WORKINGAGE

Smart Working Environments for All Ages

D2.3 Data Management Plan

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WP2 – User Centric Design

D2.3 – Data Management Plan

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Acronym Table

ITCL	Instituto Tecnológico de Castilla y León
EXO	Exodus S.A.
UCAM	University Of Cambridge
POLIMI	Politecnico Di Milano
GC	Green Communications SAS
BS	Brainsigns
RWTH	RWTH Aachen University
TPZ	Telespazio France SAS
AUD	Audeering
EENA	European Emergency Number Association
INTRAS	Fundacion Intras
TMA	Telematic Medical Applications Ltd
WA	Workingage
WP	Work Package
DMP	Data Management Plan
DSA	Data Sharing Agreement
OA	Open Access
ORDP	Open Research Data Pilot

Executive Summary

The Data Management Plan describes all the data management processes related to the WorkingAge project. First of all, the document will define some general principles about data management policy and scientific publications in research context. Then, the Data Management Plan will define all the procedures to collect, manage and store data with the priority to be GDPR compliant. The document will define also technical procedures, such as pseudonymization and data encryption, directly related to the GDPR compliance. Finally, the Data Management Plan will describe official figures already stated by the GDPR, such as Data Controller, who will deal with Data Management and Data Protection issues.

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1. Introduction

This document is Version 1 of the Data Management Plan (DMP), presenting an overview of data management processes, as agreed among WorkingAge (WA) project's partners. This DMP will first establish some general principles in terms of data management and Open Access.

Subsequently, it will be structured as proposed by the European Commission in H2020 Programme – Guidelines on FAIR Data Management in Horizon 2020, covering the following aspects:

- Data Summary;
- FAIR Data;
- Allocation of resources;
- Data security;
- Ethical aspects;

The DMP is a "living" document outlining how the research data collected or generated will be handled during and after the WorkingAge project. The DMP is updated over the course of the project whenever significant changes arise.

1.1 References and sources

1.1.1 Open Access

1. Open Research Data Pilot (ORDP) - www.openaire.eu/opendatapilot
2. ORDP – How to create a DMP plan - www.openaire.eu/opendatapilot-dmp
3. Open Access to Scientific Publications and Research Data in Horizon 2020 - http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-pilot-guide_en.pdf
4. Guidelines on FAIR Data Management in Horizon 2020 - http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf
5. How to Develop a Data Management and Sharing Plan - www.dcc.ac.uk/resources/how-guides/develop-data-plan
6. ORDP – How to select a repository? - http://www.openaire.eu/opendatapilot-repository-guide
7. Five steps to decide what data to keep - http://www.dcc.ac.uk/resources/how-guides/five-steps-decide-what-data-keep
8. How to license Research Data - www.dcc.ac.uk/resources/how-guides/license-research-data

1.1.2 EC Data Protection Regulation

9. Regulation (EU) 2016/679 - Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).
10. National Laws developing and implementing Regulation (EU) 2016/679

2 General principles for data management

2.1 Data collected and personal data protection

Within the WorkingAge (WA) project, partners collect and process research data and data for general project management purposes, according to their respective internal data management procedures and in compliance with applicable regulations. Data collected for general purposes may include contact details of the partners, their employees, consultants and subcontractors and contact details of third parties (both persons and organisations) for coordination, evaluation, communication, dissemination and exploitation activities. Research data are collected and processed in relation with the research pilots. During the project lifetime, data are kept on a dedicated and secured Virtual Machine on a server, which are securely located within the premises of the project partners. Data archiving, preservation, storage and access, is undertaken in accordance with the corresponding ethical standards and procedures of the partner institution where the data is captured, processed or stored. The data is preserved for a time period depending on the data typology: the anonymous data on public research data repository will be stored for 10 years after the last access to them; the raw data collected during the experimental phases of the project, will be kept for scientific reproducibility and can be deleted after 10 years. These raw data are not needed to provide the WA service, therefore, the clause "for scientific purposes" will be reported on the consent form . All data susceptible of data protection are subject to standard anonymization and stored securely (with password protection). The costs for this are covered by the partner organization concerned. **Confirmation that the aforementioned processes comply with national and EU legislation is provided by each partner and verified by the Data Controllers.**

3 Research data and Open Access

The WorkingAge project is part of the H2020 Open Research Data Pilot (ORDP) and publication of the scientific results is chosen as a mean of dissemination. In this framework, open access is granted to publications and research data and

this process is carried out in line with the Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020.

