ViMM Virtual Multi-Modal Museum

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Included (indicate as appropriate)	Executive Summary	☒	Abstract	☐	Table of Contents	☒

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1.0	24.01.2017	Prof. Roko Zarnic, Slovenia	Advisor/Expert

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This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Table of Contents

1 EXECUTIVE SUMMARY

This deliverable presents an outline work agenda for all seven thematic areas (TA) of ViMM. All work described in this agenda aims either at networking activities or – mostly – at publication of articles (small analyses) and descriptive lists (with articles created from it) of background information concerning Virtual Museums. All outputs will be published on the ViMM-Website. The results of the work described in this agenda will become a pool of information about literature, best practices, technological developments etc.

In formulating the work agenda a practical approach has been chosen, with an eye on the outcomes first. For each Thematic Area several tasks are defined. It is always stated how the work will be done, which of the ViMM Working Groups will collaborate on a given task and which task will be done in collaboration with one or more Thematic Areas.

The introduction includes a section called "How to read this document", where the two kinds of results (analysis and lists) are explained further. The document then goes through the Thematic Area using always the same structure:

1) Listing the background (Description of Work, results from Kick-off-meeting and brainstorming session, list of proposed Working Groups corresponding to each TA).
2) Naming and describing a set of tasks for the Thematic Area.

2 INTRODUCTION

2.1   GENERAL INTRODUCTION

On November 2, 2016 the kick-off meeting of ViMM took place in Nicosia, Cyprus. In addition to the partners in ViMM, experts and advisors to the project took part. The next day a whole-day brainstorming session with the participation of even more experts and advisors was conducted. About 40 people participated in groups constructed according to the Thematic Areas (TA) named in the description of work (DOW) to discuss realisation of the work of ViMM in general and the TAs in particular. The DOW of ViMM project describes the kick-off meeting and the subsequent brainstorm session and continues: "*The outcomes of the event will be analyzed by the partners responsible for each TA, led by SPK, and used to form an agenda for work over the following 12 months and beyond.*" (p. 40, task 3 for work package 2).

During the brainstorming session, suggestions were made for Working Groups to move toward the goals of each of the seven Thematic Areas. These suggestions are also taken into consideration here. The partner presentations given are also taken into account in compiling this document, drawing also on a video compilation made of the event.

2.2   HOW TO READ THIS DOCUMENT

In this document the seven Thematic Areas (TA) of ViMM are treated in separate chapters as listed below (with the responsible partner):

- Definitions (CUT)
- Directions (7 Scenes)
- Documentation (SPK)
- Dimensions (FORTH)
- Demand (UPF)
- Discovery (UNIGE)
- Decisions (7 Reasons)

For each TA the following are also provided (if available):

1. *Short citation from the respective parts of the description of work*
2. *List of key terms from the presentations of the TA-leaders at the kick-off meeting*
3. *List of key terms from the brainstorming session*
4. *Short analysis of the presentation and reaction (kick-off) and brainstorm in regard to TA*

5. *List of the suggested Working Groups for the TA*

6. *Agenda for the TA for the next year*

Often the agenda of a TA mentions "lists". Such lists generally are thought of as "descriptive lists" and as "living documents". As soon as there are items on the respective list, it will be published on the ViMM-platform. Whenever there is a new entry in a "list", the respective TA will check if it is possible to generate a blog-post from it for the ViMM-platform.

Another frequently occurring aspect of a TA agenda is "analysis". This does not imply university studies following a year-long research process. Usually what is intended is a thoughtfully generated and well documented state-of-the-art report.

There are interrelationships between the agendas of the different TAs, which are outlined below. These interrelationships are important to take into consideration in order to avoid duplication of work, to maximize synergies and take into account different perspectives. One interrelationship is especially emphasised: TA1 needs to define Virtual Museum (and types thereof) first. This forms a basis for a common understanding in the work of all other TAs and WGs.

The work leading to the production *of D3.1 List of Working Groups with Terms of Reference and participants*, due by the end of M5 will further refine the outline agenda for each TA presented in this document

3 AGENDA BY THEMATIC AREA (TA)

3.1 TA1 – DEFINITIONS

Short citation from the respective parts of the description of work

The Definitions TA will address legal, technical and conceptual definitions relevant to digital CH and VM, in areas where important aspects remain to be fully reconciled and where this presents a potential barrier to progress on policies and practices. Its main focus will be on "definitions" which support the policy level of activity in relation to the role of VM in VCH.

