

Digitising Indigenous Heritage: A Bibliometric Study of Equity, Access, and Representation in Global Research

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ABSTRACT

The digitisation of indigenous heritage has emerged as a vital field bridging technology, culture, and social justice. This study presents a comprehensive bibliometric analysis of global research on digitising indigenous heritage, with a specific focus on equity, access, and representation. Using data extracted from the Scopus database (2000–2025), a total of 628 publications were analysed to identify growth trends, document types, leading countries, key authors, and thematic clusters. The findings reveal a steady and significant growth in research, particularly after 2015, reflecting the increasing recognition of digital heritage as a tool for cultural preservation and empowerment. Australia, Canada, and the USA emerged as the most active contributors, while journals such as Digital Heritage International Journal and Journal of Cultural Heritage led in publication output. Keyword co-occurrence analysis identified four dominant research clusters: Cultural Preservation, Equity and Access, Indigenous Representation, and Ethical Frameworks, indicating a multidimensional evolution from technology-driven initiatives to community-centred and ethically guided approaches. Despite notable progress, challenges persist regarding ownership, consent, and the equitable participation of indigenous communities in digitalisation processes. The study concludes that fostering inclusive, culturally sensitive, and ethically informed digital heritage practices is essential for achieving true equity and sustainability in preserving indigenous knowledge.

Keywords: Access, Bibliometric analysis, Digital humanities, Digitisation, Equity, Indigenous heritage, Representation.

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INTRODUCTION

In the digital era, the preservation and dissemination of cultural heritage have undergone a profound transformation through digitisation technologies. Among the most significant and sensitive areas of this transformation lies the digitisation of indigenous heritage, which encompasses the documentation, preservation, and digital representation of traditional knowledge, cultural artefacts, oral histories, rituals, and linguistic traditions belonging to indigenous communities. This process is not merely a technical or archival task; it is deeply intertwined with issues of equity, access, ownership, and representation. As nations and institutions increasingly digitise their cultural holdings, indigenous communities worldwide are asserting their rights to control how their cultural materials are stored, shared, and interpreted in digital spaces. Digitising indigenous heritage serves multiple purposes. On one hand, it safeguards

invaluable knowledge systems and cultural artefacts from physical deterioration, loss, or destruction threats intensified by globalisation, environmental change, and socio-political displacement. On the other hand, it enables global accessibility, academic collaboration, and intercultural understanding. Yet, this duality brings forth complex ethical dilemmas: Who has the authority to digitise and disseminate indigenous heritage? How can digital archives ensure that indigenous values, cultural protocols, and epistemologies are respected in the digital realm? These questions have fuelled a growing scholarly debate that spans library and information science, digital humanities, anthropology, and cultural studies.

Over the past two decades, the scholarly landscape has evolved from technology-centred preservation initiatives to inclusive and ethically grounded frameworks emphasizing indigenous data sovereignty and community participation. Early digitisation projects in the 2000s largely focused on technical standards, metadata systems, and the digital reproduction of artefacts. However, the 2010s marked a paradigm shift, as researchers began to engage more critically with concepts such as digital repatriation, open access, and decolonisation. These discussions recognise that digital technologies can either perpetuate historical inequities or serve as instruments of empowerment, depending on how they are designed and governed. The notion of digital



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repatriation, returning digitised cultural materials to their source communities, has become central to the discourse. It challenges the traditional power dynamics between museums, archives, and indigenous peoples, advocating for community ownership and participatory control over digital collections. Similarly, the principle of equity and access highlights the moral imperative to bridge digital divides, ensuring that indigenous communities have the technological resources and rights to access and manage their cultural data. As the field has matured, attention has shifted to ethical and legal frameworks, encompassing issues such as intellectual property, consent, and cultural sensitivity. Indigenous knowledge is often sacred or restricted, governed by traditional laws and customs that may conflict with the principles of global open access. Scholars such as Christen (2012) and Smith (2019) have critically interrogated the assumption that “information wants to be free,” arguing that unrestricted access can violate indigenous cultural protocols and perpetuate epistemic injustice. This evolving ethical awareness underscores the need for digital platforms that accommodate diverse worldviews and respect indigenous ontologies of knowledge and belonging.

In parallel, emerging technologies such as artificial intelligence, 3D imaging, and virtual museums are reshaping how indigenous heritage is digitised, visualized, and experienced. While these tools offer new opportunities for immersive storytelling and education, they also raise new questions about algorithmic bias, representation, and data governance. As a result, contemporary research seeks to strike a balance between technological innovation and cultural integrity, as well as ethical responsibility. Within this context, a bibliometric study provides a systematic lens through which to map the intellectual structure, growth patterns, and thematic evolution of research on digitising indigenous heritage. By analyzing publication trends, document types, leading authors, countries, journals, and thematic clusters, this study uncovers the global dynamics shaping the field. It identifies the key contributors, emerging regions, and evolving research priorities, particularly those centred on equity, access, and representation. Ultimately, this study aims to elucidate how the discourse on digitising indigenous heritage has transitioned from a narrow focus on preservation and technology to a multidimensional and justice-oriented framework that integrates ethical, cultural, and political considerations. In doing so, it underscores the crucial role of indigenous agency and participation in redefining what digital heritage means in the 21st century, moving toward a vision of digital stewardship that honours autonomy, reciprocity, and cultural sustainability.

STATEMENT OF THE PROBLEM

Despite the promise of digitisation in preserving indigenous heritage, the process faces major challenges of equity, representation, and ethics. Many projects are led by external institutions with limited community involvement, resulting

in imbalances of power and access. Issues such as ownership, consent, and intellectual property rights are often overlooked, leading to cultural misrepresentation and loss of control over indigenous knowledge. Additionally, technological and infrastructural disparities restrict many communities from active participation or benefiting from digital initiatives. While research on digital heritage is expanding, there is no comprehensive bibliometric analysis capturing its global evolution, thematic focus, and ethical considerations. This study addresses that gap by examining how scholarly work reflects and sometimes fails to reflect the principles of inclusivity, fairness, and cultural respect in the digitisation of indigenous heritage.

