ViMM Virtual Multi-Modal Museum

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H2020 – COOP8 - CSA - Project Contract Number 727107
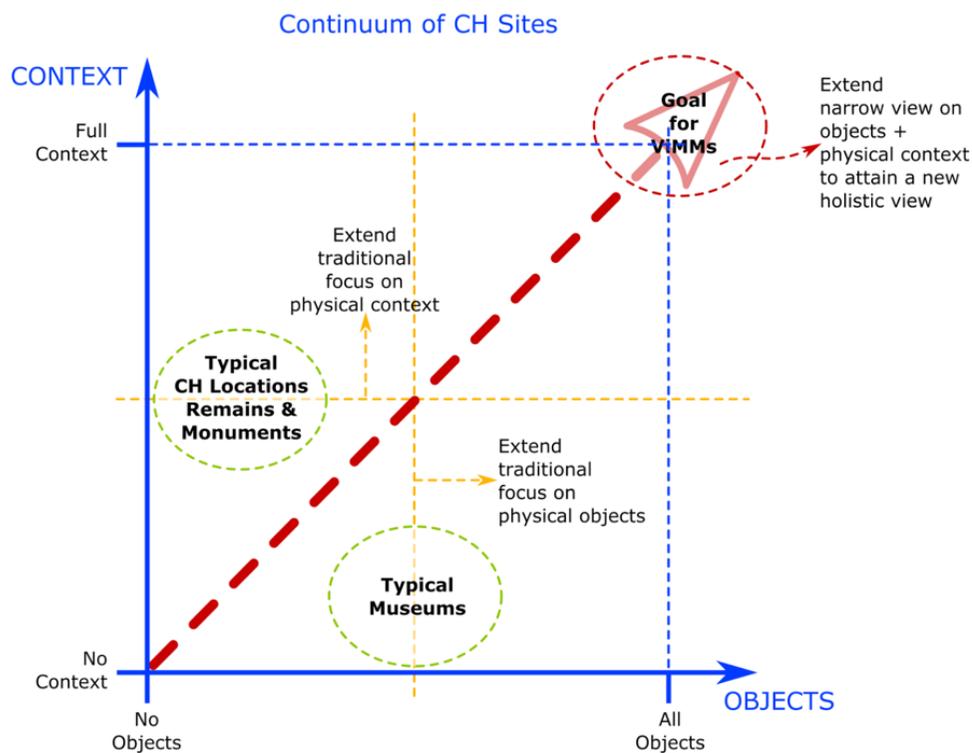
OUTPUTS OF THE THEMATIC AREA 5: DEMAND – WORKING GROUP 5.1

TA5-Demand (https://www.vi-mm.eu/ta5-demand/) looked at ways in which Digital Heritage in general, and VMs in particular, can support economic and social development by identifying key stakeholders and drivers of demand across sectors (WG 5.1); defining adapted strategies of sustainable development (WG 5.2); and gathering tools and methods for impact assessment (WG 5.3)

WG 5.1 focused on building an overview for Virtual Multimodal Museums. This included establishing the target sectors and audiences; defining the added value of VIMMs with the help of examples; and providing guidelines on policies, strategies of engagement, and evaluation.

The main **sectors** identified in relation to Virtual Multimodal Museums were: Education, Tourism, Smart Cities, Cultural Leisure, Political, Research, and Conservation & Preservation.

The **added value** of Virtual Multimodal Museums can be defined by means of a graphic illustration:

Continuum of CH Sites

CONTEXT

Full Context

Goal for ViMMs — Extend narrow view on objects + physical context to attain a new holistic view

Extend traditional focus on physical context

Typical CH Locations Remains & Monuments

Extend traditional focus on physical objects

Typical Museums

No Context

No Objects — All Objects

OBJECTS

The graph shows not only of how ViMMs are perceived, but also of their added value and the roadmap for new ViMMs to come in the future, hence describing how its demand will be positioned. The graph shows how the continuum of CH sites has been paved up until now, and how it can be used as a foundation for future experiences and proposals.

The abscissa shows how ViMMs can deal with the content described in terms of objects that are kept and that need to be shown in ViMMs to support or *extend* how this has been done in traditional museums up until today. The ordinate takes a similar stance but rather on context related to cultural spaces, such as remains, monuments, etc. Here the graph shows how ViMMs can extend the way in which CH locations have presented and exposed themselves to visitors up until now.

