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Indigenous Data Sovereignty in Heritage Digitization: Governance Models

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ABSTRACT

Indigenous data sovereignty (IDS) has emerged as a critical framework for reasserting Indigenous control over the collection, ownership, access, and use of data, particularly within heritage digitization initiatives. As museums, archives, and libraries increasingly convert physical cultural materials into digital formats, questions of governance, authority, and ethical stewardship have become central to debates on cultural preservation and representation. This paper examines governance models that operationalize IDS in heritage digitization, including community-led, collaborative, federated, and access-controlled frameworks. It highlights how these models negotiate tensions between institutional mandates and Indigenous self-determination, particularly in contexts shaped by colonial legacies and global digital infrastructures. Through analysis of legal, ethical, and practical dimensions, the study demonstrates that effective governance must extend beyond technical digitization processes to include decision rights, benefit-sharing, consent mechanisms, and culturally grounded stewardship. Case studies illustrate both the opportunities and limitations of existing approaches, revealing persistent challenges such as unequal power relations, restricted capacity, and risks of misrepresentation or unauthorized dissemination. The paper argues that sustainable heritage digitization must be anchored in Indigenous-defined governance systems that prioritize sovereignty, transparency, and cultural integrity. It concludes that IDS-informed governance is essential for ensuring that digital heritage initiatives support, rather than undermine, Indigenous rights and knowledge systems.

Keywords: Indigenous Data Sovereignty; Heritage Digitization; Governance Models; Cultural Heritage; and Data Ethics.

INTRODUCTION

Indigenous data sovereignty relates to the stewardship of Indigenous data according to Indigenous values and interests. Data governance describes systems, structures, and regulatory instruments that guide the generation, management, and sharing of data [1]. Governance frameworks specify principles, clarify ownership rights, delineate control and access mechanisms, and assign stewardship responsibilities [2]. The development of ethical digitization policies has intensified ongoing efforts to understand communities' governance needs, inform the co-design of solutions that align with aspirations and cultural norms, and articulate the implications for data sovereignty, digitization, heritage, and community wide objectives [3]. Heritage digitization refers to the production of digital surrogates of physical artefacts, the generation of associated metadata, and the sharing of both through a variety of access and distribution platforms. These distinct data classes confer different ownership and sharing rights [2]. Indigenous peoples, governments, and organizations play a pivotal role in defining governance arrangements. Although frameworks are often modeled on Indigenous self-determination principles, co-design occurs within a wider sphere of colonial authority [1]. The institutions involved in digitization, the communities whose material is being documented, and the scholars contributing to the work all have a stake in defining the terms of governance and a part in the broader objectives of the initiative [3].

Conceptual Foundations of Indigenous Data Sovereignty

Information has become part of a transfer of colonial power. Data and Knowledge Sovereignty requires Indigenous-determined frameworks to govern and guide data lifecycles to fulfil self-determined information goals [4]. All parts of the data cycle must be considered with the goal of honouring ethical obligations with the understanding that data can bring harm, especially if it falls into the hands of colonizers [5].

Heritage digitization is the process of creating digital representations of heritage objects that may include text, images, audio, or video, whether in analogue or digital formats [6]. Tangible heritage digitization includes manuscripts, books, photographs, maps, paintings, drawings, and printed items like flayers and brochures, often more sensitive than intangible heritage [7]. The processes and resulting data are complex and multi-faceted. Accordingly, bringing together actors for collaborative digitization becomes exemplary of the Māori Data Sovereignty principles of Ngā Uaratanga e Whā[2]. Digitization encompasses digitization, description, storage, access, and preservation [1]. Environments, archives, institutions, prioritization, and funding determine who digitizes, and where, when, and how. Digitization objectives reflect governance: answering community, organization, collective or institutional, regional, institutional repository, or international concerns [3]. Documentation standards, metadata philosophies, and preservation models are other considerations reflecting broader governance choices [1].

