Joining Forces in Audiovisual Digitisation, Digital Preservation and Access: The Indian and the Flemish Approach

Irfan Zuberi (NCAA) and Brecht Declercq (VIAA)

ABSTRACT

The paper presents the benefits of a collaborative approach in the domain of audiovisual archiving in two very different contexts: NCAA in India and VIAA in Flanders. Following an initial contextualisation in the respective countries, the authors share a detailed modus operandi, outlining the functionalities and traceability matrices of the implementation processes involved in the networks that they have managed to build. Especially critical are the insights and parallels between NCAA and VIAA in the domains of audiovisual digitisation, digital preservation and access. Concluding with a look to the future, the authors hope to put forward the idea that a well-defined collaborative approach has the potential of functioning as a possible solution to the needs and aspirations of all stakeholders - content providers, digitisation agencies, archival network and a wide range of potential users.

1. Introduction & Background

Introduction

For over ten years now, many institutions managing non-file-based audiovisual collections have become pressingly aware of the grand challenge of audiovisual preservation, metaphorised so magnificently by Indiana University's Mike Casey as the monster called 'Degralescence'.[1] Casey suffices with mentioning the keywords 'large numbers', 'obsolescence', 'degradation', 'high research value' and 'short time window'. We don't deem it necessary for the audience of the IASA Journal to elaborate or prove Casey's points which we fully underwrite and concur with.

While many institutions globally are now arduously busy with the preparative or even operational phases to bring this two-headed monster down, many amongst us have found ourselves confronted with Degralescence's villain accomplices - Dissension and Austerity. In this article, we present a particular strategy to tackle the monster and its accomplices and it can be summarised in one word - Collaboration. We do this by comparing two successful applications of this approach from two very different parts of the world, but showing a striking number of parallels: NCAA in India and VIAA in Flanders.

Background

A large volume of India's cultural wealth, created during the last several decades, is stored in audiovisual form with governmental and non-governmental institutions and private collections. The content of these holdings enshrines the creativity of some of India's greatest artistic talents. Needless to say, this is an invaluable national heritage that needs to be preserved in perpetuity and also made accessible to the citizens of the country and, indeed, the world. In the absence of systematic and up to date preservation technologies, lack of awareness and proper upkeep, as well as the fragility of the medium they are stored in, these resources are in imminent danger of being lost forever. Moreover, with frequent changes in hardware and advancements in technology, the playback of these audiovisual resources, which are mainly in analogue format and stored on different types of tapes, records, cylinders etc., has become a

1 Casey, M. (2015) Why media preservation can't wait. The gathering storm. In: *IASA Journal*, 44 (1, 2015).

global challenge. Given this background, the Ministry of Culture, Government of India, on 1 April 2014, sanctioned the approval for and entrusted Indira Gandhi National Centre for the Arts (IGNCA) to set up the 'National Cultural Audiovisual Archives.'

Mutatis mutandis the same situation was present in Flanders, where, as early as 2006, the urgency of audiovisual preservation made its way to the political agenda. During several research projects between 2008-2010, media as well as heritage institutions prepared what was then still quite uncertain: the founding of an organisation dedicated to the digitisation, sustainable digital preservation and giving access to the region's vast and wealthy, but also technically diverse and widely spread audiovisual heritage. Discussions back in those days were mainly about technical differences between the cultural heritage institutions and the broadcasters and about the question whether this institution, in spirit, should be conceived more from a centralising or a distributed functioning. These issues soon proved to be superable, but the aftermath of the economic crisis caused a vast delay in the execution of the plans. On 21 December 2012 however, the mission of founding a 'Flemish Institute for Archiving' (henceforth: VIAA), fostering it and raising it to become an independent organisation within two years was given to iMinds, an institute of the Flemish government offering support, research and incubation facilities to companies and organisations in the field of ICT and broadband technology.

In India, the vision of National Cultural Audiovisual Archives (henceforth: NCAA) is the creation of a state-of-the-art digital repository, geared for long-term preservation and dissemination of the content that it receives from its partnering stakeholders. The designated community of NCAA, the first audiovisual archive of its scale and kind in India, covers a wide range of potential users, including scholars, researchers, practitioners of the arts, media professionals, connoisseurs and aesthetes in general. In terms of its mission, NCAA positions itself as an archive of archives and an integrating platform for repositories that are scattered all over the country and had been working in relative isolation. The principles of Open Access have been a driving force for NCAA and it streams the content it receives from its partnering stakeholders in the public domain through its web portal. In its recently concluded Pilot Phase, during 1 April 2014 – 31 March 2018, NCAA has had several major achievements. It pursued digitisation standards that are in line with those recommended by IASA and customised the Dublin Core metadata schema to suit the uniqueness of the holdings of its partnering stakeholders, thus ensuring uniformity and the possibility of interoperability. Over 30,000 hours of audiovisual resources have been digitised from the repositories of twenty-two (22) partnering stakeholders of NCAA, featuring the broadest possible interpretation of Indian arts and culture, including visual and performing arts, oral traditions, documentation of traditional crafts, textiles, theatrical practices, community lifestyles and traditional knowledge systems. Perhaps the biggest achievement of NCAA has been its certification under the ISO 16363:2012 standard, thus becoming the world's first audited and certified Trustworthy Digital Repository.

In VIAA's first 24 months, still very much characterised by uncertainty and inconsistency of political support, the strongest need was felt to be its own confirmation. Its first mission statement was therefore very straightforward: "VIAA aims to digitise and preserve the Flemish audiovisual heritage and make it accessible for everyone." Within its three core activities – digitisation, archiving and interaction – VIAA achieved to set up three major works: a digitisation project, the largest up until then in Flanders, involving no less than audiovisual 170,000 carriers from 40 organisations; a sustainable digital storage infrastructure of 2x300TB disk space and 2x17PB on LTO, ruled by a state-of-the-art HSM and a multi-tenant MAM system; and a first way for the public to access the content, in the form of an educational platform filled with audiovisual archives content, designed to fit the needs of Flemish primary and secondary school teachers.

