

D7.4: Report on Business Models

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Executive Summary

Providing engaging digital content is a multilayered process that requires the co-operation of a broad range of disciplines. The digitization of heritage sites and artefacts, with the added complexities of state ownership, limited physical access and recognizable iconic forms could challenge any co-operative project.

3D-ICONS have established a successful business model that address the challenges faced by all parties looking to work in this arena. In this context 3D-ICONS have:

- investigated the technical issues relating to acquisition, processing and visualization of rich digital content,
- explored potential revenue opportunities through alternative licensing schemes,
- analyzed the whole process chain to identify the costs of digitization and where optimizations can be made,
- and looked to the broader legal landscape in terms of aligning the goals of the project to European directives.

The 3D-ICONS Business Model that emerged and adopted by all partners was one that addressed both technical and operational challenges and the combined requirements of the public and private sectors working together.

Like the task itself, a successful business model requires inclusive cooperation of all stakeholders. The primary driver for this level of cooperation is the establishment of clear non-restrictive rights management policies. Effective Intellectual Property (IP) management is a prerequisite if parties are to profit from original work and stimulate creative use. 3D-ICONS developed clear guidelines property owners and developers, recommending the use of the Creative Commons suite of licenses.

Understanding the value involved in producing content is crucial in any project and this includes the less tangible 'soft' resources that many institutions can rely on. 3D-ICONS looked at ways of optimizing the use of existing assets and the creative use of licensing and profit sharing to reduce the risk for all parties involved in creating content.



In support of 3D-ICONS and for future projects a suite of tools were developed to assist with the supply of content to Europeana. These include an on-line metadata registration interface that is compliant with Europeana which provides an intuitive method for the submission of records. This is supported by a dedicated 3D portal for the storage and cataloguing of 3D models which not only maps directly to Europeana but provides for a richer data set for more detailed cross referencing.

There are many ways to prepare content for users, the 3D-ICONS Business Model provides a set of tools and recommendations that will enable greater efficiency, supply content to Europeana and critically provide for sustainable revenue generating opportunities.

Part 1: 3D ICONS Business Models

1.1 Introduction

The commercial business of scanning and post processing our heritage to produce marketable 3D models is extremely varied and there are a great many opportunities to be exploited by our creative industries. Currently there is no 'norm' for this work and much of it is project based. A not uncommon project-based business model for such 3D work could, for instance, be summarised as:

1. A particular location, building or artefact is needed for a specific project
2. It is 3D surveyed and content specific to the project is post-processed by a range of contractors
3. Resulting 3D models are provided to the commissioning company or organisation
4. If a host heritage organisation (a monuments department, museum or gallery) is involved, they may receive an access/facilitation fee.

Only rarely does the heritage organisation acquire some or all of the 3D data for its own purposes or for distribution to other users. Most do not have the equipment or skills to review 3D data and rarely does the 3D data reach a long-term heritage archive in a suitable format.

The 3D-ICONS Business Model is radically different. Critically, it places the heritage organisation within the business model and it requires an additional output – publically searchable and viewable information on the 3D Assets produced. Specifically, 3D-ICONS contributes metadata on its 3D Assets to Europeana, but as a result of this provision other long-term heritage archives are becoming involved in aggregating 3D Assets and their substantial data files. The 3D-ICONS Business Model does not prevent commercial production of 3D Assets or impede project-based work. It simply underlines the numerous advantages to heritage organisations, survey teams and post-processing specialists of working together to archive their work and of promoting public access to at least the equivalent of 3D Thumbnails of their sites and collections.

The 3D-ICONS Business Model has been well received by consortium partners and the heritage organisations they work with. It has also been appreciated by audiences as we have disseminated the work of the project. We certainly believe that by creating 3D archives that are publically and professional accessible through Europeana and other search engines and services, we will help to stimulate the Creative Industries involvement in digital 3D. The truth of this will only be revealed over the coming years but the creation of reliable and accessible archives of 3D data and post processed models will have a significant impact on monument management as well as architectural practice. The role of organised archives and search engines such as Europeana will become ever more relevant as the number of 3D models increases. 3D-ICONS has made a major contribution to the volume of models available and the metadata standards required. Others, such as the Fraunhofer, are developing automated scanning systems for the volume 3D capture of museum artefacts.

We will look at these issues in more detail in this report, but even from this brief and simplistic description of a not uncommon business model for the production of digital 3D Assets of our European heritage, the impact of what we term here the '3D-ICONS Business Model' on those who produce and use 3D is already significant. The report's focus is therefore on the net experience of the 3D-ICONS partners and with particular respect to their dealing within the heritage sector. While this report does draw some data from commercial avenues, it does not attempt to describe the wider and rapidly changing global market for 3D materials.

1.2 Core Business Activity

The 3D-ICONS project has sought to establish a professional 'archive friendly' pipeline for the survey, post-processing and documentation of 3D models of archaeological sites, historic buildings and artefacts. A fundamental aim of standardising these models and their associated metadata is to facilitate public and professional access to them as a result of their presence in Europeana. Partner organisations have tested and proven a process that will assist any cultural heritage organisation in the creation of 3D models. Guidance is provided on the choice of technologies, making decision about the range and quality of content to be produced and how this might serve an end-user, and the release of content through an appropriate broker.

The array of players in producing content and bringing it to the end users are many and varied but can be simplified as follows:

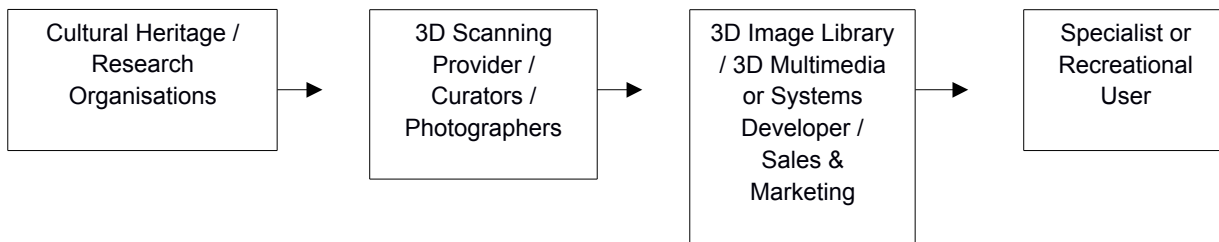


Figure 1 – Contributors to the process of making 3D models and moving them to market.

The work of the 3D-ICONS partner organisations has met with challenges at each stage of the process, largely because of the lack of experience and robust guidelines. We have shown, however, that the development and deployment of successful technologies to allow quality models to be produced and in the release of those models, either wholly or in part, to the market place is achievable and now have a rich diversity of case studies

1.3 Europeana

The 3D-ICONS test ground has focussed on not-for-profit distribution of cultural heritage material but improvements made here can only help open up the opportunity for profit potential too. Over the last ten years Europeana, as the only pan-European search engine, has made significant inroads into making cultural content available on-line on a not-for-profit basis. An astonishing 300 million objects have now been digitised across Europe. They reflect the many facets of European culture captured in books, paintings, letters, photographs, sound and moving image. However, this figure represents only 10% of the estimated total of objects held in heritage organisations, and only one third of the digital content is currently available online (Europeana 2020 Strategy).

This achievement is, at one level, very impressive but the reality is that most of this digital content is not now suitable, or indeed readily available, for commercial reuse. Formats and file sizes have changed in both 2D, movies and, above all, 3D Data. For example, barely 3% of the content on Europeana is rights cleared (or at least easily clearable) for creative re-use, commercial or 'not for profit', even though much of the content to be found on

Europeana could find ready reuse in social media or for instance via APIs for mash-ups, etc. The time, effort and capital expended to reach a figure of 10% of Europe's heritage digitised underlines what a strategic and long term process this is – even for 2D images of widely varying quality. Europeana itself has identified that to open up collections for the benefits of society and the economy, there needs to be a combined approach to developing standards, embracing new technology, by [changing copyright](#), and developing new business models. This is, as 3D-ICONS has shown, all the more so in the case of 3D Data.

Many content rich organisations across Europe still struggle to cover their running costs so some level of income generation is attempted by charging for commercial access to digital content. In practice, few are yet competent at this or properly digitally aware of the deals being struck. Honest brokerage and a trusted market place would help this situation and release potential. The response from Europeana has been to adopt the Creative Commons, a system which allows organisations, be they commercial or non-commercial, to place their content in the public domain while retaining ownership. We have underlined the importance of this in the 3D-ICONS Business Model. We have recognised that if quality assets are to be made publically available and viewable with no need for plug-ins or proprietary viewers, significant post processing is almost always required. Given the cost of post-processing of 3D survey data and also the considerable new IPR that is generated, it is therefore essential that 3D assets are licensed correctly. Organisations are then able to support Europeana with their content whilst capitalising on their business assets. As a result of adopting Creative Commons as a key component of their IPR Scheme, Europeana has become a significant channel for rich content and heritage. Academic and commercial organisations working with 3D-ICONS have been able to place 3D models and metadata into the Europeana search engine.

1.4 Sustainable market development

Market development in 3D materials operates in largely uncharted territory, with rapid advances in technologies and conflicting license policies producing an ever shifting landscape. Recently, the primary facilitators of activity have been 'soft businesses' such as the heritage and education sector, with Europeana at the forefront. A key shift in the current project-based approach to the market in 3D content to a more sustainable approach is the access and archive approach inherent in the 3D-ICONS Business Model.

This facilitates multiple users of the original model as well as recognising the ‘for profit’ and ‘more than profit’ value of these resources.