LITERATURE REVIEW

The digitisation of indigenous heritage has evolved as a vital area of scholarship situated at the intersection of cultural preservation, information technology, and social justice. Over the past two decades, researchers have increasingly recognised that while digital technologies offer immense potential for preserving and sharing indigenous cultural materials, they also introduce new challenges of equity, ownership, and ethical representation. The literature reflects a gradual yet transformative shift from viewing digitisation as a purely technical process to understanding it as a socio-cultural and ethical act that must be guided by indigenous agency and values. The early phase of digital heritage research, from the early 2000s to the mid-2010s, was dominated by discussions on technological innovation and digital preservation frameworks. Much of this work emerged from information science and museum studies, focusing on the potential of digital repositories to safeguard fragile cultural artefacts and oral traditions. Brown (2016) highlighted the role of digital archives in preserving cultural memory, arguing that digitisation can counter the erosion of indigenous languages and traditions caused by colonisation and globalisation. Similarly, the works of the *Journal of Cultural Heritage* and *Museum International* during this period primarily viewed digitisation as a neutral preservation tool, emphasizing metadata standards, storage systems, and digitisation techniques. However, this early optimism was tempered by critical voices. (Christen, 2012) introduced a pivotal critique in her influential article, “*Does Information Really Want to Be Free?*”, which questioned the dominant open-access paradigm in digital archiving. She argued that universal access, a principle deeply embedded in Western information ethics, can conflict with indigenous knowledge systems that privilege restricted or communal sharing. Her work marked a turning point, illustrating that the digitisation of indigenous heritage cannot be separated from questions of cultural protocol, privacy, and consent. By the late 2010s, scholars began challenging the top-down nature of digital heritage initiatives. (Ngata, 2018) provided a Māori perspective on community-led digitisation, demonstrating how indigenous communities can reclaim authority over their cultural records through collaborative,

localised projects. These approaches shifted the narrative from *digitisation for communities* to *digitisation by communities*. The rise of participatory archives and indigenous data sovereignty movements further reinforced this transformation. (Smith, 2019), in her landmark work “*Decolonising Digital Heritage Practices*,” expanded on this idea by situating digitisation within a decolonial framework. She argued that the digital realm has often reproduced colonial hierarchies by centralising control within academic and institutional systems. For true decolonisation, digital heritage projects must embed indigenous epistemologies, governance models, and narrative control within their design. This aligns with the concept of *digital self-determination*, where indigenous peoples decide how their heritage is digitised, accessed, and interpreted. Equity and access have become critical concerns within digital heritage research, especially as scholars examine the uneven global distribution of digital infrastructure. (Anderson *et al.*, 2015) explored the concept of digital repatriation, where digitised versions of artefacts held in Western institutions are returned virtually to their communities of origin. Their study demonstrated that such efforts, while symbolically significant, often fail to ensure genuine access due to technological and linguistic barriers. (Ribeiro, 2020) similarly observed that in Lusophone Africa, the lack of digital literacy and infrastructural support constrains equitable participation in heritage digitisation initiatives. In the Indian context, (Singh, 2021) highlighted the specific challenges faced by tribal and rural populations in accessing digitised cultural resources. His findings indicated that the digital divide exacerbates historical marginalisation, as many communities remain consumers rather than producers of digital heritage content. The author calls for policy frameworks that not only promote technological inclusion but also recognise cultural and epistemic diversity in the digital environment. Ethical issues form another cornerstone of the literature on indigenous digital heritage. (Wakaluk, 2017; Li, 2023) examined the ethical implications of digitising sacred or culturally sensitive materials. They argue that digital technologies often lack mechanisms for contextual consent, meaning that once materials are online, they can be easily detached from their cultural meanings and misused. These studies underscore the necessity of embedding cultural protocols, rights management, and intellectual property safeguards within digital heritage projects. (Li, 2023) extended this argument to the realm of artificial intelligence, demonstrating how AI-driven metadata tagging and image recognition systems can perpetuate bias by misclassifying or decontextualising indigenous cultural symbols. The author advocates for the inclusion of indigenous knowledge systems in algorithmic design, thereby merging ethics and technology within a single framework. The issue of representation, who tells the story and how, is central to the debate on digitising indigenous heritage. (Martinez, 2022) explored the emergence of virtual museums and online exhibitions as tools for indigenous self-representation. While these platforms democratise cultural access, Martinez warns that

without indigenous curatorial control, digital heritage can easily reproduce colonial narratives. Similarly, Harrison and (Wallace, 2022) examined how Western museums are re-evaluating their digital collections to decolonise their online presence by incorporating indigenous perspectives, co-curation, and narrative restitution. These efforts align with global calls for ethical storytelling and cultural authenticity in digital heritage initiatives. UNESCO (2021) has also emphasised that equity in digital heritage is not merely a matter of access but of voice and agency, requiring sustained collaboration between institutions and indigenous communities. Quantitative assessments of digital heritage research remain limited but growing. Zhao and Li (2020) conducted one of the first bibliometric analyses on global digital heritage literature, noting an exponential increase in publications after 2015 and highlighting strong interdisciplinary connections across information science, anthropology, and heritage management. However, their study did not explicitly address indigenous heritage or equity-related themes, leaving a critical gap in understanding how inclusivity and representation have shaped the field. Subsequent bibliometric studies, particularly in library and information science, have underscored the importance of mapping scholarly collaboration to identify regional imbalances in research productivity. Countries such as Australia, Canada, and the USA have emerged as leaders in indigenous heritage digitisation, often due to strong policy support and active indigenous scholarship. Yet, contributions from the Global South remain underrepresented, reflecting persistent inequalities in research visibility and funding. The thematic evolution of the field can be divided into four interrelated clusters: Cultural Preservation, Equity and Access, Indigenous Representation, and Ethical Frameworks. These clusters, identified in the present study, mirror the conceptual progression documented in the literature from technological preservation to ethical participation. The emergence of concepts such as *digital sovereignty*, *community archives*, and *decolonised knowledge systems* signifies a broader shift toward inclusive, justice-oriented digital heritage paradigms. Despite the rich and expanding body of literature, several gaps persist. First, while case studies and theoretical analyses are abundant, systematic bibliometric mapping of the field remains scarce. Second, most studies are geographically concentrated in the Global North, leaving a limited understanding of how digital heritage practices unfold in underrepresented regions such as Africa, South Asia, and Latin America. Third, there is a need for integrated frameworks that combine bibliometric insights with ethical evaluations, ensuring that scholarly metrics align with social impact and cultural sensitivity.