These results were followed by a prolongation of VIAA's mission by the Flemish government in 2015 with a yearly subsidy of around 4.4 million euros. This allowed VIAA to expand its activities massively in the past 4 years and to become an independent institution separate from iMinds. Today VIAA has a staff of 23 full time equivalents, works for 140 public, commercial and regional broadcasters, cultural heritage institutions, city archives, government bodies and performing arts organisations together called 'content partners'.[2] The ambition is to digitize the 650,000 audiovisual carriers of their collections by 2021. The 17PB digital storage space is already filled by half and is managed through a MAM system with a tenant for every content partner. Thanks to a shared catalogue, the content partners can take a look into each other's collections and the educational platform Het Archief voor Onderwijs (The Archives for Education) already reaches a large share of the Flemish teachers corps.

2. Modus Operandi

2.1 Coming Together

Detailed consultations at several levels formed part of the process of setting up the NCAA. These included discussions at the Ministry of Culture, Government of India and consultations with subject experts in the domain of audiovisual archiving. The purpose of this effort was to work towards bringing together the various stakeholders who would be involved in the implementation processes of NCAA. Following several such consultations, a consolidated meeting of experts was convened on 19 July 2013 to discuss the modalities of the NCAA initiative and issues related to its functioning were deliberated upon. These included concerns with regard to the setting up of a Pilot Phase project management unit, adherence to standards, modalities of digitisation, identification of contributing organisations (henceforth: Partnering Institutions), shortlisting of audiovisual formats for the Pilot Phase, development of a MAM system and issues related to intellectual property rights.

As mentioned above, the concept of VIAA grew from the idea that the solutions to the threats to Flemish audiovisual heritage would necessarily be technologically advanced and expensive. Yet, as in India, the model of cooperation was not clear from the beginning. The broadcasters and cultural heritage institutions involved had very different missions and these were naturally reflected in their vision on digitisation, archiving and access to their collections. However, from the end of the 2000s onwards, the Flemish government made it clear to everyone involved that if it would reserve resources for the audiovisual heritage, there couldn't be any question of tranching over the full range of institutions managing audiovisual heritage collections. In other words, collaboration was the only realistic model, even beyond the traditional sectoral boundaries.

It was clear from the beginning that NCAA and VIAA had no intention whatsoever of replacing their content partners in any of their activities. For both, the intent is to be complementary: where the partnering stakeholders lack the knowledge and resources to set up processes around digitisation, archiving and access, NCAA and VIAA offer opportunities to them, thus providing specialisation more on a technical than on a content level.

2 A full overview of VIAA's content partners can be found on https://viaa.be/en/partners.

2.2 The 'NCAA Memorandum of Agreement' and the 'VIAA Deal'

Among the key topics of discussion during the consolidated meeting of experts held on 19 July 2013 prior to the setting up of NCAA was the incentives to be given to and the responsibilities envisaged for the potential Partnering Institutions. A template memorandum of agreement was drawn up, with an adequate bias in favour of the incentives that would be given to the organisations that come on board with the NCAA.

Incentives-Responsibilities Matrix during the Pilot Phase of National Cultural Audiovisual Archives

S. No.	Incentives	Responsibilities
1	NCAA will coordinate a preliminary survey of the audiovisual collection and its IPR status, and carry out an institutional capability assessment of the 'Partnering Institution' in accordance with approved formats.	The 'Partnering Institution' will provide information about the institutional capability, and assist in the preliminary survey and collection assessment of its audiovisual holdings.
2	NCAA will assist in the creation of a catalogue of the complete audiovisual holdings of the 'Partnering Institution' to be shared online through the NCAA Web Portal.	The 'Partnering Institution' will make the complete catalogue of its audiovisual holdings accessible in the public domain through the NCAA Web Portal.
3	Based on the significance, condition and IPR status, a part of the holdings of the 'Partnering Institution' would be identified, in consultation with the 'Partnering Institution', to be taken up for digitisation.	The 'Partnering Institution' will help in the identification and prioritisation of the whole or part of the collection that can be taken up for digitisation and public access.
4	NCAA will extend support for metadata creation for the selected portion of the audiovisual holdings of 'Partnering Institution' in the approved extended Dublin Core schema.	The 'Partnering Institution' will identify personnel for metadata creation as per NCAA's approved guidelines.
5	Selective digitisation of the audiovisual collection of 'Partnering Institution' would be undertaken at the behest of the NCAA. The digitisation would be done by a third party agency selected through due process.	The 'Partnering Institution' will nominate a coordinator to liaise with the digitisation agency in order to ensure secure transportation and efficient digitisation of the selected content.

Incentives-Responsibilities Matrix during the Pilot Phase of National Cultural Audiovisual Archives		
6	Centralised public access of the digitised audiovisual material with metadata sourced from the 'Partnering Institution' will be arranged under a non-exclusive Open Access regime by the NCAA in collaboration with C-DAC.	The 'Partnering Institution' will check the quality of the digitised output in line with the digitisation standards and quality assurance guidelines of NCAA, including carrying out a process of metadata verification and enrichment.
7	NCAA will undertake outreach & awareness programmes for wider dissemination of the initiative in collaboration with the 'Partnering Institution'.	The 'Partnering Institution' will help in the identification of significant collections beyond the 'Partnering Institution', both in institutions and with individuals that form a part of the extended network of the 'Partnering Institution'.
8	NCAA will conduct training & capacity building in the areas of documentation, metadata creation, and handling of audiovisual materials for the personnel of the 'Partnering Institution'.	The 'Partnering Institution' will take initiative in organising training, outreach & awareness programmes to spread the mission of NCAA within its extended network.

