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## Standard Version 1

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## Table of Contents

<b>TABLE OF CONTENTS</b> .....	<b>4</b>
<b>LIST OF FIGURES</b> .....	<b>4</b>
<b>LIST OF TABLES</b> .....	<b>4</b>
<b>ABBREVIATIONS</b> .....	<b>5</b>
<b>1 STANDARD VERSION 0.1</b> .....	<b>6</b>
1.1 INTRODUCTION.....	6
1.2 SCOPE OF THIS DOCUMENT.....	8
1.3 PART 2. LIVING LAB BUSINESS MODEL (LLBM).....	8
1.3.1 <i>Customer segments in Health and Wellbeing Living Labs</i> .....	8
1.4 PART 5. R&D SERVICES .....	10
1.4.1 <i>Access to data</i> .....	11
1.4.2 <i>Intake and matching</i> .....	11
1.4.3 <i>Capacity building</i> .....	12
1.4.4 <i>Clinical trials</i> .....	12
1.4.5 <i>Co-creation session</i> .....	13
1.4.6 <i>Competitor and market analysis and benchmarking</i> .....	14
1.4.7 <i>Concept and proof-of-concept tests – concept feasibility study</i> .....	14
1.4.8 <i>Equipment and facility rental service</i> .....	15
1.4.9 <i>Expert opinion, and advisory services</i> .....	15
1.4.10 <i>Foresighting (trends, weak signals and wild cards)</i> .....	16
1.4.11 <i>Temporary research funding</i> .....	16
1.4.12 <i>Grant writing and funding application support service</i> .....	16
1.4.13 <i>Idea selection and testing</i> .....	17
1.4.14 <i>Impact assessment and validation test</i> .....	17
1.4.15 <i>Innovation network orchestration</i> .....	18
1.4.16 <i>Large-scale real-life testing and piloting</i> .....	18
1.4.17 <i>Legal, regulation and safety standard support</i> .....	18
1.4.18 <i>Living lab project planning and management</i> .....	19
1.4.19 <i>Marketing and sales support</i> .....	19
1.4.20 <i>Panel management</i> .....	19
1.4.21 <i>Post-market surveillance and market acceptance testing</i> .....	20
1.4.22 <i>Prototyping test</i> .....	20
1.4.23 <i>Public procurement support services</i> .....	21
1.4.24 <i>Simulation test</i> .....	21
1.4.25 <i>Small-scale real-life testing and experimentation</i> .....	21
1.4.26 <i>Stakeholder (and partner) analysis and mapping</i> .....	22
1.4.27 <i>Usability testing</i> .....	22
1.5 PART 7B. DEVICES AND TECHNOLOGIES .....	23

## List of Figures

FIGURE 1 THE KEY ELEMENTS AND CONCEPTUAL OVERVIEW OF THE LIVING LAB MANAGEMENT SYSTEM.....	6
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## List of Tables

TABLE 8 RESEARCHERS EXPERTISE.....	8
TABLE 9 DEVICES AND TECHNOLOGIES PROVIDED BY LIVING LABS .....	23

## Abbreviations

WP	Work Package
LL	Living Lab

PENDING APPROVAL BY REA

## 1 Standard Version 0.1

The current report is the first public version of Living Labs Standard. This Standard is considered Version 0.1 as the information included in this standard have not yet undergone a full cycle of Harmonization. This Standard depicts the expertise and the feedback gathered only from VITALISE consortium Living Labs. This Section is structured in such a way so that it can be separated from the rest of the deliverable and published in the VITALISE website.

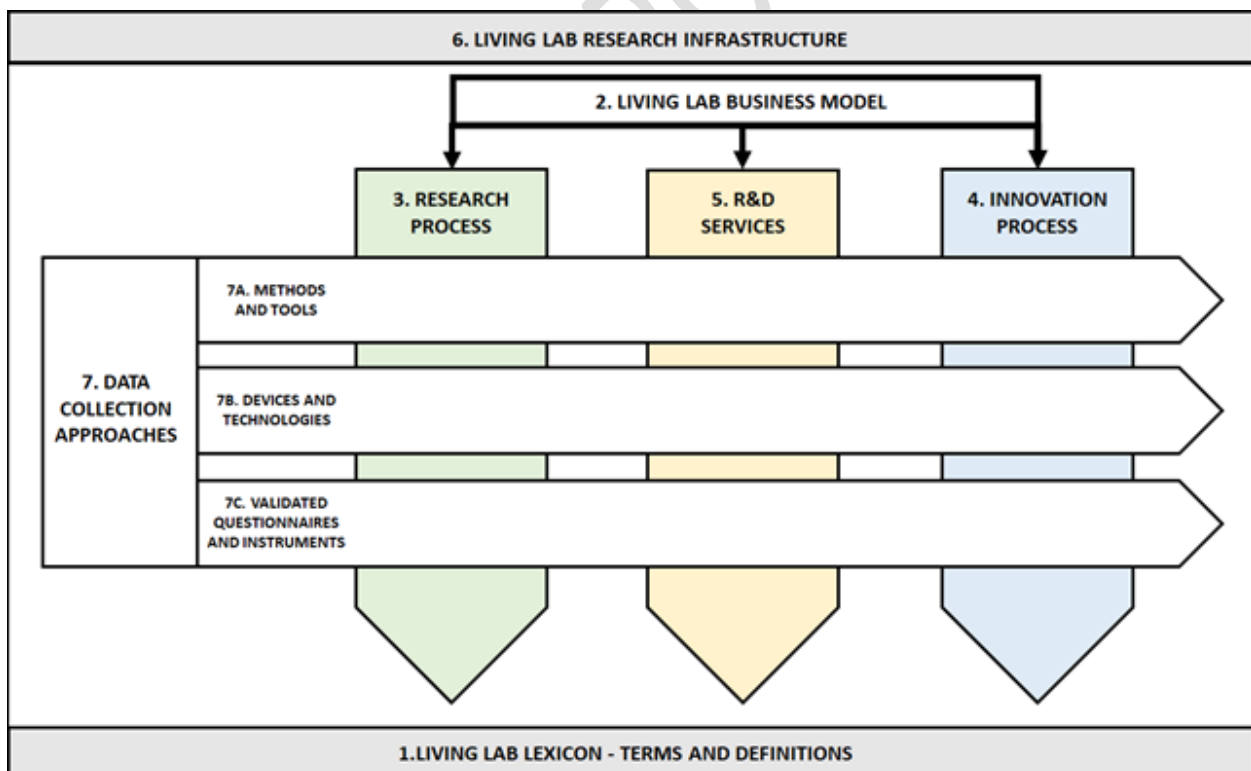
### 1.1 Introduction

The European Network of Living Labs (ENoLL) – an international non-profit association promoting and enhancing user-driven innovation ecosystem defines living lab is “a user-centred, open innovation ecosystems based on systematic user co-creation approach, integrating research and innovation processes in real life communities and settings” (<https://enoll.org/about-us/>).

The aim of this Living Lab standard is to guide Living Lab operators and researchers to execute, develop and maintain a harmonized framework for systematic Living Lab practices. Establishing Living Lab management system, they will

1. promote the expansion and growth of Living Lab movement beyond current actors and customers,
2. stimulate cross-organization and transnational research collaboration,
3. enable data sharing and comparison of the research results,
4. increase research quality, and
5. define a common terminology and language among researchers and practitioners.