The strategy to apply Open Access for the project's scientific results is revised, step by step, according to personal data protection regulations, the results of the ethical approval process of the research protocols and the provisions of the Consortium Agreement. If needed, it will be possible to "opt out" from this open access strategy for specific and well-defined subsets of data. However, the dissemination will not affect personal data of the participant.

3.1 Scientific publications

Open access is applicable to different types of scientific publication related to the research results, including its bibliographic metadata, such as:

- journal articles;
- monographs and books;
- conference proceedings, abstract and presentations;
- grey literature (informally published written material).

Grey literature includes also reports and deliverables of the projects related to the research, whose dissemination level is marked as Public.

Open access is granted as follows:

- Step 1 – Depositing a machine-readable electronic copy of a version accepted for publication in repositories for scientific publications (before or upon publication).
- Step 2 – Providing open access to the publication via the chosen repository.

For access to publications, a hybrid approach is considered (both green OA and gold OA), depending on the item and the dissemination channels that will be available:

- Green OA (self-archiving) – depositing the published article or the final peer-reviewed manuscript in repository of choice and ensure open access within at most 6 months (12 months for publications in the social sciences and humanities).
- Gold OA (open access publishing) – publishing directly in open access mode/journal.

3.2 Data Management Policy

The Data Management Policy will address the points below and will detail the current status of reflection within the consortium regarding the data that is being produced. According to ORDP requirements, the WorkingAge DMP observes FAIR (Findable, Accessible, Interoperable and Reusable) Data Management Protocols.

The project coordinator and all partners will be individually Data Controller of the data over which they control the purposes and means of processing the personal data and may be Data Processor of data provided and/or controlled by other partners, according to the distribution detailed in the Data Sharing Agreement

signed by the project partners on 23/12/2020 whose summary is reported on the site www.workingage.eu, pursuant to the aforementioned article 13 of the EU Regulation. In particular, the Data Sharing Agreement will identify, for each type of data and/or each processing, the Data Controller and the associated Data Processor(s) with which the designated Data Controller shares those data for scientific purposes under the project. The matrix with the Controller and the Processors for each type of data will be specified in the Data Sharing Agreement.

For each In-Company test, the designated pilot partner will be Data Controller of the personal data included in the associated consent forms who will administer it on the terms and conditions detailed in article 4.1.4.

The consent forms related to the In-Lab experimental testing will be directly administered by the partner who will run the tests in his own laboratory, who will be the sole Controllers of the associated personal data and of the processing of such data in accordance with the applicable regulations and this Data Management Plan.

3.3 Research data

In addition, open access is granted also to underlying research data (data needed to validate results presented in publication) and their associated metadata, any other data (not directly attributable to the publication and raw data) and information on the tools needed to validate the data and, if possible, access to these tools (code, software, protocols etc.). The open data access is intended exclusively for the anonymized experimental data. The experimental data which could not be anonymized will be excluded from the open access repository.

Open access is granted as following.

- Step 1 – Depositing the research data in a research data repository. A repository is an online database service, an archive that manages the long-term storage and preservation of digital resources and provides a catalogue for discovery and access.
- Step 2 – Enabling access and usage free of charge for any user (as far as possible).

The consortium will try to publish as much research data as possible, but this will be decided on a case-by-case basis, in order to be compliant with the GDPR in terms of publishing non-sensitive and personal data.

3.4 Other project's outcomes

As per any other outcomes of the project, they are disseminated accordingly to the dissemination level indicated in the Description of Action and they are also subject to protection in accordance with the Consortium Agreement and in reference to Access Rights.

4 FAIR Data management plan

4.1 Data summary

The Data Summary provides an overview of the purpose and the nature of data collection and generation, and its relation to the objective of the WorkingAge (WA) project.

4.1.1 Objectives of the project and research

The WA project as a complex research requires careful planning, management and administration in its development and implementation. Work has been structured in ten work packages: six covering Research and Innovation work, two for test (Integration and User tests), one for exploitation and dissemination, one for the definition of all specifications and one management work package. WP1 will include all management issues. Prior to the main research cycle, the consortium will participate in WP2: this WP intends to set the bases for all ulterior research including the selection of tools and participants, optimizing the time for the tests. Research cycles (Expected at least two) will start with the definition of the interventions for the users (WP3) at work and in daily life process. This work will be the base for WP4 (HCI platform), WP5 (IOT infrastructure and services), WP6 (Data Analysis) which occur in parallel (and sharing produced knowledge). Ethics and security domain performed during WP7. Deployment and Integration (WP8) in which the final prototypes and the optimization of the research cycles will be adapted for the tests. The intervention models and measurement prototypes will be then integrated and used to collect data in the WP9 (Test Performance). In WP10 Standardization and Business Development, Commercialization and IPR Management will be worked considering the future the market release of the studied solution. This WP will also summarize all the actions proposed for dissemination.