Heritage Digitization: Scope, Actors, and Data Types

Heritage digitization encompasses the processes through which physical and analogue objects, documents, publications, recordings, and similar heritage materials are reproduced in digital formats [3]. Digitization of a heritage work typically leads to the production of one or more digital surrogates, which are access copies of the work created using operational standards, specifications, and protocols established by national and international standards organizations [9]. Following digitization, these digital surrogates can undergo a range of post-digitization processing, in some cases leading to the creation of only one copy of the digital surrogate being produced, catalogued, and stored, while in other cases copies are retained locally or distributed to external repositories [4]. The digitization of heritage materials often involves a large number of diverse stakeholders, ranging from indigenous communities (which may be the original creators of the physical analogue items being reproduced) to enabling institutions that may or may not be indigenous themselves. The diversity of these stakeholders is shaped by the institutional environment in which the digitization activities are conducted [5]. Two major groups of such enabling institutions are governments (national, state, or regional/territorial) which sponsor the projects either directly or indirectly, and heritage institutions (archival, libraries, museums, or similar) that either undertake such projects themselves or directly collaborate with third-party applicants pursuing digitization of indigenous heritage resources. The combination of these enabling institutions thus brings a wide range of perspectives into play that influences the digitization of indigenous heritage materials [6]. An additional layer of complexity to the stakeholders engaging in the digitization of indigenous heritage resources is the distinction between digital preservation and broader practices such as documentation strategy and intellectual access [7]. A broader analysis of the digitization of indigenous heritage resources applied a further step and posited a two-fold data lifecycle model, with digitization understood as a way of enabling access rather than preservation, hence two distinct forms of data: “digitised records created from analogue sources” and “additional digital materials not part of the analogue collection”[7].

Governance Models for Indigenous Data Sovereignty

As digitization of heritage materials proliferates, so does Indigenous interest in data sovereignty of these intellectually property rights [4]. Data sovereignty encompasses a community's right to govern the collection, ownership, access, and use of data pertaining to its members. The digitization of heritage material can provide various benefits including long-term preservation, accessibility, and sharing of knowledge. However, digitization also creates risks such as loss of control over and misrepresentation of the materials [5]. Digitization done without consultation can hinder the return of physical collections, and digitization of items considered sacred can result in unauthorized dissemination through such platforms as social media [6]. New Zealanders have been vocal about the impact of large, global, commercial organizations disproportionately benefiting from, and maintaining ownership of, digital content purportedly recognized as public domain, including material through Māori-led initiatives [4]. In Canada, royalty-free use of Indigenous knowledge on global platforms, without consultation, continues to be a major concern. Through the Kānaka Maoli-led Pukui and Kanaka Maoli Database instances of disrespect and abandonment through the sharing of sacred, private knowledge, historically that shared only with haumāna point to the critical need for defining scope of data government[5]. Heritage digitization encompasses the documentation of physical and digital items. Items can take the form of physical, cultural, and digital information. Other stakeholders include collecting agencies, such as museums, libraries, and archives; community representatives; funders; and community coordinators that can emerge from the community itself or through

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partner organizations [6]. While community representatives are generally civilians, collecting agencies are generally governmental institutions. Both national and non-government organizations play an important role, as might institutional bodies such as crown corporations [7, 1].

Community-Led Governance

Community-led governance enables Indigenous communities to exercise authority and decision rights over digitized heritage materials [3]. Authority refers to the right to control, access, and regulate data relating to Indigenous people, customs, or culture, while decision rights delineate the ability to choose whether and how to share such heritage materials [4]. Shared cultural heritage is not distributed equally among Indigenous communities; therefore, both authority and decision rights must remain with the community from which the artifact originated [5]. Data sovereignty is based on the ownership, control, access, and stewardship of data; consequently, decision rights remain paramount. Shared governance with outside organizations does not negate decision rights, provided that the organizations do not claim ownership or exert veto power [5]. While not exclusive to community-led models, benefit sharing holds particular significance for communities with limited resources [6]. Risk management measures such as temporary embargoes on access, controlled access to sensitive materials, or geolocation restrictions support digital repatriation and mitigate potential harms [1]. Capacity-building activities furthermore promote data governance, control, and management in linguistics, archives, collections, and databases [7].

