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SPICE
Social cohesion, Participation, and Inclusion through Cultural Engagement

D8.6 Dissemination and Exploitation Plan (M36)

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Foreword

We, the SPICE consortium as a whole, would like to frame this final version of this deliverable, with the conviction that SPICE, a research and development project will have a defined impact in the cultural heritage sector. Hopefully, the newly added sections will permit the reviewers to identify the exploitability ambitions of SPICE and its partners to the possible extent until this moment and the level of market readiness expected for this type of project. We have looked for possible and terrene technological artifacts to be developed by the end of the project and the proposed pilots. We have carried out, following the previous reviews and recommendations, several analyses using different methods such as the Innovation Radar tool of the EU and the Lean Canvas Method, to identify the innovation and commercial potential of the most promising technological outputs of the projects. The selected products (called marketable assets) are the result of different approaches to value each of the eighteen assets developed under realistic criteria and not only the will of the partners. Most affected is his fourth section, renamed "Exploit Area and Market Scope", suggesting a new and expanded approach. Minor changes were made throughout to improve the meaning and understanding of this achievement. Finally, the Consortium would like to emphasize that this is not the work of a single partner, with all partners contributing within their knowledge and project roles.

Executive Summary

The SPICE project aims to promote diverse participation in the heritage sector through the process of “citizen curation”. Citizens will be supported to: develop their own personal interpretations of cultural objects; work together to present their shared vision of life through culture and heritage; and gain an appreciation for alternative cultural perspectives through the development of new technologies and methods.

This deliverable represents the final version of the plan for Task 8.1: Dissemination and Publication and Task 8.3: Competitive Analysis and Exploitation Planning by detailing how partners the project and the corporation in general plan to benefit from the outcome of the project. This deliverable corresponds to D 8.6 "Final Exploitation and Dissemination Plan" that provides a cumulative overview of actionable outcomes, as well as past and future activities to use and share the knowledge generated within the framework of the project group. Initially, in the early version of Deliverable 1.5, “Innovation Action Plan”, 2 innovative assets were identified, and an Innovation radar analysis was conducted on these 2 assets. However, our contacts with stakeholders and our direct experience of using SPICE’s assets to develop five citizen curation applications, has persuaded the SPICE partners that the innovative value of SPICE’s assets was significantly higher. Therefore, SPICE partners decided to expand the initial list of 2 assets to 12 assets in a later version, to finally 20. Due to the progress of the development of these innovative assets and their planned exploitation that has been monitored in this task the new innovation strategy leads to a split catalogue of 20 assets that can be used as a software suite for the development of citizen curation activities and applications. Although this is an RIA act and its commercial ambitions cannot be clearly established, the consortium has decided to increase the TRL from 5 to 7, so SPICE and its artifacts will be defined for stakeholders and other R&D projects for future research or innovative actions. Concerning performance, six key areas were identified. In addition, some of the project's innovation assets will be analysed and explored as key actionable knowledge outputs from the project in deliverable D 1.5 “Innovation Action Plan”. These potential areas of exploitation are primarily the responsibility of the parties involved in the development of each WP, especially those with clear ambitions and leading several Work Packages and the potential exploitation for Citizen curation methods:

- Tools and methods for modelling and analyzing citizen curation activities
- Distributed Linked Data infrastructure
- Interfaces for citizen curation
- Integrated socio-technical system for citizen curation
- Design of curation activities

In this final version of the exploitation plan, however, we have followed a different approach. We have focused on SPICE as a whole, which we have interpreted as a suite of combinable and customizable tools and methods to develop citizen curation activities. We explain in Section 3 in detail the rationale for this approach, but the main reasons are that 1) this is the way these tools have been used to develop citizen curation activities within the SPICE project in five case studies; 2) This is the main way in which SPICE's will be commercialized by two SPICE's partners: Padaone and GVAM; 3) This is ways best aligned to the purpose of the SPICE's project itself, whose ultimate goal was to develop a variety of tools and method intended to expand the opportunities of cultural heritage organizations to develop a wide range of citizen curation activities; 4) most importantly, it is very well aligned to the market itself. In the cultural heritage industry, the stakeholders are becoming increasingly aware of the need of developing citizen curation activities, the market for citizen curation software is already emerging, and SPICE as a whole is possibly the solution that is closer to becoming a whole solution for citizen curation, capable of becoming highly compelling for the first early adopters. 5) Finally, it uncovers clear opportunities for further collaboration between SPICE's partners to continue the development of SPICE at its full potential.

In addition to these areas of joint exploitation, Spice partners have also disseminated in this plan the project results that have been achieved for those potential areas of exploitation in the project.

In the final version of this report, we meet the main requirement of the previous reviews, along with others to clearly demonstrate the commercial ambitions of the project. The design of SPICE's exploitation plan faced significant challenges: 1) citizen curation software would become a new product category in the market, which creates considerable risks and challenges for the development of a new market; 2) most SPICE's partners are research and non-profit organizations with an interest in research and development activities rather than commercial plans; 3) There are only three partners that are private companies and have developed specific plans for the commercial exploitation of SPICE's assets; 4) the SPICE project has created a large number of exploitable assets that create significant value to cultural heritage organizations; 5) Some assets can also be exploited by other industries beyond the cultural heritage industry.

Therefore, we have attempted to design an exploitation plan capable of meeting all these challenges:

- We designed a realistic exploitation plan that could be doable by all players involved. This involved also uncovering all potential opportunities and challenges of the project to design a plan that maximizes the exploitation potential for SPICE.
- It had also to reach as much detail as possible at this stage with a full definition of the target market, business model, commercialization concrete plans by some partners, etc. We seek a plan that could evolve over time and be enriched with new elements as new empirical evidence arise.
- It also had to raise enough empirical evidence to validate our main business and exploitation hypotheses.
- We looked forward to defining an **exploitation plan that could encompass and maximize the opportunities of all SPICE's partners** to develop long-term activities around citizen curation, whether their objectives are research, development, or commercial. Therefore, it has been very important to design an exploitation plan that could reconcile the diverse interests and strategic goals of all SPICE's partners.
- Also, as requested by the EC reviewers, we have brought **very detailed and realistic commercialization plans and market uptake strategies by SPICE's partners**. These plans also provide an opportunity to commercialize all SPICE's assets even though only two partners will develop commercial plans supported by the third private company in the consortium.

Most importantly, we have designed an exploitation plan that could clarify the next steps for every SPICE partner to further develop the strategic citizen curation arena and turn it into a widespread category that can bring some positive changes in the activities of the cultural heritage industry and society as a whole.

In this document, we also present a common strategy related to Media Report 8.4 Deliverable on communication activities, including reporting on communication activities carried out throughout the whole

working period of the project. It is important to highlight in this sense that dissemination and communication are two differentiated terms that involve different actions and strategies.

Therefore, the primary aim of the Dissemination Plan is to outline the results and outcomes that the project has produced amongst specific stakeholders and audiences, as well as involve these in the research process, promoting the use of outputs and facilitating the means to support this testing activity after the project end. This deliverable also defines the key audience, including heritage institutions, community organizations, and excluded social groups, researchers, educators, universities, as well as related research projects and other audiences found of interest. It identifies the various skills and experiences available within the project consortium to carry out the dissemination strategy, and who among SPICE partners could connect better dissemination with exploitation in every eventual lead. This plan also defines the means of communication for the primary audience, along with the communication plan defined in Deliverable 8.4, including the internal partner intranet established by UNIBO, email contacts, and video meetings, as well as such as workshop projects, training, and testing opportunities. and disseminated through presentations, publications, and other activities specifically designed for this audience. Qualitative and quantitative indicators have also been established to assess the success of this plan and help plan the next phases of the dissemination strategy, develop future activities, and adapt the plan to ensure that the strategy effectively reaches key audiences. KPI also help track activities and their relationships.

1. Introduction

1.1. Structure of the Plan

This document is structured as follows.

- In the following parts of **Section 1,** the main approach toward exploitation and dissemination management is described.
- **Section 2** looks at the contractual framework and the rights and obligations of the members of the consortium related to the exploitation of the results of the project.
- **Sections 3** and **4** specify the expected outcomes and exploitation areas for the results of the project and how these can be extended in various ways.
- **Section 5** refers to the market frame planned to be developed in future steps
- **Section 6** refers to the dissemination plan created for the project.
- **Section 7** provides plans for each of the individual partners.
- **Section 8** refers to future commercial arrangements with parties who are not currently direct members of SPICE.
- **Section 9** discusses the potential activities toward the development of standards.

1.2. Exploitation Management

Regarding exploitation, this Plan identifies

- The expected outcomes and assets coming from the SPICE project
- How these assets could be further commercialized within some business models
- Possible areas in which the SPICE outputs, methods, and technologies could be commercialized
- Actions to be taken to validate these market potentials and other steps that would need to be taken to make it viable.

Regarding the expected outcomes coming from SPICE, six major areas of exploitable knowledge have been identified. All of these have been developed to complement and create synergies between each other to create new methods and technologies with the final purpose of supporting new citizen curation activities

and specifically a series of case studies that will be carried out along the project. However, this does not mean that these areas of knowledge cannot be further developed and exploited in independent ways and even applied for different purposes.

An important activity that will take place in the next two months is to move forward on the ownership model of the different assets to be exploitable, and how to sustain SPICE results that would be required to bring this about. We present a complete developed business plan for the commercial exploitation of the different assets developed during the SPICE project by the different members of the consortium.

1.3. Dissemination

This plan sets out the details of the types of dissemination activities that have been undertaken during the project's lifetime. It captures all dissemination activities that have been planned and reports those that have already been undertaken by the project partners in the past three years of the project. Although some activities may seem missing in this report, it was decided to allocate them in deliverable “D8.4. Interim report on Communication Activities” so that duplicities amongst deliverables were prevented.

Carrying out effective dissemination and communication is a fundamental activity in any research project since the success of these activities contributes decisively to the short and long-term success of a research project. This can be measured by ascertaining knowledge usage (from external parties) as well as by the degree of adoption. The SPICE project has clearly identified this as an important issue and has reached a wide number and range of scientific publications and the user community, which has allowed us to disseminate it widely.

To maintain the planned line of dissemination it is important to keep an effective follow-up of the dissemination actions undertaken throughout the project. To this end, the project has maintained a "live" record of dissemination and communication activities, included in this report, which has served as a model for controlling the quality and quantity of these publications.

This document gathers the different actions, actions, publications, and objectives achieved in terms of communication and dissemination impact of the SPICE project.

2. Rights and Obligations of the members of the consortium

2.1. Who Owns What

This section is aimed at explaining the legal structure of the SPICE project and the various rights and obligations of its members, particularly regarding the exploitation and ownership of the results of the project and their dissemination. Hence it covers such topics as Intellectual Property Rights (IPR), the requirement to disseminate new knowledge, and the use of and access to such knowledge (as well as existing knowledge which is an input to the project). The legal structure is based on:

- the Grant Agreement (number 870811) between the EC and Alma Mater Studiorum - Universita di Bologna (to which all partners have acceded) and
- the Consortium Agreement (CA) between all of the partners.

In Section 5, Ownership rights of SPICE’s exploitable assets, which is later in this same deliverable, we have specified how the rules defined in the Grant Agreement and outlined in this section, are applied to determine a detailed and concrete distribution of ownership rights for all IP assets identified within the SPICE project.

2.1.2. Grant Agreement

Grant Agreement leaves in a big part to the Consortium Agreement the clarification of issues regarding the future use and ownership of the results of the project merely stating that the partners will work on the usual principle that inventions should be protected (Open-Source licensing being the appropriate protection for Source Code) and the IPR regime will be governed by the Consortium Agreement. This is later developed in section 2.2.

2.1.2. Consortium Agreement

On another hand, the CA defines and states the relevant articles on ownership, use, dissemination, protection of *results first defined* in the GA and gives the general principles to make them applicable. These "General principles" define certain terms which are relevant to this plan as follows:

- "*access rights*" means licenses and user rights to *results* or *background.*
- "*background*" means information that is held by *the partners* before they accede to this agreement, as well as copyrights or other intellectual property rights pertaining to such information, the application for which has been filed before their accession to this agreement, and which is needed for carrying out the *project* or for using *the results obtained.*
- "*dissemination*" means the disclosure of *results by* any appropriate means to the cultural heritage community and memory institutions, to the research community, and to the general public through a process involving presentations, publications, conference papers and sessions, and participative workshops, showcases and demonstrations, etc.
- "*fair and reasonable conditions*" means appropriate conditions including possible financial terms taking into account the specific circumstances of the request for access, for example the actual or potential value of the *results* or *background* to which access is requested and/or the scope, duration or other characteristics of the *use* envisaged.
- "*results*" means the outputs, including information, whether or not they can be protected, which are generated under the *project*. Such results include rights related to copyright; design rights; patent rights; or similar forms of protection.
- "*use*" means the direct or indirect utilization of r*esults* in further non-commercial research activities other than those covered by the *project*, or for developing commercial activities, creating and marketing a product or process, or for creating and providing a service.
- *"partners"* consists of all the entities taking part in the project and all the partners together form the consortium. It is also required for each partner (defined, as mentioned above, as the SPICE partners) shall:
    - Use - or ensure that they are used - results of which it has ownership. This use is reported in this final deliverable.
    - Demonstrated adequate and effective protection of results.
    - Ensure that the results of which it has ownership are disseminated.

Taking into account the previous definitions the CA states a series of principles regarding the ownership of the results:

- In general terms results are the property of the partner that has carried out the work and has generated that result.
- Joint ownership of results - In case of joint ownership of results in this Project, co-owners' shares of ownership shall be proportional to the intellectual contribution invested in generating that specific result. The joint owners shall agree on shares of ownership, all protection measures and on the division of related costs in a joint ownership agreement to be negotiated in advance.
- Use of joint results - Where no joint ownership agreement has yet been concluded or in absence of a joint ownership agreement, each of the joint owners shall be entitled to use the jointly owned Results, firstly, for non-commercial purposes, including research or educational activities, on a royalty-free basis and without requiring the prior consent of the other joint owner(s), and, secondly, for commercial purposes, including jointly exploiting the jointly owned Results and granting non-

exclusive licenses to third parties (without any right to sub-license), subject to giving at least 45 days prior notice to the other joint owner(s) and the payment of fair and reasonable compensation.

- Transfer of results - Each Partner may transfer ownership of its own results or, unless agreed otherwise in a joint ownership agreement, of its own share of jointly owned Results, following the procedures of the Grant Agreement Article 30.
- Access Rights – this aspect deals with the background to which partners are ready to grant Access Rights and any background that they specifically wish to exclude, and the general principles and arrangements for applying for and using access rights. It is also confirmed that any grant of Access Rights not covered by the CA are at the absolute discretion of the owning partner and subject to such terms and conditions as may be agreed.

2.1.3. Future Agreements

Throughout the life of the SPICE project, the possibility of further agreements between the partners (and possibly third parties) to fully exploit the results of the project has been explored, taking into account the results of the project. The results and knowledge that can be extracted from the project, the further steps foreseen by the project, as well as external factors such as the emergence of specific market opportunities and the likelihood of success in raising capital in the future. In this regard, the commitment of the project partners has been to exploit the key results of the project for the benefit of all stakeholders and to contribute knowledge for future research.

2.2. Protection of knowledge

The GA made several statements regarding the defense of the results. Specifically, the partners have agreed to provide the most appropriate licensing and protections for their own results or to co-own and develop business relationships with potential customers and business partners. Partners must also monitor their use and documentation, and contribute to standardization initiatives where appropriate.

In this regard, the partners worked on the common sense that inventions should be protected (open-source licenses are the appropriate protection for source code) and that intellectual property regimes would be regulated governed by the union agreement on the following lines:

- Ownership of background know-how is unaffected by the Project.
- Each Partner owns the resulting IPR generated by it under the Project.
- Software source code will be published under an agreed Open-Source license.
- Each partner identified in the CA any items of relevant background IPR knowhow that are freely available to the other Partners for access and/or for use; and any that are subject to commercial restrictions or payment of license fees; the list of background identified may be updated by each partner if needed during the lifetime of the project.
- Researchers will have the right to publish research results, subject to the terms of the Collaboration Agreement, with a reasonable period of notification of publication.

2.3. Access Rights

Section 9 of the CA includes a number of provisions regarding access rights. These cover such topics as the definition of the background needed for the purposes of the project, the granting of access rights and any associated conditions or limitations including such grants to other beneficiaries, where this is needed for the work of the project. Such access rights shall be granted on a royalty-free basis.

Regarding access rights for exploitation, partners are allowed, subject to agreement, access rights to results and background, if it is needed to exploit their own results. Such access rights shall be granted on fair and reasonable conditions. Requests for such access rights should be made up to twelve months after the end of the project or the termination of the requesting Partner’s participation in the project.

3. Introduction to the exploitation plan

3.1. Preliminary considerations about the challenges of building an exploitation plan for the SPICE project.

The design of an exploitation plan to attempt the commercialization of the assets developed during the SPICE project faces some important challenges:

1. The SPICE project has developed a broad range of assets that can become highly valuable for potential users within the cultural heritage industry and also in many other industries. Many of SPICES's identified exploitable assets are tools intended to solve some of the challenges of moderating automatically user-generated content in extensive communities. This is a critical part of citizen curation activities in cultural heritage organizations, but it is also critical for any organization willing to build extensive communities of highly committed customers, e.g., in social media. Therefore, many of SPICE's assets admit widely different commercialization approaches: they can target widely different target customers and become part of different products.
2. Also, the extensive family of SPICE's assets admits different combinations to create different products. Some solutions can be bundled together to create user-generated content moderation. Others can be bundled to create an interface for developing activities for user communities in a variety of contexts. In fact, in previous Deliverable 8.2, this was the approach selected to develop an exploitation plan for SPICE's exploitable assets: to bundle together some of SPICE's assets to create families of products, or proto-products that could be the basis for several widely different exploitation plans within the SPICE project. These subsets of SPICE's assets could then be commercialized through different business models and intended for different target customers inside the cultural heritage industry or any other industry.

Dividing SPICE's assets into subsets and then developing a variety of exploitation plans for each one seems also very tempting. It can be considered a catch-all approach that appears to seize the whole commercial potential of SPICE's assets. However, this is not the approach that we have finally selected, and it may be worth explaining our reasoning:

- Considerations about what is a product. SPICE's assets can create value for a variety of potential customers, but value-creation is not enough for them to become products. The same can be said about most different combinations that can be created by bundling SPICE's assets. These subsets or combinations can also be highly valuable but it is doubtful that they can become products by themselves, without adding more essential pieces to them. A product must comply with certain criteria that inherently make it a business opportunity:
    - A product, particularly an innovative product, must meet a clear need, hopefully, an underserved or unmet need and also a critical need.
    - A product must be easy to communicate. Potential customers should understand its value proposition rapidly and effortlessly. Otherwise, it will be impossible to communicate its value offering efficiently, which entails high marketing costs, long sales cycles, and low conversion rates that altogether make for unprofitable businesses.
    - A product must have a clear target market segment. It does not matter if it has many potential customers, it must have at least one that is well-defined and can be reached by also well-defined channels.
    - A product needs also to have a certain level of completeness. Highly specialized products are viable in well-established markets but innovative products require being highly compelling while also minimizing adoption barriers. This calls for offerings that comprehensively solve critical needs, not certain elements of critical needs that still leave many elements unsolved.

The combination of all these criteria has convinced us that among the variety of subsets that we could make from SPICE's assets, we should select those or the ones that most clearly comply with all these requirements: complete enough, compelling enough, well-defined target customer segment, easy to communicate efficiently. At this stage of the project, we do have enough information to make this complete assessment, difficult to do completely during previous, more exploratory stages. This type of pivoting is usual in innovation (most VCs even consider it desirable).

- Moreover, what has convinced us more clearly about the exploitation plan with the highest potential is the reality of the market. Once we have completed the market study to elaborate this exploitation plan, we have generated important evidence that one specific market is the best suited for a certain combination of SPICE's assets, and that market is precisely the cultural heritage industry. Worldwide, museums and any cultural heritage organizations face the same challenges: they need to attract increasingly diverse societies, and frequently they fail to have sufficient appeal for some of them, therefore having some visitor groups widely underrepresented. Moreover, museums are radically changing how they see themselves and the very mission they think they must comply with within society. From storage, conservation, science, and education, which have been the pillars of traditional cultural heritage organizations, new priorities are increasingly raising such as promoting social cohesion or contributing to promoting certain values. Also, cultural heritage organizations are heavily adopting technology to enhance visitor experiences. **In this context, the whole cultural heritage industry is running at full speed to meet precisely… SPICE's assets, and not some specific assets developed by the SPICE project, but all together. Moreover, even though there are already a broad variety of software solutions intended to meet specific functions of cultural heritage management, citizen curation is still today largely underserved. This turns SPICE into a significant market opportunity.**
- However, the variety and complexity of SPICE's assets puzzled us for some time because it may be largely possible that some cultural heritage organizations could find valuable some of them but others not so much, or not at all. How could SPICE's assets become a product with such a large family of sometimes loosely related assets that may be wanted by some customers and not required by others? How can this complex family of assets become some sort of SPICE product? The solution to this enigma came from the SPICE project itself. Within the project, the partners had the challenge to carry out a variety of citizen curation activities by using the tools and solutions developed to this end. They created widely different citizen curation activities and accordingly, they did not use the same SPICE assets. No two of SPICE's case studies used the same assets from SPICE's portfolio of solutions, and no solution within SPICE's portfolio was not used by at least one case study. All five case studies developed within the SPICE project combined and customized a different selection of assets to develop widely different citizen curation activities. This led us to understand that the creation of citizen curation activities by cultural heritage organizations will likely follow the same pattern:
    - Developing citizen curation activities is inherently a creative process that will require cultural heritage organizations to design activities that best meet their priorities and their collections. Some potential SPICE product could become a comprehensive solution to facilitate all the stages of this creative process, but the process will always require some creative freedom on behalf of the cultural heritage organizations. There will always be a task of combining, customizing, selecting different assets, and also attempting to develop something entirely unexpected. Furthermore, cultural heritage organizations will specifically attempt to create the unexpected since one of their main goals is to achieve differentiation and visibility in the market, which requires unique visiting experiences and offerings.
    - Therefore, even what SPICE is today, a combination of tools and solutions that can be combined in different ways perfectly meets what would be expected from a fully developed citizen curation software solution. Consequently, SPICE's complex collection of assets is perfectly suited to become what cultural heritage organizations need: a creative tool comprised of building blocks that they can combine in a variety of ways to create broadly different citizen curation activities.

- Another reason convinced us that SPICE's entire collection of assets could be considered the final product, i.e., that among the different combinations of SPICE's assets that could become products, SPICE as a creative design solution for citizen curation activities may be considered the closest to the market in terms of TRL. We specifically asked those who have already used SPICE's assets to develop citizen curation activities, that is, SPICE's partners, how close would be any cultural heritage organizations to building completely operative citizen curation activities by using only SPICE's assets, and the answers were unequivocal: very close. Naturally, SPICE is a product that still needs some development to become a viable product for commercialization, but some visionaries among cultural heritage organizations, which were willing to fulfil SPICE's gaps, lack of integration between the different tools, and unsolved usability issues, could go very far by using SPICE's assets to develop a variety of citizen curation activities.
- Finally, our market study on primary and secondary sources, which has involved a survey of cultural heritage organizations, has provided clear evidence that the market is ready for a comprehensive citizen curation software solution such as SPICE. There are already clear indications of an emerging citizen curation software market that nowadays is mainly served through *ad hoc* development projects. In this context, **SPICE as a suite of combinable and customizable tools and methods for the development of citizen curation activities is possibly the best-positioned solution to become the first compelling whole product in the market for the development of citizen curation activities in the cultural heritage industry**.

As a result of all these considerations, we have considered the most valuable and exploitable asset in the SPICE project, a certain concept of SPICE as a solution for the creative design of citizen curation activities intended for cultural heritage organizations. There are, however, two additional considerations that must be stated regarding this election:

- This election is the best aligned with the strategic goals and interests of most SPICE's partners, which for the most part already develop most of their economic or research activities within this industry or are directly part of this industry.
- However, we have also wanted to make this decision with some partners having alternative plans even outside the cultural heritage industry. Therefore, we have designed a business plan that does not require a unanimous decision because it provides the necessary flexibility for partners to follow widely different exploitation approaches. Our open-source business model provides SPICE's partners with great flexibility to follow their own interests:
    - Commercial and exclusively research activities.
    - Commercialization by joining resources and efforts through some sort of organization.
    - Commercialization of the whole solution by any partner by itself without requiring the contribution or authorization of any other partner, since open-source licensing agreements could allow doing so.
    - Commercialization of SPICE's assets to different target customers out of the cultural heritage organizations.

  The business model we have selected provides the required flexibility for SPICE's partners to follow different paths toward commercialization. Therefore, it enables any partner to explore any commercialization opportunity not defined in this exploitation plan.

3.2. Methodological considerations

The methodology that we have followed to build the exploitation plan for the SPICE project has been based on three primary pillars:

1. **Development of a business model sufficiently ambitious to seize the great business opportunity** that we believe exists today for the development of citizen curation software for the cultural heritage industry.

2. **Design a business model that can be flexible enough to meet the characteristics and strategic interests of the broadly diverse community of SPICE's partners**, in which there are research and education organizations, cultural heritage organizations, and companies.
3. **Attempt to achieve some empirical validation for the main design decisions** made concerning the definition of SPICE as an exploitable product, our business model, and market uptake strategies.

Therefore, we have followed a methodology that formally comprises three main stages that nevertheless has been applied through several iterations to develop the final version of the exploitation plan:

1. **Design stage** regarding the exploitation strategy, business model, and product definition. This process started from preliminary ideas and concepts that were already present in the original proposal and also in the previous plan at D 8.2 (M12). However, the development of the project has put us in close interaction with the reality of the market, which has enabled us to test some of this initial hypothesis. Several of them have proved to be very suitable for the development of an exploitation opportunity around SPICE such as the original innovation concept or the initial commitment of the partners to the open-source model. The execution of the SPICE project has confirmed to us that SPICE as an innovation idea was very visionary, and it meets a raising critical need in the cultural heritage industry. Also, the open-source model can become the basis of a dissemination model for most software solutions developed within the SPICE project, and most importantly, it can also be the basis of a sustainable and profitable business opportunity, while also being suited for the different strategic interests of the SPICE partners.
2. **Validation stage**: The validation stage has been performed through an iterative process comprising two main phases: a) validation through secondary sources by extracting valuable insights from the abundance of information already available on the Internet, and 2) validation through primary sources, i.e., by requesting insights directly from the stakeholders. To do this, we have identified the main exploitation business hypotheses of SPICE and tested them with the main stakeholders to validate or otherwise refute them. The interactions with stakeholders have taken place through informal and formal interactions. The latter has been an extensive **customer development survey intended for cultural heritage organisations**, whose results and specific questions are shown in Section 9 and in annex 1 in this deliverable. For this, we have taken advantage of the networking of SPICE's partners to meet with **relevant players in the cultural heritage industry**. Our main goal has been to validate the existence of potential customers interested in SPICE's technical infrastructure and willing to use SPICE's assets and even pay for premium features.
3. **Definition of the final exploitation plan:** as a result of this iterative process, we have achieved a final definition of SPICE's exploitation plan that meets our initial objectives: it is sufficiently ambitious, adequate to seize the current business opportunity, is suitable for all SPICE partners, and it is well-supported by empirical evidence.