4.1.2 Purpose of the data collection during the project

WorkingAge will use innovative Human-Computer-Interaction (HCI) methods (augmented reality, virtual reality, gesture/voice recognition and eye tracking, neurometrics) to measure the user's cognitive and emotional states and create communication paths. At the same time with the use of Internet of Things (IoT) sensors will be able to detect environmental conditions. The purpose is to promote healthy habits of users in their working environment and daily living activities in order to improve their working and living conditions.

4.1.3 Relation to the objectives of the project

By studying the profile of the >50 (year old) workers and the working place requirements in three different working environments (Office, Driving and Manufacturing), both profiles (user and environment) will be considered. Information obtained will be used for the creation of interventions that will lead to healthy ageing inside and outside the working environment.

WorkingAge will test and validate an integrated solution that will learn the user's behaviour, health data and preferences and through continue data collection and analysis will interact naturally with the user. This innovative system will provide workers assistance in their everyday routine in the form of reminders, risks avoidance and recommendations. In this way the WorkingAge project will create a sustainable and scalable product that will empower their user's easing their life by attenuating the impact of aging in their autonomy, work conditions, health and well-being.

4.1.4 Processing of the data and consent form

For each In-Company test as described in article 4.1.6.2, the designated pilot partner will be Data Controller of the personal data included in the associated consent forms. The designated pilot partner is responsible for the provision and collection of consent forms prior to any In-Company testing. The consent form will be provided to each person concerned, containing information about the project, all the data processed during the In-Company experimental testing and a list of the associated Data Controllers, according to the Consent Form template appended to the Data Sharing Agreement. In particular, the designated pilot partner will deal with the following tasks:

- Consent forms provision and collection in the pilot site.
- Consent forms validation and sending to BrainSigns.
- Contact point for the users and the company.

The role of the pilot partner in each In-Company site will be covered by an employee of the partner allocated to the specific pilot site. The matrix with the Controllers and the associated Data Processors of the data included in the consent forms will be specified in the Data Sharing Agreement.

The consent forms transfer will be handled according to the following steps:

- Validation of the number of consent forms by the Controller of the specific pilot site and transfer of the summary, including the consent forms number, to BrainSigns.
- Transfer of the consent forms via insured courier (or by email if possible to destroy the paper format) by the pilot partner to BrainSigns.
- Validation of the consent forms received by BrainSigns.
- Consent forms storing a secure closet by BrainSigns in such a way as to ensure the protection and confidentiality of the personal data included in the forms for 10 years.

The consent forms related to the In-Lab experimental testing will be directly administered by the partner who will run the tests in his own laboratory, who will be the sole Controllers of the associated personal data and of the processing of such data in accordance with the applicable regulations and this Data Management Plan.

4.1.5 The types and formats of data generated/collected

All the data are stored in digital way and the different types are defined as follows:

4.1.5.1 Raw data

Raw data is data produced by all the devices used in the measurements: EEG (Electroencephalography), ECG (Electrocardiography), GSR (Galvanic Skin Response), Camera (video and images), Voice Recognition, Movement and Pose Recognition.

4.1.5.2 Online pre-processing

Online pre-processing is the action of checking the quality and/or decoding and/or modifying raw-data before storing or uploading them (e.g. by filtering techniques).

4.1.5.3 Online markers / annotation / indicators calculation

Thanks to sensors data and online calculations one can identify specific events (e.g. interruptions during the working task, etc.) and/or compute various indicators (e.g. performance indicators).

4.1.5.4 Offline markers / annotation / indicators calculation

Thanks to observers and/or offline calculations one can retrieve contextual information and/or identify specific events (e.g. unsafe situations, events complex to automatically identify online), and/or various indicators. Such process can be used to enrich and/or manually/automatically annotate or mark information in the database.

4.1.5.5 Offline data acquisition

Some data are acquired using either questionnaires or interviews that are potentially supported by markers and/or annotation data. Such data (sometimes called subjective data) can be stored in raw form (audio-visual recording or scanned documents), or encoded form. Moreover, it is possible that data will be acquired offline, deriving from service providers (e.g. weather forecast).

