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D I G I T A L   A G E N D A   F O R   T H E   E U R O P E A N   F I L M   H E R I T A G E

# Challenges of the **Digital Era** for **Film Heritage Institutions**



## EXECUTIVE SUMMARY

a Study prepared for the  
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Cover picture: digital reconstruction of the film "*Pan Tadeusz*", Courtesy of Filmoteka Narodowa/Polish National Film Archive

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# Foreword

“Digitisation and online accessibility are essential ways to highlight cultural and scientific heritage, to inspire the creation of new content and to encourage new online services to emerge. They help to democratise access and to develop the information society and the knowledge-based economy.<sup>1</sup>”

“Embodying creative works in digital form has the unfortunate effect of potentially decreasing their usable lifespan. Digital information is ephemeral: it is easily deleted, written over or corrupted.

Digitized and born digital materials are an important part of the world’s cultural heritage, but unless active steps are taken to preserve them, they will be lost.<sup>2</sup>”



*Digital reconstruction of the film “Mania”*,

Courtesy of FilMOTEKA Narodowa/Polish National Film Archive

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<sup>1</sup> European Council of Ministers on the launch of the Europeana prototype, Brussels, 20 November 2008

<sup>2</sup> “International Study on the Impact of Copyright Law on Digital Preservation” A joint report of the Library of Congress National Digital Information Infrastructure and Preservation Program (US), the Joint Information Systems Committee (UK), the Open Access to Knowledge Law Project (AU), the SURF foundation (NL), July 2008



# the Analysis

## The Study's goals

This Study aims at analysing challenges and opportunities, and at proposing concrete actions in order to make sure that Film Heritage Institutions (FHIs) across the European Union are able to continue to fulfil their role in preserving the cinema of the past and that of the future, and to multiply ways by which they provide access to their invaluable collections.

This objective is as farsighted as challenging, as the process by which European cinema is turning Digital in all its aspects – from production to exhibition, distribution and access via innovative models and services – is still largely ongoing.

As defined by the Commission, the Study's remit was to provide the necessary background information, analysis of the situation and benchmarking, in order to produce practical proposals based on which policies and strategies can be defined and implemented by the Commission, the Member States and the FHIs. More specifically, the remit of this Study includes:

- To analyse in depth the challenges facing the FHIs across all Member States
- To establish which kinds of legal/organisational/technical changes have to be introduced to ensure that film archives will continue to perform their role in the digital era
- To propose practical recommendations and a calendar to Member States and FHIs on how to prepare for the digital era
- To provide policy options for EU action

This Study focuses on the access to and preservation of European cinema; this is intended to include all types of works produced for cinema distribution: feature films, documentaries, newsreels, narrative and non-fiction shorts, commercials, trailers, and so forth.

'Preservation' is intended both as preservation of the works of the past, conserved or not (yet) in a FHIs, and the works that are being currently produced or that will be produced in the future, as they will all become heritage.

The geographical scope of the study includes all Member States, covering hundreds of institutions regulated by different cultural, political, and legislative approaches, differing in size, funding, and sometimes scope. Also, the Study tries as much as possible to include in the analysis also the film preservation activities carried out in commercial sector, as they play a significant and growing role in preserving and providing access to important parts of the European cinema heritage.

In order to better understand challenges, opportunities and potential answers to the many questions, the study also takes a very close look at other fields facing issues similar to those of the FHIs: audiovisual archives from broadcasters and data from space agencies. Current trends and activities in the United States were also explored and taken into account.

## Methodology

The task of assessing the challenges and opportunities for the Film Heritage sector in the Digital Era is undoubtedly complex, for many reasons.

The complexity and depth of the technical changes in the whole chain of cinema production and distribution, and consequently in archiving and preservation, are impacting FHIs and the industry in all sectors of their activities: collecting, preserving, restoring, distributing and providing access to cinema heritage, all extremely interdependent tasks that require a high level of specialization.

The variety of players in this sector, with many public and private bodies and institutions differing in size, funding levels, vocation, and activities adds to this complexity.

Differences in the Members States' legal frameworks, regulations, structures of the sector also make the scenario harder to define, as does the interaction of the Film Heritage sector with others, such as production and distribution.

The only way to address the challenge of producing a comprehensive, coherent amount of information, a useful analysis of the present situation from which sound and consequent proposals and conclusions are to be derived, is to base the whole process on a solid methodology and a correct understanding of the problems and issues.

The results contained in this Study are based on a methodology designed to gather as much input and feedback as possible from as many stakeholders as possible:

- Analysis of relevant literature, based on a 'selected bibliography' consisting of some 200 entries, including documents from most relevant EU projects.
- Input and support from an Advisory Board.
- Distribution of some 150 detailed questionnaires addressed to FHIs, government bodies, experts and the industry.



In total, the Study received 55 answers to the questionnaire, from Institutions in 17 Member States and of EU-wide associations like ACE, which represent all large European FHIs.

- In-person interviews with some 40 experts from 32 bodies, including EU-wide associations from the industry, interviews with FHIs and industry experts in the US; in overall, 30% of the interviewees were from the cinema industry. Most of the interviews involved multiple experts and lasted 2.5 hours on average.
- A half-day Brainstorming Session where the preliminary results were discussed with a selected group of experts.
- An online-consultation (open between the 13<sup>th</sup> of July and the 30<sup>th</sup> of September, 2011) to gather insight and feedback from the widest possible number of stakeholders (18 responses from bodies and individuals in 7 member states and 6 EU-wide associations were received).
- A public workshop to discuss and finalize the results and recommendations, held in Brussels on the 20<sup>th</sup> of September. The workshop saw the participation of 99 people from 17 member states and the US; participants included 30 FHIs, 17 government bodies, and 28 representatives of the cinema industry.