1.4.1 Soft Businesses

In the current situation within 3D-ICONS content that is distributed is generally done so on a not-for-profit basis, through portals such as Europeana. There has been internal discussion about the potential to generate revenue from content as well, but to date this has not been undertaken. Within the parameters of this project Europeana is therefore our identified market. To date, Europeana has operated on a purely not-for-profit basis but it has acknowledged that there are economic gains to be made from the cultural heritage it holds data on and new targets are being set within Europeana’s 2020 strategy to begin to generate revenue. In part, this is a response to cuts in funding, but as this is a situation that is shared by many cultural organisations, it may provide an example that others could follow.

It is important, however, to recognise the Soft Business that organisations such as Europeana generate. A fundamental of many heritage organisations is that our shared cultural heritage fundamentally belongs to us all and that end-users should have an unobstructed access to their heritage. That need not mean that commercial opportunities are not embraced or supported. Even through Europeana, project partners are already making a contribution to Europe’s economy. The largest indirect contribution expected from Europeana is an uplift in tourism numbers and research quality. This is particularly true of 3D Data provided by 3D-ICONS where World Heritage monuments are presented and data sets are of research quality.

Europeana is but one route to distribution and in future content providers could look to develop other potential markets.

Education - the education sector is excited about material that is digitised and the imaginative potential that it provides. 3D models of iconic sites can provide access and exploration of sites where a physical visit to a site cannot be achieved, for example through web site or specialist digital publication. Of course, education providers are not always in a position to purchase non-essential resources, but cultural heritage organisations could choose to use models to enhance their own on-site interpretation or

education, using the same content to develop their 3D models into additional products for sale.

An example from the project is STARC creating 3D models with primary school children, following their visit to the lab. The school was from the village of Pyrga, Cyprus, and the programme aimed to introduce new technologies for a better understanding of local heritage and the history of the village.

DISC is in the early stages of discussions with the Office of Public Works on how data and models can be incorporated into the interpretive centres across Ireland, for example at Bru na Boinne Visitors Centre, Glendalough and Clonmacnoise.

The acquisition and digitization of the Sarcophagus of the Spouses is part of an interdisciplinary and cross medial project, conducted by several research groups including FBK, aimed at delivering highly detailed photo-realistic 3D representations of the Etruscan masterpiece for successive multimedia purposes (<http://sarcofagodeglisposi.fbk.eu/node/7>). The project is a case study for the European project Virtual Museum Network of Excellence (www.v-must.net).

Performing arts – there is potential for increased use of 3D in the field of the performing arts, for example as stage sets. As identified in the 3D-COFORM Market Strategy Analysis there are also opportunities to use 3D models to support cross art form projects such as those including dance and music. Digital media has already inspired people to create new content and provided them with the tools to innovate and create new forms of art. If the ‘prosumer’ revolution takes off (the market segment between professional and consumer) we can also assume that artists will seek to develop their own creative responses to 3D material if it is readily and openly available, in ways not yet anticipated.

3D image libraries – 3D image libraries of real world rather than made world collections have yet to emerge to any significant extent but made world collections show that they hold potential. The likely direction of development is that 2D image libraries will start to incorporate more 3D images (SCRAN, The Scottish Cultural Research Network has already done this with a limited number of sites and objects) rather than separate emerging 3D specialisms. The work of 3D-ICONS has underlined the importance of 2D photography in texturing geometry and it is clearly the case that image libraries will provide 2D ‘screen grabs’ of 3D models as well as all the relevant building blocks of the models

and sample video outputs. In other words, real world 3D image libraries are complex and rich spaces – as the assets and rich metadata linked to Europeana by 3D-ICONS demonstrate.

1.4.2 Hard Businesses

The market place is maturing and new opportunities are emerging especially as 3D cinema and TV become more grounded.

TV and Film - There is real potential in this field to supply 3D models for advertising campaigns, animations, feature films or educational programmes. To give an impression of the potential of 3D film in particular, the situation in Germany can be taken as a case study. In June 2010 Germany had more than 270 theatres with at least one 3D capable screen. In 2010 and 2011 two 3D films were produced by the largest independent German film studio, Constantin Film. The first one "Konferenz der Tiere" (The Animals Conference) was heralded as the first German animation film in 3D (October 2010). A budget of over 15 million Euros was planned for the re filming of the thriller "The Jesus Video" in 2011 and The Caligari Film- und Fernsehproduktions GmbH, located in Munich, was also planning a 3D film for 2011, receiving for it more than 1.5 million Euros in funding. If this level of industry and consumer interest in 3D continues to grow, it should have a positive impact on the readiness of the public and producers to engage with 3D in the cultural heritage sector. (Example taken from 3D-COFORM Market Strategy Analysis Second Stage Report, 2011)

Within the project DISC is currently discussing the use of their laser scan data of Skellig Michael with a film currently in production. The production company have filmed the exterior shots on location on the island and may also want to carry out some interior shots. Since this is not possible due to the fragile nature of the site, they may use DISC's data to reconstruct the site within the film studio instead.

Games – The potential for 3D gaming is not yet fully developed but is anticipated in coming years. The games market is a competitive one with participants seeking the next competitive edge so it is reasonable to assume that higher quality and more detailed depictions might be sought in the future. As the nature of games evolves, industry players

may become potential purchasers of 3D models of cultural heritage sites and monuments. Games involving adventures, role playing and 'first-person-shooters' could all benefit from high quality models.

As a sector, gaming is a good example of European competitiveness but it is also a field facing ever increasing global competition. Serious games is currently a niche area within the overall gaming industry but a sector with the potential for significant growth and impact. Better deployment of digital game technologies in non-gaming sectors could lead to improved competitiveness of businesses, improvements in EU economies, new business models, technology transfers, and a wide range of indirect societal benefits. Currently, however, low funding in serious games, the cost of game development, platforms, VR environments, simulators, etc., makes such games unaffordable for potential customers. Serious game producers need to be able to reach potential consumers quickly and at reasonable cost. ICT tools such as rapid development platforms and quick development environments, rapid prototyping, collaborative design for serious games, ICT platforms for crowd-funding or crowd-sourcing could be helpful. Advances in areas such as augmented reality (3D, avatars, VR/AR environments), more versatile game engines, customised game solutions, simulation solutions, platform standards and open standards have also been identified as useful by industry players.

During *The Future of ICT for Creativity and Creative Industries Workshop* organised by the 'Creativity' Unit in DG CONNECT, the European Union, which was held in Luxembourg on 27 & 27 March 2014, participants generally agreed that the demand for content is rapidly outstripping current abilities to supply. Various future directions to address market blockages were identified including Automatic & Dynamic Content Creation and Adaptation - enabling users to go from content which is static to content that is generated. It is thought that this could lead to a significant enhancement in the user experience allowing different rendering according to the user preferences. In gaming this is already the situation – users often enter a different gaming scenario every time they enter a game. However, although the technologies exist in gaming, there is an on-going and ever increasing need to generate content. Content creators should be encouraged to become meta-creators – to annotate all manner of content so that it can be delivered in unexpected ways to go beyond their original purpose. For this to happen in the case of 3D models, licensing decisions need to be made to allow the availability of part of whole 3D models for creative re-use and quality issues need to be resolved.



e-Publications – the very significant take-up of tablets and other portable technology has dramatically changed the ways in which heritage organisations and other content providers distribute and publish their work. This includes 3D content which has successfully been brought to public use on these platforms. Within 3D-ICONS, CMC has been working with Historic Scotland to develop distributed content on the site of Skara Brae. This UNESCO World Heritage Site is a major tourist attraction but also a significant schools education resource. Situated in the relatively remote Northern Isles of Orkney, Historic Scotland wish to look at using 3D as a particular added value resource in the creation of tourism and education products. The costs and business case for doing this are being investigated by CMC, while Historic Scotland are considering its future potential both for revenue earning and also as an education resource. In effect, the new distribution media combined with rich content is changing the business model of this heritage organisation.

1.5 Readiness for market

Key to assisting the emerging markets for creative industries using 3D is development of robust standards in content capture and post-production formats using interoperable, standardised metadata. Content providers need to ensure that their content is acceptable to potential clients and vice versa. This is, of course, exactly the same request that archive organisations are making, so there is a natural convergence on standards that 3D-ICONS have promoted in our Business Model.

Although commercial markets for 3D models do exist, their norm at present is project-based with a bias to creating new content as required. At an individual project level the effort, need for case by case innovation and the sheer variety of end formats possible for each model currently produced generally make them uneconomic for multiple sales. Production processes and formats need to become standardised, and end quality needs to be assured, for production to become more economical and for the sale proposition to improve.

The same pattern can be found for 2D digital resources in the past. Over the last 20 years, there has been an enormous investment in digital content across Europe but there has been significantly less effort in commercialising it. Some of the base line content, individual source images for instance, have emerged into the public domain but only in specific sectors of the creative industries, whereas much of the rich value added content

animations or interactive information has not migrated forward onto current digital platforms such as iPads and smart phones. Much of this material is now in danger of being lost to public and commercial use.

1.6 Movement between markets

There has been some debate as the 3D-ICONS Business Model has developed about how easy it is to move cultural heritage material acquired and developed within a research framework on towards a creative commons not for profit agreement distribution agreement. For some organisations even this level of public release has not been easy and, in some cases, content was lost to the project and had to be replaced from other heritage sources. That this happened fairly widely underlines the difficulties in getting heritage organisations to move towards greater distribution of their assets. That 3D-ICONS was able in the end to persuade so many organisations to place content in Europeana has in itself resulted in a significant shift in perception as to the importance of public access to 3D assets. At the same time this public access has itself helped shifted professional opinions on the importance of 3D data from technical research that was not a heritage organisation's responsibility to a lasting public resource that needs to be properly archived.