The Figure 3 defines the conceptual overview of the living lab management system presented in this standard document.



**Figure 1 The key elements and conceptual overview of the living lab management system**

The following key elements will concern the Living Lab community and will be further assessed in the next Standard Version.

**1. Living Lab Lexicon (LLL) – terms and definitions:** LLL introduces, lists and shortly defines a comprehensive catalogue of terms associated and included in different parts of the living lab

standard (i.e. 2 to 9). The LLL is grounded on Wikipedia type of user interface, where definitions including overlapping terminology, will enable quick jumping between different descriptions and to in-depth descriptions in other standard sections. LLL will help to discuss living lab related issues among the different stakeholder, who currently are using varying terminology.

**2. Living Lab Business Model (LLBM):** *“A business model describes the rationale of how an organization creates, delivers, and captures value”* (Osterwalder and Pigneur, 2010). LLBM part is grounded on Business Model Canvas (BMC) approach (Ibid.), which consists of the following nine different elements. (1) key activities, (2) key resources, (3) partner network, (4) value proposition, (5) customer segments, (6) channels, (7) customer relationships, (8) cost structure and (9) revenue streams. The purpose of the LLBM part is to identify different attributes associated with each nine BMC element. Having a unified way to describe LLBM, enables quantitative business model comparison between different living labs as well as open ups possibilities to track changes in business model strategies.

**3. Research process:** Living lab research process part focuses on defining the key steps to execute and define a living lab research methodology. The part is comprised of (1) a common template to define research protocol, (2) ethical and data management plans, (3) participant recruitment procedures, (4) infrastructure selection procedure, (5) data collection procedures, (6) data analysis and comparison practices and (7) fair data practices for opening data. Each phase consists of aim, outcome and maturity level description. Furthermore, research process phases are interlinked other living lab standard parts in order to identify which other items are relevant for each research process phase. Having a standard way to describe living lab research design, helps developing a unified research methodology, which enables a robust results comparison a cross the different studies and increases the research quality.

**4. Innovation process:** Living lab innovation process part focuses on defining in an unambiguous way, the different innovation management process phases which are or can be covered during the living lab data collection phase. This part defines an iterative and agile user-centered innovation and design process and align the phases with Technology Readiness Level (TRL) concept. TRL is widely adopted concept to describe developed solution maturity level. Respectively to research process, different innovation process phases are interlinked other living lab standard parts in order to identify which of the other items are relevant for each process phase. Each phase key activities, aim, methods, outcome and TRL maturity level description.

**5. R&D services:** R&D services part defines a group of common R&D services, which a Living Lab can offer to its' customers during the different Living Lab R&D process phases. Each service combines one or more data collection approaches or other activities or parts of the Living Lab standard, needed to accomplish living lab R&D project as whole or part of it. Each service description defines the type of service and additional details related to service delivery such as technical and functional quality. In longer run, the aim is to define the Minimum Acceptable Service Level for each service type in order ensure service quality across the different living labs.

**6. Living lab Research Infrastructure (RI):** This part provides a classification schema and definitions for different types of living lab infrastructures. In regulation No 1291/2013, European Union Parliament and Council of the European Union (2013) defines RIs as “facilities, resources and services that are used by the research communities to conduct research and foster innovation in their fields”. The definitions and descriptions for (1) single-sited, (2) distributed, (3) virtual and (4) mobile living lab facilities are provided.

**7. Data collection approaches.** Data collection approaches consists of the following three sub-parts: (1) methods and tools, (2) devices and technologies and (3) validated questionnaires and instruments. This part provides a collection of practical data collection approaches, which can be combined in multiple variation when defining a living lab project research methodology. *7A Methods and tools* part identifies and describes the different types of specific research methods, tools, and practices, which can be used for data collection during a living lab project. Among these are e.g. interviews, workshops and surveys. In the future, the standard will used for sharing the best practices and defining the appropriate ways to utilize the particular method in different living research contexts.

*7B Devices and technologies* defines a commonly used technological solutions to collect and analyse living lab research data. Correspondingly to 7A methods and devices, the standard will used for sharing the best practices and defining the appropriate ways to utilize the particular technology in a research setting. *7C. Validated questionnaires and instrument* consists of a bunch of scientifically validated surveys, scales, interventions or similar, which are known to reliable measure certain phenomenon. Standard will promote especially questionnaires and instrument which are multilingual and freely available. If multiple instruments are available to measure same phenomenon, standard will make recommendation to make selections.

The structure followed in this deliverable includes information about the proposed title and description of the work along with Key characteristics, Pre-tasks: Participants' role, Objectives, Methods and Tools/online tools: It is common that a set of information is not yet identified for each service that is why some categories are removed from specific services.

To conclude, it is important notice that the above described conceptual overview and the included key elements of the living lab management system are preliminary concepts. Therefore, the names, details and concept itself can be changed in follow-up versions.

## 1.2 Scope of this document

This is the first draft version of the Health and Wellbeing Living Labs Standard (Version 0.1). The structure and content of this document will be continuously improving and a new version will be released every 6 months. The information presented are a result of an analysis performed in the VITALISE project and more details about the analysis can be found in the Deliverables of the project. The rest of the document presents:

- **PART 2. Living lab business model:** The identified end users that can use the R&D services provided by Health and Wellbeing Living Labs
- **PART 5. R&D Services:** A list of R&D services provided by Health and Wellbeing Living Labs
- **PART 7A. Methods and tools:** In this standard version identified methods and tools are presented as a part of R&D service descriptions
- **PART 7B. Devices and technologies:** In this standard version identified devices and technologies are presented as a part of R&D service descriptions

## 1.3 PART 2. Living Lab Business Model (LLBM)

*"A business model describes the rationale of how an organization creates, delivers, and captures value"* (Osterwalder and Pigneur, 2010). LLBM part is grounded on Business Model Canvas (BMC) approach (Ibid.), which consists of the following nine different elements. (1) key activities, (2) key resources, (3) partner network, (4) value proposition, (5) customer segments, (6) channels, (7) customer relationships, (8) cost structure and (9) revenue streams. The living lab standard defines common attributes associated with each nine BMC element.

This standard version focuses on defining customer segments in Health and Wellbeing Living Labs.

### 1.3.1 Customer segments in Health and Wellbeing Living Labs

Below you can find the identified target-users for the services, methods and tools that Health and Wellbeing Living Labs provide.