4.1.5.6 WorkingAge database

The WorkingAge database will consist of data collected during studies (online / offline), plus markers / annotations / indicators (online / offline). The project database will be organized in directories: each partner could use a directory in which it stores the different data acquired types. All the data stored in the database will be encrypted and each dataset will be accessible only to the partner who acquired the dataset and to other partners who own the secondary decryption key.

4.1.6 Data sources

In this section, all the sources of data are briefly discussed. The data will be generated by two types of test (*In-Lab* phase, and *In-Company* phase) in three different time-scales (single test, week test, long-term test).

It is noted that D2.5 "Field Test Strategy" and D2.6 "Intervention Protocol" will describe the tests with more detail, which may introduce some modifications.

4.1.6.1 In-LAB Phase

4.1.6.1.1 Single Tests

Experiments will be performed with one individual in a single occasion. Single tests will run in two sessions and two series of these tests will be implemented. These tests will be performed with up to 90 individuals. They will involve the analysis of in-depth aspects and validity of the intervention focusing on user expectation, usability and validity. Users of these tests will not have age requirements (only gender and/or health requirements) and will not be rewarded.

In-LAB tests will be performed in parallel with the development of three modules of the WA system, namely WP4, WP5 and WP6. The aim of these tests is to verify the functionality of each element of the WA system, irrespective of its effectiveness, which will be tested in the second set of tests described hereinafter. Researchers and students from the responsible partners will be involved for testing the measure, teach and adapt modules, whereas tests for the middleware will consist mainly in software tests to verify the communication among the elements of the WA system. Preliminary in-lab tests aim at verifying that the different modules are able to detect mental strain and monitor user's interaction with the system and the validation of the technical functions and the identification of software bugs of the offline and online training system. Therefore, users will be asked to carry out representative tasks with the developed training system. Three types of activities will be included in this type of tests:

"Offline" assessment, consisting in questionnaires regarding demographic questions, or tests for perceptive, cognitive or motoric capabilities. Moreover, skills and constitutional characteristics will be queried by questioning.

Real-time measurements consist in measuring physiological indicators for mental strain, such as pupil diameter, blinking rate, skin conductance, cerebral activity, body temperature, and heart rate. Other measurements to create HCI interactions will also be tested.

Performance indicators will be tracked, e.g. time for decisions, executions step for the task, mistakes, and redundancies.

For these tests, users recruited by each organization developing a module will interact with the system: UCAM for facial expression analysis and recognition, EXO for gesture recognition, RWTH for eye tracking, ITCL for body pose recognition, AUD and POLIMI for voice and BS for EEG, ECG.

4.1.6.2 In-Company Phase

At the moment of writing, the pilot tests are planned to be performed in Spain, by end-user's organizations Grupo Antolin, Mutua in Spain and in a tele-working context; led by INTRAS. The consortium will point to reach a multi-site design, which will allow the evaluation of the WA system in different social and cultural company contexts. The variety of partners' profiles will allow the consortium to test the WA solution in heterogeneous environments: some tests will be more focused on the company dimension involving occupational health and safety

professionals or human resources managers, while others will address the worker's environments with the support of ICT or organizational departments.

Pilot application will consist of the following phases: (i) protocol design, (ii) analysis of the pilot study with sample size considerations, (iii) pilot applications, (iv) assessment of results. The research body of the consortium will focus this pilot application to seek the potential mechanism of efficacy for a new intervention and investigate those indicators that are triggering the aforementioned intervention. The selection of the sample sizes for the WA project includes judgement- and aims-specific considerations, but also practical feasibility that leads to proper conclusions and interventions. The inclusion criteria for the tests will be being healthy age 50+ and exclusion criteria having neuropsychiatric disorders or addiction problems.

4.1.6.2.1 Single Tests

Experiments will be performed with one individual in a single occasion. These tests will be used to fine-tune the subsystems for the users that will perform the week and long-term tests.

These tests will aim to assess reliably the psychological, physical, cognitive and social health status in the presence of an occupational health specialist by means of the HCI services. This experiment should be done with a large group of 30 subjects (10 for each use case) from the total 90, and would be preceded by development of the different assessment methodologies. These will include information from existing renowned tests, such as: quality of life (WHOQOL-BREF) and activities of daily living (ADCS-MCI-ADL), reduction in health resource consumption (EQ-5D), Mini-Nutritional Assessment (MNA); Health-related quality of life (HRQOL), Life's Simple 7 metric., EQ5, ESM, PHQ, GAD score, test of executive functioning, PAST, fluency tests, long-term memory tests working memory and Lubben Social Network Scale. These methodologies will be tested with questionnaires, speech, or AR interaction.

