

Media Archives and Digital Preservation: Overcoming Cultural Barriers

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ABSTRACT

Like archives in other social and cultural heritage domains, media archives have begun implementing digital preservation processes and strategies. However, a robust take-up of digital preservation standards such as OAIS has not occurred. A key question is whether or not implementing these standards is relevant in all media archives. If not, is there a danger that media collections will be lost as part of the social and cultural record? Six media archives, representing three different ‘types’ - broadcast, hybrid and national libraries - were studied to gain a better understanding of how digital preservation norms fit into their mission, what drives their requirements, and whether in fact digital preservation is relevant to their main ‘business’.

By adapting an IT service management model to the media archive context, one can conclude that implementing preservation as a service is not relevant for broadcast archives; the focus on storage and access information management serves their core business needs. Preservation is the business of national libraries and implementing standard digital preservation norms such as OAIS and PREMIS are routine. However, unburdened by the high quality content and speedy access requirements broadcast and hybrid archives must meet, their technical content quality tends to be lower and access delivery more limited. Hybrid archives are in a good position to safeguard media collections for the future. They already carry out the essential storage and access information management tasks. However, in order to truly ensure the preservation of *authenticated content over time*, hybrid archives need to more fully define and implement preservation service management processes that will deliver specific levels of quality with an associated cost, to a broader client base. In addition, they need to develop a stronger internal digital preservation culture and shared vocabulary throughout the organization. This would be realized by increasing the digital preservation skill set and more forcefully introducing digital preservation norms and standards. Process and culture development, taken together, can help the hybrid archive more easily transition from a reactive to a proactive preservation organization.

Keywords

Broadcast Archives, Media Archives, Digital Preservation

1. INTRODUCTION

According to Ray Edmondson, an audiovisual archive focuses on collecting, managing, preserving and providing access to, or making use, of a collection of audiovisual and related materials [1]. Audiovisual collections abound: within national and regional archives; in academic and research institutions; in museums, other

cultural institutions and corporations, to name a few. But by far the largest collection of audiovisual material is produced by broadcasters; such collections are primarily managed by broadcasters themselves, in ‘hybrid’ archives fulfilling both production and cultural heritage missions and in some cases, national libraries and archives.

Like archives in other social and cultural heritage domains, media archives have begun implementing digital preservation processes and strategies. In fact, the project PrestoPRIME (2009-2012), a collaboration between five of the largest European broadcast archives focused primarily on digital content management and preservation within the broadcast media domain. One of its main deliverables, an “OAIS compliant” preservation framework, included services, tools and a reference architecture model for digital life-cycle management - from ingest to dissemination [2]. Project partners such as INA (Institut National d'Audiovisuel), S&V (The Netherlands Institute for Sound and Vision), the BBC, RAI (Radiotelevisione Italiana) and ORF (Österreichischer Rundfunk) learned a great deal from this research. Each have begun to implement some of PrestoPRIME's outcomes but a robust take-up of the project's digital preservation processes has not yet occurred.

This paper explores four main questions:

1. What is digital preservation and how might it be measured?
2. What current digital preservation concepts, norms and standards are used within the media archive domain, particularly by archives that operate either within or very near a media production environment?
3. Do archives managing media collections recognize digital preservation as a business need? Do media archives see a value in implementing digital preservation standards? What drives their requirements?
4. Is there a danger that part of the social and cultural record in these archives may be lost? If so, what strategies may help prevent this?

2. Digital Preservation (DP)

“Digital preservation combines policies, strategies and actions to ensure the accurate rendering of authenticated content over time, regardless of the challenges of media failure and technological change. Digital preservation applies to both born digital and reformatted content.

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Digital preservation policies document an organization's commitment to preserve digital content for future use; specify file formats to be preserved and the level of preservation to be provided; and ensure compliance with standards and best practices for responsible stewardship of digital information.

Digital preservation strategies and actions address content creation, integrity and maintenance [3].”

Digital preservation, consisting of digital life-cycle management processes, spans an archive's operations: acquisition, ingest, metadata creation, storage, preservation management and access. Everyone, from producers to collection managers to end-users shares responsibility in the preservation chain. Preservation is not only the implementation of robust IT service management technology; preservation is especially an investment in governance, defining preservation services (its 'business') at levels to which the organization can commit. According to Hoogervorst, an organization must also ensure that internal competences clearly fit defined activities that support this 'business' and that it explicitly budgets for people, processes and infrastructure supporting (preservation) business requirements [4].