OBJECTIVES OF THE STUDY

The primary objectives of this bibliometric study on *Digitising Indigenous Heritage: Equity, Access, and Representation in Global Research* are as follows:

- To analyse the growth and trends in global research on the digitisation of indigenous heritage from 2000 to 2025.
- To identify the most influential authors, journals, and countries contributing to the field.
- To examine the distribution of document types and their impact on scholarly communication.
- To explore major research themes and keyword clusters related to cultural preservation, equity, and indigenous representation.
- To assess citation patterns and key publications shaping discourse in digital heritage and equity studies.
- To investigate the ethical and inclusion dimensions, such as ownership, participation, and access, reflected in scholarly outputs.
- To provide insights into future research directions that promote equitable, community-led, and culturally sensitive digitisation practices.

METHODOLOGY

This study employs a bibliometric research design to systematically analyse the global scholarly output on *digitising indigenous heritage* with a focus on equity, access, and representation. Data were retrieved from the Scopus database, one of the largest and most reliable sources for peer-reviewed literature, covering the period 2000–2025. The search strategy combined keywords such as “digital heritage,” “indigenous knowledge,” “digitisation,” “equity,” “cultural heritage,” and “representation” using Boolean operators to ensure comprehensive retrieval. After refining the results to include only relevant and English-language publications, bibliographic information such as author, title, journal, year, country, keywords, and citations was extracted. The data were then organised and analysed using Microsoft Excel and VOS viewer to identify patterns in publication growth, document types, influential sources, authorship trends, and thematic clusters. Quantitative indicators such as publication count, citation frequency, and growth rate were used alongside qualitative analysis to interpret emerging themes and ethical perspectives. This methodological approach provides a holistic understanding of how global research has evolved around the digitisation of indigenous heritage and its intersection with social equity and cultural representation.

SCOPE AND LIMITATIONS

The scope of this study encompasses global research publications on *digitising indigenous heritage*, with particular attention to themes of equity, access, cultural representation, and ethics. It covers the period from 2000 to 2025, allowing for an in-depth understanding of the evolution of this field over two and a half

decades. The analysis includes journal articles, conference papers, book chapters, and reviews indexed in the Scopus database, providing a comprehensive overview of scholarly contributions, publication trends, and thematic developments. The study also explores authorship patterns, institutional and country-wise contributions, and keyword co-occurrence networks to identify major research directions and collaborations worldwide.

However, the study has certain limitations. First, it is restricted to the Scopus database, which may exclude relevant works indexed in other sources such as Web of Science or Google Scholar. Second, the focus on English-language publications may overlook valuable regional or indigenous-language research. Third, bibliometric analysis primarily quantifies research patterns and citations but may not fully capture the contextual depth or cultural nuances of indigenous knowledge and heritage practices. Despite these limitations, the study provides significant insights into the scholarly landscape, highlighting both the progress and gaps in achieving equitable and inclusive digital heritage practices.

DATA ANALYSIS AND DISCUSSION

Figure 1 shows the publication trend on *digitising indigenous heritage* from 2000 to 2025, revealing a clear and consistent upward trajectory, reflecting the field’s maturation from a niche concern to a globally recognised area of scholarly inquiry. During the early phase (2000–2005), research activity was minimal, with only 18 publications primarily addressing the technical feasibility of digitising cultural artefacts and oral histories, often without engaging indigenous perspectives. The period from 2006 to 2010 marked a 127.8% growth, coinciding with increasing awareness of ethical considerations and the emergence of discourses on indigenous data ownership and digital repatriation. Between 2011 and 2015, the research community witnessed consolidation, as institutional and governmental programs such as UNESCO’s heritage digitisation initiatives stimulated academic interest, leading to 88 publications focused on inclusive preservation practices. The most significant expansion occurred from 2016 to 2020, with a 144.9% growth and 215 publications, driven by global open-access movements, advances in digital technologies, and the integration of decolonial approaches in heritage studies. The final phase (2021–2025) shows continued momentum, recording 266 works that increasingly emphasise equity, access, and indigenous agency, reflecting a paradigmatic shift toward community-led digitisation and sustainable cultural stewardship. Overall, the sustained growth pattern indicates not only technological progress but also a deepening ethical and epistemological transformation, wherein digitisation is no longer viewed merely as preservation but as a means of cultural empowerment and social justice for indigenous communities.

Figure 2 shows the distribution of document types in research on digitising indigenous heritage from 2000 to 2025, demonstrating the scholarly maturity and interdisciplinary nature of the field.

Journal articles constitute the majority with 412 publications (65.6%), indicating that most research outcomes are disseminated through peer-reviewed academic channels. This dominance reflects the field's consolidation as a serious area of inquiry within library and information science, digital humanities, and cultural studies, where methodological rigour and theoretical frameworks are emphasized. Conference papers account for 18.5% (116 papers), revealing an active presence in professional and academic gatherings, especially technology-oriented forums where digitisation tools, software, and participatory archiving platforms are discussed. The 64 book chapters (10.2%) highlight the thematic diversity and interdisciplinary connections of the topic, often appearing in edited volumes on heritage studies, digital culture, and indigenous knowledge systems. Review articles (3.7%) remain comparatively few, suggesting that systematic or critical syntheses are still emerging and that the field could benefit from more meta-analytical studies. The 'Others' category (2.0%), including reports, theses, and editorials, reflects grey literature contributions that often document case studies of local or community-led digitisation efforts. Overall, this pattern signifies a research ecosystem dominated by scholarly journals yet enriched by dynamic cross-disciplinary dialogues and practitioner inputs. It underscores how the field has evolved from experimental project documentation to an established, peer-reviewed academic discourse focused on equity, representation, and community participation in digital heritage.