Other tests may be added, according to the decisions of the specialists. Performance should be compared with questionnaires and other tests managed by a trained specialist (external validity). Additionally, test-retest reliability should be assessed.

4.1.6.2.2 Long-Term Tests

This test type will assess the ultimate goal of prevention and monitoring on a long-range time scale, Up to 90 individuals will be monitored for about a year towards the end of the project. Such a last testing session will also investigate issues and benefits that may arise with long-term usage without the interference of more controlled testing conditions and at the same time test adherence and compliance. Good predictions and compile advice on how to further pursue this objective in future research and development will be included in the final report. There will also be a follow-up after 6 months to see whether the technology is still used (reflecting sustainability). Users will be rewarded with the equipment needed for the experiment. These users will include the week tests users and new users performing the questionnaires of the single tests to fine tune the system.

In order to test the adherence rate of the solution 90 users (30 per use case) will have to use the complete solution for a long period of time (1 year). Participants' average weekly compliance rate will be calculated. Tests for Dropout and Compliance; TAM will also be considered for evaluation. The following Key-Point Indicators will be covered: i) reported average weekly compliance of the indications; ii) Use of the networks to report improvement, iii) attrition rate.

A compendium of tools series of testing for the assessment of the physical, psychosocial, working and health wellbeing of the worker in the context of primary prevention will take place during the year.

The evaluation methodology will be user centred and will describe a series of Key Performance Indicators (KPI) supported by the knowledge and input of the parallel research. This evaluation will be supported on the evidence exposed during the validation with real users.

4.2 FAIR Data

In general terms, research data generated in the WorkingAge project are – in as far as possible – "FAIR", that is findable, accessible, interoperable and re-usable.

4.2.1 Findability - Making data findable, including provisions for metadata

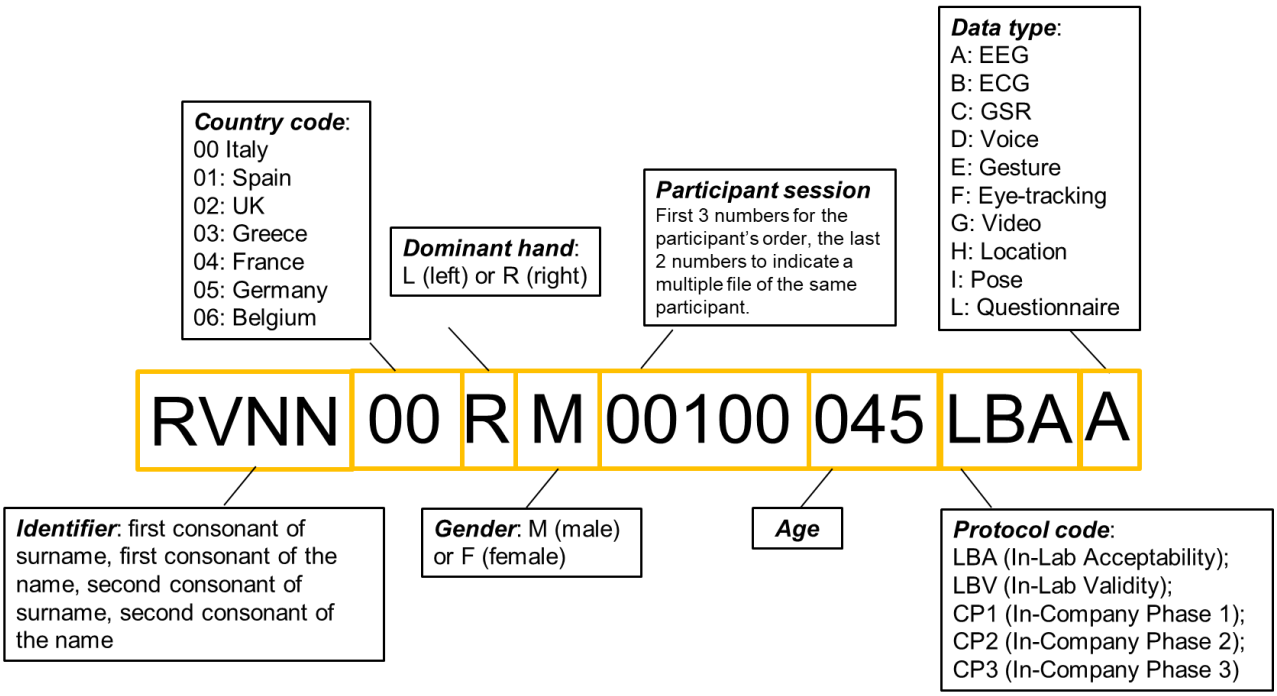
Publications are provided with bibliographic metadata (in accordance with the guidelines). Unique and persistent identifiers are used (such as Digital Object Identifiers - DOI), when possible also applying existing standards (such as ORCID for contributor identifiers). As per the European Commission guidelines, bibliographic metadata that identify the deposited publication are in a standard format and include the following:

