Milestone 18 Sustainability and Exploitation Plan

Version 0.1

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Executive Summary

This document provides a report of the business planning and the sustainability strategy for the the Saint George on a Bike (SGoaB) project as a competence hub for improving the quality and quantity of open metadata associated with imagery from European cultural heritage. It especially aims to address the challenge of providing Artificial Intelligence with insights into culture, symbols and traditions.

In the first section, we describe the main mission, vision and objectives from the project SGoaB and its focus on embedding culture in Artificial Intelligence and make culture and history more accessible to people.

In the second section, we collect important information from Action 10.1 and Action 10.2 regarding the target market, market analysis and stakeholders. Additionally, Action 10.1 is referred to the development of a business plan, whereas it has been necessary to analyse different business models according to the outcomes of the project. Those confirm the future need to focus on the deployment of this Culture based approach, combined with HPC (high-performance computing) and give us a first orientation to develop a feasible exploitation plan and to face our future business approach.

In the third section, we describe the IPR analysis, collect potential exploitation results, exploitable assets and exploitation plans from the individual partners. We also summarise the information about the exploitable assets that could be used for the enhanced services portfolio and the business model with respect to the services offering. According to the exploitation plan, we then start to define the exploitation plan of the SGoaB project, which form part of the business model.

In the fourth section, we develop the first business model canvas plan in accordance with the initial information about the market assessment, exploitation results, and planned and existing IP from the individual partners.

In the fifth section, we present the vision and plan for the services portfolio, product management and the sustainability of the project, which will be mainly developed beyond the end of the project.

1. Mission, Vision and Strategic Objectives

SGoaB is a European CEF for Cultural Applications. It is an opportunity to provide a high-performance (cultural heritage) metadata enrichment capability for the European Data Infrastructure. The service we propose focuses on images and the generation of detailed descriptions of their content. An image captures many aspects of a scene at once, not only what one may have thought of describing in words, but also what everyone else, in different places, times, and contexts, may see in it. Images are rich in content and significance, but they either lack metadata or, if they have it, it is usually not much more than a caption rather than a full description of what´s going on in the image. The existence of a good description will enable visually impaired people to better understand website content, and will make it possible to search for images based on concepts that appear in the image but not in the image caption (for instance, representations of pets in the 15th century art).

These technologies will be made available to European culture-based companies so that they can maintain and develop their competitiveness. This CEF would like to bring together, in the form of a technical community, different players such as developers, academics and scientists, ISVs, scalability experts and consultants, and technology providers. SGoaB will offer technical support to meet the challenges of the different needs of these partners but may also develop complementary solutions together to meet the needs of industrial markets.

2. Market Analysis

According to the "Creative economy report 2008" of United Nations, in Europe, the creative economy generated a turnover of 654 billion euros in 2003, increasing 12 per cent faster than the overall economy and employing about 4.7 milli on people. In addition, the sector plays a crucial role in fostering innovation, in particular for devices and networks. The EU records the second highest TV viewing figures globally, producing more films than any other region in the world.

It is estimated that cultural tourism accounts for 40% of all European tourism; 4 out of 10 tourists choose their destination based on its cultural offering (ref: http://ec.europa.eu/growth/sectors/tourism/offer/cultural_en).

Europe is the world's biggest source and destination market in international tourism. Eurostat forecasts that, according to recent estimates, in 2015 there were 2.8 billion overnight stays.The impact of digitalization and new trends, such as Artificial Intelligence, in the sectors is still to be fully understood.

2.1. Service positioning and Stakeholder Engagement Strategy

This section presents the outcome of a first effort of identifying relevant end-users and use cases for the work of the project. Note that in the contexts of a large data aggregator like Europeana, or of scientific infrastructures like EUDAT, the actors involved in a use case may not be necessarily the "end user" chiefly targeted by the part of the services that is more visible to the general public. For example, Europeana intends to deliver value to a range of Cultural Heritage actors that work for Cultural Heritage Institutions and related projects. Needless to say, the goals of these actors will be eventually to serve an audience of "end users" in the more intuitive sense. However, the best way to serve these goals may not be easy to identify at the level of a back-end service like the one developed by Saint George on a Bike, if just because one "back-end use case" may serve several "end user use cases" or even other back-end use case, as when a search service is provided as part of an API that will be used by applications not yet designed.

In this section two use cases stand out. The first is enriching Europeana collections, as a generic back-end use case where metadata on Europeana images is enriched in order to serve a diversity of applications built on top of metadata, including some other use cases in this section. The second is searching based on enrichments, as it corresponds to a functionality that Saint George on a Bike has been charted to deliver as part of Activity 8 "End user general service definition".

In this section we also include a subsection on rejected use cases, which lists the scenarios that we have envisioned in the earlier stages of our effort but that we decided to drop when realizing they would be too difficult and/or not interesting enough. We include them should they prove interesting ideas for further projects.

According to the Use cases, different stakeholders have been contacted. A short review of the use cases is herein presented.

UC1: General service for enriching collections: This use case provides a general service/technical interface enabling enrichment of cultural heritage datasets. This interface would allow Europeana to integrate this service in its ingestion and enrichment process (use case 3.2). This service could also potentially be used by aggregators and data partners as well as other third parties, independently from the results being ingested in Europeana.
Note that this use case is different from the use case outlined in 3.6 as this is a generic service and not a (customizable) service trained on custom datasets given by users

UC2: Ingesting results from general enrichment service into Europeana: The Europeana collections will be enriched with relevant metadata, which can be used later on to provide a richer browsing and discovery experience to end users on the portal or services built on top of the Europeana APIs.

UC3: Search based on enrichment: SGoaB is set up to implement a search service based on enrichments produced with AI technology. This would make Europeana objects easier to discover based on richer criteria related to image content and potentially higher level concepts recognized in image content (e.g. icons and symbols).

