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META-MUSEUM

Moving Emotions towards confidence in the Transformative Appropriation for a Meaningful Understanding of cultural heritage: a neuroScientific approach to EUropean Museums

DELIVERABLE D1.2

TITLE Ethics Management Plan

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DISSEMINATION LEVEL
☐ PU - Public
☒ SEN - Sensitive

TYPE
☐ R - document, report
☐ DMP - Data Management Plan
☒ DATA - Data sets, microdata, etc
☐ DEM - Demonstrator, prototype
☐ OTHER

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DELIVERABLE REVIEW HISTORY

VERSION	DATE	DETAILS
0.1	10 Dec. 2024	1st draft submission
0.2	23 Dec. 2024	2nd draft

LIST OF ABBREVIATIONS

ACRONYM	DESCRIPTION
EMP	Ethics Management Plan
DMP	Data Management Plan
FAIR	Rindability, Accessibility, Interoperability, Reusability
GDPR	General Data Protection Regulation
SOP	Standard Operating Procedure
UWB	Ultra-Wide-Band
GSR	Galvanic Skin Response

RELATED DOCUMENTS

Related Documents	Location
XYZ.doc	MS Teams location

FRAMEWORK

1. Reference to WP and tasks as descripted in the DoA

WP1: Project Management and T1.5 Ethics compliance: support in Ethics issues.

2. WP1 and T1.5 objectives

WP1 aims at managing the overall project coordination and technical and administrative procedures; with a clear responsibilities' distribution among partners, ensuring that the objectives are met in budget and time, with a high quality.
D1.2 is related to T1.5: Definition of the protocols for experiments involving humans, informed consent, personal data and AI use, according to the Declaration of Helsinki, and relevant EU regulations. The Ethics Management Plan (EMP, D1.2) will be drawn, specifying the ethical implications of the chosen methodologies as well as steps taken to preserve confidentiality and anonymity.

3. Linked tasks

T2.1 Transformative nature of CH: stakeholders and audience analysis
T2.2 Samples composition
T2.4 Questionnaires design
T3.1 Database definition
T3.2 Sensors selection and data collection
T3.6 Data security and governance
T4.4 "attaCHbox" App
T5.1 Definition of Psychometric and Physiological Quantitative Assessment of Well-being and Confidence
T5.2 Ethics and DMP
T5.3 Experiments on emotional reactions
T5.5 Experiments on Positioning
T6.1 Approval from the Ethical Committee
T6.3 Status quo measurements implementation
T6.6 P1 implementation
T7.1 Adaptation of Psychometric and Neurophysiological assessment to clinical settings
T7.2 Clinical Risk Management Plan and procedures to get approval from the Ethical Committee
T7.3 Status quo and P2 implementation
T8.4 Ethics and data protection
T8.5 P3 implementation

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1 Introduction

This document outlines the Ethics Management Plan (EMP), a comprehensive framework designed to ensure the ethical integrity of the META-MUSEUM project. The plan provides guidance to the research team in maintaining the highest standards of ethical conduct and addresses key ethical considerations at every stage of the project. The foundation of this plan is built on established ethical principles, including respect for human dignity, integrity, transparency, and accountability.

The EMP specifies the ethical implications of the chosen methodologies and steps taken to preserve confidentiality and anonymity. The EMP ensure that all activities respect basic human rights, research ethics and privacy, and that special safeguards are in place to deal with any vulnerable target groups, such as patients in hospitals, according to the Declaration of Helsinki and all relevant EU measures in this regard. The EMP specifies the ethical implications of the chosen methodologies and steps taken to preserve confidentiality and anonymity. Except for WP1 (*Project Management*) and WP9 (*Communication, Dissemination and Exploitation*), activities and tasks in other WPs will include research: several of them will involve participants, consulting with stakeholders, and personal data processing.