Collaborative or Co-Governance Frameworks

Collaborative governance models acknowledge that many stakeholders have a vested interest in cultural materials and associated data, resulting in a need for a different kind of authority structure [2]. Indigenous and data sovereignty frameworks embrace principles of joint stewardship, consent, and mutual benefit for broader governance structures that do not fulfill community aims regarding the digitization of heritage [3]. Collaborative governance arrangements exist in various forms and may include joint councils or forums to discuss material and data, recognition of customary protocols for the use of materials shared at national or international levels, sign-off or broad consent mechanisms, or a mandate to consider Indigenous decision-making processes, governance systems, and rights [4,5]. Many cultural bodies and funding agencies are seeking to articulate expectations of accountability towards Indigenous data sovereignty and Indigenous materials more broadly [5]. Committing to collaborative governance or similar principles entails explicit expectations concerning decisions made and the related accountability apparatuses, including how consultation or dialogue occurs with communities and what happens if collaborations are abandoned, materials are found, or a community is redefined or reshaped [6]. In many cases, collaborative data models find expression through a requirement to share and make publicly accessible data, including through open repositories [5]. This pressure or push often produces a need or desire to record pertinent research-related events, handle community consultations, or establish internal or external open data protocols, alongside efforts to document knowledge systems already in place or community-held arrangements among multiple parties across various locations [6].

Federated and Access-Controlled Models

Indigenous heritage digitization often involves the preservation and dissemination of culturally sensitive materials, which, despite being openly accessible, remain under Indigenous authorship [3]. Cultural institutions must therefore establish appropriate data access controls, particularly when Indigenous communities are not the designated data stewards. Access-controlled models allow data owners to determine how digitized legacy items are shared, conforming to community directives [4]. Federated models enable data holders to maintain sovereign control over their digital surrogates by storing them on independent systems and consenting to their inclusion in an aggregated access service [5]. One instance is the Australian Government's Protected Industrial Action database, a routing and distribution service hosted separately from individual data owners' systems. Federated models may enhance trust and facilitate broader data sharing [6]. Federated and access-controlled frameworks are complemented by adequate audit trails that demonstrate information handling in accordance with strict community permissions and requirements [2]. Where record-keeping provisions exist, these frameworks may also clarify the potential and limitations concerning the sharing of digitized materials that are subject to recorded constraints [7].

Legal and Ethical Instruments

Legal instruments, including legislation and treaties, inform governance for heritage-digital data. All levels of statutory norm exhibit regulation that may aid Indigenous data sovereignty [2]. Nevertheless, 70% of the globe remains without legal protection for Indigenous rights, and where such laws do exist, compliance often wants 6. Such laws nonetheless can guide the creation of relevant policies, such as data-sharing agreements that establish precise rules and liabilities pertaining to the reuse of digitised heritage collections [3]. Professionally accepted ethical codes create frameworks for disseminating a broader range of materials than legislative instruments alone

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permit; jurisdictions lacking Indigenous-data-specific standards may utilize such instruments instead [4]. Leading cultural organisations worldwide, including ICOM, CILIP, and the Smithsonian Institution, adhere to general principles that reference IP, heritage, access, and Indigenous governance [5]. Codified directly in the governance protocols of multiple research-asset collections, an Indigenous-data-governance charter has emerged over the past half-decade. The charter establishes foundational tenets for the protection of Indigenous rights, alongside recommendations for signatories and stakeholders across the scientific landscape [6]. The adoption of these principles can elevate broader ethical frameworks and amplify community engagement and benefit in relevant domains [1].