Table 1 Researchers expertise

Researcher expertise	Brief use case description
Policy Makers	Studying the impact of new service models or new collaboration models in healthcare, designing or improving policies, gathering requirements for improving health and wellbeing of citizens, co-creation of research methodologies for policy making



Experts in communication studies	Defining written, oral, visual and digital communication within a certain workplace. Evaluating (multi professional) healthcare team collaboration, communication and debriefing in various healthcare situations in simulated environments (especially in Simulation lab)
Computer/Technology Scientists	Developing systems/tools/ technologies, testing and evaluating an ICT tool, prototype and real-life testing, computer vision & AI, Virtual Reality & Augmented Reality, Cybersecurity
(Clinical, social, developmental, neuro-) Psychologists	Studying the behaviour and the mental wellbeing of participants, conducting psychometrics evaluation and real-life setting experimentation/observation/real life testing
Social workers/researchers	Conducting an investigation in accordance with the scientific methods and tools, studying the impact of new care models and/or care innovations on society, developing models for a caring and inclusive society
Researchers with clinical expertise	(Doctors, nurses, healthcare workers, specialists, physiotherapists etc.), conducting research of healthcare services and practices, research on symptomatology or epidemiology of a disease, analysis of clinical effects of research performed in the study, e.g; via real life testing
Experts in UX research and assessment	Developing the process for user experience design (UXD, UED, or XD) supporting user behavior through usability, usefulness, and desirability provided in the interaction with a product or service, addressing all aspects as perceived by users with a focus on the quality of the user experience. Studying and experimenting the best practices for UI/UX and evaluating user's experience in different situations and while using different tools
Experts in sport science	Experimenting novel training methods, and their effectiveness in various dimensions such as safety, engagement, and physical capabilities. Studying the impact of physical movements in various functions and wellbeing features
Experts in rehabilitation (physical, cognitive)	Physiology, physiotherapy, occupational health research, rehabilitation and prevention. Cognitive diseases assistive technology, neuromuscular rehabilitation assistive technology
Experts in performing arts	Creative health improvement (e.g. for cognitive decline) through music and dance (example: redesigning public spaces into healthy spaces: test and validate Smart methodologies, products and services through folk dance)
Business developers	Studying the product-market fit, matching a solution with a societal need, learning about the user acceptance of products and services, as well as about potential products to develop, willingness to pay, business model and ideal route to market

Pedagogues/educators	Evaluating different pedagogical approaches and their impact learning performance (especially in Simulation lab)
Experts in applied economics	Evaluating cost and performance in different healthcare processes, situations and public health
Experts in ergonomics and safety	Implementation and validation of ergonomic technologies/services to support workers and system performance, promoting ergonomics in working environments, improving both health/well-being and productivity, while avoiding occupational hazards
Citizen Scientists / users as co-researchers	User empowerment, training, design, analysis and implementation of strategies and methodologies for user engagement and for raising awareness and generating citizen participation
Biomedical researchers	Studying biochemical and physiological functions, investigating how the human body works with the aim of finding new ways to improve health. Biomedical engineering knowledge (Home hospitalization, Transitional Care, Multifunctional interaction), as well as digital biomarkers analysis (e.g. for cognitive state)
Experts in accessibility Design	Validating accessible Architectonics and escape route models with VR experiment and real-life simulations
Neuroscientists	Focusing on the brain and its impact on behaviour and cognitive functions (cognitive neuroscience, EEG-based BMI research, protocol / paradigm testing, study framework evaluation)
Innovation and design management researchers	Ecosystem and innovation management research, social network analysis. Evaluating how health and wellbeing ecosystem operates between different actors at local, regional, national and international level, including also scaling and commercialization
Experts in organizational studies	Co-creation, experimentation, organizational research, experts by experience / peer support included. Evaluation how multistakeholder collaboration and co-creation is done and how effective it is. Evaluates experimentations and experimentation culture. How users are involved into these processes
Data Scientists	Collecting, analysing and interpreting digital data, such as data analytics in healthcare and digital patient recordings (how patient information recording process is managed and utilized during the intervention by using digital tools in simulated situations)

## 1.4 PART 5. R&D Services

R&D services part defines a group of common R&D services, which a Living Lab can offer to its' customers during the different Living Lab R&D process phases. Each service combines one or more data collection approaches or other activities, or parts of the Living Lab standard needed to accomplish a living lab R&D project as a whole or part of it. Each service description defines the type

of service and additional details related to service delivery such as technical and functional quality. Living lab R&D services are classified into the following categories:

1. Networking and capacity building
2. Project planning and management
3. Market and competitor intelligence services
4. Co-creation
5. Testing and validation
6. Advisory services
7. Marketing and sales support

It is noted that some of the services can be included in multiple categories

#### 1.4.1 Access to data

**Description:** Referring to service, which enables customers to access or retrieve data from one or more databases consisting of relevant data, based on mutual agreements respecting ethics and GDPR, which can be used for development or testing purposes.

**R&D service categories:** Market and competitor intelligence services

**Key characteristics in living lab context:**

- Usually 2 sources: already existing data, new data collected
- Data must be anonymized and encrypted
- Consent from participants may also be needed
- Type of data: demographics/personal data, health-clinical data (e.g., cognitive, treatment changes, physical performance, care to rehabilitation), measure data, sensors' data (brain activity)
- For open data, FAIR data principles should be followed
- Ethical approval and GDPR processes when needed

**Pre-tasks:**

- Create a data gathering database, specific parameters of improvement
- Define the accessibility of the database (public or limited access) and how it is collected (in an integrated way or occasional/ad hoc databases/infrastructures)
- It is, usually, needed a request that is passed to the responsible of databases

#### 1.4.2 Intake and matching

**Description:** During this service, the customer's (e.g., a company, SME, a start-up, a researcher) development and testing needs are clarified for the project planning purposes. It also includes the process of mapping the customer's needs and co-designing of the strategic planning in relation to the target/purpose of the project and living lab capabilities to offer the particular project.

**R&D service categories:** Project planning and management

**Key characteristics in living lab context:**

- Can be both open discussion or more focused
- Usually at the beginning of the research process
- Can be virtual/online or in person event
- Duration varies-30 minutes (very short from) to few hours or days. In most of the cases there are multiple meetings taking place/more than one contact
- Often multi-stakeholder approach: Researchers, clinicians, customers, students

**Participants' role:**

- Customers as co-creators

**Pre-tasks:**

- Discuss and understand who are the customers and what are their needs.
- Agree to a plan -usually it is made a document/contract- (set goals, explore the different services, engage the operational team
- Revise & follow-up activities with the customer

**Objectives**

- Make a project proposal/offer
- Make a project contract

**Named methods:**

Client's needs elicitation methodology, interview/focus group/questionnaires for defining the project and collecting the needs, co-design of the strategic planning in relation to the target/purpose of the project

**1.4.3 Capacity building**

**Description:** Training, knowledge sharing and awareness raising, site visits and event arrangement. Offering training for end-users and/or practitioners to improve their skills and knowledge about living lab approach, co-creation, iterative development and healthcare and wellbeing market. Stimulating knowledge sharing and awareness raising by publishing professional and scientific publications and arranging events, site visits and seminars.

**R&D service categories:** Networking and capacity building

**Key characteristics in living lab context:**

- The way of knowledge sharing and transfer depends on the project and on the purpose
- Use of short-term or long-term methods and courses
- Material can be both created for a purpose but also some available online

**Participants' role:**

- Service beneficiaries become trainees
- Living Labs can offer support for the design and facilitation of capacity building programs

**Methods:** Co-creation methodology, focus groups, training sessions (tech & non-tech), ethical training & legal in large scale settings, seminars, presentations, workshops, webinars, forums, websites and web-engines, events, site visits, publications, summer schools, degree program, methodological training, how to use new product

**1.4.4 Clinical trials**

**Description:** Clinical trials are experiments or observations done to evaluate the effectiveness and safety of new solution by monitoring its effects on large groups of people. Subjects are typically divided into two or more groups, one having "real treatment" by using the developed solution and the other group(s) using tried-and-true solution or not using any solution. The results are compared between the groups to evaluate the impacts.