List of key terms from the presentations of the TA-leaders at the kick-off meeting

- legal, technical and conceptual definitions

- practice and policy – but focus on policy level

- By helping establish an evidence-based policy focus, clear terminologies and standards, leading up to the European Year of Culture in 2018 and beyond …

- … support the broad range of stakeholders in VM in establishing a well-defined path in future research, innovation and implementation and the establishment of an integrated policy for Cultural Heritage in Europe

List of key terms from the brainstorming session

Standards

- schema, ontology

Intangible

- human body, organization

Virtual museum

- Connection with conservation

Virtual museum (definition)

- historic sites?, digital collections?, curators and audiences?, end users?, benchmarks

Cultural Heritage

- economy, PSI directive

Ethics

Short analysis of the presentation and reaction (kick-off) and brainstorm in regard to the TA

Presentation at kick-off, brainstorming session and Working Group list showed an urgent need for definitions of concepts fundamental to the work of ViMM. Even seemingly clear concepts

like Virtual Museum or Virtual Cultural Heritage have to be defined – at least working definitions (which might be further elaborated through the project) need to be agreed upon very soon to ensure a common understanding of what a Virtual Museum is in order to underpin the work of the other TAs. Even if it makes sense to focus on concepts that are used at the political level, there has to be a common understanding of the most basic terms (like VM)

3.1.1   LIST OF THE SUGGESTED WORKING GROUPS FOR THE TA 1

WG 1.1 What is a Virtual Museum (Definition / Typology / State of the art survey)

WG 1.2 Metadata, terminology and identifier standards (Recommendations for standards – link with TA3)

WG 1.3 Partnering with international organizations (Overview / Communication Plan)

3.1.2   AGENDA FOR TA 1 FOR THE NEXT YEAR

a)   Formulate a working definition to final definition

TA1 will formulate a working definition for "Virtual Museum" (soon). This definition will be further discussed in WG 1.1. and published prominently on the ViMM platform. Everyone is invited to help improve the definition. Work on refining the definition will be open until the end of project.

TA1 will collect and publish as a list at the ViMM platform as many as possible definitions available for virtual museums as an input for the discussion.

b)   From a draft list of types of Virtual Museums to a developed typology

Then TA1 develops a draft list of types of virtual museums. This list is further discussed in WG 1.1 and published on the ViMM platform. Everyone is invited to help to complete the list of types of Virtual Museums. In this growing list there will be a name for the type of VM, description of the type of VM and a growing number of examples for each type of VM. Work on the typology will continue until the end of the project.

c) Conduct a survey, collect definitions, collect state of the art examples

With the working definition and first draft of list of types of Virtual museums ready TA1 will conduct a survey to ask for:

- Comments on the working definition

- Other available definitions

- Other types of Virtual Museums.

- Examples of Virtual Museums s)

The outcomes of the survey will be used to enrich the definition and help to improve the typology of VM and focus the surrounding discussion..

d) Define metadata and recommend terminology and standards to use (TA1 with TA3)

For each type of Virtual Museum there may be a different set of metadata necessary for describing the Virtual Museum as such but also for describing the single elements / objects / entities /actions of a Virtual Museum.

Using the draft list of types of Virtual Museums as a starting point TA1 jointly with TA3 will add the Metadata-Standards that have been used (or might be recommended) for a type of Virtual Museums in the list of types (see above, so this list has Name of Type/Definition of Type/Examples/Metadata-Standards used/Metadata-Standards recommended). TA1 and TA3 will conduct this work (enriching the list) collectively with WG 1.2 until the end of the project. In addition and separately, a list of Metadata- and other Standards likely to be relevant for Virtual Museums will be prepared by TA1 with TA3 and WG1.2 and WG 3.1. This list will collect Name of Standard / Short description of Standards / Where to get more Information about the standard.

e) Networking / Partnering

TA1 has a further task in networking with international organizations. This networking will help to involve as many organizations as possible into the work of ViMM. To this end TA1 will inaugurate a working group (WG 1.3) with which is creates a list of relevant players in the field of Virtual Museums. This list will be made public at the ViMM-Platform and everyone is invited to contribute to it. The descriptive list will contain: Name of Organization / Short description of organization / Contact details for organization / Relations to the field of Virtual Museums. WG1.3 will also address the remit, policies and interests of each one together with questions of interaction and communication with ViMM.

3.2 TA2 – DIRECTIONS

Short citation from the respective parts of the description of work

The Directions TA will identify and assess emerging technical issues, innovations and tools which can improve the 'digital encounter', such as quality of images, sonic narratives, display and interactivity with digital objects, new ways of personalized storytelling, embodied interaction, user-generated content and adaptive guidance. This will help establish the main technical 'pipelines' for VM and its different, adapted ways to bridge the physical and the digital world (depending on the user location, i.e. at home/office/school or on site, where the environment is paramount). Key 'bridging' techniques such as VR/AR and 3D are the focus of TA4 Dimensions.