In summary, via surveys and interviews, the Study received valuable input from more than 100 institutions, bodies and individuals located in 17 Member States and in the United States; this figure includes many associations representing a vast number of members in all EU member states.

The authors of the Study thank all those who contributed to this study, by accepting to be interviewed, by responding to the questionnaire, or by sending written comments and contributions.

## A heritage worth preserving

Twelve hundred feature films produced in 2010, almost one billion admissions amounting to nearly €6.5B in box office receipts alone, a key content on TV, home-video and VoD: cinema is both a critical component of the European media industry and an irreplaceable heritage for our culture and history.

The European Film Heritage Institutions (FHI) hold and conserve collections that span from the earliest years of cinema to today and that represent the vast majority of the European film memory: the memory of cinema and the memory of Europe that is captured by cinema.

These collections represent an invaluable asset for Europe, for its culture, history and identity, and for its cinema industry.

The digitization of these collections and their digital distribution and increased accessibility constitute a key component of any strategy for a European Digital future.

There is strong evidence supporting these statements on the necessity to preserve the cinema of the past as well as that of the future.

A clear indicator that cinema is considered a key component of all Member States' culture is the fact that cinema industry is supported to a significant extent by public funding in many different forms.

While economic and industrial considerations play a role, cultural reasons are seen as vastly predominant to justify the public support to cinema, as proven by a survey of film funds across Europe<sup>3</sup>.

Estimates from the European Audiovisual Observatory place state aid to film industry at around €1.6B/year in direct aid to which at least another €1B/yr in tax incentives must be added. Along the same lines, according to a study analysing the financial structure of European cinema:

*“the primary source of cinema funding in Europe is public sector support. The reimbursable and non-reimbursable funding of films accounts for a range of 42% on average (Italy, Spain) to 60% in certain cases”<sup>4</sup>.*

Although the point has been made that cinematographic works are industrial products and as such they should not be the object of a public policy of preservation and access, there is strong evidence that this concept is in contrast with the European context and tradition, as such a view is in contradiction with a vast body of legislation from Member States, and the European Commission, Council, and Parliament.

The “Council Resolution of 26 June 2000 on the conservation and enhancement of European cinema heritage<sup>5</sup>” emphasises how the cinematographic heritage *can play a decisive role in consolidating the cultural identity of European countries both in their common aspects and in their diversity. Citizens, in particular future generations, will, through the medium of these works, have access to one of the most significant forms of artistic expression of the last 100 years and a unique record of the life, customs, history and geography of Europe.*

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<sup>3</sup> On a scale with 0 as 'neutral balance', -6 as 'mostly commercial' reasons and +6 as 'mostly cultural reasons', average score is +3.4 with only 2 countries out of 27 choosing 'commercial' and only 5 voting 0 for 'balanced'. “ThinkTank on European Film and Film Policy The Copenhagen Report”, 2007. <http://www.filmthinktank.org/papers>

<sup>4</sup> “Identification and evaluation of financial flows within the European cinema industry by comparison with the American model” study n° DG EAC/34/O1 [http://ec.europa.eu/avpolicy/docs/library/studies/finalised/film\\_rating/sum\\_en.pdf](http://ec.europa.eu/avpolicy/docs/library/studies/finalised/film_rating/sum_en.pdf)

<sup>5</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2000:193:0001:0002:EN:PDF>

The same Resolution also makes an explicit link to the economic value of the cinematographic heritage by stating that: *in the present climate of proliferating distribution channels which increase demand for new programme contents, this form of cultural heritage too is an important basis for creating new cultural products.*

The recognition that the cinematographic heritage has an enormous cultural value for Europe, and that it plays also a role in reinforcing the media industry, and as such it should be preserved, restored and made accessible, is confirmed in many later documents.

For example, the “Council Resolution of 24 November 2003 on the deposit of cinematographic works in the European Union<sup>6</sup>” after reaffirming that *“European cinematographic works constitute a heritage that has to be conserved and safeguarded for future generations”* acknowledges that in order to preserve them, cinematographic works should be *“systematically deposited in national, regional or other archives”*.

Similarly, the “Commission Recommendation of 24 August 2006 on the digitisation and online accessibility of cultural material and digital preservation<sup>7</sup>” recommends that Members States

- *establish national strategies for the long-term preservation of and access to digital material, in full respect of copyright law [...]*
- *make provision in their legislation so as to allow multiple copying and migration of digital cultural material by public institutions for preservation purposes [...].*

Needless to say, the cultural as well as economic importance of the preservation and accessibility of European cultural heritage is mentioned in both “A Digital Agenda for Europe<sup>8</sup>” and the “The New Renaissance – Report of the ‘Comité des Sages’<sup>9</sup>”.

Finally, the “Recommendation of European Parliament and Council Recommendation of 16 November 2005 on film heritage and the competitiveness of related industrial activities<sup>10</sup>” and the most recent “Council Conclusions on European film heritage, including the challenges of the digital era (November 2010)<sup>11</sup>” both reconfirm the need of preserving and making accessible the cinematographic heritage and make a number of key considerations and recommendations, including on digital challenges and opportunities, defining an impressively clear and comprehensive course of actions for EU institutions and Members States.

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6 [http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003G1205\(03\):EN:NOT](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003G1205(03):EN:NOT)

7 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:236:0028:0030:EN:PDF>

8 [http://ec.europa.eu/information\\_society/digital-agenda/documents/digital-agenda-communication-en.pdf](http://ec.europa.eu/information_society/digital-agenda/documents/digital-agenda-communication-en.pdf)

9 [http://ec.europa.eu/information\\_society/activities/digital\\_libraries/doc/reflection\\_group/final-report-cdS3.pdf](http://ec.europa.eu/information_society/activities/digital_libraries/doc/reflection_group/final-report-cdS3.pdf)

10 <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32005H0865:EN:NOT>

11 [http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/educ/117799.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/educ/117799.pdf)

# Outlining the scenario

## *Cinema is Digital now.*

The transition to Digital projection in theatres is well under way across Europe and experts expect it to be basically completed in all major European markets by the end of 2012.