Taking the next step of establishing business to business commercialisation agreements for content that is currently only released on a not-for-profit basis and no derivatives is likely to be even more challenging. We can expect quite a number of organisations to simply not have the appetite for the increased administration, even if they are on the lookout for some additional income. This remains the norm for a very large proportion of Europe's 2D creative content which is available only on a not-for-profit no derivative basis, meaning that much of Europe's USP Content is, or is perceived to be, out of bounds to our own creative industries. The potential for and cost of post processing in 3D is so great that this is a much more serious block on the development of 3D assets than it is for 2D.

Participants from within the creative industries attending *The Future of ICT for Creativity and Creative Industries Workshop* agreed that this reluctance to release content for commercial development is impeding the growth of 'for profit' SMEs in the sector. At a European level more cultural content needs to be made available on a 'for profit' basis, to allow the resulting derivatives to be revenue generators. For this to happen, there is a need on all sides for a trusted market place. SME's in the creative industries need an easy point of access to content as well as successful business and rights management models.

In the argument for or against greater commercialisation the way that 3D survey and post-production work is funded must be taken into account. At present, the majority of such work is funded through grants, either from the European Union or other public sources. A large proportion of these grants filters into Universities or Research Institutes with no requirement for their projects to make any profit. There is, in these cases, no push to try to make money, or in some cases even to distribute what has been experimented with and produced. Despite the time and effort expended, and money spent, not all models are therefore required to be complete – let alone fit for purpose in terms of supplying an end user, be that for profit or otherwise. One of the few forces for greater standardisation of agreements and content has been the requirements of Europeana to make as much cultural content available as possible. A future phase within the development of Europeana in support of Europe's Creative Industries should perhaps address the question of a library of commercially licensed 2D and 3D material. A shift of perception is required so that:

- If money has been awarded from government sources then any models produced should be of sufficient quality to be made accessible to end users and be made publicly accessible;
- The core purpose of the funding may not be to make profit but should not preclude a cultural heritage organisation from attempting some cost recovery as an add-on activity.

In the case of the first point, it is beyond debate that public money should result in benefit for all. As regards the second point, how heritage organisations regard their societal role to help others create profit is changing. The dramatic recent release of license restrictions on their content by the Rijksmuseum, Amsterdam, indicates that this is possible.

While current thinking on how 2D and 3D cultural heritage content might be used and on what basis is starting to change, the scale of production of 3D content within Europe remains a limiting factor. In terms of technology exploitation, one recommendation has been to connect SMEs and micro-SMEs in the creative industries with heritage organisations and developers of new and emerging volume scanning technologies, such as those begun under 3D-COFORM and taken forward by the Fraunhofer and others. Fundamental to such an approach is the 3D-ICONS Business Model in which funding is only made available if the resulting content is released in such a way that commercial development and derivatives are allowed – at least for European SMEs. The experience of 3D-ICONS suggests that this is not going to be a simple concept for heritage

organisations to agree to individually – but, if led at a European level, such a seismic shift may be possible.

Globally, the creative industries are currently dominated by large US multinationals who are often gatekeepers to information and critical data needed by smaller creative industry players. Europe's strength is in content and we need to use that to force more open European licenses and standards. As 3D-ICONS has found, there is an appetite for such initiatives and some heritage organisations would welcome a European lead. During 2013, DISC has worked in conjunction with the City of Derry Culturetech (<http://2014.culturetech.co/>) and FabLab (<http://fablabni.eu/>) in an initiative to explore the area of innovation within the digital creative sector. Shaun Whorisky carried out an artist in residence programme (<http://culturetechinresidence.blogspot.co.uk/>) where he explored how 3D data captured by DISC could be used in a range of products, for example 3D printing and augmented reality.

The Future of ICT for Creativity and Creative Industries Workshop suggested that more creativity and more experimentation is both needed and possible. Creativity has become democratised and it is easier for everyone – prosumers, artists, technology developers, and creative companies to collaborate and be creative and daring in developing new tools - which might also turn out to be relevant for main stream actors. New digital technologies should empower smaller players to make a difference – small universities & research institutes as well as companies and prosumers. An example is rapid prototyping which means an acceleration in production processes further reducing the time to market for new ideas.

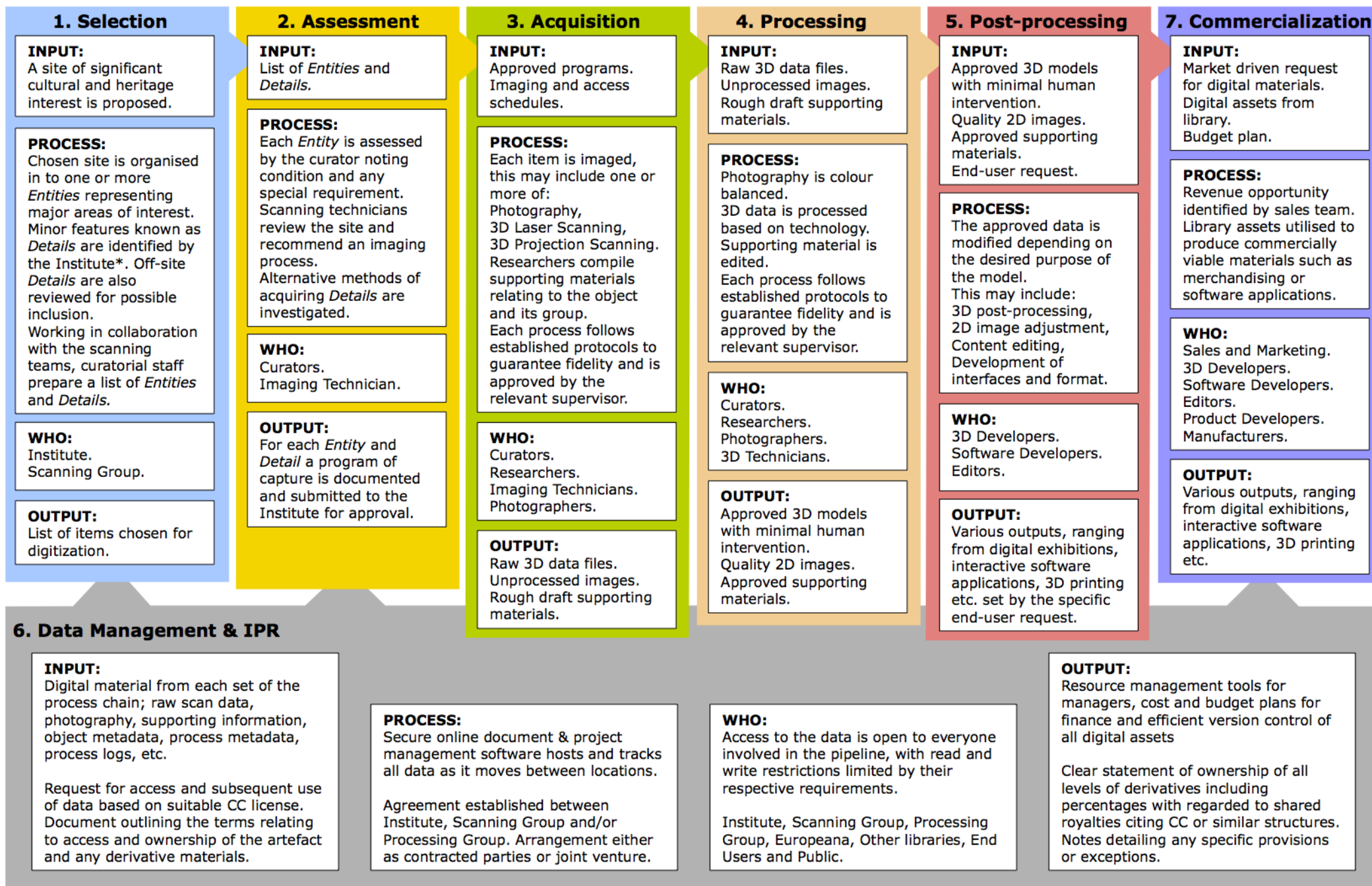
Part 2: IPR & Licensing Schemes

2.1 Distribution, Access and Control

The goal of the 3D-ICONS project has been to establish reliable processes for the production of 3D models, with a specific remit to contribute them to Europeana. There has been considerable focus not just on producing quality models, but also on ensuring that they may be subsequently made publically available. While metadata release has always achieved Europeana standards as a minimum, levels of distribution, access and control of the 3D models and metadata have varied. Copyright and the IPR that surround the use of cultural heritage content has been much debated during the course of the project and remains an issue. The 27 countries making up the European Union have diverse IPR legislation, with additional strong regional differences within some of those countries. The result is substantially different legal systems and business practices as well as a rich set of legal languages, which makes a standardised approach to sales contracts and licences complex and challenging. The IPR Scheme (D7.2) attempted with some success to stand back from the legal detail and outline in plain English and diagrams the procedural requirements necessary if 3D content was to flow from content provider to 3D producer to distributor.

The emphasis in D7.2 was to establish best practice in releasing content via Creative Commons and on to Europeana. The emphasis in this deliverable is to explore the importance of allowing and promoting the generation of derivatives for initial data. This is not just about promoting a commercial market place for 3D material. We would like to see scanning projects leading to a wide range of derivative material that is also released for public use, but we recognise that the cost of generating these derivatives is many times greater than the cost of scanning and that a route to commercial returns is likely to be needed.