3.3. Exploitation Management

The SPICE project has developed several outcomes that can be found useful and adopted by several target segments. All these assets could be commercialized separately or bundled together, and some could even find interests beyond the cultural heritage industry, for which they have been intended within the SPICE project. Large corporations in a variety of industries could be targeted by some of SPICE's partners to commercialize these assets. However, most of these assets are highly specialized software tools intended to solve very specific needs. Also, there are significant interdependencies between all of these assets. Any organization in the cultural heritage industry will likely need to adopt several of these assets together to develop specific applications to foster visitors' engagement. Therefore, we have reviewed the D 8.2 approach and now we consider that the exploitation of these assets separately would significantly reduce the effectiveness and efficiency of the exploitation plan. Consequently, we have opted for a highly focused exploitation plan intended to boost the exploitation potential of SPICE's outcomes:

- We have identified the expected outcomes and assets coming from the SPICE project.
- We have defined **a business model that maximizes the exploitation and dissemination of SPICE's assets** while also providing highly profitable business opportunities. Moreover, since most of SPICE's partners are research and non-profit organizations, which are interested in exploring further applications and developments of these assets, we have selected a model that also maximizes for these organizations the opportunities for further research and development.
- The interdependencies between SPICE's exploitable assets make it advisable to take advantage of the synergies between them for exploitation. They can be considered pieces that can be combined and customized to develop a wide variety of applications. This is not coincidental since SPICE's partners from the very beginning purposely selected six major areas of exploitable knowledge to develop assets that complement and create synergies between each other to create new methods and technologies with the final purpose of supporting new citizen curation activities: Tools and methods for modelling and analyzing citizen curation activities, Distributed Linked Data infrastructure, Interfaces for citizen curation, Integrated socio-technical system for citizen curation, and Design of curation activities.

  The SPICE's case studies are a clear demonstration of the ability of SPICE's assets to become building blocks of very different applications. Therefore, **the exploitation potential of each asset can be highly enhanced if they are commercialized under the umbrella of a single brand name**. This facilitates significantly the communication of each asset's value proposition and enables target customers to understand easier what they could get from SPICE's assets. We consider the best umbrella for our exploitation assets to be "SPICE, software suite for citizen curation and engagement".
- Naturally, this approach requires a **highly focused exploitation plan intended for the cultural heritage industry**. However, it does not exclude any SPICE partner from attempting the exploitation of specific assets also outside the cultural heritage industry. For example, the hate speech detection software developed within the SPICE project can also be applied by any organization moderating a large volume of user-generated content, e.g., on social media. We consider the highly focused exploitation strategy the most likely to maximize SPICE's exploitation success and sustainability. However, the design of our business model provides any SPICE partner with the flexibility to attempt also the commercialization of any asset separately.
- This has enabled us to make a highly targeted market study of SPICE's potential within the cultural heritage industry, and also explore more specific routes to market.
- We have attempted to validate this approach with relevant stakeholders in the cultural heritage industry. Our validation efforts have been focused on validating **the need, the solution, and the business model**, and obtaining a clear view of the further development pipeline of SPICE's assets, **what needs to be developed, improved, and added, to increase SPICE's value and reduce any critical adoption barrier**.

4. Identified exploitable Assets

SPICE's partners have created an outstanding technical infrastructure for citizen curation in cultural heritage organizations. The technical infrastructure(s) at SPICE is the software and network systems aiding and enhancing the process of citizen curation by providing a technological foundation for the museums and cultural heritage organizations. The current list, which is shown below, updates the previous exploitation and dissemination plan at D 8.2 (M12). The previous list has been increased with eight new assets, which the SPICE partners have considered that are valuable and unique and could become highly useful for any cultural heritage organisation using SPICE suite to develop citizen curation activities. Also, the previous assets were

classified into six major areas, which were intended to become development and possibly exploitation areas. In the following lists, however, we have wanted to highlight the unity and interdependency of all SPICE's assets toward the overall objective of developing citizen curation activities.

Deliverable 1.5 (Section 3) provides a detailed explanation of why the SPICE partners have decided to expand the initial list of 12 assets to 20, and moreover why at previous D 1.5 the assets where integrated in just 2. Due to the progress of the development of these innovative assets and their planned exploitation that has been monitored in this task the new innovation strategy leads to a split catalogue of 20 assets that can be used as a software suite for the development of citizen curation activities and applications. The rationale for this significant increase in SPICE's innovative value has to do with the SPICE partners having the experience of developing five case studies during the project to demonstrate the capabilities of SPICE. In these case studies, the SPICE partners have developed five instances of citizen curation applications for cultural heritage organizations: Pop-up VR Museum, GAM Game, IMMA Deep Viewpoints, Hecht Museum, and MNCN. This has entailed that the SPICE partners have met the challenge of designing citizen curation activities from scratch by using what was available within the tools and methods developed during the SPICE project. It has also involved developing some new tools required by this task. This process has given the SPICE partners a whole new perspective on SPICE, which is actually closer to how SPICE's assets will be used and perceived by potential users in the cultural heritage industry. The addition of eight new assets to our preliminary list of innovative solutions is the result of this new perspective. The direct experience of facing the challenge of developing real citizen curation activities has changed the view of what the SPICE project can offer to cultural heritage organizations to help them develop engaging citizen curation applications. The SPICE partners concluded that SPICE offered much more than 12 innovative solutions. There were at least eight additional assets that were very helpful to assist cultural heritage organizations to solve some specific challenges of developing citizen curation activities.

4.1. Exploitable assets

Table 4-1 SPICE's identified exploitable assets

Asset	Asset Description
1. Interpretation and reflection toolkit for citizen curation	Methodological toolkit and handbook which includes a framework for utilizing interpretation and reflection methods to build social capital. The handbook will provide illustrative cases and practical examples of citizen curation activities, utilizing the methods in a range of contexts and with different kinds of audiences and target groups. Interpretation methods: artefact analysis, Narrative methods and Slow looking, Data storytelling, Visualization techniques, Narrative Identity and Auto- and Duoethnography. Shows how citizen curation can be carried out with a range of audiences in various contexts. It helps for the specification of the activities in a specific case application. For more information, see **D2.5 Methodological toolkit for citizen curation**.
2. Tools for interpretation and aggregation of objects	A set of tools oriented to configure, detect, visualize, understand, explain, and navigate through citizen communities. The set includes explanation and configuration tools.
3. Multilingual semantic annotation tool for social curatorial products (user-generated content):	The Semantic Annotator is an annotation service for the semantic enrichment of textual content, targeting user-generated content as well as descriptions of museum artifacts. The Semantic Annotator analysis on the one hand puts the visitor at the center by analysing, interpreting, and then enhancing his point of view; on the other hand, it contributes to the process of defining profiles of

	each visitor to build Community Models. The service is multilingual and supports English, Finnish, Hebrew, Italian, and Spanish. It consists of a natural language processing pipeline that performs Sentiment Analysis, Emotion Detection, and Entity Linking. The service annotates the textual contents concerning the **ontological model** developed in WP6 and generates as output an RDF (Resource Description Framework) graph to be stored in the **linked data hub**. For further information, see **D3.4 - Final semantic annotator.**
4. Multilingual emotion detection model	The novel aspects of the Semantic Annotator lie in the **multilingual Emotion Detection component for the Art domain** that combines state-of-the-art AI models with language-specific domain knowledge. The rule-based system relies on language-specific knowledge (i.e. sentiment/emotion lexicons associating linguistic expressions to sentiment/emotions) and it doesn't require any representative dataset. AI models instead allow for tailoring the system to the domain, jargon, and style of final users; however, they require representative datasets for each language. The Emotion Detection system is designed to be (partially) explainable since every emotion/sentiment detected in text references a textual snippet from the contents, thus providing a simple explanation of the analysis. This asset can be applied for **hate speech detection**: Trained models & code to predict toxic comments on 3 Jigsaw challenges: ● Toxic comment classification, ● Unintended Bias in Toxic Comments, ● Multilingual toxic comment classification.
5. AI Recommendation tool	A tool that provides visitors with diverse and/or socially cohesive recommendations based on communities to which the user belongs so it can suggest content reflecting similarity and diversity within the community as well as connections to other communities. SPICE's recommendation techniques aim to promote social cohesion and inclusion. Our approach includes the community feeling as a useful component of the recommender algorithm that considers not only the individual preferences but also the individuals' awareness of being part of a certain community and how this feeling affects individuals' preferences when dealing with a set of communities in the social world. The role of the social recommender is to provide recommendations for content to the visitor whenever there is a request. It relies on the analysis done by the user and community modellers – the user and the communities the user belongs to and on the guidelines regarding the type of content to provide. Reasoning on the guidelines and the models, the recommender selects the relevant content (or a set of candidates) and presents them to the visitor.
6. Linked Data Hub	An infrastructure, based on the Linked Data principles, to connect cultural objects, collections, and citizen contributions, to provide the backbone for interoperability and knowledge exchange within SPICE activities. It provides the technical infrastructure for data management, essentially helping developers extract collection metadata from museums, managing them into a unifying

	system, and researching into supporting the interoperation between the museum's collections and users' interaction applications. The SPICE Linked Data Hub supports methods for generating and publishing linked data from collection metadata and digital assets, into a Linked non-Open Data network of resources. The SPICE LDH approach is to go beyond aggregators and research on an infrastructure that could mediate between cultural heritage institutions and citizen engagement businesses and organisations, keeping ownership and control in the hands of the data providers. The platform supports application developers with a Web API, linked data integration and querying, access control associated with licenses and terms of use, request, and negotiation of custom licenses, and content monitoring to help data managers deal with sensitive or privacy-related information. The Linked Data Hub has developed an infrastructure that permits: ● building a development infrastructure to allow citizens' opinions, responses, and memories to be shared within safe channels preserving the privacy, ownership, and fair use of the resources involved. ● support developers of applications for citizen engagement in requesting and negotiating access to digital resources and exploiting a stack of intelligent services for content discovery, analysis, and tracing, e.g., supporting application developers for negotiating licenses with data managers. For further information, see **D4.2 - Linked Data server technology: integrating feedback from use case requirements**.
7. SPARQL Anything	SPARQL Anything is a system for Semantic Web re-engineering that allows users to ... query anything with SPARQL. SPARQL Anything uses a single generic abstraction for all data source formats called Facade-X. Facade-X is a simplistic meta-model used by SPARQL Anything transformers to generate RDF data from diverse data sources. Intuitively, Facade-X uses a subset of RDF as a general approach to represent the source content as-it-is but in RDF. The software is developed in Java and it is 100% open-source under the Apache Licence 2.0. SPARQL Anything is built on top of Apache Jena and comes as a software library, a command line interface, and a server, and it is also available to Python users (PySPARQL-Anything).
8. Tracking and Analysis service for digital assets	This asset works as an extension of the Linked Data Management Platform to allow the analysis of usage traces.
9. Service for discovering and linking Digital Assets	An extension to the SPICE Linked Data Hub which allows for (a) automatically linking assets from different collections and museums and using those links to enhance the description of each one of them, and (b) searching and discovering assets from multiple collections with fine-grained access control policies.
10. Integrated interfaces for citizen curation - inSPICE	Web application that allows instantiating, configuring, and executing a citizen curation activity where interpretation and reflection activities are intertwined. Within this web application, parameterizable templates of citizen curation activities can be defined by museum staff for artifact analysis, collecting of methods, and narratives combined with visualization techniques.

	• InSPICE provides a **catalog of experiences** identified in the SPICE project as engaging citizen curation activities for end users. They are examples of good practices already validated in the SPICE project that other museums and cultural sites can adopt. • InSPICE provides up to 80% of the infrastructure required for a museum or cultural site to carry out these activities, which highly reduces the cost of developing these activities. • InSPICE provides the building blocks of these activities (showing content, requesting inputs, etc.), which can be combined to develop similar activities to the ones carried out in SPICE, or recombined to create new ones. • It is aimed at museum employees with no technical knowledge, who can develop these activities through a user-friendly process of configuring activities. For further information, see **D5.3 Integrated interfaces for citizen curation**.
11. Scripting service for social curation	Scripts are the elements detailing the socio-technical activities played by the users and the software components in SPICE to foster the interpretation and reflection loop. For further information, see **D6.7 Curation scripting support**.
12. Toolset for semantic Integration and specification	This set of tools will provide APIs and reuse existing protocols to integrate end-users' applications to allow exploitation of the ontologies developed in WP6 and their reasoning components with SPARQL.
13. SPICE Ontology Network (SON) for citizen curation	The SPICE Ontology Network (SON) is an Ontology network for citizen curation: it implements the formal semantics for an integrated socio-technical system for citizen curation. It includes a technical research infrastructure to integrate multiple knowledge graphs and ontologies, a linked data social media layer, interface components, annotation software, recommendation systems, data mining tools, and models/methods devised by the SPICE work packages. SON is an integration driver: it creates an interoperable space, where applications can interact with shared semantics. SON enables software components to organise, exchange, query, interpret, and reason over data collected or generated during citizen curation activities. SON empowers applications with knowledge-level reasoning to support citizen curation activities. This enables, for example, the discovery and extension of latent sensemaking, and the automated inference of implicit (non-trivial) implications from the data shaped according to the SON or aligned to it. SON includes among others: 1) two ontologies for representing User Profile and Communities; 2) an ontology formalizing Curry's theory on moral values; 3) an ontology, called Value Core, developed to generalize the various ontologies formalizing theories on Moral Values (i.e. Curry, Haidt, Schwartz); 4) an ontology called "Atlas of Emotions" aims at integrating the multiple theories on emotions (i.e. Ekman, Pluchick, Ortony-Clore-Collins, and Shaver); 5) an ontology dealing with symbolic meaning;

	6) an ontology for supporting thematic reasoning; 7) an ontology for supporting formal comparison of non-formal theories. For further description, see **D6.5 - Final Ontology Network Specification**.
14. Replication service of SPICE Case studies in heritage institutions	This is a solution for developing and monitoring the contents of heritage experiences based on the case studies carried out within the project. Methods used here include: 1. Activity-oriented scenario design; 2. Persona design; 2. User (UX) experience and Service design maps. For more information, see **D7.7 Case studies progress and plan - final version**.
15. Methodologies for the creative co-design of citizen curation experiences	Throughout the development of SPICE's five case studies the consortium has built a set of methodologies intended to select relevant user experiences, human behaviours, and heritage experiences for specific end-user communities. These methodologies can become a roadmap for other cultural heritage organizations to carry out future co-designed activities. These methodologies, most of them collaborative, can help any cultural heritage organization go through all the necessary steps to develop these types of visiting experiences: ● UX mapping for end-user communities ● Citizen curation methods and the reflection process ● Developing user models and community models for social recommendation ● Activities and roles in the MANIFEST ● Citizen curation activities for interface development ● Scripting activities. For further information, see **D7.4 Socio-technical roadmap with project management tool**.
16. The User Model and Community Model	In the SPICE project, user models represent the individuals that are interacting with the system. They are key elements (together with the community models) used to guide the process of content recommendations to individuals, taking into consideration individual and community interests, as well as script guidelines, to search and identify relevant users' contributions, to provide alternative interpretations of objects, to promote the social contagion among users and to emphasize the similarities and differences within and across communities. Communities are key elements to searching and browsing contents of interests, identifying similarities and differences across users and their contributions, providing alternative interpretations of objects, promoting the social contagion among users, and emphasizing the similarities and differences within and across communities. Detection, visualisation, and explanation of communities allow for the exploration, reflective reasoning, and social cohesion of the users. For further information, see **D3.3 - Final User and Community Models**.
17. Socio-technical systems (STS) maps and the UX maps	They help cultural heritage organizations to implement citizen curation applications and identify potential problems: 1. Map the interaction of each of the stakeholder communities with the SPICE system, for the potential application; 2. Reveal as much as possible where the goals of promoting accessibility and inclusiveness might confront unexpected glitches in the form

	of ethical issues. For further information, see **D7.4 Socio-technical roadmap with project management tool**.
18. DEGARI affective systems for complex emotion extraction and reasoning	DEGARI is an affective reasoner able to extract and classify complex emotional content from the textual content associated with museum items. A specialty of the system is in that - differently from the other sentiment analysis and emotions extractors - it focuses on the classification of compound emotions (i.e. emotions based on the combination of basic ones by exploiting Plutchik's ontology). The system is also used to provide affective-based recommendations of museum items. The software is 100% open-source under the GPL 3 license.
19. Value detector system for moral value detection and composition with factual knowledge extraction	The value detector system for moral value detection reuses the FRED knowledge graph extractor and augments the frames from the knowledge graph with moral value frames that are composed with the factual knowledge already provided by FRED. It is then possible to run querying and reasoning on the augmented graph. Moral frames disambiguate and formalize Haidt's Moral Foundation Theory. Its usage includes e.g. the ability to associate user interpretations of heritage to the moral values that are (explicitly or implicitly) expressed by them. The software is 100% open-source under the GNU GPL3 license
20. Virtual Empathy: a cognitively validated VR system to foster perspective taking and reflection over heritage interpretation, aided by automated emotion and value detection from users' verbal interpretation	Virtual Empathy is a Virtual Reality system that fosters perspective taking and reflection over heritage interpretation, enhanced by automated emotion and value detection from users' verbal interpretation. The possibility to enhance empathy has been rigorously demonstrated in a series of cognitive science experiments. Its usability in museums has been also demonstrated with a high SUS score. The software is 100% open-source under the GNU GPL3 license.

5. Ownership rights of SPICE's exploitable assets

The previous deliverable D8.2 Exploitation and Dissemination Plan of the SPICE project treated in detail the question about the Rights and Obligations of the members of the consortium related to SPICE's exploitable assets. In this section, we are going to avoid repeating what was already stated in sufficient detail in deliverable D8.2. There were, however, some questions that were treated only in a preliminary manner in that deliverable and still require some clarification. The main issue still pending is the distribution of the ownership IP rights for all the exploitable assets among the members of the SPICE consortium. The rules that determine the ownership IP rights of the SPICE consortium were well established in the initial project and later also in the grant agreement signed by all partners (see Section 2 in this deliverable). In those documents, the consortium members agreed that the ownership of the IP rights for all the exploitable assets of the project would be defined from two main attribution criteria:

1. **Previous development work:** some of SPICE's assets had already reached some level of development before the SPICE project because they were the result of previous development work by some of

SPICE's partners. The grant agreement stated that these previous developments must be recognized for an accurate estimation of the ownership rights of the members regarding each exploitable asset. To make a proper estimation of these previous developments of the exploitable assets, the grant agreement also stated for each asset that had previously achieved a certain level of development, the specific TRL reached before the SPICE project, and the TRL expected after the project. Therefore, we will be able to assign previous ownership rights in proportion according to the TRL that each asset had before the SPICE project.

2. **Distribution of development efforts during the SPICE project**: The second rule for the distribution of ownership rights stated that it would be proportional to the contributions made by each partner to the development of each exploitable asset.

Based on these two principles, we have made an estimation of the ownership rights for each exploitable of all consortium members. The methodology used to make this estimation and the results have been shared with all SPICE partners, and some partners have made amendments to develop a distribution of the ownership of IP assets that can be acceptable to all partners. This methodology and results were shared will SPICE partners in a consortium meeting specifically intended for defining IP rights, they were also shared with them all by making them available in a shared folder within the project cloud shared space, and the partners were given ten days to make amendments publicly.

Table 5-1 First attribution criteria for ownership of IP rights among the SPICE partners: contributions to development efforts.

Exploitable asset	WP	UNIBO	AALTO	DMH	AAU	OU	IMMA	GVAM	PG	UCM	UNITO	FTM	CELI	UH	CNR
1. Interpretation and reflection toolkit for citizen curation	WP2	3	15	3	17		3				2	3		3	
2. Tools for interpretation and aggregation of objects	WP3	4								14			13	18	0.5
3. Multilingual semantic annotation tool for of social curatorial products (user-generated content):	WP3												13		
4. Multilingual emotion detection model	WP3												13		
5. AI Recommendation tool	WP3	4								14			13	18	0.5
6. Linked Data Hub	WP4					24									
7. SPARQL Anything	WP4	4				24					4		2	2	
8. Tracking and Analysis service for digital assets	WP4	4				24					4		2	2	
9. Service for discovering and linking Digital Assets	WP4	4				24					4		2	2	
10. Integrated interfaces for citizen curation - inSPICE	WP5	1						6	21		4				3
11. Scripting service for social curation	WP6	15				6		3	1	1	25		2	2	1.5
12. Toolset for semantic Integration and specification	WP3	4								14			13	18	0.5
13. SPICE Ontology Network (SON) for citizen curation	WP6	15				6		3	1	1	25		2	2	1.5
14. Replication service of SPICE Case studies in heritage institutions	WP7	1	29	3	13	5	12	3	1	13	6	6	3	13	
15. Methodologies for the creative co-design of citizen curation experiences	WP7	1	29	3	13	5	12	3	1	13	6	6	3	13	
16. The User Model and Community Model	WP3	3	15	3	17		3				2	3		3	
17. Socio-technical systems (STS) maps and the UX maps	WP7	1	29	3	13	5	12	3	1	13	6	6	3	13	
18. DEGARI affective systems for complex emotion extraction and reasoning											10				
19. Value detector system for moral value detection and composition	WP6	20													10
20. Virtual Empathy: a cognitively validated VR system to foster perspective taking and reflection	WP5	5													35

Table 5-2 Second attribution criteria for ownership of IP rights among the SPICE partners: development efforts already made before the SPICE project by partners.

Exploitable asset	Initial TRL	Final TRL	INITIATOR	PREVIOUS EFFORT	UNIBO	AALTO	DMH	AAU	OU	IMMA	GVAM	PG	UCM	UNITO	FTM	CELI	UH	CNR
1. Interpretation and reflection toolkit for citizen curation				0.0														
2. Tools for interpretation and aggregation of objects	4	6		99.0														
3. Multilingual semantic annotation tool for of social curatorial products (user-generated content):	4	7	CELI	17.3												1		
4. Multilingual emotion detection model	4	7	CELI	17.3												1		
5. AI Recommendation tool	4	6	UH	99.0														
6. Linked Data Hub	3	6	OU	24.0					1									
7. SPARQL Anything				0.0														
8. Tracking and Analysis service for digital assets	4	7	OU	48.0					1									
9. Service for discovering and linking Digital Assets				0.0														
10. Integrated interfaces for citizen curation - inSPICE	3	7	PG	26.3								1						
11. Scripting service for social curation	3	6	UNITO	56.5														
12. Toolset for semantic Integration and specification				0.0														
13. SPICE Ontology Network (SON) for citizen curation	4	8	UNITO	56.5										1				
14. Replication service of SPICE Case studies in heritage institutions				0.0														
15. Methodologies for the creative co-design of citizen curation experiences				0.0														
16. The User Model and Community Model	4	6		98.0														
17. Socio-technical systems (STS) maps and the UX maps				0.0														
18. DEGARI affective systems for complex emotion extraction and reasoning			UNITO	0.0										1				
19. Value detector system for moral value detection and composition	1	6	UNIBO	6.00	1													
20. Virtual Empathy: a cognitively validated VR system to foster perspective taking and reflection	1	7	CNR	6.67														1

By combining both attribution criteria, we can make an accurate estimation of the ownership of IP rights by all consortium partners for every exploitable asset identified in the SPICE project.

Table 5-3 Final attribution of ownership of IP rights among the SPICE partners estimated by combining the two principles stated before

Exploitable asset	UNIBO	AALTO	DMH	AAU	OU	IMMA	GVAM	PG	UCM	UNITO	FTM	CELI	UH	CNR
1. Interpretation and reflection toolkit for citizen curation	6%	31%	6%	35%		6%				4%	6%		6%	
2. Tools for interpretation and aggregation of objects	8%								28%			26%	36%	1%
3. Multilingual semantic annotation tool for of social curatorial products (user-generated content):												100%		
4. Multilingual emotion detection model												100%		
5. AI Recommendation tool	8%								28%			26%	36%	1%
6. Linked Data Hub					100%									
7. SPARQL Anything	11%				67%					11%		6%	6%	

8. Tracking and Analysis service for digital assets	5%				86%					5%		2%	2%	
9. Service for discovering and linking Digital Assets	11%				67%					11%		6%	6%	
10. Integrated interfaces for citizen curation - inSPICE	2%						10%	77%		7%				5%
11. Scripting service for social curation	27%				11%		5%	2%	2%	44%		4%	4%	3%
12. Toolset for semantic Integration and specification	8%								28%			26%	36%	1%
13. SPICE Ontology Network (SON) for citizen curation	13%				5%		3%	1%	1%	72%		2%	2%	1%
14. Replication service of SPICE Case studies in heritage institutions	1%	27%	3%	12%	5%	11%	3%	1%	12%	6%	6%	3%	12%	
15. Methodologies for the creative co-design of citizen curation experiences	1%	27%	3%	12%	5%	11%	3%	1%	12%	6%	6%	3%	12%	
16. The User Model and Community Model	6%	31%	6%	35%		6%				4%	6%		6%	
17. Socio-technical systems (STS) maps and the UX maps	1%	27%	3%	12%	5%	11%	3%	1%	12%	6%	6%	3%	12%	
18. DEGARI affective systems for complex emotion extraction and reasoning										100%				
19. Value detector system for moral value detection and composition	72%													28%
20. Virtual Empathy: a cognitively validated VR system to foster perspective taking and reflection	11%													89%

The previous table entirely clarifies the question about the distribution of ownership rights between SPICE's partners. However, except for asset numbers 3 and 4, all SPICE's assets will be shared and exploited under an open-source licensing agreement. Therefore, the SPICE partners do not need to sign explicit exploitation agreements for the cession of exploitation rights with other SPICE partners. Any SPICE partner willing to exploit other partners' assets will be allowed to do it under the open-source license like any other user. Only if the exploitation plans of a SPICE partner would go beyond the open-source licensing agreement, it would need to request other SPICE partners to sign a specific licensing agreement that surpasses what is allowed to other users.

6. SPICE product: SPICE as a software suite for citizen curation and engagement

Despite the variety of assets developed by the SPICE project and the fact that each one could have an exploitation journey by itself, there is a clear unity between them. They all are pieces intended to enable cultural heritage organizations to develop citizen curation experiences. Citizen curation enables citizen groups to express their own views about cultural heritage experiences as well as appreciate the perspective of other communities.

The SPICE product can be defined as a suite of combinable and customizable tools, methods, and technologies intended to augment the visitor experience of cultural heritage organizations through computer-mediated communication systems. All the SPICE's technical infrastructure of tools and methods are intended to develop a specific type of visitor experience intended to encourage participation, understanding, and social cohesion. SPICE provides cultural heritage organizations with the tools to develop these visitor experiences.