While until months ago only some films were distributed *also* for digital projection, now almost all movies are distributed *both* on film and on digital, and some are distributed *only* digitally. Soon, distribution on film is fading away and it will soon disappear.

The impact of these changes on the whole cinema industry is deep; the sectors of cinema production and postproduction already show signs of undergoing a restructuring phase that is expected to intensify.

The impact of the switch to Digital of the whole chain from capture to projection will lead to the progressive disappearance of the whole sector of analogue film technology: production of film equipment as well as the production of film stock are expected to either disappear or to become an expensive rarity. 'Analogue islands' will always exist, as they do in other industries, and FHIs will continue to operate analogue film projectors, but as a system, cinema will switch completely to Digital in the very near future.

Together with the traditional film industry also competences, skills and know-how related to analogue film will sooner or later disappear.

These two dynamics are already well under way, and they cannot be stopped or reversed. Although an exact timeframe is difficult to predict as it depends on many factors, this is expected to be in the next 5 to 7 years.

FHIs as well as the film industry are struggling with this transition and in general are ill prepared for its consequences.

As all stakeholders will require time to adapt to the new environment, actions must be taken in the shortest possible term.

If concrete and effective actions are not taken immediately, the result of the combined effects of the two above-mentioned dynamics will lead in the next 5 to 7 years to:

- The loss of a significant number of works that are digitally produced, because FHIs and the cinema industry are not equipped for their preservation.
- The loss of all the analogue works produced until now that are not digitised, as only digitised content will be accessible.

These two consequences will have a dramatic impact on European culture as the cinema of the past will be practically inaccessible, and on the cinema industry as older titles will not be commercially exploitable anymore.

Works that are not digitised and digitally preserved will disappear, for all purposes from the public sphere and European citizens will be denied a significant component of their past and their identity.

Moving images - be they TV, cinema or even video games - are based on a language whose understanding is fundamental for anyone living in the 21st century. Letting 120 years of European cinema images disappear will only result in a wasteland inhabited by new generations unable to understand what they access most: moving images.

“These are early days for the digital economy and as it continues to develop the demand for audiovisual works will grow exponentially. To satisfy that demand the industry depends on the talents of the creative community – in particular screenwriters and directors.<sup>12</sup>”

This quote from a document of the Society of Audiovisual Authors is a perfect point to introduce another key issue. Screenwriters, directors, but also cameramen, editors, actors, etc. are the ones who really create the European audiovisual industry, which is valued at more than €108B.

This means that at least a significant share of that value is due to authors who developed their creativity by studying in Europe’s higher learning system of schools and universities, and by accessing the wealth of European cinematographic past.

It is extremely difficult to predict the exact percentage of newly produced films that are bound to be lost in the next 10 years if no actions are taken. As migration should take place every 5 years, it is not unrealistic to assume that 20% of works produced in 2011 (i.e. 220 feature films and 280 shorts) will be lost by 2016, the same amount of films produced in 2012 will be lost in 2017, to which another number of films produced in 2011 should be added. Aggregated losses in 2017 might reach the number of 330 feature films and 420 shorts, and so forth every year.

To assess the effect of such a loss from an economic standpoint, it might be useful to remind that the VoD market is projected to reach the €2B threshold in 2013, and that approximately 60% of content on VoD channels is cinema; within cinema content then, ‘catalogue titles’ (i.e. works that are at least five years old) are predominant. As cinema also represents a sizeable share of broadcasting time (which provides even higher revenues than VoD) it is obvious that the negative impact of a lack of policies for the digitisation and preservation of the EU cinema, will be significant.

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<sup>12</sup> From: Audiovisual Authors’ Rights and remuneration in Europe, a SAA (Society of Audiovisual Authors) White Paper [http://www.saa-authors.eu/dbfiles/mfile/1400/1468/SAA\\_white\\_paper\\_english\\_version.pdf](http://www.saa-authors.eu/dbfiles/mfile/1400/1468/SAA_white_paper_english_version.pdf) [http://www.ukfilmcouncil.org.uk/media/pdf/6/r/Common\\_declaration\\_on\\_Digital\\_Cinema.pdf](http://www.ukfilmcouncil.org.uk/media/pdf/6/r/Common_declaration_on_Digital_Cinema.pdf)

The home-video market (DVD+Blu-Ray) amounted to €9.5B at the end of 2009, and a significant part of this market goes to European productions, including heritage films. This share is at danger of shrinking significantly if works are not digitized, even more so as other countries are increasing their offer.

One of the clearest and strongest statements on the economic implications of the non-digitization of the European films comes from the 'Common Declaration in Support of Digital Cinema', signed in 2005 by the members of EFAD- European Film Agency Directors:

*It is absolutely necessary that the largest possible catalogue of new and classic European films is available in the appropriate HD digital format for VOD, web and cable-based home video services, or in the DCI-compliant 2k to 4k digital format for theatrical screening. With the American majors moving quickly into the VOD and digital cinema market, with large and compelling libraries of American titles, there is a real risk that European films will lose out and never reach a new and committed audience if European producers, distributors and exhibitors are unable to respond speedily to the digital challenge. Effective support measures with a view to encouraging the digitisation and digital distribution of films are critical to the development of both digital cinema exhibition and of VOD platforms and are needed at both the national and the European level.<sup>13</sup>*

The text has the great advantage of posing the issue from a strategic point of view, in which the digitization and the availability of a critical mass of good quality digital content for distribution via VoD and D-Cinema channels is seen as a critical 'competitive advantage', without which Europe risks losing even more ground against US companies, who undoubtedly come with a remarkable amount of high-quality digitized content ready for cross-platform distribution.

A comprehensive policy of digitisation of the European Film Heritage will open up unprecedented opportunities for European citizens and the European film industry.