List of key terms from the presentations of the TA-leaders at the kick-off meeting
Some examples

- the design process, technical and financial viability and maintenance of VM collections and functionalities;

- innovative tools and methods to extract meaning from digital artefacts, including video recordings, audio recordings, digital images, text, multispectral and thermal information and 3D representations of objects or scenes;

- the potential of the Cloud to enhance the ability of both existing museums and 'start-up' VM to support and sustain use of new ICT technology e.g. through reducing costs and storing content;

- possibilities for assisting curation of different types of VM by providing layout options which allow for flexibility and diversity of appearance, interactive personalisation by users of the viewing experience and depth of information depending on their interests, age, technical skills and depth of understanding;

- establishing meaningful narratives for collections and displays and story-led interpretation within VM and addressing the fundamental issues required to make this happen e.g. workable frameworks for image rights and the ability of museums to support new ICT technology;

- the process and methods of scientific validation of VM information (currently quite advanced concerning the visualisation of antiquities and objects but not sufficiently elaborated and structured concerning multiple experiences and interaction of the visitor with VM);

- the selection of different interfaces (hand-held, PC-based, integrated, smart replicas) that allow seamlessly blending or being an addition to the on-site and on-line dimensions;

- robust and standardised presentation (html5, webGL3, DX12/13, JAVA, …) and transfer techniques (http/ftp/sftp/lan and others) for porting content accessibly to the user, designed for specific device hardware types (mobile/desktop etc.);

- the use of social media networks to enhance the dissemination process of published content by linking users together, sharing their experiences and creating groups of interest. identification of content;

- methods for crowdsourcing content and allowing user-generated content on cloud-computing for VM.

List of key terms from the brainstorming session

- An extensive analysis and overview of availability of, needs for and use of technologies surrounding VR/AR used by CH. This includes interfaces, user interaction, community building, design, embodiment, tools, technologies, programming languages, etc.

- An overview and analysis of types of content and the different ways to enrich experiences of CH, apart from and connected to each other (e.g. in stories).

- Analysis of and advice on the implementation of VR in CH in a sustainable, future-proof way and cost and time efficient manner and suggestions for EU programs financing/advising institutes to stimulate this.

Short analysis of the presentation and reaction (kick-off) and brainstorm in regard to the TA

Presentation at kick-off, brainstorming session and working group list creation showed that there is an need for knowledge about tools to be used in the creation of Virtual Museums (of all types) as well as a need for an easy way to access best practice examples for designing a VM (from narrative to interaction). A list of all forms of human-digital-interaction that can be used in Virtual Museums is also needed. TA2 will also investigate the potential of social media and crowdsourcing in creation, involvement and dissemination of Virtual Museums.

3.2.1   LIST OF THE SUGGESTED WORKING GROUPS FOR THE TA 2

WG 2.1 Tech and tools (Overview / Analysis)

WG 2.2 Meaningful content connected to the real world (Overview / Analysis)

WG 2.3 Future in mind (Overview / Analysis)

3.2.2   AGENDA FOR TA 2 FOR THE NEXT YEAR

a)   A list of tools to create or use in Virtual Museums

TA2 – together with WG 2.1 - will work on a descriptive list of technical tools and publish it on the ViMM-Platform. This list shall include tools that have been used and tools that might be used in the creation of a Virtual Museum or that form a part of it. Most of such tools will be software-tools, others might be connected to hardware.

As a starting point, TA2 will develop a preliminary list with Name of tool / Description of the tool / Examples where the tool has been used / Where to get the tool / Conditions to get the tool (Open Source). This list will be made public and will be enriched through discussions in Working Group (WG 2.1) but the public is also invited to enrich the list.

b)   A list of technical solutions for human-digital interaction

TA2 will – together with WG 2.1 - work on a second list. A list of all kinds of technical solutions for human-digital-interaction (regarding VM). This list will contain Name of solution / Description of solution / Examples of implementation of the solution with ways to access the examples. This list will be published on the ViMM-Platform and the public will be invited to comment and enrich the list.

c)   Guidelines for developing a virtual museum with meaningful content connected to the real world

TA2 will work on a guideline for designing a VM (from narrative to interaction) and publish it on the ViMM-Platform. Creating a Virtual Museum (of any type) requires the narration and planning of the points and means of interaction. A flow chart with all the things to consider in a logical order (e.g. 'check funding first before looking for programmer's) will be developed. This work will be conducted by TA2 together with the Working Group 2.2. A focus will be put on the connection of the Virtual Museums with the real world(s).