UC4: Populate a crowdsourcing tool with candidate enrichments: SGoaB intends to incentivize crowdsourcing campaigns in which the end users may validate metadata enrichments, either as a purpose in itself or as a means to provide another service. The manager of such a campaign could be a Europeana data officer, a Europeana data provider or Europeana aggregator.

UC5: Upload in data sharing platforms: Enrichments will be uploaded to Europeana collections website as well as the European Commission's European Data Portal. Public administrations could use the rich heritage metadata to generate quality material for the websites, leaflets that promote their regions, improve the advertising and quality of cultural tourism and other cultural activities and fairs. This information can also serve as education material.

UC6: Browsing based on enrichment: In Europeana and other portals, enrichments can be used to support browse functions that allow users to discover relevant content. For example, Europeana entity pages are used to present all items in Europeana collections that are associated with an entity (concept, place, person). On pages for single objects, Europeana and other portals present links to entities that are relevant for the objects. Other links such as "More like this" links may also be featured; they direct users toward objects that are of the same (or related) type, or about the same (or related) topic. Such features can especially exploit linked data networks that relate the entities that are connected to objects.

UC7: Support enhanced accessibility of Europeana content for visually impaired persons: Metadata enrichments generated by the project could be used to improve the web accessibility of the associated images for people with disabilities. Concretely, web portals like Europeana could use the descriptions in the alternate tags of images to make their web pages accessible.

This would be of immediate interest to public administrations and associations. As a matter of fact, the extent and success of this use case depends on achieving some form of collaboration with the Illunion facility service, associated with the ONCE foundation for the blind. We will otherwise not implement this use case during the project, but rather offer the enhanced metadata such that other actors could use it for web accessibility in the future.

UC8: White-label, custom trained enrichment service: The hypothetical application of this use case will depend on a way to indicate that the enrichment is valid for browsing but not necessarily for other use cases (e.g. searching), which could be done with a threshold in the confidence levels.

A user, for example a researcher or a data operator from a cultural heritage institution, performs her own training (or transfer learning) using her own datasets, to produce a "tuned" version of the service that will perform better for her own needs.

This can allow for fine-grained learning, and to lift some rights issues (as the tuned enrichment service could be confined within a user's context).

This would require more work in terms of setting the service and instances thereof, but would bring a clear value in terms of HPC. Users interested in applying SGoaB technology to visual data from another domain may indeed do so efficiently, since our service will be implemented using high-performance technologies (though not offering real-time enrichment).

Rejected use cases:

        a. A data partner can contribute their training data to the "general" enrichment service

b. Similarity-based search for images, based on some fingerprints

c. Enrichment by end-user: User uploads one cultural heritage object (either an image or an image with metadata) and gets a description of its content.

d. Employ cultural heritage images and enrichments in captcha for crowdsourcing.

2.2.   Target groups based on SGoaB use cases

As an initial identification of potential users of our services, we have organized them in different targets. By doing this approach different exploitation strategies can be further elaborated.

Table 1: Target groups

Sector
Research institutions particularly those interested in the European cultural heritage, history, and anthropology
Cultural and creative industries advertising, architecture, arts, crafts, design, fashion, film, performing arts, publishing, etc
Cultural tourism
Private cultural institutions such as museus
Public and private educational institutions
Public administration bodies interested in preserving the European cultural heritage
The citizens
Pan-european policy makers

The project has also explored the interest of other target groups, such as for instance public administrations, foundations, or other organizations with social ends, interested in improving services such as web accessibility for the disabled (e.g. Illunion S.L.)

2.3.   Interaction with potential stakeholders and end-users

The identification of potential stakeholders should establish the basis to cover the whole service value chain. HPC providers, Culture-based companies, Academia, EU Projects, Cultural communities, etc. have already been engaged, covering different needs at different TRL requirements.

In this section, an explanation of each stakeholder is presented as well its own interests in the Use Cases. Based on this interest, many discussions have begun among Use Case leaders and potential stakeholders, allowing SGoaB staff to understand the existence of different needs and requirements.

In the first 12 months of the project, the General Assembly identified an initial panel of institutions that will be contacted during the whole project based on the outcomes of the use cases aiming to provide input to the team on an annual basis.

2.4.   Stakeholder engagement: methodology

The main objectives of the stakeholder engagement procedures are presented in this section: data collecting, main markets assessment from the end-user point of view for the different use cases and provide cultural-based related exploitation strategies (museums, music events, etc.). Moreover, stakeholder's collaboration should provide input - data, reports etc. within target sector. The interaction steps are described next:

1. Project Manager and Exploitation Manager contacts the potential stakeholder.
2. A teleconference is scheduled between the potential stakeholder, the PM and EM, together with Europeana if proceed.
3. A short document describing the use cases is shared with the potential stakeholder.
4. Once the member defines its interests based on the Use Cases (UCs), a survey is shared with the stakeholder to know about the specific technical and exploitation interests, together with its capabilities (business and technical).
5. Once the EM has analyzed the answers, a specific roadmap is defined towards interacting with specific Use Case leaders.
6. Interviews and teleconferences are scheduled between the stakeholder, the Use Case leader, BSC, Europeana (if proceed) and the EM.

Questionnaire provided to all stakeholders

The EM has prepared a common survey to understand the interest and potential added value that a stakeholder can bring to the SGoaB exploitation development (Milestone 18). In that sense, different type of potential end-users interested in different capabilities should provide feedback about the on-going actions, which enriches the feedback that all leaders must consider aiming to develop a successful asset. Thus, the preparation of questionnaires has been oriented to Culture-based institutions, HPC and IA technology providers, ISVs, Academic experts and research code developers, etc. Here the main questions that have been asked to all of them in a first wave are presented:

    i.   Which is your interest in the relation about AI and Cultural Heritage?
    ii.   What is the Minimum Value Product (MVP) for your service? (Please describe the minimum useful outcome from this Use Case that can be employed for your service)
    iii.   What is the current alternative you are using? (Please name a software that is currently used to solve the same case. Please indicate whether there is any limitation that you wish our Project would overcome)
    iv.   What use case/s would be relevant for you? (Please indicate whether there exists a data set that can be used for testing purposes and might have been used to validate an alternative product. Is it freely available?)
    v.   Who is the Expert? (Please indicate whether there is an expert user that is in charge of using the service and/or modifying it. If possible, indicate his/her contact details)
    vi.   What are the typical inputs? (Which type of files, formats, repositories, etc. are used to feed the service)
    vii.   What are the typical outputs? (What is the desired format of the output, or alternatively which software is used for visualization or analysis)
    viii.   What is your current "operational environment"? (e.g., Virtual Access to the service, a dedicated Web Framework)
    ix.   What are the required "standards"? (in terms of formats, delivery time, interfaces, etc.)