Activity Chain



*Institute refers to the organization responsible for managing a particular heritage location.

Whilst a number of potential markets have been identified in this report, within these markets it is the 3D post-production entrepreneurs who are essential to a vibrant 3D assets market. The challenge in coming years will be to find ways in which to engage with them and to develop the content produced through cultural heritage projects. Many of these entrepreneurs work as individuals or in micro SMEs. On their own they are unlikely to succeed in creating a vibrant market for their 3D products. If SME's in the creative industries can release their content through an easy point of access without having to review legal agreements each time, then the potential for revenue generation upon which they depend can be released. Content providers have a role in enabling the flow of content whilst also receiving a realistic share of revenue to ensure their own survival. The future of ICT in this sector is to help bring new and exciting products to market and to improve access to markets for all. Post-production 'creatives' would also benefit from retaining the imprimatur of cultural heritage organisations to provide visibility and reputation – giving them an incentive to lodge the new derivatives they create with the original content releasing organisation. Portals such as Europeana represent one route to the market place but a project to test the commercial market for 3D models could test the wider response of different markets to the proposition of using 3D models and could help to establish clearer areas of potential.

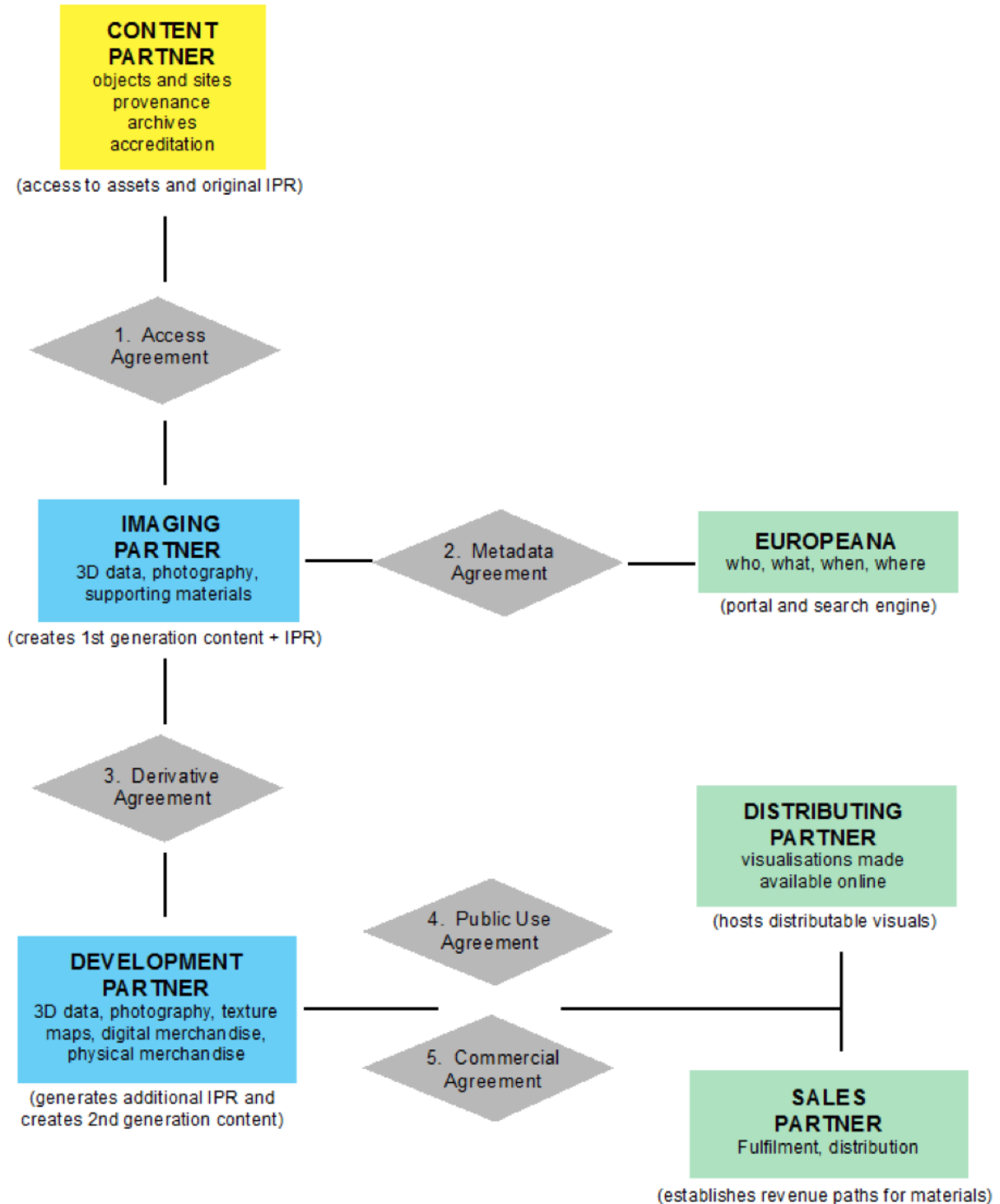
The need for partnerships, both intra sector and cross sector, will therefore remain significant for attracting funding, stimulating development and disseminating content to end users. The benefits are amply demonstrated in European projects such 3D-COFORM and 3D-ICONS where partners not only benefit from shared expertise but also the exposure that their work receives across the European cultural sector.

2.2 The 3D-ICONS IPR Scheme

As introduced in Part 1 of this report, for cultural heritage content to be released successfully and systematically on a not-for-profit or for profit basis Cultural Heritage organisations need to take a combined and simplified approach to IPR and licensing. D7.2, the Report on IPR Scheme, identified that at present 3D-ICONS project partners employ a wide range of different licensing arrangements when it comes to distributing their material, responding to national law as much as institutional habit. In some cases, there is also a lack of understanding and fear about how to protect commercial rights adequately.

The IPR Scheme proposed in D7.2 has attempted to address some of these issues and to provide a common scheme that partner organisations can adopt, confident that their

interests are protected. Many partners have already adopted the scheme, at least in principle, though the need to take more local legal advice is a further step in the process.



The focus of the scheme has been the common objective of project partners to place 3D-Entities and 3D-Details with metadata in a place where they can be accessed by the public via Europeana and other national portals without loss of legal rights over that content. By focussing on the common ground the scheme has been able to look past the many and varied practices of different institutions and different countries to find an approach that can work across the board. Key to the success of the scheme has been the clarification for partners and content providers of the distinction between 3D-Entities, 3D-Details, content data and metadata, allowing the development of clearer access agreements. All relevant 3D-ICONS partners have additionally signed up to Europeana's Data Exchange Agreement (DEA).

An important step in developing the IPR Scheme has been the clear expression of the diversity and range of people and organisations involved in creating 3D-Entities, a creative process that results in the generation of Intellectual Property Rights (IPR). The later processes of the Activity Chain (post processing and commercialisation) are far more specialised and creative than the earlier phases which are dominated by controlled access rights (not IPR) and relatively automated processes of factual recording. Consequently, it is the later processes of model generation and post-processing of models that require greatest investment and also generate the most clearly documented IPR. This is important in terms of recognising that while the Content Providers may control access it is the later processes that have the highest costs and greatest IPR.

There are multiple benefits of achieving a level approach to IPR and licensing. For the organisation providing content, less time is spent re-negotiating contracts every time material is sought for external use and distribution of 3D material can start to be factored into economic planning. For the end user, the benefit is ease of access and freedom to explore the potential of 3D material beyond what has perhaps been possible so far. For both sides there is clarity about what is and is not permissible and reassurance that contracts support the rights and needs of both.