The META-MUSEUM project has measures in place to ensure that highest ethical standards of research are maintained and upheld and this document outlines the measures. The project will invariably follow all standard principles of research ethics and data will only be collected with any ethics approvals obtained beforehand (when studies are interventional) and having secured the informed consent of any participants (when studies require research participants). The project will naturally share benefits (in the form of research products), as open access will be ensured to all deliverables. The potential participants who will be involved in the project are all grown-up (18+ y.o.) and can grant agreement. The Data Management Plan (DMP, D1.3) will describe the data management life cycle for all data collected, processed and stored, including the type of data, data format, meta data, and procedure for archiving the data in a secure fashion. The responsible partner institutions with relevant DMP will be in charge of data archiving. Trusted FAIR data repositories, such as Zenodo, Dryad, or Figshare, will also be used to publish data in cases such data is not restricted by privacy and confidentiality considerations and General Data Protection Regulation (GDPR) requirements. DMP provides more details of data protection and sharing. Any collected personal data will be processed in full compliance with the GDPR and any relevant national data protection laws. The measures foreseen for the regulation contribute to better online and offline security.

2 Ethical Approval

Approval from an ethics board is necessary for any research involving human participants to ensure that the dignity, rights, safety, and wellbeing of all individuals are the primary concern of the research study. According to the META-MUSEUM ethical approval procedure, protocols and necessary documents (including informed consent) will be sent to the local independent Ethical Committee for approval. An information sheet will be provided to all participants, who are required to sign the informed consent form to participate in the study. The META-MUSEUM project involves personal research data collection and processing from observational studies, experimental interventional studies, consultations and stakeholder meetings. Interventional studies will involve observational research methods: qualitative interviews/guided discussions with experts (i.e. Associated Partners museums' personnel), other events engaging stakeholders, and literature reviews. Ethics approval is not required for observational studies but is required for interventional studies. Each individual Member State may have different procedures and requirements. Several

EU Member States have no requirement to obtain ethics approval for stakeholder consultations and studies where no human data will be included and/or processed, though differences are possible in relation to ethics oversight requirements and regulations. It's important to refer to associated museums countries. The responsible partner's/partners' national ethics oversight regulations (i.e., in force in the country of the data controller) will be followed in all instances.

WP5 (Laboratory based investigations), WP6 (P1: experimentations in Museums), WP7 (P2: experimentations in Hospitals) and WP8 (P3: experimentations in hybrid environments) will facilitate interventional studies where human participation is required. In these WPs, leads will be in charge of securing any required approvals from the research ethics committee. Where ethics approval or notification is required for a study, the study will only start after obtaining the required approvals from the responsible partner's country (i.e., the country of the partner deemed the data controller). The design of protocols related to ethical issues related to national, EU, and international guidelines will be performed. For the WP7, documents, including the Clinical Risk Management Plan (T7.2), will be developed and submitted the local Ethical Committee for approval, and all patients will be required to sign the informed consent to participate in the study in Hospitals. The protocols according to the Declaration of Helsinki about experiments involving humans, and the informed consent specific for volunteering participants will be sent to the Ethical Committees for approval and all participants will be required to sign the informed consent to participate in the study. The appropriateness and completeness of the written information to be communicated to the subject and procedures concerning the collection of informed consent will be taken into account. Data and any ethics related issues will be managed according to DMP and the EMP.

3 Data management and informed consent

META-MUSEUM will seek methods to balance the quest for innovation with ethical considerations. This balance is essential to ensuring that technological progress aligns with societal values and improves the well-being of individuals and communities. Informed consent is a basic tenet of our research ethics. The aim is to guarantee that individuals can participate in the research voluntarily and willingly (with information about the goal of the study, research processes, possible risks and distresses, possible reimbursements), with a complete understanding of what involvement involves, and that they give consent before entering the study. A dedicated Partner (BEIA) is responsible for data curation, storage, and preservation. The team will conduct data management and quality assurance, ensure the data's security, privacy, and integrity, and manage backup and recovery procedures. The costs associated with data management, curation, storage, and preservation will be included in the project budget and reviewed regularly to ensure their sustainability. Prior to their participation, any participants taking part in the observational studies, interventional studies and actions will receive user briefing kit and their consent will be requested. The user will use local templates and follow its Member State requirements and institutional SOPs for data storage to produce these materials and consent forms. Any partner institutions concerned will take appropriate measures to make sure the signed informed consent forms are handled, received and stored in accordance with the Member State's regulations. In other cases, the sole Data Controller will be the responsible partner institution. Participants will be informed and sign the consent in both phases (*status quo* and pilots) of WP6 and WP7 (T6.3, T6.6, and T7.3) and WP8 implementation (T8.5). For WP6, the META-MUSEUM team will make participants fill in a pre-visit and a post-visit questionnaire, to profile them, monitor their understanding of CH transformative nature and their state of confidence (i.e., cognitive information will be collected), and if the visit transformed them. Enrolled patients in WP7 will sign the informed consent and fill pre- and post-session questionnaires. In line with the Declaration of Helsinki, the participant information materials will include information that data will be confidentially and securely stored in a GDPR-compliant storage solution for five years after the project; other information required by the national authorities