Table 1 - NCAA Pilot Phase Incentives-Responsibilities Matrix

Importantly, it was made clear from the start that the entire cost incurred on digitisation of select holdings from the Partnering Institutions would be borne by NCAA. Further, in case any Partnering Institution required assistance for metadata creation in the schema approved for the NCAA, the NCAA also agreed to support the salary of hired contractual staff up to a period of one year. Finally, financial assistance has also been provided for staff from Partnering Institutions to attend training programmes conducted by NCAA.

At VIAA, more or less the same story happened. In principle, all the partners were free to refuse a collaboration with VIAA. In practice, however, VIAA's proposal proved to be too attractive for them to pass up. It starts from what one might call 'the VIAA deal'. This means, first and foremost, that VIAA uses its own government subsidy to pay for the digitisation of the holdings of its content partners. Furthermore, the content partners also receive a sustainable digital storage service in exchange for a limited contribution to the costs. In exchange for these services, the content partners grant to VIAA a non-exclusive license to use the content on its own platforms to the extent that they themselves are rights holders.

Although this deal for the content partners has certainly proven to be incentivising, we should not underestimate the efforts that are expected from them. In preparation for the digitisation, they have to label, package and register all carriers with a number of technical characteristics in an online database made available by VIAA. For example: for the registration of some 100,000 ¼" audio tapes alone, the public broadcaster VRT has employed two full-time employees for almost five years. In addition, the content partners are also expected, once have their material digitized, to perform a quality check on the result and to provide descriptive metadata.

2.3 Typology of Stakeholders

The Partnering Institutions of NCAA represent variety along multiple axes – governmental/ non-governmental, regional/pan-Indian, archives/museums and research centres/production and broadcasting houses. The important thing, however, is that, as indicated earlier, they have come together due to a shared base of common and mutual values, resources, interests and aspirations. The following is a typology of the Partnering Institutions of NCAA:

i. National Archives: The purpose of national archives is to systematically collect and document the heritage of the nation.
National Archives of India, National Institute of Design, Indira Gandhi National Centre for the Arts, Indira Gandhi Rashtriya Manav Sangrahalaya, Centre for Cultural Resources and Training, Indian Council for Cultural Relations, Sahitya Akademi & Sangeet Natak Akademi

ii. Research Archives: Research archives can be described as having specific subject interests like events from certain periods in history, regional mandates, coverage of specific cultural groups or particular art forms etc.
Rupayan Sansthan, Samvaad Foundation, Natya Shodh Sansthan, Sangeet Parishad Kashi, Saptak Archives, Shri Kashi Sangeet Samaj, All India Kashiraj Trust, Indira Kala Sangeet Vishwavidyalaya, Jatin Das Centre of Art, Kalakshetra Foundation, Kerala Kalamandalam, Manav Uttardayitav & Regional Resource Centre for Folk Performing Arts

iii. Production & Broadcast Archives: Production & broadcasting archives contain archival material created with the specific purpose of dissemination, publication and commercial broadcast/telecast.
Cinema Vision India

These twenty-two (22) Partnering Institutions of NCAA are spread across a total of twelve (12) cities across the country. The map given below points the cities with the number of Partnering Institutions in them indicated in parentheses.

Map 1 - NCAA Pilot Phase - Cities with Partnering Institutions

From a budgetary and organisational perspective, it was impossible for VIAA to roll out its activities from the beginning for all audiovisual heritage managing organisations in Flanders. VIAA initially restricted its group of content partners to the thirty (30) recognised and subsidised cultural heritage institutions in Flanders, supplemented by the nine regional broadcasters and the public broadcaster VRT. As soon as the budget allowed, new groups of partners were added. The recognised but not subsidised heritage institutions were the first to join, followed by the archives of several government departments. The main city and municipality archives soon followed. Since 2016, performing arts organisations and the so-called heritage cells (inter-municipal partnerships in heritage management) have also become content partners of VIAA.

As can be expected, all these organisations are very different. Yet they can be grouped according to a few characteristics. The cultural heritage institutions (libraries, archives, museums and city archives) usually focus on one subject, city or region, artistic discipline or broader social theme, which is not always delineated in time. Their audiovisual collections are therefore technically quite diverse. Also, their storage conditions are almost never adapted to the requirements of professional audiovisual carrier storage and they sometimes acquire material in poor state. Descriptive metadata are often present only to a limited extent and the content is often produced for a rather specific audience. All these circumstances make the digitisation and contextualisation of this material sometimes rather challenging.

Things are completely different in the media sector. While the size of a regional broadcaster's archive is usually comparable to the largest ones of the cultural heritage sector, the national broadcasters are of a different order of magnitude. For example: the total quantity of Betacam cassettes of the commercial broadcaster VTM to be digitised is about 65,000. That's 3.5 times as much as the largest audiovisual collection in the cultural heritage sector. The broadcasting collections are not only larger, but also technically more homogeneous. Given the available technical expertise and the fact that the institution who created the content is also its custodian, the carriers are (on average) also in a better state. The material is produced for a large audience and in terms of descriptive metadata, at least a basic level is usually provided. The digitisation and the opening up of this material are therefore no doubt simpler.