Two concepts are key to digital preservation: *integrity* and *authenticity*. A repository should be able to prove, *based on evidence*, that an object under its control is what it is purported to be (authenticity) and that it has not been corrupted over time (integrity)[5]. Any changes to digital objects must be documented, should be detectable and manageable. Preservation workflows, strategies and actions ensure that integrity and authenticity are guaranteed despite the processes digital objects undergo and include the systematic registration of metadata throughout an object's life-cycle. Heavily dependent on information management, a clearly defined information architecture plays a crucial role in ensuring that this data is systematically managed.

There are different standards and guidelines archives can use when defining desired levels of digital preservation services. OAIS provides a functional and information reference model [6]. The metadata schema PREMIS provides archives a structured approach to maintaining life-cycle events and outcomes [7]. Other metadata schemas ensure that essential object properties are registered so that if required, they can be maintained over time. Varied certification trajectories help archives measure their own preservation management maturity level. These range from the more simple to the very complex: the Data Seal of Approval (DSA), the Nestor Seal (DIN standard 31644) and finally the ISO 16363, Audit and Certification of Trustworthy Digital Repositories.

3. Case Studies: DP Norms in Media Archives

To illustrate three media archive 'types', Broadcast, Hybrid and National and their varying application of digital preservation norms, research was performed on six different media archives by way of a literature search and interviews.

3.1 Broadcast archives

RAI, a Public Service Broadcaster and Italy's largest radio-television broadcasting company and media repository, began television broadcasting in 1954. Its primary mission is broadcasting television and radio programs produced either internally, co-produced or purchased. Although it has no legal obligation to comply with a particular archive model, as a publicly funded company, RAI feels obligated to preserve and promote its archived programs for cultural heritage purposes. It does not retain material for which it has no exploitation rights (and is

preserved by other organizations) or raw material not considered useful for production. The RAI manages both master quality broadcast formats (MXF) suitable for production, post-production or other re-use as well as lower quality proxy formats. Its descriptive, rights, technical and process metadata are currently managed and stored on database systems, according to custom designed data models. Most metadata interchange processes are based on either custom defined XML schemas or standard XML formats such as EBU Core, MPEG-7, and MPEG-21. The RAI has experimented with scenarios in which archive packages of media and metadata are used for content management, such as METS, and supported the standardization of the Media Preservation Application Format in MPEG. However, the RAI archive is strictly related to production; the reliability of content and metadata storage and management is ensured with standard defined ICT practices. Storage and format migration processes are not formally pre-defined but responsible persons and units are identified. RAI is concerned with preservation but focuses primarily on fulfilling production and access technology requirements and believes that as production and archive continues to converge, preservation will essentially become a production task [8], [L. Boch, personal communication, March 2015].

Since the mid 1980's, **BBC Scotland library services** has managed both the analogue and digital radio and TV output of BBC Scotland as well as programs produced in Scotland for the BBC Network. BBC Scotland falls under the BBC Charter; its Charter Amendment (2006) requires "...arrangements for the maintenance of an archive...which is representative of the sound and television programmes and films broadcast or otherwise distributed by the BBC. (2) Those arrangements— (a) must ensure that every such archive is kept safely, to commonly accepted standards..." [9].

Like the RAI, BBC Scotland sees its primary mission as producer and distributor of television/radio programming. It too follows broadcast industry standards in its format choices; metadata schemas have been developed in-house based on such standards as P/Meta, and DMS-1, and incorporate ISO and SMPTE standards. It has an active selection and retention policy and since 2007 all BBC Scotland completed programs have been retained. The BBC Scotland does not currently intend to re-model its workflow processes according to OAIS, nor become certified as a 'trusted digital repository'. BBC Scotland's full digital production platform includes a newly upgraded MAM system. The primary goal of the upgrade was "to enable a seamless interface between the digital archive content and the production systems; to enhance search and retrieval functionality and to increase the speed of content delivery to production systems" [10]. With budget and time constraints, some automated preservation workflow functionality was implemented and continues to be developed. Content selected for long term preservation is managed through general IT system maintenance and security protocols. [V. Plaine, personal communication, March 2015].

