ManagiDiTH
ADVANCED DIGITAL SKILLS

Digital Health Stakeholders Report

D 5.1

WP5

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Abstract	The goal of the ManagiDiTH project is the design and implementation of an innovative Master program that qualifies the graduated students for efficient management of digital transformation of health services. The report presents the digital health stakeholders identified in the framework of ManagiDiTH project. The methods for stakeholders data collection and data analysis are described. The analysed data is contributing for better understanding of ManagiDiTH ecosystem, better visualization of the participants in the project, their interests and engagement effort. A communication plan is designed considering the category of the stakeholders, their activities, interests, influence and impact on project outputs.

Keywords	e-Health; digital stakeholders; ecosystem; e-Health companies

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1. Introduction

The numerous challenges that providers of health services are currently facing (i.e., financial strain due to increased costs and lower revenue; shortage of healthcare professionals; increased demand for personalized, preventive and predictive care; cybersecurity issues) underscore the importance of actively choosing, evolving, accelerating, and extending innovation efforts of healthcare organisations [1]. The purpose of the ManagiDiTH project is to design and implement an innovative Master program that qualifies the graduated students for efficient management of digital transformation of health services. The project purpose is in line with the vision of The Digital Education Action Plan (2021-2027) - a renewed European Union (EU) policy initiative adopted in 30 September 2020, for a high-quality, inclusive and accessible digital education in Europe. The Action Plan calls for greater cooperation at European level on digital education and aims to support the adaptation of the education and training systems of Member States to the digital age. It creates opportunities for the education and training community (teachers, students), policy makers, academia, and researchers on national, EU and international level [2].

The project promotes engagement of stakeholders from the quadruple helix (public sector, research, private sector and civil society) throughout the strategy of smart specialization of personnel of the health and care organizations. Smart Specialization Strategies (S3) for improvement of health services is embedded in the "Policy Objective 1" of the European Regional Development Fund – "A smarter Europe by promoting innovative and smart economic transformation" [3]. The project will contribute to the four main targets of Digital Decade policy program for 2030: skills; digital transformation of businesses; digitalization of public services; secure and sustainable digital infrastructure [4]. The smart specialization provided in the Master program will support digital transition of the health systems in three major areas:

i. The preventive, predictive and increasingly personalised approach to healthcare provision.
ii. The integration between physical (infrastructures and equipment) and virtual components (digital terminals, web applications, virtual assistants), which promotes greater convenience and enhances quality in access to health services.
iii. The security and transparency of processes.

The pedagogical objectives of the Master program promote:

i. Understanding of the digital transition in organisations, particularly health organisations.
ii. Critical appreciation of the different types of health services, including resources, information and data consumption.
iii. Understanding different approaches of e-health technologies for personalization, prevention and prediction of healthcare services provision in health institutions as well as at home, involving patients and their relatives.
iv. Skills and competences development for digital transformation of health services, including design and implementation of new procedures and services supported by information and communication technologies.

v. Knowledge, skills and competences development that ensure interoperability between health and care services in the healthcare ecosystem.
vi. Knowledge, skills and competences development for optimization of data flows and analysis between care processes.
vii. Skills development for development or maintenance of software applications (especially middleware) for optimal functioning of organisational procedures and services.
viii. Knowledge, skills and competences development for data integration among different information systems, and between these and common equipment in units providing health care.

The graduated students of ManagiDiTH Master' program will be qualified:

i. to plan and support the digitalisation of health services;
ii. to design and implement new procedures and services, supported by information and communication technologies;
iii. to ensure the interoperability and operation of technological equipment in health organisations;
iv. to design and develop system software and application software that enables new organisational procedures and services and improves communication with suppliers and users.

The interdisciplinary themes for Master's curricula are based on recommendations for teaching biomedicine and health information management of the International Medical Informatics Association (IMIA) [5], and HITComp competencies [6]. The program will be aligned with the Council of Europe's EQF Recommendation (2017 / C 189/03) on the European Qualifications Framework (EQF) for lifelong learning and the National Qualifications Frameworks (NQFs) [7], as well as qualifications systems that are defined as equivalent to the EQF, as they support existing recognition practices. The targeted population for the new Master are graduates students on: Healthcare, Social & Welfare, Information and Communication Technology, and Business Administration. The Master's will work as a conversion course, with graduates from each background learning complementary skills.

The graduated students of Master program would have knowledge of the healthcare sector and the main pillars within the sector (e.g., evidence-based practices; value-based healthcare) as well as the skills and competences to create, implement and manage new digital service in a regional and/or European health ecosystem that promote social innovation. Social innovation is defined as "new ideas (products, services and models) that simultaneously meet social needs (more effectively than alternatives) and create new social relationships or collaborations. In other words, they are innovations that are both good for society and enhance society's capacity to act" [8]. Therefore, the project contributes to European Digital Agenda [9] by promoting digital transformation of health services, social innovation through e-Health and e-government, as well as the New European Innovation Agenda (adopted in July 2022) [10], by supporting deep tech innovation and cooperation between companies for innovative solutions in health services.

The report presents the digital health stakeholders identified in the framework of ManagiDiTH project. The guide is to be understood as a general orientation document which will be improved and updated

in the final project report, after analysis of effectiveness of stakeholders' engagement and evaluation of project outcomes and stakeholders' satisfaction.

Stakeholders are defined as "individuals and organizations who are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or successful project completion (Project Management Institute (PMI®), 1996)" or "individuals, groups, or organizations that have an interest in the project and can mobilize resources to affect its outcome in some way" [11]. Therefore, the stakeholders support, influence, or hinder the project's progress and success. Stakeholders may play various roles in a project depending on their relationship to the project and the organizations.

Following we present the methodology used for digital stakeholders' identification and analysis and our insights on this research.

2. Methods

2.1. Stakeholders Data Collection

The research on digital stakeholders in the framework of Work Package WP5 – Interaction Research & Health Industry Sectors of ManagiDiTH project was continuation of work on ecosystem mapping of WP3 – Co-design and Capacity Building. The local and pan-European healthcare providers, pharma companies, med-tech companies, policy makers, regulators were investigated and an ecosystem in which country health system may interact with academies and med-tech companies was characterized in WP3 report.

Research on the local organizations and their relationships that may be impacted by the outputs of the proposed Master, and those that may contribute for the successful implementation of the Master program was carried out within WP5. The research on stakeholders was focused on the organizations from the three countries from which students are being included in the Master program. The online search was started by using the keywords "national health system" and "digitalization of healthcare system", in national language (Portuguese, Greek, Finnish). Different data related to the administrative structure of the healthcare system, and local organizations involved in promotion and development of e-Health technologies, were extracted from different websites. Table 1. includes synthetic description of the relevant websites that were consulted to extract data required for defining the Portuguese, Finnish and Greek health and digital stakeholders.

Qualitative contents analysis was performed from the selected documents. Summary description of different organizations (i.e., companies/enterprises, associations, research centres, hospitals, clinics) as well as information on the organization website, address, and contacts was included in an excel table. Mind mapping was used to organize data on different organizations and for developing a coding scheme for content analysis.