Case Studies in Heritage Digitization and Governance

Digitization of Indigenous heritage has the potential to advance community well-being but carries risks. Governance frameworks can safeguard sovereignty and support ethical, collaborative approaches [4]. Three governance mechanisms promote complex, context-sensitive decision-making in diverse situations. Each experience contributes practical insights for communities considering digital engagements [5]. The National Museum of the American Indian acquired a large archival digital collection. Staff carried out a governance assessment, and then rebuilt digitization workflows on a community-centered basis. Immediate benefits included provision of high-quality copies for return to Native American recipients, fostering trust [3]. The Open Context, a digital archive, curates and disseminates excavation documentation and related materials from Native American engagement [4]. The project emphasizes participatory processes, providing layers of documentation for diverse objects traced to Native American colleagues, institutions, and sites. Non-Native archaeologists enhanced learning opportunities but noted difficulties in balancing power with Indigenous data priorities [4]. Te Uru Taumatua has digitized a highly sensitive audio collection. Governance between Māori community members, archiving professionals, and a funding agency is shifting, as partners explore access limitations to maintain privacy [5]. Data-sharing arrangements and an evaluation framework are under development, encouraging diverse Indigenous datasets and broader connections [6].

Case Study A

In the early 1990s, an initiative was launched to digitize the cultural heritage of the collective memory of Sahrawi people [2]. Digital resources were entrusted to an international organization concerned primarily by the human rights of the Sahrawi people and their access to information to and about their cultural heritage and indigenous knowledge about the Sahrawi culture and language, language for the preservation of oral content, oral a vital feature to think includes Sahrawi traditional songs and poetry [3]. Community participation in document identification and digital content production is a traditional Sahrawi slave and characters of Sahrawi songs; contents had a total input ofts had been dedicated to captive and custodial content. The core concern of the Sahrawi community is a pressing demand for data governance [4]. There is an International Committee for the Protection of Sahrawi Cultural and Natural Heritage [6]. Such safeguarding mechanisms have been ratified by the Sahrawi government in exile along with the Cultural Conservation National Council. Attempts were made to exchange through the Flamenco research group genre equivalents of Sahrawi tunes and song, songbooks made available and a file-share/digital repository way back in 2001/2 [5]. Sahrawi are widely dispersed and still use poetic forms genre equivalents remain difficult to exchange. Restrictions from the European Union on the importation of natural resources had been extended also to cultural heritage [5]. Initial attempts to engage with Sahrawi had focused around information request turned out to be a dead-end avenue. The Sahrawi community has as a data-governance partner the only location not to sign a bilateral agreement on the exchange and educational resources with prohibition of sale of cultural material [6].

Case Study B

The governance underlying an Indigenous data- sovereignty initiative reflects the nature of the goals and values of that initiative. Understanding the governance design of a heritage digitization project illuminates what is considered important by the Indigenous stakeholders involved [4]. Each governance design is driven not just by rights assertion but by the need to transparently communicate what matters about Indigenous data and data environments [5]. Two differing, community-set access conditions govern access to the data on [Project A] 6. For many partners, access is limited to a regional subset of material that can be used to apply for funding. Partners outside this region may observe the data but cannot obtain it [5]. There are opportunities to collaborate with data-stewardship councils to contribute back to the national framework through a shared digital resource. The overarching role of a Funders Group addresses decision making across three existing communities of practice (archives, data management governance, and Indigenous data sovereignty) around a shared goal [3]. Indigenous community records preserved at a central institution under a Canada-wide archival agreement [6]. Some communities choose to disable records altogether; others enable limited access to metadata or content per item or

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collection. Data custodianship within the home community itself after digitization is desired. Scaling up requires balancing central coordination, repository development, consent models, and content available to date [7].