x.   Do you have any additional requests? (Please indicate any additional information that you find important or useful)

Table 2: End-users to be contacte from M18 onwards

Num.	Participant organisation name	Status of the interaction	Interest in the outcomes of SGoaB beyond the end of the project
1	Europeana		
2	Museo del Prado	oan has contacted Carlos Chaguaceda (Director de Comunicación del Prado). The first meeting was on 19/03/2021. We are having the coordination meeting on 07/06/2021..	We are in the process of understanding their needs, current approach, and looking for concrete collaborations based on SGoaB outcomes, but also beyond that
3	Museo del Reina Sofía	Joan has contacted Rosa Rodrigo (Directora de Desarrollo Estratégico, Comercial y Públicos). A second interation will be schedule in a near future. https://www.museoreinasofia.es/museo/equipo/rosa-rodrigo-sanz	
4	Creatives Unite: https://creativesunite.eu		
5	Fundació cultural la Caixa	Joan will try to manage to contact them.	
6	Bayreuth Festival (Wagner)		
7	Fundació Gran Teatre del Liceu	Recalled Valentí Oviedo (Director general en Fundació del Gran Teatre del Liceu) (no reply at the moment)	
8	Sonar I+D	Fernando Cucchietti has contact with them.	
9	National Libraries	Quim Moré has contact with them.	
10	Literature editorials		
11	Editors, Magazines		
12	Illunion S.L.(Fundación ONCE)	Joan has a potential focal point.	
13	Primavera Sound	Fernando Cucchietti has contact with them.	

14	Diputación de Granada (art)	Fernando Cucchietti has contact with them.	
15	Other projects: RIS3CAT *Engagement* (UPF, MNAC, Fundació Tàpies, Indissoluble, Mobile Media Content, Eurecat)	Joan can manage to contact them.	
16	MNAC	Cedric Bhihe has contacted Pilar Cuerva. We had a first meeting on 26/05/2021	we are preparing a second one

Table 3: End-users interest in Use Cases

Nº	Participant organisation name	UC1	UC2	UC3	UC4	UC5	UC6	UC7	UC8
1	Europeana	X	X	X	X	X	X		X
2	Museo del Prado								
3	Museo del Reina Sofía								
4	Creatives Unite: https://creativesunite.eu/								
5	Fundació cultural la Caixa								
6	Bayreuth Festival (Wagner)								
7	Fundació Gran Teatre del Liceu								
8	Sonar I+D								
9	National Libraries								
10	Literature editorials							X	
11	Editors, Magazines								
12	Illunion S.L.(Fundación ONCE)								
13	Primavera Sound								
14	Diputación de Granada (art)								

15	Other projects: RIS3CAT *Engagement* (UPF, MNAC, Fundació Tàpies, Indissoluble, Mobile Media Content, Eurecat)									

3. Exploitation Results and Plans

This section collects the potential **exploitation strategy**, including a brief description of the innovation and exploitation SGoaB structure, the knowledge and technology transfer initial overview with regards to industry and Academia, including a discussion about joint exploitation strategy, Use Case (UC) interests, exploitable assets, and exploitation plans from each individual partners. Thereby summarizing the exploitable assets per UC, addressing the expected outcomes, which could be used for the Services Portfolio and to define the plan of the business model with respect to services offering.

3.1.   Exploitation structure

The Barcelona Supercomputing Center (BSC) serves as Coordinator of the SGoaB project. This role is a responsibility shared between the Project Coordinator (PC), i.e. M.C. Marinescu, the Project Manager (PM), i.e. Gabriela Serra, and the Exploitation Manager (EM), i.e. Joan Farnós, or the individuals assigned to these roles during any interim absences from the project.

The Exploitation Manager (EM) has the task to understand and assess innovations and innovators in a project, as well as commercialization opportunities and related strategies. For a given innovation, the EM identifies the best place for the project partner to take it to market and provide advice on fulfilling the innovation potential. The EM is an expert with a clear affinity for identifying market opportunities and overcoming commercialization hurdles.

The key task of the EM is to collect relevant information on potential innovation and innovators by reading project materials and engaging in discussions with partners at the review meeting. This way, and depending on the stage to project (just started, progressed or nearly finished), the EM assesses how well prepared the consortium/innovator is for entering the market and how they intend to anticipate changing market conditions. At the same time, the interaction between the EM and innovators in the consortium is meant to raise their awareness of the issues at hand and to help them develop a more compelling exploitation attitude.

In order to ensure that the results of the project will not remain confined in academia or research labs but will find their route toward the market, a proper innovation management is of paramount importance. The exploitation manager will work closely with the project coordinator and the consortium exploitation team to ensure a proper exploitation path. Innovation management processes include both day-to-day management of knowledge and IPR issues and the iterative creation of exploitation plan and technology roadmaps. More concrete, it will include the following actions:

i.   Monitor IPR compliance with CEF and consortium agreement rules.
ii.   Facilitate any related conflict.
iii.   Facilitate the creation of commercial agreements between partners leading to joint exploitation after the end of the project.
iv.   Monitor the project to guarantee consistency between technical and marketing choices.

  v. Monitor the market during the whole duration of the project, particularly concerning the evolution of the technology, potential customers, and existing and emerging competitors.

  vi. Plan initiatives that combine technical and exploitation objectives to create business models for defining and exploitation path of most relevant innovations within the project.