**R&D service categories:** Testing and validation

**Key characteristics in living lab context:**

- Clinical trials are similar to impact assessment and validation test activities but follow more strict validation and approval process.

**Participants' role:**

- Customers as co-creators

### **Objectives**

- To find out if new solution is safe and effective
- Get official approval for new solution

### **Methods:**

- Has multiple phases and classes which depend on the developed solution

#### **1.4.5 Co-creation session**

**Description:** Workshop is a facilitated a group activity to find solutions for a specific problem by gathering ideas, solutions and insights from workshop participants while using variety of methods. Depending on the workshop focus, it may comprise ideation, concept development and testing. Typical duration for short workshop is from 45 minutes to 90 minutes, medium-length workshop from 90 minutes to 3 hours, and long-workshop from 3 hours to 1 day. The number of participants may vary depending on how many facilitators are available, and what kind of working methods are utilized. Typically, workshop facilitated by a single facilitator consist of six to eight persons. Number of participants are often even numbered to enable them to work in pairs.

**R&D service categories:** Co-creation

#### **Key characteristics in living lab context:**

- Fundamental features: Requires (1) facilitator(s), (2) interaction/is interactive, (3) iterative process
- Can be applied in almost all phases: e.g., ideation, concept creation/testing, prototyping, prototype testing
- Can be virtual/online or in person event
- It is a service but also a generic method
- Duration varies, but usually 2-3 hours
- Often multi-stakeholder approach: Researchers, clinicians, students (e.g., paediatric project, project on language and communication). Depending on the concept all actors of the quadruple helix are contacted, number of users depends also to the stakeholders. Engagement of different stakeholders can also be achieved by running series of sessions

#### **Participants' role:**

- In the beginning of the innovation process, involve the users as the creators
- If there is a product with higher TRL, a ready MVP is more like a focus group,
- Need finding session, focus group is more of an evaluation,

**Pre-tasks:** prepare session upfront with the sketches, if focus group - open questions (sent beforehand), workshop preparation template

#### **Objectives** (varies depending on researchers interest):

- Co-creation session: Finding solutions for a specific problem with or without prototypes or mock-ups. Co-creating the actual design, sketch interfaces, make the solution tangible, Drafting (prototypes, drawing, soft(adobe)), mockups
- Demo-session: specifically, setup to explain about the use of a prototype or market ready product and gather (first) feedback. Often done before launching a test.
- Business model session (broader, a service?): developing and defining a business model (e.g. potential customers, sales channels, distributors, value chain, the Willingness to Pay, revenue streams etc.

**Methods:** brainstorming, use simulations, group discussion / focus groups, Semi-structured focus group, survey, questionnaire

**Tools:** Projection walls, visual mockups, use tangible tools for prototyping (e.g. wearables), team groups, polling (tech); questionnaires, focus groups, idea generation techniques, post-it notes, creative supplies, art supplies,

**Online tools:** Online system for (idea generation platform, open), Teams meeting, Zoom with breakout rooms, Google meet, Miro whiteboard, Mural.co

#### 1.4.6 Competitor and market analysis and benchmarking

**Description:** Quantitative and qualitative methods are used to evaluate the size of the market both, in volume and in value (also known as market studies). Customer segments, buying patterns, competition, and the economic environment are defined to identify the regulations and the barriers to entry. Defining the market by listing and describing current, future, direct and indirect competitors and analysing their competitive offering (e.g., SWOT) and user experience. Comparing offerings by measuring the performance of the developed products, services, or processes against those, which are considered to be the best in the industry. Can consist also literature reviews to a search and evaluate of the available scientific or professional body of knowledge for the given subject or chosen topic area.

**R&D service categories:** Market and competitor intelligence services

**Participants' role:** Competitors or interested in collaborations, can be done by students or experts.

**Limitations:** The study is no longer than ca 10 pages and is limited in operational workload to max 3 days, could apply only if transposed to a clinical or community research context

**Objectives:**

- identify the “space” for innovation, not analysing only specific segments, but also looking for new opportunities
- analyse market acceptance, support scalability and transferability potential, focus can be domestic/international/global market,
- identify direct and/or indirect competitors, qualitative or quantitative description of the market, focus can also be in research context or innovation management practices

**Methods:** Desk research, acquiring the information from the experts in the field, following the market as a job profile/duty, the people working know specific segments/areas, bibliometric studies, literature reviews to a search and evaluate of the available scientific or professional body of knowledge for the given subject or chosen topic area, technology exploitation, market analysis, benchmarking, other methods combined with interview(s) with a leading reference organisation or expert(s), assessment of technologies, knowledge syntheses (systematic and scoping reviews), evaluations methods of intervention (ETMI method), workshops and sessions, measures of satisfaction of users

**Tools:** SWOT analysis, business model canvas, Innovation management standard (CEN/TS 16555 - covered 7 standards, after ISO 56002:2019)

#### 1.4.7 Concept and proof-of-concept tests – concept feasibility study

**Description:** Concept test is low cost and quick process in which high-level concept(s) is tested with real end-users via different methods such as interviews and surveys. In order to conduct concept test, preliminary concept description must exist in written or visual format, which is then communicated to the real end-users or experts. The main aim is to collect feedback for the initial concept proposal and its possible variations. Concept test can also include a feasibility study, which also covers technical, economic, legal, operational and scheduling issues relating the proposed concept. In all, concept-testing phase verifies if a concept has market interest, while feasibility study shows if the product or service based on concept can be developed. Collected feedback includes also improvement suggestions.

**R&D service categories:** Testing and validation

**Key characteristics in living lab context:**

- Core service in LL

**Participants' role:** two main actors (projects and companies), joint work among Living Labs and interested partners/stakeholders

**Process phase:** after concept co-creation

**Objectives:**

- verifies if a concept has market or research interest,
- testing early “prototypes” to get feedback for development, identify improvement suggestions,
- concept feasibility test focuses on verifying if concept can be technical/economically done (preliminary assessment),
- provides development recommendations based on user/patient/customer experience and needs, identify key measures to investigate in follow-up tests, personalized in the client need and varies case by case

**Methods:** survey, demo-session, interview, wizard of oz

**Tools:** paper prototype, visual dummies close to final (visual UI), visual VR can be used to test-multitasking (real work), long term evaluations, interviews, questionnaires,

**1.4.8 Equipment and facility rental service**

**Description:** Offering equipment, labs, spaces, human resources and other facilities for rent. Some Living Labs do this based on a win-to-win agreement where money does not change hand. Also, some Living Labs require research collaboration when renting.