Table I. Description of relevant websites consulted for defining health and digital stakeholders from three European countries

Name of Website	Link	Country	Summary description
European Commission	https://health.ec.europa.eu/state-health-eu/synthesis-report_en	PT, FI, GR	Synthesis Report presented by the European Commission highlights a selection of horizontal observations based on the analysis of the country profiles. The 2023 edition of the State of Health in the EU's Synthesis Report consists of two parts. Part 1 presents a chapter on European health systems' reforms and investments after the COVID-19 pandemic. Part 2 of the Synthesis Report presents the key findings from the 29 Country Health Profiles prepared by the Organisation for Economic Co-operation and Development (OECD) and the European Observatory on Health Systems and Policies (Observatory).
ePortugal	https://eportugal.gov.pt/en/inicio	PT	Information on different public services for citizens and enterprises.
SNS Serviço Nacional de Saúde	https://www.sns.gov.pt/institucional/ministerio-da-saude/	PT	Ministry of Health ensure the necessary actions for the formulation, execution, monitoring and evaluation of the national health policy; In relation to the National Health Service, abbreviated as SNS (Serviço Nacional de Saúde), the Ministry of Health exert functions of regulation, planning, financing, guidance, monitoring, evaluation, audit and inspection.
Direção-Geral de Saúde	https://www.dgs.pt	PT	Directorate-General of Health coordinate and develop Health Plans and Programs; Coordinate and ensure epidemiological surveillance; Analyse and disseminate health information; Regulate and ensure quality in health; Managing Public Health emergencies; Support the exercise of the powers of the National Health Authority; Coordinate the activity of the Ministry of Health in the field of European and international relations; Monitor the National Health Service Call Center; Coordinate and monitor the Public Administration Services Performance Evaluation Subsystem (SIADAP 1) of the Ministry of Health.
SPMS - Serviços Partilhados do Ministério de Saúde	https://www.spms.min-saude.pt/	PT	Part of Ministry of Health SPMS provides specific shared healthcare services in terms of information and communication systems and technologies, purchasing and logistics, financial services, human resources, and other complementary and subsidiary activities, to all establishments and services of the SNS, regardless of

			their legal nature, when they carry out activities in the health area.
KanTa Service	https://www.kanta.fi/en/what-are-kanta-services	FI	Kanta produces digital services for the social welfare and healthcare sector. The users of Kanta services include citizens, pharmacies, healthcare services and social welfare services. Service providers in both public and private health care are using Kanta service.
THL E-Health and e-welfare of Finland. Check Point 2022.	https://www.julkari.fi/bitstream/handle/10024/145973/THL%20REP006_2022.pdf?sequence=4&isAllowed=y	FI	Report coordinated by Finnish Institute for Health and Welfare (THL) on the progress of digitalization of social and health care in Finland. The report presents the results of the research from the perspectives of citizens, physicians, registered nurses, and social welfare professionals as well as social welfare and healthcare organizations. From the citizen perspective, the study examined the availability, use and user experiences of e-health and e-welfare services. The study provides valuable information on the development of digitalisation since the 2017 and the situation and impact of implementing the 'Information to support wellbeing and service renewal - eHealth and eSocial Strategy 2020'in 2020–2021.
FINDATA Social and Health Data Permit Authority	https://findata.fi/en/	FI	Findata is the data permit authority for the social and health care sector, and its activities are based on the Act on the Secondary Use of Health and Social Data (552/2019, finlex.fi).
WHO	https://www.who.int/publications/m/item/universal-health-preparedness-review-(uhpr)--national-report-of-portugal	PT	The World Health Organization (WHO) is a specialized agency of the United Nations that promote public health. The document from the website link presents a compilation of findings of the Universal Health and Preparedness Review (UHPR) pilot initiative in which Portugal engaged with WHO. Information on health system organization, outcomes of the UHPR, highest national priorities and actions, most recent simulation exercises in which country participated within the scope of the International Health Regulations is provided.
WHO	https://eurohealthobservatory.who.int/publications/i/finland-health-system-review-2019	FI	The WHO document provides updated information on country health system organization and healthcare providers, funding mechanisms, what resources are available for the health system, what reforms are being pursued, how is health system performing.
European Observatory on Health Systems and Policies	https://eurohealthobservatory.who.int/publications/m/portugal-country-health-profile-2023	PT	The website provides information on health, health determinants and risk factors, the organization and financing of the health system, the effectiveness, accessibility and resilience of the health system from Portugal.
European Observatory on	https://eurohealthobservatory.who.int/publications/m/finla	FI	The document cover health status in the country; health determinants and risk factors; the organization and financing of the health system; an overview of the

Health Systems and Policies	nd-country-health-profile-2023		effectiveness, accessibility and resilience of the health system; and a spotlight on mental health and services in the country.
European Observatory on Health Systems and Policies	https://eurohealthobservatory.who.int/publications/m/greece-country-health-profile-2021	GR	The document provides information on health status in the country, the determinants of health, focussing on behavioural risk factors, the organisation of the health system, the effectiveness, accessibility and resilience of the health system.
EU-Healthcare.Fi	https://www.eu-healthcare.fi/healthcare-in-finland/healthcare-system-in-finland/	FI	Information on organization of Finnish healthcare system is provided within the website.
Instituto Nacional de Estatística	https://www.ine.pt/xportal/xmain?xpgid=ine_main&xpid=INE	PT	INE elaborate and disseminate statistical data from Portugal.
Pordata, Estatística sobre Portugal e Europa	https://www.pordata.pt/en/Home	PT	Pordata is a certified statistical database about Portugal, its Municipalities and Europe. With free access it addresses the various themes in society.
Statistics Finland	https://stat.fi/index_en.html	FI	Statistics Finland process data accumulated from various data sources into statistics that support decision-making and for the use of citizens, researchers and others needing data.
Hellenic Statistical Authority (ELSTAT)	https://www.statistics.gr/en/home	GR	ELSTAT produce statistics that are useful, relevant, for public policy, the economy, and more broadly the life of the people from Greece.
Health Cluster Portugal	https://www.healthclusterportugal.pt/	PT	Health Cluster Portugal is a private non-profit association that currently brings together more than 220 members, including R&D institutions, universities, hospitals, organisations from civil society, and companies in the areas of pharmaceuticals, biotechnology, medical technologies, and services.
HealthTech	https://healthtech.teknologiateollisuus.fi/en/association/member-services	FI	HealthTech cluster is an association that provides regulatory support, growth and internationalization, information and tools, model contracts, and training for developing corporate responsibility and communication competence to companies having products or services related to technologies for health.
Health Capital Helsinki	https://healthcapitalhelsinki.fi/covid19-finnish-health-tech-companies/	FI	List of Finnish companies with innovative health tech solutions to COVID-19.
Hellenic Digital Health Cluster	https://www.hdhc.gr/en/partners-and-members	GR	Hellenic Digital Health Cluster (HDHC) is a dynamic initiative of the Foundation for Research and Technology – Hellas (FORTH) that aims to include

			Greece among the leading countries in the field of digital health internationally. HDHC includes 30 innovative and dynamic companies of the digital health ecosystem in Greece and internationally, as well as FORTH.