After developing a first draft of the flow chart together with WG 2.2, TA2 will publish it as a working paper on the ViMM platform and invite the public to comment from its own experience.

d)   Future proof Virtual Museums

TA2 will investigate what could make a Virtual Museum future proof and what are the 'no-gos' for sustainability. This investigation / analysis will include cost and time efficiency. It will be conducted in consultation with WG 2.3. After completion, it will be published on the ViMM-platform.

3.3   TA3 – DOCUMENTATION

Short citation from the respective parts of the description of work

The Documentation TA will address emerging and future documentation needs such as those related to … data modeling … existing and used standards … systems for managing and re-using complex documentation … the role and application of LOD in enriching the information created by VM … leveraging popular photography … the use of UAVs … documentation for the preservation of European heritage ….

List of key terms from the presentations of the TA-leaders at the kick-off meeting

We propose to:

- collect data models (standards) in use and describe them briefly

- determine areas where there are no standards available yet

- check the usability of LIDO for describing virtual exhibitions

- check CIDOC-CRM for usability for describing virtual exhibitions

- check the DEMES (Digital Exhibition Metadata Element Standard) for usability in the context of VM

- detect missing elements and check other available (and used) standards for appropriateness

- analyse – given today's systems for knowledge management used in museums – what they are missing in order to manage and re-use complex documentation effectively and how they (in general) could be improved.

- develop a general set of recommendations

- broadly analyse the actual use of LOD in museums and portals

- outline possible uses of LOD and what the advantages are

- collect positive examples where citizen science helps in improving documentation

- because museums do not often use UAVs for documentation (imagine a UAV inside a museum building) we will look for experienced partners to learn how UAV-data is used in documentation of monuments and sites

- describe the current role of documentation in the preservation of European CH

- describe the potential documentation has in this preservation and protection

List of key terms from the brainstorming session

- A suggestion is to define groups of virtual entities (e.g. virtual objects, virtual collections, virtual/digital exhibitions, virtual museums, …) and focus on the documentation of these

entities and their access and use. The working group under TA1: Definitions (or in collaboration between TA3 and TA1) can be helpful in this respect.

- Another suggestion is to focus on the documentation of two of the potential entities (see above), on 3D-objects and virtual/digital exhibitions. Here a working group might analyse the standards used in documenting different aspects (technical, legal, content, use, …) of the entities. If there are no commonly used standards the working group might develop recommendations.

- A third suggestion would be the establishment of a working group to collect best practice examples on automatic information extraction and the use of technical means (like uav) in documentation.

Short analysis of the presentation and reaction (kick-off) and brainstorm in regard to the TA Presentation at kick-off, brainstorming session and working group list creation showed that there is a need to clarify whether metadata-models for Virtual Museums exist and / or what existing Metadata models might be adapted to be usable for describing Virtual Museums. It also became clear that there are other virtual entities that must be distinguished from Virtual Museums, as for example Websites, holographic presentations, digital movies, …

3.3.1 LIST OF THE SUGGESTED WORKING GROUPS FOR THE TA 3

WG 3.1 Types of virtual enties (Definitions – link with TA1)
WG 3.2 Documenting 3D-objects and virtual/digital exhibitions (Recommendations for standards)
WG 3.3 Automatic information extraction: who and how? (Best practice examples)

3.3.2 AGENDA FOR TA 3 FOR THE NEXT YEAR

a) Define Metadata and recommend terminology and standards to use (TA3 with TA1)
For each type of Virtual Museum there might be a different set of metadata necessary for describing the Virtual Museum as such but also for describing the single elements / objects / entities /actions of a Virtual Museum.
Using the draft list of types of Virtual Museums as a starting point, TA1 jointly with TA3 will add the Metadata-Standards that have been used (or might be recommended) for a type of Virtual Museums to the descriptive list of types (see above), so that this list has: Name of

Type/Definition of Type/Examples/Metadata-Standards used/Metadata-Standards recommended). TA1 and TA3 will conduct this work (enriching the list) collectively with WG 1.2 until the end of the project.