SPICE's technical infrastructure can be considered an early version of a product intended to help cultural heritage organizations develop a specific type of visitor experience with a great variety of possibilities: it provides value (it has a value proposition), it meets a market need and a relevant one for today's cultural heritage organizations, and it has validated its ability to build specific applications.

Moreover, SPICE's case studies showcase the broad range of creative possibilities that SPICE's technical infrastructure makes possible:

- The **Design Museum Helsinki** Pop-up VR Museum enables us to examine use and visitor reception in relation to new generation digitally born heritage artifacts.
- **Galleria D'arte Moderna**'s GAM Game allows for experimentation into the combined use of gamification strategies with heritage artifacts.
- **Irish Museum of Modern Art**, IMMA's Slow-looking Dashboard prototype demonstration facilitates extending an already-known art-historical methodology into the digital domain so that we might better observe processes involved in the act of reflection.
- Both **Hecht Museum's** and **Museo Nacional de Ciencias, MNCN** Naturales pilot studies with school children aim to provide a more introspective experience of imagining ancient times, or even different worlds that exist by looking at heritage artifacts using different scales.

Figure 6-1 SPICE's value proposition

Can SPICE's technical infrastructure for citizen's curation in cultural heritage organizations be considered a product despite being at an early stage of development?

Previously, we have argued that it is, that SPICE's technical infrastructure contains most of the components of a product. However, we still wanted to validate this hypothesis with the SPICE's partners that more closely investigated this possibility, the partners involved in developing SPICE's case studies. Therefore, we have asked them directly and obtained the results summarized below.

Table 6-1 SPICE's assets used to develop each case study

Asset	Pop-up VR Museum	GAM Game	IMMA, Deep Viewpoints	Hecht Museum	MNCN
1. Interpretation and reflection toolkit for citizen curation	✓	✓		✓	✓
2. Tools for interpretation and aggregation of objects	✓	✓			
3. Multilingual semantic annotation tool for of social curatorial products (user-generated content)	✓			✓	
4. Multilingual emotion detection model	✓	✓	✓	✓	✓
5. AI Recommendation tool				✓	
6. Linked Data Hub	✓	✓	✓	✓	✓

7. SPARQL Anything			✓		
8. Tracking and Analysis service for digital assets			✓		
9. Service for discovering and linking Digital Assets			✓		
10. Integrated interfaces for citizen curation - inSPICE				✓	✓
11. Scripting service for social curation			✓		
12. Toolset for semantic Integration and specification	✓	✓			
13. SPICE Ontology Network (SON) for citizen curation	✓	✓		✓	
14. Replication service of SPICE Case studies in heritage institutions					
15. Methodologies for the creative co-design of citizen curation experiences				✓	✓
16. The User Model and Community Model				✓	
17. Socio-technical systems (STS) maps and the UX maps	✓	✓	✓	✓	✓
18. DEGARI affective systems for complex emotion extraction and reasoning	✓	✓		✓	
19. Value detector system for moral value detection and composition		✓			
20. Virtual Empathy: a cognitively validated VR system to foster perspective taking and reflection	✓				

The answers of the SPICE partners responsible for developing the different case studies of the project provide strong support to the vision of SPICE as a suite of combinable and customizable building blocks that enables cultural heritage organizations to develop citizen curation applications. SPICE can therefore be considered an early version of a product that provides considerable creative freedom to cultural heritage organizations to build a variety of citizen curation experiences, simply by adopting SPICE's technical infrastructure *à la carte*. When asked directly on this question, there is also a broad consensus about this view of SPICE's capabilities.

Table 6-2 Do you think that SPICE's assets could be understood as a set of combinable and customizable tools, methods, and technologies intended to augment the visitor experiences in cultural heritage organizations?

	Answer	**How close would be these cultural heritage organizations to developing a complete citizen curation experience with SPICE's tools? What would they still need that is missing in SPICE's assets?**
Pop-up VR Museum	**Yes**	Yes, when they are polished and easily accessible, distributed and used, they could be very beneficial to other cultural heritage organizations. DMH Case Study is ready with a complete citizen curation experience with the Pop-up VR Museum application and other workshop activities.
GAM Game	**Yes**	Yes, they can be considered as a modular architecture where each component can be eventually used and integrated into other applications to develop citizen curation experiences.
IMMA	**Yes**	In our case study, we can envisage various assets bringing added value to the citizen curation experience as optional 'plug-ins'. Deep Viewpoints is fully operational at IMMA.
Hecht Museum	**Yes**	Fairly close, integration is needed for User Model, Community Model, Social Recommender, and InSpice (UI generator)
MNCN	**Yes**	The use cases that use exclusively web technology (Hetch, IMMA, GAM) could be replicated with very little effort, including information on the specific works you want to work with. With a little more effort, variants of these experiences could be defined.

The previous tables collected the opinions and impressions of those that have already faced the challenge of developing citizen curation activities by using any of SPICE's identified assets. Their answers provide several important insights about SPICE:

- SPICE partners have actually used SPICE's assets as a suite of combinable and customizable suite of tools and methods for the development of citizen curation activities.
- SPICE as a software suite for citizen curation is far from becoming an actual product. It is not a product yet, it is far from being a whole product either because there are still several gaps and there is lack of integration between the components, but some early adopters in the cultural heritage industry could go far in developing citizen curation activities by only using SPICE's assets. Naturally, early adopters are, by definition, willing to forgive any gap or any further costs or risks of adopting SPICE for citizen curation.

These two findings highlight, however, how far has come SPICE to becoming a real citizen curation product. It enables SPICE partners and other stakeholders of the cultural heritage industry to become aware of a clear development roadmap for SPICE in the following years. SPICE could become the first whole product in an emerging citizen curation software market.

7. Market study

7.1. Target users

The main target customer of whole SPICE technical infrastructure are **cultural heritage organizations** including museums, historic sites, monuments, zoos, cities and towns, etc. However, some parts of it can have a wider target market, e.g., the multilingual semantic annotation and the emotion detection model can be adopted by any organization in almost any industry.

SPICE technical infrastructure provides a varied suite of tools and building blocks to create visitor experiences and citizen curation processes. Cultural heritage organizations can combine and customize them to create a variety of applications. The applications will vary due to the diversity in end-user communities, the genre of pilot applications, and the variety of content for engagement with stakeholders.

7.2. Citizen Curation as an emerging trend in cultural heritage

Museums and cultural organizations are increasingly adopting technologies, particularly mobile technologies through visitors-owned cell phones or through tablets. Whether through offering immersive app-based tours or experimenting with augmented reality, the cultural industry has already engaged with mobile technology to enhance visiting experiences. Not surprisingly, the Global Museum Software Market Size is projected to grow from 1.95 billion USD in 2021 to 3.07 billion USD by 2030, at a CAGR of 13.23%[1]. This information indicates the dynamism of the software market for cultural heritage. However, citizen curation is only an emerging trend in the cultural heritage industry, so to have a more accurate measurement of the potential market size for citizen curation, we attempt a market size estimation in Section 7.5 below.

SPICE, however, will involve using technology, whether in a virtual or physical museum space, not just as an alternative source of information but as a way of promoting and collecting responses to the object. Design inside the gallery space will therefore focus on encouraging the visitor to look deeper and make meaningful connections to objects. Technology will also be designed to support interaction outside the museum space, including pre and post-visit activities. SPICE proposes museums and cultural heritage organizations go a step further a provide visitors with applications that foster reflection, detailed feedback on collections, creativity, debate, and exchange of their own opinions or contributions with other visitors. These activities of citizen curation involve upgrading visitors' impressions and reflections shared during the visit as a new valuable asset that can enhance other visitors' experience and become part of the collection itself. Simultaneously, it involves upgrading the role of the cultural heritage organization to become more active in fostering the

[1] Global Museum Software Market by Type (Cloud Based, Web Based), By Application (Large Enterprises, SMEs) And By Region (North America, Latin America, Europe, Asia Pacific and Middle East & Africa), Forecast From 2022 To 2030.

integration of minorities and groups at risk of exclusion and promoting their inclusion among wider groups. These activities are currently not often provided by cultural heritage organizations and museums.

Museums are already transforming visiting experiences by adopting technologies. However, when assessing the top technological trends of museums today, it is hard to find citizen curation applications[2]:

1. **Multisensory experience:** Augmented reality (AR) is likely to completely change the field of museums and how the world sees them.

2. **Museums trends shaped by the VR culture:** Virtual reality (VR) completely changes how we look at things. It feels like being in a specific place while not really being there. Virtual reality technology is something that museums have started to explore and it is likely to affect the way museums operate.

3. **Museum technology:** Voice commands will allow customers and museum staff to facilitate their daily tasks. It will be easy for a visitor who has an interest in a particular topic to find all the data related to it just by expressing it. It is also a great way for museums to collect data and information.

4. **Museum attendance:** Another significant trend that has recently made an appearance on the museum scene is museum attendance. This trend deals with advertising how safety precautions for the covid-19 are part of the new museum experience and how the flow of visitors is limited.

5. **Know what your customer wants:** This is probably one of the most followed trends currently in the museum industry. It has opened new opportunities for museums to reshape their identity. Museums have often been regarded as monotonous or traditional in their approach, but that is changing. Now, proper research is conducted on what a specific group of people expects when they come to a museum to create more impactful experiences.

6. **Museum apps:** In 2021, you can forget about traditional audiobooks. Museum apps are taking the center stage by digitizing the museum experience. Apart from being safer as customers can use their own mobile devices, museum apps can be customized and include a lot of useful information, interactive maps, etc.

7. **Creating a smooth experience:** Museums can create a smoother experience by making sure clients don't have to wait in line, buy tickets in-person, etc. All this can be avoided with the use of digital technology.

8. **Take into account every detail:** Visitors normally come to the museum and hope to find data and information on a topic or piece of art that piques their interest. The museum must have sufficient data and statistics that are well-researched to meet the expectations of all visitors.

Among all these trends cultural heritage organizations seem to be part of citizen curation activities. However, very recently, after seven years of debate, the International Council of Museums (ICOM) has created a new consensual definition of "museum":

"A museum is a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets, and exhibits tangible and intangible heritage. Open to the public, accessible and **inclusive, museums foster diversity** and sustainability. They operate and communicate ethically, professionally and **with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing**."

In this new definition of museums, we can identify several elements that are directly aligned with the objectives of citizen curation activities.

On the other hand, there is also a clear idea that museums and, in general, cultural heritage organizations are in the midst of a transformation period: "Today's museums are no longer just collections of art and artifacts. They are **community connectors**, educators, and **engines for societal change**. They boost tourism but **also reshape cultural narratives**[3]."

[2] 8 trends that are transforming museums, 2022

[3] The changing role of museums, 2021.

Again, we can also recognize the seeds of citizen curation applications in this definition of the direction that is shaping the museum's changing role in society. Among the identified priorities used to describe this change, we can also identify citizen curation activities even clearer:

- In a survey intended for influential museum leaders in Chicago, Houston, New York, Los Angeles, London, and San José, Costa Rica, the first conclusion was: "**The museum experience will become more interactive and self-directed.** As museum leaders look to the future, they see a shift to a greater level of visitor control and new methods of audience engagement. Today's emphasis on in-person, personal, museum-curated experiences will **evolve to accommodate digital engagement (on- and off-site), self-directed entry experiences, and visitor curation.**" (What is the future of the museum?)
- Reflecting communities: In the PAMA in Canada (Peel Art Gallery, Museum and Archives) they are attempting to mirror up to its communities. As Peel Regional Municipality grows steadily more diverse, PAMA has worked not only to reflect that but also to have the communities themselves shape the programming.
- Giving a voice to the marginalized and reaching out to underserved populations: the Baltimore City Life Museum has actively given tours to marginalized communities and enrol junior volunteers in these communities (Who is this museum fo? - The Harvard Gazette).
- The role of museums has been challenged to evolve beyond colonization and into a space for remembering and **reflecting on history**. As part of the structural transformation process, there must be greater diversity in senior and executive positions. It is critical to engage the community in order to improve service access (What is the role of museums today, 2022, Ara Bontemps Museum).
- **How do museums remain relevant in the 21st century?** In 2013 Linda Norris and Rainey Tisdale, two scholars and museum professionals published a book titled Creativity in Museum Practice, replete with creativity exercises and stories from the field as a **guide to developing an internal culture of creative learning in museums** and delivering an increased value to museum visitors. **Creative leaders are looking for interactive programs, love to improvise, engage the community in conversations, and take risks** (The Role of Museums in the 21st Century).
- The Montreal Museum of Fine Arts has recently introduced a program called The Art Hive that brings together art and well-being. The aim of the project is to form "a creative studio supervised by an art therapist, with art materials provided free of charge." This will be a space "**where participants can meet to discuss, participate or exhibit**" (The Art Hive)

Therefore, we consider that there is sufficient evidence to conclude that there is an incipient market for citizen curation applications for cultural heritage organizations. We believe that even though citizen curation applications do not appear in the top technological trends of cultural heritage organizations today, the market is ripe to start adopting solutions such as SPICE at a large scale shortly.

7.3. SWOT analysis

STRENGTHS	OPPORTUNITIES
• SPICE has developed a sophisticated set of tools that can be adopted by cultural heritage organizations to meet their specific goals. • SPICE's cases studies have shown how the SPICE technical infrastructure can be landed to develop engaging new visitors' experiences	• There is a market for new digital technologies intended to enhance visitors' experiences. Digital technologies are increasingly used by museums. • Cultural heritage organizations aim to attract minorities and underrepresented visitor groups. • The Global Museum Software Market Size is projected to grow from 1.95 billion USD in 2021 to 3.07 billion USD by 2030, at a CAGR of 13.23%.
WEAKNESSES	**THREATS**
• The consortium is dominated by research organizations and non-profits that are mostly not interested in carrying out the commercial exploitation of the SPICE technical infrastructure. • Only three private companies out of 14 partners, and do not have the resources to carry out an ambitious commercial exploitation of SPICE.	• Global Museum Software market is becoming increasingly competitive with a large number of well-established companies and start-ups, e.g.,Museum Archive, My Tours, eMuseum, CatalogIt, Lucidea Software Solutions, PastPerfect, eHive, artAttendant, RocketRez, Gatemaster, eMembership, etc. • The SPICE suite is too ambitious to be a market-ready standalone system and will require higher investments

7.4. Market barriers

Cultural heritage organizations meet some relevant barriers to the adoption of citizen curation activities:

- **Budgetary restrictions**: cultural heritage organizations are normally public and private foundations that mostly depend on fixed budgets to carry out their activities. In many cases, the revenue generated by selling tickets does not cover their operating expenses and consequently, they have scarce resources for investment projects such as adopting new technologies or applications. Therefore, they often depend on ad hoc public programs or private sponsorships to be able to carry out their investment plans in technologies and applications. Ultimately, this involves that they typically focus only on clear priorities in their adoption decisions. This budgetary restriction may involve that unless citizen curation becomes a priority for cultural organizations and public and private sponsors, it will be difficult that them to have the available funds to adopt citizen curation activities.
- **Total cost of adopting citizen curation activities**: citizen curation is a new concept for many cultural heritage organizations, which involves the adoption of new products and technologies, but also new ideas and, perhaps also, new paradigms about roles that cultural heritage organizations must fulfil in society. Also, cultural curation involves new forms of interaction between visitors and collection objects, which involve higher participation and even the cocreation of a whole new dimension of cultural assets generated through this interaction. The need to adopt this wide range of novelties to traditional cultural heritage activities ultimately increases the total cost of adopting citizen curation, so raises barriers to adoption.
  The adoption decision of citizen curation activities in cultural heritage organizations is likely to be made collectively by several players and even influenced by many more, even vetoed by some (management, public and private sponsors, curators, etc.). Therefore, the adoption decision process must be further

clarified to have a clear understanding of the barriers that this adoption process may meet and how to get every critical player on board.

7.5. Market size

It is a significant challenge to estimate the size of a new market such as the citizen curation software market because there are no available reports that may provide us with some information. Also, since the market is just emerging, the majority of the potential customers, i.e., cultural heritage organizations are not even aware yet of the need to develop citizen curation activities, or its not become a priority yet. In many cases, they have not even explored in the market what solutions are already available.

The lack of secondary sources about the potential size of the market involves that we need to make some assumptions to provide a realistic estimation of its size:

- **Technology Adoption Curve**: not all market segments are equally willing to adopt a new product category such as citizen curation software. In the market, we may find a minority of cultural heritage organizations that have already identified the need and are willing to start testing the available solutions. They are early adopters and visionaries. It will take time until the bulk of the market, the mainstream market is ready to enter the market.
- **Technology adoption cycle**: due to the identified market barriers, we do not believe that the citizen curation software market will mature rapidly. It will take some time, and to be conservative in our estimations we estimate the whole technology adoption cycle to last up to 15 years.
- **How often will cultural heritage organizations make investments in implementing citizen curation software and technologies?** Again, we want to make conservative assumptions, so we estimate once every three years.
- **Markets:** SPICE targets any cultural heritage organization anywhere worldwide, but to be realistic, we should focus, at least initially, on our immediate markets, since it may be difficult to expand our market reach to other areas. Therefore, we will initially focus on Europe as a primary market, and North America as a secondary market. North America has been selected mainly for two reasons: their museums face very similar challenges to European museums, which are also leading them to citizen curation, and it is a very large market.
- **Segments:** SPICE targets three main segments in the cultural heritage industry: 1) museums, which are likely our primary market; 2) cultural heritage sites; 3) potentially also, historical or monumental cities, towns, and villages. However, museums are likely to be a high proportion of SPICE's customers at least initially because they seem to be ahead of the others in becoming aware of the need of implementing citizen curation activities. The other two segments are likely to be initially marginal, and particularly the third will take still some time to mature. It is more accurately a follow-on, future segment for SPICE. Therefore, our estimations will here focus on museums.

Table 7-1 Museums in target markets

	TOTAL	Art, archæology and history museums	Science and technology museums, ethnology museums	Other museums
Austria[4]	370	77	47	246
Belarus	131	112	11	8
Belgium				
Croatia	206	67	25	104
Denmark	258	242	10	6
Finland	317	128	42	147
France	1,300	350	300	650

[4] MUSEUMS IN EUROPE, 2022.

Germany	6,059	987		5,072
Greece	1,541	1,541		
Hungary	661	197	155	309
Ireland	218			
Italy	417	417		
Latvia	130			
Luxembourg	35	11	8	16
Norway	274	200	14	60
Poland	665	272	116	277
Portugal	577			
Romania	548	211	113	200
Slovak	85	36	11	38
Slovenia	48			
Spain	1,125	600	232	293
Sweden	198			
The Netherlands	873	553	311	9
UK	1,850			
TOTAL Europe	**16,586**	**6,001**	**1,395**	**7,435**
Other target markets				
USA[5]	33,082			
Canada[6]	2,700			
Total other markets	35,782			

Table 7-2 Estimation of the size of the Citizen curation software

			2024	2026	2032	2038	2040
Market segment			Visionaries	Early adopters	Early majority	Latle majority	Laggards
		Museums	3%	6%	40%	40%	11%
New customers entering the market	Europe	16,586	498	995	6634	6634	1824
	North America	35,782	1073	2147	14313	14313	3936
Accumulative customers	Europe		498	1493	8127	14762	16586
	North America		1073	3220	17533	31846	35782
Market size (Euros)	Europe		7,463,700	22,391,100	121,907,100	221,423,100	248,790,000
	North America		16,101,900	48,305,700	262,997,700	477,689,700	536,730,000
Average cost of adopting citizen curation activities				45,000			
Frequency of purchase: every 3 years							

Our estimations portray a market that will grow progressively over time and which will reach will become an appealing market opportunity over time. Also, other market segments may progressively join museums in the market, thus creating a market opportunity that at its peak may become a billion-Euros market. Moreover, we do not expect that this market will become an as highly contested market as other neighboring

[5] https://studyinginswitzerland.com/most-visited-museums-in-the-world/
[6] Canadia Museums Association, 2020

markets within the cultural heritage area, which may turn citizen curation into a great niche market that may provide a growth venue for small companies.

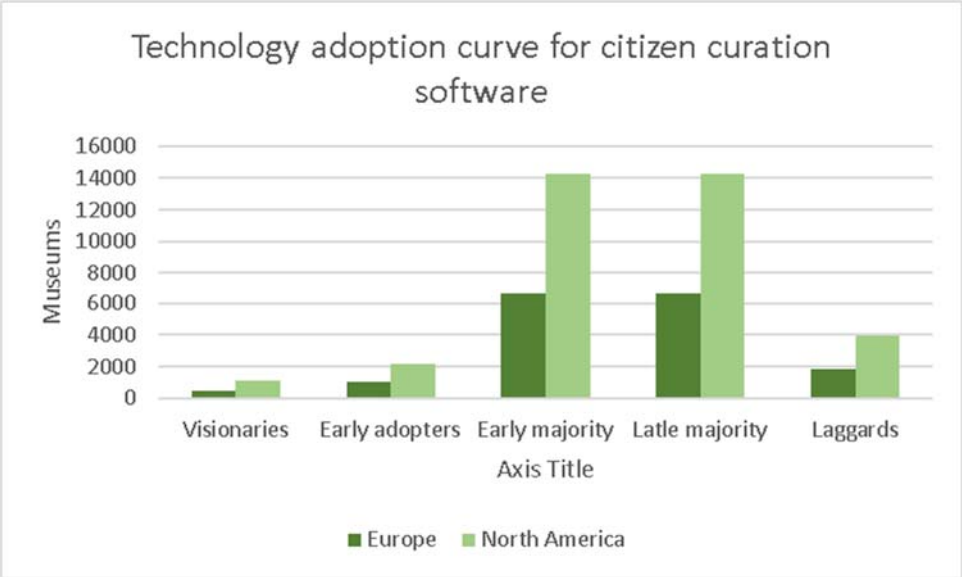


Figure 7-1 Technology adoption curve for citizen curation software

8. Business model

We have chosen an **open-source business model** as the most suitable for the exploitation of SPICE's assets:

- It will enable to maximization of the impact and dissemination of SPICE's tools in the cultural heritage industry and beyond. Citizen curation software solutions are, for the most part, a new product category since the cultural heritage industry only recently is becoming aware of the need to provide this type of activity. There have been many visionary attempts to develop these activities, but the majority of cultural heritage organizations provide only traditional solutions to facilitate visiting experiences (audio guides, mobile apps, etc.). Being a new product category, the effort and resources of developing this new market largely surpass the capabilities of SPICE partners. The open-source business model enables SPICE partners to share this effort with other developers and organizations also interested in the strategic area of citizen curation. Moreover, the open-source business model significantly reduces the costs of adopting citizen curation and engagement solutions to the entire research and cultural heritage community. The same can be said about its impact on lowering the barriers to the adoption of citizen curation software by the whole cultural heritage industry.
- It is particularly suited for driving the development of new technologies such as citizen curation software and its applications since it invites third parties (software companies, museums, developers, etc.) to join the effort of enriching SPICE's assets with new contributions that can provide further customer value or reduce barriers to adoption (e.g., by reducing the learning curve of cultural heritage organizations to adopt citizen curation tools and turning them into specific applications). In fact, the development of a community of third parties interested in citizen curation and engagement for cultural heritage and willing to contribute to further developments is a key part of the open-source business model.
- It is also particularly suited for the way these tools are likely to be implemented by cultural heritage organizations. SPICE will not provide final and fully developed applications for citizen curation and engagement. This is one of SPICE's strengths as a citizen curation software suite, because of the inherent characteristics of citizen curation activities. To be engaging for end users, these activities

require an effort of commitment, adaption, and creativity on behalf of the particular organization implementing them. New future developments in the InSPICE platform may be aimed to guide the museum´s employees through this creative process.

- It allows for reconciling the diverse interest and goals of SPICE's partners:
    - **Research organizations and non-profits** can conduct collaboration agreements with third parties (other museums, research organizations, etc.) to pursue their long-term interests and strategies.
    - **Private companies** can develop profitable businesses by providing complementary services such as customization, further development, and support, or by charging some parts as premium features.
- It also provides SPICE's partners with the flexibility to pursue their goals:
    - It allows SPICE's partners to pursue simultaneously the exploitation of SPICE's assets bundled under a common umbrella brand, while also providing freedom to commercialize some assets separately. Under an open-source business model, both goals do not create conflicts. The SPICE brand is used because it facilitates communication and commercial efforts by presenting SPICE's assets as combinable and customizable pieces intended to build citizen curation and engagement experiences in cultural heritage organizations. However, any of SPICE's pieces can build open-source communities by themselves or be commercialized separately because it meets an unmet need for a target segment.
    - It allows SPICE's partners to commercialize any exploitable asset to different target customers outside of the cultural heritage industry. Many of SPICE's exploitable assets are highly useful technical tools that a broad range of industries can find useful for a variety of purposes, e.g., the multilingual semantic annotation tool for social curatorial product, the multilingual emotion detection model, the AI Recommendation tool can be found highly valuable by large companies willing to build extensive communities of loyal customers in social media. In those circumstances, companies must moderate user-generated content to prevent interactions that could harm other users and the brand itself. These tools developed under the SPICE project may help these potential users to perform son sort of automatic community management and control over the content shared through their platforms or social media accounts.
    - It provides also flexibility even to commercialize some of SPICE's assets with a different licensing agreement. The open-source business model involves that the core technology is freely available. However, some assets may be offered as a premium for a paid license. This provides SPICE's partners to develop highly profitable and sustainable business models around SPICE. In fact, some of the largest software companies in the world follow an open-source business model: Amazon, Google, Microsoft, IBM, Oracle, SAP, and Intel are among the largest contributors to open-source software in the world, e.g., Google´s Android and Chromium are both open-source projects, which do not prevent Google to develop also software solutions under different models. Microsoft's Azure SDK is also open source, which does not prevent Microsoft from developing its main business on proprietary software.
- **Finally, there is already a successful experience within the SPICE project: SPARQL ANYTHING** is building an open-source community for its use and further development with more than 100 participants, which in some cases are making contributions to enrich this application by adding new features and adaptions. Among the participants are developers, heritage organizations, and private companies.

Figure 8.1 gathers the main characteristics of SPICE´s business model in a business model canvas.