will be also included. Definition of the protocols for experiments involving humans, informed consent, personal data and AI use, according to the Declaration of Helsinki, and relevant EU regulations. The specific information needs of individual potential participants will be taken into account and attention will be given to the methods used to deliver the information (Association, 2013) in all instances. Aside from the DoH requirements, the participants will also receive the following information: information on data protection; about the activities involved in participation; the contact details of researchers; confidentiality details; and the contact details for complaints. The project will apply GDPR plus meaningful consent. We will observe compliance with the requirement to minimise the amount of personal data and Compliance with the GDPR requirement for securing data.

4 Relevant international and EU standards and conventions

The ethical management of the META-MUSEUM project requires alignment with a comprehensive set of international and EU standards and conventions to ensure that the project's activities comply with the highest ethical and legal principles. These frameworks provide guidance on respecting human rights, fostering inclusivity, protecting data privacy, and ensuring the safety and well-being of individuals involved in or affected by the project.

Foremost among these is the Universal Declaration of Human Rights (UDHR), adopted by the United Nations in 1948, which sets out fundamental human rights that must be respected globally. The principles of dignity, equality, and freedom enshrined in the UDHR form the ethical foundation for all research and innovation activities.

Complementing this, the European Convention on Human Rights (ECHR) provides a binding legal framework for safeguarding human rights within the EU. The ECHR requires adherence to key provisions such as the right to privacy, the prohibition of discrimination, and the protection of individual freedoms, all of which are crucial in project design and implementation.

In the context of research and innovation, the EU's Charter of Fundamental Rights further elaborates on these principles, emphasizing specific rights relevant to projects that involve technological development or scientific inquiry. Articles within the Charter underscore the importance of protecting personal data, ensuring non-discrimination, and promoting cultural and linguistic diversity.

Compliance with the GDPR, which operationalizes the right to data protection within the EU, is particularly critical for projects handling sensitive or personal data. The GDPR mandates robust safeguards for data processing activities, emphasizing transparency, accountability, and the minimization of risks to data subjects.

In addition to human rights instruments, the Declaration of Helsinki, adopted by the World Medical Association, provides essential guidelines for projects involving human participants, particularly in medical or biomedical research. It establishes standards for informed consent, risk minimization, and ethical review processes, ensuring that participants' rights and welfare are prioritized.

Similarly, the International Ethical Guidelines for Health-Related Research Involving Humans, prepared by the Council for International Organizations of Medical Sciences (CIOMS) in collaboration with the World Health Organization (WHO), offer detailed protocols for ethical oversight in health-related studies, highlighting principles of social value, scientific validity, and equitable distribution of benefits.

Regarding cultural heritage and indigenous knowledge, the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage adopted by UNESCO provides ethical guidelines to prevent exploitation and ensure respectful engagement with cultural assets.

Moreover, environmental considerations are increasingly integral to ethical project management. The Paris Agreement, a legally binding international treaty on climate change, and the EU's Green Deal underscore the ethical imperative to minimize environmental harm and promote sustainability. These commitments align with the principles of the Aarhus Convention, which guarantees public access to environmental information and participation in environmental decision-making processes.

By embedding these standards and conventions into the Ethical Management Plan, the META-MUSEUM project demonstrates its commitment to responsible conduct, fostering trust among stakeholders and contributing to broader societal and environmental goals.

5 Identification and recruitment of participants

The identification and recruitment of participants in project activities must adhere to ethical standards that prioritize respect, transparency, and inclusivity. This process begins with defining clear criteria for participant selection that align with the project's objectives while ensuring fairness and equity. Outreach strategies should actively target diverse groups, including underrepresented and vulnerable populations, to foster inclusivity and prevent any form of discrimination. Recruitment efforts must be accompanied by comprehensive communication to potential participants, outlining the purpose, scope, and implications of their involvement in the project. Ensuring that participation is voluntary and free from coercion is fundamental, and steps must be taken to address any potential barriers to participation, such as language or accessibility issues.