Part 3: Cost Analysis & Sustainability

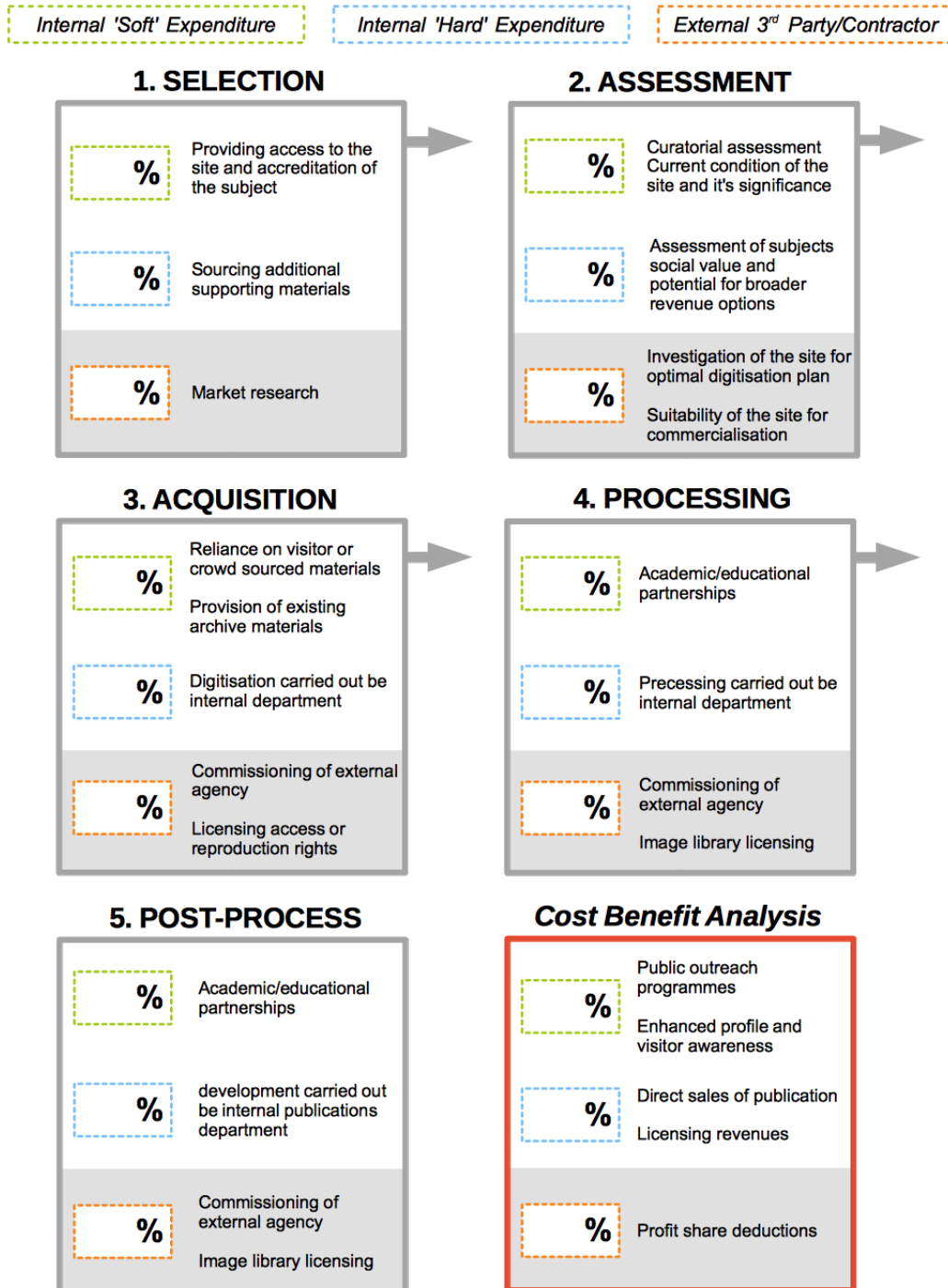
3.1 Cost Benefit Analysis

Digitisation of heritage objects is a complex operation with a series of interconnected steps. Each process has its own cost structure that can vary greatly depending on the particular circumstances of the project. Any cost analysis needs to take into account the true range of resources being deployed and the full range of benefits that eventually accrue. Generally expenditure will fall into one or more of three categories; internal 'soft' expenditure, internal 'hard' expenditure and expenditure on or by external third parties or contractors. Only once each step in the digitisation process has been assessed will the apportioned total costs incurred on a project be apparent and can any apportioning of effort and credit be possible.

All organisations as they look at this sort of audit tool will adapt it to their own circumstances. Heritage organisations might, for instance, wish to maximise 'soft' expenditure and to allow for the effort they put into maintaining sites and collections. Sub-Contractors working on post-production may want to offset some of these soft costs by allowing research and educational use of their processed 3D models. One benefit of a more open system of auditing production costs might be more mutually beneficial and transparent agreements between the consortiums involved. End users and distributors could also feel confident that there is tracking of the key players in content generation and those who want to provide further derivatives know who to approach for what aspects of a set of rich 3D models.

As noted different organisations will adapt this tool to their own situation, but as a basic guide here are some exemplar definitions.

3D ICONS Cost Benefit Analysis Chart



Internal 'Soft' Expenditure

Allowance for relevant and related activities carried out to maintain and permit access now or in the past to sites and artefacts, most commonly by heritage organisations. Where used, this might include past research and photography. Likewise, any new effort by existing staff and volunteers would be grouped here.

Internal 'Hard' Expenditure

Costs incurred over and above normal activities of the heritage organisations are accounted for in this category, and include such items as additional staff, hardware and training.

External Third Party/Contractor

The commissioning of external organisations to provide services is provided for here and includes consultancy, technical support and maintenance.

Some of the third party costs could be offset by providing advantageous incentives such as profit sharing or preferential licensing agreements. This may, however, impact on the expected share of the return of investment. Mutually beneficial partnerships may ultimately increase the value of the return.

3.1.1 Selection and Access to Content

Choosing the subject matter for 3D modelling is a careful and significant process.

Heritage organisations might control access to a site, having both a cost or a value in this service and also being in the position to influence licenses of subsequent 3D visualisation reproduction rights.

Alternatively, the selection may be externally motivated, such as with a request from a film location company to digitise an historic site. In this instance, partnership with the governing body would ensure a fair exchange for both parties.

In any event establishing the 'soft', 'hard' and third party value associated with selection and access needs to be gauged. This might vary depending on the 'brand value' of the

organisations involved. Larger organisations might have internal marketing systems in place that could provide this, for others it would be a matter of calculating how much of the day-to-day activity is consumed.

3.1.2 Assessment and interpretation

Understanding the context and content of what is to be surveyed and modelled is a significant task that should inform many stages of the modelling process.

As stewards of sites and collections, heritage organisations are charged with maintenance and monitoring. This activity might form part of the 'soft' category of costs.

The technical jobs of digitisation and post-processing will require consultation with third party service providers.

3.1.3 Acquisition

Once the active process of acquisition is reached costs are more apparent and easily tracked.

The action of acquiring raw digital data could range from terrestrial laser scans to gathering crowd sourced images. Acquisition can be costly and while project specific formats may be cheaper, these often have limited range and could potentially exclude additional future revenue opportunities. Acquisition for the widest possible use naturally maximises future prospects. The negotiation of licensing fees in exchange for digitisation would be an affordable way to limit risk for both parties.

3.1.4 Processing

Data will often require 'developing' in order to make it useful to a wider audience. In many cases those acquiring the data will also process the information. Where this is not the case, or where future licensees require access to raw data, maintaining suitable rights is very important.

Creative Commons licensing can be utilised to provide non-commercial usage to educational bodies, boosting public awareness without compromising commercial opportunities.

3.1.5 Post-processing

Post-processing is the manipulation of the 'developed' data for specific use such as digital publications, visualisation and site management. Like processing, the task of post-processing can be supplied by non-commercial partnerships. It can also be a re-usable resource. If the initial acquisition has a broad enough scope then the data can be re-purposed for a variety of outputs. Maximising the usefulness of digital raw materials is important step in future proofing content and gaining the maximum return.

3.1.6 Cost Benefit Analysis

Depending on the desired outcome of a project the primary drivers could be a soft return, enhanced social profile, or hard revenue generating through licensing and sales. Ultimately, digitisation could be profitable in each category, with increased public awareness of the subject, costs to the heritage organisation balanced either through grant funding or sales revenue, and the private creative industries rewarded in their efforts.

3.1.7 Sample Project – Skara Brae

CMC working in partnership with Historic Scotland undertook to develop the digital archive relating to the neolithic site of Skara Brae. A breakdown of each of the five sections follows with a brief note of explanation. The project incorporated data from Historic Scotland's own archives, the archive at the Royal Commission on the Ancient and Historical Monuments of Scotland (RCHAMS), the Scottish 10 project and CMC's own collection of materials.

1. Selection.

Internal 'Soft' Expenditure: 70%



Internal 'Hard' Expenditure: 25%

3rd Party: 5%

Notes: Skara Brae is an iconic and well documented site, the majority of effort in the selection process would be drawn from existing works.

2. Assessment.

Internal 'Soft' Expenditure: 20%

Internal 'Hard' Expenditure: 70%

3rd Party: 10%

Notes: A survey of the existing digital content needed to be carried out, as this would not normally be part of the day-to-day activities additional budget would be required. External professional advice was also secured at this stage.

3. Acquisition.

Internal 'Soft' Expenditure: 10%

Internal 'Hard' Expenditure: 20%

3rd Party: 70%

Notes: Acquisition of the 3D laser scan data required the most effort. This was secured through partnership with Scottish 10 who granted a non-commercial license to CMC. Additional costs were incurred digitising original hard copies of archive materials.

4. Processing.

Internal 'Soft' Expenditure: 20%

Internal 'Hard' Expenditure: 10%



3rd Party: 70%

Notes: CMC incurred the majority of the costs relating to the processing of the data.

5. Post-processing.

Internal 'Soft' Expenditure: 10%

Internal 'Hard' Expenditure: 0%

3rd Party: 90%

Notes: CMC occupied the lead role in preparing the digital materials, all of the 3D content required extensive development.

Cost Benefit Analysis

Internal 'Soft' Benefit: 80%

Internal 'Hard' Benefit: 5%

3rd Party: 15%

Notes: The projects greatest benefit will be the gathering and cohesive cataloguing of all the Skara Brae related materials. Development of a demonstrator application showcasing the benefits of such a scheme highlighted these benefits and aims to secure additional funding. Further commercial development of the assets into a full educational package or visitor attraction would significantly raise the potential for revenue generation.

3.2 Towards sustainability

Integral to future development of the 3D assets of heritage sites and artefacts is providing appropriate development rights for post-processing by third parties. Incentivising access with suitable licensing agreements would generate cost effective acquisition of source data.

Breakdown of Effort by Activity	CETI	CAAI	CNR	DISC	FBK	CMC
Selection	2%	0%	3%	0%	2%	1%
Assessment, Acquisition Planning	9%	2%	10%	8%	5%	3%
Acquisition, Imaging	15%	32%	10%	21%	12%	8%
Data Processing	55%	32%	43%	14%	27%	28%
Post-processing, Optimisation	5%	33%	17%	48%	46%	55%
Metadata Management	14%	1%	17%	9%	8%	5%

As shown in the above examples processing and post-processing of the data carry the greatest cost burden. These are essential tasks in preparing content for user consumption. Traditionally this risk is carried by SME's when licensing images, but with the higher costs associated with 3D, few publishers can afford such risk without suitable agreements in place.