In addition - and separately - a list of Metadata- and other Standards probably relevant for Virtual Museums will be prepared by TA1 and TA3 together with WG1.2 and WG 3.1. This descriptive list will collect Name of Standard / Short description of Standards / Where to get more Information about the standard / Use cases.

b) Looking deeper into three existing (and potentially useful) documentation standards

TA3 will analyze the potential of LIDO, CIDOC-CRM and DEMES-Standard for describing Virtual Museums. Results of this analysis will be published at ViMM-Platform separately but will also become part of the list of Metadata-Standards TA3 is developing together with TA1 (and WG 1.2)

c) Defining the limits

TA3 will work towards a typology of Virtual Entities (e.g. virtual museum, virtual exhibition, virtual visitor(?), …) other than but related to Virtual Museums. This typology will result in a set of definitions defining the differences between the entities and especially Virtual Museums. This work will be conducted within WG 3.1. The typology will be published on the ViMM-platform.

d) Documenting 3D-Objects and virtual exhibitions

TA3 will, together with WG 3.2, analyse the Metadata-Elements necessary for the description and cataloguing of 3D-Objects and Virtual Exhibitions (to ascertain whether these Elements can also be used for describing Virtual Museums). The analysis will be published on the ViMM-Platform.

e) Re-use of data and information

TA3 will analyze the potential of the use of Linked Open Data (LOD) for the documentation of Virtual Museums, to discover whether there are any particularities in the use of LOD in this context. The analysis will be short and made public on the ViMM-platform.

f) 'Wisdom of the masses'

TA3 will work on a list of examples where citizen science helps in improving documentation of Museums and their objects generally. It will than analyze whether the examples found

generate ideas for involving citizen science in the documentation of Virtual Museums or if citizen science might be integrated into Virtual Museums directly. The list will be published on the ViMM-platform, together with the short analysis.

g) Automatic information extraction

TA3 together with Working Group 3.3 will work on a list of best practice examples for automatic information extraction. A draft list will be created and published on the ViMM-platform. This list will be open and the public invited to contribute to it until the end of the project. The list will have the following columns: Information extracted (e.g. measurements) / Example.

3.4 TA4 – DIMENSIONS

Short citation from the respective parts of the description of work

The Dimensions TA will address the need of Virtual Museums (VMs) to focus on cutting edge VR/AR technology and the possible potential that these technological approaches will have.

List of key terms from the presentations of the TA-leaders at the kick-off meeting

- Mixed Reality potential, including social VR and Augmented VR!

- VR storytelling?

- forms of presentation environment, for example, the availability of templates for art galleries and museums which at the same time avoid redundancy and stereotyping

- linking exhibited content to other relevant content to provide greater understanding of the viewed item

- VR/AR h/w and enabling technologies

- Should we invest in technology in museums when everything changes so fast? How to decide?

- Physicality to non-Physicality. How is the Virtual Museum presented to the user to enrich the experience?

- "New navigation tools". Create intuitive tools to find items

- Decompose Mechanics, Dynamics and Components of Gamification elements and underline the differences in both realities

- Improve the quality of applications with motivating stories.

List of key terms from the brainstorming session

VR/AR storytelling

- Improve the quality of storytelling using cutting edge technology. Present the VM in a way to motivate visitors to come back.

- Study the differences of storytelling in AR and VR. How the storytelling experience differ when we switch to another technology/equipment.

Presence and new technologies, visualization and interaction

- An overview of possible technological equipment that can constitute a VM.

- New ways of visualization and interaction with exhibits.

Gamification

- A general approach on the possible gamification elements of VMs. A definition of the main standards for using game principles in CH by VMs.

- An overview on new mechanics/dynamics and components with possible potential in VMs

Short analysis of the presentation and reaction (kick-off) and brainstorm in regard to the TA
Presentation at kick-off, brainstorming session and working group list creation showed that there is a need to illustrate the potential of Mixed Reality. While we will have a list of tools that might be used creating Virtual Museums already prepared by TA2 (in connection with WG 2.1) we also need to assess their potential. It is also desirable to have links to already available publications as a 'short history of the VR/AR-technology and how it might continue'.

3.4.1   LIST OF THE SUGGESTED WORKING GROUPS FOR THE TA 4

WG 4.1 VR/AR storytelling (Overview / recommendations)

WG 4.2 Presence and new technologies, visualization and interaction (Overview / recommendations)

WG 4.3 Gamification (Overview / recommendations/define standards)

3.4.2   AGENDA FOR TA 4 FOR THE NEXT YEAR

a)   What-is-useful-for-which-end-and-for-whom-under-what-considerations

TA4, together with Working Group 4.2 will prepare a descriptive list of "what is useful for which end and for whom under what considerations" among the tools to create Mixed or Virtual Reality with a focus on visualization and interaction. This list will have the following columns: Usefulness (e.g. Taking measurements, Contextualizing, Visualizing…) / Example / How to get to the example / Interpretation (like: Was useful before but now it is better to use … or: Only useful indoors …).