ViMMs can therefore provide a holistic stance upon objects and context that unifies the two which have been too often separate and treated differently. Therefore, the **uses** of ViMMs in the near future should allow a smooth flow between the context of CH and the objects that represent specific aspects of that CH. The uses of ViMMs should also take into account the potential of pre-visit, during-visit and post-visit experiences of the CH sites and institutions.

Added Value of ViMMs	
Education	In education ViMMs act as a link between formal with informal education at primary and secondary school levels. In their digital format, ViMMs can contribute to link these two areas without needing to physically move to the specific CH site. But they can contribute even more strongly by acting as motivators toward the physical visit and to prepare the grounds to make the most out of the presential visit. Even when making a presential visit, ViMMs can contribute to a better understanding of what the visitors are seeing, by having a number of different inputs appealing to the whole cognitive array of visitors. In this sense, ViMMs can provide tools for students and teachers to create audiovisual and storytelling activities. This will foster a revision of contents by the CH institutions and an internalization work to better explain their heritage through the different media that ViMMs provide. This will also allow schools to become content aggregators and make the museological narrative their own. This way the action of CH institution is extended to the classrooms which can structure classwork avoiding the centralization of actions on the teachers only. This also will generate new networks of collaboration in culture and education and will potentially increase the number of visits to CH sites. ViMMs can also become powerful training tools for archaeologists, historians, curators, etc., at undergraduate and postgraduate level. These tools can provide excellent contexts for experimenting with simulated visits and learn which are the best strategies and approaches for projecting the content of a specific CH site through ViMMs.
Tourism	ViMMs can be excellent preparatory tools for tourist visits to CH sites, an aid during the physical visit, and a complement for after the visit. They can bring more detailed information that the info available during a visit on site. In other words, they can provide a more "experiential" visit on site, as opposed to the classical information transmission approach. The experiences may be strongly based on storytelling strategies and highly interactive and explorative. Moreover, in the context of cities with a strong flow of tourism, such as Barcelona, the proportion of foreign visitors at some CH sites can be above 90% of the total visits. ViMMs can rise to become correction factors for this unbalance attracting a larger proportion of local visitors. On the other hand, those CH sites that have low visibility to both foreign and local visitors may use ViMMs to increase their visibility make them more attractive to the public and help improve their economic viability. ViMMs can also generate new and strong networks of collaboration to provide a dense context to visitors in which they not only visit one single and isolated site but can achieve a better view of the local CH.

Smart Cities	ViMMs can add to the network of knowledge and digital experiences that create a Smart City system network. This way they empower the actual foundations of the Smart Cities concept.
	On the other hand, cities gradually tend to look alike as they are being subjected to globalization. Art and culture can help counter this standardization and therefore ViMMs can foster the specificity of the local CH and differentiate every city from the rest. In this respect, ViMMs can link the contents of the CH sites with the urban environment generating all encompassing experiences within the cities.
	Moreover, in the opposite direction, tools available for the Smart City environment can link to the ViMMs defined for specific CH sites and therefore feed these sites with visitors that smoothly, naturally and seamlessly flow from the city environment to the CH environment.
Cultural Leisure	ViMMs will add to the better knowledge, awareness, appreciation, respect and cooperative maintenance of local heritage.
	Some of the activities designed by the Activity Departments of CH sites fall into the category of Cultural Leisure and therefore the challenge will be to design ViMM experiences for these and extend them adequately.
	ViMMs can use entertainment as a strategy to make CH sites more dynamic and turn culture into a thrilling activity and make it even more accessible to everyone, hence broadening the social base of culture and democratizing it.
	Moreover, cultural leisure is already an important economic area in which society is willing to spend. Therefore, ViMMs can provide an even broader offer.
Political	ViMMs contribute to cultural democratization facilitating the physical and cognitive access to cultural heritage, as well as Increase the socio-economic well-being of the population.
	Hence these policies will give many more chances and tools for people that usually have little or no contact with culture.
Research	Museums have traditionally undertaken research internally which has been externalized through their exhibits and activities. They have also incorporated technology from other sectors but probably at a lower rate than desirable. An awake cultural institution is permanently busy in rethinking and promoting an "experience design" of its content. ViMMs can become excellent tools if they are made sufficiently accessible to the curators. Therefore, important research must be undertaken between these institutions and universities and technological partners.
	ViMMs can also become excellent tools for researchers that need to access the CH content at time when it is either difficult because of distance or because of incompatible schedules with the CH institution. Therefore, research and researchers can greatly benefit from ViMMs as accessibility tools.