To digitize and to provide access to these collections, as well as to preserve for future generations the works produced today means to save a vital component of European history, culture and identity.

Therefore, Member States (MS), EU Institutions and FHIs must act immediately to make sure that digitization and digital preservation save the cinema of the past and that of the future.

The analysis, conclusions and recommendations presented in this Study are solely driven by the intent to advise on the best strategies to achieve the goals of digitising and preserving the European cinema of the past and of the future, to the best knowledge and experience of the authors, and on the wealth of information gathered in the process of preparing this study.

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<sup>13</sup> [http://www.ukfilmcouncil.org.uk/media/pdf/6/r/Common\\_declaration\\_on\\_Digital\\_Cinema.pdf](http://www.ukfilmcouncil.org.uk/media/pdf/6/r/Common_declaration_on_Digital_Cinema.pdf)

# Collections

*No preservation is possible without acquisition.*

In the field of Digital Preservation, time is of the essence, and European works must be deposited as soon as possible with FHI for their preservation.

Deposit of a digital master bears virtually no costs for the depositor, while it has tremendous advantages in terms of ensuring the preservation of the work.

The EU should recall the importance of establishing structured, mandatory mechanisms for the deposit of European works. Legal deposit of all European works is to be preferred; the deposit of publicly funded works is a possible alternative, although it is obviously more limited in its effect.

FHIs via the Technical Commission of the International Federation of Film Archives (FIAP) produced a first set of recommendations concerning viable formats for the (legal, contractual or voluntary) deposit of D-Cinema materials. This is a step in the right direction, but only the first of many that are needed. The recommendations highlight how encryption is a serious threat to preservation, and that only un-encrypted content can be the object of a serious preservation activity.

FHIs must be ready to take all needed precautions and technical solutions to make digital deposits safe and secure.

FHIs are not adequately equipped to correctly acquire cinema content in digital form. MS and the EU should act swiftly to provide the MS with all the necessary resources to collect all European cinema works, and to preserve them for the future. This includes financial resources, human resources, and organisational support to exchange best practices and guidelines and to acquire the skills required.

## Storage and Long-Term Preservation

At proper conditions, analogue films can be conserved virtually forever, up to 500 or 2000 years depending on the type of support provided.

Long-Term Preservation of analogue film elements is therefore not problematic and it should be continued and fully supported. With its relatively low costs (in comparison with digital preservation) and its longer life expectancy, preservation of existing analogue works is a form of insurance against the loss of unique works and the need to re-digitise parts of the collections in the future.

As all films are now produced digitally, they must be preserved digitally (any other alternative is short-lived and not practical).

Successful preservation requires a systematic approach to be adopted, regardless

of the physical form of the archive to be managed. Policies and systems for the management and preservation of physical collections are well established.

Long-Term Digital Preservation (LTDP) is a process, a system, not a storage medium. This means that FHI must be legally authorised to perform all the processes required: produce multiple copies, transfer or transmit to remote location (mirroring), format migration, etc. Current legislation in some countries is restrictive. Each MS should analyse legislation and adapt it.

FHIs should immediately start planning for digital repositories based on the OAIS Reference Model<sup>14</sup>; these must be 'trusted repositories' able to preserve content safely and securely. Many standards and experiences exist on the subject in other IT fields; EU digital repositories should be based on them.

In the present transition phase, D-Cinema standards are satisfactory for LTDP (provided they are not encrypted), but research is needed on the necessity for archival standards for LTDP of cinema content.

Wherever applicable, legislation should be amended so that basic principles for deposit are defined, while the concrete application (e.g. technical terms) is left to the FHI to define, as the technology evolves fast.

Due to its well-known weaknesses (small size, small market share, limited capacity to invest) it is unlikely that the European cinema industry alone can undertake the digitisation of its catalogue and the preservation of new productions.

Many FHI currently lack the budgetary resources and the expertise to design vast digitisation and LTDP plans, but this expertise exists across other FHI and it should be pooled together.

The Commission should encourage, support and foster the idea of creating an EU-wide 'steering group', (or 'advisory group') of experts mainly from FHI, but open to other technologists, with the aim of:

- Helping FHI design plans, tenders, etc. for LTDP and digitisation
- Seeing that these plans allow for a high degree of interoperability
- Recommending actions, including research
- Monitoring the evolution of the EU LTDP landscape

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<sup>14</sup> Reference Model for an Open Archival Information System (OAIS, ISO 14721:2003)



## Analysing the costs

The amount of cinema materials requiring digitisation in Europe is estimated at 1M hours. This figure considered to be a 'worst case scenario'.

The cost model adopted for digitization projects show that per-hour costs range between €500 and €2,000. This translates in €500M to €2B to digitize the entire European cinema heritage.

€1B, the median point in the above range, corresponds to approximately 38% of the aid that Members States invest in the cinema industry in one year.

Based on a projection of 1100 feature films and 1400 short films produced every year, the amount of data can be calculated between 5.8 and 30 Petabytes (PB)/year. 5.8PB will be taken as reference in the Study.

The cost of depositing a digital master in a FHI is virtually zero.

According to the Study's cost model, new cinema digital productions can be preserved safely at very reasonable costs: as little as €1.5M/year in a 20PB archive system.

Even by multiplying this by a factor of 4 to allow for lack of economy of scale, the cost would still be only 0.2% of what MS invest supporting cinema industry.

If the whole of the European Film Heritage is digitized, this is projected to amount to 1,050PB. Preserving this amount of data would cost between €147M and €263M depending on the solutions implemented.

These costs and investments must be ADDED to the FHIs' current budgets, as the care of digital works does not REPLACE the care of analogue collections, but it adds to it.