Obtaining informed consent is a cornerstone of ethical participant engagement. Consent procedures must be designed to provide participants with clear, accessible, and comprehensive information about the project, including its objectives, methods, potential risks, and expected benefits. Participants should have ample opportunity to ask questions and must provide their consent willingly, with the understanding that they can withdraw at any time without repercussions. In cases involving individuals unable to provide consent independently, additional safeguards, such as obtaining consent from legal guardians, must be implemented to ensure ethical compliance.

Balanced gender representation is a critical component of ethical recruitment and participation. Efforts should be made to achieve gender equity by considering gender-specific needs and perspectives throughout the recruitment process. This includes using gender-sensitive language in outreach materials, providing opportunities for input from all genders in project activities, and monitoring gender representation to ensure that no group is underrepresented or marginalized. By fostering gender balance, the project not only enhances its ethical integrity but also ensures that outcomes are inclusive and reflective of diverse experiences and perspectives.

6 Bias-free language and respectful communication

Ensuring the use of bias-free language and respectful communication is fundamental to fostering an inclusive and equitable environment throughout the project lifecycle. Bias-free language avoids perpetuating stereotypes, discrimination, or exclusion based on gender, race, ethnicity, age, disability, sexual orientation, religion, or socioeconomic status.

The adoption of neutral and inclusive terminology is essential in all forms of project communication, whether written, verbal, or digital. For instance, using gender-neutral pronouns or

job titles (such as "they" or "chairperson" instead of "he/she" or "chairman") demonstrates respect for diverse identities and experiences.

Respectful communication requires active listening and an appreciation for cultural and linguistic diversity among participants and stakeholders. It involves creating opportunities for open dialogue, addressing misunderstandings constructively, and maintaining professionalism in all interactions. Sensitivity to cultural norms and values ensures that communication strategies resonate with diverse audiences while avoiding unintended offense.

To institutionalize these practices, the project team should undergo training on unconscious bias and inclusive communication. This not only raises awareness but also equips team members with practical tools to implement these principles consistently. Moreover, project documents, presentations, and outreach materials should be reviewed to ensure they reflect bias-free and respectful language, fostering trust and collaboration among stakeholders.

By embedding bias-free language and respectful communication in its ethos, the META-MUSEUM project reinforces its commitment to equality, diversity, and ethical integrity, ensuring that all individuals feel valued and respected in their contributions.

7 Data collection procedures

The data collection procedures in the META-MUSEUM project will involve the expertise and collaboration of multiple partners, each responsible for specific methodologies and datasets, ensuring a comprehensive and ethically compliant approach. The process will address the needs of the project while adhering to the highest ethical standards, including the protection of participants' rights and data integrity.

POLITO will lead the design and implementation of two critical activities: a) the distribution of tailored questionnaires created by OPI-PIB (T2.4), and b) the execution of indoor positioning tests (both taking place during activities of T6.3 and T6.6). The questionnaires will be crafted to gather qualitative and quantitative data on participants' interactions with cultural heritage experiences. These instruments will be designed to capture insights into user engagement, accessibility, and inclusivity while ensuring that questions are free from bias and respect participants' dignity. For the indoor positioning tests, POLITO will employ ultra-wide-band (UWB) technology, a highly precise and reliable method for tracking movement patterns within museum spaces. UWB operates by emitting low-power radio signals that can determine positions with centimeter-level accuracy. This technology is known for its safety, as it uses extremely low energy levels that pose no risk to human health, complying with international safety standards for electromagnetic emissions. The data collected during these tests will include anonymous information about visitors' spatial behavior, such as movement trajectories, time spent at exhibits, and interaction points.
No personally identifiable information will be recorded, ensuring that participants' privacy is fully protected. The use of anonymized data minimizes ethical risks and aligns with GDPR principles of data minimization and confidentiality.