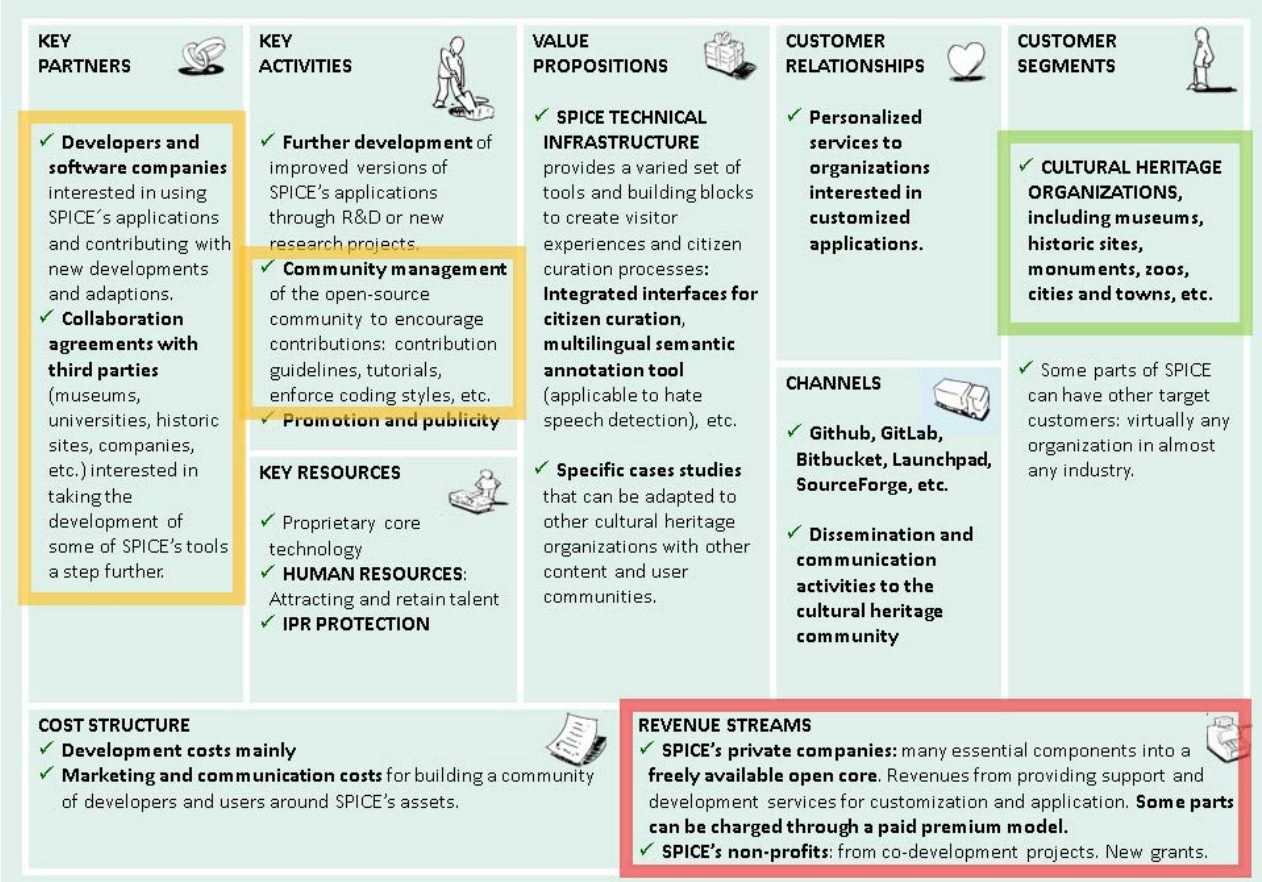


Figure 8-1 SPICE's Business model canvas

9. Stakeholders' validation

Our methodology for the design of the exploitation plan for the SPICE project included a stage of empirical validation. This is a critical part of the process because we want to ensure that we build our exploitation efforts on a sound basis. We are following the **Customer Development methodology** developed by Steve Blank[7]. To obtain an overall view of the main components of our exploitation model, we have attempted a comprehensive validation on three levels:

A. Validation of customer needs
B. Validation of the solution
C. Validation of the business model

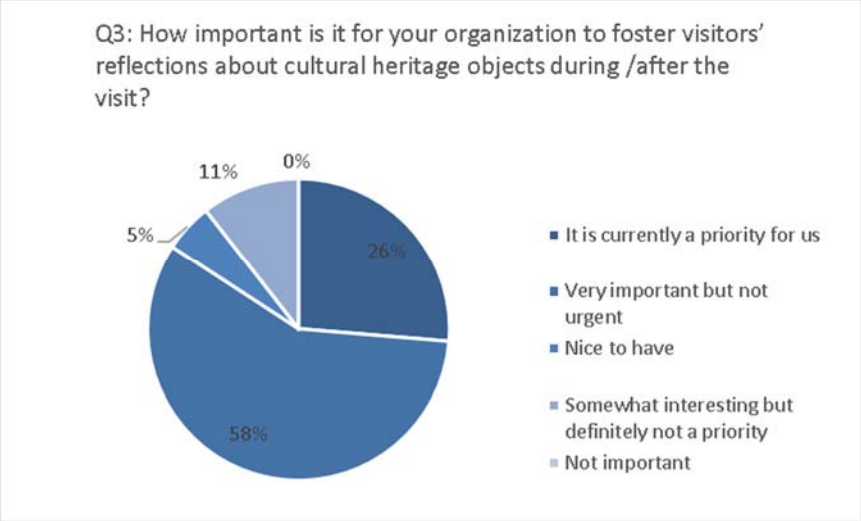
The method selected to extract this empirical evidence from SPICE's potential customers has been an in-depth survey aimed at cultural heritage organizations. We have taken advantage of the networking of SPICE partners and dissemination to stakeholders (see Dissemination Plan section of this report) to collect answers from a varied sample of 20 cultural heritage and scientific organizations.

[7] Steve Blank, The Four Steps to the Epiphany: Successful Strategies for Products that Win

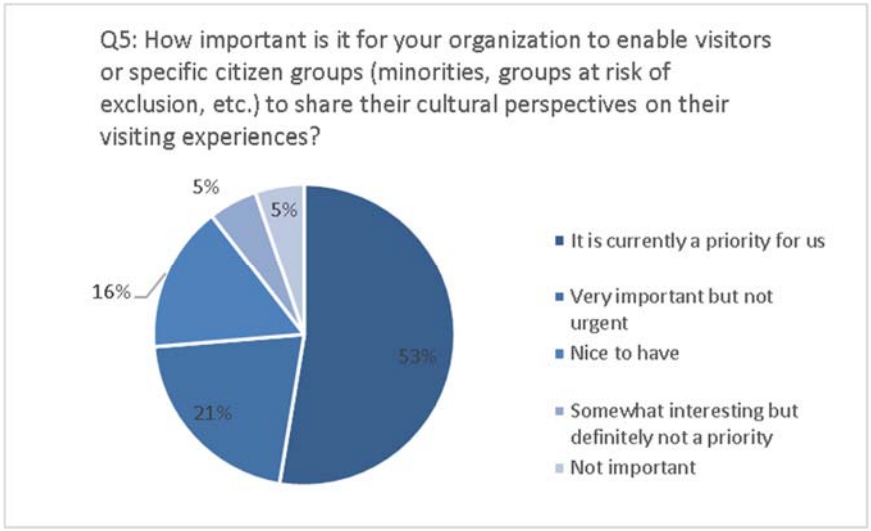
9.1 Validation of customer needs

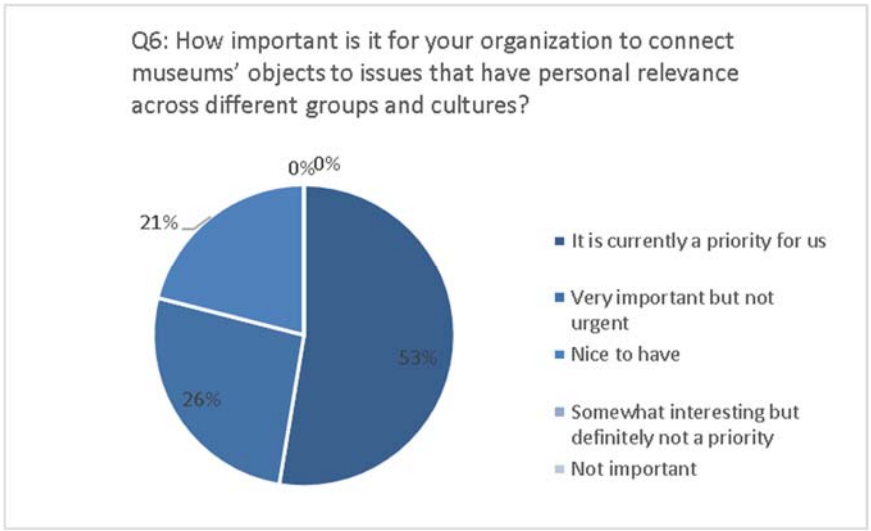
The customer development methodology requires validating the customer needs before even presenting our solution. This is the most important part of the validation process because it is intended to achieve a deeper understanding of the customers, their critical needs and priorities. Therefore, we devoted the largest section of our survey to achieve a clear understanding of customer needs. In particular, we attempted to understand whether citizen curation activities are part of the priorities of cultural heritage organizations today, or not.

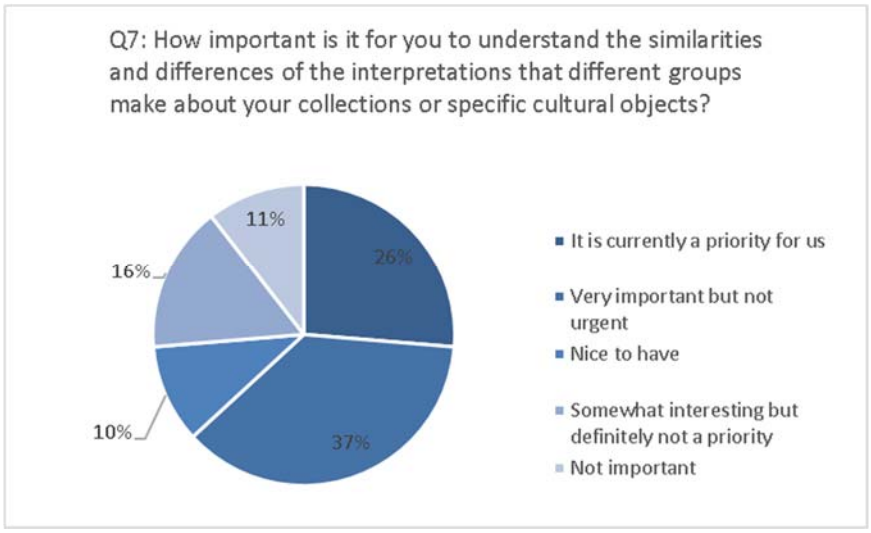
Figure 9-1 SPICE´s customer development survey: questions intended to validate that cultural heritage organizations NEED citizen curation activities

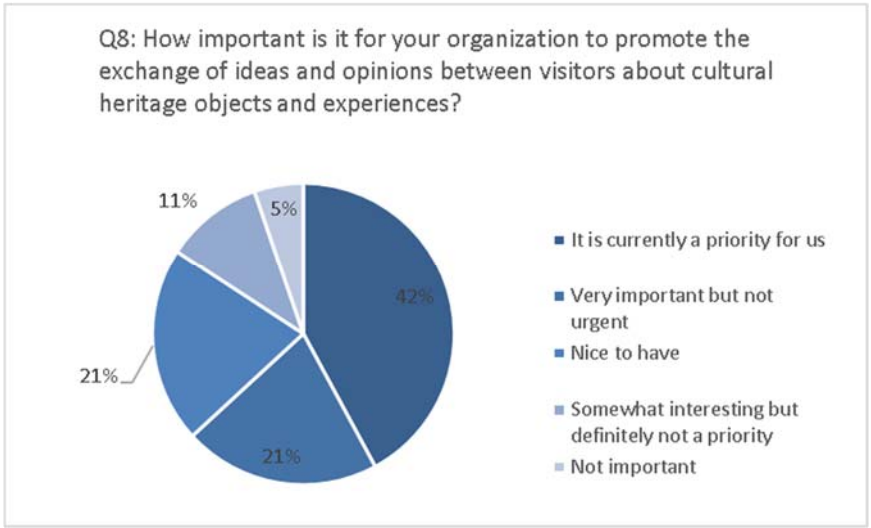


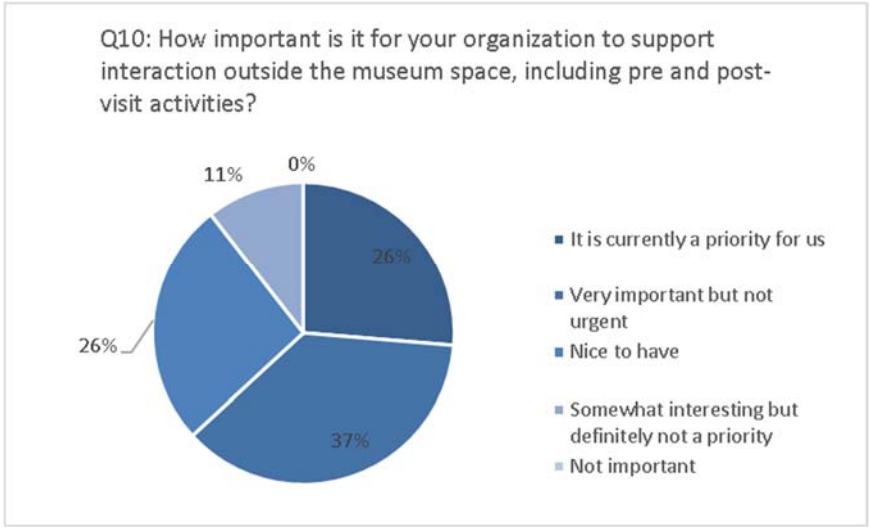
Q4: How important is it for your organization to obtain visitors' feedback about specific objects in your collections?
0%
0%
16%
47%
37%
It is currently a priority for us
Very important but not urgent
Nice to have
Somewhat interesting but definitely not a priority
Not important

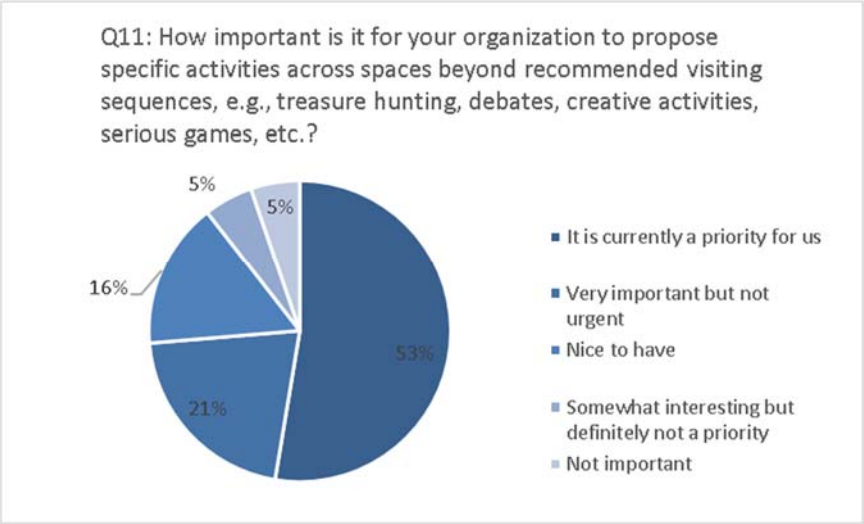

Q5: How important is it for your organization to enable visitors or specific citizen groups (minorities, groups at risk of exclusion, etc.) to share their cultural perspectives on their visiting experiences?
5%
5%
16%
53%
21%
It is currently a priority for us
Very important but not urgent
Nice to have
Somewhat interesting but definitely not a priority
Not important


Q6: How important is it for your organization to connect museums' objects to issues that have personal relevance across different groups and cultures?
0%
0%
21%
53%
26%
It is currently a priority for us
Very important but not urgent
Nice to have
Somewhat interesting but definitely not a priority
Not important


Q7: How important is it for you to understand the similarities and differences of the interpretations that different groups make about your collections or specific cultural objects?
11%
26%
16%
10%
37%
It is currently a priority for us
Very important but not urgent
Nice to have
Somewhat interesting but definitely not a priority
Not important

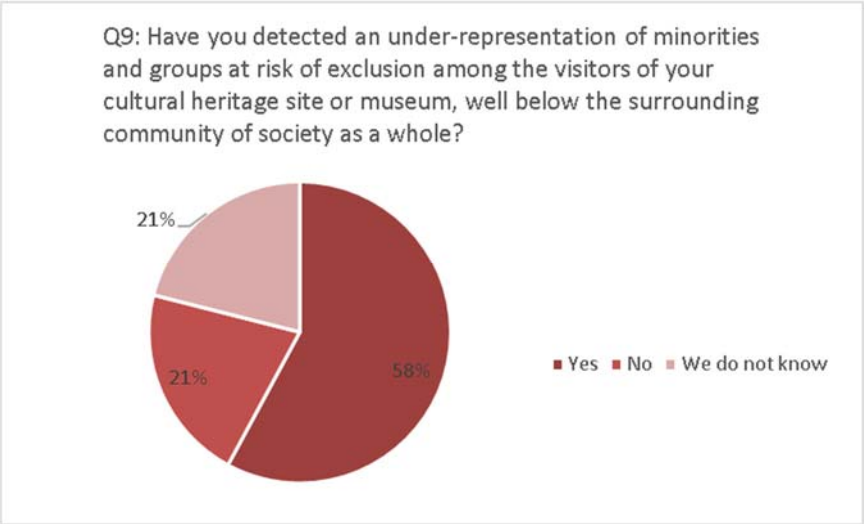

Q8: How important is it for your organization to promote the exchange of ideas and opinions between visitors about cultural heritage objects and experiences?
11%
5%
42%
21%
21%
It is currently a priority for us
Very important but not urgent
Nice to have
Somewhat interesting but definitely not a priority
Not important

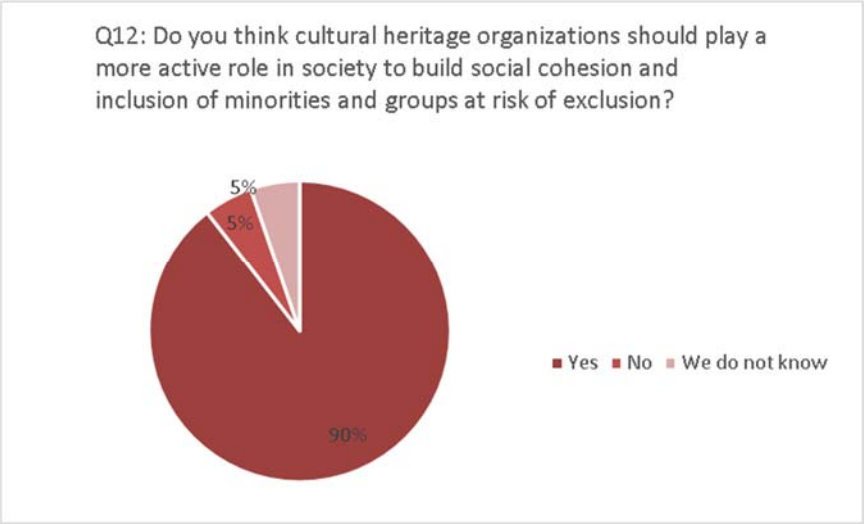

Q10: How important is it for your organization to support interaction outside the museum space, including pre and post-visit activities?
11%
0%
26%
26%
37%
It is currently a priority for us
Very important but not urgent
Nice to have
Somewhat interesting but definitely not a priority
Not important



The obtained answers from cultural heritage organizations provide us with a clear view that SPICE meets some of the priorities of cultural heritage organizations. Some types of citizen curation activities are already part of the short-term goals of these organizations, which provide us with a sound validation that SPICE is well aligned with customer's more pressing needs. It also creates the basic requirement for SPICE to become a highly compelling product in the market.

Two additional questions are also intended to validate some customers' concerns that are also on the basis of SPICE and cultural curation activities.





These are important insights to validate some of the most important motivations for cultural heritage organizations to implement citizen curation activities. This proves that cultural heritage organisations are concerned about becoming sufficiently inclusive and having a broad and diverse representation of visitors aligned with the reality of the surrounding society. It also provides clear evidence that cultural heritage organizations are willing to transcend their traditional role related to conservation, scientific research, education, and tourism, to become also contributors to social goals such as achieving higher social cohesion or promoting tolerance with specific groups at risk of exclusion.

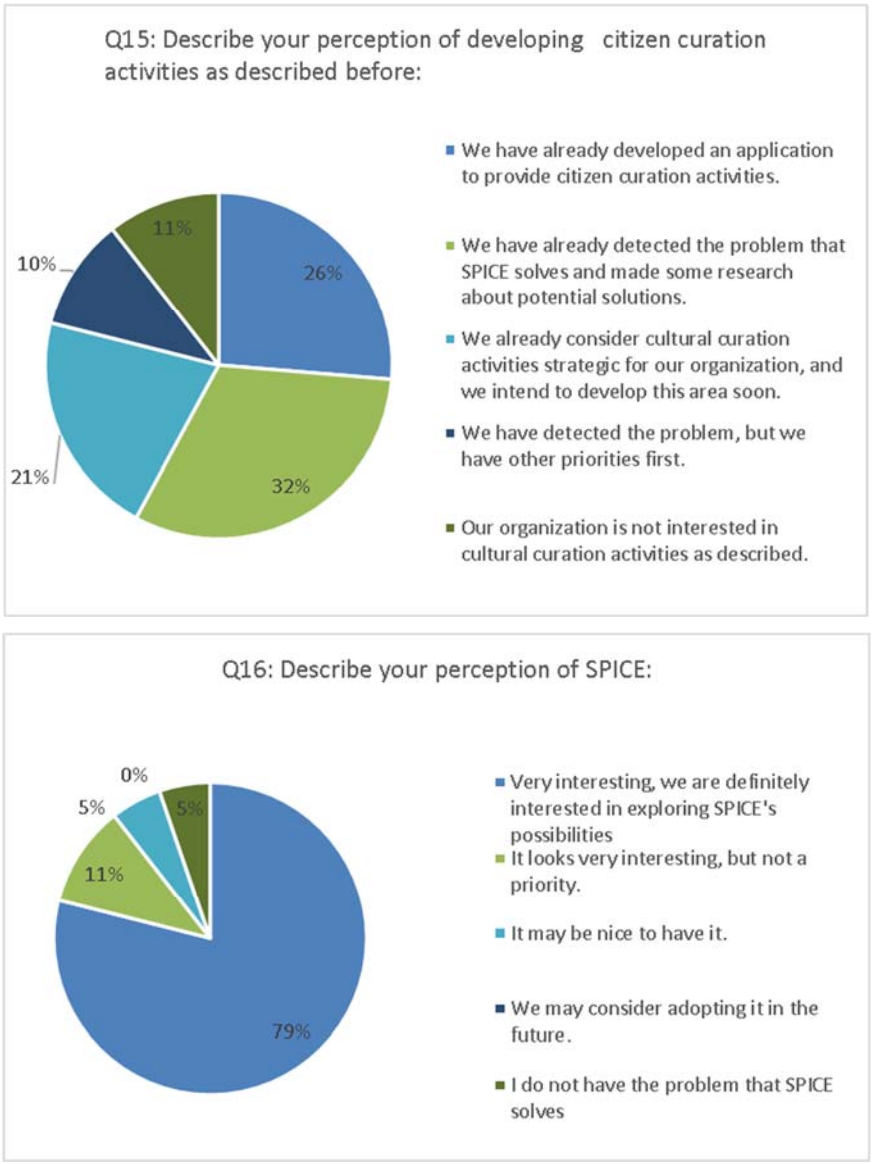
9.2 Validation of the solution

The validation of the solution requires a brief explanation of SPICE as a product. We have attempted to provide our potential customers with a short explanation of SPICE as a product. Keeping this explanation as short as possible is a critical part of the validation at this stage, because had we needed long explanations about SPICE to make our customers understand it, it would signal that they are not ready for a citizen curation software solution. It would be a signal that the market is still too far, and it will require long educational efforts and extensive resources to develop a market for SPICE in the cultural heritage industry.

Our validation of SPICE as a solution for the development of citizen curation activities for cultural heritage organizations has been focused on three clear goals:

1. Validate how high cultural curation activities, now mentioned specifically with this name, are in customers' priorities
2. Validate what is the perception of our potential customers about SPICE.
3. Validate the maturity of the market. Some types of citizen curation activities have been around in the cultural heritage industry for some tie already. However, only recently the cultural heritage industry has become aware that they need to surpass their traditional functions to adopt new roles related to contributing to driving social cohesion and inclusiveness.
4. Validate how far are SPICE's potential customers from actually start thinking about taking purchasing decisions about citizen curation solutions such as SPICE.

Figure 9-2 SPICE´s customer development survey: questions to assess SPICE as a citizen curation solution



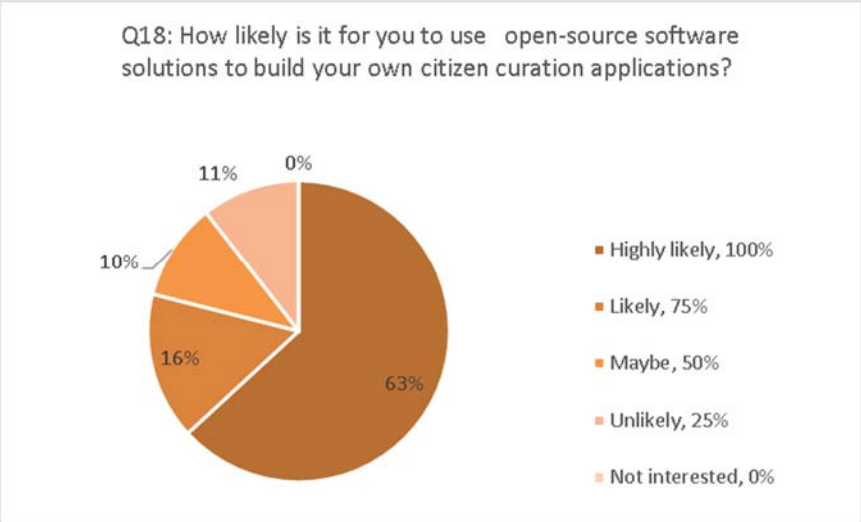
The answers received from cultural heritage organizations validate some key business hypotheses of SPICE:

1. Cultural curation is already among the priorities of cultural heritage organizations,
2. They are willing to explore SPICE to fulfil this need.
3. The market already exists and counts with many cultural heritage organizations already searching for citizen curation solutions and purchasing what is currently available.
4. The market for citizen curation software solutions is not far in time to become a reality and SPICE is in a very good position to become a first mover in the market, thus benefiting from an outstanding competitive advantage.