A lack of action would result in

- A loss of newly produced films due to lack of serious long term preservation
- And the non-availability of any film that is not digitized
- Projections for loss of new productions are calculated at 220 feature films in 2016 and 330 in 2017 and onwards.
- Public funds invested in these works are calculated at €580M to €780M per year.
- These two factors will negatively impact European competitiveness in several fields, such as VoD, home video distribution, TV market.

The cultural impact of the complete disappearance of European film heritage is also a serious concern, as higher education in anything media-related will be impossible.

## Digital Restoration

According to most of the stakeholders, digital restoration can be considered a 'mature field', with few specialised software solutions available to correct damage and flaws in image and sound. Very little R&D seems to be ongoing, compared to some 10-15 years ago.

Costs are rapidly decreasing in terms of hardware / software. Costs are still high because of the incidence of manpower to perform tasks that cannot be automated. Experts are sceptical that new research might make the software fully automatic, or significantly decrease manual labour.

Some archivists and service providers indicated that scanners should be made more compatible with archival films, which are often fragile and damaged. On the other hand, many expressed the concern that as soon as cinema capture turns completely digital (i.e. there is no more 'shooting on film'), the scanner industry is bound to disappear. Even now, there seems to be scanning overcapacity in Europe, at least in the sector of new productions.

## Access to Film Heritage and Europeana

Most FHIs are engaged in some sort of digitisation activity, although the scale and scope of such activities differ from one FHI to another.

According to the results of the surveys, most FHIs provide most digital access services to two categories of users: researchers and scholars on one hand and broadcasters on the other, with the general public being largely served by theatrical projections or by DVD.

The examples of online access are so limited in scope and in size, or are so recent that they are hardly significant. Nevertheless, the variety of models and projects is a witness to the fact that digital access to FHIs' collections can open a wide range of possibilities for cultural and educational purposes.

In order to make it possible to make larger portions of the FHIs' collections accessible, actions must be taken to provide the necessary funding for the digitization process, and to research, encourage and support new models to simplify the clearing of rights as the process is costly and lengthy for mass digitization projects aimed at older and non-mainstream works.

There is hardly any FHI in the public sector that is not supportive of the idea of general access to at least parts of its collections, for educational and cultural uses.

Also, FHIs see Europeana as an unprecedented opportunity to not only provide access to their collections, but to be able to contextualize them with other types of documents and collections.

After projects like European Film Gateway<sup>15</sup>, technical issues do not seem to be of significant concern for FHIs to provide content to Europeana.

An analysis of the requests for access, the archival DVD sales, and other mixed data, seem to indicate that when offered, the public is interested both in the narrative feature film as well as in 'other materials', such as documentaries, newsreels, animation, commercials, amateur films, etc. In other words even parts of film history considered 'minor' are of interest on some level to the general public. A similar trend is also to be noticed in 'professional' access from researchers and scholars and from broadcasters, with both these groups expanding their interests beyond the traditional concept of 'film content'.

Even at the planning stage, FHIs need to be supported by MS with appropriate funding.

MS should engage themselves to create sustained support to FHIs as LTDP requires regular ongoing funding.

Digitisation plans should duly take into consideration all processes required before the actual digitisation, and MS should support FHIs also for this activity, which includes the clearing of rights.

Access should be planned for, and provided via ALL digital channels because they respond to different needs and audiences. Online access to open platforms such as Europeana is a key channel, but not the only one.

Without these resources, digitization and access – including on Europeana – is impossible.

## Digital Cinema and Film Heritage

The Digital Cinema Initiative (DCI) specifications were made for the distribution and exhibition of commercial theatrical feature films. Consequently the needs of archival films as well as those produced for TV were not considered in the original version. Recent additions introduced in the standards (e.g. about frame rate) overcome the most relevant limitations.

Most FHIs are getting equipped for D-Cinema projection, or are planning to do so, also because of their activities in exhibiting current films as well as digital restorations.

FHIs can also take advantage of the reduced costs of distributing D-Cinema as compared to analogue cinema, and this can provide a chance to re-distribute archival materials at reduced cost. Since the very beginning of the discourse on D-Cinema, FHIs were seen as providers of content for D-Cinema. This objective must be reinforced as D-Cinema distribution can be done at very low cost for FHIs.

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<sup>15</sup> <http://www.europeanfilmgateway.eu/> Training and education

# Training and education

FHIs will need highly competent staff, trained and educated for analogue and digital archiving and preservation.

The situation of higher education in this field in the EU is not good; the US have a significant advantage in this field.

MS should encourage the creation of university-level degrees in this field, in collaboration with FHI. The Commission should encourage and support this effort.

Training of existing staff is also critical and it should be undertaken immediately. As competences are not present everywhere, efforts should be taken (e.g. by using EU programmes?) to support this training, e.g. by creating common training tools, or a pool of experts, etc. The above- mentioned Advisory Group could support this initiative.



*“Des Lebens ungemischte Freude” (D 1917). Fern Andra-Film-Co. Georg Bluen (Berlin)*  
courtesy of Deutsches Filminstitut - DIF.

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# the Proposals

## General principles

- 1 All parties concerned must act immediately, as the technical and structural changes in the cinema environment are profound and well under way. These changes challenge the whole life-cycle of cinema works and the traditional activities of the European FHIs to the extent that both the preservation of the cinema of the future, and the accessibility to the whole European film heritage are at risk.
- 2 The principles that should guide these actions are clearly defined in the many EU documents regarding film heritage and its preservation, and in particular in the “Council Resolution of 26 June 2000 on the conservation and enhancement of European cinema heritage, and the “Recommendation of the European Parliament and of the Council of 16 November 2005 on film heritage and the competitiveness of related industrial activities”.
- 3 The basic principles contained in these official documents constitute a sufficient basis for the actions that are required. Furthermore, the recommendations and resolutions contained in these documents should be implemented with the shortest possible delay and with the utmost decision and energy.
- 4 All parties concerned, the EU institutions, the Member States, the FHIs and the cinema industry must recognise the urgency of taking actions and must
  - positively engage themselves in solving the issues endangering the preservation and future accessibility of European and national cinema
  - create the conditions by which precise and detailed plans are defined at national level with the involvement of all FHIs and of the principal stakeholders
  - recognise that the depth of the changes in the field is such that extraordinary measures must be taken if the European cinema of the past and of the future is to be preserved.