Using content analysis of different documents, the organizations and their relationships in ManagiDiTH project ecosystem were classified in the following categories: Academies; Healthcare Providers; Companies/Enterprises with products or services for e-Health; Health Insurance Institutions; Organisations that promote Digital Health; Research&Development institutions with expertise in e-Health technologies; Pharmacies; Wellness institutions; Welfare institutions; Policy Makers; Regulators. In academies category are included the universities from the project consortium. Data on healthcare providers (i.e., public, private, public-private hospitals; public and private primary healthcare centers; long-term healthcare network) that were contacted for information by project team were included in category healthcare providers. By considering adoption by some Health insurance (HI) of different e-Health technologies (e.g., use of wearable technologies to get data of their existing customers regarding the level of physical fitness exhibited by the customers), a HI category was included in ManagiDiTH ecosystem. Associations having as primary objective promotion of digitalization of public services, Association of Enterprises that promote e-Health technologies, Associations of Health Professionals, Associations of Patients, Public Institutions that promote implementation of e-health technologies, Innovation centers (e.g. incubators that fuel e-Health technology development; technological parks; research parks) were included in category Organisations for Digital Health.

2.2. Stakeholders Data Analysis

Stakeholders' analysis was based on data from ManagiDiTH ecosystem mapping. While both stakeholder mapping and ecosystem mapping can help to better understand the systems that influence or are impacted by the project activities, they are not the same thing. Stakeholder mapping (i.e., who are the actors in the ecosystem) tends to focus on the actors (i.e., individuals or groups who have a vested interest in a project). Ecosystem maps focus on systems, networks, and connections.
First, the stakeholders were grouped into two main categories: those who are from categories of ecosystem that contribute to project implementation and those from organizations that are affected by the ManagiDiTH project activities. Some stakeholders fall into both categories. The list including project contributors (i.e., the project team) is continuously updated with internal and external stakeholders that participate to the project execution.

Second, the stakeholders were grouped considering their role in project implementation:

i. Internal Stakeholders: the project tasks leaderships; project team members; representative of the associate partners in the projects.

ii. External Stakeholders: Healthcare Providers; e-Health Companies/Enterprises; R&D Institutions; Health and Wellness Professional Associations; Organisations for Digital Health; Pharmacies; End-User (i.e., students, institutions that will collaborate on master thesis dissertation, institutions that will employ the graduated students).
iii. Steering Group: Advisory board that include academies authorities, WP leaderships that facilitate communication between the project team and other stakeholders, select the members of the Management Team, supervise the work program, secure necessary resources, support achieving project goal and the overall performance of the project.

A database on stakeholders' skills, level of influence, interests, potential impact on the project, communication style, their needs, their preferences, expectations, concerns, issues related stakeholder participation on project implementation was developed. Information on skills was based on main profession and job function. The level of influence of a stakeholder was classified on high, moderate, low. Interests on collaboration in project for designing curricular theme (i.e., for designing curricular modules, for training during project implementation, for training during Master program, to collaborate in the process of elaboration of Master thesis, to advocate for Master successful implementation, to receive information on project activities and results) were included in database. Potential impact of stakeholder on the project outputs was classified as high, moderate, low. The data on external stakeholders were obtained using public data on organization contact as well as email address obtained from contacted persons that confirmed interest in collaboration with project team. A mind mapping tool was used for Stakeholder Affinity Mapping, in which the stakeholders were grouped based on their interests on project activities. It allows better visualization of commonalities between different groups. Data on stakeholders was arranged on a grid according to the influence and potential impact on project outputs of each stakeholder in order to define priorities on communication and collaboration with different stakeholders.

2.3. Communication plan

Organisation of data on stakeholders that may allow planning the communication considering stakeholders interests and communication channels preferences has a great importance for successful implementation of the project. Communication plan ensures that information is delivered in timely, accessible and clear manner. Communication plan with industrial partners are with tight connection to the ManagiDiTH communication plan developed in WP8. Organization of data on stakeholders' personal contacts (e-mails, telephone, social media contact) and contact data use are made in accordance with national laws on sensible personal data and European Union General Data Protection Regulation (GDPR).

3. Findings and Insights

The consortium of the present project was initially composed of four Universities from different countries (ISCTE-Instituto Universitário de Lisboa, LAUREA University of Applied Sciences, Aristotle University of Thessaloniki - AUTH, University Gustave Eiffel - UEIF), one Research Centre (Instituto de Telecomunicações - IT) and three SMEs (Clinipower Finland Ltd, Whymob and Mundi Consulting). It is also supported by a network of eight Associated Partners and one third party giving in-kind contributions including: Living Labs, Hospitals, Digital Innovation Hub, HealthCare company, and five Patient Associations (see Table II).

Table II. Consortium Participants

N	Short Name	Legal Name	Country	Role
	ISCTE-IUL	ISCTE-INSTITUTO UNIVERSITARIO DE LISBOA	PT	COO
2	LAUREA	LAUREA-AMMATTIKORKEAKOULU OY	FI	BEN
3	AUTH	ARISTOTELIO PANEPISTIMIO THESSALONIKIS	EL	BEN
4	UNI EIFFEL	UNIVERSITE GUSTAVE EIFFEL	FR	BEN
5	IT	INSTITUTO DE TELECOMUNICACOES	PT	BEN
6	WHYMOB	WHYMOB LDA	PT	BEN
7	CLINIPOWER	CLINIPOWER FINLAND OY	FI	BEN
8	MUNDICONSULTING	MUNDISERVICOS – COMPANHIA PORTUGUESA DE SERVICOS E GESTAO LDA	PT	BEN
9	HEALTH CLUSTER	HEALTH CLUSTER PORTUGAL – ASSOCIAÇÃO DO POLO DE COMPETIVIDADE DA SAUDE	PT	AP
10	ALMA ZOIS	THESSALONIKI WOMEN ASSOCIATION WITH BREAST CANCER	EL	AP
11	DIABETESLIITO	FINNISH DIABETES ASSOCIATION	FI	AP
12	ENOLL IVZW	EUROPEAN NETWORK OF LIVING LABS IVZW	BE	AP
13	VALLI	THE UNION FOR SENIOR SERVICES, VALLI	FI	AP
14	ADHD HELLAS	ADHD HELLAS	EL	AP
15	HOVI GROUP	HOVI GROUP OY	FI	AP
16	HOSPITAL CVP	CVP-SOCIEDADE DE GESTAO HOSPITALAR S.A.	PT	AP

Universite Gustave Eiffel had requested a termination of the grant.
Associated partners in consortium must implement the action tasks attributed to them. They may not charge costs or contributions to the action and the costs for their tasks are not eligible. Third parties (e.g., enterprises that develop e-Health technologies; association that promotes digitalisation of health services) can give in-kind contributions (e.g., personnel, equipment, other goods), if necessary for the implementation, but they do not implement any action tasks. They may not charge costs or contributions to the action and the costs for the in-kind contributions are not eligible.
In the Table III is presented the Project Management Team.

The Project Management Team:

i. is responsible for liaising with the European Commission and providing progress reports;
ii. provides a secretariat to the Steering Group;
iii. supervises project plan implementation (i.e., monitor and measure progress and performances);
iv. communicates regularly, openly and transparently with the stakeholders;

v. manages stakeholders' expectations, and address their concerns and issues;
vi. recognizes and reward stakeholders' contributions;
vii. evaluates stakeholders' satisfaction.