**R&D service categories:** Networking and capacity building

**Key characteristics in living lab context:**

**Participants' role:** In some cases, researchers can visit the LL and use the provided facilities for free of charge

**Objectives:**

- Getting temporary human, space, technical or other facility resources,
- Enable research collaboration

**Methods:** Payment, research collaboration grounded on living lab resources

**Tools:** Simulation lab

**1.4.9 Expert opinion, and advisory services**

**Description:** Expert(s) who have long-standing practical and/or scientific experience in the field of enquiry provide(s) a well-founded written or oral answer for your questions, including the ethics domain/ ethics guidelines, and offer(s) advisory services on the use of specific equipment. Expert(s) are discussing ideas and problems from a different angle to respectfully challenge, test and refine ideas (e.g. as devil’s advocate looking for problems). Qualified and traceable arguments in favor of and against a specific position in an applied issue to support decision-making and development activities. Professional work is a paid service, but “consultation” can be a free of charge service. In most cases it is done by living lab on its own or hosting organization personnel.

**R&D service categories:** All categories

**Key characteristics in living lab context:**

- Typically consists of one-to-one relationship between the customer and the expert, but may include opinions from multiple experts.

- Internal or external experts (local, national and international experts)
- Multidisciplinary collaboration/Pool of experts

**Objectives:**

- Offer advice on UX or usability studies,
- consulting care solutions (ICT and devices), in specific/narrow fields in which living lab has experts (e.g., energy consumption calculations),
- consulting on consent and ethics requirement and processes,
- consulting technical solutions (ICT, medical and other devices, sensors, wearables, health apps, machine learning, medical engineering)
- consulting legal issues, networking and contacting people (e.g., doctors, academia, pharmacy, healthcare professionals, policy makers, local ecosystem actors), research ideas,
- innovation management, interventions,
- creation of training materials and processes

**Methods:** one to one and group discussion, advisory board, expert identification

**Tools/Online tools:** ethical tools, training materials

**1.4.10 Foresighting (trends, weak signals and wild cards)**

**Description:** Foresighting is a practice of exploring expected and alternative futures. Trend is a general tendency or direction evident from past events increasing or decreasing in strength of frequency of observation. A weak signal is an indicator of a potentially emerging issue that may become significant in the future. “Wild card” is high-impact event that seem too incredible or is considered too unlikely to happen; yet many do happen.

**R&D service categories:** Market and competitor intelligence services, Co-creation

**Objectives:**

- policy consulting,
- create a future vision,
- identify new opportunities and risks,

**Methods:** back casting, brainstorming, user/citizen panels, workshop/session, expert panel, interview, literature review, role playing, scenarios, survey, SWOT, wild card & weak signals, Science fiction/crazy ideas

**1.4.11 Temporary research funding**

**Description:** Providing funding (or an investment) for research, product and business development for small and medium-sized companies or start-ups. Typically, funding is targeted for short-term small-scale experiments or if an externally funded project has resources for this kind of activity (e.g., open calls). Also, can be done in collaboration with local research centers, publicly funded “development companies” and networks or similar.

**R&D service categories:** Networking and capacity building, project planning and management

**Objectives:**

- providing funding to execute small scale living lab project (e.g. testing)

**Methods:** Offering funds within funded projects for small-scale testing or co-creation

**1.4.12 Grant writing and funding application support service**

**Description:** Offering tailored support by identifying the proper local, regional, national and international funding instruments, helping to write and manage a funding application process



including finding the right partners for the project if needed. In most cases a living lab will become a project partner but it can also be provided as a paid service without participation.

**R&D service categories:** Networking and capacity building

**Objectives:**

- Acquiring/providing funding for “customer” to execute a living lab project or buy living lab services,
- getting project partner for a living lab project

#### 1.4.13 Idea selection and testing

**Description:** Idea testing is a low-cost and quick process in which high-level ideas are selected (i.e. ranked) or tested with real end-users via different methods such as interviews, surveys or during the workshop. In order to conduct idea testing, different high-level ideas are pre-described in written or in visual format, and then communicated to the real end-users or experts. The main aim is to collect feedback on the already existing idea proposal. Feedback can also include improvement suggestions.

**R&D service categories:** Testing and validation

**Objectives:**

- Collect feedback, prioritize ideas or different alternative options,
- lowering development risk by selecting best/most promising idea for further development,
- challenge the ideas from different perspectives

**Methods:** Co-creation workshop, interviews, focus groups, surveys, questionnaires, small group discussions, informal talks

#### 1.4.14 Impact assessment and validation test

**Description:** Impact assessment is a formal, evidence-based procedure that assesses the total outcome that comes as a result of the tested activity, above and beyond what would have happened anyway. Depending on the duration and scope of the validation process impact can be evaluated on individuals, organizations and the society in the short, medium and long term. Validation is the documented act of demonstration that a product or a service will consistently lead to the expected results. Validation test ensures that the product or the service actually meets the defined requirements and demonstrates that the solution fulfils its intended use when deployed on appropriate real environment.

**R&D service categories:** Testing and validation

**Key characteristics in living lab context:**

- The validation test is usually designed by LL
- Validation testing has to meet some minimum TRL level in order reliable test the solution impact

**Objectives:**

- Verify that the develop solution will consistently lead to the expected results and meet defined requirement,
- evaluate social impact,
- quantify change after solution usage

**Methods:** Survey, observation, pre and post measurement (short and long term), quantitative measures (e.g., physiological measures), feasibility study, usability study, interviews

**Tools/online tools:** questionnaires, validated scientific scale/questionnaires, sensors, thermal cameras

#### 1.4.15 Innovation network orchestration

**Description:** Establishing productive working relationship between existing and previously unconnected but complementary actor parties and helping them (companies, public health and other sector, academia, and end-user stakeholders) to work together properly and well. Handling conflicts and supporting interactions.

**R&D service categories:** Networking and capacity building

**Objectives:**

- establish new collaboration relationships,
- promote living lab methodology and raising awareness,
- lobbying living lab movement

**Methods:** events, seminars, webinars, conferences, one-to-one meetings, site visits, publications (scientific and professional), memberships in local/regional/national/international associations/networks

#### 1.4.16 Large-scale real-life testing and piloting

**Description:** Similar to small-scale testing but with a longer duration or larger number of test participants who are representing the real end-users of the target group. During piloting, the aim is to evaluate the full scale and near or fully functional product(s) or service(s) at the system level in real environment with real end-users to make sure that the solution is scalable. Includes often impact assessment and validation testing.

**R&D service categories:** Testing and validation

**Key characteristics in living lab context:**

- Usually, the aim of the testing defines the number of participants
- Sometimes, for large numbers the LL can hire a specialized company for support

**Objectives:**

- Evaluate scalability,
- evaluate system level impact and functionality,

**Methods:** Testing in real-life setting with real users, longitudinal study, sensors, interview, survey, observation, ethnographic studies, diaries, qualitative/quantitative methods, pre and post measurement

#### 1.4.17 Legal, regulation and safety standard support

**Description:** Providing support to navigate to the legal, regulatory and safety standard requirements and help planning to meet the requirements.

**R&D service categories:** All categories

**Key characteristics in living lab context:**

- Legal design and decision-making support
- Support on signed agreements, protocol
- In some cases, external contractors for IPR, RGDP

**Objectives:**

- Similar to expert opinion and advisory services but focusing on legal and regulatory issues

#### 1.4.18 Living lab project planning and management

**Description:** Planning project goals, costs, schedule, list of deliverables, delivery dates and resources. Written project plan for one or multiple innovation stages is made. In the project management, planned tasks are completed by executing, monitoring, controlling, and closing the work of a project team to achieve specific goals and to meet specific success criteria at the specified time.

