Recordkeeping Metadata, the Archival Multiverse, and Societal Grand Challenges

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Abstract

This paper defines recordkeeping metadata and offers the concept of the Archival Multiverse and the Records Continuum Model as complementary frames within which research and development in recordkeeping metadata can be situated. To demonstrate the significant and evolving nature of this work and how it is situated within the Records Continuum, the paper first provides a brief overview of key efforts in recent years by the archival and recordkeeping community to automate the creation, management and reuse of recordkeeping metadata in order to address diverse social, cultural and technological as well as bureaucratic concerns and imperatives. It then introduces two examples of new recordkeeping metadata research initiatives that extend the scope and applicability of this work within the Archival Multiverse and in response to other local and global concerns. The first is a project that aims to build an exemplar metadata-driven *Sustainable Living Archive* for Indigenous communities in Australia. The second is a project of the Building the Future of Archival Education and Research Initiative (AERI) to identify ways in which archival and recordkeeping metadata research can contribute to nationally and internationally-identified "societal grand challenges" such as climate change, peace and security, human rights, and sustainability.

Keywords: archival multiverse; archives; culturally-sensitive metadata; Indigenous protocols; pluralisation; recordkeeping metadata; societal grand challenges

Introduction

Recordkeeping is a fundamental infrastructural component supporting robust and reliable egovernment, ebusiness, ehealthcare, and escience. It also supports such desirable objectives as democracy, human rights, self-determination, sustainable development, and social inclusion that might be pursued by less bureaucratically-organised as well as under-represented and historically disempowered groups (Gilliland & White, 2009). *Recordkeeping metadata* has been defined as:

> all types of structured information, including archival description, that is created manually or automatically by recordkeeping systems including metadata that documents the juridical-administrative, business and technical contexts within which records are created; identifies records and delineates how the records behave, their function and use; identifies and describes the relationships within and between records and other information objects; and expresses and supports how records should be managed, and what happens to them over time (Gilliland et al., 2006).

Another definition is that it includes "all standardised information that identifies, authenticates, describes, manages and makes accessible documents created in the context of social and organisational activity" (RKMS, n.d.). In the archival and recordkeeping domain, the presence and plurality of types and sources of metadata are increasingly acknowledged to be essential components in facilitating the life-long management, preservation, access and manipulability of the *bureaucratic record*, and in presenting and explicating the *societal record,* as these *record* constructions are narrowly and broadly understood within the emerging concept of the *Archival Multiverse*. The Archival Multiverse is both locally and globally oriented. It encompasses "the

plurality of evidentiary texts (records in multiple forms and cultural contexts), memory-keeping practices and institutions, bureaucratic and personal motivations, community perspectives and needs, and cultural and legal constructs" (Pluralizing the Archival Curriculum Group, 2011). We have argued elsewhere that awareness of and responsiveness to the Archival Multiverse should permeate all activities of archives, archivists and archival research. These activities include supporting emergent nations and post-conflict societies; empowering multiple ethnic communities within individual nations; building strong, sustainable communities; and supporting social justice, human rights, and social inclusion agendas (Gilliland & McKemmish, 2011).

A complementary and informative conceptual framework for this positioning of recordkeeping metadata is the Records Continuum Model, developed by Australian records theorist Frank Upward (1996). The Records Continuum Model articulates the complex social and cultural embeddedness of records and recordkeeping, regardless of organisational or community setting. Upward has argued that recordkeeping occurs along four intersecting axes: Evidentiality, Identity, Recordkeeping Containers, and Transactionality, and has four concentric dimensions: Create, Capture, Organise, and Pluralise. The research discussed in the paper suggests the possibility of identifying or creating *post hoc* metadata to document any given point in the records continuum, that for born-digital records, some of the metadata could be automatically identified, inferred or created, and that metadata can also be used to empower and support diverse groups and interests.

The first section of the paper provides an overview of recent recordkeeping metadata research that has primarily investigated automated creation, management and re-use of metadata relating to digital archives and records. The second section contemplates an evolving focus on how local, national and global ways of describing, exchanging and understanding resources can be accommodated through recordkeeping metadata, with a particular emphasis on the needs of Indigenous communities. It uses as an example a proposed Australian project relating to *Sustainable Living Archives*. The paper concludes with another example of the widening scope of research and development relating to recordkeeping metadata, the AERI initiative to identify ways in which archival and recordkeeping research can contribute to nationally and internationally-identified "societal grand challenges."