Table III. Project Management Team

Name	Profession	Role	Lead Beneficiary
Maria de Carmo Gomes	Associate Researcher	Project Coordinator	
Janet Smitson	Director Client Portofolio Delivery	WP1 leadership	ISCTE-IUL
Vasiliky Pavlidou	Associate Researcher	WP2 leadership	AUTH
Tuija Marstio	Pedagogy Master of Business	WP3 leadership	LAUREA
Janet Smitson	Director Client Portofolio Delivery	WP4 leadership	ISCTE-IUL
Octavian Postolache	Full Professor DCTI-ISCTE, Senior Researcher IT	WP5 leadership	IT
Amina Can	Executive Diretor MundiConsulting	WP6 leadership	MundiConsulting
Maria de Carmo Gomes	Associate Researcher	WP7 leadership	ISCTE-IUL
Lina Lindqvist	Communication Manager	WP8 leadership	LAUREA

The team is playing an active role in addressing concerns of different stakeholders, providing a critical voice and a dynamic response to circumstances. The Project Management Team regularly evaluate stakeholders' engagement efforts, and if the needs of external stakeholders are being met, to ensure continuous improvement in project activities and to maintain strong stakeholder relationships.
The current Project Working Team includes 110 professionals, more than one quarter having higher education qualifications on informatics, electrical engineering or physics.

Various activities are being realized for strengthening collaboration between academies and healthcare providers within ManagiDiTHproject. Research on the health system organization, on the companies that provides technologies for healthcare digitalisation, which may be impacted by the outputs of the proposed Master and may contribute for the successful implementation of the Master program was carried out within WP5. The research on stakeholders was focused on the organizations from the three countries from which students are being included in the Master program.

Portugal is EU Member State since 1986. It has 10 467 366 inhabitants (23.4% elderly population in 2022) in a total area of 92 212 km2. Universal National Health Service (SNS) was introduced since September 1979. The financing of different healthcare providers in Portugal may be public, private or from a mixture of public and private sources. National Health Service (SNS) funds derive from the State Budget. However, there are also out-of-pocket payments (co-payments and direct payments by the patient) and a private financing component associated with voluntary health insurance and health subsystems [12]. The most important public health subsystem is the ADSE (Assistência na Doença aos Servidores Civis do Estado – Sickness Insurance for State Employees), which covers all public servants not covered by other special schemes. The ADSE was created in 1963, and currently cover healthcare services for state employees, their consort, dependents, and retirees (i.e., in 2022 has 1 275 582 beneficiaries). In exchange for a monthly deduction (3.5 per cent from their salary or pension), they can access not only public healthcare services but also private healthcare services at lower prices (contracted scheme). They can also opt for the free scheme and be later reimbursement. In the last

years the state budget dedicated to health was about 10% of the Gross Domestic Product (GDP). More than 10 Private Health Insurance Institutions are present in Portugal. The other public subsystems cover some special groups of public servants and are the ADM for the military personnel of the Armed Forces, the SAD/GNR for the military personnel of the National Republican Guard, the SAD/PSP for the police personnel of the Public Security Police and SSMJ for some special professional groups (prison guards, Judiciary Police agents, probation officers, etc.) of the Ministry of Justice.
Health policy, oversight and implementation in Portugal is led by the central government through the Ministry of Health. The Ministry of Health is responsible for planning and management of the SNS, as well as regulating, auditing and inspecting public and private health providers. The Ministry of Health comprises several institutions, some under its direct administration, some under indirect administration and others with public enterprise status (see Figure 1).

Greece is EU Member State since 1981. It has 10 394 055 inhabitants (22.8% elderly population in 2022) in a total area of 131 694 km2. Greece has adopted a highly centralised mixed health system model since 2011, which combines a single health insurer that collects contributions with substantial funding from central government. The National Health System was created in 1983. The Greek healthcare system is characterised by the coexistence of a National Organisation for the Provision of Health Services (EOPYY), compulsory social insurance and a strong voluntary private healthcare system.

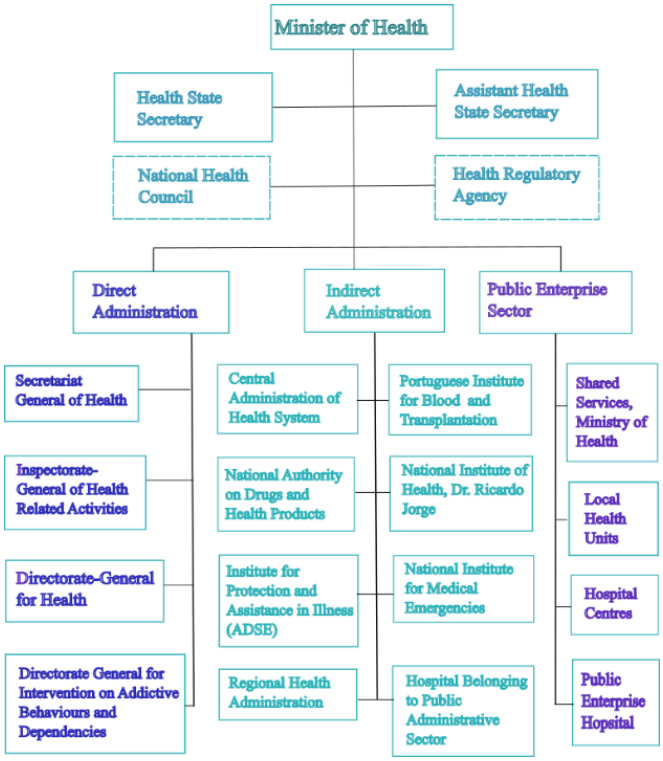

Figure 1. Organigram of Portuguese Ministry of Health. Source: Simões, Jorge de Almeida, Augusto, Gonçalo Figueiredo, Fronteira, Inês. et al. (2017)

The EOPYY manages a unified health insurance fund. Primary and outpatient care and diagnostic services can be carried out by private institution having contracts with the EOPYY. The Ministry of Health is responsible for the extensive regulation of the entire system [13].

Finland is EU Member State since 1995. It has 5 563 970 (23 % elderly population in 2023) in a total area of 338 411 km2. For more than a century the municipalities had responsibility for primary and specialist health care, with support from the government, employers and taxpayers. Municipalities were also responsible for other social services such as nursing homes, child day care, social assistance, basic education and services for the elderly [14]. In Finland public healthcare services are provided to everyone residing in the country. In addition, numerous private healthcare services operate in Finland. [15]. Several measures had indicated that access to care, especially primary care, was poor and existence of relatively large geographical and socioeconomic inequities in access, utilization, and quality of services. To tackle these issues, since 2000 a process to reform the health system was initiated [16]. A major reform was implemented in January 2023 [17]. Health and social services in Finland were reorganized by vertical integration in health care and horizontal integration of health and social services both at the level of administration and organization as well as through processes and patient pathways [16]. Well-being services counties (22 WBSC), including the city of Helsinki and the Hospital District of Helsinki and Uusimaa were created. These are financed from the state budget and governed by elected councils [15].