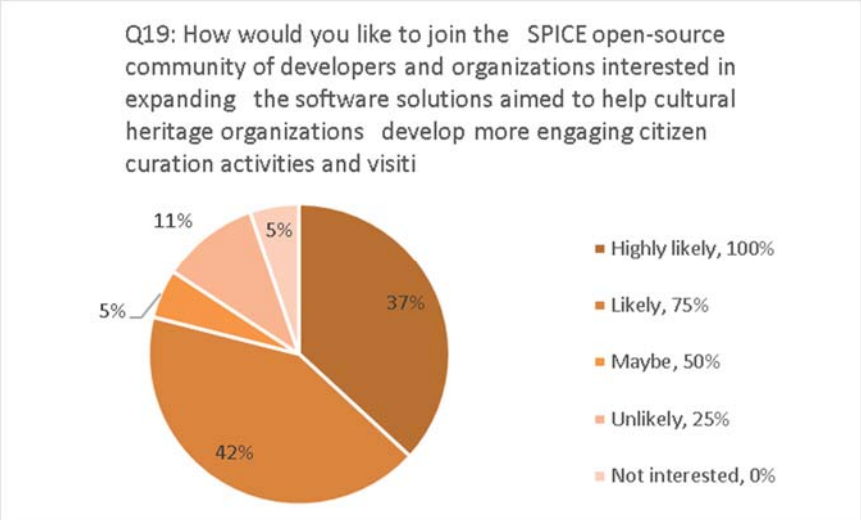
9.3 Validation of the business model

The validation of SPICE's business model is the last part of our validation process, and it aims to validate some of our key business design decisions.

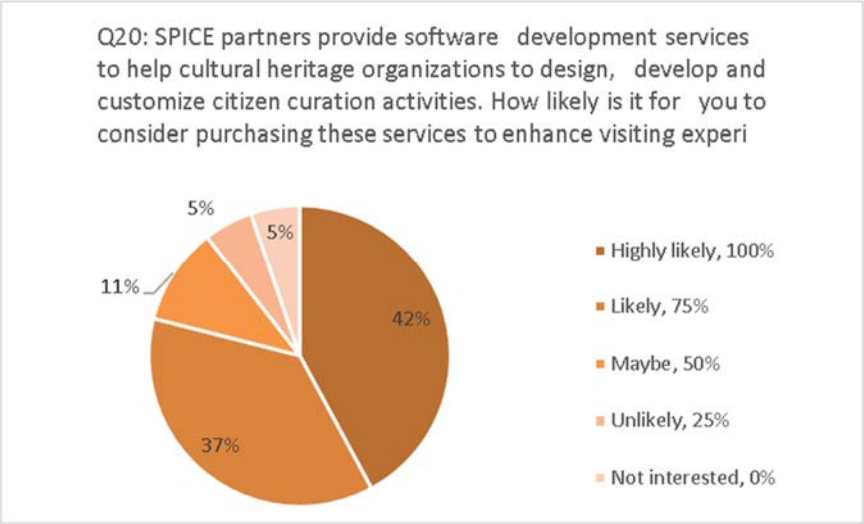
Figure 9-3 SPICE´s customer development survey: questions intended to validate SPICE's business model



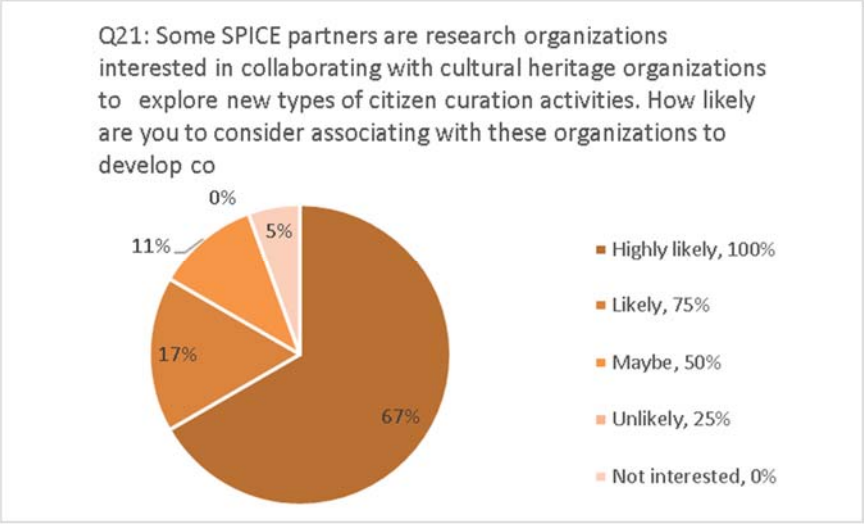
The first question is intended to understand how comfortable are cultural heritage organizations to develop citizen curation activities by taking advantage of open-sources resources like SPICE.



The creation of a growing community of developers and organizations interested in increasing the availability and quality of open-source citizen curation resources is a key part of any open-source business model. This model is intended to grow through collaboration as much as through competition. It is rather a *coopetitive* model that creates visibility and new capabilities in a new market space through the efforts of an increasing community of players. This cooperation is a critical part of SPICE's success, since the resources required to create a new product category such as citizen curation software easily may surpass the capabilities and resources of SPICE partners. Therefore, validating the willingness of some potential customers of becoming part of this community of organizations interested in the development of citizen curation software is also a critical part of the validation of SPICE's business opportunity.



Furthermore, we want also to validate that there is a business opportunity for the SPICE partners that are willing to develop a commercial venture around SPICE and the citizen curation software market.



Finally, since there are many partners within the SPICE project that are mostly interested in continuing their research activities around citizen curation in the cultural heritage industry, we have also wanted to validate this critical part of their exploitation plans.

10. IP management: Licensing model

We have already stated that most of SPICE's partners have chosen to license the exploitable assets they have contributed to developing under an open-source business model, in which each partner would be free to reuse and improve the results of SPICE: open sources models, like strong Copyleft GNU GPL licenses or alike for software and Creative Commons 4.0 CC BY-NC-ND for content, with also different expectations regarding commercialisation (e.g. "licence allowing to get revenues from some services running on the platform", or "royalty-free"…). During the project, each developed asset has been the subject of a software disclosure process, where all dependencies to third parties' components were listed and their licence checked for compatibility with future exploitation plans.

The close collaboration of partners in the design and implementation of the SPICE assets, as well as the many third-party software components used for implementation, creates an inevitable complexity in the intellectual property sharing and the type of license applicable to the different components. In this context and knowing the consortium had a strong will to keep the project's outcome easily available for future

research and easily composable with other project's results, it was agreed to choose an open-source approach. The following Figure shows the different open-source licences that were proposed and discussed[8].

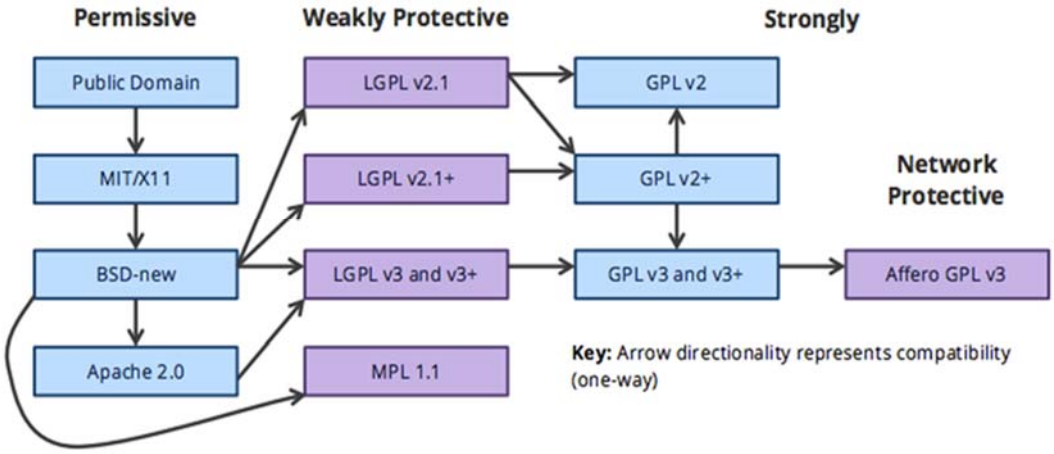


Figure 10-1 Open source licences and their compatibility

To keep the possibility of commercialising assets while allowing their use for non-profit purposes like research and teaching activities, and based on the continuous IP management and analysis during the project, the consortium can opt for a dual licensing scheme with on one side the open source GNU AGPLv3[9] or Apache 2.0 for all foreground software components and the CC BY-NC-ND 4.0 license[10]for content, and on the other side proprietary licensing to be decided on a case-by-case basis. The choice of AGPL and CC BY-NC-ND was directed by the choice of clearly separating between free use, where all extensions should also be free for use, and the commercial activities, which should remain in the hands of the project's partners. We highlight here the features we retained for each approach.

Affero GPL or Apache 2.0 (Openness strongly protected) / CC BY-NC-ND:

- Service-friendly: services using the tools can be commercialised
- Suits a service-based model for a SPICE business entity
- Forces A-GPL licensing of any extension, meaning potential future benefits (in kind) for partners
- Release Management of SPICE evolution is kept by SPICE partners and SPICE-business entity
- Interesting if community is created, maintained and managed.

Proprietary licence:

- Competitive advantage for the licensee and direct revenues for SPICE partners or the SPICE business entity (see Section 5 of this document).
- Close sources, licensing with specific conditions, Royalties fees.

Table below shows the licensing model selected by SPICE's partners for every exploitable asset in the project. The dominant model is the open-source licensing model with only two assets, the 3. Multilingual semantic annotation and 4. Multilingual emotion detection model will be exploited through a different model. Therefore, SPICE's partners will maintain SPICE's core technology open source while also leaving the door open for the commercial exploitation of some assets.

[8] Adapted from David A. Wheeler under the Attribution-Share Alike 3.0 License.
[9] More information: https://www.gnu.org/licenses/agpl-3.0.en.html
[10] More information: https://creativecommons.org/licenses/by-nc-nd/4.0/

Table 10-1 Licensing model for all SPICE´s exploitable assets

Exploitable asset	Exploitation model
1. Interpretation and reflection toolkit for citizen curation	Open source
2. Tools for interpretation and aggregation of objects	Open source
3. Multilingual semantic annotation tool for of social curatorial products (user-generated content):	Paid license of use
4. Multilingual emotion detection model	Paid license of use
5. AI Recommendation tool	Open source
6. Linked Data Hub	Open source
7. SPARQL Anything	Open source
8. Tracking and Analysis service for digital assets	Open source
9. Service for discovering and linking Digital Assets	Open source
10. Integrated interfaces for citizen curation - inSPICE	Open source
11. Scripting service for social curation	Open source
12. Toolset for semantic Integration and specification	Open source
13. SPICE Ontology Network (SON) for citizen curation	Open source
14. Replication service of SPICE Case studies in heritage institutions	Open source
15. Methodologies for the creative co-design of citizen curation experiences	Open source
16. The User Model and Community Model	Open source
17. Socio-technical systems (STS) maps and the UX maps	Open source
18. DEGARI affective systems for complex emotion extraction and reasoning	Open source

11. Road to market and development pipeline

SPICE as a product is still in an early stage of development of roughly TRL 6. Some visionary and early adopters could go very far already in developing citizen curation activities and engaging visiting experiences by using only SPICE's software and tools. These visionaries may supplement SPICE's assets with their own developments, know-how, and ingenuity. However, SPICE has still a long way to become a viable solution for the mainstream market in the cultural heritage industry.

Therefore, the development of SPICE as a successful exploitation opportunity involves a comprehensive strategy with several key pillars:

1. Commitment of SPICE partners with the further development of SPICE's citizen curation software and know-how
2. building of a thriving open-source community of developers and organizations interested in driving the development of citizen curation software further.
3. Further development of a consistent business model for SPICE
4. Development of sustainable businesses around SPICE
5. Continuation of the dissemination efforts of SPICE partners to create awareness about the value that citizen curation can provide to cultural heritage organizations.
6. Creation of a unified brand umbrella around SPICE.

11.1 Commitment of SPICE partners with the further development of SPICE's citizen curation software and know-how

The SPICE project consortium comprises a group of researchers, entrepreneurs, and organizations that share the same vision about the key role that citizen curation is called to play in the cultural heritage industry in the next decade and beyond. The whole industry is changing as a result of profound changes in the society

and technology, and a broad implementation of citizen curation will become one of the keys for cultural heritage organizations to adapt to new realities and even thrive.

The commitment of the SPICE partners to the further development of SPICE's capabilities and tools was well stated in the previous version of the SPICE's exploitation and dissemination plan in deliverable 8.2 (M12). Here, we intend to summarize and update new developments that SPICE partners are already planning to enrich citizen curation capabilities for the cultural heritage industry:

Università di Bologna (UNIBO):

UNIBO is developing tools for monitoring user generated contents on social media platforms (e.g. Twitter) and engagement activities to integrate outputs of the Linked Data Hub, the SON ontologies, and emotion and sentiment analysis. UNIBO plans to provide efficient methods to support curators and museum professionals in evaluating engagement activities and support the design of new ones. UNIBO will propose our results to other museums that are not part of the SPICE consortium to co-design better tools and to validate our results.

The Open University (OU):

Citizen Curation tools co-developed with IMMA. These tools will enable museum professionals to author and launch new Slow Looking activities to their physical and virtual visitor groups. The museum professional will also be able to monitor and moderate citizen contributions shared with the museum and as well as share them anonymously vias the Slow Looking platform and social media. The citizen will be able to use the platform to carry out Slow Looking activities, manage their contributions and share them with friends and the museum.

Aalborg University (AAU)

a. Further or other research coming from Spice output:

- Additional research at the intersections between interactive digital storytelling, media technologies, narrative cognition and cultural semiotics.
- The models and methodologies developed in SPICE will be incorporated in investigations about narrative cognition in interactive media carried out at the Augmented Cognition lab (directed by Luis E. Bruni) at the Department for Architecture Design and Media Technology at Aalborg University Copenhagen.
- Interdisciplinary research together with national and European cultural heritage institution as well as creative industries, on the interpretation-reflection loop outside of the use of SPICE. As well as employment of singular methods and theories developed in the process of SPICE, in domains different from cultural heritage (e.g. education, tourism, conflict resolution, social work, etc.).

b. New technologies and tools to be developed:

- Formalization of the Interpretation-Reflection Loop, as a method for regarding the dynamic process between a citizen or visitor, as a consumer of information, as well as an active producer (Prosumer).
- Final tool kit and handbook of interpretation-reflection methods and tools for participatory community action.
- Applications in domains other than cultural heritage and museums.

Aalto University (AALTO)/ Design Museum Helsinki (DMH)

a. Further or other researches coming from Spice output is an area that needs further development

- Audience studies for new methods development.
- Autoethnography as a form of creative historiography.
- Design and development of eTourism sites.

- Gamification and its implementation in museum-based experiences using immersive media.

b. New technologies and tools to be developed:

- Further development and demonstration of the case study developed within the SPICE project: the *travelling museum Pop-up VR Museum* experience deployed via portable virtual-reality (VR) headsets such as the Oculus Quest.
- Demonstrations and workshops to members of the Finnish Museum Association (*Museoliitto*) See, https://www.museoliitto.fi.
- Demonstrations and workshops to other professionals in collaboration with Aalto Media Studios, as well as with other university initiatives.

Irish Museum of Modern Art (IMMA)

Interaction with cultural assets activities: The IMMA website (imma.ie) will integrate citizen responses created through use of SPICE tools with a panoply of digital assets – social media, SoundCloud talks, YouTube channel, linking them to the Irish national collection of contemporary and modern art. For the SPICE user, this will enrich the experience of engaging with artworks, through linking to a wider database of resources; for the heritage institution, this will create new possibilities for engaging with audiences digitally and on-site, as well as providing new insights into the way the collection is perceived and understood by various user groups.

Padaone Games (PG)

Development of citizen curation products and services: The SPICE project aims to define a series of citizen curation processes, together with technologies to support these activities, which by the end of the project will have been tested in different pilots. Our aim is to build on this experience to take the most promising citizen curation processes and technologies, and further develop them to the level of products that may be of interest to different museums.

PG envisages that the experience gained in the SPICE project will enable us to develop authoring tools for museums that, in a simple way, allow museum staff to set up and launch their own citizen curation activities that support social participation through interpretation and reflection activities.

Universidad Complutense de Madrid (UCM)

UCM is developing Tools for visualization and explanation of communities to enhance already developed within the SPICE project.

Universita degli Studi di Torino (UNITO)

Based on the results of the SPICE project, UNITO will develop ontology reasoning services based on TCL logic, a common-sense reasoning framework. These new types of reasoning will be developed in cooperation with the Research Center on High Performance Computing for Artificial Intelligence (HPC4AI, https://hpc4ai.it/), a joint research center of the University of Turin and Polytechnic University of Turin, by developing tools for recommendation and audience engagement in cultural archives and media repositories.

Fondazione Torino Musei (FTM)

The GAM game app developed within SPICE will follow-on developments to integrate possible intersections with other ongoing projects in the museum, possibly the ones for telepresence.

MAIZE SRL (CELI)

Automatic emotion detection and named entity recognition for multilingual texts in different domains (e.g. healthcare, customer service, etc) and different applications, e.g. chatbots and conversational interfaces.

University of Haifa (UH)

a. Further or other research coming from Spice output:
   - Possible collaboration with the Psychology Department at the University of Haifa: Evaluate the use of personality tests to predict user behaviour in SPICE scenarios.
   - Possible collaboration with the Education Department at the University of Haifa: Evaluate the effectiveness of SPICE methodology to induce cohesion and inclusion in mid/high school students.

b. New technologies and tools to be developed:
   - Social Recommender: The recommender will be based on similarities and dissimilarities between social groups.

GVAM Guias Interactivas (GVAM)

- Development of citizen curation products and services: The SPICE project aims to define a series of citizen curation processes, together with technologies to support these activities. GVAM expects that the experience gained in the SPICE project will enable the company to develop tools for museums that include citizen curation activities that support social participation through interpretation and reflection activities.
- Development of new interactive tools with visitors: taking advantage of the different technologies implemented in the project, such as semantic annotations services, interpretation aggregation or the linking functions between digital assets, GVAM plans to develop and implement new interactive action within their products that involve a bidirectional communication with the visitor such as recommendation services or tools for the sharing of impressions or opinions provided by the visitor.
- GVAM plans to exploit some of the developments and technologies developed in SPICE for the generation of reputation data and recommendation functionalities in touristic destinations applications.

Consiglio Nazionale delle Ricerche (CNR)

- Jointly with UNIBIO, CNR is developing a system for Semantic Web re-engineering that allows users to query any file format (e.g. CSV, JSON, XML, HTML etc.) as it was RDF. The source code is available at https://github.com.
- Jointly with other partners, CNR is designing a novel network of ontologies in WP6 (the SON ontologies), inspired by CNR work on the Framester factual-linguistic data hub and the Descriptions and Situations ontology design pattern framework.
- Jointly with University of Bologna, CNR is developing extensions of its FRED machine reading tool, in order to complement knowledge graph extraction from text with higher levels of meaning, including multiple emotion annotation schemes, value knowledge, interpretation perspectives, etc. This will be used to both analyze and support citizen curation activity in museums.

11.2 Building an open-source community of developers and organizations

The development of a growing community of developers and organizations interested in using and adding new features and developments for citizen curation is a key part of the open-source business model. In order to create further customer value for cultural heritage organizations and also reduce barriers of adoption (complexity, the total cost of adoption, etc.), the SPICE partners will need the passionate engagement of third parties to expand SPICE's capabilities and create entirely new features. This is for the SPICE partners critical to reducing the cost of turning SPICE into a whole product, that is, a product with a highly compelling value proposition and minimized risks and costs of adoption for potential customers. Currently, SPICE is far from becoming a whole product since it will require significant development efforts and many complementary products and services to achieve this goal. Perhaps, the main benefit of the open-source business model is its potential to attract a broad number and variety of third parties to join the effort of building whole products.

The process of building an extensive community of third parties interested in using, customizing, and developing further features and capabilities for SPICE has already started. The SPICE partners are already building communities around assets such as LInked data hub or SPARQL Anything. In fact, SPARQL Anything has reached significant visibility, and it has managed to attract an active community of more than a hundred users on GitHub, which is high for such as specialized tool. Other SPICE's assets will follow the same path that will be fed through:

- The commitment of SPICE's partners to the further development of its capabilities
- The ongoing dissemination efforts of the consortium among the stakeholders within the SPICE project and beyond, since most of them are engaged in long-term research and development plans.
- The commercial efforts of the three companies' part of the SPICE consortium.

11.3 Further development of a consistent business model for SPICE

The design and development of an open-source business model have some requirements that SPICE's partners must comply with carefully. The open-source business model provides great flexibility to include both software tools that users can use freely and also premium products and services that potential users must pay for. The coexistence of both options is what makes open-source businesses sustainable and highly profitable. In fact, some of the most profitable companies in the world follow the open-source business model in some way: Google, Amazon, Microsoft, Oracle, Intel, Nvidia, etc.

However, in order to work, an open-source business model must be consistent and evolve in a way that does not frustrate customers' expectations. This entails that SPICE's partners must be consistent and clear in what features or solutions are open-source and which are premium. **It is critical, from the beginning, to think through which features will always be free and which will be premium and then communicate that plan clearly with developers. Once a developer end-user community is thriving around the open core, SPICE's partners can introduce new premium features that appeal specific segments anytime, but they cannot turn what was initially free into premium options.**

Moreover, in order to attract and engage growing communities of users and developers, the open-business model must ensure that it provides a core of software solutions for free through broadly permissive licensing agreements.

11.4 Development of sustainable businesses around SPICE

Three of SPICE's partners are companies that intend to develop sustainable businesses through the exploitation of SPICE's assets.

CELI will exploit the multilingual text analytics prototype developed and tested in SPICE project, both in the cultural heritage domain and in other commercial sectors, such as social media analytics and information extraction applications for clients in other industries.

Padaone aims to turn SPICE into a strategic product, capable of driving the company's growth in the following decade. So far, PG products have been mostly developed on video game technology, in particular Unreal Engine and Unity 3D. The interfaces and pilots to be developed within the framework of the SPICE project will use web technology, which will open up new possibilities for the development of products where the game component plays a more secondary role. SPICE will expand the technological offer of PG, opening up new possibilities for commercial exploitation.

GVAM:

- Interaction with cultural assets activities: The participation of GVAM in the development of interfaces for citizen curation will be and opportunity for the company to develop new citizen curation and interpretation functionalities that can be integrated in their current app and audio guide products.

- Internal adoption or exploitation: GVAM plans to make use of the knowledge taken from the project in order to improve their services in regards to the design of their guided tours and the activities that involve interaction with visitors.

11.5 Continuation of the dissemination efforts of SPICE partners

The dissemination efforts of the SPICE consortium are largely detailed in another section within this deliverable. Here, we want to state that most SPICE's partners have long-term interests in the cultural heritage industry and they regularly develop research or economic activities in this area. As part of these activities, they perform ongoing dissemination activities in events, publications, and relevant forums, which will continue after the SPICE project. These regular and extensive dissemination activities will surely drive SPICE further development and adoption by stakeholders.

11.6 Creation of a unified brand umbrella and product around SPICE

SPICE technical infrastructure provides a varied set of tools and building blocks to create visitor experiences and citizen curation processes. They have been combined and customized by SPICE's partners to create a wide range of visitor experiences. **SPICE's product development must define how these tools can be selected and combined by cultural heritage organizations to develop their own visiting experiences according to their specific goals. SPICE provides the ingredients and recipes for a creative process that cultural heritage organizations must lead.** SPICE is inherently a set of complex and diverse tools that can be selected and combined through a creative process that also has significant technical complexity.

This has two important implications for the exploitation of SPICE:

- **The exploitation of SPICE's assets must be unified through a common brand umbrella**, so these assets can be easily recognized and located by potential users. All SPICE's assets are pieces of potential applications, often too fragmentary to become viable products in the market. Therefore, their potential in the market gets broadly enhanced by creating a strong link between each other as part of a comprehensive solution capable of providing a more compelling value proposition. In short, SPICE's assets are stronger together and have a significantly higher potential as part of SPICE as a set of tools and solutions for the development of citizen curation activities for the cultural heritage industry. This entails that SPICE's partners should maintain a strong link between these assets through the exploitation stage. The highest risk of these assets is to remain isolated. They are very valuable, but they do not provide a value proposition comprehensive enough and compelling enough to survive in the market by themselves. Left by themselves, many of these assets will rapidly undermine their exploitation potential. However, under a common brand such as SPICE, they will be part of a product much closer to become a whole product, that could become a compelling product in a market that is increasingly pressed to adopt citizen curation. They will not be only small isolated pieces difficult to locate and integrate, they will be part of a brand and a value proposition with much more potential of achieving visibility in the market.
- SPICE's assets should also remain strongly linked from a technical perspective. Without clear instructions about how potential customers could combine, customize, and use them to develop their citizen curation activities, they will unlikely adopt SPICE's assets. It would be too difficult, too costly, and involve a high adoption barrier. SPICE requires a further development effort intended to make the process of designing and developing citizen curation activities with the current set of tools and solutions easier and less costly. This process is also part of the process of creating a whole product out of SPICE's assets. There is a need for further integration between SPICE's assets, there is also a need of generating more and better information resources to help customers build valuable activities from SPICE's assets at a reasonable cost, and there is also a need of creating complementary services to help them through this process.

12. Sustainability Risks analysis

SPICE's exploitable assets and SPICE as a product still has a long way to become a marketable product. There are still many uncertainties and risks that could derail the project from becoming a successful and sustainable product.

1. **Risk of failing to obtain the required financial resources to drive SPICE's development up to TRL 8-9 (likelihood: medium, impact: high), financial risk**: In order to complete the development of SPICE and make it market ready, SPICE's partners will need additional resources. Failing to get these resources, SPICE will be unable to reach maturity and ready to be widely adopted by the market. **MITIGATION:** SPICE's partners are willing to build another proposal to achieve the funding they need to continue the research and development of SPICE. Therefore, we will scout for further European funding opportunities to obtain the resources that SPICE needs. This is important because the cultural heritage sector is not considered strategic for private investors, and therefore it is unlikely that we will be able to obtain the financial resources we need from venture capital investors, despite the remarkable economic potential of the emerging citizen curation software market.
2. **Risk of dispersion of SPICE's partners and solutions (likelihood: medium, impact: high), commercial risks**: we have already stated that SPICE's exploitable assets have significant interdependencies that make them more valuable for potential customers as part of a whole offering. Together, they are more likely to build a compelling value proposition and create a successful product that resonates in the market. Otherwise, by attempting to develop exploitation plans by themselves in an isolated way, they will find it difficult to become whole products and minimize barriers to adoption. By keeping a strong link with each other, through a common brand and technical know-how on how to combine them to develop citizen curation activities, they will find more opportunities to be located, used, and in some cases, purchased by potential customers. Therefore, SPICE's assets have the risk of losing this strong link between each other, missing this opportunity of achieving high visibility in the market, and simply fading away. **MITIGATION**: SPICE's partners are willing to maintain the strong link that nowadays exists between the solutions developed during the SPICE project. They are also willing to strengthen the link between SPICE's partners themselves by maintaining a close collaboration and fulfil the development of SPICE as a comprehensive citizen curation software solution for cultural heritage organizations.
3. **Further inconsistencies of the business model (likelihood: medium, impact: high), business risks**: The open-source business model provides a great level of decentralization and flexibility. This gives a community of partners such as SPICE great freedom to follow widely different pathways to fulfil their different goals. There is no need for strong unanimous agreements between the partners to develop any type of exploitation plan, whether it is in further research and development or any commercial activity. However, the open-source business model still has some overall rules to become sustainable and grow an extensive community of users and customers. These rules require that most of the core technology must be offered open-source with a permissive licensing agreement and that it must be consistent over time regarding what assets are provided free of charge and which are considered premium. It is possible to add new premium products and services anytime, but what was initially offered for free and open-source, must be kept that way over time. **MITIGATION**: SPICE's partners are strongly committed to the open-source model and well-aware of the requirements of this model. It is highly unlikely that they will introduce any change in the open-source status of the SPICE's assets that they have already decided to exploit through this model.
4. **Risk of competitors and new entrants (likelihood: high, impact: medium), competition risk**: The citizen curation software market is a new market that is currently emerging as museums become increasingly aware of adopting new roles in society and a more proactive approach to capturing more diverse visitors. This market is still very small and relatively unknown compared with other software markets in the cultural heritage area such as cultural heritage management solutions, cloud ticketing, or software to enhance visiting experiences (e.g. AR and VR-based apps). However, as more museums or cultural heritage organizations adopt innovative citizen curation applications, the market is going

to achieve increasing visibility, and will certainly attract new entrants from neighboring markets in software for the cultural heritage industry or from new innovative startups. Nevertheless, this market will take still some time to take off, and in any case, some level of competition will help any player in the market by sharing the great educational effort of developing a new market between many companies and organizations. **MITIGATION:** SPICE has a window of opportunity and a certain first-mover advantage in this market area. Whether we seize or miss this opportunity will depend on SPICE's partners to advance through the development of our citizen curation software and launch it to the market in the next 3-4 years. Beyond that point, we can meet strong competitors already entrenched in this market area.