1. Automated Creation, Management and Reuse of Archival and Recordkeeping Metadata

In the first three dimensions of the Records Continuum Model, recordkeeping metadata may be necessitated by juridical, regulatory or industry requirements or archival and recordkeeping metadata standards. However, in the digital world, manual techniques are proving insufficient to capture, generate, appraise and preserve the ever-expanding volume and diversity of this metadata (Gilliland et al., 2005; Gilliland et al., 2008). This section briefly reviews several examples of computational analysis, registration, and transformation being applied in the automated capture, generation, management and reuse of recordkeeping metadata. While the rest of this paper deals with how the focus of research in this field is evolving and widening, developments relating to the automated creation, management and reuse of metadata raise many research questions that remain to be substantively addressed. These include investigating which aspects of archival description might reasonably be automated (e.g., automatically generated provenance/author data and dates or development of specialized item-level indexes), which should continue to be done manually, and what additional description and metadata-based user services might be automated (e.g., automated user clearance for access to restricted records, redaction of sensitive materials to be made publicly available, or custom packaging of an OAIS Dissemination Information Package in response to a user request.

1.1. Automatically Deriving or Inferring Recordkeeping Metadata

In the early 2000s, the potential for automatic processing of electronic records began to be identified by several experimental and applied research projects. Researchers at the San Diego

Supercomputer Center (SDSC) developed the Persistent Archives Technology for the U.S. National Archives, a collaborative approach to the XML-based preservation and reconstitution of electronic records that was informed by the theoretical conceptualizations and practices of recordkeeping being developed through other electronic records projects at the time (Moore et al., 2000a & 2000b).   Derived and inferred metadata such as document structures and activity patterns played a key role in that work, which, in the subsequent Archivists' Workbench Project, was scaled down for application in smaller institutional environments that might have quite different computing and financial resources, archival programs and priorities. The approach applied by the Archivists' Workbench involved creating "imperfect" software-neutral digital proxies that, while they likely do not address all the complexities and subtleties of the record, can render and layer a range of types of copies or views of the records. They provide a mechanism for preserving records in software-independent form and then reconstituting them; supporting new forms of visualization of records, their relationships to other records, and their internal structures and contents; and enhanced and more granular querying and access capabilities than might be available through manual, collective description.

1.2. Automatically Capturing Recordkeeping Metadata

In 2008, InterPARES 2 researchers found that metadata embedded both explicitly and implicitly in recordkeeping systems related to aspects such as "identity, linkages, documentation of documentary forms, juridical requirements, business rules and technical procedures, access privileges, establishment of the authoritative record when multiple copies exist and transfer of relevant documentation" (Gilliland et al., 2008). The research also demonstrated that much of the relevant juridical-administrative, provenancial, procedural, documentary and technological context resides within a diversity of metadata and metadata processes created through the workflows and activities with which the record is associated in its life before it is described by the archivist. This research pointed to the potential for automated tools to create, capture, infer or inherit metadata that could then be incorporated into the description of that record. Experimental work currently underway at the Texas Advanced Computing Center (TACC) is looking at automated methods for analysis and description of archives, and addressing some of these ideas about context. That work also exploits the kinds of intra- and inter-documentary relationships inherent in the archival bond in order to identify latent stories that might emerge out of a collection of documents (Dubrow, 2011).

1.3. Automatically Re-purposing Existing Metadata as Recordkeeping Metadata

The Clever Recordkeeping Metadata Project was a Monash University-based collaboration of academics in Australia and the United States, the National Archives of Australia, the State Records Authority of New South Wales, the Descriptive Standards Committee of the Australian Society of Archivists, and an advisory group drawn from industry and international experts (Evans et al., 2005, Evans et al., 2009). The project developed a prototype that was able to take metadata that had already been bureaucratically created and repurpose it as recordkeeping metadata, thus reducing the amount of effort and resources that would be needed to create the recordkeeping metadata necessary for corporate recordkeeping and institutional archives. It also exposed barriers to interoperability and the inadequacy of existing standards and schemas in terms of supporting such interoperability.