The collections of the performing arts sector have quite a few parallels with those of the cultural heritage sector, but what the broadcasters and the performing arts organisations have in common, is that archive management is not their core task. The collections from the performing arts sector are the smallest, with a maximum of around 2500 carriers per organisation. Technically, they are rather heterogeneous, but handy video formats (VHS, DV cassettes, DVD) do stand out clearly in quantity. As with the broadcasters, in the performing arts institutions the archives managers work for the same organisation as the one who created the content. The fact that these archivists can focus on one theme - the oeuvre of their own employer - together with the fact that they are often still in close contact with the creators of the content, has a positive effect on the knowledge about what's on the carriers. Although the storage conditions in this sector often are clearly more peculiar than in the heritage sector and at the broadcasters, the condition of the carriers is usually quite good as a result of their relatively young age.

2.4 Digitisation Coordinator

The next point of comparison that this article would like to tackle is in the organisational aspects of the titanic work of digitisation. Here, too, a clear parallel is visible. NCAA followed a multi-layered process of selecting a digitisation agency that it collaborates with in its role as the digitisation coordinator for its Partnering Institutions. Several factors had to be taken into account as part of this process – where would the digitisation take place, how would the analog material be transported, what would be the way to ensure an in-built quality check in the process, when would the analog material handed over to the digitisation agency be received back as part of a consignment that would also contain the digitised output and several other such concerns. All such issues were discussed in several rounds of meetings with Nodal Officers from the Partnering Institutions of NCAA to ensure that all their concerns were factored in and resolved.

In order to oversee the process of selection of the digitisation agency, the Steering Committee of NCAA set up a Tender Committee which worked closely with the Technical Sub-Committee of NCAA to ensure that administrative, technical and financial aspects were all looked at by experts in the respective fields. The Tender Committee guided NCAA in the preparation of a Request for Proposal which served as a public tender, inviting digitisation agencies from India and abroad to submit proposals. A two-bid process was put in place in such a way that technical bids were assessed and analysed by the Technical Sub-Committee and only those agencies which cleared technical assessment were considered for comparative financial bids. The technical assessment process included sample digitisation of the following audio and video formats that were shortlisted for the Pilot Phase, taking analog material from the repositories of the Partnering Institutions of NCAA:

Audio: ¼" Audio Tape, Audio Cassette & DAT
Film: 16mm Film Reel
Video: U-Matic (Hi-Band & Low Band), Betacam, VHS, Mini DV & Hi8

The Request for Proposal was advertised on 15 September 2015 and NCAA signed an agreement with Prime Focus Technologies Private Limited on 1 March 2016 following the completion of the selection process. The intervening period comprised several rounds of technical scrutiny and a visit to the digitisation facility even after technical assessment of digitised output had been cleared and financials had been mutually agreed upon. The signed agreement contains sections on the digitisation process, adherence to standards, quality check mechanism, clauses on non-disclosure of digitised output, file-naming protocol, delivery of archival and access quality digitised output and standard operating procedures to be followed by NCAA and its Partnering Institutions with regard to the digitisation activity. Over the course of two years in its role as digitisation coordinator, the following is a summary of the digitised output from the repositories of the Partnering Institutions of NCAA over the course of a total of seven installments:

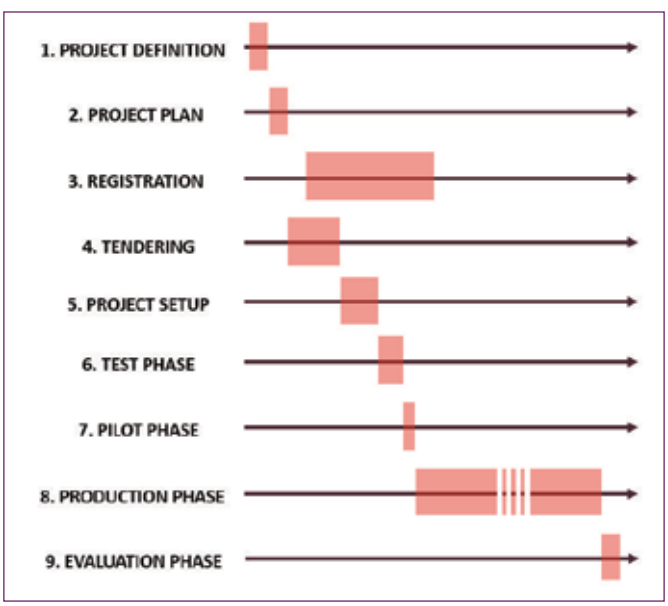
Digitisation Activity in the Pilot Phase of National Cultural Audiovisual Archives

S. No.	Partnering Institutions	City	Audio (hours)	Video (hours)	Total (hours)
1	Centre for Cultural Resources & Training	Delhi	430	147	577
2	Rupayan Sansthan	Jodhpur	1422	1507	2929
3	Indira Gandhi Rashtriya Manav Sanghrahalaya	Bhopal	1775	2189	3964
4	Cinema Vision India	Mumbai	--	2942	2942
5	Indian Council for Cultural Relations	Delhi	1195	3547	4742
6	Indira Gandhi National Centre for the Arts	Delhi	2818	1922	4740
7	Natya Shodh Sansthan	Kolkata	154	147	301
8	Saptak Archives	Ahmedabad	38	--	38
9	Samvaad Foundation	Mumbai	696	20	716
10	Sahitya Akademi	Delhi	2869	--	2869
11	Kalakshetra Foundation	Chennai	3515	340	3855
12	Jatin Das Centre of Art	Bhubaneswar	318	--	318
13	All India Kashiraj Trust	Varanasi	14	336,78	350,78
14	Shri Kashi Sangeet Samaj	Varanasi	538	79	617
15	Sangeet Parishad Kashi	Varanasi	177	--	177