- The terms ["European Union (EU)" & "Horizon 2020"].
- The name of the action, acronym and grant number.
- The publication date, the length of the embargo period (if applicable) and a persistent identifier.

Datasets are provided with appropriate machine-readable metadata (see paragraph 4.2.3) and keywords are provided for all type of data.

4.2.1.1 Naming conventions and versioning

Files are named according to their content to ease their identification with the project, following this format:



- Identifier
- Country code, e.g. 00 for Italy, 01 for Spain, 02 for UK (eventually we could include also the partner code).
- Dominant hand, R for right handed or L for left handed.
- Gender, M for male or F for female.
- Participant order.
- Age.
- Protocol code, e.g. LBA for In-LAB Acceptability.
- Data Type, e.g. A for EEG data, B for ECG data, C for GSR data.

The purpose of the proposed naming convention consists in having a common standard to univocally identify the participants' data during the different analyses. The metadata proposed above will be linked to a random hash.

Each partner will keep the link between the hash and the participant's identity on his side, in particular it will be stored by the Data Controller. BrainSigns, as Data Manager of the project, will receive only the anonymous data label containing the partner's name and the participant's order. An example is reported below:

Mapping on Data Controller's Side		Label uploaded on server (BrainSigns)
RVNN03RM0001045LBAE	EX001	EX001

4.2.2 Accessibility – Making data openly accessible

Data and related documentation are made available depositing them in the repository of choice (Zenodo), together with the publications, and are accessible free of charge for any user. All the experimental data will be allocated to Zenodo repository will be anonymous. No personal or pseudonymized data will be published on Zenodo repository**. Zenodo is a repository built by CERN, within the**

OpenAIRE project, with the aim of supporting the EC's Open Data policy by providing a set of tools for funded research. Zenodo provides tools to deposit publications and related data and to link them. Any needed restriction in access to the data is evaluated before final publication, in accordance with ethical aspects (conducting research with humans and children) and with protection of personal data.

All the consent forms related to the WorkingAge activities will explicitly indicate that the pseudonymized dataset will be published on a public repository. In case of privacy issues, Zenodo repository allows the publisher to restrict the data access, asking for the data owner approval before downloading them.

4.2.3 Interoperability - Making data interoperable

Metadata models were evaluated among the ones available in the Metadata Standards Directory.

Dublin Core standard (Table 1) was selected to add metadata to each of the datasets identified in sub-section 4.1.

Table 1 – DC Metadata Element Set

Term name	**contributor**
URL	http://purl.org/dc/elements/1.1/contributor
Label	Contributor
Definition	An entity responsible for making contributions to the resource
Comment	Examples of a Contributor include a person, an organization, or a service. Typically, the name of a Contributor should be used to indicate the entity
Term name	**coverage**
URL	http://purl.org/dc/elements/1.1/coverage
Label	Coverage
Definition	The spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant
Comment	Spatial topic and spatial applicability may be a named place or a location specified by its geographic coordinates. Temporal topic may be a named period, date, or date range. A jurisdiction may be a named administrative entity or a geographic place to which the resource applies. Recommended best practice is to use a controlled vocabulary such as the Thesaurus of Geographic Names [TGN]. Where appropriate, named places or time periods can be used in preference to numeric identifiers such as sets of coordinates or date ranges
References	http://www.getty.edu/research/tools/vocabulary/tgn/index.html
Term name	**creator**
URL	http://purl.org/dc/elements/1.1/creator
Label	Creator
Definition	An entity primarily responsible for making the resource