This is not just about 3D-ICONS, though it will need to be covered here too. It is about ensuring that the diverse range of added value activity that can take place with sets of 3D data are in the best possible position to take place.

With few exceptions, heritage organisations lack the funds to fully develop a wide range of digital assets. It is, therefore, essential to establish robust access and license agreements that protect the cultural interests of organisations and finance their digitisation with minimal state support. Adopting inclusive methodologies with respect to metadata and sharing the existence of digital materials with Europeana provides for a wider audience and could potentially attract future revenue opportunities.

There is a need to future-proof content through the use of non-proprietary file formats and, where possible, follow industry standards in the storage and processing of primary data. The keys to a sustainable programme of digitisation and on-going post processing are therefore:

1. reduction of hard costs through effective management
2. maximising re-usability through best practice
3. beneficial licensing of content

Part 4: Models of Best Practice

4.1 Current best practice

The 3D-ICONS best practice methodology is the shared work practice of all the 3D-ICONS partners. It is being used to document over 160 European monuments and produce over 3000 3D models for dissemination through Europeana. As each of the partners overcome their own challenges, their processes are amalgamated into the general practice. Important common impediments have been addressed such as the complexity of rights management and the technical challenges relating to visualisation.

The following examples highlight the diverse nature of the projects within 3D-ICONS and illustrate the potential for diversity in the market place.

Example 1: Skara Brae – CMC and Historic Scotland

Historic Scotland scanned the Neolithic site of Skara Brae as part of a larger digitisation project, prior to involvement in 3D-ICONS. The scope of the original project related solely to the acquisition of the primary data. Within 3D-ICONS, CMC negotiated for access to not only the scan data but also significant amounts of other digital content including contemporary and archive photography. By processing the materials into a more user accessible format and publishing the results on Europeana, CMC are exploring the 'ready for market' process, in particular the development of end user applications.

Example 2: The Paestum Project – FBK and the University of Salerno

Working with the University of Salerno, the Bruno Kessler Foundation (FBK) is digitising the classical ruins of the city of Paestum in Italy. To facilitate such an ambitious project, they have developed a multi-disciplinary educational experience that operates via an annual summer school project. Involving all aspects of heritage and tourism such as conservation, archaeology, digitisation and visualisation, the project provides invaluable training and produces high quality 3D materials under a creative commons licence.

The first example highlights the opportunities that could be opened for SME's by the implementation of suitable licensing structures. Awareness of and access to high quality digital media could provide the impetus for the creative industries to engage with the cultural sector. The second example demonstrates creative management of cultural sites through partnerships with academic institutions and private enterprise. The result is a

significant benefit in terms of social awareness, enhanced education and the affordable digital preservation of an ancient city.

4.1.1 Volume of Data

One important element provided for within the 3D-ICONS business model is its ability to cope with significant volumes of data. Channelling content from multiple partners and tracking the progress of each step was orchestrated by online management tools. This emphasised the importance of efficient content management systems that accurately reflect the aims of the project. The table below displays the number of objects digitised and subsequently processed in each semester of the project.

Semester*	# Objects	# Models
1	712	121
2	106	237
3	375	428
4	580	655
5	698	555
6	251	695

*Source: Orpheus Project management tool.

4.1.2 Rights Issues

Recommending the use of Creative Commons as a license structure by which project partners could release their content greatly simplified the initial contacts stage for many in the project. Out of the fourteen creative partners, nine have opted for the Creative Commons set of licenses. Of the other five, although pre-existing restrictive licenses were already in place, the materials were released to Europeana utilising the Paid Access rights statement. The 3D-ICONS model has been instrumental in ensuring that each partner has established clear rights statements and that the potential for commercialisation exists for much of the content.

4.1.3 Metadata


3D material is a content rich resource that draws from a wide range of source materials and produces a complex family of derivatives. Quality metadata is essential in order to provide public access to this material in an intelligent fashion.

The importance of correct metadata structures has been subject to extensive project-wide discussions. 3D-ICONS is looking to produce over 10,000 metadata records that describe 3D objects and their supporting images.


3D-ICONS also expanded on the CARARE Metadata schema and developed CARARE2 to specifically meet the needs of the 3D ICONS project by enabling information to be captured about the provenance of 3D objects. In addition to the simplification of many of the records the main changes are:

- The scope of the Heritage Asset has been broadened to include printed materials, archives and born-digital objects relating to the archaeological and architectural heritage.
- Digital Resource has been simplified to focus on the type, format and location of the online resource.
- Heritage Asset becomes mandatory; there must be at least one in each CARARE object. It remains mandatory to include at least one digital resource in each CARARE object.
- The rights statements have been simplified and metadata rights clarified.
- Provenance has been added to Heritage Asset.
- Elements for types of relations from heritage assets, digital resources and activities have been specified for clarity.

Working within the CARARE2 framework, 3D-ICONS has developed a compliant web-based tool for the efficient entry of metadata records to Europeana. An automatic validation tool was included and ensured that only complete records were submitted for ingestion each month.



[Home](#)
[Classes](#)
[Publication Console](#)
[Settings](#)
[Logout](#)



Digital Resource

- Record Information
- Actors
- Relations

Id:

****Appellation Name:**

lang: ↕

pref: ↕

***Link:**

****Object:**

***Is Shown At:**

***Description:**

lang: ↕

pref: ↕

***Type:** ↕

***Format:**

lang: ↕

Language:

lang: ↕

****Copyright Credit Line:**

lang: ↕

****Europeana Rights:** ↕

Access Rights:

lang: ↕

Image: Screenshot of the 3D-ICONS metadata entry tool.

4.1.4 Accessible Digital Storage

Another potential issue for many aggregators of 3D data is the requirement for long-term storage. Rather than just a server to host GB's of data, useful storage must also be supported by a searchable front end. 3D-ICONS established an online repository to meet

the needs of its partners. The 3D-ICONS Portal has mapped the necessary metadata elements to the Europeana EDM and includes additional paradata fields, which can cover the processes and equipment used to create the 3D model and related digital content. The portal allows users to supply content to Europeana without the additional burden of building and maintaining their own on-line repository.

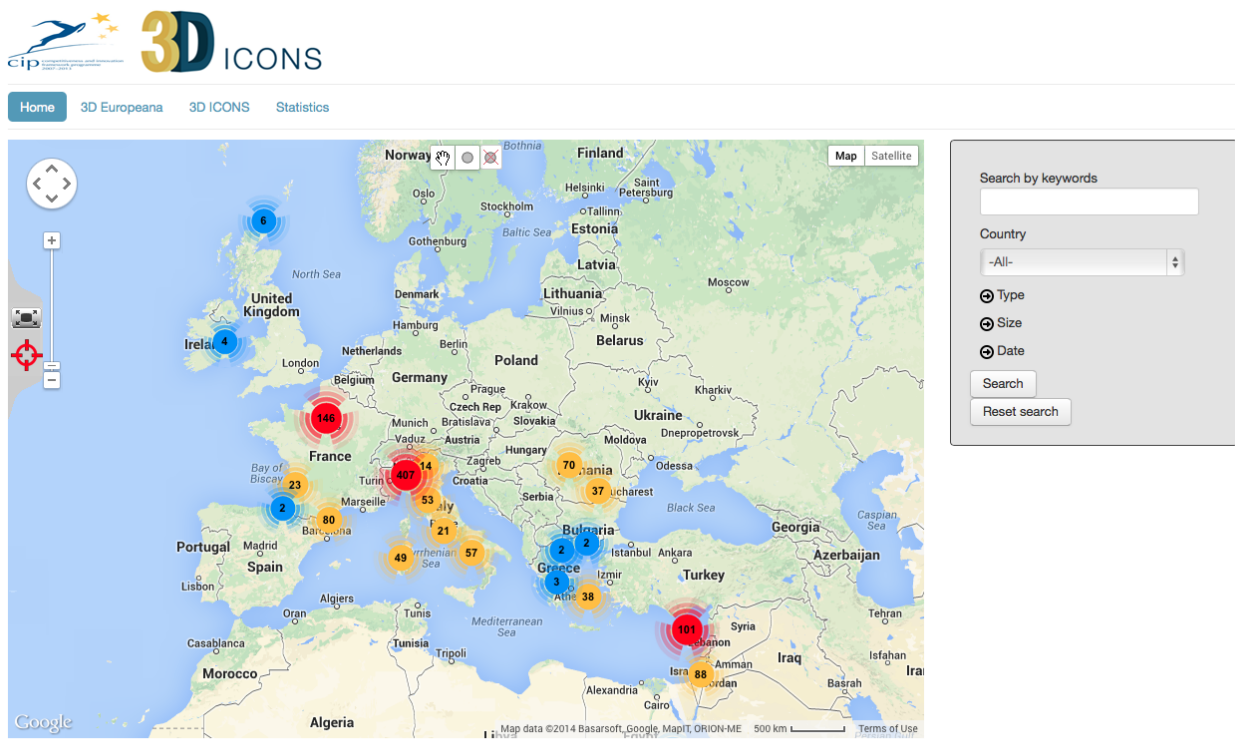


Image: Screenshot of the 3D-ICONS Portal

3D-ICONS portal: <http://3dicons.ceti.gr>

4.2 Future best practice

The implementation of industry compliant standards for the acquisition and storage of digital content would provide a valuable benchmark for heritage organisations to assess the value of their data. It would also widen their potential markets and open opportunities in the commercial sector.