BBC Scotland does collaborate with the British Film Institute (BFI) which maintains the National Television Archive; it deposits its de-accessioned analogue carriers with the BFI once they have been digitized. Since 1990, the BFI has been recording selected BBC London output at a quality level sufficient for research purposes. The BFI is currently working on developing direct ingest of selected, high quality digital output for long-term preservation and a larger amount of lower quality output for research purposes. The BFI is also the designated National Television Archive for the public service commercial broadcasters

(ITV, Channel 4 and Channel 5) under the terms of the 1990 Broadcast Act and the 2003 Communications Act. These acts include a funding mechanism for both preservation and access operations [S. Bryant, personal communication, March 2015].

3.2 Hybrid archives

INA maintains the French radio and television archives, provides production services to broadcasters and producers (through InaMÉDIAPRO), serves the general public, and produces its own media content for distribution. Its collection represents more than 80 years of radio and 70 years of television programs and includes material submitted for legal deposit since 1992. As of 2012, INA is also responsible for the legal deposit of French websites published by broadcasters, media groups and their service providers. It has also established partnerships with other parties to publish and market their collections; in some cases preservation is included in the agreement [11]. INA's sustainability model relies on the valorization of content in order to supplement government funding; thus it has heavily invested in developing InaMÉDIAPRO [12]. INA is currently negotiating with the French Ministries of Culture and Finance to become THE digital repository for all national cultural institutions. INA's preservation format choices reflect current broadcast technologies and the need to serve production and various media distribution channels. In 2011 it chose JPEG2000 in an MXF wrapper [13]. INA's metadata schemas have been developed in-house to suit its particular development needs over time. The digital repository system was not originally designed and built according to the OAIIS reference model. However, INA retains digitization process data including QC outcomes, extracts technical metadata and generates checksums. None of this data is currently maintained in standardized archive metadata schemas nor "packaged" with the media files [8]. Becoming certified as a 'trusted digital repository' is not considered a priority at this time [J. Varra, personal communication, 2015].

The Netherlands Institute for Sound and Vision has performed a dual role since its inception in 1997: as the central production archive for national public broadcasters as well as the national audio-visual cultural heritage archive. Its collection includes more than 800,000 hours of radio, television and film programming. It was mandated by the government (Mediawet 1987 and 2008) to maintain the national broadcast collection produced by the 15 public broadcasters and the national rights holding organizations. A seven year long digitization project produced digital files for more than half of its analogue collections and it ingests digital born, broadcasted content daily. S&V also serves as a national resource aiding small and large cultural, educational and academic institutions in the preservation of its audiovisual material. It is currently involved in obtaining the Data Seal of Approval. This strategic goal formed the basis for a project in 2012 that resulted in the development of OAIIS compliant workflow descriptions and policies that are currently being implemented in its technical architecture and systems [14]. Its preservation strategy includes different preservation levels (such as bit preservation/full preservation) and associated services for both internal collections as well as for third-party clients.

Like INA, its core collection preservation format reflects its largest designated community, broadcasters; its master files are MXF and all material it manages is normalized to this format. Its descriptive metadata schema was developed in-house based on FRBR; its technical, process and provenance metadata schemas have been developed in-house or are produced in software proprietary formats. No formal archive metadata standard has yet

been implemented. It has recently acquired a new Media Asset Management (MAM) system to better guarantee performance, speed and stability in managing and delivering content to its users, and to support defined preservation workflows.

3.3 National libraries

In addition to its traditional library collection, the **Royal Library of Sweden's** mission includes maintaining comprehensive holdings of Swedish media history (television and radio programs) for reference purposes. They currently house more than 8 million hours of audiovisual material acquired under legal deposit. In addition, as of July 2012, media companies that produce Swedish content on the internet are legally required to deposit a copy to the library [15]. The digital library repository was designed according to OAIIS principles and its preservation policy states that preservation is to be carried out in accordance with 'trusted digital repository' standards. Its digital audiovisual collection is not yet managed in its digital repository but planning is underway. Descriptive metadata is acquired from published sources. Formal metadata schemas in use include MODS, METS and PREMIS; they are currently considering VideoMD and AudioMD for future technical metadata management in collaboration with the national archive. Its choice of media preservation formats reflects its reference only mission; the video collection in particular is of low technical quality. Although producers can request material, the Library does not provide primary services to the media production community; users are directed to the broadcasters themselves if professional broadcast quality is needed [Unauder, K., Konstenius, G., Degerstedt, S., Green, E., personal communication, March 2015].