UNIROMA1 will focus on collecting neuro-physiological data to deepen the understanding of human responses to cultural heritage stimuli. EEG data will be acquired using a Mindtooth Touch EEG headset with water electrodes. This headset, used for assessing psychophysiological variables such as stress, will be positioned according to the International 10-10 System at the following locations: AFz, AF3, AF4, AF7, AF8, Pz, P3, and P4. Thus, two neuro-physiological indices will be extracted: the Approach-Withdrawal Index, with positive values indicating an approach/interest tendency, while negative values suggest a withdrawal tendency; the Cognitive Effort Index, which is derived from the GFP in the theta band over all the frontal electrodes (AFz, AF3, AF4, AF7, AF8). Increased theta values are indicative of higher cognitive effort.

Moreover, the Galvanic Skin Response (GSR) will be also recorded with a Shimmer 3 GSR+ device (Shimmer Sensing, Ireland) with a sampling rate of 64 Hz, applied to the nondominant hand of the subject. The constant voltage method (0.5 V) will be used for GSR acquisition. Electrodes will be placed on the palmar side of the middle phalanges of the second finger of the nondominant hand. These devices have been already used in previous studies and they do not have any particular risks for the subjects. UNIROMA1 will ensure that all neuro-physiological data collection adheres to ethical guidelines for biomedical research, and ensuring participant comfort and safety during neurophysiological data acquisition. For participants involved in WP6 (T6.3 and T6.6) POLITO and UNIROMA1 will obtain the approval from the Ethical Committee and the written informed consent. For patients involved in WP7 (T7.3), UNIROMA1 will obtain the approval from the specific Clinical Ethical Committee (T6.1 and T7.2) and the written informed consent.

VILNIUS TECH will lead WP8 (P3 experimentations in hybrid environments) and collect the following data to adapt personally the cultural heritage environment to visitors (T8.5):

- emotional states: surprised, sad, disgusted, angry, happy, scared;
- arousal, valence;
- affective attitudes: confusion, boredom, interest;
- physiological states: respiration, breathing rate, heart rate, temperature, pupil size, blinking rate;
- Brain waves: Delta, Theta, Alpha, Beta.
- Voice emotions: stress, excitement, uncertainty, energy; mental effort, hesitation, cl stress; concentration, anticipation, embarrassment; sub-emo, sub-cog, and arousal (sub-emo is indicative of a generally emotional state, while sub-cog indicates "heavy feeling," concern, and deep logic); happy, sad, aggression.

STICHTING VU will lead WP5 (Laboratory-Based Investigations), which aims to recreate a scaled-down version of the museum experience in a controlled laboratory setting. This environment allows for a systematic methodological validation and experimental interventions to study emotion-induced bodily and neurophysiological biomarkers. The research will focus on healthy participants, investigating their emotional reactions, particularly neurophysiological and postural responses, which are reliable indicators of subjective states.

The study will employ a multimodal approach, beginning with the use of wearable neurophysiological devices to capture emotional and cognitive signals. Neurophysiological data will be recorded using the Mindtooth Touch EEG headset, which features saltwater sponge electrodes and passive Ag/AgCl sensors. The electrodes will be placed according to the International 10-10 System at specific locations, including AFz, AF3, AF4, AF7, AF8, Pz, P3, and P4. The data will allow for the extraction of key variables such as the Approach-Withdrawal Index, which differentiates between tendencies to engage with or withdraw from stimuli, and the Cognitive Effort Index, which indicates the level of cognitive effort exerted by participants.

In addition to EEG recordings, further physiological parameters associated with emotional status will be measured using a wristband sensor. This device will monitor heart rate, temperature, and electrodermal activity (EDA), offering a comprehensive assessment of participants' emotional states. Skin conductance responses, specifically the Skin Conductance Level (SCL), will also be analyzed using a Shimmer 3 GSR+ device. These measurements will provide insights into participants' arousal and stress levels.

Postural emotional reactions will be recorded on a force platform, enabling the study of movement-related emotional responses such as approach-avoidance tendencies and postural freezing. These measures will contribute to understanding how bodily responses reflect emotional engagement.