Finally, the exploitation strategy is divided in different main topics which involve different specific steps:

1. Definition of SGoaB as an asset partner/provider. Collaboration development strategy.
2. Cultural Industry, Public Authorities and Entities Engagement
3. Sustainability strategy.

3.2. Knowledge and technology transfer to industry and scientific community

The Exploitation Strategy is outlined in line with the project progress at M24. This strategy, which is an initial one and will be updated as the project evolves, incorporates on the one hand a preliminary analysis on how to map the market needs and assets offered by SGoaB to partners' characteristics and each asset's exploitation potentials, and on the other hand defines a joint exploitation strategy which also incorporates elements of a future SGoaB business plan that will be finalized by the end of the project. These three main pillars of the project's exploitation strategy will be:

- **Joint exploitation of the project results in the scope of the SGoaB ecosystem**: The SGoaB partners will engage in joint exploitation activities within the project's (business) ecosystem. These activities will include the provision of technical support and services, business support, training and other consulting services to potential customers making use of the project platform and tools.
- **Exploitation of the SGoaB Use Cases**: The Use Cases will act as key business channel promoters to exploit SGoaB, as they will constitute real-world proof of the added value SGoaB can provide, becoming an essential part of the SGoaB business plan.
- **Partners' individual exploitation plans**: SGoaB has enabled BSC and EUROPEANA to strengthen and expand these activities, enhancing their existing products and service portfolios as well as enabling them to acquire greater market shares.
- **Scientific exploitation is of paramount importance to increase the impact of SGoaB outcomes.** This approach can be handled through competitive funding together with new stakeholders from different fields (Academia, Culture-based institutions, Public bodies, etc.)

3.3. Exploitation of the SGoaB use cases

In order to have a shared vision and, consequently, a shared version of the exploitation agreement, initial feedback and experiences from the actual results of exploitation activities put forward during the project period within the value chain are taken into account, as well as partner visions and exploitation both market oriented and scientific objectives. To this end, a series of activities have been carried out to harmonise the various points of view and concentrate on a shared, common objective.

In this initial phase of the project, partners are positively evaluating the adoption of a ***joint exploitation model*** able to address, in particular, what is also defined as *external* exploitation, i.e. bringing the SGoaB results to the outside world and generating business opportunities through

these results. In its initial perspective, an SGoaB joint exploitation is devised as a further step compared to individual exploitation, to develop a common and consistent vision by partners aimed at clarifying the following issues:

• Which **role** is played specifically by each profile involved in SGoaB (BSC and Europeana, but also involving strategic stakeholders).
• What and **how** SGoaB could be exploited by each stakeholder.
• How the joint exploitation strategy could be **introduced**.

SGoaB partners actively participate in the establishment, operation, support and sustainability of the project ecosystem. Furthermore, they will contribute to the gradual and continuous expansion of the ecosystem on the basis of additional stakeholders in all computational cultural domains.

As part of the evolution of the **ecosystem**, additional services (to be evaluated in the following years) could be provided. These services will need to fit in the partners' strategy for value generation, through offering services at a fee, after an initial pilot phase of ecosystem expansion (when such services will be offered free of charge).

Table 4: Use Cases service summary

Asset title	'Business' name for the asset
Lead partner(s)	
TRL initial	
TRL target	
Description	A description of the asset: Focus on main value proposition(s), "selling" points
Objectives	
Lead partner(s)	Lead (point of reference) partner for the asset
SGoaB results and components involved	One or more of the other assets involved or linked to this asset.
Type(s) of asset	Examples (multiple possible): Product, Service
Relevant stakeholders	Stakeholders involved in the use of the asset. It should include parties already contacted/involved in SGoaB and exploitation, for example by direct contact, presentation, take-up of the component. Example: direct customers, direct suppliers, suppliers of complementary products
Exploitation channel(s)	The main exploitation channels for the asset, e.g. Support, Training, Consulting, Extension/Customization. More than one channel is possible for an asset also depending on the partners involved
Possible competitors	Possible competitors in the market offering similar/competing value propositions

Replicability in other domains and ecosystems	Replication capabilities in different domains. They should be as much as possible concrete and based on the bottom-up capability of the partners.
Action plan / status	Concrete action (plans) for pushing the asset to the market: i.e. so that it is concrete and not just theory.
Other relevant information	Risk, initial expected revenue streams, IP issues, etc.

3.3.1. Exploitation strategy per partner

In order to define the appropriate exploitation strategy, It is necessary to previously open the discussion about the IPR approach. As it is well-known, free and open source software licenses offer different **degrees of freedom**. The licenses can be:

- **Permissive**: Guarantees the freedom to use, modify, and redistribute, while also permitting proprietary derivative works. Requires authorship notice.

- **Standard Reciprocal or Weak Copyleft:** Not all derived work inherits the copyleft license of the original work, allowing integration with other licenses. Generally used for the creation of software libraries by allowing other software to link to the library and then be redistributed without the requirement to be distributed under the library's copyleft license.

- **Strongly Reciprocal or Strong Copyleft:** License provisions of the original work can be imposed to all derived works, which means that the first creator of the works has the most rights.