Figure 2. Division of responsibilities in Finnish health system. Source: Finnish Government

The Ministry of Social Affairs and Health (STM) is responsible for social and health policy and prepares legislation. The ministry steers health care in collaboration with the agencies and institutions under it. Agencies under the Ministry of Social Affairs and Health include: the National Institute for Health and Welfare (THL); the Finnish Medicines Agency (Fimea); the Radiation and Nuclear Safety Authority; the Finnish Institute of Occupational Health (TTL); the National Supervisory Authority for Welfare and Health (Valvira) [18]. Nowadays, the Ministry of Social Affairs and Health has greater involvement in annual planning and investment [17]. Health Innovation Systems (HIS) framework was introduced in 2009 to articulate the intertwining of technical, institutional and organizational gradients in the evolution of medical practice. Finnish HIS are dynamic constructs comprising of a constellations of component organizations engaging health related activities, aiming the coordination of the ecosystem of competences across five dimensions : (i) the body of knowledge that makes up scientific understanding of disease; (ii) the set of clinical practices that shape the provision of diagnostic and

therapeutic services; (iii) the constellation of design and production activities underpinning the supply of medical instruments; (iv) the regulation of health activities to ensure quality criteria; (v) the instituted channels for assessing the effectiveness of patient care, and for receiving and processing the feedback stemming from the front-end [14].

By analysing the ecosystem of the ManagiDiTH was observed a multi-faceted stakeholders' map centerer on the theme of wellbeing. In Figure 3 is represented the interconnectedness of various entities that contribute to public and individual health. The stakeholders are categorized into sectors such as Health and Social Care, Education, Research, Supportive chat cervices, among others. Each sector is represented as a piece of a puzzle, suggesting that wellbeing is a complex construct that relies on the collaboration of different actors including governments, health care providers, educational institutions, commercial entities and non-profit organisations. [19.]

This stakeholder map delineates the intricate ecosystem of wellbeing, where inter-sectoral collaboration is paramount. It underscores the multiplicity of contributors, ranging from policy makers and healthcare professionals to educational institutions and commercial technology firms. The visualization encapsulates how entities such as sports clubs, social media influencers, and municipalities, together with EU funding instruments, shape the wellbeing landscape. Central to this framework is the recognition of the role played by supportive services, such as chat services and technical companies specializing in wearables and wellbeing apps. The encompassing presence of global goals and health authorities signifies the alignment of local and international efforts towards enhancing wellbeing. The conceptual model asserts that the dynamic interplay among these stakeholders is essential for addressing the comprehensive needs of patients, citizens, and consumers in the pursuit of holistic health and wellbeing. [19.]

Figure 3. MangiDITH ecosystem mapping diagram. Source: WP3 Ecosystem Map Report

The students on the Master program may be able to study the effectiveness, accessibility and resilience of different healthcare providers and different health services from different regions of Europe. The different organization of health system and differences in health services from each country may expand the knowledge of the Master students on the ways to enhance quality and effectiveness of preventive, primary or hospital care. Considering only the number of hospitals in each country the Master program may support the training for better management of health system digitisation. Portugal has 241 hospitals (52.7% being private hospitals), Greece has 265 hospitals (51.7% of hospitals being private), and Finland 217 hospital (31.8% private hospitals). Data from Instituto Nacional de Estatística indicates that in Portugal are functioning 2 921 pharmacies. In 2022 in Finland were functioning 815 pharmacies and in Greece in 2020 were 10 427 pharmacies. To facilitate healthcare professionals in documenting transactions, prevent malicious or fraudulent medicine prescription and to restrict pharmaceutical expenditure the electronic prescription was introduced in Greece since 2010 [20]. In Finland electronic prescription has also adopted since 2010, and it became the sole prescription method in 2017 [21]. E-prescription enables a prescriber to electronically send an accurate, error-free and understandable prescription directly to a pharmacy from the point-of-care. Electronic prescription has great importance for the quality and safety of patient care. The Greek national e-Prescription system that initially has mainly an administrative and auditing role for healthcare delivery, was improved by functionalities that enhance patient safety (i.e., prevent potential Adverse Drug Reactions via some kind of “alert” raising), allow the order of lab tests via the same e-prescription user interface, and promote evidence-based policy development through the collected data [20]. In Portugal is functioning at national level electronic prescription since 2015. *PEM Prescrição Médica Electrónica* is an e-Prescription tool that allow drugs prescription in National Health Service of Portugal. This application is available for almost all public healthcare providers as well as for private providers through the *PEM Private Prescribers* application. The SPMS – Shared Services of Health Ministry (Serviços Partilhados de Ministério de Saúde) in Portugal have an important role on providing services related to information and communication technologies for healthcare providers. Most of public hospitals and primary healthcare centres from Portugal use an Electronic Health Records (EHRs) system - *SClinico* that provides access to data on patients for physicians and nurses. In Finland KanTa is a wide ecosystem digitally integrating healthcare service providers and pharmacies through a centralized data source containing records for each Finnish citizen. The KanTa database contains personal healthcare records with a separate partition for medicine prescriptions. The centralized data allow physicians to investigate previous prescriptions ordered by any healthcare service provider while prescribing. Pharmacists access the database to fetch prescriptions when dispensing the medicine, and the prescription can be dispensed in any pharmacy [21].

The inputs from different representative of healthcare providers related with their experience and expectative on e-Health technologies will have great impact on Master contents. The working team identified existence of at least 540 Health Tech European companies, 40 companies being from Portugal, 87 companies from Finland and 22 companies from Greece (see Annex I, II and III) that are developing different type of e-Health technologies (Annex IV). Data on products and services provided by the Health Tech companies was organized in a table following the categories: M-Health; Electronic

Health Records (EHR); Electronic Medical Records (EMR); Situational Awareness, E-Prescription; TeleConsultation; TeleDiagnosis; TeleTreatment; TeleRehabilitation; Ambient Assisted Living (AAL); Questionnaires for Health Included; Information Management System (IMS); Artificial Intelligence (AI); Simulation; E-Health Tech Consulting; E-Learning; Nurse Call; Wearable Devices; In-Home Sensors; Physiological Signal Monitoring; Activity Monitoring; Physical Exercise Planning; Fall Detection; Medication Management; Messaging; Video Connection; Event Log and Reporting; Alert Sent to Physician; Allert Button; Call Center; Mobile App for Helpers (Annex IV). The lists are constantly updated with new information from stakeholders and literature search. Portuguese, Finnish and Greek ManagiDiTH ecosystems includes different organisations that promote digitalisation of health services. These may be health clusters (e.g., DigitalHealthPT; Hellenic Digital Health), public organizations that ensure implementation of different e-Health technologies (e.g., SPMS-Serviços Partilhados de Saúde, Portugal), associations of different professionals (e.g., APDSI-Associação para a Promoção e Desenvolvimento de Sociedade de Informação), innovation centres (i.e., start-ups incubators; research parks; technologies parks). In Portugal are acting two main health clusters (i.e., associations of different institutions that aim to promote digitalisation of health services) – Health Cluster and DigitalHealthPT. Health Cluster is associate partner in the consortium. ISCTE-IUL the coordinator of the project is facilitating access for different ManagiDiTH stakeholders to their innovation centers: AUDAX – Centre for Innovation and Entrepreneurship (i.e, start-ups incubator); and The Centre for the Valorization and Transfer of Technologies (CVTT). The CVTT is a research and knowledge transfer infrastructure created in 2019. This centre is based on the combination of two research reference areas at ISCTE-IUL: social sciences and humanities and digital technologies. Its main objective is to provide integrated knowledge transfer solutions for society, organizations, companies and public administration. In 2020, ISCTE-IUL participated in the creation of the Digital Innovation Hub Artificial Intelligence & Data Science for Public Administration (AI4PA), which consists of a collaborative network that includes specific digital competence centres organised to support the digital transition of Public Administration. The AI4PA's activities are guided by five axes of activity: experimentation (testing before investing); skills and training; strategies for digital transformation; facilitation, intermediation and networking; access to finance. The expertise of the representatives from the associate partner in the project consortium, the European Network of Living Labs IVZW (ENoLL IVZW) would also contribute to increase potential for innovation during project implementation.