Digitisation Activity in the Pilot Phase of National Cultural Audiovisual Archives					
16	Indira Kala Sangeet Vishwavidyalaya	Khairagarh	1151	667	1818
17	National Archives of India	Delhi	--	0,2	0,2
18	Sangeet Natak Akademi	Delhi	19,3	11,2	30,5
19	National Institute of Design	Ahmedabad	115	500	615
	Total		17244	14355	31599

Table 2 - Digitisation Activity in the Pilot Phase of NCAA

The search for suitable digitisation service providers was and still is one of the core tasks at VIAA. While NCAA was looking for a single digitisation company for all types of carriers to undercut coordination-related problems, VIAA decided to look for the most suitable company for each type of carrier. In 2013, a tender was launched for the digitisation of Betacam SP and U-Matic cassettes, ¼" audio tapes and audio cassettes, summarised under the project name 'Digitisation Wave 1'. As with NCAA, it was necessary to take these first steps to create an atmosphere of complete transparency and trust. VIAA therefore convened the technical managers of all content partners and carefully listed all the concerns and requirements in each part of the process. After intensive consultation, a tender specification with four lots was established, won for the video carriers by Memnon Archiving Services S.A. and for the audio carriers by SONIM S.A., both based in Brussels. After months-long phase of further logistical, organisational and technical detailing of the process and extensive testing, the first carriers were digitised on 4 December 2013.



Scheme 1: Phasing of VIAA's Digitisation Projects

This first project was not only one of the three major achievements in VIAA's first operating year, it also set up a scalable model and structure for most of the upcoming projects. Yet we can say that every digitisation process is slightly different. For example, in 'Digitisation Wave 2' the numbers of carriers to be digitised were much lower, but the technical challenges with a diverse set of open reel video tapes, Philips VCR cassettes, wire recordings and wax cylinders were all the greater. In the meantime, the structures and workflows that had been set up had already proven their value and a great deal of trust had grown between VIAA and the content partners. This enabled VIAA to set up more complex projects, such as 'Digitisation Wave 5', for about 18500 lacquer and shellac discs from sixteen (16) content partners. Because of the fragility of these carriers, they were not transported to the digitisation company, but a complete on-site digitisation chain was set up by the French audio digitisation company Gecko SAS at the premises of VRT, the content partner with the biggest collection involved.

Since 2013 VIAA has set up digitisation projects for more than 470,000 carriers from 140 organisations. For these projects it called upon the services of eight digitisation service providers in four countries. As all the processes were designed with scalability and an ultra-light overhead cost as a main focus, these projects have proven to be manageable with no more than four staff members from VIAA's side.

2.5 Digital Preservation

Given that most of the Partnering Institutions of NCAA do not necessarily possess the technological infrastructure required for the all-important task of digital preservation of digitised content, NCAA carries it out both as an important incentive and a critical service to its stakeholders as a dedicated audiovisual archive.

§ Archival Quality Data

The archival quality digitised content is provided to NCAA by the digitisation agency on two identical sets of LTO tapes. The media files that form part of archival quality data are in open source formats – .mxf & .wav and the three accompanying report files are in .pdf/a format. These two sets are stored in two different seismic zones – New Delhi and Bengaluru – in climate-controlled environment. At the end of the Pilot Phase of NCAA, the quantum of archival quality data has reached approximately 3.5 PB. NCAA maintains a thorough database of the LTO tapes and periodically carries out randomised checking to ensure data integrity.

§ Access Quality Data

The access quality digitised content, along with corresponding metadata, forms the complete set of access quality data. The media files that form a part of access quality data are in the following formats – .mp4 & .mp3 and the three accompanying report files are in .docx, .xlsx and .pdf formats. This data is stored on five platforms to ensure sufficient data redundancy: NCAA local server with 50 TB storage, Partnering Institution-specific external HDDs with NCAA, mirrored external HDDs with the respective Partnering Institutions, on the NCAA Digitalaya (the back-end of NCAA Web Portal), and the Disaster Recovery site of National Informatics Centre. At all these locations, constant MD5 and SHA1 checksums are deployed to preserve bit integrity given that the access quality data is used in multiple ways by the Partnering Institutions and NCAA and is accessed online by users.

When it comes to sustainable digital archiving, at VIAA the same principles apply. As in India, it's all about technically complex processes and expert knowledge and infrastructure not always present at every collection managing institution. Here too, large economies of scale are made by developing a joint infrastructure for components such as the digital (online, nearline and offline) storage, the hierarchical storage management (HSM) or the MAM system. The content partners also receive a constant overview of everything that they have stored in the archive by means of an online live dashboard. In addition, the services around it are shared: transcoding, exchange of metadata, but also more abstract ones such as the so-called 'preservation watchdog' (a permanent monitoring of the obsolescence of file formats and codecs). In the future, one could even think of a joint purchase of automatic feature extraction services for example.