PERMISSIVE	WEAK COPYLEFT	STRONG COPYLEFT
Apache 2.0 Berkeley (BSD) Massachusetts (MIT)	Lesser General Public License (LGPLv1, LGPLv3)	General Public (GPLv2, GPLv3)

Here is a comparison of the different types of licenses and the possibilities they offer:

The five properties of freedom	Types of open source license	Possibilities
Use	Permissive	**Use:** Possible **Source code modification:** Possible **Copy:** Possible **Distribution of modified versions:** Under other type of licenses is possible **Commercialisation:** Possible
Modify		
Copy	Standard Reciprocal or Weak Copyleft	**Use:** Possible **Source code modification:** Possible **Copy:** Possible **Distribution of modified versions:** Under other type of licenses is possible if there is a combination work **Commercialisation:** Possible
Distribute modified copies		
Commercialise	Strongly Reciprocal or Strong Copyleft	**Use:** Possible **Source code modification:** Possible **Copy:** Possible **Distribution of modified versions:** Under other type of licenses is not possible **Commercialisation:** Possible

On the other hand, each partner, further than its responsibilities assumed in the Use Cases development, has its own initial exploitation strategy, briefly described in the next table:

Table 6: Exploitation strategy per partner

Partner	Initial Exploitation Strategy
BSC	BSC will use the results of this project to improve its internal research lines in the fields of exascale computing, NLP, AI and metadata digestion. The main benefits will be the development of new algorithms and methods, and the collaboration with key partners from EU like Europeana. BSC collaboration with Europeana will be consolidated and reflected in joint publications, organization of events, etc. Some of the BSC developments in this project will be used inside Europeana platforms, increasing BSC's exposition to cultural heritage relevant problems and thus enhancing BSC's technology transfer.
EUROPEANA	

Either way, during the EU funded stage we must work on identifying the adequate business models that can ensure the long term sustainability of the initiative, as well as establish the first alliances with the main stakeholders. At the end of the funded stage, within the Final sustainability and commercial exploitation plan, we will describe the steps to follow with regard to the spin-off, its creation, marketing plan, legal constraints, funding schemes, possible business models, and other aspects required for a successful takeoff. BSC fosters the exchange of knowledge and expertise between academia and private companies to maximize the research potential by transforming research results into practical applications. Some of the business models we will consider include:

Freemium: Provide basic service with the main functionalities for free, with the possibility for the customer to upgrade the service with more advanced features by paying a fee.

Dual Licensing: The software is distributed simultaneously in open source for public administrations and academia, and commercial proprietary license for private businesses.

Support and Services: Paid packages with guarantees of data availability; prioritization of bug fixes for paying customers; timely help for customers using the data; services around data visualization, analysis, and mashing with other data.

Open Source: The product is a freely distributed source code. This business model takes place on top of services, or simple unpackaged data that are provided for free and in an open format.

Table 6: Business Model comparison

Business Model	Advantages and chances	Disadvantages and risks
Fee or annual subscription	Minimum capital investment More affordable with a predictable payment Schedule Flexibility-add/remove users as needed Set price is easier to budget for Specific vendors	Costs more over a several year period More expensive than fee-per-study for low scan volumes Vulnerable to price increases for renewals Fee could be too expensive Not enough users for vendors
Fee-per-study (whitepapers, reports, practice guideline, etc.)	Low entry price Clearer ROI Not ties to specific Vendors Closely align close to use	Header to budget for Less cost effective for high volumes
Analytics as a service (AaaS) Software as a service (SaaS) Platform as a service (PaaS) Infrastructure as a service (IaaS)	No product training required No additional resources required	Not instant results Less cost-effective for high scan volumes Complex marketplace structure
Project based contracting	Vendors are more accountable	Complex contracts Overhead of measuring performance metrics All projects should be registered on platform (vendor/user)

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Based on both IPR and initial exploitation strategy, next Table 6 and Table 7 collects the foreground and its associated exploitation strategy based on the EC standards.

List of applications for patents, trademarks, registered designs, etc.						
No.	Type of IP Rights	Confidential YES/NO	Foreseen embargo date dd/mm/yyyy	Application reference(s) (e.g. EP123456)	Subject or title of application	Applicant (s) (as on the application)
1	BSC software (name?)	YES	TBD	-	Under discussion based on the IPR analysis described in section 3.3.1 and different business models described in Section 4	BSC

Table 6: Record of patents, trademarks, registered designs, etc.

List of exploitable foregrounds										
No.	Type of Exploitable Foreground	Nature of Exploitable Foreground	Description of exploitable foreground	Confidential YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
2	New AI based workflows	Method	Scientific partnerships	YES	TBD		Culture industry, HPC centers	TBD	Tool chain	BSC
3	Numerical framework for virtual testing of cultural heritage	Software library	SaaS, Scientific partnerships ,R&D Projects.	YES	TBD	TBD	Culture	TBD		BSC
4	SGoaB Metadata	Data coming from use cases	Data	YES	TBD	Validation results. Data available under agreement with Europeana/ BSC.	Culture industries, academia	TBD		BSC/Euro peana
5	New backend	Software	SaaS, Scientific partnerships , R&D Projects	NO	-	Publication in peer-reviewed journals and R&D Projects.	Academia	TBD		BSC
6	Benchmark of different models	Library, Software.	SaaS, Scientific partnerships , R&D Projects.		TBD	BSC will use such tools in collaboratio n projects at European level, both with the industry and relevant scientific partners, with special focus on	Culture	TBD		BSC

					knowledge transfer. Publication in peer-reviewed journals, and 7project collaboration (Academia and Industry)				
7	Software or simulator to help the decision-making process	Software	SaaS, Scientific partnerships, R&D Projects.	TBD	TBD	Publication in peer-reviewed journals, and project collaboration (Academia and Industry)	Culture	TBD		BSC
8										

Table 7: Record of exploitation foregrounds

4. SGoaB Business Model Plan (Action 10.1)

In this section a Business Canvas Model will be developed. Thus, it is important to identify all the content and specially the added value according to the already identified targeted end-users.

The Values Propositions from the Business Model Canvas help us to ensure that the SGoaB services are positioned around what not only the customers or user's values and needs but also the vendors in this case because they will be the customers of the SGoaB portal.
Either way, according to the GA and the Action 10.1 and Action 10.2, we could define following customer segments like:

[1] Cultural end-users, social science and art communities and trading organisations from cultural sectors like music (including Opera), Museums (Pictures, Music, Archaeology, etc.), Public Organisations like those related to security, etc.
[2] End-users with similar applications like the use cases.
[3] End-users and academics using IA based simulations at HPC level.
[4] ISVs, code developers, technologies providers, scalability experts and consultants specialising in IA-based simulations at petascale level.