It is expected that collaboration with different companies/enterprises, research centres, innovation centers will create an environment for Master students that foster discovery and development of different e-health technologies that may contribute to the digital transition process of the health sector.

In Figure 4 a sample of Stakeholders Affinity Mapping is presented. It allows better visualization of common interests of different stakeholders from different organizations of ManagiDiTH ecosystem. The actors involved in each category are represented by name initials.

The experts on different technologies from the consortium partners were consulted on future digital skills needs using foresight methodology. The team that contributed to the design of Master modules

and Curricular Units includes specialists on informatics or informatics engineering, engineers, specialists in physics or medical physics, specialists in business, health professionals. The foresight methodology is used in decision making process. It elucidates future possible development paths. Foresight has the following characteristics: Action-oriented; Open to alternative futures; Participatory; and Multidisciplinary. For smart specialization (RIS3), foresight studies would ideally combine regional expertise with international expertise that are able to put regional assets in perspective with wider, international trends [8]. The identified main objectives inherent to the professionalisation of specialists for the e-Health sector are related to technologies for: data science and artificial intelligence; interconnectivity, Internet of Things (IoT) and sensing; integration of different technologies that may improve virtualization and provision of health services to digital terminals; cyber-security applied to the protection of databases and the reliability of information systems and digital networks. The designed modules for Master program, resulted from the collaborative work of different experts will enhance the competences of different professionals, for digital transformation of health services, carrying high values for individuals and society.

The Trialogical Learning framework are being used both for contents design of Master Curricular Units as well as during students training. Trialogical Learning "refers to those forms of collaborative learning where people are collaboratively and systematically developing shared, tangible 'objects' (conceptual or material artifacts, practices, ideas) together" [22]. The trialogical approach is not a specific pedagogical model and do not refer on combining processes of knowledge acquisition by individual learners (a 'monological' approach) with processes of participation in social interaction (a 'dialogical' approach), but on understanding those processes where common objects of activity are developed collaboratively (both individually and collectively). It is considered a metalevel framework for identifying, examining, and fostering learning that go beyond mere individual knowledge acquisition or social participation [22].

In Trialogical Learning framework the technologies have an important role for providing practical support for modifying and developing targeted tangible outcomes throughout collaborative pursuing targeted epistemic objects (e.g., artifacts and practices) at the edge of knowing. Collaboration between different stakeholders in Trialogical framework is embedded in heterogeneous networks of artifacts and objects. The teachers identified within consortium members teaching pool, experts in their subfield, are collaborating for co-design of the learning modules of Master Curricular Units by using different information and communication technologies (e.g., *MIRO* - a platform integrated with over 130 apps for collaborative visual thinking, planning, and design, that offers tools for workshops, diagramming, project management, data visualization, and more; *Moodle* - a Learning Management System designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalised learning environments; *Ayoa* - an app that helps generate infinite ideas, accelerate learning, and increase productivity in work and education by combining mind mapping, brainstorming, task management and collaboration features with AI).

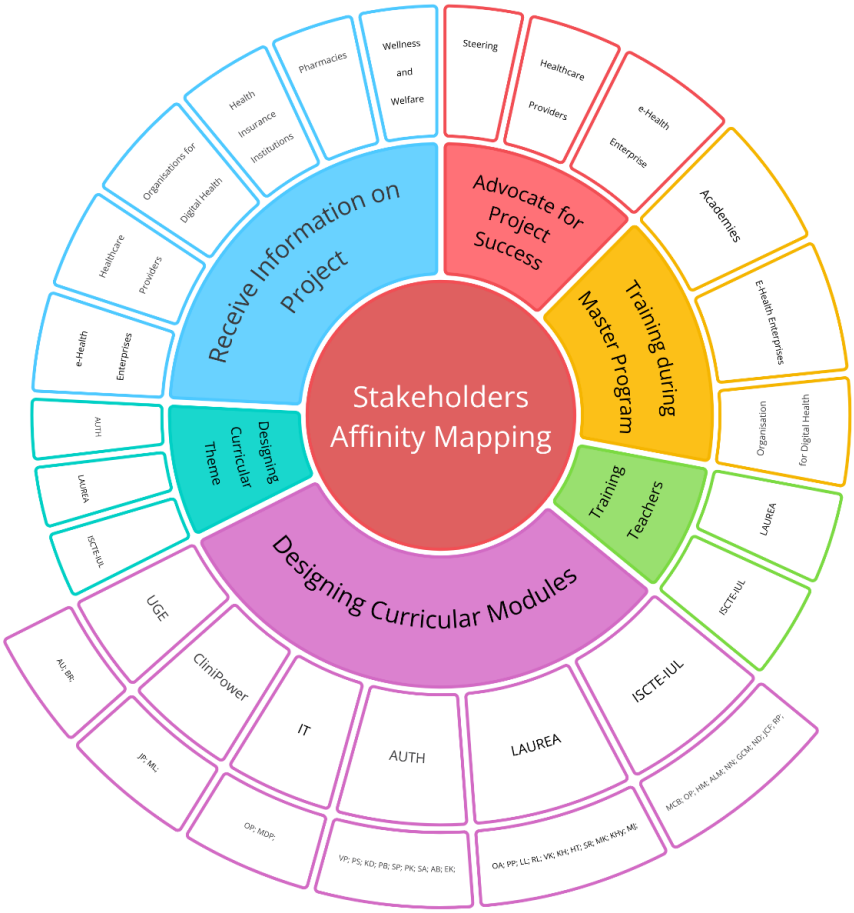

Figure 4. A sample of Stakeholders Affinity Mapping

Collaborative works between different stakeholders is ongoing to design and develop contents of Master Curricular Units that include videos, gaming, podcast, assignments, puzzle, in MOOCs (Massive Open Online Courses). Webinars, online learning boards, digital living labs will also be used during Master program to co-create knowledge and skills. Throughout Trialogical Learning approach, teachers are defining:

i. what learning content can be internalised thorough individual knowledge acquisition (monological);
ii. how learning can occur through participation in communal activity (dialogical);
iii. what learning content requires creation of knowledge.

The project team is pursuing the development of communities of practice (i.e., based on Wegner's theory of learning) and the culture of interdisciplinary co-creation by joining representatives of different enterprises in project activities. It is expected that representatives of different healthcare providers or of companies/enterprises that develop e-Health technologies will collaborate during project ManagiDiTH implementation:

i. to inform on different issues that require research for solutions;

ii. for co-production of teaching material;
iii. or for creating internship opportunities and innovation environment.

The pool of teachers and specialists will function not only as examiners and facilitators but also as mentors who will support the students' orientation process in the definition of their research project and, later, of their own professional development paths. The European network that the project provides will significantly enlarge the range of experts and mentors to mobilize the best experiences and visions, and a wider context of cooperation.