| Conservation & Preservation | ViMMs will raise awareness in society on the importance to preserve our CH. This is essential in the strategies to preserve our heritage because people cannot really value what is not known to them. Hence, they cannot preserve what they do not value. |
| | ViMMs are in part transforming the physical CH into digital CH. Traditional museums work to achieve a feasible and sustainable physical preservation of the pieces in their collections. ViMMs will need to provide also means to achieve the digital preservation of the cultural heritage. |

	Stakeholders - Large Institutions	Stakeholders - Small Centers
Education	Large Museums & CH Sites; Government Administrations (State, Regional, City); Universities; Education Consortia; Education Departments or Ministries or Government Policy Makers; EU Programs as Creative Europe; Large Industrial Corporations (acting as sponsors); Large World Events such as the Mobile World Congress mSchools	Small Museums & CH Sites; Public & Private Schools (teachers, students, families, etc.); Museum Staff (Archaeology & History Experts, Curators, etc.)
Tourism	Large Museums & CH Sites; Consulates and Embassies; Tourism Promotion Organisms; Government Administrations (State, Regional, City); Large Tour Operator Companies; Culture Ministries; Agencies for Cultural Heritage Management; Mass Media such as TV & Radio; Editorial Industry	Small Museums & CH Sites; Travels Agencies; Hotels & Restaurants; Museum Staff (Archaeology & History Experts, Curators, etc.); Small institutions for promoting culture; Transports Companies; Local Mass Media
Smart Cities	Large Museums & CH Sites; City Halls; Smart City Expo; Government Administrations (State, Regional, City); United Smart Cities Program; Large Industrial Corporations; Large World Events such as the Mobile World Congress	Small Museums & CH Sites; Citizens in general; Museum Staff (Archaeology & History Experts, Curators, etc.);
Cultural Leisure	Large Museums & CH Sites; Government Administrations (State, Regional, City); Mass Media such as TV & Radio; Programmers of large cultural festivals; Editorial Industry	Small Museums & CH Sites; Families, Museums, CH Sites, Archaeology & History Experts, Curators, Hotels
Political	Large Museums & CH Sites; Government Administrations (State, Regional, City),	Small Museums & CH Sites;
Research	Large Museums & CH Sites; Government Administrations (State, Regional, City), Universities & Research Centres; EU Projects; CH Institutions such as Europeana; SMEs; NGOs; Technology Centres;	Small Museums & CH Sites;
Conserv. & Preservation	Large Museums & CH Sites; Government Administrations (State, Regional, City); Technology Providers and Industry	Small Museums & CH Sites;

Target Audiences & How to Engage Them	
Education	Primary Schools are easily engaged since there are strong programs of school trips in almost all countries. Secondary schools are similar but at a lesser level. They can be more engaged under the user-generated potential since the students have a higher knowledge on the topics. All students are targets for the pre- and post-visit uses of ViMMs. These can be very good educational tools and support for the teacher in in-class activities, as well as tools for homework assignments. Nonetheless, to really engage these audiences it must be clear that schools and teachers expect that the experiences offered by ViMMs are adequately linked and contextualized with their curricular and syllabus needs. So, a detailed study of how schools work, how they base their education on projects and hence joint design of ViMMs would seem the right way to approach this. Moreover, teachers will need training in the specificities of ViMMs, as well as in the technologies used by them.
Tourism	Cultural Tourism is obviously one main target; however, other types of tourism can also be drawn into this area. A good dissemination of ViMMs before their travel experience can raise awareness and foster pre-, during, and post-visit uses of ViMMs. ViMMs cam use the free Wi-Fi services that different institutions offer through customer registration to better understand the type of visitors they are receiving and therefore better understand how to capture and engage these visitors. These services can also propose questionnaires to the visitors to get even more detail on their profiles and preferences. Tourism Agents and large Tourism Service Providers are also part of the audiences that need to be engaged. If they are convinced that ViMMs offered at different institutions are interesting, useful and fun, they will offer them in their packages and promotions.
Smart Cities	All citizens are prone to engage in ViMMs if these are adequately linked to Smart Cities structures and networks. Therefore, an intelligent and well-planned connection between the Smart Cities initiatives with ViMMs and the CH institutions that will be making use of them is crucial.
Cultural Leisure	Although similar to Cultural Tourism or Tourism in general, Cultural Leisure probably applies more to the local public. Therefore, the people in the city or neighboring location to the CH site would be clearly the main target. Engagement of this public can be done in a number of ways. If children are engaged due to school trips, then it is very probable that parents and second level family are compelled to also visit the sites, for example, on the weekends. This clearly defines a net with other sectors and therefore, the notion of sector network becomes important as has been appearing under other issues.
Research	Research groups and institutions not yet involved in research on ViMMs should be also understood as potential audiences, to be able to better advance in the conceptualization of content tailored to ViMMs, the development of new and more robust technology, technology transfer to industry, etc.