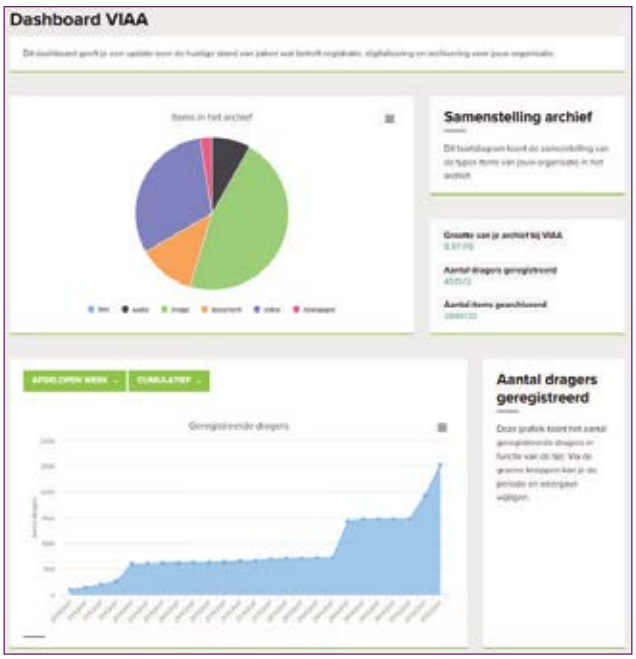


Image 1: Screenshot of VIAA's live dashboard for content partners

Also in this domain, VIAA has built a solid track record over the last 5 years. In 2013-2014, a MAM system (Zeticon Mediahaven) was purchased and implemented, which is used by hundreds of users and dozens of services already. Besides, the servers and LTO tapes do not only serve as a central intake point for digitised sounds and images. They are also the gateway to VIAA's services for digitally-born content. The most striking project that VIAA realised in this area was a complete, synchronized copy of the VRT archive, which was made between August 2016 and March 2018. As master formats for video, VIAA uses MXF/MJPEG2000 for the cultural heritage content and MXF/IMX D10 for broadcast content. For content coming from film, a DPX sequence is the master format for the images, an uncompressed LPCM/WAV is used for the audio. For immediate professional reuse, an Apple ProRes 4:2:2 (Normal) is also made as a mezzanine. Browse copies for both film and video are in .mp4. For audio, VIAA uses an uncompressed LPCM/WAV as a master format and .mp3's as browse copies. All reporting files are in XML, drawn up according to a PREMIS compliant schema.

2.6 Access Platform

Online access is provided through the NCAA Web Portal, the details of whose back and front end are as follows:

1. Back-end: NCAA commissioned the Centre for Development of Advanced Computing in Pune to design and develop an e-Library and archival system named "DIGITĀLAYA" to integrate digitised data with metadata on the cloud server of National Informatics Centre. NCAA DIGITĀLAYA serves as the MAM system at the back-end of the NCAA Web Portal. It is a complete solution reflecting the workflows and processes of NCAA with two roles at the level of the Partnering Institutions - Submission Information Package (SIP) Creator (responsible for the task of metadata creation) and Archivist (responsible for the task of ratification of the metadata created by the SIP Creator). At the level of the NCAA Pilot Phase project management unit, there are two additional roles - Archival Administrator (responsible for addition of Partnering Institutions and creation of metadata templates) and Director (responsible for publishing the material ingested into the archive on the web portal).

2. Front-end: The web portal at http://ncaa.gov.in/repository/ is the front-end of the NCAA DIGITĀLAYA. The access quality digitised data is integrated with the verified and enriched metadata in the NCAA DIGITĀLAYA prior to being published on the NCAA web portal, along with the accompanying reports mentioned above in the section on digital preservation.

The NCAA Memorandum of Agreement speaks of: (a) providing free accessibility to copyright-free and those audiovisual content over which the Partnering Institutions hold rights of ownership, and (b) preparing suggested guidelines for obtaining intellectual property rights and other relevant copyright clearances for all other audiovisual content shared by the Partnering Institutions with NCAA. Envisaged as a means to inject egalitarianism in the access of authenticated archival audiovisual content and driven by concerns entailed with public funding, NCAA has taken bold steps into the terrain of Open Access. As of May 2018, over 23,000 hours of audiovisual content is accessible on the NCAA Web Portal representing the cultural diversity of India in the broadest sense.

Just as at NCAA, at VIAA the backbone of the media management is in the MAM system. Through this system the content partners can access their own content via a separate tenant that is created as soon as their first file is ingested on the VIAA servers. Technically speaking the SIP is created by VIAA itself and consists of the essence files and one or more XMLs describing the file's lifecycle.[3] The metadata fields in the MAM then allow for an EBU Core compliant description of the content and also leave space to add remarks gathered during a human quality check. Content partners can export their own master, mezzanine and browse copies and metadata files as they want.

In the front end VIAA has until now set up four major outlets. The most important and most successful one is 'Het Archief voor Onderwijs' (Archives for Education). After a one year beta phase in 2015, it was officially launched in January 2016. Fed by an editorial team from VIAA itself and supported by archival researchers at VRT, this platform provides teachers with carefully selected archival material for direct use in the classroom and in line with the official curricula and learning objectives. In two years, it firmly established itself with a large

3 For digitised films also a scan of the original film can(s) is added.

share of the Flemish teachers, even though the content provided on the platform doesn't serve every subject on every level yet.

A second outlet channel of VIAA was a temporary, yet very successful one. 'De Beeldcapsule' (The Image Capsule) was a public campaign organised in 2015 and 2017 and aimed at raising the awareness of wider audience of the value of the national audiovisual heritage and the threat it is under. The website featured 50 appealing, humorous or nostalgic clips from a broad range of collections, thus demonstrating directly their diversity and cultural wealth. Visitors were encouraged to indicate their favorite clips by adding them to a time capsule and sending them symbolically to the year 2115 and 2117 respectively for our successors to be able to get an idea of what happened a century before. Both campaigns gathered wide acclaim and extensive attention from the national media and the 2015 edition was even nominated for the FIAT/IFTA Awards.

VIAA's third main outlet is strictly speaking not a public one, as the access to it is strictly limited to content managers, curators and archival researchers working for the content partners. The 'Catalogus Pro' (Catalogue Pro) allows these staff members within certain limits to rifle through each other's collections, thus encouraging cross-sectoral and cross-institutional reuse of the content. As with the Archives for Education, within a few months of its launch, the Catalogus Pro became a fixture for its target group.