Additionally, at the moment, we identify the following stakeholders for the CEF, but this information could be updated during the SGoaB project:

[1] **Private End Users:** the end-users are companies that need to solve a problem or to develop new products in their field. They are one category of the potential consumers.
[2] **HPC resource providers:** the HPC resource providers are organisations who own the physical hardware for high-performance computing. They set up and maintain the HPC systems, take care of support, user management, and accounting to charge for usage.
[3] **Research code developers/Code developers:** the code developers create and optimise codes and could collaborate with others stakeholders like HPC providers, ISVs, solution providers to support any technical challenge.
[4] **ISVs:** ISVs are companies that develop software for particular markets.

[5] **Scalability experts and consultants:** the scalability experts and consultants are companies that have been in contact mostly with potential vendors or providers and potential users. They could know a large number of potential members of the community, could have knowledge from the different providers and could form the "bridge" between the vendors and users.

[6] **Technologies providers:** they are mainly in contact with the HPC providers and work on co-design activities together with them to improve the efficiency of the HPC.

[7] **Academics:** they work together with HPC providers and develop codes and software themselves. They could support the community with technical solutions that do not yet exist on the market.

[8] **Open source groups**: these groups have contacts with different stakeholders such as Industrial end-users, possibly HPC providers, academic and scientists, and could offer services and support for these stakeholders.

[9] **Industry sector trade organisations:** these organisations have contacts with different stakeholders and mostly specialise on concrete industrial sectors and or applications fields. They are very familiar with the challenges from their industrial sectors and applications. Sometimes they know of some technical solutions, but they could inform their stakeholders, mostly industrial end-users about new services or technical expertise.

[10] **Cultural Communities:** these communities know a large number of potential stakeholders, such as codes developers, ISVs, open source, and industrial end-users, and share a lot of technical knowhow and expertise that could be interesting for the SGoaB partners.

These customer segments will be also updated beyond the end of the project in line with our market dive activities.

Either way, after the EU funded stage, the SGoaB services will be mainly oriented towards the research community, public administration, and the private businesses. The value propositions to the different sectors are summarized in the following table:

Table 9: Value proposition segmented per sector

Sector	Value proposition
Research Institutions	For data scientists, large quality datasets are absolutely necessary to get statistically relevant results, and they are hard to come by. For researchers in humanities, anthropology, arts, audiovisual, history, etc., offer easy access and findability of relevant material within a rich set of digitized resources; this would be a big step forward for people in these communities, who usually spend a lot of time manually searching for specific resources. For Research code developers/Code developers: could in collaboration with ISVs, code developers or industrial end-users improve and develop codes.
Public Administrations	Our service is an efficient (HPC) tool for obtaining descriptions of images, which may be used in many sectors: cultural, touristic, social, etc, to generate content for websites, publications, and otherwise support the activities of departments and entities in charge of preserving the cultural heritage (e.g. museums, libraries).
Private Sector	The proposed service will allow a number of businesses and creative industries to explore culturally valuable images (e.g. for fashion, cultural tourism, design, etc) and web usability. Some resulting products may be catalogues, audiobooks, art exhibitions, Web publishing.

	End Users: could keep and improve competiveness of European companies. **HPC resource providers:** could show the advantages and the possibilities of HPC use and could increase the usage of HPC systems. **Independent Software Vendors (ISVs):** could develop commercial and technical opportunities and develop network through the cultural community. **Scalability Experts and Consultants:** could develop commercial and technical opportunities and develop network through the cultural community. **Technologies Providers:** could improve commercial and technical opportunities and develop network with HPC providers. **Industry sector trade organisations:** could improve technical knowledge and develop network to connect different stakeholders.
Academics	Could develop and improve technical knowledge; create innovation through new technical expertise and develop network with the different stakeholders.
Open Source Groups	Could develop and improve technical knowledge and develop or optimize new open source; could improve networks with different stakeholders to give solutions for different challenges.
Cultural Communities	Could develop and improve technical knowledge through the different stakeholders and offer technical solutions for different industrial applications.

4.1.   Key Activities

After 24 Months of the project, we could confirm following key activities of the SGoaB project:

[1] **Improve and develop simulation codes**.

[2] **Improve data management and analytic tools, expertise and services** which are necessary to develop simulation codes and machine learning applications.

[3] **Offer education** like training, conferences, MOOC (Massive Open Online Course), webinars, etc. to pass technical knowledge and knowhow to the different stakeholders according to their needs.

[4] **Present use cases and success stories** to inspire companies (SMEs, mid-caps and big caps) from the same industrial sectors and with the same or similar technical applications to use the solutions, tools and the technical expertise developed for these use cases and success stories.

[5] **Offer community management** to exchange technical knowhow, knowledge, expertise faster and more efficiently.

[6] **Stimulate innovation and new development** to help the European end-users to keep and develop competitiveness.

[7] **Spread and share cultural knowledge** to help the cultural community obtain new technical expertise and knowhow faster and to be technically more competitive.

We want to remark that we have no final business model yet, because it is just now we can offer the use-cases to potential end-users. This is why this Milestone is now a living document subject to updates, improvements, and changes

4.2.   Key Resources

A business entity would provide the business operation for the SGoaB portal to function properly if we would offer pay per use and SaaS services.

The computing resources and domain expertise would be provided by the partners Vendors entities, will offer their services in it.

The amount of resources invested could depend on the increase in generated business or in the services offering on the SGoaB portal.

4.3.   Stakeholder relationships (Communication channe)

This part has to be developed from mid-term of the project and on-wards as soon as the services portfolio is defined. But we could determine that the SGoaB main asset should be:

[1] Fair and neutral to give all stakeholders the opportunity to participate in this cultural Cultural community.

[2] Community-oriented to join all expertise, technical knowhow and knowledge from all concerned stakeholders with respect to the cultural and technical challenges.

[3] Technology or solution exchange focussed to offer technical solutions to the different stakeholders and to keep and develop European competitiveness.