Competing Activities	
Education	Although museums and CH sites are strong referents for schools, there are other digital educational tools that compete for the time used during the academic year. This competition is both for the time available to the teachers to deal with the full syllabus, as well as, for the time and resources available for outings. The type of digital educational tools that compete with ViMMs are: MOOCs, e-learning in general, Market Apps, etc.
Tourism	In this sector, leisure in general competes with CH, namely: the beach, amusement parks, sports, adventure activities, landscape and natural parks, etc.
Smart Cities	The city itself and daily activities supported by Smart City infrastructure and tools.
Cultural Leisure	In this sector, leisure in general competes with CH, namely: the beach, amusement parks, sports, adventure activities, landscape and natural parks, etc.
Conservation & Preservation	The actual conservation and preservation of the physical objects and remains competes for resources regarding the conservation and preservation of DH. In other words, if currently funding is an issue for physical heritage then we must be aware that it will also be an issue for digital heritage.

Funding Sources	
Education	Usually funding for school trips is based on family budget. It would be very important to have good public funding for covering school trips to sites. It would also be important to guarantee sufficient technical equipment and infrastructure in schools to use the digital tools. However, ViMMs can also make the physical visit unnecessary from certain points of view due to powerful new ways of interactive narrative that can engage the children and allow them to learn about many aspects of the content of the CH site without needing to be there. This requires other type of funding, for example, for technology needed from schools to take advantage of all the power of ViMMs from their own building. Funding can be obtained from public and private sources, such as administrations at all levels or banking foundations that support culture with the goal of reducing their tax impact. Now, the Activities Departments of the CH sites themselves would be willing to financially support ViMMs if they finally deliver what they currently promise.
Tourism	The chambers of commerce and the departments or ministries of economy of every country must surely be interested in supporting ViMMs to foster tourism in general, and even more the cultural type of tourism. Also, the agencies for tourism of every country are key actors in funding ViMMs. Fees of the physical visits can also be invested in part on ViMMs since these should also increase the number of visits generating a virtuous circle.
Smart Cities	Part of the general funding for Smart Cities infrastructures and activities should be also applied to ViMMs to create an all-encompassing network of services and tools.
Cultural Leisure	In this sector we could agree that the same applies as in the case of Tourism (see above)
Research	Research funding sources are already in place and more are being open from EU frameworks, such as H2020. But we must emphasize the importance of having continuity in future programs and frameworks. At national level, funding research on ViMMs is also crucial, although many countries in Europe have little funding in these areas.
Conservation & Preservation	If the Culture Ministries and other government structures support already conservation and preservation of the physical objects and sites, they they should be convinced of the importance of also funding conservation and preservation of the infrastructures and services related to ViMMs.