The **Bibliothèque Nationale de France's** (BnF) mission is to collect, preserve and provide access to all published material in France. Its audiovisual legal deposit started with recordings in 1938 and video material in 1975; web-based legal deposit began in 2006. The audiovisual collection currently consists of over 1.2 million items, primarily recordings (900,000), followed by video (200,000) and "multi-media" material (134,000) [16]. It also offers preservation services to third-parties, and for this they have been certified by the "Service interministériel des archives de France" (SIAF). They are currently considering attaining the DSA for management of certain collections [Ledoux, T., personal communication, March 2015]. Its commitment to providing long-term access to all digital material it digitizes or collects digital born, is reflected in the development of its Scalable Preservation and Archiving Repository – SPAR. Designed according to the OAIIS reference model, it was intended to be full OAIIS, covering all preservation needs. SPAR's initial development focused on meeting collection and data management goals; further development of the access, administration and preservation planning functional modules is underway [17]. Workflows include metadata extraction, fixity checking and links with producer contracts. Data management is seen as the heart of the repository's development. The BnF utilizes the formal metadata standards METS, PREMIS and MPEG-7 for its audio and video collection. Its preservation format choices reflect its reference only mission for video: MPEG-2; recordings are uncompressed WAV [18].

Table 1. Use Case Summary

Archive Processes & Norms	Broadcast Archives		Hybrid Archives		National Libraries	
<i>Media Archive</i>	RAI	BBC Scotland	INA	S&V	Royal Library of Sweden	BNF
<i>Collection</i>	Primarily own material	Primarily own material	Third party producers Own productions Copyright owners	Third party producers Own productions	Third party producers Copyright owners	Third party producers Copyright owners
<i>Ingest (Collecting)</i>	Automatic Ingest	Automatic Ingest	Automatic Ingest	Automatic Ingest	Semi-automated as acquired	Semi-automated as acquired
<i>Preservation Format Norm</i>	Broadcast Production	Broadcast Production	Broadcast Production Driven	Broadcast Production Driven	Non-Production Norm	Non-Production Norm
<i>Process Focus (Managing)</i>	Storage & Access Capacity & speed driven	Storage & Access Capacity & speed driven	Storage & Access Capacity & speed driven	Storage & Access Capacity & speed driven	Preservation, Information Management, Storage & Access	Preservation, Information Management, Storage & Access
<i>Access</i>	y	y	y	y	y	y
<i>Preservation Services Defined</i>	Partially	Partially	y	y	y	y
<i>Metadata Focus</i>	Descriptive/Content search driven ID/Process Driven Rights	Descriptive/Content search driven Rights	Descriptive/Content search driven Rights	Descriptive/Content search driven Rights	Descriptive & Preservation	Descriptive & Preservation
<i>Integrity</i>	Supported	Supported	Supported	Supported	Guaranteed	Guaranteed
<i>Authenticity</i>	Supported	Supported	Supported	Supported	Guaranteed	Guaranteed
<i>Long term preservation</i>	Guaranteed for selected material No formal Selection Policy	Guaranteed for Material in Selection Policy	Guaranteed (all retained)	Guaranteed for Material in Selection Policy National AV collection Guaranteed as a commercial preservation service	Guaranteed for Material in Selection Policy	Guaranteed for Material in Selection Policy
<i>Primary Designated Community(s)</i>	Media Producer General Public - (viewers)	Media Producer General Public - (viewers)	Media Producer General Public Research/Education	Media Producer General Public Research/Education	General Public Research/Education	General Public Research/Education
<i>Business model</i>	Access Cost driven	Access Cost driven	Access Cost driven Commercial Production Sales	Preservation driven but not main driver Access Cost driven Commercial	Preservation driven Access supported but not main driver	Preservation driven Access supported but not main driver

4. Media Archive Requirements: The Drivers

Given this insight, it might help to consider media archive requirement drivers from a business environment point of view, to determine if preservation forms part of the ‘business’. A simple illustration adapted from Randone [19], to the media archive environment is shown in Figure 1.