1.4. Automatically Registering and Managing Evolving Recordkeeping Metadata Schemes and Mappings

As the volume of metadata necessary to ensure the creation, preservation, pluralisation, and various uses of reliable and authentic records grows exponentially in relation to the records to which they pertain, the challenges of managing, and possibly summarizing or eliminating metadata also grow. In 2005, InterPARES2 researchers developed the Metadata Registry and Archival Description Analysis System (MADRAS) (Rouche & Evans, 2004; Gilliland et al.,

2005). MADRAS supported the automatic registration of successive versions of any metadata scheme or mapping being used in a particular recordkeeping context in order to document, for evidential and information purposes, the version that was in use at the time when a record was created (i.e., rather than at subsequent points when it might be undergoing preservation or reconstitution processes, or being used). The system also analysed, draft or complete versions of metadata schemes and provided creators with an assessment of the extent to which the schemes met recordkeeping requirements as articulated through different industry, national and international standards and best practices.

2. Accommodating Local, National and Global Perspectives Through Metadata

The fourth dimension—Pluralise—addresses the societal implications of recordkeeping. This dimension challenges archivists and recordkeepers to use metadata to address the experiences, needs and aspirations of marginalized and under-represented groups as well as addressing the wider societal imperative to ensure that recordkeeping can help to document, empower and enfranchise. New research is increasingly responding to the need, also implicit in the Archival Multiverse concept, for recordkeeping metadata to address the Pluralise dimension of the Records Continuum Model. Currently, standards and best practices that are relevant such as the ISO Records Management Metadata Standard (ISO 23081, 2006) and archival and other descriptive standards are developed based upon input from professional organisations, formal information institutions, concerned industries, and individual information professionals. There has been little participation by or consultation with ethnic, racial and Indigenous communities that might have differing perspectives on the representation, terminology, provnance, ownership, and dissemination of records and stories by or about them (Gilliland & White, 2009). Responding to this situation, Indigenous communities in both Australia and the United States have developed protocols that articulate a range of considerations and approaches regarding how and when their records and other forms of knowledge are captured, represented, preserved and viewed (ATSILIRN, 2005; First Archivist Circle, 2007).

2.1. Indigenous Community Metadata Considerations

The experiences of Australian Indigenous communities poignantly illustrate how records and their metadata can consciously or unconsciously participate in systematically perpetrating the destruction of identity, memory, and lives of individuals and entire communities. Records routinely applied the official bureaucratic terminology of those carrying out the relevant programs and activities and used English names and designations to refer to Indigenous lands, locations, communities and individuals. Such metadata is an artifact, and thus evidence, of the programmatic activities in which the recordkeepers were engaged, as well as the bureaucratic worldviews at the time. The structures, categorizations and language used in the records are far from benign in terms of both their historical *effect* and the *affect* they can cause within Indigenous users today. The *Bringing Them Home* report called for description of these materials in ways that would assist Indigenous persons in their quests while protecting their privacy and guarding against any future compilation of dossiers about them. It also called for funding to support indexing projects and the development of associated policies on access and use (Australian Human Rights Commission, 1997). In effect, this was asking not only for more complete representation of a past that was inadequately captured in the extant and official record, but also for something new and ethically, theoretically and practically challenging for those holding records -- an alternate, Indigenous community-centric representation of those aspects of the past that had been captured.

Several initiatives, such as the recently developed Aboriginal and Torres Strait Islander Data Archive (ATSIDA), designed in accordance with the ATSILIRN Protocols, and the Australian Trust & Technology Project, which investigated the archival needs of Indigenous Australians particularly relating to oral memory (McKemmish et al., 2011), illustrate, however, the ways in