To complement the physiological and postural data, validated psychometric scales will be administered to participants. These assessments will evaluate aspects such as confidence, well-being, affective states, and aesthetic attractiveness. By integrating these subjective measures, the

study will gain a deeper understanding of the participants' emotional experiences and cognitive states in response to the recreated museum-like environment.
In summary, this comprehensive multimodal methodology will combine physiological signals, postural analysis, and psychometric evaluations to provide an in-depth framework for quantifying well-being, confidence, and emotional engagement. The approach is expected to validate the laboratory-based setup while advancing our understanding of how individuals emotionally and cognitively interact with cultural stimuli.

KMOP will involve its Ethical Research Committee for all the research activities the partner coordinates in Greece and EU (such as online surveys and online individual interviews – T2.1 and T2.2). It will oversee the process, review and approve the needed documents (e.g., data collection instruments, consent forms) and will ensure the privacy and the safety of the participants. KMOP's Research Ethics Committee requires that activities and data processing should be implemented under the provisions of the GDPR, the Universal Declaration of Human Rights and Convention 108 for the Protection of Individuals with Regard to Automatic Processing of Personal Data, the Declaration of Helsinki ethical principles for medical research involving human subjects, and the national laws, including those governing the acquisition of valid consent. All reasonable measures should be taken so that individual rights and freedoms of participants, especially those belonging to vulnerable populations, are protected.

BEIA will develop the attaCHbox App (T4.4), that will be used to collects people's co-created contents: participants during P1, P2 and P3 will be asked to leave their interpretation, intended as "meaning creation" but also "playing a role" connected to the cultural experience just lived. These contents (image, videos, audios) will be subjected to signature of the privacy consent in accordance with the requirements of GDPR and will be made available for other users (both physical and virtual) and within the three pilots. These very short videos will be made available in museums and displayed to visitors.

By integrating these data collection efforts, the META-MUSEUM project will achieve a multidimensional understanding of user interactions and responses to cultural heritage. Each partner's expertise and adherence to ethical standards will ensure the data collection is robust, respectful, and valuable for the project's objectives.

8 Data anonymization and protection management

META-MUSEUM will involve quantitative and qualitative personal data processing. Some cases will require transcripts. Unless participants consent otherwise, data will be anonymized, and ethical rules (in line with research ethics guidelines and other related principles, e.g. the Chatham House Rule) will be adhered to and the principles of trust followed in public consultation events. Where transcripts of video and audio files that require anonymisation will be needed, any video and audio files will be deleted after the transcript verification. All information analysis will work with the anonymized data. Impact assessment regarding data protection will be completed before beginning of data gathering. VILNIUS TECH will design protocols according to the national, EU and international guidelines related to ethical issues for the implementation of P3 (experiments protocols, informed consent, personal data and AI use). M4 will collect and process completely anonymised emotional, affective and physiological data.

Data and any ethics related issues will be managed according to DMP and EMP. To reduce risk, the developed tools will comply with all international data protection laws while minimising the amount of personal data collected. Users will also control system functions according to need. The measures foreseen for the regulation contribute to better online and offline security.

9 Data storage

Within the META-MUSEUM project, efficient data management plays a critical role in achieving the established objectives, with BEIA holding primary responsibility for curating, storing, and preserving the generated data. This task involves developing and implementing a data storage system that ensures data quality, security, and integrity, as well as compliance with legal requirements and relevant international standards.

The data storage system is designed to collect and organize information from various experimental sources, including sensor-generated data, questionnaires, and other tools used in the project. Each dataset undergoes a rigorous process of validation and preprocessing to ensure consistency and accuracy before storage. To meet these requirements, the database is designed to be scalable, enabling the efficient integration of new data types or sources throughout the project lifecycle.

Data security and confidentiality are fundamental priorities in the storage process. Data is protected through the implementation of advanced measures, such as encryption of sensitive information and the use of an authentication system for controlled access. These measures align with data protection regulations, such as GDPR, ensuring legal compliance and safeguarding information against unauthorized access. Additionally, robust periodic backup procedures are in place to prevent accidental data loss. Backup copies are systematically managed, and rapid recovery mechanisms ensure operational continuity even in the event of unforeseen incidents.

In the long term, the storage infrastructure is designed to be durable and accessible, ensuring not only the preservation of data but also its reusability for future research. This aspect is essential for fully leveraging the project's results and facilitating their use by the scientific community and other stakeholders. All these elements are integrated into a comprehensive data governance framework that defines clear rules for accessing, using, and protecting stored information.