- MS should engage themselves in providing steady and continuous support for the FHIs in both preservation and access via mass digitization of cinema content to avoid its becoming inaccessible in a digital world.
  - Digitization and Digital Preservation entail a complete redefinition of traditional archival practises, such as ingest, viewing, quality control, checking, which must all be redesigned for digital content. The FHIs should also be supported adequately to acquire the necessary equipment.
  - MS, eventually with the support of the appropriate EU programmes, should support the re-training of FHIs staff to acquire the necessary skills.
  - MS should encourage a structured and institutionalised education and training for personnel working in FHIs and other heritage institutions. According to the Second Implementation Report the European Union is lagging behind in terms of higher education for moving image archiving.
- 5 The issues discussed in this study are not stabilized and are evolving very fast.

It is therefore advisable that such an analysis of the overall situation and of the advances in the different MS and FHIs is performed on a regular basis, for example every two or three years.

The answers to the challenges, and the best ways to seize the opportunities offered by the advent of digital are to be found via the closest and most effective inter-European collaboration.

- 6 The FHIs, with the support of the Members States and the Commission should immediately establish an effective network to address the issues raised in this study, to share experiences and competences, and to plan for common actions.

## Collection

FHIs are not equipped to deal with the ingest of new works that are entirely produced digitally: they lack the internal expertise, the equipment and the staff to perform these tasks.

This translates into a serious danger for the conservation itself of European cinema.

As the activity of preserving current digital productions does not replace the conservation of the analogue collections, but it adds to it, and in consideration that a whole new set of skills, equipment and qualified staff needs to be acquired by all FHIs, it is important to recognise that this inevitably must translate in a significant increase in the FHIs' budgets to allow the transition.

Obviously, the exact extent of the budgetary increase cannot be defined by this study for each institution, but it is liable to be significant.

- 7 Member states should support FHIs with significant increases in their budgetary resources in order for them to acquire the necessary equipment, staff and competences.
- 8 FHIs must as soon as possible act by defining detailed plans for their actual needs in the short and medium term (i.e. from the next fiscal year to the next three years).
- 9 As most FHIs lack even the expertise to draw up such plans, the Commission might help in searching for possible instruments to facilitate this phase, for example, by facilitating the circulation of competences, or by supporting the definition of *best practices* and *guidelines* for actions to be adopted by the FHIs.

As they were calculated by this study, the costs of introducing contractual or legal deposit across Europe for digitally produced works are not excessively high. Most specifically, the costs for the industry are virtually non-existent, while the costs for the FHIs and the Member States are reasonably low, for example in relation to the levels of public aid to the cinema industry.

The study also confirmed the absolute need to reinforce the mechanisms of compulsory deposit, and, lacking this, of contractual deposit for at least all films having received public funding.

- 10 The Commission should reconfirm, and stress the necessity of introducing and reinforcing mechanisms for the structural collection of cinema works, produced and distributed analogically or digitally.

- 11 Member states, with the input of the FHI should review the existing laws and regulations concerning the mechanisms in place in their legislation in order to make sure that:
  - all works that should be deposited are actually deposited, and
  - this happens in the proper formats and at the time of distribution.

For the time being the formats required are those specified by the Technical Commission of the International Federation of Film Archives: DCDM or unencrypted DCP.

- 12 Legislation should be formulated so that the FHIs in charge of the deposit can define the appropriate formats without having to re-write the law.
- 13 The law and regulations must also clearly define that the guiding principles are that what is deposited is appropriate for long term preservation, and it is deposited as soon as the work is finished, for example at the moment of the first distribution.
- 14 These two actions should be taken as soon as possible, ideally within 12 months from the publication of this study.
- 15 FHIs should immediately start planning for the best ways to design and implement digital repositories for long term digital preservation of digitally produced and /or distributed cinema works. Such repositories should meet the requirements of the ISO standard "OAIS – Reference Model for an Open Archival Information System".
- 16 Such repositories must also be designed to provide the maximum possible levels of security and control to avoid any risk of piracy, while maintaining unencrypted materials.
- 17 Such repository(-ies) should be in place not later than December 2012.

In the transitional period, FHIs should make up plans to allow for the secure and safe safeguard and preservation of digital content in a "transitional repository" that might not fully comply with the OAIS Model.

- 18 Member states should support this planning stage with the necessary funding.
- 19 The ACE (Association des Cinémathèques Européennes) and the European FHIs, duly supported by the member states and possibly with the help of the Commission, should collaborate as closely as possible so that the characteristics and the specifications of such repositories are defined jointly by pooling together the competences and the expertise present in the different FHIs across Europe.
- 20 To this end, the ACE should create and coordinate a Group of experts drawn from within the FHIs, but also with the contribution of external experts to support this endeavour. Such an Expert Group should later become permanent, and be responsible for a continuous study of technical and organizational issues, and be required to produce research, analysis, and recommendations on issue such as preservation techniques, and



technologies, procedures, and metadata. A Sub-group could also be responsible for dealing with digitization issues.

- 21 In time, it could be advisable that such an Advisory committee or group has a precise formal status allowing a real supervision of the cooperation and coordination of initiatives at EU level, at least in an advisory role.
- 22 The above mentioned Advisory Group should also be charged with the discussion of the opportunity of the introduction of an EU standard for the deposit and submission of digital cinema content to FHI for long term preservation.
- 23 Such a standard should be open, thoroughly described, and designed for a wide range of materials, potentially including video and TV-originated content. Further research is needed in order to better define the precise requirements. Because of its EU-wide impact, it is necessary that any research in this field takes place within the framework of EU-wide R&D activities.
- 24 As it is expected that analogue collections will become more long-term preservation-oriented as analogue materials will not be less used for access purposes, MS should make sure that FHIs are properly equipped for the long term preservation of analogue materials in the best possible conditions of conservation as defined by the most recent body of research. As a matter of fact not all European FHIs have the necessary resources, or are not equipped for such strict conditions of conservation.