Media archives have always been driven by technology, as content cannot be accessed without the use of machinery and, now in the digital domain, hardware and software. Migration to new formats, a common preservation process in the analogue period, was mostly organized manually. One could say that most media archives were resource driven. Managing physical tapes and films, and creating descriptive metadata were handled per item and stored in silo applications: Excel sheets and databases for example. These multiplied over time as more process related metadata was captured. *The first phase of file based digital archiving was handled with a similar approach.*

Today, media archives are confronted with an explosion in the amount and diversity of material (formats) being produced. Large amounts of analogue material have been digitized and incoming material is digital born. Workflows have been automated and almost all archive processes operate within an IT environment. Media archives connected to production environments are heavily affected by dynamic changes in media production and delivery technologies; they are motivated to design their systems with broadcast system interoperability in mind. This translates into large investments in IT storage, network capacity, speed and efficiency; the implementation of (often) proprietary hardware and software tools and systems; and choices for preservation formats that most economically fit their primary users’ needs. Often, commercial media asset management systems are employed to accommodate workflow processes that are primarily designed to satisfy production requirements. Their traditional focus on content re-use and access has resulted in extensive development of time-based description to better serve clients. Focus on preservation metadata (technical, provenance) is

considered a more secondary task. *The second business phase focuses particularly on storage and access; (Descriptive) information management’s goal is locating and delivering requested material, a piece of data, out the massive amount of files.*

Mastering the storage and access information management level, the next phase is incorporating preservation management services where preservation is managed as a business.

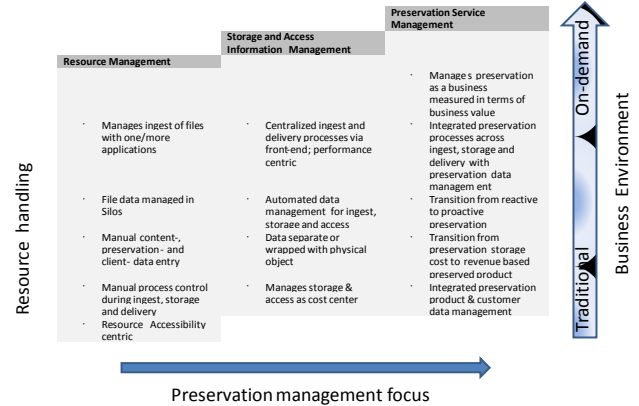


Figure 1. Evolution from IT Service Management to Preservation as a Business Service

5. Media Archives: Is Preservation Their ‘Business’?

The key question here is whether the third phase, preservation managed as a business, is relevant to all media archives.

5.1 Broadcast archives

The largest media collections are often found in independent units within a broadcasting company, whether it be public or commercial. These units maintain and provide access to broadcasted radio and television programs produced by the mother organization as well as unedited production material, program documentation and other context information, stored in production level quality to serve production goals. The stakeholders - producers, archive staff and media professionals, in general - work for the broadcaster. Their users are media professionals such as program makers and production assistants.

Most broadcasters currently work in a file-based production environment. Here, the archive is fully integrated with a technical production and delivery IT infrastructure. Ensuring content availability for in-house production is priority number one. Retention policies, descriptive approaches and access requirements are dedicated to supporting production goals. ‘Re-use’ demands are often met with more recent material, so what constitutes long-term value may not quite match what cultural heritage institutions define it as. Because preservation is more of a secondary task, and although there are staff responsible for making sure material is accessible over time, implementing what is seen as potentially disruptive and complex digital preservation ‘standards’ is not considered urgent or necessary. Without a strong institutional mandate to implement preservation services, preservation-specific budgets are often minimal; budget restrictions logically result in choices that primarily support fulfillment of production and access business requirements. Metadata implementation demonstrates a strong investment in descriptive metadata because it supports access priorities.

Managing preservation metadata (administrative, technical, provenance and process history) is more ad hoc; it is not considered as essential as in the digital preservation domain. Staff competences tend to support broadcasting operations and needs: they have a good functional understanding of how the tools support content production and re-use. Staff formerly trained in archive methodologies are not heavily represented in the organization. Knowledge about exactly how or whether existing tools support preservation processes is not always present. Standard archive approaches to acquisition/selection planning, understanding and accepting responsibility for material coming into the collection for the long-term, and what that implies in preservation process terms, is not yet dominant in broadcast companies.