**R&D service categories:** Project planning and management

**Objectives:**

- successful development and implementation of all project procedures,
- supervision and quality control,
- internal/external communication,
- optimization of the allocated resources,
- getting clients and funding,

**Tools:** Project management guidelines, teams, excel, email, phone, messaging application,

#### 1.4.19 Marketing and sales support

**Description:** Providing marketing and sales support for 1) making right contacts by giving business contacts, sales and business leads, 2) setting up and arranging meetings and events, 3) showcasing products and services in a showroom or giving online/onsite visibility in living lab own communication channels, 4) providing “user approved” certification, and 5) offering soft landing support to help to setup business in given living lab country or region.

**R&D service categories:** Marketing and sales support, networking and capacity building

**Key characteristics in living lab context:**

- It can be introductory to healthcare companies and service providers and goes up to the point of developing a BM

**Objectives:**

- Finding right contacts and customers for living lab clients,

**Tools:** “user approved” certification, showroom, showcasing, business meetings, interviews, events, soft landing services, sales/business leads

#### 1.4.20 Panel management

**Description:** Panel is a pre-existing group of pre-screened people (e.g. patients, practitioners etc.) who have given their consent to take part in different research activities over an agreed period. Panel members have given their contact details and other profiling information, which enables fast recruitment for specific research activities as they come up.

**R&D service categories:** Project planning and management, networking and capacity building

**Key characteristics in living lab context:**

- Group of patients, students but also experts/experts by experience and other staff can also be used as a panel (needs to agreed case by case)
- Having engagement procedures in place (win to win situation), social activities

**Objectives:**

- enable fast participant recruitment,
- lower the management effort (no need to fill profile information multiple times)

**Method:** survey, recruitment collaboration with medical professionals (e.g., in hospital ward)

**Tools:** intake questionnaire, phone, open calls in social media/web, posters, email, personal invitations

#### 1.4.21 Post-market surveillance and market acceptance testing

**Description:** Post-market surveillance is a “real world” test of medical innovations in patient subgroups. It is a practice of monitoring the safety of a medical innovation after it has been released on the market. Market acceptance testing focuses on collecting market feedback for the next revision development and tracking the solution performance in real competitive market conditions.

**R&D service categories:** Testing and validation, Market and competitor intelligence services

**Key characteristics in living lab context:**

- Usually within a clinical or community research context (within the context of specific projects/the products that come out as research outcomes) and not as a standalone service.
- As normal customer feedback collection and health promotion, for continuum improvement of the tool

**Objectives:**

- monitoring the safety of a medical innovation after it has been released on the market,
- evaluate social impact,
- identify new opportunities for business and research

**Methods:** survey, observation, interviews, helpdesk logs, technical logs, complain reports, pre and post measurement (long term), market studies

**Tools/online tools:** questionnaires, validated scientific scale/questionnaires, sensors

#### 1.4.22 Prototyping test

**Description:** Prototyping test is a low cost and quick process in which product or service with limited functionality and interaction is tested with real end-users. Interactive prototype product or service must exist so real end-users or experts can experience it. Prototype can be, for instance,, an interactive mock-up of a web service, which interface looks like a real thing. One can navigate through different screens and see simulated content. Also, the service prototype can consist of role-playing exercise to simulate service encounters. The main aim is to collect feedback on as real kind of user experience as possible, but at a lower cost. Different methods such as interviews, surveys and observations can be used.

**R&D service categories:** Testing and validation

**Key characteristics in living lab context:**

- From rapid prototyping to the MVP
- IT solutions/Physical and cognitive exercises

**Objectives:**

- similar to proof-of-concept but testing higher fidelity solution,
- identify improvement suggestions and usability test,
- provides development recommendations based on user/patient/customer experience and needs,
- identify key measures to investigate in follow-up tests

**Methods:** survey, observation, demo-session, interview, wizard of oz, usability tests, role playing

**Tools:** paper prototype, wireframes, interactive mockups, scaled down prototypes, visual dummies close to final (visual UI), video recording, usability questionnaires, eye tracking

### 1.4.23 Public procurement support services

**Description:** Public procurement (e.g., related to research activities) is governed by EU and national rules. Support with public contract issues and the public procurement process is given to help clients to meet the tendering criteria and/or join the tendering process. Also helping public authorities to establish market dialogue when developing the public procurement announcement. This includes Pre-Commercial Procurement and innovative procurement processes.

**R&D service categories:** Networking and capacity building, co-creation, advisory services, marketing and sales support

**Key characteristics in living lab context:**

- Pre-commercial procurement, innovative procurement, public procurement
- Project based
- Validation Software (integration) - Hardware (operational validation in real environment)
- Legal design and decision-making support

**Methods:** Planning process based on co-creation, pre-commercial procurement (PCP), innovative procurement

### 1.4.24 Simulation test

**Description:** Simulation is a technique that creates a situation and environment, which allows end-users to experience a representation of a real event in a risk-free environment. Predefined simulation scenario defines a particular set of conditions to resemble authentic situations in a location where a simulation experience takes place to test and to gain understanding of tested solution and related human interactions. After simulation event, facilitators and end-users re-examine the simulation experience, and various aspects of the completed simulation are discussed.

**R&D service categories:** Testing and validation

**Key characteristics in living lab context**

- Mainly for ICT solutions
- Simulation labs, smart home that simulate real-life home/specific scenarios to simulate real space

**Objectives:**

- simulate real-life situations and behavior but lower cost,
- identify improvement suggestions and usability test,
- provides development recommendations based on user/patient/customer experience and needs,
- identify key measures to investigate in follow-up tests

**Methods:** Simulation test, virtual reality (VR), usage scenarios, interview, debriefing, observation, survey, wizard of oz, sensors, usage logs, hospital ward, interactive patient mannequin, usage scenarios,

**Tools:** audio recording, video recording

### 1.4.25 Small-scale real-life testing and experimentation

**Description:** An experiment is a small-scale and short-term preliminary study conducted to evaluate feasibility of the suggested product or service and to improve it based on the testing result. Testing includes a small number of test participants who are representing the real end-users of the target group.

**R&D service categories:** Testing and validation

**Key characteristics in living lab context**

- Usually lab-based studies
- Can mostly involve qualitative feedback
- Testing quality and user satisfaction,

**Objectives:**

- verify that the develop solution will work also in real-life setting,
- evaluate usability before engaging more people in testing,

**Methods:** testing in real-life setting with real users, survey, sensors, interview, survey, observation, diaries, qualitative/quantitative methods, pre and post measurement

**Tools:** validate questionnaires

#### 1.4.26 Stakeholder (and partner) analysis and mapping

**Description:** Identifying groups, organizations, and people who are relevant stakeholders. Prioritizing and ranking stakeholders based on their perspectives and interest. Mapping the relationship between different stakeholders and company objectives. Deliverable(s) Written report.