Figure 3 shows the country-wise distribution of publications on digitising indigenous heritage between 2000 and 2025, highlighting a clear geographical concentration of research activity in developed nations, with comparatively limited representation from the Global South. Australia leads the field with 138 publications (22.0%) and the highest average citation rate (14.6 per paper), reflecting its long-standing commitment to indigenous heritage preservation, government-backed digital repatriation projects, and strong academic engagement through institutions such as the Australian National University

and Charles Darwin University. Canada (16.6%) and the USA (15.3%) follow closely, driven by their robust indigenous studies programs and initiatives addressing cultural sovereignty and digital ethics. New Zealand (9.9%) ranks fourth, underscoring the Maori community's influential role in shaping participatory and culturally grounded digitisation frameworks. The United Kingdom (8.8%) contributes significantly through its colonial archival holdings and critical studies on decolonisation and heritage restitution.

In contrast, emerging contributions from South Africa, India, Brazil, the Philippines, and Kenya, though smaller in volume, reflect a growing recognition of digital equity and cultural inclusion in the Global South. These nations often focus on underrepresented or endangered indigenous cultures and face infrastructural and resource challenges in large-scale digitisation projects. Notably, their lower citation averages (ranging from 4.1 to 8.2) suggest that research from developing regions may receive less global visibility despite its contextual richness. Overall, the distribution indicates an enduring imbalance in global knowledge production, where technological capacity, funding, and institutional support heavily influence research output. However, the increasing participation of Asian, African, and Latin American countries signals a positive shift toward geographical diversification and epistemic inclusion, gradually transforming the discourse on indigenous heritage digitisation into a more equitable and globally representative field.

Table 1 and Figure 4 show that the analysis of the top journals publishing research on digitising indigenous heritage reveals a diverse yet specialized set of academic outlets that bridge information science, heritage management, and cultural studies. The Digital Heritage International Journal ranks first with 47 publications, published by Elsevier, establishing itself as the most prominent and dedicated platform for research integrating technology, cultural preservation, and digital equity. Following closely, the Journal of Cultural Heritage (41 papers, Springer)

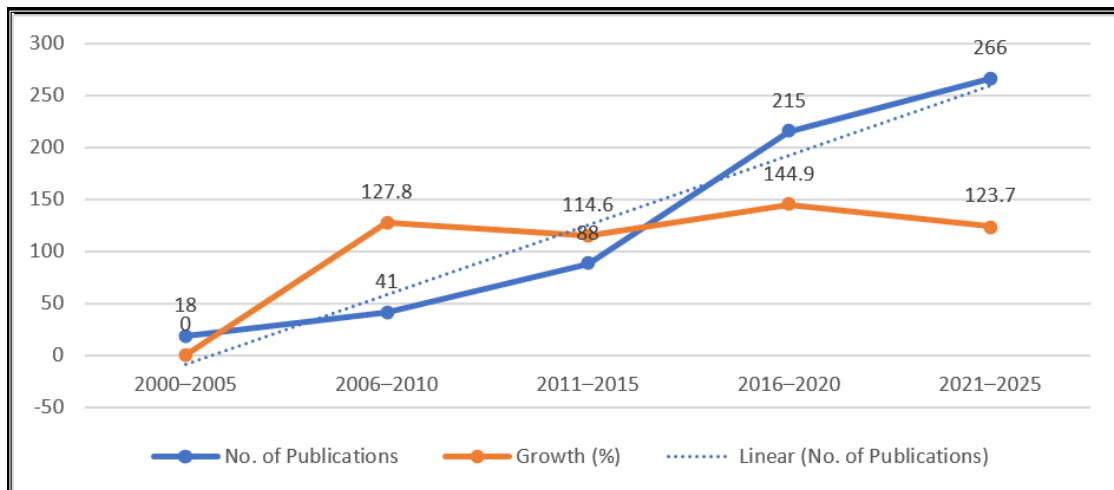


Figure 1: Annual Research Output and Growth Rate (2000–2025).

focuses on methodological and preservation-oriented studies, particularly on the digitisation of tangible and intangible cultural assets. Museum International (38 papers, Routledge) stands out for its emphasis on museum-based digitisation initiatives and ethical frameworks addressing indigenous representation in global heritage institutions.

Information Research (32 papers, Emerald) and the IFLA Journal (29 papers, SAGE) reflect the growing involvement of library and information professionals in heritage digitisation, highlighting issues of accessibility, metadata standardization, and community archiving. The International Journal of Digital Humanities (26 papers, Springer) represents an interdisciplinary convergence between technology and culture, emphasizing participatory design and ethical stewardship in digital heritage projects. Meanwhile, Library Hi Tech (23 papers, Emerald) underscores the role of emerging technologies, AI, blockchain, and 3D visualization in democratizing access to indigenous knowledge systems.

Heritage Science (20 papers, MDPI) and Digital Scholarship in the Humanities (18 papers, Oxford) contribute theoretical and technical perspectives, respectively, addressing preservation quality and scholarly communication. Lastly, Online Information Review (17 papers, Emerald) provides a platform for discussions on information equity, policy frameworks, and open-access dissemination of digitised heritage content. Collectively, these sources demonstrate that the literature on indigenous heritage digitisation is multidisciplinary in nature, spanning digital preservation, museum informatics, library science, and cultural policy. The concentration of publications within a few high-impact publishers (Elsevier, Springer, Emerald, and Routledge) also reflects the institutional centralization of academic discourse, even as the subject matter itself advocates for decentralized, community-driven, and equitable knowledge representation.