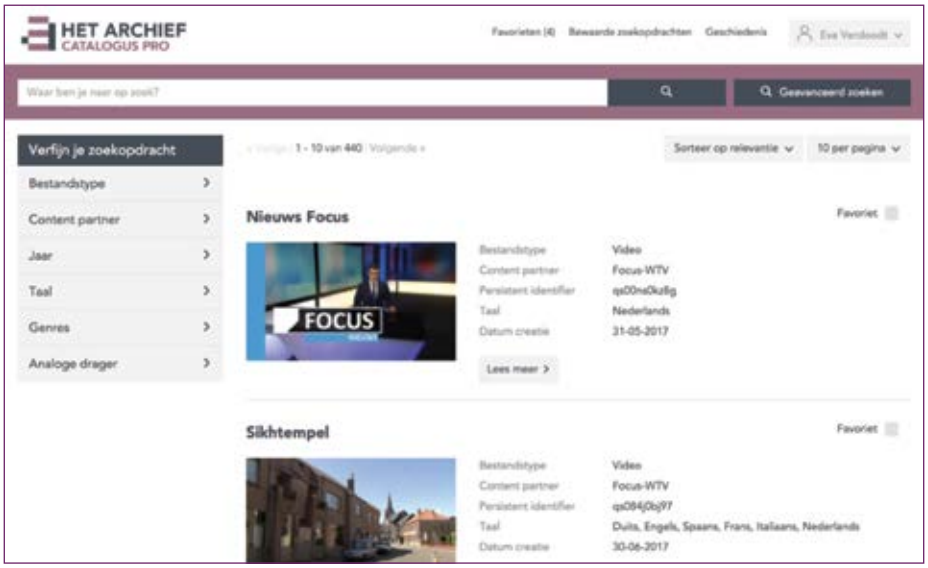


Image 2: screenshot of VIAA's cross-institutional search platform Catalogus Pro.

Fourth and last major outlet of VIAA is the content platform 'Het Archief' (the Archives). Currently this platform only features a newspapers collection from World War I, coming from a one-off paper digitisation project executed by VIAA. However, the plan is to use this platform in the coming years to show audiovisual content from the content partner's collections in the public domain. However, in order to convince the content partners that they too can show content from their collection without incurring extensive copyright infringement risks, VIAA will also need an initiative similar to NCAA's Intellectual Property Rights Advisory explained below.

2.3 Intellectual Property Rights Advisory

Since most Partnering Institutions of NCAA do not have audiovisual archiving as a part of their institutional mandate, NCAA had factored in the need to set up a well-researched intellectual property rights advisory from the start. Towards that end, the Steering Committee of NCAA oversaw the selection of Centre for Internet & Society by the Intellectual Property Rights Advisory Committee of IGNCA for the task of working closely with NCAA to generate a set of documents that could serve as ready reference in the legal domain. This was especially necessary given that NCAA is committed to the principles of Open Access and wanted to address all possible concerns of its Partnering Institutions to enable maximum outreach of their audiovisual resources in the public domain. The process of generating the intellectual property rights advisory has been an arduous sub-project within the NCAA initiative, including site visits, meetings with institutional heads, interfacing with officials at the Ministry of Culture, Government of India and getting the content of the advisory ratified within the legal community. The table below lists the documents that have been generated which would soon also be made available on the NCAA Web Portal:

Intellectual Property Rights Advisory for National Cultural Audiovisual Archives		
S. No.	**Section – I**	**Section – II**
1	Memo on "Orphan Works" under the Indian Copyright Act, 1957	IPR Licensing Agreement
2	Memo on Government Copyright under the Indian Copyright Act, 1957	Comprehensive IPR Policy for NCAA & Partnering Institutions
3	Comprehensive Takedown Notice and Disclaimers	Recommendations on Dissemination of Content & Possible Monetization/Revenue Sharing Agreement
4	Memo on "Fair Dealing"/"Fair Use" and its application under the Indian Copyright Act, 1957	Policy Recommendation Brief for the Ministry of Culture, Government of India
5	Memo on "Traditional/Community Knowledge" under the Indian Copyright Act, 1957	Memo on Performer's Rights
6	IPR Data Collection Form	Memo on Principles of GLAM (Galleries, Libraries, Archives & Museums) and Access to Knowledge
7	Memo on Copy Determination related to Archival Content	Memo on Curation, Access and Usage of Digital Archives
8	Memo on Acquisition of Content (including an analysis of Memorandum of Agreements)	Memo on Cultural Informatics and Digital Humanities
9	Memo on Creative Commons Approach	Catalogue of existing GLAM and/or Open Digital Archives for different genres of resources
10	Site Visits	Consolidated IPR Report

Table 3 - IPR Advisory for NCAA

3. Way Forward & Conclusion

3.1 Way Forward

After this presentation of NCAA's and VIAA's genesis, growth and current activities, the question remains what the future might bring for both organisations. For the next phase of NCAA, a detailed proposal has been submitted to the Ministry of Culture, Government of India. It has been suggested that the recently concluded Pilot Phase be followed by Phase I & II, during the 2018-2023 period. The table below presents an outline of the proposed objectives-targets matrix for the NCAA in the forthcoming timeline of the initiative:

Proposed Objectives-Targets Matrix for Phase I & II of National Cultural Audiovisual Archives (2018-2023)