**R&D service categories:** Networking and capacity building, Market and competitor intelligence services, co-creation

**Key characteristics in living lab context**

- Within a research context / for programs and projects.
- Trying to promote a diversity-centered design

**Pre-tasks:** Searching and listing all the interested stakeholders/partners, contacting them, and then mapping possible contributors

**Objectives:**

- identifying relevant/key/negative stakeholders,
- identify stakeholders' interest,
- provide information to participant recruitment

**Methods:** focus group, workshop, interviews, questionnaires methodology, social network analysis, two-dimensional matrix (e.g., power, influence, interest/need, support/attitude), primary/secondary/tertiary stakeholder, the salience model

**Tools:** Miro online whiteboard, user requirement analysis

#### 1.4.27 Usability testing

**Description:** Usability testing is a technique used to evaluate a product by testing it in order to give direct input on how real users use or would use the product or service. Usability inspection is conducted when a professional evaluator inspects a user interface and gives an expert opinion regarding the usability. This approach does not involve real user. Usability testing with real users includes real users who have no prior exposure to the product or service. In the context of Living Labs is mostly provided real user testing.

**R&D service categories:** Testing and validation

**Objectives:** Identify usability problems, provides development recommendations based on user/patient/customer experience and needs,

**Methods:** Moderated/unmoderated, remote/in-person, comparative testing, open ended explorative testing, user satisfaction, phone/video interview, usability lab testing, session recordings, observation

**Tools:** SUS, QUEST, feasibility assessment and other several tests, eye-tracking camera

## 1.5 PART 7B. Devices and technologies

The following table presents the available technologies for data collection from VITALISE consortium Living Labs. The database will be continuously updated aiming to include the most commonly used technologies but also custom-made solutions from each Living Lab.

**Table 2 Devices and technologies provided by Living Labs**

Categories	Data collection technology name	Description	To measure
Activity	Balance measure	Ainone Balance® Software is intended for use by health, social and sports professionals to support the assessment of balance and to detect changes in human performance (Class I medical device – MDD 93/42/EEC)	Human balance
Activity	Activity monitoring	Smart wristband watch	Accelerometer, barometer, gyroscope, heart rate sensor, light sensor
Activity	Activity sensor	The ultimate wearable sensor for measuring movement and heart rate in sports and other activities	Movement measurement (9-axis IMU)  Heart rate (bpm), R-R intervals, single channel ECG (non-medical), Bluetooth heart rate profile  Temperature
Activity	Activity Trackers and wearables	Various wearables to track activity and physiological parameters (Movement, EDA, HR) and analysis to extract activities, <b>postures</b> , stress	Posture, Movement, Activity Level and Stress Level
Activity	Advanced Daily Activity Monitoring Solution	A set of home sensors that can track the presence of a person in different places inside a house, or when the person has left the house. The presence of the person and its movement between rooms in a house. With some feature engineering there are a lot of low and	Home sensor monitoring

		high level features that can be extracted (e.g. sleep duration/pattern/quality, bath visits/duration, guests and socialization, home wondering, walk speed, trend of transition speed, IADLs, Frailty, Depression, IADL decline, Behavioural anomaly)	
Activity	ehcobutler - Book of Life	A modular open environment platform to promote health, satisfaction and personal well-being of elder people with mild cognitive impairments. The platform includes leisure and care activities, such as Book of Life, My Memories, Walking in Relaxing Nature, Cognitive training through GRADIOR, Videoconference, e-mail, Internet, Lifestyle recommendations, Nutritional recommendations...	Well-being, cognitive training
Activity	G-Walk	G-WALK is a small inertial sensor that is used for the study of dysfunctional human movement. It relays 12 spatio-temporal parameters of gait and three planes of pelvic movement to a PC via Bluetooth connection.	Gait, performance
Activity	Inverse kinematics data	A jacket equipped with 6 Adafruit's 9-DOF sensors (3 for each hand), that solves the inverse kinematic problem of 2, 7-DOF hands.	Inverse kinematics data
Activity	motion capture	A sensor suit which enables the collection of precise <b>position and angles of the different body parts</b> . Used to monitor activities, and contrast with other, not so intrusive, technologies	Body Posisiton
Activity	Orientation analysis	BNO055 is a smart 9-DOF sensor that collects data from an accelerometer, a magnetometer and a	Orientation



		gyroscope and does sensor fusion in order to produce the absolute orientation of the chip.	
Activity	Polar team pro	Polar Team Pro combines high-precision GPS-derived <b>movement data</b> , inertial sensor metrics and integrated heart rate monitoring, into a mobile and easy-to-use, wearable player tracking system	Physical activity, physical performance
Activity	Smart Watches	Garmin Vivosmart 4 is a fitness and health monitoring tool which include estimated <b>wrist-based heart rate</b> , all-day <b>stress tracking</b> , relaxation <b>breathing timer</b> , <b>VO2 max</b> , <b>Body Battery energy monitor</b>	heart rate, VO2 max, stress tracking, Body Battery
Activity	Smart Watches	The Wavelet Wristband measures <b>physiological and activity data</b> . The wristband tracks steps, sleep, calories burned, heart rate and blood oxygen saturation. This is a cloud-based, clinical monitoring device is designed for large-scale patient data collection and analysis.	steps, sleep, calories burned, heart rate, blood oxygen
Activity	Wearables	The E4 is a medical-grade wearable device that offers real-time <b>physiological data acquisition</b> , enabling researchers to conduct in-depth analysis and visualization.	physiological and behavioural biomarkers
Environment/context	Air quality sensor	Air quality sensor with WiFi connectivity	Concentration levels PM1, PM2.5 and PM10
Environment/context	Air quality sensor	<b>Air quality sensor</b> with WiFi connectivity	Concentration levels PM2.5 Pressure, Temperature, & Humidity Sensor
Environment/context	Blinds actuator	Blinds are 100% domotic, every time they are actioned can be monitored	Blind operation

Environment/con text	Cama-up (behavior patterns, alarms ...)	Device to assist people with reduced mobility in the actions of <b>getting into and out of bed, with monitoring of usage habits and alarm system.</b>	usage habits, alarm system
Environment/con text	CAPTAIN - virtual coach for home assistance	Technology developed in the Living Lab for coaching of older adults	
Environment/con text	Doors and windows sensors and actuator	magnetic sensor on each window and door, so they can be monitored independently of manual or automatic operation	Door operation window operation
Environment/con text	ehcobutler - Book of Life platform for older people	A modular open environment platform to promote health, satisfaction and personal <b>well-being of elder people</b> with mild cognitive impairments. The platform includes leisure and care activities, such as Book of Life, My Memories, Walking in Relaxing Nature, Cognitive training through GRADIOR, Videoconference, e-mail, Internet, Lifestyle recommendations, Nutritional recommendations...	Well-being, cognitive training
Environment/con text	Flood sensors	a resistive moisture sensor connected to a generic KNX transceiver	Technical alerts (Flood)
Environment/con text	Light level sensor	a KNX connected luminosity sensor for monitoring indoor conditions	Luminosity
Environment/con text	Presence Sensor	a KNX connected Passive Infra-Red sensor for monitoring <b>indoor movements</b>	Presence
Environment/con text	Sensewear Armband	Energy expenditure measure	Physical activity
Environment/con text	Sleep sensors	Various wearable of <b>mattress sensors</b> to assess sleep quality	Sleep Quality
Environment/con text	Smart Home Sensors for Activity Recognition	Smart home sensors (Presence, Appliance/Object use etc.) and analysis to recognize activities in time	Activities of Daily Living