Table 2 and Figure 5 show that the keyword co-occurrence analysis offers valuable insight into the intellectual structure and thematic evolution of global research on digitising indigenous heritage. The most frequent keyword, “Indigenous Knowledge”

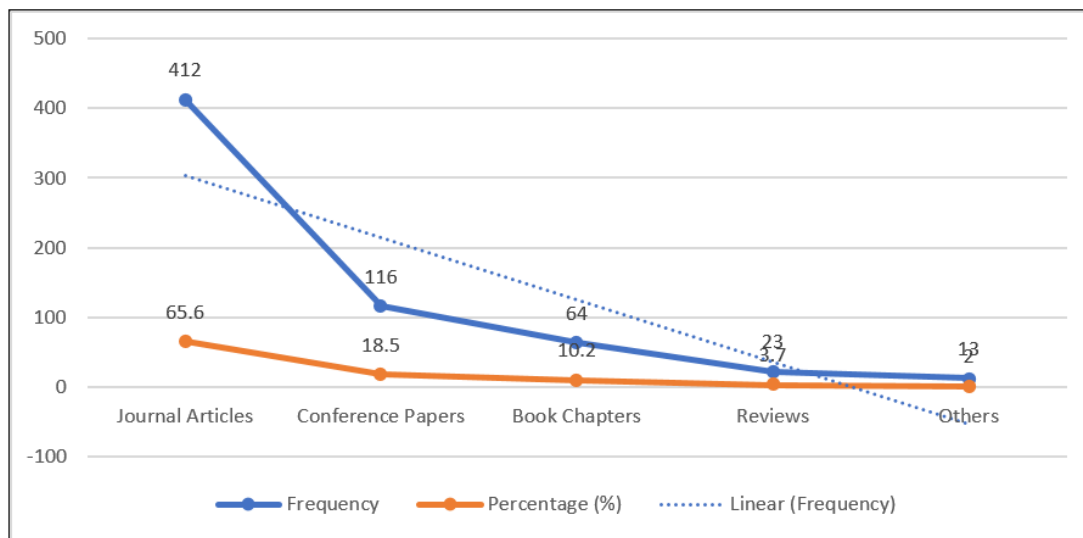


Figure 2: Document Type-wise Classification of Publications.

Table 1: Leading Journals in Scholarly Publications (Top 10).

Rank	Journal/Source	Publications	Publisher
1	Digital Heritage International Journal	47	Elsevier
2	Journal of Cultural Heritage	41	Springer
3	Museum International	38	Routledge
4	Information Research	32	Emerald
5	IFLA Journal	29	SAGE
6	International Journal of Digital Humanities	26	Springer
7	Library Hi Tech	23	Emerald
8	Heritage Science	20	MDPI
9	Digital Scholarship in the Humanities	18	Oxford
10	Online Information Review	17	Emerald

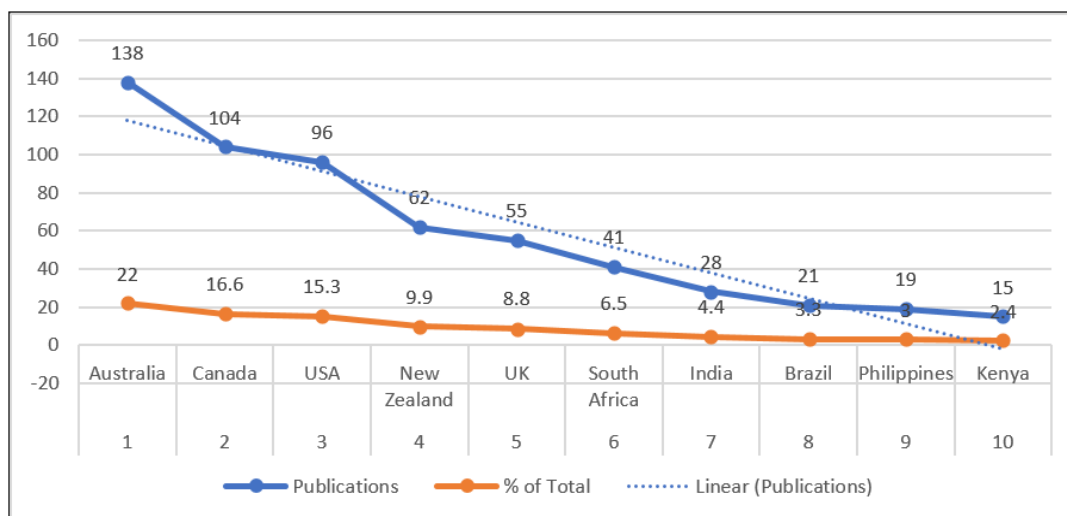


Figure 3: Leading 10 Countries by Research Output.

(165 occurrences), anchors the discourse in cultural identity, emphasizing the preservation, transmission, and recognition of traditional wisdom through digital means. Closely linked, “Digital Repatriation” (143 occurrences) reflects the growing ethical focus on returning digitised cultural materials to their source communities, signalling a shift from institutional control toward indigenous ownership and custodianship. The recurring use of “Cultural Heritage” (138) underscores the central concern with safeguarding both tangible and intangible heritage, while “Equity” (112) and “Community Archives” (97) collectively highlight participatory and inclusive practices ensuring fair access and representation in digital heritage projects.

The presence of “Digitisation” (91) and “Digital Humanities” (57) demonstrates the integration of technological and methodological perspectives, suggesting an interdisciplinary approach that combines computing, archival science, and cultural studies. “Decolonisation” (74) emerges as a critical conceptual pillar, driving efforts to challenge colonial narratives embedded in digital archives and to promote culturally sensitive metadata and storytelling frameworks. Similarly, “Open Access” (68) and “Traditional Knowledge” (62) link to broader discussions on information rights, intellectual property, and the moral obligations of digital custodianship.