S. No.	Objectives	Targets
1	Identifying and preserving the cultural heritage of India available in audiovisual form in institutions and private collections across the country through a process of digitisation and making it accessible to the people.	Selection and digitisation of three lakh (300,000) hours of audiovisual resources and curation of fifty thousand (50,000) hours of born digital audiovisual content.
2	Instituting state-of-the-art digitisation and storage systems through the aegis of IGNCA and its partnering stakeholders to preserve these audiovisual resources and ensure access to them over the long-term, in accordance with the ISO 16363:2012 standard.	Creation of two (2) physical archives of digital data with controlled climatic conditions for long-term preservation of archival and access quality digitized audiovisual resources.
3	Scaling up the NCAA Web Portal and offering sustained online access to the audiovisual resources digitised from the repositories of the partnering stakeholders.	Development, maintenance and constant updation of the NCAA Digitalaya and Web Portal in terms of addition of new features, data integrity measures and enabling ease of access and use.
4	Standardisation, periodic upgradation and data migration using the methods and technologies deployed in the production, storage, preservation and retrieval of audiovisual resources.	Establishment of workflows and processes to automate preservation of digital data by way of periodic data refreshment and data migration in order to ensure long-term sustainability.
5	Maintaining the ISO 16363:2012 certification status through constant self-audits in order to clear the annual surveillance audits and renew the certification during the 2020-2023 period.	Periodic updation of core policy documents to reflect updated workflows and processes and carrying out professional advisory for other institutions to achieve Trustworthy Digital Repository status.

Proposed Objectives-Targets Matrix for Phase I & II of National Cultural Audiovisual Archives (2018-2023)		
6	Interfacing with the Intellectual Property Rights regime to suggest the inclusion of archives in the 'fair use' clause under the Indian Copyright Act as well as other related legal instruments.	Publication of white papers on Intellectual Property Rights issues related to the archiving of audiovisual resources.
7	Capacity building and skill development in storage, preservation, metadata creation, digitisation and retrieval of audiovisual resources.	Institutional membership of and representation on international forums such as UNESCO, CCAAA, IASA, FIAF, ICA and SEAPAVAA in order to strengthen the domain of audiovisual archiving in India.
8	Instituting training, outreach and awareness programmes and organising workshops, seminars & conferences to strengthen the domain of audiovisual archiving in India.	Host two (2) national/international conferences, conduct annual training programmes and curate an ongoing series of listening/viewing sessions in order to build capacity and ensure wider outreach.

Table 4 - NCAA Phase I & II Proposed Objectives-Targets Matrix

It is hoped that the ISO 16363:2012 certified Trustworthy Digital Repository status of NCAA will help in leveraging it as a model solution within the expanding realm of Cultural Informatics and Digital Humanities in India so that other aspects of Indian arts, such as digital iterations of manuscripts, visual art, photographs and other such objects may be incorporated within its purview. There are, however, external as well as internal challenges that present themselves before the vision that NCAA aspires for. A perceived lack of synchronisation between the various digital initiatives of Government of India and the current shortcomings in terms of infrastructural support within the IGNCA are just a couple of factors that NCAA would have to engage itself with in its next phase of existence.

For VIAA too, the coming years will be a crucial phase in its development. Up until now VIAA has always been supported by short-term agreements with the Flemish Government, which entailed considerable uncertainty and the rather heavy burden to produce an almost constant stream of strategy and planning documents. That is why VIAA is currently striving for a full-fledged management contract in its relationship with the Flemish Government for the period 2019-2023, in which the objectives and the resources set against them are laid down. The main internal factors that will influence this document are the end of the mass digitisation of audiovisual carriers (except for film), the expansion of a descriptive metadata creation strategy, the gradual transition from a private storage infrastructure to cloud storage, the expansion of the intake of born digital materials, a closer digital integration with the infrastructure of the content partners, and last but not least, the offering of archival images and sound for teachers and pupils that reaches full maturity.

Next to that there are also a few external factors of influence. First of all there's the digitalisation of society as a whole, causing an increased demand for sustainable digital storage, not only for audiovisual files. Furthermore, there's the increasing importance of 'content', especially in the educational domain. This domain in itself is also becoming more interactive, more differentiated and more individualised. Another important factor is the political pressure to increase collaboration and generate more internal revenue. Finally, there are notable technological evolutions, such as artificial intelligence, virtual and augmented reality, etc. that have their own unraveling impact.

In these circumstances, the questions for VIAA to solve will be about the further expansion of its partner group - with whom and to which extent, about digitisation post 2021, expansion towards other carrier types, about metadata as a new focus domain, about its own role as a forerunner in the digital innovation of the cultural heritage domain, about the new target groups and strategies to serve them, about how these increased ambitions can be financed and how VIAA as an organisation should adapt. In the best of scenarios, all these questions get a satisfying answer in the upcoming months that will allow VIAA to thrive in the next five years of its existence.

3.2 Conclusion

In this article we have tried to present and compare two initiatives from very different parts of the world that each provide an answer to the challenges posed by degradation and technology obsolescence, digital preservation and increasing demand for access to the audiovisual heritage. Although very different, these answers show striking similarities, provoking the conclusion that if similar answers can fit such different contexts, they might serve as an inspiration for many more. It is therefore hoped that the collaborative approach towards audiovisual archiving, presented in this article would lead others to consider some of the benefits it has yielded for NCAA and VIAA.

Acting as a pivot point between content partners on the one hand and service and goods providers on the other hand not only decreases the knowledge level required at each of the organisations involved, it allows also to obtain far lower prices for those services and goods. One doesn't necessarily have to collaborate in all working domains if that's not possible. Collaboration in one or more areas can already yield very large economies of scale and the thriving force does not have to be a newly established institution as was the case with VIAA and NCAA either. As long as the responsibilities are well-defined, a consortium of peers might reach the same goal. At least at NCAA and VIAA this has made the digitisation, preservation and access to audiovisual heritage a truly collaborative effort.