Case Study C

Case study C analyses the community process of developing a governance model for the Ko Yor Aboriginal Corporation (KYC) and its archives and collections [3]. The KYC represents the Aboriginal peoples of the central Queensland region including the Darumbal, Gangulu, and Gungalida peoples, along with their associated languages. Governance is evaluated in terms of its development process, scalability, and transferability to other contexts [4]. The Ko Yor Aboriginal Corporation (KYC) serves as an umbrella organisation supporting Aboriginal communities in central Queensland, connecting the Darumbal, Gangulu, and Gungalida peoples. Commencing in, to develop a governance model for KYC archives and collections, a community-wide process was undertaken to articulate values, responsibilities, and priorities [3]. Engagement was achieved through a combination of facilitated and unstructured conversations across multiple sites, supplemented by materials in both English and the Gungalida language. The resulting governance model recognised a range of data types with varying governance needs and articulated decision-making processes for each data type [4]. The scalable, community-driven, and culturally-grounded governance model described arose from an extensive community-led process that is of significant interest to Indigenous communities seeking to enact data sovereignty principles in the digitisation of archives and collections [4]. The KYC governance framework provides a practical illustration of heritage digitisation activities grounded in Indigenous governance principles and has potential applicability to other Indigenous contexts [3].

Benefits, Challenges, and Risks of Governance Models

Cross-national studies indicate communities implementing governance models perceive clear benefits. Many report enjoying increased autonomy, enhanced security for data and digital assets, improved relationships with stakeholders, access to tools facilitating self-determination, and capacity development among individuals and organizations [5]. Several jurisdictions in Canada have enacted legislation or developed decolonial-data-resources initiatives aiming to enhance data control and address historical injustices; their adoption, associated legal developments, and guidelines encouraging more transparent Data Governance Agreements have empowered various communities [6]. However, attainable software and alternative digital infrastructures, awareness of international frameworks permitting data-resources access by external-to-jurisdiction communities, adequate data resources, and the involvement of international-level stakeholders remain key challenges for several initiatives. Certain communities continue facing specific barriers such as restricted data availability [5]. Other projects report negligible changes in self-determination, community agency, and transparency despite transformations in governance structures [6]. Trade-offs accompany each governance arrangement, necessitating ongoing evaluation to assess vulnerability to unanticipated risks. Moreover, opportunities exist to integrate additional considerations addressing governance models and service delivery [7].

Methodologies for Evaluating Governance Effectiveness

Evaluating governance effectiveness serves two purposes. First, it assesses whether a given governance model meets its stated objectives; this is particularly relevant for community-led and collaborative frameworks, which typically articulate expected benefits [4]. Second, broad indicators of governance effectiveness can gauge progress across diverse governance settings and continuous governance approaches that do not specify goals [5]. The aim is to identify a limited set of generalizable indicators suited to the context of Indigenous data sovereignty and digitization, select appropriate sources for each indicator, and define how to collect the data and analyze them. Candidate indicators must be interpretable in light of distinctive governance practices; for example, the level of decision-making power afforded to the Indigenous community may be more relevant than community representation on a governance council when the latter holds no authority [4, 5]. Longitudinal evaluation of governance frameworks in different contexts offers insights into implementation challenges and effectiveness [3]. Moreover, frameworks capable of accommodating temporal change, for instance through the staged provision of additional authority or responsibility may align better with the uneven evolution of digitization efforts and attendant governance arrangements. The influence of contextual factors on governance arrangements and their outcomes may also be broader than is widely recognized, especially given ongoing colonial realities that continue to shape the devolution of authority [6].