The Commission should call the MS to support the FHIs adequately to this end.

- 25 The Commission should reaffirm the principle that MS must implement legislation allowing FHIs to undertake all necessary technical processes to ensure the long-term preservation of cinema content.
- 26 Appropriate exceptions to existing copyright laws must be introduced that broaden the spectrum of possible activities so that no possible misinterpretation is possible. *For example, the simple concept of 'copying for preservation' although it is a good basis, must be tested against all possible necessary processes, which might include media and format migration transmission to one or more remote locations for preservation purposes, etc.*
- 27 The Commission and the MS should consider to effectively encouraging the voluntary deposit of non-national works, or of all works that are not funded (for the MS where deposit is mandatory only for publicly funded films). There is a serious danger that from 2012 / 2013 only national productions will be deposited in FHIs, thus seriously under-representing the cinema culture of all MS that is largely influenced by works from non-European countries.
- 28 It is therefore highly advisable that Member states consider some forms of incentives – economic or otherwise – to encourage voluntary deposits, although it is clear that the best incentive will be the availability of a trusted repository for long term digital preservation as previously described.

## Preservation

*One lesson to be learnt from other fields is that LTDP is possible, it is done everyday everywhere, for large amounts of data, and for high security data as well, that transitioning to digital requires funds and a capacity to plan ahead and engage in strategic planning, all things that FHI's are not so used to doing anymore as the technology they are using has been stable for too long, and because they simply lack the manpower and the funds.*

Solutions exist in areas that are close to FHI's, as broadcast, space and health data, etc.

- 29 Effective and efficient systems cannot be improvised, they require time and effort to be properly designed, implemented and tested. Effective metadata creation and management, and high levels of interoperability are key elements for success.
- 30 Work must be considered ongoing, not a 'one-shot'
- 31 The following recommendations are part of the planning that the FHI's should undertake, and of the research that the EU should encourage and support:
  - The provision of adequate and continued funding to maintain digital archives.
  - Works produced digitally must be preserved digitally.
  - Continue to build on best practices developed in adjacent industry segments.
  - At a European level, ensure a minimum level of interoperability for the access to catalogue information and content.
  - Data formats used for archive content should be standardised and open.
  - Content encryption increases the risk of data loss. Unencrypted storage should be favoured over encrypted storage, with content security provided by other means.
  - Content should not be stored in encrypted form.
  - Archival content may be stored using lossless compression.
  - Lossless coding schemes should be optimised for simplicity and robustness rather than absolute compression efficiency.
  - Digital formats are to be preferred for born-digital works in order to preserve work in its entirety.
  - Maintaining the current national structure of FHI's will continue to enable Member States' access to existing photochemical based film heritage.

Long Term Digital Preservation (LTDP) systems are at the moment large and expensive, and they are not necessarily well tailored to the needs of cinema content (such as many very large files, or a very high number of average –sized files, constraints in terms of read/write speed, bandwidth, Quality of Service if ‘real-time’ is required, possibility of working with many formats both at ingest and output, etc.).

- 32 A real advantage in terms of economy of scale across the sector of FHIs and audiovisual archives as well, would be a serious impulse to define a collection management system whose core engine is open source and made available to all institutions. R&D is needed, as a realistic business model that makes such an application both affordable and sustainable in the long term. This should be considered to be a priority for research, which, because of its scope and complexity, is to be carried out at EU level.
- 33 Similarly to the example of the CEN standard for filmographic terms, the FHIs should work on the definition of metadata standards for the long term preservation of born digital or digitized moving images and related sounds. Schemata for such technical, administrative and preservation metadata do not exist, and plus they would require to be adapted to Europe, for example in terms of multilingualism.
- 34 The hypothesis of large, transnational repositories operating at European level, perhaps under the umbrella of Europeana is worth studying and possibly experimenting, as it could be a solution to encourage voluntary deposit for non-European works that could be deposited in such a structure without having to be deposited 27 times.

Having said that, at the moment the experience in the FHIs and in other fields is too limited, besides, the concerns about security and the fragmentation of the European cinema market make it improbable that such a solution can be pushed already now. This is rather a perspective in the medium-long term.

A possibility would be that an appropriate research project on such an issue was introduced, either at National, or, more appropriately, at EU level.

## Restoration

- 35 Research in the field of Digital Restoration should be encouraged, at EU or MS level. In particular, further development in scanning technologies specifically adapted to archival films would be welcome.

## Access & Europeana

- 36 The Commission should reaffirm and reinforce the recommendation for the MS to define and implement large digitization programs, similar (in scope, if not in application) to the Dutch project 'Images for the future'.
- 37 It is also vital that MS recognise that digitization should happen in the short term or the risk is that technology and expertise for digitising large collections of analogue film materials are lost.
- 38 As the study highlights, the window of opportunity for such mass digitisation projects is already closing, and it is not realistic to assume that it will last more than 7-10 years.
- 39 Such projects should be vast, covering possibly the whole national production, with equal attention to fiction and non-fiction (which has a remarkable commercial value).
- 40 Clear and strong collaborations with the rights holders are needed. It is highly probable that this collaboration will be gained in exchange for public funding to support digitisation, as most rights-holders are not ready – technically and financially – to undertake such massive digitisation projects.
- 41 Once such mass digitization projects are in place, the problem of material for Europeana will be solved. It must be clear that the very first reason for the lack of cinema material to be made available in Europeana is the lack of funding. Apart from the projects in the Netherlands and some initiatives such as those in Norway and the one being planned in Finland and France, MS have not invested new resources for the digitization of the cinema heritage.
- 42 It must be also very clear that the lack of appropriate funding lies behind the rights issue. Lack of funding implies that the FHIs simply lack the manpower to carry out the necessary research on the rights; in addition, the availability of funding would make it possible for the FHIs or the MS to set up business models and engage in negotiations with the rights-holders. Projects such as 'Images of the Future' show that they can be successful as long as the public sector comes in with resources and long-term commitment.