This list will we published on the ViMM-platform as a draft and will be enriched over time by TA4, WG 4.2, by users and commenters. The aim of the list is to be helpful for those that have to decide which tool to take and to guide them to cutting edge VR/AR-technology.

b)   VR/AR-Storytelling

TA4 together with WG 4.1 will work on techniques for VR/AR-Storytelling. A list – to be published on the ViMM-platform will be the outcome. The list structure will be like: Name of technique / Description of technique / Example of usage / How to get to the example. The list is open for comments and contributions by the public which TA4 will edit and integrate into the list. The list will be published as soon as first elements are in it and it will grow over time until the end of the project.

c) Gamification

TA4 will analyse the role of Gamification in Virtual Museums. This analysis will be conducted through desktop research and discussions within WG 4.3. A definition for Gamification will be developed, its application in current Virtual Museums will be analysed and the potential Gamification holds for Virtual Museums will be elaborated. The analysis will be published on the ViMM-platform.

3.5 TA5 - DEMAND

Short citation from the respective parts of the description of work

The Demand TA will address ways in which VM can support the economic and social development of the CH sector by capitalizing on developments such as the growth of the VR/AR market to an expected $150 billion by 2020 (…) and will address issues such as … drivers of demand … making the most of the data economy … linking CH/VM to sources of financial investment … identification and clearer market definition of existing and potentially significant areas of user demand for VM among target sectors …

List of key terms from the presentations of the TA-leaders at the kick-off meeting

- List sources of investment (public/private, local/national/EU…).
- Explore drivers for demand (not purely/directly economic – social benefit in the form of learning, awareness, inclusion, leisure…).
- Identify target sectors (audiences, cultural heritage settings, researchers, communities, associations, media professionals, public administration, companies…).
- Identify target areas (tourism, education, research, entertainment, creative industry, smart cities…).
- Test new forms of impact assessment more in line with EU perspective on Societal Challenges.
- Propose innovative solutions to incentivize development.

List of key terms from the brainstorming session

Continuous assessment

- Goal / added value of CH and VM
- Tools / benchmarks / indicators of economic growth / activity, improvement in knowledge / education, citizen engagement, performance of structures and policies to increase multiplier impact in local economies and relevant returns to the cultural organisations (plus any other outcomes)

Policies / Strategies

- New models of governance and decision-making processes (e.g. take example of other fields, such as gaming industries, creative arts, research institutions …)
- Ensuring affordability and sustainability (e.g. plan sustainable and innovative business plans, business partnerships among private and public stakeholders, mitigated decline vs. endless growth)
- Mobilizing private and public funding (e.g. ERDF)

- Incentivizing economic feedback / growth (e.g. from industries) based on well-documented studies on micro/macro-economic impact in the cultural sector, design of strategies such as advertising, branding, etc.

- Fostering social impact (e.g. museums, citizens, urban planning) by means of engagement strategies regarding: relevance, accessibility, authenticity, participation (in construction of CH) and enrolment (of new audiences)

Uses / sectors

- Tourism

- Education: formal (new modalities, e.g. flipped classroom) and informal

- Smart cities (for locals and foreigners, understand, discover, value cities as open museums, part of everyday life, VM as a device for social engagement)

Short analysis of the presentation and reaction (kick-off) and brainstorm in regard to the TA
Presentation at kick-off, brainstorming session and Working Group list creation showed that there is a need for data about the potential economic value of Virtual Museums and especially for sound methodologies and tools. Equally needed are a grouping and listing of stakeholders and a description of their respective demands.

3.5.1   LIST OF THE SUGGESTED WORKING GROUPS FOR THE TA 5

WG 5.1 Uses and sectors (Map / guidelines / toolkits)

WG 5.2 Policies and strategies (Strategies / model / map)

WG 5.3 Continuous assessment of VMs (Methodologies / KPI / tools)

3.5.2   AGENDA FOR TA 5 FOR THE NEXT YEAR

a)   The need for Virtual Museums

TA5, together with WG 5.1 will analyze target areas and target sectors for Virtual Museums. The guiding question is: Who has which interest in what kind of Virtual Museum application. First there will be the creation of a list of target areas and sectors, then looked into for the kind of interest in Virtual Museums that exists or might exist in each area/sector will be investigated. As an outcome, there will be a report about "The need for Virtual Museums" to be published on the ViMM-platform together with the list of target areas and sectors This list will grow over time and will have the following columns: Name of area/sector / Short description of area/sector / Kind of interest in Virtual Museums.

b) Added value shown by examples

TA5, together with WG 5.2 will analyze the potential for added value of Virtual Museums. It will create a list of examples showing where the added value in each case is generated from and what the added value is. This list will have rows like: Title of example / Short description of example / Keyword for added value (e.g. financial gains, educational gains …) and what (in the example) generated it. The examples will be put onto the VIMM-platform.

c) Market analysis

TA5, together with WG 5.3, will conduct an analysis of the economic conditions for Virtual Museums. This will contain a closer look into the prerequisites (money, know-how, …) for Virtual Museums (who can afford?) as well a look into the market potential (what are the competitors: games, movies, social media …). The work will result in a number of small case studies to be published on the ViMM-platform.