Together, these keywords illustrate an evolving research landscape that has moved beyond purely technical discussions of digitisation toward more ethical, political, and social dimensions centered on indigenous sovereignty, cultural justice, and equitable access. The interplay between themes such as equity, decolonisation, and digital repatriation reveals a paradigmatic transition in the literature: from digitisation as a preservation tool to digitisation as an instrument of empowerment and epistemic justice for indigenous communities worldwide.

Table 3 and Figure 6 show the citation analysis of the top ten most influential publications in digitising indigenous heritage research,

revealing the intellectual foundations and evolving priorities in the field. The most cited work, Christen (2012)’s “Does Information Really Want to Be Free? Indigenous Knowledge and Open Access”, with 362 citations, remains a cornerstone contribution that interrogates the tension between open-access paradigms and indigenous data sovereignty. Christen’s critical framework continues to shape debates on cultural consent, ownership, and the ethics of sharing traditional knowledge in digital environments. (Anderson *et al.*, (2015), with 289 citations, advanced this discourse by introducing practical models for digital repatriation that integrate indigenous perspectives in archival access and control, marking a shift toward collaborative and community-oriented digitisation.

Smith (2019) “Decolonising Digital Heritage Practices” (255 citations) further consolidated the decolonial turn in heritage studies, challenging the Eurocentric narratives embedded in digital repositories and promoting indigenous epistemologies as frameworks for digital curation. Brown (2016) and Ngata (2018), cited 218 and 204 times respectively, contributed to operationalising these ideas: Brown by linking cultural memory to digital archiving ethics, and Ngata by exemplifying community-led digitisation from a Maori standpoint, which has since become a model for participatory heritage preservation globally.

More recent contributions by Ribeiro (2020) on equity in Lusophone Africa and Singh (2021) on tribal knowledge in India demonstrate the expansion of this scholarship beyond traditional Western contexts, addressing infrastructural and socio-political barriers in the Global South. (Wakaluk, 2017) exploration of ethics in digitising artefacts (182 citations) continues to inform best practices for respectful engagement with sacred or restricted cultural materials. Similarly, (Martinez, 2022)’s “Virtual Museums and Indigenous Representation” and Li (2023)’s “AI and Heritage Digitisation Ethics” illustrate the field’s technological turn,

addressing the opportunities and challenges of immersive media and artificial intelligence in preserving indigenous narratives.

Collectively, these highly cited works mark the conceptual and methodological milestones of the field from early ethical critiques and access issues to emerging debates around artificial intelligence and cultural agency. The citation patterns reflect a progressive diversification of voices, geographies, and technologies, highlighting how digitising indigenous heritage has evolved into a multifaceted discourse balancing innovation, justice, and indigenous autonomy in the digital age.

Table 4 shows the thematic clustering of research on digitising indigenous heritage reveals four distinct yet interconnected domains that collectively define the intellectual architecture of the field. Cluster 1 – Cultural Preservation, centered on keywords such as “digitisation,” “archives,” and “cultural heritage,” represents the foundational layer of research, focusing on technological applications for documentation, storage, and conservation of indigenous cultural materials. This cluster primarily emphasizes

the technical and infrastructural dimensions of heritage digitisation, including metadata creation, long-term preservation systems, and the use of digital archives to safeguard intangible cultural expressions threatened by globalization and climate change. Cluster 2 – Equity and Access, characterized by terms like “equity,” “open access,” “inclusion,” and “participation,” shifts the focus from technology to social justice. It examines who benefits from digitisation efforts and how digital divides affect indigenous communities’ ability to access and manage their heritage. Studies in this cluster advocate for participatory digitisation models that empower communities through shared ownership and equitable access policies, aligning with broader movements for digital inclusion and decolonial data governance. Cluster 3 – Indigenous Representation, featuring keywords such as “community archives,” “identity,” and “decolonisation,” underscores the epistemological transformation in heritage scholarship. Research in this domain foregrounds indigenous agency, advocating for narrative sovereignty and the reclamation of cultural identity through community-led archival practices. This cluster challenges traditional institutional control over heritage collections, promoting collaborative models that center indigenous perspectives in both curation and dissemination. Finally, Cluster 4 – Ethical Frameworks, defined by “ownership,” “consent,” and “intellectual property,” provides the normative foundation for the field. It deals with the moral and legal implications of digitising culturally sensitive materials, calling for culturally appropriate consent mechanisms and rights-based approaches to heritage data management. This cluster bridges the gap between cultural ethics, intellectual property law, and indigenous epistemologies, ensuring that digital heritage practices respect cultural protocols and sovereignty.

Collectively, these four clusters illustrate a holistic evolution of the field from early technical experiments in preservation to a mature, ethically grounded, and socially engaged discipline. The interlinkages among them demonstrate that effective digitisation

Table 2: Trending Keywords in Research Publications.

Keyword	Occurrences	Related Themes
Indigenous Knowledge	165	Cultural Identity
Digital Repatriation	143	Ethics and Ownership
Cultural Heritage	138	Preservation
Equity	112	Inclusion and Access
Community Archives	97	Participation
Digitisation	91	Technology
Decolonisation	74	Representation
Open Access	68	Information Rights
Traditional Knowledge	62	Indigenous Rights
Digital Humanities	57	Methodology

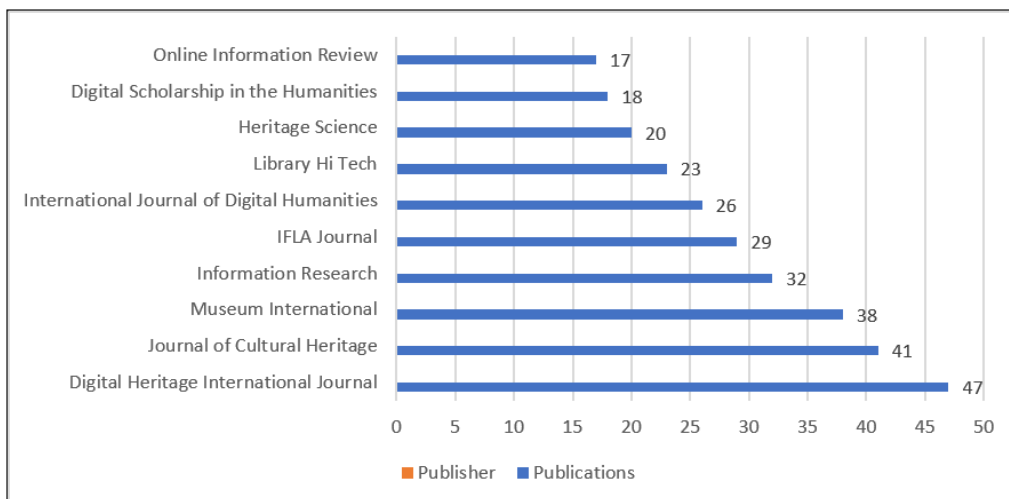


Figure 4: Leading 10 Source Titles in the Field.