		and in turn user behaviors/function/cognitive decline	
Environment/context	Smoke sensors and Fire sensors	Detect smoke and high temperature, above the stove	Technical alerts (smoke, temperature)
Environment/context	Temperature sensor	a KNX connected temperature sensor for indoor temperature monitoring	Temperature
Virtual reality/interactive technology	VR headset	Virtual reality is a fascinating way which let you look around a virtual space as if you're actually there or play a game as though you're really in it.	Virtual reality
Virtual reality/interactive technology	Interactive screens	big touch screens capable of showing and interacting with web pages (e.g., questionnaire response)	Web Interaction
Virtual reality/interactive technology	Emocube3	An interaction prototype used by the user to select a face (representing emotion, or any other metric), as well as gestures	Alternative and augmentative Interaction
Virtual reality/interactive technology	Neurologic	Intervention system to address the decline of executive function through the combination of Virtual Reality and Neurofeedback technologies and Third-Generation Therapies (Mindfulness). The system allows the real-time integration of data from EEG technology in order to identify higher cognitive functions and emotional states that allow adjustments in the activity during the performance. Virtual Reality technologies facilitate that the stimulus, activities or strategies learned have a direct transfer to everyday life environments.	Adjust treatments and therapy. Real-time feedback for patients. Offer structured data to evaluate the cognitive evolution of patients as of their performance in the training sessions.
Virtual reality/interactive technology	AI Emotional Analysis	Digital components for the <b>speech analysis and speech generation</b> to	Speech analysis and intuitive user interface

		provide intuitive user interface	
Cognitive function	Gradior suite	GRADIOR Suite is a neuropsychological intervention suite for a comprehensive approach to the therapy. This comprehensive approach intends to contribute to maintain the cognitive function, control of behavioural symptomatology, improve well-being, quality of life and independence of people with cognitive impairment or deficit. GRADIOR Suite allows to address the cognitive dimension of people through the use of 'GRADIOR Cognitive Stimulation', a support tool oriented to cognitive training and stimulation. GRADIOR Suite also allows to address the sensorial and emotional dimension of people with 'GRADIOR Multisensorial', another support tool, based on Virtual Reality, to work the different senses inducing states of relaxation and sensorial stimulation and, at the same time, working on the behavioural symptomatology.	Adjust treatments and therapy. Offer structured data to evaluate the cognitive evolution of patients as of their performance in the training sessions.
Assisting technology	ANDIN (voice commands, gait patterns)	Smart walker that assists people with mobility difficulties, enhances their autonomy, safety and increases their well-being. helps the person to walk safely, assists their steps, adapts to their speed, detects obstacles, makes emergency calls	usage habits, alarm system, voice commands, walking speed, distance with the user, location
Assisting technology	INOTEC (bathroom shedding patterns)	Smart toilet aimed at people with mobility problems, to enhance their autonomy in a safe way and their well-being. assists the person in getting into and out of the	water temperature, drying temperature, usage habit.

		toilet. User cleaning. toilet cleaning.	
Assisting technology	Robots – Human-Robot interaction	Humanoid robotic head for verbal human-robot interaction	Natural Language Understanding  Intent and entity identification  Gesture detection (smile)  Engaged users  Video stream
Assisting technology	Robots – Human-Robot interaction	Social humanoid robot	Speech recognition  Human recognition
Assisting technology	Robots – Human-Robot interaction	Social humanoid robot	Speech recognition  Human recognition: Engagement state Age Gender Mood Excitement Smile state Attention Intention  Pictures  Map
Assisting technology	Pepper social robot	The social robot, named Pepper, will serve as a mean to screen, monitor and interact with older adults with cognitive impairment (e.g., MCI, mild dementia) in care facilities. The interaction with Pepper will accompany patients and motivate them to perform activities in order to stimulate <b>cognitive and neuropsychological domains</b> . Also, Pepper will	Capture Cognitive activities performance; capture progress of in different indicators for wellbeing and personalized recommendations; <b>Big data</b> collection.

		provide a mean to big data collection in order to assist the healthcare professional to improve the efficacy of the implemented intervention.	
Biometrics	Biometrics measurement	The Hellenic Educational Self-Care and Support Heart Failure app. An app designed to help patients with <b>heart failure</b> self-report and monitor their status. It integrates blood pressure, Weight, dyspnoea, blood glucose, swellings, bpm, SpO2 Patient's mood and reaction to certain assistive tips	Basic biometrics
Physiological monitoring	blood sugar level	iHealth Gluco is a medical device that designed for <b>diabetic patients, measures blood sugar levels</b>	blood sugar level
Physiological monitoring	Cosmed K5 metabolic system for both laboratory and field testing	COSMED K5, the 4th generation of the most popular wearable metabolic system, a breakthrough in the field of exercise physiology and human performance assessment. The extensive list of new and unique characteristics of the K5 expands the scope of <b>metabolic testing</b> from clinical exercise testing to performance assessment.	Energy expenditure, physical activity etc.
Physiological monitoring	Dynamometer	The Digital Hand Dynamometer is a stand-alone device developed to be used just like a traditional hydraulic hand dynamometer. Highly accurate grip strength measurement from 0-200 pounds (lbs.) or from 0-90 kilograms (kg) are digitally displayed on the LCD, and up 20 test results for each hand can be stored in memory during testing.	dynamometer, digital hand dynamometer

Biosignals	Electroencephalography (EEG)	Electroencephalography (EEG) is an electrophysiological monitoring method to record <b>electrical activity on the human scalp</b> that has been shown to represent the macroscopic activity of the surface layer of the brain underneath. It is typically non-invasive, with the electrodes placed along the scalp. EEG measures voltage fluctuations resulting from ionic current within the neurons of the brain. EEG refers to the recording of the brain's spontaneous electrical activity over a period of time, as recorded from multiple electrodes placed on the scalp.	electrophysiological timeseries
Biosignals	EEG (electroencephalogram), orientation	The EMOTIV EPOC+ is a portable, high resolution, 14-channel, EEG system. It was designed to be quick and easy to fit and take measurements in practical research applications	EEG, orientation
Biosignals	Electronic Medical Recording of Acute Ischemic Episodes	Iliaktis is a <b>digital registry</b> that provides specialized forms for the data gathering of patients with <b>ischemic episodes</b> . It can collect data that refer to the episode itself and also the follow ups of the <b>patient for up to a year in recovery</b> . It gathers data regarding heart disease, Ischemic episode data, CA Report, Discharge data, Follow-up data for 1 month/6months/12months after the episode.	<b>Patient history &amp; demographics</b>

Physiological monitoring	Pulse Oximeter	Pulse oximeter is a device that is placed on a fingertip. It uses light beams to estimate the <b>oxygen saturation</b> of the blood and the pulse rate.	<b>pulse oxygen and pulse rate</b>
Physiological monitoring	Scale	iHealth scale bluetooth can be used to calculate the <b>weight, BMI</b> . iHealth's scales can assist those who are overweight in their battle against obesity.	Weight, BMI

PENDING APPROVAL BY REA