These customer relationships will be established between these two main categories:

With vendors/services providers based on:
- Long term
- Personal service
- Co-creation
- Codes or technologies oriented

With end-users based on
- Self service
- Personal service
- Dedicated service
- Long term
- Linked in community
- Solution oriented

4.4.   Business Channels

To disseminate information about the activities and services offering on the portal, we could define following channels:

Web presence: through the SGoaB homepage, potential users and vendors could find information about our services offering and expertise.

Social media: by social media we can provide information about our different activities and our services to new stakeholders to develop the SGoaB community.

Industry, ISVs, HPC events, exhibitions and conferences: most stakeholders regularly attend their respective events, exhibitions and conferences. We could meet them during such events and hold a presentation on the SGoaB to promote our cultural community.

Direct Marketing: we could communicate the benefits of the SGoaB directly to potential customers such as vendors and users.

Marketing activities of services providers: those would inform directly their existing and potential customers about theirs services.

Trading organisation: to exchange information about specific applications and with respect to special industrial sectors.

4.5.   Revenue Streams

The following benefits are foreseen for each of the categories of major stakeholder identified above.

End Users: can use some services developed in SGoaB in return for payment directly to the service providers, depending on the type of service. They do not need to pay any fees to use the portal.

HPC resource providers: SGoaB could offer to the HPC resource providers a platform to increase the impact of their product and attract new customers.

Research code developers/Code developers: the outcomes of SGoaB offers the possibility of attracting new code developers. Joint R&D projects can be handled towards fostering the impact of SGoaB outcomes.

ISVs: as an outcome of SGoaB, ISVs could be interested to sell the final assets and attract new customers. ISVs could offer services later on a pay-per-use or SaaS basis, ISVs could pay a commission to the SGoaB partners to pay for part of the ordering/billing/delivery processes offered by SGoaB partners.

Scalability Experts and Consultants: SGoaB partners could offer services later on a pay-per-use or SaaS basis.

Technologies Providers: A pay-per-use or SaaS basis can be analysed based on stakeholders' feedback.

Academics: could use some of services developed by SGoaB directly for non-commercial purposes, and depending of the type of research could also offer their own expertise. Because they have no revenues, those should not have to pay any fees.

Open Source Groups: group members could use some of services developed in SGoaB in return for payment directly to the service providers or the CEF, depending of the type of service, but could also offer their own expertise. In this case, they should have to pay fees.

Sector trade organisations: organisation members could use some of services developed by SGoaB in return for payment directly to the service providers, depending of the type of service, but could also offer their own expertise.

Cultural Communities: community members could use some of the services offered as an outcome of SGoaB in return for payment directly to the service providers, depending of the type of service, but could also offer their own expertise.

4.6.   Costs

The main costs generated will be confirmed in the second year according to the definition of the enhanced-services portfolio. The following main costs can be considered in any case:
- HPC-related staff (HPC and code experts, consultants, training experts) who will offer technical expertise to the users.
- Administration staff (public relations, community support, sales & marketing, management) who will manage the CEF in those different departments.
- Office space - if the SGoaB related services needs staff, the employees will probably need space to work.
- IT expertise for developing and maintaining the maintaining the SGoaB outcomes and website as well as ultimately developing a marketplace to sell services on a pay-per-use and SaaS basis.

5. Vision and Plan for Business Development and Sustainability (Action 10.2). Implementation of sustainability activity

For a sustainable business plan, information on the cost for providing a service or a good is key. In SGoaB, the services can be categorised into Training, (Client-specific) application developments and Consulting.

Regarding the training services, the SGoaB partners dispose already of a large experience, many of them already offering training. Based on their experience, cost estimation for training activities will be possible. Consultancy mostly consists in sharing the know-how, best practices and experiences. Often, this knowledge is part of the intrinsic knowledge of an expert. Thus, the cost for providing consultancy services is mainly the effort in hours (days) for the experts involved in delivering this consultancy.

For assessing the effort and the cost related to the third category of services, namely the (Client-specific) application developments, we have (1) collected information form the partners on the PM cost and (2) enacted a logging protocol for tracking the development effort.

5.1. Potential Services Portfolio and Products Management

TBC based on Use Cases development and stakeholder's interest (Table 3)

5.2. Funding sources following the EU funded stage

During the EU funded stage we will devote resources to finding other funding for M36-48), such that we can guarantee the sustainability of the project.

During the first year after the EU funding phase (M36-48) BSC-CNS will work on the exploitation strategy of SGoaB and also at partner level, always focused in the impact maximization of the foreground.

We have already identified some Go To Market (G2M) funding initiatives to support the access to market and the creation of the initial stage capital to give the company a head-start. Some of the funding sources that have been identified for this proposal stage are:

Go To Market funding:

[1] National (Catalan and Spanish governments)
   a. CaixaImpulse (La Caixa)
   b. Valuni (ACCIÓ)
   c. Producte i Llavor (AGAUR)

Public funding for early-stage companies:

[1] National (Catalan and Spanish governments
   a. Startup Capital (ACCIÓ)
   b. Spain Startup Co-Investment Fund (ENISA)
[2] European
   a. Start-up Europe
   b. EIT Digital Accelerator (EIT)

Private early-stage venture capital funds:

[1] European:
   a. EBAN (European Trade Association for Business Angels)

5.3.   Marketing and Business Development Activities Plans

In terms of the SGoaB objectives, the main targets of the SGoaB CEF are:

-To team up to support several key cultural industries in Europe in dealing with complex applications using HPC technologies.

-To conduct research, provide leadership, guidance on good practice, user support mechanisms as well as training and networking activities to a community.

-To offer services regarding machine learning, simulation, modelling and HPC capabilities to cultural end users, academics and enable ISVs, code developers, technologies providers, domain experts and HPC centres to offer different services.

-To create and demonstrate a sustainable infrastructure where actors at all levels in the value chain can realise sufficient commercial benefit to enable that infrastructure to persist independently of EU funding."