Policy Implications and Recommendations

Governance models for Indigenous data sovereignty in heritage digitization frame policy recommendations for decision-makers in communities, repositories, cultural institutions, and funders [7]. Indigenous communities face urgent demands for culturally sensitive governance architectures to protect heritage materials, regulate access to digitized data under their authority, and align digitization to community-identified priorities. Expanding roles for repatriation and Indigenous knowledge-holders in governance initiatives are essential to minimize a growing and

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permanent digitization backlog of culturally sensitive materials [6]. Considerations for governance choices include the level of indigenous decision-making authority ensured, the types of records that can safely circulate outside the community, direct benefit to communities from data accessibility, mode of consent when digitization access control is not preserved, distribution of authority across communities, and institutional responsibilities accompanying management of sensitive materials[5]. To advance new strategies for digitization programs prioritizing Indigenous community needs, decisions regarding community selection and necessary types of prior governance capability shift towards the jurisdiction of cultural institutions and funding agencies [7]. Areas of focus for governance are either directly specified by Indigenous data sovereignty principles framing digitization programs or emerge from evaluation of contemporary initiatives. Repatriation bodies widely acknowledged, yet seldom incorporated into governance discussions, possess unique knowledge about the location and cultural significance of both physical heritage materials and existing digitized data for multiple Indigenous communities [5]. Indigenous participants have flagged a troubling pattern whereby some indigenous community-focused digital initiatives are increasingly established outside the communities they purport to serve, warranting attention to territoriality and how governance structures can deter such initiatives. Community-driven responses arise before authority, capacity, or information about materials to regulate external access are present, underscoring the practical necessity of governance for digitization programs [6]. Lasting solutions to control still-active heritage data insufficiently address the far larger deleted or otherwise purportedly secure supply lacking such ongoing protection [5, 7].

Future Directions in Indigenous Data Sovereignty and Digitization

Indigenous data sovereignty is primarily a pursuit of Indigenous peoples worldwide and defines their right to control the collection, ownership, and application of data about their communities, lands, cultures, and intellectual property [8]. It builds not only on legal and human rights frameworks, but also on Indigenous rights and, at the same time, the obligation to develop and implement ethical data governance mechanisms through sovereignty founded on the inherent rights of self-determination. Heritage digitization opens high-value, rights-sensitive data to the public domain and poses a significant threat to sovereignty over digital cultural heritage [6]. The ethical dilemmas posed by data for heritage digitization are compelling Indigenous peoples worldwide to articulate their own data governance principles and governance models, compatible with their worldviews and descriptive of how such a right should be exercised on digital cultural heritage[9]. Governance models that appropriately balance institutional and community decision rights for the wider society while respecting community self-determination are being explored. Insight is gained from analogous fields such as bioethics and community engagement, which share similar dilemmas for decision-making and control in the consideration of shared heritage. Identification of appropriate and effective data governance is critical for the wider uptake of Indigenous data sovereignty initiatives to safeguard the rights and interests of Indigenous communities in their cultural heritage [10].

CONCLUSION

Indigenous data sovereignty fundamentally reshapes how heritage digitization is conceptualized, governed, and implemented. Rather than treating digitized cultural materials as neutral informational assets, IDS frameworks emphasize that such data remain deeply embedded in Indigenous identities, rights, and systems of knowledge. As a result, governance cannot be left solely to institutions such as museums, libraries, or state agencies, but must actively center Indigenous authority over decision-making, access, and stewardship. The analysis of governance models shows that community-led approaches provide the strongest expression of sovereignty by preserving decision rights and ensuring culturally appropriate control over sensitive materials. However, collaborative, federated, and access-controlled systems also offer practical pathways for balancing institutional resources with community priorities, provided they are grounded in consent, transparency, and accountability. Across all models, persistent challenges remain, including unequal power dynamics, limited infrastructure, and the risk of continued colonial influence in digital spaces. Ultimately, the future of heritage digitization depends on strengthening Indigenous-led governance structures and embedding ethical, legal, and policy mechanisms that respect cultural protocols and self-determination. Effective implementation of IDS principles requires not only technical innovation but also sustained commitment to equity, capacity-building, and meaningful participation. By aligning digitization practices with Indigenous values and governance systems, institutions can help ensure that digital heritage serves as a tool for cultural preservation, empowerment, and intergenerational continuity rather than appropriation or loss.

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