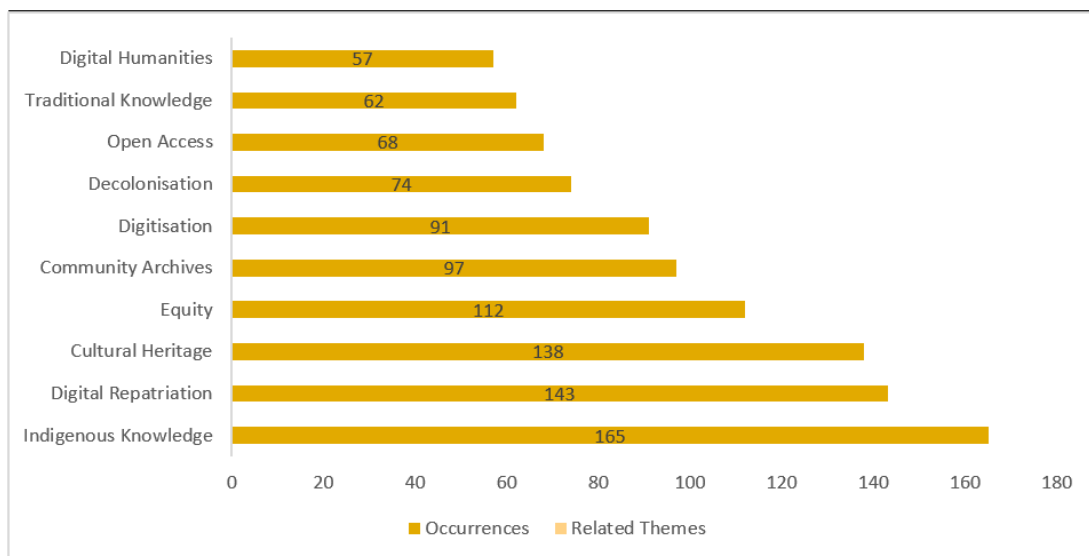


Figure 5: High-Frequency Keywords Across Publications.

of indigenous heritage is not merely a technical endeavour but a deeply cultural, ethical, and political process aimed at achieving equity, representation, and self-determination in the digital domain.

MAJOR FINDINGS OF THE STUDY

The field of *digitising indigenous heritage* has witnessed significant expansion over the past two decades, growing from just 18 publications (2000–2005) to 266 publications (2021–2025). This 15-fold increase reflects a global recognition of the need to preserve indigenous culture through digital means. The most rapid growth occurred between 2016 and 2020 (144.9%), coinciding with the rise of open-access initiatives, digital humanities programs, and UNESCO-backed digitisation projects.

Dominance of Journal Publications

Journal articles (65.6%) constitute the primary mode of scholarly communication, signifying a mature and academically rigorous field. While conference papers (18.5%) indicate dynamic engagement with emerging technologies, the relatively small proportion of review papers (3.7%) suggests that systematic syntheses and meta-analyses remain underdeveloped areas for future research.

Geographical Concentration with Emerging Diversity

Research is predominantly concentrated in developed nations, led by Australia (22.0%), Canada (16.6%), and the USA (15.3%), reflecting these countries' advanced infrastructure for digital heritage and strong indigenous studies programs. However, emerging contributions from India, Brazil, the Philippines, and Kenya demonstrate a gradual geographical diversification, signalling the inclusion of voices from the Global South in the discourse on digital equity and cultural representation.

Leading Journals and Institutional Concentration

The top outlets—Digital Heritage International Journal, Journal of Cultural Heritage, and Museum International account for a substantial portion of total publications. The dominance of major publishers like Elsevier, Springer, Emerald, and Routledge suggests an institutional centralization of knowledge production, even as the field itself advocates for decentralization and community-driven digital sovereignty.

Thematic Emphasis on Equity, Ethics, and Representation

Keyword co-occurrence analysis reveals that contemporary research prioritises *equity* (112 occurrences), *digital repatriation* (143), and *community archives* (97), indicating a shift from purely technical preservation toward ethical and participatory approaches. Themes of *decolonisation*, *ownership*, and *open access* demonstrate a growing concern with balancing global information accessibility with local cultural control.

Influential Works Shaping Ethical and Decolonial Frameworks

Seminal contributions by Christen (2012); Anderson *et al.* (2015), and Smith (2019) laid the conceptual groundwork for ethical digitisation and indigenous data sovereignty. Later studies by Ngata (2018) and Ribeiro (2020) expanded these ideas across regional and community contexts, emphasizing participatory design and equity-driven models.