The project working team is constantly seeking inputs from representative of companies/enterprises and healthcare providers and is creating an environment of collaboration in which representative of enterprises specialised in e-Health technologies may participate with their ideas and feedback for improvements of project activities.

Continuous communication, collaboration, consultation with stakeholders are necessary:

i. to evaluate their needs, concerns, and expectations;
ii. shared understanding of project objectives;
iii. positive engagement of stakeholders;
iv. manage opposing opinion;
v. efficient allocation of resources;
vi. identification and mitigation of potential risks during project activities;
vii. leveraging stakeholders feedback for ongoing project improvement and course correction;
viii. to adapt and evolve project activities in response to changing circumstances.

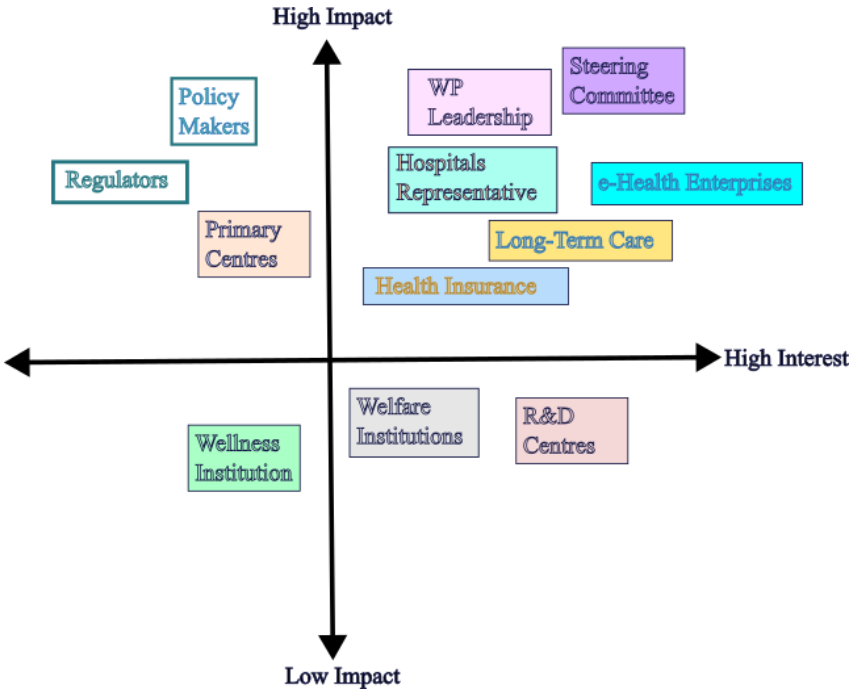

Figure 5. Example of priorities determination using data on interests and impact on the project outputs.

Stakeholders engagement in the activities of ManagiDiTH project require a good communication plan. Communication between stakeholders will be realized through emails, SMS, social media, or by regularly updating information from the project website. An attractive and dynamic web page of the project was built as a tool for communication with external stakeholders and dissemination of project activities (see https://managidith.eu/). Communication with external stakeholders shall include vision statements and objectives, how the process will unfold, what the value they may obtained from collaboration with ManagiDiTH team. A clear and in accessible manner information delivering contribute for stakeholders' engagement. To enhance external stakeholders motivation to collaborate on project activities, the team shall design tailored messages that may consider information on their profiles, activities, the value that they may obtained from collaboration with ManagiDiTH team. Efficient communication is established also by defining priorities in message and feedback delivering. To define priorities on communication and collaboration with different stakeholders, different group of stakeholders shall be arranged in a grid according to their influence and potential impact on project outputs. Each stakeholder individuals with strong influence and expectations as well as those with high influence but lower expectation would be kept engaged by regular communication. Stakeholders with limited influence can be contacted on an as-needed basis. A sample of organisation of data of different categories of organisations from the ManagiDiTH ecosystem that consider their influence and impact on project activities is represented in Figure 5.

Targeted visits to stakeholders, meetings with local and regional representative of healthcare providers, representatives of companies/enterprises that have products and services related to e-Health, organisations that promotes digital health, policy makers, regulators, are included in communication plan. Newsletter and leaflets will be designed and distributed for communication of project activities.

The planned workshops in the ManagiDiTH project are contributing for communication with companies/enterprises, healthcare providers, and other stakeholders for better identification of their needs and concerns related skills and competences for digitalisation of health services. There are also used to disseminate project activities. Participation in conferences is also included in communication plan.

The high numbers of different specialists in the project, with many different views on the issues in the project turn difficult the communication both between internal and external stakeholders. The Smart Specialisation Guide [8] recommend organisation of a group of 'boundary spanners', people with interdisciplinary knowledge or proven experience in interaction with different actors, and who can help moderate the process and manage potential conflicts.

4. Conclusions

The ManagiDiTH project ecosystem is a complex ecosystem that includes at least eleven categories of organisations: academies that design, promote, and implement smart specialisation for digital transformation of health services; research centres on e-Health technologies; organisations that

promote digitalisation of health services; healthcare providers; enterprises that have product or services related to e-Health technologies; health insurance institutions; pharmacies; wellness institutions; welfare institutions; policy makers; regulators. Engagement of different stakeholders from these organisations requires a cross-functional collaboration between specialists in different scientific domain and between project team and end-users of the Master program as well as a communication plan that is tailored to stakeholders' profile, activities, interests, influence and impact on project outputs, and which may be adapted to different circumstances. The stakeholders data analysis is contributing for better understanding of ManagiDiTH ecosystem, better visualization of the participants in the project, their interests and engagement effort. Complexity of the relationships in the ManagiDiTH ecosystem and the multitude of ecosystem players require continuous updating of external stakeholders list and strategy for their engagement in the Master program.

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Annex I. Portuguese e-Health companies, associations that promote e-Health and research centres