BEIA's responsibility for these activities is detailed in the deliverable associated with T3.1 which will describe the database's characteristics, the types of data stored, the standards adhered to, and the defined levels of user access. This deliverable will provide comprehensive documentation of the implemented processes and support all subsequent activities that rely on proper data management.

10 Sharing META-MUSEUM Results

We will use the Graphing tool to identify trends, patterns, and connections. It facilitates data visualization to recognize current trends and data that can assist in future predictions. Open access will be granted to all research results, and they will be shared in training materials, publications, popular science literature or through open data. Open Science practices will be adopted to share with other wider networks, other researchers and all citizens the project's activities, contents and results. An open cooperative work and systematic sharing of knowledge and tools will be practised as early and widely as possible. Open Access and Citizen Science (collaboration with citizens) are the basis of the "circular culture", by enabling cultural institutions to overcome the top-down approach, taking into account citizens' contributions. Data open access can contribute to the dissemination even after the project has ended, involving other institutions interested in the project. During META-MUSEUM implementation, data will be stored and managed in an inclusive way, via open files and open platforms.

The citizens' contribution will be crucial to the project's progress in the collection of pilots' data. The contribution will be indirect, relating to neuroscientific measurements and profiling of participants through questionnaires, and direct, thanks to participatory activities during the Pilots, where participants will be invited to create and share contents.

All scientific articles will be deposited and released with a CC BY license (PSi Directive 1024/2019) as soon as possible or, at the latest, on the date of publication and immediate open

access will be guaranteed. In this context, on the project web site free open access will be given for articles related to project results. Furthermore, all of the scientific project results will be made accessible from on IRIS, (https://iris.polito.it/) the Coordinator's Open Repository of publications produced by the scientific community of POLITO where publications bibliographic data can be provided with their open access full-texts. IRIS has got a promoting and leading role in getting research products to become accessible and shareable. Other Partners' repositories include the e-Scholar permanent data repository at the Manchester University Library.

Partners will use the EC "Horizon Results Platform" to share and upload META-MUSEUM's key results and to meet new stakeholders interested in the project's results and their further exploitation. The creation of content (e.g. digital narratives based on TMt) broadening and deepening the understanding of the CH transformative nature could feed into open database projects such as Wikimedia Commons and Wikidata, by implementing already existing actions of Associated Partners Museums.

Annex 1 – Sample consent form

Each partner will submit a proper consent form, according to the template approved by the Institution. If no forms are available, the following one will be used:

I, [name] *(the undersigned), volunteer to join the project titled META-MUSEUM and confirm the following statements (tick all appropriate circles):*

- *I asked about the META-MUSEUM activities and experiments to reflect on the information and have received satisfactory answers.*
- *I was informed about the details related to the META-MUSEUM project presented in the Information Sheet attached to this consent form.*
- *I understand the privacy and confidentiality procedures as they have been described in the Information Sheet attached with this consent form.*
- *I understand that I participate on voluntary grounds, that I can withdraw anytime without giving reasons and that my withdrawal will not carry penalties nor questions will be asked to find out the reasons of my withdrawal.*
- *I know that I can get my data that I, as a participant, have voluntarily provided, and that, in case it is inaccurate, I may ask for that information to be amended and/or rectified, and I can also request the deletion of all personal information that I have provided.*
- *I understand that any and all data collected about me will be kept confidential as described in the Information Sheet attached with this consent form.*
- *I know that the information gathered from my participation will only be used for the original purpose of META-MUSEUM project and will not be reused for any other purposes as described in the Information Sheet attached with this consent form.*
- *I understand that the data collected from my participation can be used for dissemination and publications as described in the Information Sheet attached with this consent form.*
- *I have been informed by the META-MUSEUM representative of the obligation of the project consortium to inform the following you and the Project Coordinator in case of unexpected findings.*
- *I understand that in case I want to request data access, rectification and/or deletion, I must contact the relevant project representative (contact details below) and that the representative will then forward the request to the META-MUSEUM Project Coordinator (contact details below) who will act on my request.*

I, [name], agree to take part in the META-MUSEUM study as an external participant and to date and sign this informed consent form.