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Socio-technical and Socio-cultural Challenges of Audio and Video Preservation

Audio and video documents are the most significant primary sources of linguistic and cultural diversity. With all respect to the role of language and written texts in human communication, the limits of these traditional tools to communicate and describe cultural phenomena are obvious and undisputed. It must be noted that scientific interest was the driving force for the invention of audiovisual recording technology: the study of language and the human voice paved the way for the invention of sound recording while the interest to analyse fast movements, which could not be explored by the naked eye, triggered the invention of cinematography. Several disciplines like linguistics, ethnomusicology and parts of anthropology did not really flourish until the advent of audiovisual documents which - more or less perfectly and more or less objectively - permit the creation of adequate primary sources of or about the phenomena of interests themselves: language, music and dance, rituals, artefacts etc. Consequently, it was the academic world that installed the first sound archives, 1899 in Vienna, 1900 in Paris and Berlin, 1908 in St. Petersburg.

Commercial exploitation, though not at the cradle of the new recording technologies, started even before 1900: the products of the phonographic and film industries soon quantitatively surpassed the academic activities. It is noteworthy, however, that systematic collection and archives for the products of the entertainment industry emerged only by and by in the 1920s and 1930s, as libraries and archives started to include audiovisual materials in their collections. In those years, independent units in forms of sound archives were created (e.g. the Discoteca di Stato in Italy or the French Phonothèque National), while film archives were founded in the Netherlands, the UK, the Soviet Union, France, and Germany. As Radio Broadcasters also developed from 1922 onwards, radio sound archives came into existence.

The consolidation of audiovisual archiving only happened after World War II, heavily supported by the international spread of magnetic tape recording technology for audio, which had been in existence in Germany already since the mid-1930s. From 1956 onwards magnetic video recording became available and gradually replaced film recording in television stations. Outside broadcasters, magnetic tape recording, specifically the availability of battery-operated portable equipment, enormously furthered the production of research materials, as it became possible to record language, music and rituals everywhere in the world in good quality. This also created the corpora that constitute the primary source

materials of our present-day academic knowledge of the linguistic and cultural diversity of mankind. While the creation of film documents for research was not very widespread because of the considerable costs involved in the production and development of film, moving image documentation for scholarly and cultural purposes mushroomed, since in the 1908s true portable video recorders became available which permitted the creation of video documents in a fashion similar to what had already existed over the past decades for audio.

These three creative sectors in audiovisual production - the record and film industry, the radio and televisions broadcasters, and the academic and cultural bodies - have accumulated a remarkable legacy of primary source materials, which form the most significant sources of cultural and linguistic diversity of mankind. They are partly artistic creations in their own right, like films and music productions, and partly documents of political, historical and cultural events and phenomena. Most justifiably, audiovisual documents have been called the media of the modernity: no adequate understanding of the past 100 years would ever be possible without them.

Concentrating now on audio and video recordings, the worldwide holdings are estimated to be 100 million hours for each of the two categories. While photographic materials and films can be preserved as originals, provided stringent storage and handling conditions are met, this is not possible for audio and video recordings in the long term. Historical cylinders become brittle and mouldy, unique instantaneous disks deteriorate beyond retrievability, life expectancy of magnetic tape can be assumed to be only in the order of decades, and recordable optical disks must be considered to be at great risks, unless produced under tight quality control, which practically can hardly be met.

Carrier instability, however, is only part of the problem. As machine-readable documents, all audio and video recordings depend on the availability of format-specific replay equipment, some of considerable sophistication. Thanks to the technical development over the past 20 years, we have experienced ever shorter commercial life cycles of dedicated audio and video formats. Whenever a format had been superseded by the next, industry swiftly ceased production of new equipment, spare parts, and professional service support.

Around 1990, this foreseeable development led to a shift of paradigm amongst sound archivists: it was realised that the classic aim to preserve the document placed in the archives' care would ultimately be in vain, because even if carefully kept carriers survived over longer periods, the unavailability of replay equipment would make these stocks soon irretrievable, and thus useless. Audio preservation has to concentrate on the safeguarding of

the content, not of the original carriers, by copying contents losslessly from one digital preservation platform to the next. Analogue contents have to be digitised first.

This new paradigm met with some scepticism from traditionally-minded archivists; however, German radio broadcasters took the lead to develop digital mass storage systems, which soon became state of the art in audio archiving. The incentive for their installation was not so much preservation, but automated access to huge archival holdings, which was considered to become a strong weapon in the fight of these previously monopolistic institutions against upcoming competition from private broadcasters. Video archiving is following that path, with some time delay however, as storage quantities for video are significantly higher. Outside the radio world, national archives and libraries, but also some research archives followed.

Feeding analogue and single digital carriers into digital repositories is a demanding and time-consuming process. Principles have been standardised by the International Association of Sound and Audiovisual Archives (IASA), which had also issued practical guidelines for the production and preservation of digital audio objects. The transfer of originals is in need of modern replay equipment, of test equipment and expertise for their proper maintenance. The time needed for one transfer operator must be estimated to be at least triple the duration of audio, and even significantly more in the case of video documents. Bigger radio and national archives are solving that problem by simultaneously transferring three or four audio tapes at one time, making use of special quality control software to replace the aural control of the operator. This works with fairly homogeneous source material as typically available in radio archives. Holdings of research materials, because of their diverse technical nature, hardly lend themselves to this kind of "factory transfer".

Yet there is more to it than solving the transfer of originals. Digital preservation is equally demanding, as it requires an ongoing investment to keeping digital data actively alive. Appropriate professional storage technology and management software is expensive and needs subsequent renewal at least in the pace of migration intervals, which are generally in the order of five years. It must be clearly stated that the use of recordable optical disks as sole digital target media constitutes a great risk, although it is unfortunately widespread, specifically amongst small and less wealthy institutions. Professional digital preservation currently costs 5 USD/GB/year, however with a clear tendency to come significantly down in the short term. According to latest developments, costs in the order of 1 USD/GB/year, a mid-term vision only a year ago, may be within realistic reach pretty soon.