5. **Risk of failing to attract stakeholders and build a growing open-source community around SPICE (likelihood: medium, impact: medium), commercial risk**: Building a growing community of developers and organizations interested in helping SPICE's partners through the process of increasing SPICE's capabilities is a key part of the open-source business model. This allows us to share with more stakeholders the great effort required to create a whole product around SPICE and create new customer value. Failing to attract third parties to help us in this process will highly diminish the potential of SPICE to become a highly compelling product capable of meeting the needs and expectations of the mainstream market within the cultural heritage industry. It would remain as a solution for early adopters and visionaries, which are willing to fill the gaps with our solution and meet the risks and costs of adopting a solution that is not mature enough to become a whole product. **MITIGATION**: The dissemination activities of SPICE's partners must be well aligned with the strategic goals of the open-source business model. SPICE's partners carry out extensive dissemination activities regularly, which may provide significant help in engaging new stakeholders to become collaborators and active participants in SPICE's open-source communities.

13. Commercial exploitation

Three partners within the SPICE consortium have an interest in developing the commercial exploitation of SPICE's assets: **Padaone, GVAM, and Celi**. They all are private companies, which will add SPICE's assets to their regular business activities. Therefore, in this section, we intend to describe in more detail, the commercialization model of these two companies around SPICE. The two companies will follow a widely different approaches in their commercialization plans:

- **Padaone** will have **a vertical and comprehensive approach regarding SPICE's assets**, i.e., it will be focused on the cultural heritage industry and open to use and implement any SPICE's asset, although particularly centered around *10. Integrated interfaces for citizen curation – inSPICE.* The application of other SPICE's assets will depend on the needs of each specific museum or cultural heritage organization. **Padaone will ally with GVAM to carry out the commercialization of SPICE's assets to take advantage of GVAM's extensive customer portfolio**.
- **Celli** will have a **horizontal approach and focus exclusively on one of SPICE's assets**, *3.Multilingual semantic annotation tool for social curatorial products* (with the potential application of also *4. Multilingual emotion detection model*, which expands the capabilities of the former). Therefore, Celli will commercialize 3. Multilingual semantic annotation tool in a wide range of industries beyond the cultural heritage industry.
- **GVAM** operates in the cultural heritage market space and has already broad product and customer portfolios. **Therefore, GVAM aims to include SPICE´s assets in their product portfolio according to customer demand**. Within this plan, GVAM will associate with Padaone to the commercialization of SPICE as a software suite. However, GVAM also aims to pursuit the further development of some specific SPICE´s assets in collaboration with SPICE partners. GVAM has already collaboration projects with the University of Haifa, UNITO for their VR developments, and UNIBO.

13.1 PADAONE

Padaone is the main developer and owner of the IP rights for asset 10. Integrated interfaces for citizen curation – inSPICE, which had reached a certain level of development before SPICE project. Padaone intends to turn this asset into a business opportunity through the following business model:

- **The target market will be exclusively the cultural heritage industry**, which involves three main market segments:
  - **cultural heritage organizations**: primarily museums, but also any cultural heritage site, and potentially, also monumental cities, towns, and villages.
  - **Schools and teachers** are primary users of educational software tools and software solutions intended to enhance visiting experiences to cultural heritage sites through appealing activities.
  - **Families**: Parents are also potential users of software solutions intended to enhance visiting experiences to cultural heritage sites through games and engaging activities to the visit more engaging and educational for children.
- **Product**: the main product is 10. Integrated interfaces for citizen curation – inSPICE but Padaone. However, this product will be enhanced in two ways depending on customers' demands and priorities:
  - Implementing any of SPICE's assets to add new capabilities to develop more engaging citizen curation activities depending on customers' needs. Padaone shares the vision of SPICE as a comprehensive development system intended to create a wide range of citizen curation activities. Therefore, Padaone will propose other SPICE partners' collaboration agreements for specific projects when required by the specifications of cultural heritage organizations.
  - By implementing other Padaone's products from its portfolio of technologies to create highly engaging activities, particularly **augmented reality and image recognition** to create engaging visiting experiences. These technologies will enable inSPICE to develop engaging activities such as escape room, treasure hunting, and other games.
- **Commercial strategy and alliances**: Padaone will seek to create alliances and commercial agreements with stakeholders to facilitate access to the cultural heritage market:
  - **Strategic alliance Padaone-GVAM**: GVAM has an extensive commercial network in the cultural heritage market. Both companies are willing to collaborate to leverage this asset to facilitate the introduction of SPICE to relevant customers in the market.
  - **Ambassador museums**: Padaone will develop an ambassador program with some museums to disseminate SPICE's capabilities and in general, the citizen curation concept in the industry at the international level. Padaone will propose this collaboration to the four museums that are already part of SPICE.
- **Business model**: Padaone will follow the open-source business model chosen by most of SPICE's partners. The software of 10. Integrated interfaces for citizen curation – inSPICE will be available under a permissive licensing agreement for other developers and organizations. Cultural heritage organizations will be free to use and adapt this asset to create their citizen curation activities. However, to drive SPICE's expansion and increase visibility, Padaone has designed an alternative model for the two other target segments. InSPICE will be offered to teachers and students, and families through a freemium model. These segments are not expected to take advantage of the open-source model to customize our citizen curation capabilities of inSPICE. Instead, they will be users of inSPICE as a web-based application:
  - **InSPICE will be entirely free for teachers and students**.
  - **InSPICE will provide both free and premium services to parents**.
- **Revenue model**: since inSPICE is offered through an open-source model, Padaone does not generate revenue through licensing agreements for using inSPICE or any other SPICE asset. **Padaone will obtain revenue streams from complementary development services of configuration,**

development, design, and customization of citizen curation activities for cultural heritage organizations.

- **Complementary services to overcome barriers to the adoption of citizen curation**: cultural heritage organizations face significant budgetary restrictions that may hinder their ability to adopt citizen curation activities. To overcome this barrier, Padaone will collaborate with cultural heritage organizations to find sponsors for the adoption of citizen curation activities. The sponsorship model is relatively frequent in the cultural heritage industry for the adoption of new capabilities, services, or technologies. Moreover, the value proposition of the citizen curation concept, particularly, some aspects such as its ability to enhance inclusiveness and social cohesion regarding minorities or groups at risk of exclusion, may be appealing to some large companies.

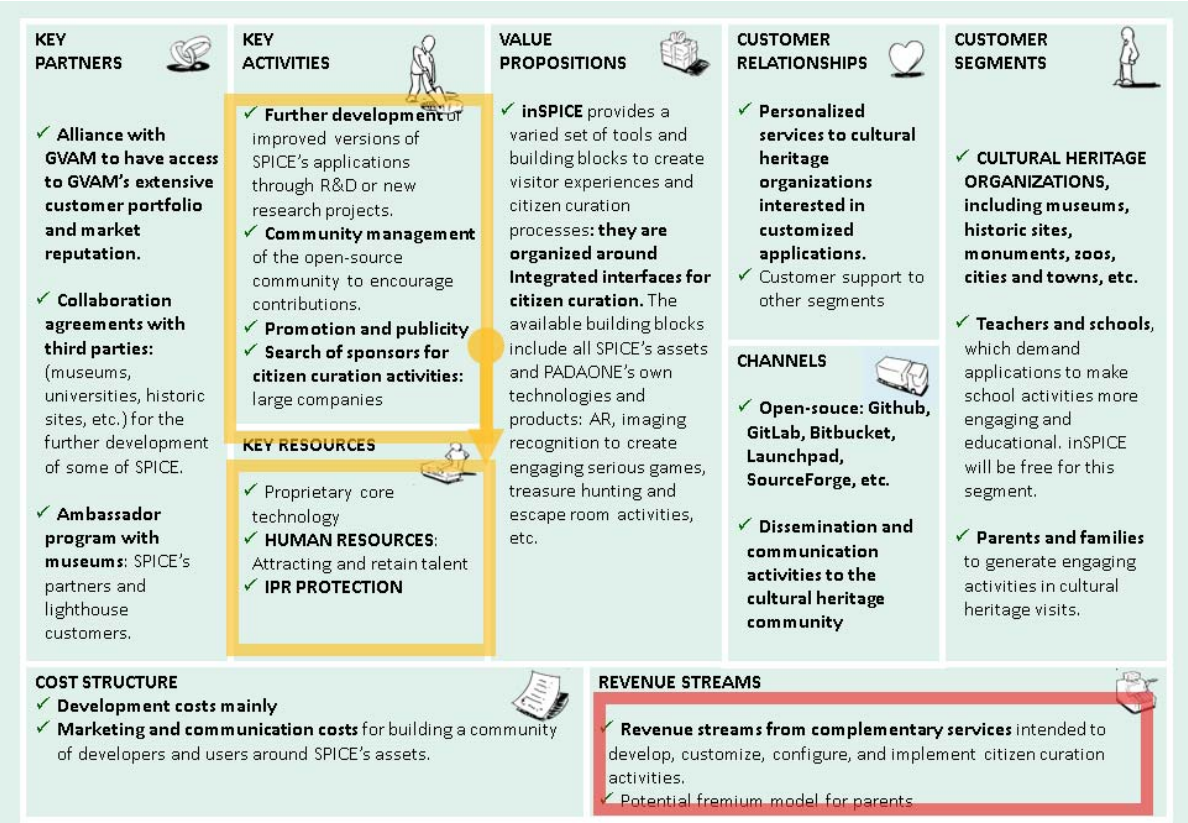


Figure 13-1 Padaone's business model canvas

Padaone's business model has several elements in common with the overall SPICE's business model previously outlined but has also been customized to seize some commercial opportunities and leverage Padaone's own product portfolio. In fact, Padaone's business model seems the realization of SPICE's business model canvas. It preserves every essential element from SPICE's assets (assets, target market, etc.) while introducing a set of elements intended to turn SPICE into a successful and sustainable venture, e.g., addressing two additional segments such as schools and parents, or introducing key alliances with cultural heritage organizations or SPICE's partners themselves.

13.2. CELI

CELI has ownership rights over two SPICE's assets: 3. Multilingual semantic annotation and 4. Multilingual emotion detection model. Both are derived from a product that is already in the market, CELI ANALYTICS. The two SPICE's assets have been the result of expanding the capabilities of CELI ANALYTICS by integrating machine learning-based classification of texts. Previously, classification in CELI ANALYTICS was based on language rules. The application of machine learning technology has provided this product the capability to analyse any type of text and be applied to any domain.

On the other hand, 3. Multilingual semantic annotation is the main asset. 4. Multilingual emotion detection model is only an extension of the former, and cannot be commercialized separately.

The main characteristics of CELI's commercialization model for these two assets are the following:

- **Broad target market beyond the cultural heritage industry:** CELI ANALYTICS can be used to process any text, and consequently, it can be used in any domain. Therefore, its commercialization is not restricted to the cultural heritage industry. CELI commercializes this model to a broad range of companies and organizations in any industry that needs to manage extensive communities of users typically in social media communities, e.g., banks or insurance companies. CELI will provide CELI ANALYTICS to any cultural heritage organization willing to adopt SPICE and require multilingual semantic annotation as part of their citizen curation activities.
- **Revenue model**: CELI has two revenue sources from the commercialization of CELI ANALYTICS: 1) Annual payments for the licence of use of CELI ANALYTICS, 2) supplementary development services to adapt and customize CELI ANALYTICS to meet customers' specific needs for additional data analysis or visualization mainly.

Early adopters of CELI ANALYTICS in the cultural heritage industry: CELI has already tested the application of CELI ANALYTICS within the cultural heritage industry. On the one hand, two of SPICE's case studies, Pop-up VR Museum and Hecht Museum, implemented CELI ANALYTICS to develop their citizen curation activities. On the other hand, another cultural heritage organization, **Cariplo Cultural Heritage Foundation**, in the Lombardi region also has implemented CELI ANALYTICS to analyse visitor-generated content coming from social media.

13.3. GVAM

GVAM is a well-established technology supplier in the cultural heritage software market. Consequently, it already has a broad customer base and product portfolio intended to this market. Therefore, GVAM is very well positioned to assess the market potential of SPICE as a citizen curation software suite and of each SPICE's assets separately. Therefore, GVAM has develop a plan to seize the opportunity of commercializing SPICE's assets in at least two ways:

- Commercialization of SPICE as a software suite in alliance with Padaone, as explained before. GVAM is well positioned in the cultural heritage market and it will provide Padaone with access to its customer portfolio or to new customers since GVAM is already a recognized brand in this market.
- GVAM plans to add specific assets from the SPICE project to its development pipeline in collaboration with some SPICE partners. In some cases, they are assets with great potential that nevertheless have not reached market-ready status, or need further adaptation to meet the needs and wants of cultural heritage organizations. To do this, GVAM has already established collaboration agreements with the University of Haifa, UNIBO, and UNITO.

14. Dissemination Plan

14.1. General dissemination strategy

As noted in the introduction of this report D 8.6, dissemination provides a more targeted approach and allows for a greater emphasis on disseminating project results, rather than communicating overall project progress. It is also the complement of the exploitation activity shown in the sections above regarding the exploitation plan. Now we are summarizing the activities carried out till M36 in approaching stakeholders and the scientific community and we are reviewing the envisioned strategy designed in the proposal and its initial step reported in previous D 8.2 (M12)

The primary objective of a dissemination strategy is to promote SPICE among researchers, students in relevant professional and academic disciplines, the scientific community at large, and other specific stakeholders who may be affected by the development of the scope. Also aims to raise awareness of the

project, and to promote participation in activities such as community groups for cultural heritage institutions and government agencies to stimulate their desire to use the technologies developed within SPICE. Finally, we aim to foster possible changes in working practices in this area.

The SPICE dissemination team has succeeded in establishing a set of distinct aims and objectives that have been achieved in this period and will keep with the partners' compromise:

- Defining the key target audiences;
- Informing and engaging the SPICE key target audience about the project and its developments;
- Establishing a set of actions for the dissemination of results;

In addition, some other tasks related to managing IP and commercial activities still in process:

- Identifying additional resources to be devoted to dissemination activities;
- Defining partner responsibilities for future tasks;
- Providing qualitative and quantitative indicators;
- To deliver a distinctive management body such a new legal entity or stable consortium

Some of these issues have been addressed in previous sections. Future dissemination should be maintained also to keep an "alive" presence in the community.

14.2. Responsibilities within the consortium

As a "coral" activity, all project partners have been responsible for contributing to dissemination activities, including identifying events, contributing to the development of dissemination materials and actions, participation in dissemination events, and publication opportunities (as appropriate). Furthermore, several partners have some of these activities in their common roadmap of action so they have been more active (e.g. academic institutions in publishing scientific papers or participating in congresses). Also, this affects the topics covered by partners: those partners developing or carrying out tasks suitable to be communicated were the ones to lead its dissemination activities (e.g. Open University for Linked Data assets). In addition, some partners have used and provided their own network of contacts and used their public relations departments within their research institutions, that also helped to disseminate specific SPICE results (e.g. GVAM used its clients data base to capture museum interest in SPICE artifacts).

At the same time, these are the specific responsibilities in WP8:

- GVAM has led WP8 and therefore had strategic responsibility for coordinating the dissemination activities of all partners;
- Tasks 8.1. Tasks 8.1. Dissemination and publication and T8.2. IPR management and contribution to standards have been led by UNIBO, which has also been responsible for the design and creation of the SPICE website;
- Task T8.4: Communication activities, led by IMMA, which is also the partner in charge of communication activities and leads actions on social media. Although focused on communication, the synergies and constant alignments between the two mentioned tasks and their corresponding responsible partners is key to reach potential stakeholders and facilitate the dissemination of the project in the appropriate channels. All partners provided appropriate distributed content for use by IMMA in the communication channels described in the Interim Communication Report D8.4 and the Communication Plan contained therein.
- All partners have been responsible for keeping GVAM informed of the results of their activities, as WP8 coordinator, where they participate in events, provide information of their distribution purposes, enabling promotion at events and monitoring the impact of those actions;
- All partners have been responsible for disseminating the materials generated in their own countries and networks, including translating the brochures, presentations, reports, etc. into their own languages where appropriate, and for sharing and promoting the communication channels (social media) provided by the project. In addition to being responsible for - Channels, newsletters and websites to increase the audience reached by the project.

14.3. Defining the key audiences

One of the main key actions to carry out towards dissemination was the definition of the key audiences. This is highly important in order to assure not only that the dissemination activities are going to be effective and but also to assure that the results of the project are received by the appropriate audiences and therefore that they are going to extend their lifecycle and influence to new projects, fields, etc. In this sense a series of key audiences has been identified. Those audiences are aligned with the target markets of the exploitation plan presented in previous sections.

Heritage institutions

SPICE disseminates to museum and heritage professionals in order to promote project tools and methods which can improve engagement with museum visitors. SPICE aims to engage with heritage institutions to gain feedback on the emerging methods of the project and identify issues that may affect the adoption of project results. Within the area of heritage, the key audiences are:

- Museums, art galleries, and heritage organizations, national, regional, and local in Europe, and beyond.
- Local art organizations, promoters, and networks (national museum associations such as MA, IMMA, ICOM, also NEMO, MuseumNext) which can helped in increasing the network on range of SPICE communications within their domain of expertise.
- Individuals such as artists, writers, bloggers, and communicators in the fields of art, culture, heritage, curation, and the intersection with activism, social inclusion, technology, and digital tools.

Academic and scientific community

As a H2020 project that aims to develop new methods and technologies to be used in quite wide range of applications, it is obvious that the academic and scientific community should be one of the main audiences to be reached by the project and within the dissemination efforts should be particularly focused.

Community organisations and excluded groups

The project aimed to engage community organizations and excluded groups to get feedback about the project and encourage participation in SPICE's ongoing trials. Support groups who are less able to visit museum sites physically, such as asylum seekers and children with serious illnesses, or people with disabilities. Actively engage the public from lower socio-economic groups who may not access cultural or heritage sites, as well as religious and ethnic communities who are minority groups.

Educators

The project aims to engage educators to gain feedback on how the tools and methods of the project can be integrated into courses and curricula. Mainly, we focus on educators from colleges and universities, in areas of culture and art but also related to others like sociology and humanities fields.

Other European Projects and governmental bodies

Another of the audiences that has been approached by the dissemination team were other European Union projects, especially those Horizon 2020 projects in the same knowledge field. With these projects the dissemination actions were not only to share concrete results but looking for synergies that could even enrich the results finally obtained by both project or lead to new research projects.

In the same way, it would be interesting to reach government and publicly funded bodies such as local and regional authorities or state ministries which have responsibility for heritage sites, activities, and organisations.

14.4. Informing the key audience

These are the different activities and tools that have been used during these 36 months to approach the key audiences identified above:

- Dissemination Events
- Scientific presentations
- Scientific Publications
- Stakeholders' engagement activities
- Synergies and collaboration contacts with other EU projects and associations
- Contact with institutions and agents related to SPICE action based in the project countries
- Newsletters
- Project Meetings invitations to stakeholders

Success analysis carried out in this report may lead to a selection of tools towards the project dissemination sustainability after the funded period, also looking for an optimization of resources in a reduced budget situation. Thus GVAM stablished a KPI measuring method to track and assess the focus of dissemination and communication among the monthly WP meetings and general consortium meetings. This analysis is detailed in section 14.9 and Annex 9.

14.5. Dissemination activities per audience

The partners in charge of direct dissemination and communication activities, mainly GVAM, IMMA and UNIBO, have been in charge of managing the logistics of the dissemination activities in close collaboration with the rest of the partners and especially with IMMA, in charge of SPICE communication channels. The partners have participated in a wide range of events, both large and small, depending on their area of interest, in terms of the dissemination venue considered fundamental to reach the key audience, WP8 ensures the presence of the project, either by organizing activities and/or liaising with other partners that have been considered important throughout the project.

The objective of segmenting the activities for each specific audience is none other than to maximize the impact they generate in that audience. The media chosen in the project for dissemination and the topics covered are the result of a detailed study of the interests, needs and concerns of different ecosystems. SPICE has achieved a quality in its dissemination program that we can classify with a very high-quality standard, the interactions that we have achieved with the different activities have always been of high quality, giving priority to this aspect over quantity.

As said before this success is explained quantitatively in the KPIs achievement analysis at section 14.9

14.6. Specific dissemination activities

The main effort that has been made throughout W8 in these three years of the Project has undoubtedly been the regular communication of the progress of the Project, with a focus on a general public to reach the widest possible audience and a technical focus more strictly on the assets developed.

The SPICE consortium is pleased with the achievement of major objectives in all the areas that have been deployed. Activities have included the creation and maintenance of a project website, the organization of dissemination events and participation in conferences, workshops and events related to the theme of social inclusion and cultural participation both face-to-face and online. Communication actions have also been carried out in social networks and the publication of articles in specialized magazines.

Bellow we offer a detailed list of actions that illustrates partially the overall effort captured by our measuring and reporting means. Other SPICE contribution to third party dissemination activity such as citation, integration in new projects or development plans, etc. may not be reported to GVAM. Even future use of SPICE knowledge should be taken into consideration as a dissemination benefit.

In addition, a dissemination plan has been developed that establishes the activities and communication channels to be used to reach the different target audiences. This plan has allowed the coordination and monitoring of dissemination activities, and has contributed to maximizing the impact of the project. It has also made it possible to establish contacts and collaborations with different stakeholders and entities interested in the subject.

Event-related dissemination activities

The following are the different actions/activities that have been carried out from M1 to M36 of the project funded period. Initially to communicate the objectives and proposed methods of SPICE and in the final months, to communicate its progress and results. Order may not be sensible to date as some activities were iterative or group some actions in just one commented action.