## Training and Education

Inevitably, a significant part of the FHIs' existing staff needs some level of re-training to acquire the new required skills and competences. It is necessary that FHIs engage in this activity as soon as possible, by identifying the staff that requires re-training (and is willing to do so), precisely defining their training needs and organizing the training events.

- 43 Costs for this type of training could be significantly reduced if training was to be designed at transnational level, either in language areas, or at EU level. Training materials could be produced and effectively used across

institutions. This would also have the advantage of fostering the exchange among FHIs, and disseminating the knowledge of existing best practices and standards.

- 44 It is also recommended that institutionalized, structured training and education is organized across the EU, at universities or at university- level institutions.

At present – as it was highlighted during the conference on archival education and training organized within the Spanish Presidency, and as it is reported in the Second Implementation Report – there are fairly few opportunities in this field across Europe. Obviously, digital preservation of cinema content is and will always be a specialized field requiring a relatively small number of trainees per year across Europe, but it is also true that most of the topics that such courses should cover are common to other fields with larger requirements in terms of workforce, such as the audiovisual and media industry in general.

It is time that Digital Preservation and possibly Digitization of analogue artefacts in archives, libraries and museums become a topic for higher education across Europe.

- 45 FHIs should collaborate as much as possible with such initiatives, and in general, FHIs should implement policies that encourage such endeavours, for example by defining hiring policies that strongly encourage the hiring of qualified staff against the ongoing practice of in-house training. *In-house training's effectiveness is proportional to the skills and competences that are present in the institution. This means that most FHIs might be ill-equipped to proceed to in-house training in new areas such as digital preservation and digitization that they do not really master; furthermore, these efforts tend to be a serious challenge for smaller and younger institutions who lack internal resources or highly qualified staff.*
- 46 It is also of the utmost importance that such programs and courses keep teaching analogue archiving practices and technologies. In fact, analogue collections will continue to exist within large institutions such as museums, libraries, archives, FHIs, etc. and even more critically, younger generations willing to enter this profession will be less and less exposed to analogue technologies. How many 15-25 new employees in an archive have a significant experience of analogue media – discs, films, analogue audio or video tapes?

## Research and standardization

Long Term digital preservation of cinema and of other audiovisual works, will benefit from research carried out in different areas of information technology, for example in areas such as new data storage media, cloud computing, and others.

Nevertheless, some research needs to address technologies that are more specific to cinema (and sometimes common to other audiovisual content); these specific

needs are mentioned all along the Study and this Executive Summary, but for sake of clarity are summarized here.

47 Areas on which research efforts should be focused include:

- The opportunity to define a EU standard for the deposit and submission of digital cinema content to FHIs for long term preservation; this standard should be open and designed for other moving image content like video and TV.
  - The design of open source collection systems conceived for the long term preservation of moving image materials, and to be implemented across FHIs and audiovisual archives across Europe.
  - Ensure the interoperability across repositories and metadata schemata that are or will in use across Europe.
  - As encrypted materials cannot be safely preserved, security issues for digital repositories holding cinema and video content need to be researched.
  - Research in the field of Digital Restoration should be encouraged, at EU or MS level. In particular, further development in scanning technologies specifically adapted to archival films would be welcome.
  - Assessing and clearing the copyright status of individual works being both necessary and costly, it is advisable that R&D efforts are invested in order to devise new models, workflows and tools for this task. The results obtained with the ARROW project are an encouraging sign, although they refer to a much simpler domain as that of paper publications.
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# Afterword

*“Digitisation breathes new life into material from the past, and turns it into a formidable asset for the individual user and an important building block of the digital economy.”<sup>16</sup>*

This quote from the “Comité des Sages” highlights what is at stake with the digitisation of the European cultural heritage that is to serve a critical and strategic dual purpose: as an investment in the European human capital via its culture and education, and as a key component of the digital economy.

Cinema is at the core of the modern media environment. It is at the core of European citizens’ choices for entertainment, in the theatres, on TV, on homevideo. It constitutes an important investment and industry for Europe. It represents a significant part of the European cultural history. And its images are the eye onto the European history of the last 120 years.



*Digital reconstruction of the film “Mania”*  
Courtesy of FilMOTEKA Narodowa/Polish National Film Archive

With European cinemas becoming digital, the European film heritage is at a crossroad between memory and oblivion:

- As all channels to access the European Film Heritage become digital, either the European collections are digitized, or cinema will simply disappear. The European culture will suffer the loss of 120 years of history, and the industry will lose the possibility of exploiting commercially the whole past catalogues.

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<sup>16</sup> “The New Renaissance – Report of the “Comité des Sages”” p. 4

- As all films are produced digitally, either FHI's are given the means and the tools to preserve them, or they will be soon lost forever, as long term digital preservation is more complex and more expensive than the preservation of analogue films.

The urgency of action should also be stressed at the utmost extent:

- Every year of delay in implementing long term preservation strategies for cinema works means the potential loss of some 1200 feature films.
- Projects for the mass digitisation of European cinema collections are likely to become impossible in the next 7 to 10 years. The window is slowly closing.

Digital offers unprecedented opportunities for the cultural and economic future of Europe, while posing some challenges.

We, as authors of this Study, hope that Europe will be able to act promptly in order to face the challenges and seize the opportunities.

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