermore, increasing the diversity of geographical perspectives will enhance the applicability and inclusivity of research findings. Longitudinal evaluations should be prioritized to assess the lasting effects of immersive technologies and their role in shaping cultural and educational experiences. By balancing innovation with critical reflection, the field can evolve into a more rigorous academic discipline that not only explores technological advancements but also addresses their cultural, ethical, and social ramifications.

Author Contributions

J.L.: conceptualization, methodology, software, visualization, investigation, validation, writing—original draft preparation; Z.W.: writing—review and editing; H.X.: data curation; Y.W.: supervision. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The bibliometric data analyzed in this study were retrieved from the Web of Science Core Collection (Clarivate) databases. The data are available from these databases and can be accessed with the appropriate institutional or individual subscription.

Conflicts of Interest

The authors declare no conflict of interest.

Use of AI and AI-Assisted Technologies

No AI tools were utilized for this paper.

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