Table 14-1 Event-related dissemination activities

#	Date	Event	Title and/or description of contribution	Audiences	Partners
1	15/06/20	From So Far to So Close. Addressing the Refugee Phenomenon: History, Sociology, Technology The conference was hosted by the H2020 project SO-CLOSE.	'Cultural Heritage and Digital Media. Building Synergies among H2020 Projects' Paul Mulholland (OU) participated in a virtual-format roundtable discussion and made a presentation outlining the key concepts of SPICE.	Education sector and peer-H2020 projects	OU
2	29/10/20	SPICE Mini-conference I	AALTO and AAU hosted a webinar to establish a set of evaluation protocols based on the outputs of workshop participants and to later implement these results in SPICE's actual case studies. The webinar comprised four workshops related to culture interpretation and curation methods based on SPICE's respective case studies, including Citizen Curation Methods, Persona Development along with Users, Communities and Stakeholders, Charting Activities in Context through UX and Service Maps, and User Interface Design. The webinar created a forum for communication about curation practices and associated challenges, and displayed a selection of the content with which SPICE's Museum partners aim to engage the public.	Education sector and project partners	Led by AALTO and AAU with SPICE consortium
3	05/11/20	Videogamelab – UnVirtual Realities	Sofia Pescarin (CNR) participated at UnVirtual Realities in the Videogamelab workshop that involves researchers and video game developers and SPICE was presented.	Educators	CNR
4	11/11/20	Workshop: Strumenti, strategie e tecnologie per la fruizione e la didattica dell'arte e della storia dell'arte	Presentation of SPICE at the Italian workshop organized by University of Roma Tor Vergata and Università San Raffaele, with the support of ICOM Italia	Educators; academic researchers	UNITO
5	27/01/21	5/5/ Hacking Social Innovation, iNOVA Media Lab webinar	Lily Diaz-Kommonen (AALTO) participated as guest speaker in the iNOVA Media Lab webinar '5/5/ Hacking Social Innovation.' SPICE was one of the projects outlined. The webinar featured five representatives from five innovation laboratories in five	Educators; digital heritage; public with an active interest	AALTO

			countries: Along with Aalto Media Lab, there was MIT & Engagement Lab (USA), Innovation Cube (Brazil), Polifactory (Italy), and hosts iNOVA Media Lab (Portugal). The objective was to encourage direct sharing among speakers and participants about innovation challenges and solutions.	Attending the webinar was open to everyone with free registration.	
6	23/03/21	SPICE Mini-conference II	AALTO and AAU hosted a webinar to establish a set of evaluation protocols based on the outputs of workshop participants and to later implement these results in SPICE's actual case studies. The webinar comprised five workshops dedicated to examining the aspects of the citizen curation activities conducted by the case studies' museums with their end-user communities based on mock-up scenarios as well as exploring the best ways to combine interpretation and reflection methods, related activities and mock-ups in a 'user-journey loop'.	Education sector and project partners	AALTO; AAU with SPICE consortium
7	22/04/21	The Web Conf: Developers Track	Presentation of SPICE output: SPARQL Anything. Enrico Daga (OU) presented the SPARQL Anything Project, developed within the activity of WP4.	Educators and information technology sector	OU
8	14/05/21	"Digitizing Peoples in Uncertain Times" seminar	Seminar, streamed on YouTube, related to SPICE.		UNIBO
9	21/06/21	Patch 2021 workshop on Personalized Access to Cultural Heritage	Presentation of SPICE at Patch 2021 workshop on Personalized Access to Cultural Heritage		UH
10	28/10/21	Who has Access to the Digital Humanities? Digital Humanities Network event	Presentation of SPICE case study, with a focus on inclusion		IMMA; OU
11	11/11/21	CNCI seminar (Council of National Cultural Institutions, Ireland)	Presentation on SPICE and IMMA case study.		IMMA
12	18/11/21	Arts in Education National Conference	Section on SPICE project as part of session titled: 'Zoom Out: new and emerging technologies in art education'		IMMA
13	19/11/21	ESRC Festival	Presentation on SPICE as part of session titled: 'Innovative access options in heritage and cultural venues '		IMMA; OU
14	24/11/21	SPICE workshop (New Communities Partnership)	Workshop with New Communities Partnership, an organization for migrants in Ireland, in which participants used SPICE tools and methods to undertake interpretation and mediation of artworks in the IMMA Collection		IMMA; OU

15	27/11/21	Workshop with Black & Irish	Workshop with Black & Irish, an advocacy and activist organization for Black and mixed-race people in Ireland, in which participants used SPICE tools and methods to undertake interpretation and mediation of artworks in the IMMA Collection		IMMA; OU
16	11/02/22	Workshop with Black Queer Book Club	Workshop with Black Queer Book Club, a reading group for the Black queer community in Dublin		IMMA; OU
17	23/02/22	Workshop with MELLIE participants	Workshop with participants in MELLIE, a cultural exchange program between refugees living in Direct Provision and staff and students from Dublin City University		IMMA; OU
18	07/04/22	Presentation of GAM case study	Prof. Kuflik visiting the GAM discussing the case study and possible future extensions and collaboration		UH; UNITO; GAM; CELI
19	05/05/22	Exploring Youth Voice in Art and Culture	SPICE discussed in relation to exhibition of art by young people in detention, part of the Irish case study.		IMMA; OU
20	18/05/22	Seminar: Co-Designing VR Experiences, Design Museum Helsinki	Presenting both Finnish and Irish case studies at Design Museum Helsinki		DMH, IMMA
21	18/05/22	Joint visit to the Hecht Museum.	Visit the archeological Reuben and Edith Hecht Museum in Haifa, evaluated different cases of studies.		UH; UNITO; GAM
22	26/05/22	Visit to IMMA	Tour of IMMA with Visitor Engagement staff, Citizen Curation workshop and WP3 Workshop 5 meeting		AALTO, IMMA
23	27/05/22	Black & Irish present the Black Inclusive Curriculum	Public talk with Black and Irish group, following on from their citizen curation workshop		IMMA
24	07/12/22	'Creativity and culture for social cohesion', EPALE - The European community of adult learning professionals	Mention and presentation of SPICE in online event, by Helen O'Donoghue, former Head of Engagement & Learning at IMMA.		IMMA
25	29/09/22	CDYSB-IMMA retreat for Youth Workers	SPICE discussed in relation to youth arts projects		IMMA
26	30/09/22	Radically Public: panel discussion of citizen science/curation at Trinity College Dublin	Panel discussion of citizen science/curation with IMMA representing the Irish case study alongside citizen science research projects Neureka and NovelEco (H2020)		IMMA
27	05/11/22	The Ride Away from the Storm: citizen curation with young people in conflict with the law	Presenting IMMA case study at National Arts in Education conference, specifically the collaboration with Oberstown Children Detention Campus		IMMA
28	24/11/22	XR & Digital Heritage Info-Afternoon	Info - Afternoon at Hybrid Stage, K-Floor, Harald Herlin Learning Centre,		AALTO, DHM

29	22/02/23	SPICE Pop-up VR Museum and visualization	Explore the data structures of the SPICE Pop-up VR Museum and visualizations based on community models - tools & methods that assist different communities in sharing their perspectives & gaining a better understanding of others.		AALTO, UCM
30	22/03/23	Digital Youth Work Conference, Erasmus+	Demonstration of Deep Viewpoints in the 'Play Space Area'		IMMA
31	25/03/23	Voices in Many Places: Democratic Approaches to Engaging with Contemporary Art	SPICE Presentation in context of democratic practices of cultural engagement		AALTO
32	15/03/23	Extended Intelligence for Cultural Engagement (EXICE)	The scientific conference EXICE took place on 15 March in Bologna, Italy, organised by the H2020 project SPICE. The ExICE appealed to academics and museum practitioners working in disciplines involving the application of novel ICT to cultural heritage.	Scientific community and cultural stakeholders	UNIBO, DMH, OU, PG
33	15/04/23	Museums survey about SPICE business model	Survey among museums (SPICE pilots, partners clients, etc.) to disseminate and validate the business model approach to start commercial activation.	Museums	GVAM
34	22/04/23	Demo of SPICE	Demonstration of Deep Viewpoints in the 'Play Space Area'		IMMA

Scientific Presentations: Presenting papers, talks and professional forum

Presented activities related to scientific presentation taken part during the SPICE project. These activities involved the presentation of papers and interactions with peer professionals in different events and congresses.

A complete report of this activity can be found at specific Zenodo community (SPICE: Social cohesion, Participation, and Inclusion through Cultural Engagement) https://zenodo.org/communities/spice/curate/

SPICE scientific production

The SPICE Group is a multidisciplinary group with members that come, fundamentally, from the Engineering (Computer Science) and Social Sciences (Cultural heritage) fields. That is why the publications reflect the idiosyncrasy of both disciplines. Here the achieved publications presented on relevant national and international workshops and conferences. All publications are open access and are available online.

Activity	Date	Partners involved	Description	Link

Participation at Roundtable “Cultural Heritage and Digital Media. Building Synergies among H2020 Projects” presenting SPICE	15-Jun-2020	OU	Paul Mulholland participate at the Roundtable “Cultural Heritage and Digital Media. Building Synergies among H2020 Projects” within the International Conference “From So Far to So Close. Addressing the Refugee Phenomenon: History, Sociology, Technology” University of Barcelona	https://www.uab.cat/doc/Programa_So_Close
Advanced Visual Interfaces and Interactions in Cultural Heritage (AVICH 2020) Island of Ischia, Italy	29-Sep-2020	OU, UNIBO, AAU, UNITO, AALTO, UH	Presentation of Spice Paper at AVICH 2020. Presentation at Advanced Visual Interfaces and Interactions in Cultural Heritage (AVICH 2020) of the first paper from SPICE project: "Towards Advanced Interfaces for Citizen Curation." UH was part of the organizers too.	http://ceur-ws.org/Vol-2687/
Presentation of SPICE paper “Citizen curation and NLP technologies for museums in the SPICE Project” at the AIUCD, the Italian Association for Humanities and Digital Culture	19-Jan-2021	CELI	Andrea Bolioli, Alessio Bosca, Anna Maria Marras, Rossana Damiano and Antonio Lieto together with researchers from the University of Turin, presented the paper “Citizen curation and NLP technologies for museums in the SPICE Project” at the AIUCD, the Italian Association for Humanities and Digital Culture, is one of the most important Italian initiatives in the field of Digital Humanities and Digital Cultural Heritage.	https://www.celi.it/en/blog/2021/01/aiucd-2021-at-the-annual-conference-celi-presents-the-spice-project/
Presentation of paper “A common sense reasoning framework for explanatory emotion attribution, generation and re-classification”	6-Feb-2021	UNITO	Antonio Lieto, Gian Luca Pozzato, Stefano Zoia, Viviana Patti, Rossana Damiano. First Journal Paper of SPICE in Knowledge-Based System (Elsevier Journal, Q1, Impact Factor: 8.139) presenting the DEGARI system for emotion attribution via ontological models that will be exploited in the SPICE project for artwork recommendation and classification.	https://arxiv.org/abs/2101.04017
Presentation of SPICE paper "Tourist recommendations with a touch of SPICE: A TRS with Deep Cultural Understanding"	12-Mar-2021	OU, UH	Tsvi Kuflik, Paul Mulholland and Alan Wecker: presented this paper at WebTour 2021, workshop held in Jerusalem in conjunction with WSDM 2021 that focuses on the specific challenges for tourism-related information search and recommendations.	https://web.ec.tuwien.ac.at/webtour21/?page_id=30
Paper presentation: Sequential Linked Data: The State of Affairs	21-Mar-2021	OU	Daga, Enrico; Meroño-Peñuela, Albert; Motta, Enrico. The paper proposes a SPARQL implementation of y five classic list-based computer science sequential data structure with five typical RDF data models and compare their performance by executing them against six increasing dataset sizes and four different triples.	10.5281/zenodo.4927864
SPICE panel at the MW21 conference	6-Apr-2021	UH, OU, UNITO	A panel at Museums and Web 2021 on various issues in the SPICE project. The panel consisted of Tsvi Kuflik (UH), Paull Mulholland (OU), Anna Maria Marras (UNITO), Alan Wecker (UH)	https://mw21.museweb.net/proposal/spice-social-cohesion-participation-

				inclusion-through-cultural-engagement/
Presentation of SPICE paper "Introducing empathy into recommender systems as a tool for promoting social cohesion"	13-Apr-2021	OU, UH, UCM, AAU	Paper of SPICE was presented at SOCIALIZE workshop (Università degli Studi di Torino) that aims to bring together all those interested in the development of interactive techniques that may contribute to foster the social and cultural inclusion of all users.	http://socialize2021.di.unito.it/index.html
Paper Towards Personalized Social Recommendations for Cultural Heritage Activities: Methods and technology to enable cohesive and inclusive recommendations	1-Jun-2021	UCM, CELI, UH	Belen Diaz-Agudo, Alessio Bosca, Andrea Bolioli, Guilermo Jimenez-Diaz, Tsvi Kuflik and Alan J. Wecker. Paper presented at PATCH 2021 co-located with UMAP 2021 Workshop on Personalized Access to Cultural Heritage that aims to outline the methodologies and technologies needed to be built in order to build a recommender system of cultural objects.	https://dl.acm.org/doi/10.1145/3450614.3463389
Integrating citizen experiences in cultural heritage archives: requirements, state of the art, and challenges	11-Jun-2021	OU, UNIBO, UNITO, UCM, CNR, UH, IMMA	Daga, Enrico; Asprino, Luigi; Damiano, Rossana; Diaz Agudo, Belen; Gangemi, Aldo; Kuflik, Tsvi; Lieto, Antonio; Marras, Anna Maria; Martinez Pandiani, Delfina; Mulholland, Paul; Peroni, Silvio; Pescarin, Sofia; Wecker, Alan. Article published on JOCCH about the existing research that can contribute significantly in facing the challenges raised by citizen curation, and discuss challenges and opportunities from the socio-technical standpoint and specifically about the developments being done within SPICE.	10.5281/zenodo.4927657
Paper “Facade-X: an opinionated approach to SPARQL”	11-Jun-2021	OU, UNIBO, CNR	Enrico Daga, Luigi Asprino, Paul Mulholland, and Aldo Gangemi. The paper explores an alternative solutionand contribute a general-purpose meta-model for converting non-RDFresources into RDF:Facade-X.	10.5281/zenodo.4927536
Accessible Immersive Platforms for Virtual Exhibitions involving Cultural Heritage	14-Jun-2021	AALTO	Diaz-Kommonen, Lily; Vishwanath, Gautam. In recent years, several digital platforms such as Mozilla Hubs have emerged and are rapidly growing since the COVID-19 era. Taking advantage of its ease and accessibility, our team designed a Hubs-based experience titled Chronicles of an Art and Science Collaboration and demonstrated it at Arts Electronica 2020 media festival. This immersive experience documented a collaborative project between artists and scientists dealing with the use of bio-cellulose for art and design purposes. Upon conducting a survey, we learnt about the experience from a user’s perspective, and these learnings serve as guidelines for our immersive cultural heritage-based projects envisioned in the future.	https://www.torrossa.com/en/resources/an/4899363

Presentation at EVA Florence 2021	14-Jun-2021	AALTO	Presenting our Ars Electronica 2020 project, Chronicles of an Art and Science Collaboration that serves as a basis for DMH's Pop-up VR Museum	https://www.torrossa.com/en/resources/an/4899363
Presentation of SPICE paper " Towards Personalized Social Recommendations for Cultural Heritage Activities"	21-Jun-2021	UH	Presentation of SPICE at Patch 2021 workshop on Personalized Access to Cultural Heritage.	https://patch2021.di.unito.it/
A complementary account to emotion extraction and classification in cultural heritage based on the Plutchik's theory.	July-2022	H-FARM, UNITO	Bolioli, A., Bosca, A., Damiano, R., Lieto, A., & Striani, M. A complementary account to emotion extraction and classification in cultural heritage based on the Plutchik's theory.	https://dl.acm.org/doi/proceedings/10.1145/3511047?tocHeading=heading9
In Adjunct Proceedings of the 30th ACM Conference on User Modeling, Adaptation and Personalization (pp. 391-396).	July-2022	UHAIFA, UNITO	Damiano, R., Kuflik, T., Wecker, A. J., Striani, M., Lieto, A., Bruni, L., Kadastic, N. & Pedersen, T. A. Exploring Values in Museum Artifacts in the SPICE project: a Preliminary Study.	https://cris.haifa.ac.il/en/publications/13th-international-workshop-on-personalized-access-to-cultural-he
Presentation of SPICE paper "User Evaluation to Measure the Perception of Similarity Measures in Artworks"	15-Sep-2022	UCM	Belén Díaz-Agudo presented the paper at 29th International Conference on Case-Based Reasoning (ICCBR 2021)	https://iccbr21.org/schedule
Workshop on Deep Learning for Knowledge Graphs (DL4KG), co-located with the 21st International Semantic Web Conference (ISWC), 23-24 Oct 2022, Virtual, CEUR, pp. 1–15.	Sep-2022	OU	Chiatti, A. and Daga, E. In the SPICE project are researching on an intelligent system that classifies artworks to support several tasks such as metadata curation and linking across image collections. In this paper, are reported an empirical investigation where neuro-symbolic, Deep Learning techniques are applied to a paradigmatic case of cultural heritage archive: the Tate Gallery collection open data. Posing the question of what type of feature engineering could help in reducing the impact of data sparsity in this domain.	https://oro.open.ac.uk/85282/
Knowledge Graph Construction with a façade: a unified method to access heterogeneous data sources on the Web.	Sep-2022	OU, UNIBO	Luigi Asprino, Enrico Daga, Aldo Gangemi, and Paul Mulholland. Data integration is the dominant use case for RDF Knowledge Graphs. The argue is that is possible and desirable to equip KG engineers with the ability of interacting with Web data formats by relying on their expertise in RDF and the well-established SPARQL query language. This article studies a unified method for data access to heterogeneous data sources	https://doi.org/10.1145/3555312

			with Facade-X, a meta-model implemented in a new data integration system called SPARQL Anything.	
Conference Presentation about ontologies of moral values	Sep-2022	UNIBO, UNITO	Presentation: "Basic Human Values and Moral Foundations Theory in the ValueNet Ontology" by Stefano De Giorgis	https://link.springer.com/chapter/10.1007/978-3-031-17105-5_1
Workshop Presentation about knowledge-based emotion research	Sep-2022	UNIBO	Presentation: "EW, ICK: Emotional Words Investigated with Contextual Knowledge" by Stefano de Giorgis	https://sme-2022.llf-paris.fr/?fichier=programme
Workshop presentation about generative models for moral value detection	Sep-2022	CNR	Presentation: "Detection of Morality in Tweets Based on the Moral Foundation Theory" by Luana Bulla	https://link.springer.com/chapter/10.1007/978-3-031-25599-1_1
Degari 2.0: A diversity-seeking, explainable, and affective art recommender for social inclusion.	3-oct-2022	UNITO	Antonio Lieto, Gian Luca Pozzato, Manuel Striani, Stefano Zoia, Rossana Damiano. Presentation DEGARI 2.0 (Dynamic Emotion Generator and ReclassIfier): an explainable, affective-based, art recommender relying on the commonsense reasoning framework TCL and exploiting an ontological model formalizing the Plutchik's theory of emotions. The main novelty of this system relies on the development of diversity-seeking affective recommendations obtained by exploiting the spatial structure of the Plutchik's 'wheel of emotion'. The system's goal, therefore, is to break the filter bubble effect and open the users' view towards more inclusive and empathy-based interpretations of cultural content. The system has been tested, in the context of the EU H2020 SPICE project, on the community of deaf people and on the collection of the GAM Museum of Turin.	https://zenodo.org/record/7138968#.Y3NhW-zMI-S
International Semantic Web Conference	24-oct-2022	OU	Presentation: "Neuro-symbolic Learning for Dealing with Sparsity in Cultural Heritage Image Archives: An Empirical Journey" by Agnese Chiatti and Enrico Daga.	https://iswc2022.semanticweb.org/
Conference presentation about knowledge graphs to represent cultural symbolism	Nov-2022	UNIBO	Presentation: "Marriage is a Peach and a Chalice: Modelling Cultural Symbolism on the Semantic Web" by Bruno Sartini	https://doi.org/10.1145/3460210.3493552
Pop-up VR Museum at the Third Artefacta Conference at Turun yliopisto - University of Turku	23-feb-2023	AALTO	Presentation: Design objects provoke memories & invite stories. Can design objects give agency to museum communities through Citizen Curation?	https://www.linkedin.com/feed/update/urn:li:activity:7033457366478020608

ExICE - Extended Intelligence for Cultural Engagement - University of Bologna	15-mar-2023	ALL Partners	Presentation of all SPICE case studies	https://spice-h2020.eu/conference/

14.7. SPICE Stakeholders Engagement

A number of opportunities to gain feedback have been taken with SPICE stakeholders in cultural heritage. During these meetings, core concepts of SPICE such as Citizen Curation and Co-Design are communicated, feedback has been sought after showing initial mock-up sketches of a possible SPICE interface.

Our approach has been to first identify established community organisations and projects in order to build on and extend existing relationships between museums and community groups. Stakeholders or representatives from these organisations have provided initial feedback on early ideas and mock-ups. This feedback has informed subsequent co-design workshops with the communities themselves. Co-design processes within the case study ensure that the resulting activities and tools are sensitive to the requirements of these participants.

Contacts and actions have been carried out with different organizations in the museum, educational and cultural heritage fields... and we have met with them to study the possibility of working together to experiment with SPICE tools and methods. We also conduct stakeholder surveys: To better understand the needs and priorities of the stakeholders involved in the SPICE initiative (Spanish Museums like `El Prado´, `Thyssen´, `Fundación Mapfre´ or `National Archaeological Museum´), following table present different actions that have been done during the 3 years project.

Table 14-2 SPICE Stakeholders Engagement

Date	**Institution/ Organisation giving feedback**	**Description**	**Partner involved**
Heritage Institutions giving feedback on SPICE tools			
21/01/21	IMMA	Visitor Engagement Team introduction to scripts and giving feedback on preliminary sketches of suggested interfaces and activities.	IMMA, OU
08/04/21	The Glucksman Gallery, University College Cork	Senior Education Curator Tadhg Crowley shown mock up interfaces presented at mini-conference #2 and gives feedback The Glucksman is a leading Irish museum for creative learning and access to the visual arts.	IMMA, OU
05/04/21	Hecht Museum, University of Haifa	Museum staff gave feedback on SPICE ideas.	HU
16/04/21	IMMA	Collections Curator Johanne Mullan gives feedback on mock-up interfaces.	IMMA, OU
13/05/21	DMH	Engagement with mediators and senior-citizens at Kustaankartano (senior care center) in Helsinki to understand accessibility needs and carry out basic testing with VR.	DMH; AALTO

21/05/21	DMH	Mediators gave feedback on SPICE sketches and ideas.	DMH, AALTO
18/11/21	Dublin City Council Culture Company	Community engagement staff giving feedback on SPICE.	IMMA
09/01/22	Art of Care, Brussels	Meeting with Zsolt Kozma, Founder and Curator of Art of Care a programme of art, integration, social care and education in Brussels.	IMMA
02/02/22	IMMA	Visitor Engagement Team introduction to Deep Viewpoints prototype; giving feedback on community authored scripts.	IMMA
07/04/22	NEMO (Network of European Museum Organisations)	Meeting with Kristina Barekyan of the NEMO LEM working group to discuss case study as part of forthcoming report on remote digital learning in museums.	IMMA; OU
11/07/22	Art UK	Meeting with Art UK Deputy Head Katey Goodwin and staff to discuss their 'Curations' tool and provide a demo of 'Deep Viewpoints'.	IMMA
18/11/22	Uillinn West Cork Arts Centre	Meeting with Justine Foster, Head of Education at Uillinn West Cork Arts Centre. Presented SPICE and discussed potential for collaboration with Uillinn's Youth Group in 2023.	IMMA; OU
19/01/23	The Abbey Theatre	Meeting with Phil Kingston, Community Engagement Manager to discuss SPICE and explore citizen curation in a performing arts context.	IMMA
10/04/23	The Prado Museum	Meeting with Ana Moreno, Education Department Manager to discuss SPICE outputs and business model approach	GVAM
10/04/23	The Thyssen Bornemisza	Meeting with Rufino Ferreras, Head of Education Department to discuss SPICE outputs and business model approach	GVAM
11/04/23	The Mapfre Foundation	Meeting with Ignacio Gonzalez, Collection Department Manager to discuss SPICE outputs and business model approach	GVAM
12/04/23	The National Archaeological Museum	Meeting with Carmen Marcos, former Director of the Museum to discuss SPICE outputs and business model approach	GVAM
13/04/23	Various Spanish and LATAM museums	Online meeting with museum managers to present SPICE outputs and business model approach	GVAM
Community groups and organizations contacted about SPICE			
22/01/21	MuseumNext 2021 Digital Summit	IMMA (Twitter engagement and interaction between SPICE account's tweets and conference's official account as well as the final key note speaker):	IMMA

		https://twitter.com/SpiceH2020/status/1352681718453579776?s=20	
09/03/21	MELLIE (Migrant English Language, Literacy and Intercultural Education) Programme, run by Dublin City University	Coordinator of the MELLIE Programme was contacted with a proposal for a future collaboration that would have user groups (typically those seeking asylum) work with SPICE tools and methods to engage with IMMA's collection.	IMMA
06/04/21	Fighting Words	Fighting Words was contacted as a potential collaborator which works nationally with children and young people from socio-economically deprived communities. Fighting Words is an Irish charity that provides free tutoring and mentoring in creative writing and related arts to as children, young adults, with a particular emphasis on those with special needs.	IMMA, OU
06/04/21	Narrative 4	Narrative 4 was contacted to explore the potential for collaboration, particularly exploring the concept of empathy within the SPICE project. Narrative 4 is an Irish charity which uses Story Exchange, an evidence-based methodology, to teach young people social and emotional skills and create empathy.	IMMA, OU
13-14/05/21	Kustaankartano (a senior care center in Helsinki)	In addition to medical care and nursing care, Kustaankartano also offers a variety of activities and services to enhance the quality of life of its residents. Residents can participate in activities such as exercise, games and social events.	DMH
27/05/21	HELIUM (arts charity for children living with illness)	HELIUM offers art and creativity workshops to children and youth in hospitals, health care facilities and local communities. The workshops are designed to help young people express themselves creatively and develop artistic skills, while providing a positive outlet for their creativity.	IMMA
Jul/Sept/21	Focus group with deaf users, educators and curators	To obtain information about accessibility and inclusion in deaf education and art.	UNITO; GAM
12/07/21	Black Queer Bookclub	The Black Queer Bookclub is a reading group focused on literature written by Black LGBTQ+ authors.	IMMA
28/7/21	New Communities Partnership		IMMA

09/8/21	MISA (Mercer's Institute for Successful Ageing), St James Hospital	MISA also works in partnership with other agencies and organizations to improve health care and quality of life for older people in Ireland. Bringing cultural experiences to the center's patients.	IMMA
18/01/22	Fatima Groups United (Community organisation in Inchicore, Dublin)	Fatima Groups United is an example of how community organizations can have a positive impact on people's lives and on building stronger, more united communities.	IMMA
27/01/22	Oberstown Youth Detention Centre	The Oberstown Juvenile Detention Center is an example of how correctional facilities can take a more humane, rehabilitation-focused approach to help youth overcome challenges and reintegrate into society in a positive way.	IMMA
10/02/22	Ocim - Office de coopération et d'information muséales	Ocim is a leading organization in the field of museology and cultural management, dedicated to improving the quality of services and management in museums, and encouraging public participation in culture and heritage.	GVAM
14/02/22	National Children's Hospital, Dublin	The National Children's Hospital in Dublin is an important institution for the health and well-being of Ireland's children and young people, and plays a crucial role in the country's pediatric medical care.	IMMA
18/05/22	Helsinki meeting discussing SPICE and youth art engagement	The meeting was an important step towards creating an ongoing dialogue and collaboration between key players in the field of youth arts and culture in Finland, and a way to move towards greater inclusion and participation in the cultural life of young people in the country.	IMMA
18/05/22	EMMA (Espoo Museum of Modern Art)	The museum aims to present modern and contemporary art in a way that is accessible and relevant to a wide audience. To achieve this, EMMA organizes thematic exhibitions and educational and cultural programs for all audiences, including children and youth.	IMMA
23/05/22	Dublin City University's Arts Officer and 'Our Collection Our Choice' Committee explore Citizen Curation scripts and learn about SPICE Project	The meeting was an important opportunity to discuss inclusion and participation in arts and culture, and how Citizen Curation and the SPICE Project can be used to encourage greater access and participation in arts and culture in the DCU community.	IMMA
26/05/22	TRACTION (H2020) Meeting with James Bingham of INO	The meeting emphasized the importance of collaboration and the effective transfer of knowledge and technology in the health sector.	IMMA: AALBORG

13/09/22	Oficina Técnica de Proyectos Europeos (Spain)	It is an entity that offers advisory and management services for European projects in Spain. Its objective is to help Spanish entities to obtain funding and to participate in European programs and projects, as well as to promote cooperation and the transfer of knowledge and technology at the European level.	GVAM
23/09/22	EAVF rurAllure	RurAllure is a project developed by the European Association for the Valorization of Cultural Heritage (EAVF) that aims to develop and promote sustainable tourism in rural areas of Europe, through the valorization of the cultural and natural heritage of these areas.	GVAM
27/09/22	CEPNET ERASMUS+ (IMMA hosted meeting of CEPNET with Paul Butler)	It is an Erasmus+ project that seeks to promote cultural education through the creation of collaborative networks between educational and cultural institutions. The meeting organized by the Irish Museum of Modern Art with Paul Butler is one of the activities carried out within the framework of this project.	IMMA
09/11/22	UCL -Department of Information Studies	It is dedicated to the study of information, documentation and information management. It offers interdisciplinary undergraduate and graduate programs, and conducts innovative research in different areas related to information management in the digital age.	GVAM
05/12/22	Art Nomads (Collective of migrant and refugee artists working in Ireland)	Art Nomads is a collective of migrant and refugee artists working in Ireland. The collective's mission is to support migrant and refugee artists in Ireland, promote social inclusion and foster cross-cultural understanding through art.	IMMA
03/01/23	EPIC (Empowering People in Care)	PECI works to improve the lives of young people in care in Ireland. EPIC is youth-led and works to give young people in care a voice, advocate for their rights and improve their well-being.	IMMA
Schools and teachers giving feedback on SPICE			
Date	**Action**	**Description**	**Partner involved**
During 2020	Sessions with schools in as part of the Sharper, the 2020 edition of the European Researchers'	UNITO carried out two sessions with schools in this public engagement program organized by Unito as part of the Sharper, the 2020 edition of the European Researchers' Night; 6 classes (each about 25 students and 1 teacher) took part to this activity. https://www.sharper-night.it/evento/good-morning-torino/	UNITO, FTM