Broadcast archives are optimized for their core business: storage and access information management with the focus on speed, capacity and delivery. Supporting preservation, in terms of long-term maintenance, integrity and authenticity is not their main business; introducing it only makes their business more complex and costlier. The chance that they will move from an optimal IT service management of ingest and access, to incorporating preservation service management is low as long there is no business case for it.

5.2 Hybrid archives

The ‘hybrid’ archive has two missions: a national, cultural heritage mission and a mission to serve the broadcast community’s production needs. They are often semi-governmental institutions, sometimes with a legal mandate to maintain a copyright depository. They generally fulfill their collection management obligations as they see fit. Their stakeholders are media producers (copyright deposit) and other content holders; management; and a broad group of end-users: media producers with professional requirements, the general public, the educational domain and researchers. All of these parties have an interest in the long-term management of the content entrusted to the organizations.

Hybrid archives are closely aligned with the media production environment from which they receive collection material and to which they make collection material available. They typically deal with great volumes of digital born and digitized material and consider the delivery of content to content producers their primary responsibility. Hybrid archives tend to invest more heavily in what their largest clients, the media producer (who may also be their largest funder) requires. Thus, they tend to operate more like broadcast archives than national libraries/archives, dedicating more resources (budget) to high quality IT production and technology infrastructures whose requirements primarily satisfy the broadcast industry. Metadata creation is more focused on description and access than preservation metadata. In the tension between the two missions - meeting very specialized production, access and delivery requirements the broadcast industry requires, while at the same time trying to satisfy long-term preservation requirements, developing preservation services is not given high priority. Many staff traditionally come from the broadcast industry and not the archive community. Staff from the broadcast industry bring with them a focus on their own ‘best practices’ with an emphasis on speed, production and access goals over traditional archive goals – selection, integrity, authenticity and collection building. *Importantly, their biggest client, the broadcast community, does not demand compliancy with archival preservation norms but rather broadcast industry norms, so that their own needs are met most efficiently.*

Hybrid archives are not yet optimized for their business: high performance storage and access information management is still their main focus. The business of preservation, long-term maintenance, integrity and authenticity could be better supported using the same infrastructure, by improving the organizational capabilities and implementing processes associated with preservation. They need to better realize that the “accurate rendering of authenticated content over time” is a preservation service with an associated cost. Additional costs incurred defining and incorporating preservation services might be carried through revenue generated from a larger variety of preservation “products” designed for different client segments, in addition to the media producer.

5.3 National Libraries

National libraries and archives have traditionally fulfilled a societal role as collector and guardian of the social and cultural record. Their mission generally involves maintaining a reference collection for researchers, education and the general public; acting as a legal copyright depository; and/or collecting and managing original recordings produced by government operations, retained as evidentiary value. More and more these institutions acquire digital born materials, whether it be in the form of digital publications (cds, DVDs, etc.) or professionally produced file based recordings of government activity (parliamentary session footage for example). Thus, these institutions also manage large, digital audiovisual collections. They are usually established by law and have a mandated budget to carry out their preservation obligations.

It goes without saying that developing and implementing record/collection management and metadata standards has been the norm for these organizations. The concepts “integrity” and “authenticity” have long informed approaches to collection management. National libraries, primarily repositories of published information, and national archives, that chiefly collect non-current records of enduring value and documentary material of long-term value, [20] tend to employ staff trained in library and archive principles and consider the implementation of preservation standards as their business. Managing in the digital domain has brought with it new complexity, but they appreciate and use standard guidance and approaches in transforming their collection management practices. Collection, preservation and access are all considered core ‘business’. However, unburdened by the high quality content and speedy access requirements the broadcast and hybrid archives must meet, their technical content quality tends to be lower and access delivery more limited.

Ensuring long-term preservation with guarantees for integrity and authenticity is the business of national libraries. However, although media collections of national libraries use digital object management, it is often item by item without optimized workflows: reactive instead of proactive preservation information management. Despite the implementation of high quality metadata standards (METS, PREMIS, etc.) the technical quality, of especially video content, is often of a lower quality.