This means, that SGoaB is committed to attract members such as services providers (ISVs, code developers, technology providers, domain and academics experts) and users such as industrial end users (SMEs, mid-caps and big-caps), code developers, ISVs, domain and academics experts. To reach these objectives, after the initial services portfolio has been defined, the following activities must be considered in order to elaborate a suitable marketing plan:

[1] Develop a brand strategy connected to the users (vendors and user's members) needs and competitive environments to achieve the goals of the SGoaB CEF.

[2] Create a list of existing services on the market to compare them with the SGoaB Services.

[3] Create a list of potential services needs on the market to compare them with the SGoaB Services.

[4] Create a list of SGoaB services planned for the second and third years to be able to update the marketing and business plans according to the potential new services.

[5] Create a list of potential services providers such as technology providers, ISVs and domain experts to develop the appropriate service portfolio based in the Use Case definition.

[6] Create a list of potential end users such as industrial companies especially those whose their industrial activities are focused mainly in the Cultural sector to offer them the services from SGoaB.

In terms of Business Plan, we will complete following activities in addition to the market assessment:

[1] Define the company objectives to be able to adjust the brand and business strategies.

[2] Define the benefits for users to be able to adjust the brand and business strategies.

[3] Define the benefits for members to be able to adjust the brand and business strategies.

[4] Propose a management structure to manage the sustainability of the CEF.

[5] Organise the company ownership & shareholding structure to manage the sustainability of the CEF.

[6] Define the assessment of risk & sensitivities to manage the sustainability of the CEF.

[7] Elaborate the formation timetable to keep to the roadmap and achieve the final goals of the CEF.

[8] Manage financial support to develop the sustainability of the CEF.

[9] Define a legal framework to maintain the sustainability of the CEF.

[10]   Elaborate the legal framework documentation for the portal to safeguard the IP rights of the individual partners and members.

[11]   Manage the portal website to develop the cultural community and propose services offering from vendors to users.

After all: create a brand strategy plan: including the creation of content, distribute and market, measure results.
- The idea is to compare content with that of competitors
- Develop new content which will fit into the market
- Figure out the best content channels
- Decide on content types
- Identify resources

5.4.   Sales Campaign Activities Plan

A large number of stakeholders should be contacted to boost the chances of acquiring new members. This activities plan could also enable us to increase our knowledge of stakeholder expectations so that we can optimize and adapt the SGoaB portal capabilities and thus enhance its sustainability. Proposed plan to prepare the sales campaign activities:

[1] Identify the services portfolio to develop a product and a brand strategy as well as management.
[2] Identify of the services benefits for each type of stakeholder in order to develop the dissemination material.
[3] Develop flyers, whitepapers and information material or guidelines according to type of services, to type of stakeholders, according to industrial sectors and applications from use cases.
[4] Define potential stakeholders to adapt the marketing and sales campaign activities strategies according to each type of stakeholders and their respective needs.
[5] Define the "Sales" Team to develop the future commercial infrastructure for managing each potential new and existing members of the SGoaB community.

5.5.   Risks and Barriers

According to the Action 10.2, Marketing and Business Development Activities Plans, we should consider the potential Risks and Barriers that could prevent us achieving the goals of the CEF. These are:
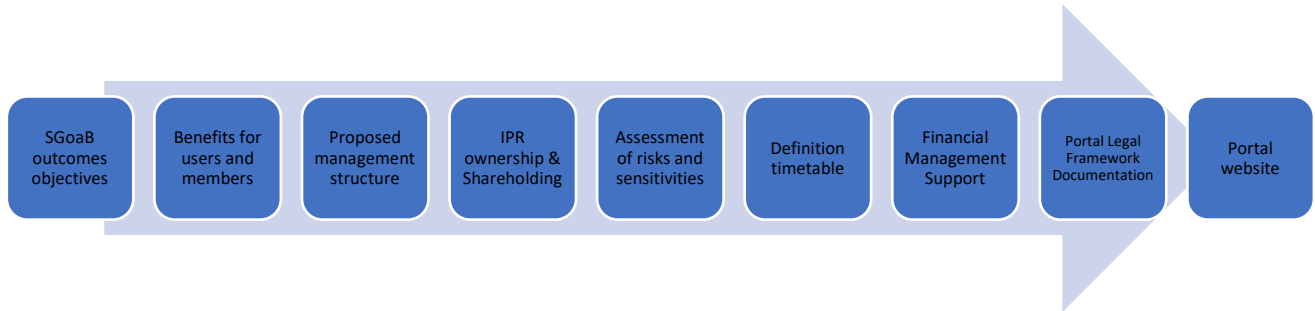
[1] Services too expensive compared to the market offering.
[2] Services not easy to use compared to the market offering.
[3] Services not in line with market needs.
[4] Services providers who are not interested in and/or have no time to use the SGoaB portal.
[5] End users who are not interested in and/or have no time to use the SGoaB portal.

5.6.   KPIs definition

The marketing plan should contain Key Performance Indicators (KPIs) that will allow the partners to measure the progress of the plan against the goals. The following KPIs could be used:

[1] Number of stakeholders.
[2] Number of stakeholders contacted.
[3] Number of "gold" stakeholders members and subsequently "platinum" stakeholder members.
[4] Number of stakeholders per type.
[5] Number of available services.
[6] Number and type of services used by stakeholders.

5.7.   Business plan definition for the outcomes of SGoaB

6. Financial Plan

6.1.   Cost and Capital Requirements

According to the Marketing and Business Development Activities Plans, in the Month 12 to Month 24, we will develop the activities from the business plan, and in particular the financial plan to guarantee the sustainability of the CEF will be developed within M24-M36 and beyond the end of the project.

Capital requirements are standardized regulations for companies or institutions that determine how much capital must be held *vis-a-vis* a certain level of company's assets. We could use an Excel sheet to collect all information about cost and capital requirement (pre-investment: tender procedure, investment cost: goods and equipment, consultants, taxes, working capital requirement, others), Contingencies, Financing Costs (e.g. Insurance, banking finances, fees, etc.).