Policies (to regain visitors, for funding, management, etc.)	
Education	Policies for fostering the use of ViMM's in school, during school trips and for work from home should be clearly defined and implemented. These policies should include adequate funding as well as inclusion of the diversity of ViMMs in the syllabuses to find the adequate level for every age. We also need policies to align current educational stances and approaches with those that are used for ViMMs, as well as including the potential properties of ViMMs in the current educational policies. In this sense, there is a strong need to define policies of content production in the digital environment specifically for ViMMs to connect with schools and students. We must get to a point in which ViMMs (together with their physical counterparts) become primary knowledge sources in a similar way to how Wikipedia currently is.
Tourism	Policies on promotion and advertising of ViMMs should be included in the local, regional and national policies for the promotion of physical CH sites.
Smart Cities	ViMMs should become an essential part of all Smart Cities policies. Even more when the notion of Smart Cities is evolving toward that of Smart Citizen because ViMMs provide those tools that are essential to create awareness, engagement, appreciation and knowledge on the citizens.
Cultural Leisure	Policies on promotion and advertising of ViMMs should be included in the local, regional and national policies for the promotion of physical CH sites.
Political	The policies in general should be clearly adopted by all sorts of governs and political structures.
Research	Research by groups that focus on the contents that are then used by ViMMs should be involved in policy making at all levels to incorporate their knowledge of the content and experiences to be deployed.
Conservation & Preservation	Culture Ministries and other government structures should define policies for ViMMs just as they define policies for conservation and preservation of the physical objects and sites.

Workflows & Evaluation	
Education, Tourism, Smart cities, Cultural leisure, Political, Research, Conservation & Preservation	All sectors would benefit of a workflow similar to the following which is being defined in terms of Education: 1. Identify the content to be deployed through ViMMs 2. Work together with schools to contrast the fitting of the proposal with that of the curricular contents and educational strategies really used by teachers. 3. Co-design the ViMM approaches defining interdisciplinary teams that contain teachers, students, content experts, media experts, technology experts, curators, etc. 4. Evaluation should be undertaken at multiple levels. One obvious one is teacher standard evaluation of students. However, many other methods should be employed such as teamwork, interviews, impact on other subjects, etc., in such a way that it is not only knowledge transfer that is evaluated. 5. Involvement of all educational institutions in the deployment and promotion of ViMMs In general, the workflow in should be based on providing simple, accessible and robust tools and environments for attracting the most general definition of visitors. The evaluation should also focus on usage numbers of both unique users, mean usage per unique user, and intensity of global use.

Successful Examples (museums, sites, EU-projects, exhibitions, policies, etc.)	
Education	The interactive wall for exploring the cave paintings of **Ullastret** (Catalonia, Spain) has been found to be a very useful experience for schools (and families) to better understand the hunting strategies that ancient hunters used and which are depicted in the paintings. This installation opened in 2008 and is still being actively used as part of the museum activities (ten years after) "**Literapolis**", is a treasure hunt app based on literature and fostering reading for primary school children, and it includes the physical visit to cultural facilities. **Smithsonian Learning LAB** **Rijksmuseum Rijkstudio** **mSchools**: Is a program that is an initiative of Mobile World Capital Barcelona, with the support of GSMA, the Catalan Gov (Generalitat de Catalunya), and the City Hall of Barcelona. Since 2013 it is present in public and private Catalan schools and it proposes a curricular development linked to mobile technology for education. It also proposes its application at a social and economical level. The goal of the program is to improve academic performance and reduce the number of school abandoning. "**El lloc dels fets**" ("The scene grounds") a collaboration between Createl (Barcelona) and mSchools (from Mobile World Capital Barcelona)
Tourism	Web page of **Picasso Museum** in Barcelona allows not only a virtual visit of the museum but also a visit of the city of Barcelona through the footsteps of Picasso. **Barcino 3D** has been a project to value the Roman heritage in an ancient city as Barcelona, providing new poles of interest to the visitors. The **Spanish National Archaeological Museum** received almost 1 million visitors in 2014 after a deep renovation of the permanent exhibition that included the incorporation of new technologies. It was four times more than in 2004. "**El lloc dels fets. Jaciments a Catalunya**" ("The scene grounds. Archaeological Sites in Catalonia.") a collaboration between Createl (Barcelona) and mSchools (from Mobile World Capital Barcelona)