which the same records with alternate, culturally and situationally appropriate metadata, including community-supplied annotations, when managed in accordance with Indigenous needs, concerns, and beliefs, and with professional awareness of the urgency that is often involved, can support redress for that violence and the reconstruction of identity, memory, and lives. A key philosophy underlying the *ATSILIRN Protocols* is a "both ways" or "two ways" approach that is based upon "equal respect for both Indigenous and 'western' languages, knowledge and learning approaches." But it is not easy to accomplish. As the *ATSILIRN Protocols* point out, among the many perspectives present in Australian library and archival materials relating to the Indigenous population are "those of the colonist, policeman and magistrate as well as those of the historian, anthropologist and social commentator" (ATSILIRN, 2005). The perspectives that are notably absent, however, are those of the Indigenous peoples themselves. In most cases, Indigenous individuals and communities feature as the subjects, and not the authors of the records. To address this absence, their presence in the records needs to be specifically drawn out in metadata, and their rights as (often unwilling or unwitting) subjects and co-creators of those records need to be acknowledged and addressed.

2.2. Researching Sustainable Living Archives for Indigenous Communities in Australia

In Australia, loss of language and culture is a critical issue for Indigenous communities. A proposed research project, *Sustainable Living Archives: Long-term preservation, cross-generational transfer and interactive use of Indigenous narratives of language and culture*, will bring together a multidisciplinary, collaborative partnership of Indigenous communities and academic researchers to address the critical research problems associated with developing *Sustainable Living Archives* of community narratives of language and culture. It is driven by the needs of Indigenous communities to record, manage, store, transmit and interact with their narratives in digital and multimedia forms, including:

- oral memory contained within country and people, transmitted and accessed through speech, performance, dance, art and song (e.g., traditional stories, songlines, contemporary narratives, family stories, recovered narratives from mainstream collective knowledge)

- records created by and for Indigenous people, communities and organisations (e.g., archaeological reports, family records and genealogy, native title claim documentation and research reports, web sites of Indigenous communities and organisations, oral history)

- digital archives (digitised copies of Indigenous records "repatriated" from library, archives and museums)

- research data archives (e.g. the Indigenous node of the Australian Social Science Data Archive, ATSIDA, hosted by the University of Technology Sydney) and the AIATSIS (Australian Institute for Aboriginal and Torres Strait Islander Studies) data archive)

- records in all forms and media created by non-Indigenous people and organisations about Indigenous people, including government records, church records relating to Aboriginal Missions, and anthropological records.

The Project envisages a S*ustainable Living Archive* as playing a critical role in re-connecting and recovering the fragmented archives of an Indigenous community, enabling long-term preservation, transmission and use of online digital and multimedia content, and providing viable, adaptable frameworks for community control, protocols and rights management over time. Its interfaces will enable access and re-use, tagging and annotation of existing content, creation of new content and layers of context, configuration and reconfiguration of archival content to enable users to develop their own virtual collections and provide different views of the archive; and interactive links to the content of other community archives, colonial and post-colonial

government and institutional archives. Most importantly Indigenous content owners and users will become commentators on and interpreters of their own culture; and the broader community will interact with the archive in line with the protocols of the content owners. The *Sustainable Living Archive* will also be performative, always in a process of becoming, growing and mutating to meet a community's changing needs.

The Project will use the Monash Country Lines Archive (MCLA) as a test bed for prototyping a S*ustainable Living Archive.* It is ideal for this purpose for a number of reasons. The term 'Country Lines' refers to the wealth of Indigenous knowledge embedded in country-centric ribbons of song, narrative and performance. In the MCLA, Monash researchers John Bradley, Shannon Faulkhead and Tom Chandler are working with Indigenous communities to capture cultural knowledge, languages and narratives in 3D animations of the Country Lines, (e.g., Yanyuwa, 2008, 2009 & 2010). The animations' instant appeal is their immediate accessibility for all ages, remote and urban Indigenous communities, and the broader Australian community. They demonstrate how language recovery and transmission of stories across generations can be achieved by using groundbreaking digital and 3D animation technologies to create a virtual world of Country Lines and provide a powerful means of intergenerational learning in the present (Bradley and Yanyuwa Families, 2010; Bradley et al., 2011). However, MCLA does not address the challenges associated with sustainability, long-term preservation, accessibility and interactive use into the future. Recovered cultural knowledge, languages and narratives are at risk of being lost again. The Project will iteratively design, prototype, and evaluate an exemplar of a *Sustainable Living Archive* made up of:

- preservation copies of Country Lines 3D animations and master scene files
- 3D models, objects, atmospheric sounds, cartography, photographs, artefacts and data developed and used in creating the animated models, landscapes and narratives of the virtual world of the Country Lines
- community stories, songs and narratives of language and culture which form the knowledge and evidence base for the animations
- records about the production of the animations and research processes, e.g. story boards, animatics, records of community consultations relating to the stories to be animated, language used, visualisation of landscapes and creatures, blogs and emails used by the animators to support creation and production
- records of the negotiation and management of rights associated with the animations, including rights relating to ownership, control, access and use
- records relating to the research undertaken in the development of the *Sustainable Living Archive* itself.

Key components of the exemplar archive will be a Repository, Registry and Interactive Interfaces. The *Sustainable Living Archives* Repository will be designed to address long-term preservation. The OAIS reference model will inform the overall architecture (CCSDS, 2002). The Fedora application's approach to managing complex objects will be adopted (Lagoze et al., 2006). The Registry and Interactive Interfaces will be driven by a Metadata Schema that identifies in a standardised way the entities and elements needed to record, manage, transmit and enable interaction with narratives of language and culture in digital and multimedia forms. Specification of the Metadata Schema and related Encoding Schemes will draw on existing metadata schemes (Dublin Core, Australian Government Locator Service, AS/ISO recordkeeping metadata standards), extending and customising them to meet the needs of community partners, and the broader Indigenous and Australian communities of users. Schema analysis, domain and

conceptual modeling, metadata modeling, concept mapping of metadata schemas and standards and empirical instantiation (which populates models with examples) will be used to develop the schematic structure for the Registry. They will draw on outcomes of the metadata research undertaken in the Clever Recordkeeping Metadata project (Evans et al., 2005), and the InterPARES2 Project (Gilliland et al., 2008). In developing the Metadata Schema, the Project will also address critical issues relating to the need for customised metadata for Indigenous digital archives, for example needs relating to describing and managing secret and sacred materials in culturally sensitive ways, accommodating constructs of collective co-creator ship and rights in records, and recognizing the multiple provenances of records (Gibson et al., 2009; Nakata et al., 2008). Metadata will also play a crucial role in the *Living Archive's* Interactive Interfaces. They will be designed using visualization, virtual reality, intelligent technologies and social media. They will include a Community Dashboard with features and tools to facilitate engagement of relevant communities with the ongoing development and management of the archive, and a User Dashboard of search, access, tagging and annotation tools for community members and others to interact with the content of the archive and add metadata, including tools to match user needs to content, deliver value-added information, and assist in negotiating terms and conditions of use (e.g., licensing templates).

The Project aims are driven by a recognition of the importance of preserving Indigenous community narratives of language and culture as part of *Sustainable Living Archives* controlled by the community, coexisting and connecting with the records of colonial and post-colonial governments, religious and cultural institutions, and anthropologists. In this regard, one of the main aims of the research is to enable Indigenous community Elders and members to become commentators on and interpreters of their own culture through their interaction with a living archive of community narratives, thus contributing to the decolonisation of the archive. The Metadata Schema will be a critical component in achieving this Project aim. The metadata-driven Registry will be designed to support the creation or transfer of new content into the archive; migration of 3D animation, digital objects and data through system upgrades; updating of access permissions and terms and conditions of use (e.g., when decisions are made to open material previously restricted to community access only to wider access, or vary the conditions for licensing the use of 3D animations, models and objects by third parties); and the dissemination, use and repurposing of the content of the archive. The Metadata Schema will support community-centered, value and culture-sensitive description of the contents of the archive; establish critical relationships between the objects in the archive, e.g., between the animations and the objects used in their production, and between the animations and their evidence base in community knowledge and stories of country; enable links to other online digital and data archives, and provide information about related material in offline digital and physical stores; and identify the metadata needed to negotiate and manage rights in the content of the *Sustainable Living Archives*. The metadata-related research and exemplar Schema will contribute to the further development of international and Australian recordkeeping metadata and archival description standards that will support the integration of the requirements of Indigenous communities into mainstream frameworks and standards, and will be crucial to demonstrating how 3D animation can create a virtual world of narratives of culture and language that can be repurposed to create all manner of interactive and performative applications.[1]

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[1] Details of this proposed new project are largely drawn from planning documents and funding applications authored by Sue McKemmish with input from co-Investigators at Monash University, Lynette Russell, John Bradley and Shannon Faulkhead (all from the Monash Indigenous Centre), Tom Chandler and Joanne Evans (COSI, Monash Centre for Organisational and Social Informatics).