3.6 TA6 – DISCOVERY

Short citation from the respective parts of the description of work

The Discovery TA will improve understanding of new ways of taking into account the state of the art in cloud computing, smart technologies and big data management in order to enable discovery for VMs of European digital content which was previously inaccessible, buried among huge amounts of data and/or not sufficiently tagged with adequate metadata.

List of key terms from the presentations of the TA-leaders at the kick-off meeting

- Automatic contextualisation and identification of content: methods for automatically finding content which is semantically similar to a given item or content which is related to a given high-level concept

- The discovery and virtual 'reunification' of CH assets which have been scattered to different parts of Europe and the world

- The role and development of Europeana to support the creation of VM and potentially to become an EU-wide VM

- The potential of big data management and opportunities created by the vast volume, variety and velocity of new data, generated every day- most of which is unstructured - for searching previously inaccessible European digital content

List of key terms from the brainstorming session

Data handling

- Defining 3D format standard to be used for Virtual multi-modal museums

- Investigating dynamic data management system for 3D content

- Linking 3D content with related meta-data for interpretation, contextualization, identification and searches

Digitalization

- Digitizing museum objects is expensive; we should prioritize the object to digitize based on the most important criteria such as: physical condition, representativeness, uniqueness and demand.

- Creating a partnership between museums, library and archives for digitizing services. This will help to optimize, share knowledge and equipment

Experience

- Offering an engaging experience for the visitor at the museums or across the web by presenting information in a creative way

- Using emerging technologies such as AR and Location-based services to augment the traditional museum content and create a relationship between the Virtual Museum and traditional museum.

- Understanding visitors' needs and expectations in order to set priorities with respect to *audience engagement*

Perspective

- moving toward a robust Museum's data management system:

- best practices for data structuring

- defining a clearly documented data management process

- articulating both long-term and short-term goals in the management of the information

- standardization of data structure in order to improve information sharing and to create opportunities across the entire cultural heritage community

- generating accurate and meaningful metadata in order to feed the SEO (Search Engine Optimisation) purposes and create a learning analytics that will help museums to engage visitors

Short analysis of the presentation and reaction (kick-off) and brainstorm in regard to the TA
Presentation at kick-off, brainstorming session and working group list creation showed that there is a need for best practice examples and guidelines for optimization of the digitalization process and the management of the data created in it. When it comes to publishing the digitized entities, there is a necessity for cooperation. Information about how such cooperation works is still needed. One of the possible outcomes of such cooperation is automatic contextualization of the digitized content. The potential of such contextualization and related experiences need to be analyzed and advertised.

3.6.1   LIST OF THE SUGGESTED WORKING GROUPS FOR THE TA 6

WG 6.1 Digitalization (Prioritization / institutional partnership)

WG 6.2 Data handling (Investigation / format standard definition)

WG 6.3 Experience (Analyses / understandings)

3.6.2   AGENDA FOR TA 6 FOR THE NEXT YEAR

a) **A flowchart for the digitization process**

TA6 will take a broader look at Virtual Museums, looking into digitalization as a process. Together with WG 6.1 the TA will work on a flowchart for digitization processes. This flowchart will demonstrate the single actions and will show the accompanying considerations for each action. It will be published on the ViMM-platform. Unlike many other similar flowcharts it will consider the situation in which digitization is done collectively by more than one institution (or more than one department of one institution).

b)   Handling 3D-Data and metadata of digitized entities

TA6 will, together with WG 6.2 analyze data handling in two ways: First, data handling of 3D data in general and second the interlinking between the 3D-data and Metadata describing the digitized entities. For gaining a deeper understanding, TA6 will work on a descriptive list of characteristics of 3D-data to identify particularities. This list might have the following columns: Name of characteristic (e.g. size, environment, …) / Applied to 3D in general (e.g. description of size, description if/what environment is generally needed, …) This list will be published on the ViMM-platform. TA6 (with WG 6.2) will also analyze the possible ways for getting metadata for the 3D objects grouped with metadata for the digitized objects (e.g. is there a container-metadata-format or has a database to be used or …). This analysis will be published on the ViMM-platform.

c)   Prospects from cooperation

Together with WG 6.3 TA6 will analyze the state of the art in cooperation for publication of digital objects. It will elaborate on the potential for (automatic) contextualization in a cooperative environment. Generally, it will collect cases and reports about experiences in cooperate publishing and work out the strengths and weaknesses that each case demonstrates. The collection of cases will be – one by one – published together with comments on the ViMM-platform.