Several dates, ongoing meetings	Sessions with school educators	Co-design of museum activity with school educators to fit educational needs	HECHT
06-Jun-21	Workshops with university students	Design workshop with 8 students. Students did a tour at the Hecht Museum and were presented with some of the planned activities. Students were asked to collect items (using photos), tag items, and provide interpretations related to the museum artifacts. Data was collected and analyzed, in order to better understand how to design the activities.	UH
24-Oct-21, 21-Nov-21, 19-Dec-21	Hecht activity - School 1	53 school pupils filled pre-visit questionnaire; 49 participated in the museum (Hecht) activity and then filled the post-visit questionnaire.	UH
21-Nov-21, 12-Dec-21	Hecht activity - School 2	26 school pupils filled pre-visit questionnaire and then participated in the museum (Hecht) activity; no post-visit filled.	UH
03-Nov-21	Workshops with schools during Science Week	Colegio Arcangel 5th and 6th (40 students).	PG
04-Nov-21	Workshops with schools during Science Week	Colegio Nuestra Señora de Val 6th x 2 (40 students)	PG
05-Nov-21	Workshops with schools during Science Week	Colegio San Francisco de Asis 2nd ESO; CEPA Aluche: adults (40 students).	PG
14-Jan-22	UNITO-GAM Game test with DEAF	Testing of the Gam Game recommendations based on DEGARI for single items (75 people involved).	UNITO, FTM, Istituto Sordi
23-Feb-22	Workshops with university students	20 students and staff from Dublin City University participated in a SPICE workshop as part of the MELLIE Programme.	IMMA; OU
14-Mar-22	Co-design with high-school teachers	Three high school teachers who are helping us in designing the authoring tool	PG
13-Mar-22 20-21-Mar-22 29-Mar-22	Hecht activity - School 3	56 school pupils filled pre-visit questionnaire; they then participated in the museum (Hecht) activity in two successive days and filled the post-visit questionnaire a few days later.	
27-Mar-22	Hecht activity - School 4	63 school pupils filled pre-visit questionnaire; 34 participated in the museum (Hecht) activity and	

28-Mar-22 31-Mar-22		then filled the post-visit questionnaire a few days later.	
25-oct-22	Feedback from school teacher	Meeting with Jennifer Buggy, coordinator of the Teacher Artist Partnership (TAP) programme and art teacher at the Education Centre, Tralee; feedback citizen authored scripts.	IMMA; OU
04-nov-22	UNITO-GAM Game test with DEAF	Testing of the Gam Game recommendations based on DEGARI for stories (67 people involved, 40 DEAF and 27 non-DEAF).	UNITO, FTM, Istituto Sordi
07-nov-22	Feedback from university lecturer and students	Meeting with Dr Samina Zaheer and four students from Punjab University, Lahore.	IMMA
08-nov-22	Shaun Ussher, EPSS action	Meeting with Shaun Ussher, PhD candidate and IRC Enterprise Partnership Scheme Scholar, provided feedback on Deep Viewpoints and the Irish case study.	IMMA
ene-23	Workshops with schools at MNCN	Two groups of 5th grade students from CEIP Bachiller Alonso López in Alcobendas, a city near Madrid, participated in an activity organized by SPICE researchers at the MNCN.	PG

Number of visitors to the case study museums informed about SPICE

Date	Number of visitors informed	Action	Partners involved
July-October 2021	249	Number of visitors to IMMA who accessed Viewpoints web app.	IMMA; OU
17-jun-21	2	First visit to one of the biggest Senior Centres in Helsinki to understand how the care-centre uses technology with senior citizens and collecting ideas about VR and working with design objects from senior care experts and clients.	AALTO, DMH
22-jun-21	3	Pop-up-VR Museum workshop at DMH. A workshop for non-institutionalized “free going” senior citizens.	AALTO, DMH
24-Nov-22	4	Workshop with New Communities Partnership, an organisation for migrants in Ireland, in which participants used SPICE tools and methods to undertake interpretation and mediation of artworks in the IMMA Collection	IMMA
27-Nov-22	5	Workshop with Black & Irish, an advocacy and activist organisation for Black and mixed race people in Ireland, in which participants used SPICE tools and methods to undertake interpretation and mediation of artworks in the IMMA Collection.	IMMA
19-jan-22	12	Online workshop with Museum Ventilators, DMH focus group of senior citizens conducted	AALTO, DMH

		via multimedia conferencing using Zoom and Miro.	
11-feb-22	10	Workshop with Black Queer Book Club, a reading group for the Black queer community in Dublin.	IMMA
23-feb-22	36	Workshop with participants in MELLIE, a cultural exchange programme between refugees living in Direct Provision and staff and students from Dublin City University.	IMMA; OU
02-mar-22	6	Workshop with Museum Ventilators, DMH focus group of senior citizens	AALTO, DMH
08-mar-22	10	Open Pop-up-VR Museum. Walk-in workshop in municipal library and individual senior citizens in Orimattila, Orimattila	AALTO, DMH
15-mar-22	12	Workshop for senior group from The Finnish Association for the Welfare of Older Adults (Vanhustyön keskusliitto)	AALTO, DMH
17-mar-22	13	Workshop with invited group of senior citizens, Happy Paintbrushes, art group for seniors in Mukkula, Lahti.	AALTO, DMH
22-mar-22	15	Workshop with group of seniors from Neighbourhood circle (Naapurustopiiri) in Maunula, Helsinki. Workshop with invited group of senior citizens ieighbourhood circle (Naapurustopiiri) of Laajasalo, Helsinki.	AALTO, DMH
29-mar-22	4	Online workshop with invited senior citizens conducted via multimedia conferencing using Zoom and Miro.	AALTO, DMH
may-22	121	Number of visitors to IMMA 'The Ride Away from the Storm' exhibition who accessed the QR code.	IMMA; OU
07-Apr-22	5	Prof. Kuflik visiting the GAM discussing the case study and possible future extensions and collaboration	UH; UNITO; GAM; CELI
05-may-22	25	SPICE discussed in relation to exhibition of art by young people in detention, part of the Irish case study.	IMMA; OU
12-may-22	8	Workshop for Konkarit group of Tampere City senior services was organized in The Labor Museum Werstas as part of the A&DO Lab Senior Day	
17-may-22	412	Open workshop for museum visitors during the Finnish Museum Week (5 days)	AALTO, DMH
19-may-22	30	Co-Designing Virtual Reality Experiences hybrid event for professionals featuring two EU projects: Beyond Matter and SPICE. Presenting both Finnish and Irish case studies.	DMH, IMMA

26-may-22	9	Tour of IMMA with Visitor Engagement staff, Citizen Curation workshop and WP3 Workshop 5 meeting	AALTO, IMMA
27-may-22	40	Public talk with Black and Irish group, following on from their citizen curation workshop	IMMA
30-ago-22	47	Open Pop-up-VR Museum workshop at DMH. Open workshop for museum visitors during the free Design evening	AALTO, DMH
21-sep-22	20	Workshop with invited group of adult students with migrant background from The Institute of Adult Education in Helsinki.	AALTO, DMH
27-sep-22	76	Open workshop for museum visitors during the free Design evening	AALTO, DMH
29-Sep-22	20	CDYSB-IMMA retreat for Youth Workers. SPICE discussed in relation to youth arts projects.	IMMA
07-oct-22	10	Workshop with invited group of customers of immigration services from the Punavuori reception centre for asylum seekers and refugees.	AALTO, DMH
15-oct-22	20	Workshop with invited group of seniors from The Happy Paintbrushes art group for seniors from Lahti.	AALTO, DMH
25-oct-22	84	Open workshop for museum visitors during the free Design evening	AALTO, DMH
29-nov-22	43	Open Pop-up-VR Museum workshop at DMH. Open workshop for museum visitors during the free Design evening	AALTO, DMH
05-dec-22	6	Workshop and testing during the SPICE conference at the Hecht Museum, University of Haifa	ALL
30-jan-23	16	Workshop with invited group of seniors, the Kyläkammari group (The Finnish Association for the Welfare of Older Adults, Vanhustyön keskusliitto) at Oulunkylä church	AALTO, DMH
17-feb-23	8	Testing and walk-in workshop for visitors at the Turku Central Library	AALTO, DMH
22-feb-23		Workshop with presentations by UCM with DMH and Aalto professionals exploring the data structures of the Pop-up VR Museum and demonstrating development and use of visualizations based on community models.	AALTO, DMH, UCM
14-mar-23	12	Open Pop-up-VR Museum workshop at the Museum of Palazzo Poggi, Bologna, Italy. Walk-in open workshop with visitors and museum professionals.	AALTO, DMH
22-mar-23	100	Digital Youth Work Conference, Erasmus+ Demonstration of Deep Viewpoints in the 'Play Space Area'	IMMA
25-mar-23	25	Voices in Many Places: Democratic Approaches to Engaging with Contemporary Art	IMMA

29-apr-23		Open Pop-up-VR Museum workshop in Oulu, Finland. Workshop and testing in open walk-in workshop organised as part of A&DO Lab Senior Day in the premises of PROTO the Designers' association of Northern Finland.	AALTO, DMH

In addition to the described actions that have already been carried out, there are other engagement activities that are being carried out, such as the presentation of a series of visitor surveys as a way to (a) disseminate the results of the project and (b) obtain more information about the potential users of the SPICE technology and, specifically, with those who could be involved in the different case studies that will be carried out during the project. We are disseminating this survey through our own communication channels, especially through the social networks of the museum partners.

14.8 Newsletter

Table 14-3 Newsletter activity

#	Date	Description	Views	Opening rate	Subscribers by date of delivery
1	15/06/20	First newsletter anouncing the project and with the purpose of building the Spice suscribers database	462	24%	0
2	29/10/20	Sign up for this SPICE webinar, which will take place on October 29th from 9 a.m. to 4 p.m.	6	27,3%	23
3	30/11/20	Description of SPICE Work Package 4, objectives and relations with other WPs	11	44%	26
4	04/12/20	Share of a series of recommendations of projects, articles, webinars, etc.	9	36%	48
5	23/12/20	SPICE: from case studies to real solutions and protocols	28	53,8%	52
6	11/01/21	Share of a series of recommendations of projects, articles, webinars, etc.	31	56,4%	56
7	29/01/21	Description of SPICE Work Package 2, objectives and relations with other WPs	24	39,3%	61
8	19/02/21	Share of a series of recommendations of projects, articles, webinars, etc.	37	59,7%	63
9	05/03/21	Description of SPICE Work Package 6, objectives and relations with other WPs	34	45,9%	74
10	19/03/21	Share of a series of recommendations of projects, articles, webinars, etc.	40	43,0%	93
11	16/04/21	SPICE Work Package 5: Interface Design for Citizen curation, whose main objective is the development of interfaces for citizen curation activities.	41	40,00%	101
12	30/04/21	Share of a series of recommendations of projects, articles, webinars, etc.	48	42,3%	113
13	28/05/21	Second SPICE mini-conference took place in which methodologies would be	51	45,8%	111

		established to connect culture with citizens.			
14	04/06/21	Museumweek participation	42	40%	113
15	18/06/21	SPICE Work Package 3	41	37,5%	112
16	02/07/21	Share of a series of recommendations of projects, articles, webinars, etc.	42	36,6%	114
17	16/07/21	SPICE Work Package 4	42	36,8%	115
18	30/07/21	Share of a series of recommendations of projects, articles, webinars, etc.	52	44,3%	118
19	13/08/21	SPICE RECOMMENDS (summer edition): Share of a series of recommendations of projects, articles, webinars, etc.	42	35,3%	120
20	08/10/21	SPICE RECOMMENDS	63	48,3%	131
21	12/11/21	SPICE RECOMMENDS: SPICE PROJECT PARTICIPATION, ARTICLE, PROJECT	66	48,3%	137
22	02/12/21	SPICE RECOMMENDS: SPICE PROJECT ARTICLE, RESEARCH-ARTICLE, EVENT	70	49,6%	142
23	28/01/22	SPICE MEETS: Special update about the advances in Work Package 1	78	42,1%	184
24	25/02/22	SPICE RECOMMENDS: SPICE CASE STUDY, RESEARCH-ARTICLE, WORKSHOP EXPERIENCE	89	48,8%	184
25	31/03/22	SPICE UPDATE: SPICE CASE STUDY, PROJECT, EVENT	80	38,8%%	207
26	28/04/22	SPICE UPDATE: SPICE CASE STUDY, NEWS, ARTICLE	81	37,8%	216
27	26/05/22	SPICE UPDATE: SPICE CASE STUDY, NEWS, ARTICLE	86	35,2%	243
28	26/05/22	SPICE UPDATE: SPICE CASE STUDY, NEWS, ARTICLE	94	35,2%	268
29	08/09/22	SPICE UP! Summer special recommendations	113	41,2%	274
30	20/10/22	SPICE UP! Autumn edition	65	23,7%	275
31	21/01/23	SPICE UP - Culture to everyone	156	50%	313
32	10/03/23	SPICE UP Pre exICE	89	23,4%	348
33		SPICE UP Pre exICE	123	27%	357
34		SPICE UP Pre exICE	214	52,6%	406
35	03/04/23	SPICE BOLONIA	194	47,3%	410
36	05/04/23	SPICE UP: Discover new SPICE projects presented in Bologna	247	52,8%	468
37	19/04/23	SPICE ENCUESTA	183	39,1%	468

14.9 Monitoring activities and KPIs

The dissemination activities that were carried out as part of the project were tracked and monitored to assess the effectiveness of the messages being communicated by project partners and to determine whether the target audience was being reached. To this end, a set of KPIs related to communication and dissemination activities were included in the grant agreement, and partners in WP8 kept an internal record of all dissemination and communication activities to be reviewed at the end of each year. These KPIs are fully included in Annex 2.

Establishing clear KPIs early on in the project helped to control the dissemination strategy objectives and informed the development and revision of activities. This approach ensured that the dissemination strategy reached the intended audience effectively and that they responded to the messages they received.

15. Commercial Arrangements

As detailed throughout the deliverable, along with the exploitation model that we have designed for SPICE, the project seeks to reach commercial agreements with those institutions interested in implementing and continuing to develop the tools that have been created in these 3 years of work. Under an open-source exploitation model most of incomes to SPICE partners (or an eventual commercial – legal entity) will come from further development, adaptations, consultancy, etc. to integrate and deliver a market ready product in those potential clients that will base their citizen curation activities onto SPICE open-source suite of tools. Please review sections in exploitation plan regarding IP management and exploitation.

The characteristics of SPICE's designed business model will enable all SPICE's partners to sign commercial or research and development agreements with third parties for the further development and exploitation of the citizen curation area. This opens a great opportunity for all partners to enrich the portfolio of tools intended to develop citizen curation activities and to turn them into successful and sustainable commercial businesses.

Collaboration agreements: The project's research findings and outcomes may be of interest to other organizations that work in the same field. Collaboration agreements could be established to enable these organizations to work together to further develop the project's outcomes or to commercialize them jointly.

Licensing agreements: If the SPICE project has developed intellectual property, such as software or technology, licensing agreements could be established to allow third-party businesses to use or distribute the product for commercial purposes.

Consulting services: The SPICE project team could offer consulting services to businesses and organizations that seek to improve social cohesion, participation, and inclusion through cultural engagement. This could include providing advice on how to develop and implement effective strategies for cultural engagement and community building.

16. Standardization activities

As another dissemination activity, building or enhancing standards on IT or culture curation may help the community stakeholders to improve their day-by-day activities, further developments or research. SPICE has contributed to it.

One of the purposes stated for WP8 Dissemination and Exploitation is the contribution to the development of standards that are intended to address the needs that will rise up from the development of SPICES. In this sense it is expected that Partners will contribute to international standardization processes related to museum metadata standards, interface accessibility, Semantic Web and Linked Data, including current initiatives on social Linked Data and social media integration.

During the implementation of the project, activities have been carried out to develop standards that have made it possible to establish guidelines and best practices in the field of social inclusion through cultural participation. These activities have focused on the identification and analysis of best practices and methodologies used in different contexts and areas. (14.7. SPICE Stakeholders Engagement).

Likewise, collaboration has been established with organizations and entities that are experts in the field of social inclusion and cultural participation, in order to establish criteria and standards that can be applied in different contexts and areas.

As a result of these activities, several documents have been developed that compile the best practices and methodologies identified, as well as guidelines and recommendations for the implementation of social inclusion projects through cultural participation. These documents have been disseminated among stakeholders and presented at various events and conferences. (14.6. Specific dissemination activities)

In general, the standards development activities carried out during the implementation of the project have made it possible to establish criteria and guidelines for the implementation of similar projects, which will contribute to the promotion of social inclusion and cultural participation in different contexts and spheres.

17. Conclusions

This deliverable presents the outputs of Task 8.1 in dissemination and publication and Task T8.3: Competition analysis and exploitation planning. In this sense, the plan covers both a dissemination strategy for the professional and academic community for SPICE, and identify the exploitable knowledge and some routes for the exploitation of the results of the project.

Regarding **the exploitation plan**, we have designed a realistic and comprehensive exploitation plan that meets the diverse interests and strategic objectives of all SPICE's partners:

- We have designed a product that maximizes the opportunities of becoming a highly compelling whole product in the cultural heritage industry and reaching visibility in the market. The SPICE project has developed a wide set of exploitable assets that could create customer value in the cultural heritage industry and often also in other industries. However, the application of all SPICE's assets to the development of five specific citizen curation activities within the project has uncovered the greatest opportunity for the exploitation of these assets. They form a family of valuable assets that can be combined and customized in many different ways to create a wide range of engaging citizen curation activities. **Each asset is valuable but all together as a suite, they are unique in the market**. There is no comparable set of tools in the market for the creation, development, and implementation of citizen curation activities. Therefore, we strongly believe that SPICE's assets have much higher market potential by keeping a strong link with each other as part of a highly compelling product. Moreover, many of them are highly specialized tools that in a new market area as citizen curation would anyway need to join other tools to create compelling value and reduce adoption barriers.
- We have obtained empirical evidence from primary and secondary sources that there is great potential for the development of a citizen curation software market.
- We have also tried to be realistic about the challenges of developing a citizen curation software market from the SPICE project.
- We designed an open-source business model for SPICE's project as the one that better meets the diversity of SPICE's partners, capable of encompassing the needs and interests of them all. The open-source business model provides the necessary flexibility to provide a framework for all partners to follow different roadmaps to the development of the citizen curation area without creating barriers for any partner to develop their specific exploitation plans. It also provides the flexibility to enable both collaborative exploitation plans as much as individual ones.
- We have defined in great detail key questions such as the distribution of IP ownership and exploitation rights among SPICE's partners.

- We have defined in detail the next steps and requirements to turn SPICE into the seed of a sizeable market, the citizen curation software market. The development of this market is not a question of commercial exploitation only. All SPICE's partners have the interest and objective of keep working on this area to increase the opportunities to develop engaging citizen curation activities and increase awareness in the cultural heritage industry about the value that this new category could create for visitors and society as a whole.
- Finally, we have defined in considerable detail the specific commercial plans that are arising from the SPICE project. Two of SPICE's partners, Padaone and Celi, in close collaboration with a third, GVAM, have developed concrete and realistic plans to develop a business opportunity with high growth potential. These commercial plans are not focused on the commercialization of only a fraction of SPICE's assets but are intended to exploit the full potential of SPICE's assets in the market.

Finally, we believe that the exploitation plan defined in this deliverable has provided us with sufficient evidence that there is a market opportunity for citizen curation software. We have also uncovered several remarkable challenges and risks in this venture. Most importantly, we believe that we have outlined a realistic plan for all SPICE's partners to keep working collaboratively and widespread the adoption of citizen curation activities in the cultural heritage industry.

Regarding the **actions carried out in the dissemination plan**, this report gives a detailed view of the audiences that were identified as key recipients interested in the tools developed in the SPICE project. The results obtained are largely satisfactory since we identified a series of assets that are of interest to potential future partners who wish to exploit these tools (mainly museums and cultural entities). The reception of the entities with which SPICE has been related throughout these 3 years of work is very positive, the feedback received from them makes us think that the developed model will have continuity once the project is finished.

The dissemination plan has focused on promoting the results and achievements of the project in different media and platforms. Various dissemination actions have been carried out, such as participation in conferences and events related to the subject matter of the project, the publication of articles in specialized magazines, and the dissemination of information in social networks and digital media.

Regarding publications related to the project, several articles have been published in specialized magazines on the topic of social inclusion through cultural participation. These articles have been written by members of the project team and have addressed different aspects of the project, such as the importance of cultural participation in building social cohesion and the inclusion of vulnerable groups in society.

In general, the dissemination plan and the publications related to the project have allowed for greater visibility and dissemination of the results and achievements of the project. We are convinced that these results and conclusions will contribute significantly to the promotion of social inclusion and cultural participation in different contexts and fields.

Annex 1, SPICE's customer development survey, questionnaire to cultural heritage organizations

The following questionnaire was intended to validate the main hypotheses of SPICE´s business opportunity through a customer development methodology. The main characteristics of this methodology has been explained in Section 9.

A. Contact data

B. Brief presentation of SPICE

What is SPICE?

SPICE is a set of combinable and customizable tools, methods, and technologies intended to augment the visitor experience of cultural heritage organizations through computer-mediated communication systems. All the SPICE's technical infrastructure of tools and methods are intended to develop a specific type of visitor experience intended to encourage participation, reflection, interpretation, understanding, and social cohesion.

SPICE software can be understood as building blocks for the creative design of citizen curation activities, which can be combined and customized according to customers' needs and goals.

SPICE enables cultural heritage organizations to develop a variety of activities and customized visiting experiences: activities to promote reflection about specific collections or cultural objects, games, challenges, pre- and post-visit activities, etc., and it is compatible with using a variety of technologies such as VR, AR, web-based interface, etc.

SPICE aims to enable cultural heritage organizations to develop new enhanced visiting experiences intended to:

- Build deeper engagement from visitors by promoting appealing activities, reflection, interpretation, sharing opinions, and debate among visitors.
- Foster visitor-created content that can become associated with specific cultural objects and be shared with other visitors to promote a higher understanding of different perspectives.
- Understanding the differences and similarities of the interpretations of different groups, particularly groups underrepresented among visitors.
- Obtain visitors' detailed feedback on parts of the collections or specific cultural objects.
- Promote inclusion of underrepresented groups among visitors by providing customized visiting experiences or gaining a deeper understanding of their opinions and interpretations.
- Promote social inclusion of groups at risk of social exclusion by promoting understanding and tolerance among visitors by sharing different opinions, views, and creative content among visitors.

C. Needs assessment

All questions have five closed answers:

Not important
Somewhat interesting but not a priority

Good to have
Important
Critical, a must have

1. How important is it for your organization to develop applications that may foster visitors to look deeply into cultural objects and invite them to share personal opinions, interpretations, or creative responses about them?
2. How important is it for your organization to foster visitors' reflections about cultural heritage objects during /after the visit?
3. How important is it for your organization to obtain visitors' feedback about specific objects in your collections?
4. How important is it for your organization to enable visitors or specific citizen groups (minorities, groups at risk of exclusion, etc.) to share their cultural perspectives on their visiting experiences?
5. How important is it for your organization to connect museums' objects to issues that have personal relevance across different groups and cultures?
6. How important is it for you to understand the similarities and differences of the interpretations that different groups make about your collections or specific cultural objects?
7. How important is it for your organization to promote the exchange of ideas and opinions between visitors about cultural heritage objects and experiences?
8. Have you detected an under-representation of minorities and groups at risk of exclusion among the visitors of your cultural heritage site or museum, well below the surrounding community of society as a whole?
9. How important is it for your organization to support interaction outside the museum space, including pre and post-visit activities?
10. How important is it for your organization to propose specific activities across spaces beyond recommended visiting sequences, e.g., treasure hunting, debates, creative activities, serious games, etc.?
11. Do you think cultural heritage organizations should play a more active role in society to build social cohesion and inclusion of minorities and groups at risk of exclusion?

D. Value proposition

12. Describe your perception of developing citizen curation activities as described above:
    We have already developed an application to provide citizen curation activities.
    We have already detected the problem that SPICE solves and made some research about potential solutions.
    We already consider cultural curation activities strategic for our organization, and we intend to develop this area soon.
    We have detected the problem, but we have other priorities first.
    Our organization is not interested in cultural curation activities as described.

13. Describe your perception of SPICE:
    It is a must-have for our organization, we may consider adopting it.
    It looks very interesting, but not a priority.
    It may be nice to have it.
    We may consider adopting it in the future.

I do not have the problem that SPICE solves
We do not understand SPICE's value proposition.

E. Business model

SPICE's tools and software are provided for the most part as open-source software solutions. Some tools require paying for a license, but for the most part, cultural heritage organizations can use them for free and join the community of organizations and developers interested in expanding this set of citizen curation software tools and methods.

Answers:

Highly likely, 100%
Likely, 75%
Maybe, 50%
Unlikely, 25%
Not interested, 0%

15. How likely is it for you to use open-source software solutions to build your own applications?

16. How would you like to join the SPICE community of developers and organizations interested in expanding the software solutions aimed to help cultural heritage organizations develop more engaging citizen curation activities and visiting experiences?

17. SPICE partners provide software development services to help cultural heritage organizations to design, develop and customize citizen curation activities. How likely is it for you to consider purchasing these services to enhance visiting experiences at your organization?

18. Some SPICE partners are research organizations interested in collaborating with cultural heritage organizations to explore new types of citizen curation activities. How likely are you to consider associating with these organizations to develop collaborative projects?

Annex 2

This table shows the KPIs of the dissemination part of SPICE, in the deliverable D8.7 of communication are those related to this other part.

Activity	KPI	Partner responsible	Expected KPIs target M1-M36	Accomplished KPIs M1-M36	Overall difference
Event-related dissemination actions	*Project workshops (local or part of conferences)*	*GVAM*	14	31	17
	Attendees per workshop	*GVAM*	30	253	223
Engagement of SPICE stakeholders' actions	*Number of heritage institutions giving feedback on SPICE tools and methods*	*GVAM*	20	18	-2
	Number of community groups and organizations contacted about SPICE	*GVAM*	20	27	7
	Number of visitors to the case study museums informed about SPICE	*GVAM*	600	1641	1041
	Number of schools and teachers giving feedback on SPICE	*GVAM*	25	25	0
Newsletter	*Number of subscribers*	*GVAM*	810	468	-342
Peer-reviewed scientific publication	*Articles in renowned journals, conference proceedings, books, monographs & reports*	*UNIBO*	27	17	-10
Scientific conference presentation	*Emerging scientific collaborations, project synergy generations, new partners, new networks*	*UNIBO*	16	13	-3
EC policy brief	*Policy briefs intended for policymakers & EC policy officers*	*UNIBO*	3	3	0
IPR	Registered designs	*UNIBO*	6	0	-6
	Trademarks	*UNIBO*	1	1	1