3. AERI and Societal Grand Challenges

Recordkeeping metadata, as already stated, are a fundamental infrastructural component of almost every aspect of organisational, technical and social systems. If recordkeeping and archiving are to support robust and reliable egovernment, ebusiness, ehealthcare, and escience, as well as democracy, human rights, self-determination, sustainable development, and social inclusion, then transformative research and development initiatives are needed to ensure that metadata frameworks, standards and tools address local, national and global needs, with particular attention to the needs of communities, as well as under-represented and historically disempowered groups in society.

<div align="center">TABLE 1: Grand Societal Challenges and Archival Challenges</div>

Area	Societal Challenge	Archival Challenge	Metadata Challenges
Climate Change	Building a green economy	Building an integrated global archive of records relating to climate change	Interoperability of Metadata Schemas and Encoding Schemes
Peace and Security	Decolonisation	Decolonising the archive, archival functionality and recordkeeping practice	Developing community-centered, value and culture-sensitive Metadata Schema and tools
Development	Democratisation	Transforming archival access	Transforming current Archival Access Metadata Frameworks and Approaches to enable citizens to participate in the constitution of the archives and to fully exercise their rights to access archival sources of information
Corporate Governance	Accountability and transparency	Developing recordkeeping and archival structures, strategies and tactics that support accountability and transparency	Ensuring that Recordkeeping and Archival Metadata and Frameworks Standards fully support accountability and transparency requirements
Human Rights	Enabling Indigenous peoples, oppressed and marginalised communities to exercise rights of self-determination	Building participatory archival models that support the exercise of cultural, information and memory rights as human rights	Building Metadata Frameworks that support participatory archival models
Health and Well-being	Addressing major health and well being issues, e.g. HIV/AIDS, malaria control, sexual violence	Developing recordkeeping and archival structures, strategies and tactics that support global health and well-being initiatives	Ensuring that Recordkeeping and Archival Metadata and Frameworks & Standards fully support
Social Justice and Inclusion	Bridging the digital and information divides	Bridging the archival divide	Redeveloping mainstream archival Metadata Frameworks, Standards and Tools to be more inclusive of the requirements and diverse needs of our local, national and global communities
Sustainable Communities	Recognising and valuing local community cultures and knowledge as critical components in building strong, healthy communities	Supporting independent, sustainable community-based archives	Developing community-centered, value and culture-sensitive Metadata Schema and tools
Information Society and Technological Change	Addressing the complexity and plurality of the worlds of recorded information in online cultures	Developing global and local archival structures, strategies and tactics to address the "infinitely expanding … continuum of recorded information that is engulfing us"	Investigating how Metadata Frameworks, Standards and Tools can be designed to address complexity and pluralisation

The Building the Future of Archival Education and Research Initiative (AERI), led by a consortium of eight U.S. universities, has convened annual weeklong institutes for faculty and doctoral students in archival science from across the U.S. and worldwide since 2008. The first

scholarly forum of its kind in the field, AERI began an initiative in 2011 to develop an archival research agenda associated with societal grand challenges. Table 1 provides examples of societal grand challenges and associated archival challenges have been preliminarily identified by AERI participants. Mapped against these are metadata research challenges that would both build upon and extend current research efforts in recordkeeping metadata while supporting various grand challenge areas. The mapping underscores the fact that while the research discussed in this paper provides examples of the potential importance and richness of issues and questions that might be addressed and methods that might be applied, there is a vastly wider expanse of potential and valuable engagement that has not taken place to date. The goal of the AERI initiative is to use this identification and mapping of challenges to identify and promote research and research collaborations capable of making significant and meaningful contributions across this global and societal expanse.

Acknowledgements

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