3.7 TA7 – DECISIONS

Short citation from the respective parts of the description of work …

The Decisions TA will examine and organize the knowledge extracted from the results of other 6 TAs in order to extract and produce a practical step-by-step process for the design of sustainable strategies and new VM, which will be made available through the VIMM communication platform for the community of cultural heritage managers and policy makers to be integrated within the VIMM communication platform.

List of key terms from the presentations of the TA-leaders at the kick-off meeting

... examine and organize the knowledge extracted from the results of the other 6 TAs … to be integrated within the ViMM communication platform that will include …

- identification of critical decision points within the process of designing new VM or transforming existing ones
- the main creative and curational concept development and the scientific, educational, social and economic added value;
- general and specific public target audiences
- functional interconnection of content from various sources
- identification of the stakeholders to be involved
- durability over time of the VM
- the business model and the financial parameters

List of key terms from the brainstorming session

Long-Term Life Cycle, Policy - Making

- Sustainability of the content provided will go hand in hand with further technological developments and their constant updates. This approach demands further investments and upkeep which must be manifested in the policy making in both a financial and an ideological sense.
- The results of the TA's Documentation and Directions will play a major role in the work of this group.

Training and Learning, Dissemination

- The content of both these topics is closely intertwined, as content creators, being able to update the platform, can then also disseminate it responsively. The results of Thematic Areas 2 & 6 will be intensely connected to this working group.

Target Audience/ Stakeholders

- The flexibility of a dynamic interface encompasses not only the appearance and usability but also the responsiveness of the platform reflecting the needs and interests of the user.

- This task requires a strong and observant monitoring of all TAs, particularly Demand and Directions.

Short analysis of the presentation and reaction (kick-off) and brainstorm in regard to the TA

TA 7 is organizing and examining the results of the other TAs to prepare a decision-making scheme which will provide a step by step process for the creation of virtual museums. This tool will be available to all users of the VIMM platform and requires a flexible interface, adjustable to the users need as well as novel technologies and techniques. As mentioned in the Kick -Off - Meeting Brainstorm Report of TA 7 (Leader 7 Reasons), the main interest of the participants where weighted on Long -Term Lifecycle, Policy Making, Training and learning and a flexible interface. These topics will set a starting point for the decision-making scheme which will be enriched by the contributions from the other TAs as well as from the Platform users.

3.7.1   LIST OF THE SUGGESTED WORKING GROUPS FOR THE TA 7

WG 7.1 Long-Term Life Cycle, Policy Making (includes business models, content development and management, decision points, sustainability, etc.)

WG 7.2 Training and Learning (related professional skills)

WG 7.3 Target Audience and stakeholders (includes also added value of Virtual Museums)

3.7.2   AGENDA FOR TA 7 FOR THE NEXT YEAR

a) Decision making-scheme

A practical step-by-step scheme for creating a virtual museum will be developed by TA7 together with WG 7.3. As soon as a first version of it is ready it will be published on the ViMM-platform. Users of the platform, ViMM-Partners of all TAs, external experts … all are invited to discuss and improve this decision making scheme which will be updated on the platform in the course of the discussion.

b) Sustainable and reusable Virtual Museums

TA7 will discuss aspects of sustainability, reusability, policy making, content development and management in the practical creation of virtual museums with WG 7.1. As a result a set of blog

entries focusing on different aspects in this field will be written and published on the ViMM platform.

c) Training and Learning

TA7 will, together with WG 7.2, discuss the potential of Virtual Museums for training and learning. It will discuss the preconditions necessary to make a Virtual Museum part of training and learning environments. A collection of good practice examples published at the ViMM-platform will be the result of this work as will also be a list of recommendations for creators of Virtual Museums, which again is published on the ViMM-platform.

d) Target Audience and Stakeholders

Aspects regarding the target audience and the stakeholders that have to be taken into account while creating a Virtual Museum will be discussed by TA7 together with WG 7.3. From this discussion a set of blog-entries will be created that are published on the ViMM-platform. This entries will reflect experience from TA7 and WG 7.3 members as well as experience from other ViMM-partners and experts.