Comment	Examples of a Creator include a person, an organization, or a service. Typically, the name of a Creator should be used to indicate the entity
Term name	**date**
URL	http://purl.org/dc/elements/1.1/date
Label	Date
Definition	A point or period of time associated with an event in the lifecycle of the resource
Comment	Date may be used to express temporal information at any level of granularity. Recommended best practice is to use an encoding scheme, such as the W3CDTF profile of ISO 8601 [W3CDTF]
References	http://www.w3.org/TR/NOTE-datetime
Term name	**description**
URL	http://purl.org/dc/elements/1.1/description
Label	Description
Definition	An account of the resource
Comment	Description may include but is not limited to: an abstract, a table of contents, a graphical representation, or a free-text account of the resource
Term name	**format**
URL	http://purl.org/dc/elements/1.1/format
Label	Format
Definition	The file format, physical medium, or dimensions of the resource
Comment	Examples of dimensions include size and duration. Recommended best practice is to use a controlled vocabulary such as the list of Internet Media Types [MIME]
References	http://www.iana.org/assignments/media-types/
Term name	**identifier**
URL	http://purl.org/dc/elements/1.1/identifier
Label	Identifier
Definition	An unambiguous reference to the resource within a given context
Comment	Recommended best practice is to identify the resource by means of a string conforming to a formal identification system
Term name	**language**
URL	http://purl.org/dc/elements/1.1/language
Label	Language
Definition	A language of the resource.
Comment	Recommended best practice is to use a controlled vocabulary such as RFC 4646 [RFC4646].
References	http://www.ietf.org/rfc/rfc4646.txt
Term name	**publisher**
URL	http://purl.org/dc/elements/1.1/publisher
Label	Publisher
Definition	An entity responsible for making the resource available.
Comment	Examples of a Publisher include a person, an organization, or a service. Typically, the name of a Publisher should be used to indicate the entity.

Term name	**relation**
URL	http://purl.org/dc/elements/1.1/relation
Label	Relation
Definition	A related resource.
Comment	Recommended best practice is to identify the related resource by means of a string conforming to a formal identification system.
Term name	**rights**
URL	http://purl.org/dc/elements/1.1/rights
Label	Rights
Definition	Information about rights held in and over the resource.
Comment	Typically, rights information includes a statement about various property rights associated with the resource, including intellectual property rights.
Term name	**source**
URL	http://purl.org/dc/elements/1.1/source
Label	Source
Definition	A related resource from which the described resource is derived.
Comment	The described resource may be derived from the related resource in whole or in part. Recommended best practice is to identify the related resource by means of a string conforming to a formal identification system.
Term name	**subject**
URL	http://purl.org/dc/elements/1.1/subject
Label	Subject
Definition	The topic of the resource.
Comment	Typically, the subject will be represented using keywords, key phrases, or classification codes. Recommended best practice is to use a controlled vocabulary.
Term name	**title**
URL	http://purl.org/dc/elements/1.1/title
Label	Title
Definition	A name given to the resource.
Comment	Typically, a Title will be a name by which the resource is formally known.
Term name	**type**
URL	http://purl.org/dc/elements/1.1/type
Label	Type
Definition	The nature or genre of the resource.
Comment	Recommended best practice is to use a controlled vocabulary such as the DCMI Type Vocabulary [DCMITYPE]. To describe the file format, physical medium, or dimensions of the resource, use the Format element.
References	http://dublincore.org/documents/dcmi-type-vocabulary/

4.2.4 Data re-use and licensing

Publications and underlined data will be made available at the end of each experimental phase, once all data are collected and analysed. All the data indicated as Open Data will be made available for re-use after the end of the

project. No personal or pseudonymized data will be published on Zenodo repository. The licences for publications and related data will be defined in the final version of this plan, based on the final data, in order to verify compliance with personal data protection regulations and the ethical approval process results.

4.3 Allocation of resources

Costs related to open-access to research data in Horizon 2020 are eligible for reimbursement under the conditions defined in the H2020 Grant Agreement [6.2 D.3], but also other articles relevant for the cost category chosen. Costs cannot be claimed retrospectively. Project beneficiaries will be responsible for applying for reimbursement for costs related to making data accessible to others beyond the consortium.

4.4 Data Security

The adopted software stack will involve a central repository, hosted by BrainSigns, where only encrypted data will reside. The repository will be implemented by means of the FreeNAS software stack, and the remote access will be managed via the NextCloud remote data storage server and clients. The logical volumes on the server hosted by BrainSigns on which the Project data will be stored will be protected by whole volume encryption employing the embedded encryption features of the ZFS filesystem.