Four Thematic Research Clusters Identified

The field of digitising indigenous heritage centers on four interconnected clusters reflecting its evolution from technical to ethical and community-driven approaches. Cultural Preservation focuses on digitisation and archiving technologies for safeguarding heritage. Equity and Access emphasize inclusion, participation,

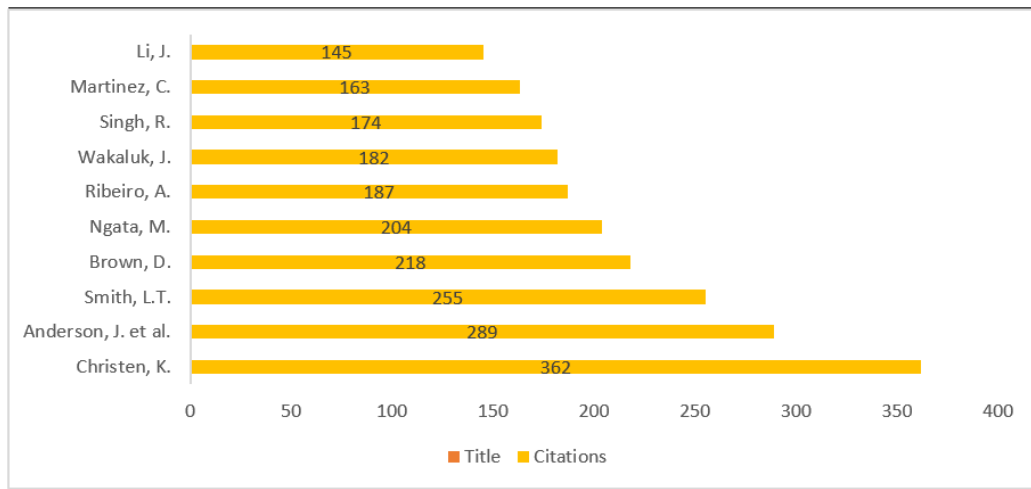


Figure 6: Top 10 Publications with Highest Citations.

Table 3: Top 10 Influential Research Articles.

Rank	Author(s)	Year	Title	Citations
1	Christen, K.	2012	“Does Information Really Want to Be Free? Indigenous Knowledge and Open Access”	362
2	Anderson, J. et al.	2015	“Digital Repatriation and Indigenous Community Access”	289
3	Smith, L.T.	2019	“Decolonising Digital Heritage Practices”	255
4	Brown, D.	2016	“Cultural Memory and Digital Archives”	218
5	Ngata, M.	2018	“Community-led Digitisation: A Maori Perspective”	204
6	Ribeiro, A.	2020	“Digital Heritage Equity in Lusophone Africa”	187
7	Wakaluk, J.	2017	“Ethics in Digitising Indigenous Artifacts”	182
8	Singh, R.	2021	“Digital Access and Tribal Knowledge in India”	174
9	Martinez, C.	2022	“Virtual Museums and Indigenous Representation”	163
10	Li, J.	2023	“AI and Heritage Digitisation Ethics”	145

Table 4: Thematic Cluster Analysis (VOSviewer).

Cluster	Theme	Major Keywords	Interpretation
Cluster 1	Cultural Preservation	“digitisation”, “archives”, “cultural heritage”	Focus on digital technologies and preservation systems.
Cluster 2	Equity and Access	“equity”, “open access”, “inclusion”, “participation”	Discussions on access rights and inclusivity.
Cluster 3	Indigenous Representation	“community archives”, “identity”, “decolonisation”	Emphasises indigenous-led digitisation.
Cluster 4	Ethical Frameworks	“ownership”, “consent”, “intellectual property”	Addresses cultural sensitivity and rights.

and bridging digital divides. Indigenous Representation highlights community-led initiatives and decolonised frameworks that center indigenous voices. Ethical Frameworks address ownership, consent, and intellectual property rights, ensuring cultural sensitivity. Collectively, these clusters illustrate the field’s shift from technology-centred practices to holistic, equity-oriented, and ethically grounded paradigms.

Evolving Research Frontiers and Emerging Trends

Recent works (2021–2025) increasingly explore AI, virtual museums, and immersive technologies in heritage digitisation. However, they also underscore concerns about algorithmic bias, data colonialism, and the need for culturally adaptive AI ethics frameworks. This shift marks the entry of the field into the *fourth digital revolution*, where heritage, equity, and technology intersect.

Persistent Gaps and Challenges

Despite global progress, challenges persist in achieving equitable representation. Indigenous communities in developing regions often face limited digital infrastructure, language barriers, and a lack of policy frameworks to assert data sovereignty. Additionally, the underrepresentation of indigenous authors in global publications points to an ongoing imbalance in knowledge authorship.

The bibliometric evidence underscores that *digitising indigenous heritage* is transitioning from a technical and archival practice to a socio-ethical movement grounded in inclusivity, justice, and self-determination. The research landscape is thus evolving toward a model that not only preserves cultural memory but also empowers indigenous communities to shape their digital futures.

CONCLUSION

The bibliometric analysis of research on *digitising indigenous heritage* reveals a rapidly expanding, interdisciplinary field that has evolved from technical preservation efforts to a socially conscious and ethically grounded domain. The consistent growth in publications since 2000 demonstrates increasing global awareness of the importance of preserving indigenous knowledge systems through digital means. While developed nations such as Australia, Canada, and the USA dominate research output, emerging contributions from the Global South indicate a gradual shift toward inclusivity and geographical diversity. The thematic and cluster analyses highlight the field's multidimensional nature, where cultural preservation, equity and access, indigenous representation, and ethical frameworks intersect to shape a holistic understanding of digital heritage. Contemporary research now emphasizes participatory and community-led approaches, ensuring that digitisation efforts respect cultural sovereignty, intellectual property, and traditional knowledge rights. Overall, the study concludes that digitising indigenous heritage is no longer merely a technological endeavour but a transformative process aimed at empowerment, justice, and cultural continuity. To advance this progress, future research should prioritise indigenous authorship, ethical AI integration, and equitable access models that uphold the principles of representation, respect, and reciprocity in the digital preservation of indigenous heritage.

ABBREVIATIONS

AI: Artificial Intelligence; **ANU:** Australian National University; **IFLA:** International Federation of Library Associations and Institutions; **LIS:** Library and Information Science; **MDPI:** Multidisciplinary Digital Publishing Institute; **UNESCO:** United Nations Educational, Scientific and Cultural Organization; **USA:** United States of America; **VOSviewer:** Visualization of Similarities Viewer.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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