The publication of recommended intellectual property guidelines for heritage organisations and for creative industries would encourage fair commercialisation of the digital assets and attract funding from the private sector. The digitisation of privately owned, historically significant buildings could also be included through appropriate non-commercial licensing for the heritage sector. Local councils who permit commercial surveying could offer more favourable terms for industries that partake of approved licensing structures.

Fair non-restrictive copyright should be an aid to the stimulation of the growth between the creative industries and the heritage sector. It would incentivise SME's to engage with heritage organisations, thereby reducing the cost of acquisition, and provide affordable digital content for the wider community.

Finally, portals such as Europeana would encourage new projects to consider their activity in the wider context. Their data could contribute to the overall wealth of European cultural heritage and simultaneously attract new revenue opportunities. Working to an EU standard would not only future proof the results for the next generation but would also create a commercially viable library of digital materials.

Part 5: European Legal Context

5.1 Introduction

The European legal system is notoriously complex with a plethora of distinct national and local regulations and practices, as indicated previous sections of this report and as set out in D7.2. However, there is increasing Europe-wide harmonisation driven by European Union Directives from Brussels which stands to be implemented at the national level. Relevant examples of these are listed in D7.2 including the long-standing Database Directive.

This report focuses attention first on the 2013 EU Directive which is aimed directly at public sector information resources in libraries, museums and archives, and in which the specific mention of Europeana indicates its importance in the eyes of Brussels & Strasbourg. Second, three selected new projects are reviewed with potential for improving the opportunities for economic growth and job creation; their prospects could be enhanced by the results of 3D-ICONS. Third, the general global scene and EU Political, Media & Public Opinion roles indicate the broader context. Fourth, projected EU Legislation trends and scenarios over a five year horizon illustrate the inherent levels of uncertainty, and a final section provides conclusions.

5.2 New EU Legislation for Digital Cultural Content

Of especial importance is the very recent Directive of 26 June 2013, Directive 2013/37/EU (of the European Parliament and of the Council) amending that of ten years previously, Directive 2003/98/EC on the re-use of public sector information. The key relevant aspects are summarised as follows:

- It extends the scope of the previous Directive to include 'libraries, including university libraries, museums and archives' [Article 18].
- The new Directive took force as of mid-July 2013. All member states are required to implement it by 15 July 2015. [Article 2 amendment]. It will be reviewed in 2018.
- Recognising the 'huge potential' of 'digital public domain material' in 'sectors such as learning and tourism' the Directive has as a key aim the 'creation of conditions conducive to the development of Union-wide services' (i.e. 'cross-border'). Moreover, 'wider possibilities' are indicated for 'Union companies to exploit its (i.e.

cultural heritage material information resources including metadata) potential and contribute to economic growth and job creation'. [Article 15]. Furthermore, Article 18 specifically mentions 'mobile products'. Article 19 again emphasizes 'job creation and growth'.

- Article 33 is especially relevant and significant and so is cited in full: ' Since the objectives of this Directive, namely to facilitate the creation of Union-wide information products and services based on public sector documents, to ensure the effective cross-border use of public sector documents on the one hand by private companies, particularly by small and medium-sized enterprises, for added-value information products and services, and on the other hand by citizens to facilitate the free circulation of information and communication.'
- Europeana's importance is emphasized in Article 19 as is the twice repeated reference to 'online accessibility of cultural material and digital preservation' citing the European Parliament's resolution of 5 May 2010, the Commission Recommendation [2017111/EU] and the [European] Council's Conclusions of 10 May 2012. Citing the three pinnacles of European Union authority of Parliament, Commission and Council this Article indicates the political commitment and reinforces this aspect with 'These documents define the way forward for dealing with the legal, financial and organisational aspects of digitising Europe's cultural heritage and bringing it online'.
- Especially significant including reference to IPR issues is Article 19, which has a notable exclusion: 'Other types of cultural establishments (such as orchestras, operas, ballets and theatres), including the archives that are part of those establishments, should remain outside the scope because of their 'performing arts' specificity. Since almost all of their material is covered by third- party intellectual property rights and would therefore remain outside the scope of that Directive, including them within the scope would have little effect'. Interestingly, Cinema & TV are not mentioned specifically, nor are the 'Creative & Cultural industries' although there is mention of SMEs.
- Considerable attention is paid in the amended Directive to pricing/charging issues by museums, archives and libraries as well as pre-existing corresponding public private partnerships and the need for appropriate transition period measures noting again differing conditions in the various EU countries. [Articles 22 – 26].

This new Directive thus represents a major effort to capitalize in socio-economic terms (including job creation) on the potential of public cultural assets in ‘education, work and leisure’ [Article 19] with regard to the ‘Single Market’, thus justifying European Union level action. In particular it tries to address challenges and opportunities involved in the development of derivative products and services for both not-for-profit and for profit purposes while still respecting the rights of the respective cultural heritage institutions.

Its implications are potentially very significant, including added value work and high value new recording in 2D and 3D by and with Creative Industries which will, however, involve significant investment and operational costs of creation with new IPR for derivative products and services. As soon as Creative Industries are involved then corresponding new IPR and monetary value thus created will need to be tracked – perhaps often non-exclusively licensed to the heritage organisation, and even sometimes wholly assigned to the heritage organisation. Resulting profits should be shared (ideally ‘equitably’), perhaps in an analogous manner with the Database Directive. However, the Directive notes that there are substantial differences in corresponding Legal & IPR Practices & Trends between member states.

5.3 Key Relevant European Projects

Europeana has already been emphasized in the preceding sections of this report. The important Europeana Strategy 2015 -2020 Impact report¹ makes no specific mention of legal aspects or IPR. However, Licensing facilitation is mentioned, referred to implicitly.

5.3.1 Europeana & Europeana Space

Rather than discuss the general Europeana thrusts here, we focus on the new EU Best Practice Network, EUROPEANA SPACE led by Sarah Watley & Tim Hammerton of Coventry University (COVUNI) assisted by the Italian **Technical Coordinator, Promoter srl.**, Antonella Fresca. This project on 'Spaces of possibility for the creative re-use of digital cultural content' has very promising pragmatic aims and approach which are squarely centred on the EU priorities of economic growth and job creation.

EUROPEANA SPACE will explore six selected Creative Industries sub-sectors: **TV, Photography, Dance, Games, Open and Hybrid Publishing, Museums**. As stated on the project web site, the pilot projects will be a means to explore different scenarios for the re-use of digital cultural content, with a special focus on the re-use of the content accessible via Europeana. The project is well described in its web-site so here we will just

¹ Europeana Strategy Impact Report. Some selected extracts. 'The fourth group that can benefit from Europeana is the large and diverse set of industries commonly referred to as the creative industries: publishers who make books on arts, culture, heritage or travelling guides, journalists looking for historic information, artists and designers doing their research, and game or app developers who can benefit from the accessibility of content and metadata.' [Page 8]

'Market failures prevent private companies and individuals from materialising potential welfare gains. There are a number of reasons as to why private incentives fall short of achieving the socially desirable investments in (linking and disclosing) databases -- cultural heritage. Europeana works in this regard because: Europeana reduces transaction costs (costs of uncovering or finding heritage and cultural information and possibly of licensing content to third parties). This creates spill - over effects for creative industries, app developers, consumers, creative industries and scholars using/looking for heritage content. Benefits accrue for numerous users, while due to transaction costs that may be high compared to individual benefit, these users or beneficiaries cannot (always) be charged and will not reach coordination in their investment decisions.' [Page 9] Cost-benefits from Europeana for the Creative Industries sector are indicated [See Figures 4 & 5] but do not appear to have been assessed in detail. Even in the early 2014 EC – organized Creative Industries Workshop legal and IPR aspects were not considered in depth.

emphasise one aspect of its plan which is of particular relevance to 3D-ICONS and necessarily should include attention to Legal and IPR issues:

‘Monetizing Workshops: 6 monetizing workshops will be organized in London in the period between April 2016 – September 2016’.

The first EUROPEANA SPACE Conference in Venice in October 2014 should provide an excellent opportunity for 3D-ICONS to participate and benefit regarding its own exploitation planning and post-project follow-through.

5.3.2 CRe-AM

Another highly relevant new EU project is CRe-AM (<http://www.cre-am.eu/>) led by Brunel University, London. CRe-AM, Creativity Research Adaptive roadMap, like EUROPEANA SPACE, is also focused on the Creative industries, but as its full title indicates aims to develop specific sub-sector Roadmaps over the course of its two years duration from October 2013 to September, 2015. It has selected seven Creative Industries areas for specific attention, art, videogames, music, e-publishing, design, architecture and new media. There are clear opportunities for synergy with EUROPEANA SPACE especially regarding the latter’s overlapping interest in ‘**Games, Open and Hybrid Publishing, Museums**’ as is presumably a part of the EU strategy.

CRe-AM, Creativity Research Adaptive roadMap, has already been very active in forming a large network – initially over 200, including some 3D-ICONS partners - and in developing an appropriate methodology, including Futures Forecasting. The methodology has been already piloted in a number of workshops, including recently at the 25th Anniversary of the EVA London Conference in July 2014 at the British Computer Society office in Covent Garden, London, as well as now on-line. The project web-site provides considerable further information.