6. Conclusion

6.1 Safeguarding the media based record

Given the above domain specific context, is *preservation of media collections in danger?*

For broadcast archives, there are no guarantees that large amounts of broadcast media will be preserved for the “long-term”. Workflows in broadcast companies may meet ALA’s definition of

digital preservation – they do have “policies, strategies and actions to ensure access to reformatted and born digital content regardless of the challenges of media failure and technological change”, but only for the set of material it sees as profitable for relatively short-term business goals; preserving a cultural historical record is of secondary importance. Performance, not preservation is their “business”; thus their business processes do not need to conform to the strict guidelines the archival community has defined.

Hybrid archives perform a critical role in ensuring that greater amounts of broadcast content are retained for the public record. However, these archives demonstrate some risk if they rely financially, and focus too much, on broadcast producers (their biggest client base) in defining archive “business” process priorities. Caught between having to serve two missions, they tend to underfund preservation service management and implementation, tend to interpret general IT service management as digital preservation management, lack enough skilled digital preservation management staff and are not completely committed to developing preservation services. Struggling with budget cuts, pressure from funders and the need to integrate preservation processes into existing and complex broadcast production system architectures, they show a tendency to focus on access and content promotion activities. The ad hoc nature of preservation process implementation makes it more difficult for these archives to gain real insight and transparency in what they do well and what they may be doing wrong.

National Libraries use the highest level of professional metadata and preservation standards, but often preserve content of the lowest technical quality, particularly for video. Their preservation infrastructures are not designed to support the storage and delivery of high quality content and as long as this is not explicitly part of their mission, investment in this area will not be given priority.

6.2 Strategies to ensure the record is not lost

6.2.1 Promote greater collaboration among media archives

Greater collaboration between broadcasting companies and institutions whose primary task is to safe guard cultural heritage should be encouraged and promoted. S&V, INA and the BFI provide three examples of institutions saving social and cultural heritage for the public record. All three have contractual agreements and/or legal mandates, as well as funding, to manage major broadcasting output in their respective countries. National libraries/archives safeguarding broadcast material could learn more from broadcasters and hybrid archives about the possible implications of retaining low quality moving image content. Collaboration on developing more advanced technical infrastructures to enable long-term retention of higher technical quality content, while not forcing national libraries to take on production support roles, might be considered. National libraries could help hybrid archives better understand and implement digital preservation metadata standards. Other kinds of collaboration might include greater selection and deposit of broadcast materials in either hybrid or national libraries and helping broadcasters better understand what processes they might implement to preserve cultural heritage without disrupting their production mission.

6.2.2 Better define the preservation ‘business’ within hybrid archives

It’s clear that dynamic production goals and long term digital preservation goals produce different ‘business’ requirements. Hybrid archives need to better define and differentiate between their production support services (storage/access) and preservation services.

- Hybrid archives need to **implement on an operational level more explicit preservation service processes** with defined levels of cost and quality for different clients and content.
- **Explicit funding to implement preservation service processes** must be made available, not only from external funders but within archives mandated to preserve digital social and cultural heritage. An explicit budget dedicated to implementing preservation infrastructure requirements and staff training is required.
- **The added value digital preservation standards bring to Hybrid archives needs to be better acknowledged within the archive.** They offer a common vocabulary to be shared, not only within the institution, but with other institutions, thus increasing opportunities for staff collaboration. Perhaps the media domain needs to work harder on mapping the OAIS concepts to their own domain specific vocabularies as suggested [6]. The PrestoPRIME project did a lot of work in this area; however implementation of the project results has not been forcefully demonstrated to date. A shared vocabulary among media archives might also better position them to motivate industrial vendors to incorporate more preservation functionality in systems designed for the broadcast industry. It need not be an either/or fulfillment of (sometimes conflicting) business requirements.
- Finally, these institutions need to **develop a stronger internal digital preservation culture.** Hybrid archives should increase the number of staff with digital preservation skills who can help IT service managers better understand, implement and measure whether their operational preservation processes guarantee collection integrity and authenticity. Staff must share the same norms and values that support the organization’s preservation business. This requires investment in more personnel skilled in digital preservation and ensuring that these skills are disseminated throughout the organization. All staff connected to the media archive life-cycle chain - acquisition, ingest, storage management, data management, preservation management and access - need to understand their role and responsibilities. For this to happen, management structures need to motivate employee behavior to support the preservation mission.

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