Smart Cities	The **Helsinki CityWall** has been an icon since 2007 on a digital information support for culture and society in Helsinki: https://www.youtube.com/watch?v=WkNq3cYGTPE
	"**Barcelona darrera mirada**" ("Barcelona Last Look") takes advantage of historical cartography to visualise through a GEO interface how was Barcelona in the mid XIX, while providing clues on how to regain pedestrian circulation and green space creation. http://darreramirada.ajuntament.barcelona.cat/
	Tarragona seems committed to take advantage of its Roman archaeological heritage through activities programs such as "**Tàrraco Viva**" ("Alive Tarraco"), audiovisual productions and an incipient but promising incursion to digital media.
	Image Project, a mini smart city designed for Chicago in which the School of the Art Institute of Chicago provides an example of how arts may help develop sustainable and high quality urban lifes.
Cultural Leisure	The web-based system of the **Episcopal Museum of Vic** has both given citizens in Catalonia (and beyond) a great platform to get to know the heritage of the museum, as well as a great visit guide for on-site visitors.
	Google Art Project (Google Cultural Institute). The main fear of the museum directors regarding this project, was that visitor numbers would be reduced due to online visits. However, many of the museums that have participated in Google Art Project have actually increased their visitor numbers because they now have more visibility at international level.
	"Art and culture – it's more in front of you; you're more exposed to it, and you're more inclined to want to go and see the real thing. I've said it a hundred times, but you can never replicate the experience of seeing a work of art online. I still prefer seeing van Gogh's The Starry Night in person". Interview Amit Sood (director of the Google Cultural Institute) published by The Guardian 03/12/2013. https://www.theguardian.com/culture-professionals-network/culture-professionals-blog/2013/dec/03/amit-sood-google-cultural-institute-art-project
	The project "**Roca dels Bous**" ("The Rock of the Oxen") is focused on providing public access to the paleolithic archaeological site in Sant Llorenç de Montgai, Lleida, Catalonia. The site was used for many years as an ox stable (hence its name) and was later used as a trekking and camping site. The current project was proposed by the Autonomous University of Barcelona and was supported by the Museum of the Noguera (a region of Catalonia) and the Cultural Heritage Directorate General of the Catalan Government. The project is based on a tablet app that guides the visitors through the site.
	Europeana and the **Virtual Museum of Canada** are also excellent examples.
Political	The **Virtual Museum of Sarajevo Siege** (http://h.etf.unsa.ba/srp/vmuzej/index-e-1.htm) helps us remember the horrors of war and the importance of politics in the resolution of conflicts.

Research	**Barcino 3D** allowed the head of the Archaeological Service of the Catalan Government to confirm that the official version describing the orientation of the Roman Temple of Augustus in Barcelona was incompatible with the orography of the terrain of the area at that time in history.
	The **PEM** (Peabody Essex Museum, Salem, USA) has recruited a neuroscientists this year 2017 and three consultants in neuroscience, thanks to a scholarship from the Barr Foundation (Boston) worth $130,000. The goal of this is to study how human brain reacts in front of art, how emotions are generated, and how these can tell us how to find better ways to engage visitors.
	CENOBIUM VM facilitates access to a set of Romanesque cloisters of medieval Italian monasteries. This VM displays photographs and 3d models in high resolution of medieval capitals of the Romanesque Cloisters. It is a clear example of how ViMMs facilitate physical access to cultural heritage.
Conservation & Preservation	**RecoVR**: Mosul allows to contemplate some objects destroyed by ISIS along with real images of how they were destroyed in 2015. The main goal of the project was re-creating the destroyed museum but not as it was but to tell the story of what happened there. It is a project born as a response to the aggression suffered by the cultural heritage. It was born to raise awareness of the cultural atrocity committed in Iraq by ISIS.

Failed Examples: (museums, sites, EU-projects, exhibitions, policies, etc)	
Tourism	The **Cora Monastery** (in Istanbul) developed a VR application running in Unity that did not warn users that it could only be experienced on site. Hence, users downloaded the app and could not experience the VR visit. Not even a small or sneak preview to engage users.
Cultural Leisure	The first app for smartphones developed in 2012 by the **VinMuseum** (Wine MUseum in Vilafranca, Catalonia) weighed 887 MB and had absolutely no text whatsoever. It can still be downloaded from the cloud stores.
	Virtual Collection of Asian Masterpieces
Political	In some cases, there is the impression that some ViMMs are developed only because there are no resources to build the physical versions. Hence, these ViMMs are born without a true purpose.
Research	There has been an abuse of hackathons by public and private institutions that have provided no means to finally develop the best proposals.