It can be assumed that the challenges as outlined above will be met by the radio and television archives as well as the national collections of fairly wealthy countries within the next 20 years. Because of the impending unavailability of replay equipment, this is the time window generally considered to be available for safeguarding what we have accumulated so far. Several post-communist and developing countries, however, will face considerable problems in safeguarding their holdings, even in a selective manner. The most significant problem is lack of funds. While it is fairly popular to finance digitisation projects in the course of international development cooperation, the lack of commitment to finance long-term preservation of the digital files makes many such projects a dead end road.

The great majority of small and hidden collections in all parts of the world, which preserve a considerable part of the world resources of cultural and linguistic diversity, have a different, generally much greater problem. The first is awareness. While generally "digitisation" is recognised to be an action to be carried out, there is little knowledge about prerequisites needed and standards to adhere to. Most typically, inadequate replay equipment is regarded to be sufficient, and there is no realistic perspective about standards and costs to preserve the digitised documents. The other notorious problem is lack of money, which mainly - apart, of course, from unfavourable general economic situations - means lack of awareness on the part of parent organisations, governing financing bodies, and/or of the public at large.

From the technical prerequisites, the required expertise, and the necessary financial resources it becomes clear that autonomous audio and video preservation requires critical mass amounting to several thousands of carriers within each format. As many important collections are held by relatively small institutions, many even still at the private homes of the researchers that had recorded them, the only viable solutions for these holdings are cooperative projects, which can be arranged in different forms: the transfer of original contents to digital files should be seen separately from digital preservation. And even the transfer of originals could be subdivided according to the various formats. Often very specific formats, like cylinders, are outsourced, while e.g. magnetic tapes are transferred inhouse. A typical cooperative model at universities could be the recording and annotation of new audio and video materials by the concerned institutes, accompanied by the transfer of analogue and historical digital single carriers in specialised audiovisual units, while the computer centres of the universities take responsibility for the long-term preservation of digital files.

On the way to improve the situation of audiovisual collections within the academic world, which often amount to considerable sizes, different obstacles can typically be spotted in the Western and the former Eastern Block world.

Typical of the Western World and its socio-economic situation is the fact that success of research institutions is measured by the degree of advancement in their respective disciplines, generally expressed in the number and size of publications, and not by preserving resources for future generations. Hence, unless they have a specific mission as an archive, institutes have the tendency to emphasise research at the expense of archiving, specifically when it comes to financial constraints. Sad experiences can be told especially of the fate of audiovisual collections at American universities, which are notoriously endangered by their parent organisations whenever financial re-allocations have to be made. Even internationally highly respected archives have come under severe threat, which has often triggered international rescue rallies; once, however, a renowned collection was frozen, and another even dissolved. The most efficient counteraction to such inherent threats is to enhance the use by making catalogues of the holdings available on the internet. This has been started successfully by collections within libraries and is now gradually followed by dedicated audiovisual research collections, which generally provide more detailed descriptive metadata on their holdings than libraries. Another factor serving to enhance attractiveness of archival materials is a recent shift of research priorities in anthropology and ethnomusicology. While previous schools have overemphasised the importance of relying on self-generated materials, there is a clear tendency to re-discover the potential of already existing sources, provided, however, the limitations of those materials are critically examined and understood.

A stereotype found in post-communist countries is the notorious mistrust in contracts and in the honesty of partners. Typically, researchers were working in relatively small units, all more or less orderly shelving their respective field tapes. Often research units with similar aims work under the same umbrella organisation, without ever having shared audiovisual field equipment or archiving infrastructure. Although these resources have been gathered with institutional, indirectly governmental support, they are considered to be private possessions. With analogue field recordings, predominantly open reel tape and compact cassettes, this has so far worked but sub-optimally, because recording equipment was generally amateur standard, and tapes have suffered from bad storage condition and from being used for transcriptions, as working copies were rare. Against this background, specifically the older generation has developed a notorious mistrust in sharing resources such as archives, because of the firm belief that this would lead to an expropriation of *their recordings* by their scholarly competitors. There is also a remarkable mistrust in the reliability of contracts granted by official institutions.

This typical and strong attitude would of course be an obstacle to any attempts of solving the problems of safeguarding small audiovisual collections through cooperative projects. A recent study, however, seems to indicate clearly that almost two decades after the political changes in post-communist countries this notorious mistrust is being eroded. In a survey of 107 European field workers, predominantly ethnomusicologists, 80% expressed their readiness to safeguard their field collections in the course of cooperative projects. The percentage of western vs eastern respondents was almost the same.

In summarising, it can be stated that the greater part of audio and video collections, held by the broadcast and national archives of wealthy countries, will be safeguarded and made available in the long term. Whether also in developing countries these kinds of institutions will be able to solve their problems within the time window of the next 20 years, remains open. Much will depend on the political will of these countries to safeguard their audiovisual cultural heritage and to allocate the necessary funds. There is some reason to hope that the development in this field in the West over the past 20 years can be optimistically extrapolated to other parts of the world. This concerns, however, only the greater part of the accumulated collection.

In terms of importance, a major part of the entire audiovisual heritage is held in small and scattered, often hidden research and cultural collections all over the world. Without them, our view of the cultural and linguistic diversity of mankind would be incomplete. Their loss would mean a substantial deprivation of cultural, linguistic, and ethnic minorities in terms of their heritage, their history and their identity. The veritable challenge of a worldwide strategy of audiovisual preservation is to spot these collections and to organise their physical survival.

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