It is useful to compare the areas selected by these two projects with the more complete one publicised by UNESCO (and others) and used for example in Germany²:

2 http://www.unesco.de/fileadmin/medien/Dokumente/Bibliothek/culture_and_creative_industries.pdf [Page 17 ~ 2004 Give full ref inf]
http://www.unesco.de/fileadmin/medien/Dokumente/Bibliothek/culture_and_creative_industries.pdf See also:
<http://www.kulturwirtschaft.de/wp-content/uploads/2013/06/DE-CCI2011-shortversion.pdf> for the 11 Sectors from Page 2, Figure 1.

- 1 Music Industry
- 2 Book Market
- 3 Art Market
- 4 Film Industry
- 5 Broadcasting Industry
- 6 Performing Arts Market
- 7 Architectural Market
- 8 Design Industry
- 9 Press Market
- 10 Advertising
- 11 Software & Games
- 12 'Other' including Libraries, Museums & Archives

The Architecture Sector appears to be a promising target for post-project 3D-ICONS follow-on developments. Notably, the interesting Singapore model not only has enriched the international development of ideas but also indicated how the Rise of the Far East is developing with its telling emphasis on 'Copyright Industries'³.

5.3.3 Inter-regional 'eCulture Cloud' Initiative

Cloud Technologies are a key topic in Horizon 2020 and there are already a number of R & D projects on 'Cultural Heritage Clouds'. We consider here one relevant new additional inter-regional approach led from Germany which has an ambitious government national 2020 Digital Strategy Plan containing 'eCulture' as one of its seven main pillars. The inclusion of this pillar has been largely due to the efforts of the Hamburg City/Land Ministry of Culture which had already produced its own 'eCulture Strategy' towards 2020.

3 http://portal.unesco.org/culture/en/files/29669/11370847883MICA_-_Economic_Contribution_Singapore_2003.pdf/MICA%2B-%2BEconomic%2BContribution%2BSingapore%2B2003.pdf

Multimedia Legal aspects have been a key area for Hamburg. One of Hamburg's current priorities is 'eCulture Cloud' in partnership with Florence and London with inter-regional aims and scope at both German and European levels. This topic was the subject of a well-attended and productive workshop at the annual EVA Florence Conference in May 2014. This issue was then also selected as one of the key topics for working group sessions at the July 2014 Summer School for Senior German Executives held in London at Ravensbourne & Birkbeck, University of London. The Europeana Deputy Director & Business Development Director, Harry Verwayen, attended as a special guest.

This Hamburg/London/Florence work is expected to lead to the core of a Consortium proposal for EC funding, including Social Media, but in any case the three current partners wish to continue in this direction and other cities appear interested. Of note is that two of the Florence and London institutions involved had an interest in 3D COFORM and a third, Ravensbourne, is especially strong in 3D Cinema, a special session on this being held at the eCulture July 2014 Summer School in London.

5.4 Global considerations and emerging new IPR-relevant legislation vis-a-vis corresponding political, media & public opinion factors across Europe

The international political scene appears fraught with dangers, from on-going conflict in the Middle East and the possibility of a new Cold War emanating from the Ukraine to the uneasy situation in the Far East. However, there are positive forces such as UNESCO efforts led by Florence activists to mount a renewed campaign focused on Ethics, with direct relevance for IPR and digital cultural heritage systems in the 3D image area as well as 2D. This is specifically relevant to 3D-ICONS with its focus on UNESCO World Heritage sites.

Another powerful force is the increasing Convergence of the Media Sector as technology continues to sweep forward. Although Murdoch's \$80 billion bid for Time Warner has failed, it will doubtless not be the last such attempt to combine 'Content' with 'Distribution' and the ever rising dominance of Amazon, Google, Netflix, BuzzFeed etc. The position is worrying European Policy makers, as evinced at the July 2014 Council of Europe Conference⁴ in Bakhu, Azerbaijan, which included discussion of Europe's Public Service Broadcasters including even the BBC, the latter still embarrassed by the failure of its £100 million Digital 4⁴Confidential reports from a participant.

Media Initiative [DMI] ending with its lead supplier, Siemens, paying a £20 million penalty. Nonetheless, the BBC and, increasingly it is expected, other European Public Service Broadcasters, are pressing on with ever-higher levels of public engagement – ‘Prosumers’. Intense interest in 3D may have waned as regards TV, as recognized at the major international 3D Summit held in March 2014 in London, but Cinema 3D is still strong and 3D Printing continues to rise with interesting prospects for 3D-ICONS but with serious potential legal and IPR issues and difficulties in abundance.

As noted in section 5.1, Directive 2013/37/EU sensibly avoids the dangerous waters of copyright law problems, as for example in the Performing Arts area, by just focusing on re-use of public sector information in Libraries, Museums & Archives. However, even this is not anticipated to be a trivial exercise as signalled by EUROPEANA SPACE’s decision to leave ‘Monetizing Workshops’ until 2016.

The July 2014 televised UK debate in the House of Lords, while cognisant of EU developments, included considerations of the need to push ahead with challenges and opportunities for both economic growth and new jobs posed by new technologies such as the Cloud and the threats to privacy, security and the need for assistance to Creative SMEs. In addition to the evident issues regarding differing EU/national situations there are also grounds for concern as regards the differing national/regional hierarchies of laws and regulations EU-wide. Similar considerations may be expected at the Hamburg City/Land level and doubtless elsewhere across the EU.

As regards IPR & relevant Legal trends it appears that the frequent ‘See-Saw’ or Cyclic effect is moving to another ‘swing’ in which ‘User-Creators’ may well have the upper voice compared with Industry, quite different from the scene some 20 years ago when major EC projects such as IMPRIMATUR were engaged in the struggle. This swing is affected by the new technologies themselves in Social Media such as Facebook, Twitter and Blogging which have proved influential in such wider political developments as in the Arab Spring and may be expected to raise the momentum for increasing ‘prosumer/citizen producer/creator rights’.

5.5 Short to Mid-Range EU IPR & Legal Trends & Scenarios

The general trend as of mid-2014 for the next few years appears likely to be characterized not only by increasing ‘top-down’ pressure from the EU Commission, Council and Parliament on national governments regarding Directive 2013/37/EU implementation, but

also by 'bottom up' citizen and micro-SME entrepreneurial demand. The latter not only legally facilitated 'access' to the rich European heritage assets via Europeana and other channels but also for their creative usage including for business development and job creation, ideally with world markets. IPR/Copyright issues will become increasingly important as the perceived opportunities for corresponding commerce and profits become more attractive.

Three EU IPR/Legal scenarios for the next five years are presented below as a discussion framework for 3D-ICONS:

Scenario 1 – Optimistic: Directive 2013/37/EU is rapidly implemented across most of the EU and leads to substantial unlocking of entrepreneurial dynamism for socio-economic and cultural benefits with thousands of firms and tens of thousands of new high value jobs by 2019. In addition there are positive knock-on effects in related areas in which copyright is crucial to protect creative rights with even greater impact. The major US companies do not succeed in capturing the lion's share of these new markets. Widespread use of 3D is facilitated by new 'glasses-free' technologies.

An optimistic use case scenario might be that 'Prosumer' children and schools crowd resource 'Lego-type' 3D printable 'units' of Edinburgh's World Heritage Centre for unit printing, assembly and educational use anywhere in the world by 2017 using 3D-ICONS technology and IPR processes etc. transferred from 3D-ICONS. Lego itself benefits from the increased demand for the wider market appeal for the 'authentic' products especially in the BRICS and MINT countries and notably in the booming 2018/2019 Africa and does not invoke copyright laws.

Scenario 2 - Pessimistic: There are widespread difficulties in getting productive take-up of Directive 2013/37/EU across the EU in this time-frame due to protectionist 'Special Case' reasons in many countries. There are similar problems for copyright intensive areas such as in the Performing Arts except for the well-resourced international majors. Few jobs are created. 3D even in cinema starts to tail off in 2015 and the next general 'upswing' only begins in 2019.

Scenario 3 - Intermediate: Somewhere between these two 'extremes'.

5.6 Conclusions

The European legal framework for regulating technology is undergoing dramatic shifts as law-makers in the legislative and executive arms of governments at EU, national and even 'local' (e.g. German Länder) levels are becoming increasingly 'techno-savvy', as exemplified by the EU 2013/37 Directive and parliamentary debate on such new technologies as the Cloud. Media coverage and an ever-rising technophile creative public, including artists and 'prosumers', reinforces this trend. The implications for more 'IPR freedom' are significant. However, whether a single initiative will be enough to reverse the old adage of 'Law (Regulations) follow well behind Technology', with powerful international technology-based giants driving advances, is still open to debate.

In particular for the subject matter of 3D-ICONS, pragmatic advances in the corresponding 3D IPR-Pipeline processes need to be reinforced by additional efforts, including improved copyright protection by 3D electronic watermarking according to some experts in the field. The debate will doubtless continue but further government measures and schemes can be expected including ones to assist in the struggles to improve European capabilities versus the global giants in the Searching/Finding/Uncovering/Accessing field for new high value derivative products and services (resulting EU 2013/37 Directive and further measures) from across a widening set of increasingly converging media as technology drives forward.

Encouragingly, there are positive examples by leading museums such as the Netherlands Rijksmuseum. However, the current⁵ furore regarding the London National Gallery's non-King Canute decision to bow to the inevitable ubiquitous role of mobiles by allowing 'selfies' by the general public including shots of masterpieces by Rembrandt, Van Gogh and others, indicates the passions which are aroused by the 'desecration' of cultural temples.

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⁵ Guardian, August 16, page 7.