The data on the central repository will be accessed by the project partners which will be endowed with a per partner asymmetric key pair and will thus be able to decrypt only the data they are entitled to access to. Data are expected to be encrypted as soon as possible on the collection endpoint, following a pseudonymization procedure which will remove all non-essential information for the data processing. The mapping between pseudonyms and actual identities, required to implement the right to data deletion which can be exercised in any moment by the data subjects, will be preserved by each data collector and will be visible to the data collector alone. The data collection endpoints should avoid any permanent storage of plaintext data, performing the pseudonymization and encryption on the fly as much as possible.

All partners will perform data elaboration storing the intermediate processed data on encrypted volumes on their own machines to minimize the likelihood of an accidental data breach.

The encrypted data interchange format chosen for the project is OpenPGP, as it is an open standard, widely interoperable, and encryption/decryption software is available both with a user-friendly GUI and as a library for machine to machine communication, on the most common operating systems.

All the connections to the infrastructure kept by BrainSigns will be protected by standard TLS encryption. The X.509 certificates to enable TLS encrypted communications will be obtained free of charge from the Let's Encrypt Certification Authority.

The access control and account management for the central repository will be done by BrainSigns, enforcing sound login password policies.

All research data produced during WorkingAge will be stored in dedicated hard drive and in separated Network Attached Storage (NAS), and for backup purpose.

4.4.1 Pseudonymization Process at Local level

Each raw data collected during the WorkingAge project by the sensors will be associated to a unique numeric identifier. The per-user data resulting from the analyses and processing performed by each partner must be labelled with a unique and randomly chosen identifier specific for the user at hand. Data results in the platform are not associated with user's identity: starting from the raw data, the partners will process the data and extract high level information.

The name of the research participant appears on the consent forms. All data in the platform is pseudonymized by assigning an anonymized user code to each participant.

Information of the association between the code and the participant's identity is stored in a specific Excel file, owned by each Data Controller (corresponding to each partner involved in the data collection). The Excel sheet is secured through 256-bit AES (Advanced Encryption Security) codification and password. The Data Controller is responsible for the Excel sheet security. Participant's data and platform's users' conversion of the experimental location are stored by the centre following the legal requirements of the country.

The raw data collected during the WorkingAge project will be encrypted by the partner who collected them. A copy of the encrypted data will be released only to the second partners who declared the willingness to access them.

All data collected during the study through the platform is associated to the platform user. That means that all shared reports, results, internal communications and external publications do not contain any personal data of the participant.

4.4.2 Data maintenance and storage at central WA level

4.4.2.1 Data access in freeNAS platform

Research and research-related personal data collected are encrypted and stored in the systems of the organization where the data were produced. Personal Data is only accessible by Data Controller of each organization.

Access is restricted to each participant, under their fictional pseudo-identity, and to the members of the Data Controller organization and WorkingAge research team.

Each access to the research data is properly logged with the information of the authorized user who requests access to the data.

4.4.2.2 Process of backups of freeNAS platform

Each partner will send the pseudonymized and encrypted dataset to the server through the freeNAS platform, after the experimental session conclusion. Each

partner will not transmit the primary decryption key. The partner's Data Controller will be responsible for the decryption key security.

4.4.3 Procedure in case of data breach

The data breach consists in a accidental or illicit loss, modification, destruction or disclosure of the personal data. In case of data breach, the Data Controller responsible for the leaked data must inform the National Data Protection Authority within 48 hours since it has been established the data breach. Moreover, the Data Controller responsible for the leaked data, according to the National Data Protection Authority provisions, must notify the data breach to all the subjects concerned.

4.5 Ethical aspects

The project will conform to privacy and confidentiality guidance from the EU guidance notes, "Data protection and privacy ethical guidelines" and GDPR. The following ethical issues have been considered in the WA project and will be explained in this point related to each country involved:

- Notification/Authorizations of the Tests
- Data processing in the Cloud
- Data Controllers
- Video recording

The ethical aspects of the research generating the scientific data of the project are covered in the following deliverables, also taking into consideration the European Commission Ethics Summary Report for the project.

- D 7.1 - Ethical and Legal report.
- D 7.2 - Security and Privacy Model.

The correspondence between the participant's code, described in paragraph 4.2.1, and the participant's identity is held in a suitably encrypted table held on a secure computer at the Data Controller's premises. No reference about the participant's code will be written on the respective consent form.

The ethics committee will include one member for each partner of the consortium. This member will act also as the contact point for data privacy issues and compliance to the data management plan. Contacts of DPOs of data collectors will be included in the consent forms as per the Grant Agreement.