Name of Organizations	Web Link	Summary Description of e-Health Product or Service	Type of Institution
Instituto de Telecomunicações	https://www.it.pt/	IT is divided in five research units: Wireless Technologies; Optics&Photonics; Information&Data Sciences; Networks&Services; Basic Sciences&Enables Technologies. Create and disseminate new knowledge and support advanced training in the broad field of the Technologies of Information, Communications and Electronics (TICE), with a special emphasis on Telecommunications.	Research&Development on e-Health
INESC Group	https://inesc.pt/	Research domains: artificial intelligence; bioengineering; system engineering and management; communications; computer science and engineering; photonics; robotics; power and energy system. Research centers: Applied Photonics; Biomedical Engineering Research; Enterprise System Engineering; Innovation Technology Entrepreneurship; Advanced Computing System; Robotics and Autonomous System; Human-Centered Computing System; Telecommunications and Multimedia; Artificial Intelligence and Decision Support; High Assurance Center; Industrial Engineering and Management; Power and Energy System; Robotics in Industry and Intelligent System.	Research&Development on e-Health
UNINOVA - Instituto de Desenvolvimento de Novas	https://www.uninova.pt/page/organisa	UNINOVA is divided in two research units: CEMOP—Centre of Excellence in Microelectronics Optoelectronics and Processes; and CTS—Centre of Technology and Systems.	Research&Development on e-Health
Instituto Pedro Nunes	https://www.ipn.pt/laboratorios	IPN is divided in seven units: LAS - Laboratory of Automation and Systems; LIS - Laboratory of Informatics and Systems; LED&MAT - Laboratory of Wear, Testing and Materials; LEC - Laboratory of Electroanalysis and Corrosion; LABGEO - Laboratory of Geotechnique; FITOLAB- Laboratory of Phytopathology; Business Incubator - IPN helps start-ups with technical guidance in the establishment and early stages of business development, tutorial follow-up for developing business plans, support for attracting investment and securing funding, intellectual property and legal assistance (e.g. technology transfer contracts and the registration of patents or trademarks), access to and contact with various national and international research centres, knowledge institutions and sources of funding.	Research&Development on e-Health
ALLAB - Assisted Living Computing and Telecommunications Laboratory	https://www.ubi.pt/Entidade/ALLAB	Laboratory at University Beira Interior. Research on technology for Ambient Assisted Living.	Research&Development on e-Health
Franhoufer	www.franhoufer.pt	Fraunhofer Center for Assistive Information and Communication Solution AICOS. Fraunhofer Portugal promotes and coordinates the cooperation between its research centers, other research institutions and Industry partners, with the objective of undertaking applied research of direct utility to private and public enterprises and of wide benefit to society. Franhoufer Headquarter is in Munich, Germany.	Research&Development on e-Health
Health Cluster Portugal	https://www.healthclusterportugal.pt/	Health Cluster Portugal (HCP) is a private non-profit association, founded in 2008, that currently brings together more than 220 members, including R&D institutions, universities, hospitals, organisations from civil society, and companies in the areas of pharmaceuticals, biotechnology, medical technologies, and services. Health Cluster Portugal's mission is to make Portugal a competitive operator in the research, design, development, manufacturing and marketing of health-related products and services, in selected niche markets and technology, targeting the most demanding and relevant international markets in a framework of recognition of excellence, technological level, skills and competences in the field of innovation. Goal: Transform knowledge into value; Improve Portugal's global competitiveness; Contribute to the health and well-being of citizens	Association that Promotes e-Health
APDSI - Associação para a Promoção e Desenvolvimento da Sociedade da Informação	https://apdsi.pt/	Exploratory Study: "Mapping Competences Needs on ICET (Information, Communication and Electronics Technologies), for training curricula adaptation"- "Mapeamento das necessidades de competências na área das TICE (Tecnologia de Informação, Comunicação e Eletrónica) visando o ajuste da oferta formativa"	Association that Promotes e-Health
Apormed - Associação Portuguesa das Empresas de Dispositivos Médicos	https://www.apormed.pt/index.php/sc	Representation of the common interests of companies producing or marketing health technologies. Promotion of high standards of competitiveness and quality and good business practices among its members. Promotion of a climate of collaboration and dialogue with the public authorities of the sector, the community of healthcare providers and patient advocacy organisations, aiming to support all actions that strengthen the guarantees of quality and safety of products and the full access of citizens to the most innovative health technologies. Support, through international organisations representing the sector, for the adoption of a global regulatory strategy. Participation in campaigns aimed at preventing the risks of inappropriate use of medical devices. Promotion of the relevance and benefits of health technologies to the public.	Association that Promotes e-Health
EIT Health	https://eithealth.eu/what-we-do/	Build an ecosystem where fresh thinking in healthcare can thrive. Our network connects world-class organisations across Europe from the three worlds of business, research and education. We call this meeting point the 'knowledge triangle' because it's where life-changing ideas happen.	Association that Promotes e-Health
Digital Health Portugal	https://european-digital-innovation-hubs.ec.europa.eu/edih-catalogue/digihealthpt-digital-health-portugal-website/about; https://www.digitalhealthportugal.eu/	Association of Health Cluster Portugal; EIT Health; Fraunhofer Portugal AICOS; Glintt; IPN - Automatics Lab; Value4Health Colab; IPN-Incubadora. Based on a coherent, multidisciplinary and agile structure and with the complementary competences of more than 30 partners - universities, research institutes, technology centers, hospitals, the association is committed to jointly support the modernization of the health sector. By capitalizing on their involvement in national and international networks and previous experience in setting up DIHs and providing services, DigiHealthPT members will support the digital innovation strategy for health, in line with major trends (e.g. tech-enabled healthcare, open innovation, data-driven prediction, patient 2.0, value-based healthcare) and European policy objectives and strategy. Digital Health Portugal was co-founded by a partnership between Cucabytech and col.lab collaboration laboratory with a vision to promote and scale up the growth of the Digital Health ecosystem in Portugal.	Association that Promotes e-Health
SPMS - Serviços Partilhados na Saúde	https://www.spms.min-saude.pt/	Part of Ministry of Health SPMS is a public institution that provides specific shared services in the area of health in terms of information and communication systems and technologies, purchasing and logistics, financial services, human resources, and other complementary and subsidiary activities, to all establishments and services of the SNS, regardless of their legal nature, when they carry out activities in the health area.	Company
Glintt Global	https://www.glinttglobal.com/	Create cutting-edge solutions that enhance patient care, ensure efficient interoperability, and empower healthcare professionals. Our commitment to a connected global care ecosystem reflects our ambition to make a positive impact on society's overall health. Let's bridge the gap between technology and healthcare, creating a digital world where innovation enhances the services provided by hospitals and pharmacies.	Company
Medtronic	https://www.medtronic.com/pt-pt/you	Transnational Corporation (Headquarter in Minnesota, USA). Health System Solutions. From AI to connected care and beyond, our technology is building a bridge to better health for more people.	Company

Name of Organizations	Web Link	Summary Description of e-Health Product or Service	Type of Institution
Iberdata Hospitalar	https://www.iberdata.pt/	IBERDATA SA has partnered with IBERMAN SA (GEE Group), the largest Spanish company in the hospital technical assistance sector, allowing to offer a more comprehensive and innovative set of services. From the simplest aspects of maintenance to the most complex, we have the solution for preventive and corrective actions, for electromedical equipment, electrical safety installations in critical areas (Block, ICU, Emergency) and computer systems.	Company
Accenture	https://www.accenture.com/pt-pt	Transnational Corporation (Irish-American Professional Services based in Dublin). Technology consulting, Technology Innovation, Artificial Intelligence, Application Services, Cloud, etc	Company
NTT Data Group	https://www.nttdata.com/global/en/	Transnational corporation (headquarter in Tokyo, Japan). NTT DATA offers a consultative approach and deep industry expertise to deliver practical and scalable IT solutions that help organizations accelerate their digital journeys. Services: Applications Services; Cloud&IT Infrastructure; Digital Workplace; Automation; CX&Design; Emerging Technologies; BPO&Digital Operations; Cybersecurity; Innovation; Business and Tecnologies Consulting; Data Analytics.	Company
LinkedCare	https://www.linkedcare.com/	Transnational Enterprise (headquarter Haryana, India). Electronic Health Records; teleconsultation	Company
Pulmocor	https://pulmocor.pt/site/	Devices for cardiorespiratory monitoring; Devices for Neurology	Company
Healthy Systems	https://hltsys.pt	Data Protection; Interoperability; Privacy; Servidors and Services Monitoring	Company
Prologica	https://www.prologica.pt/	Intelligent systems to assist the healthcare professional in collecting, monitoring and analysing data (PROMs, PREMs and costs). Our solutions integrate with the clinical and administrative systems of Hospitals.	Company
Hope Care S.A.	https://hope-care.pt/	Hope Care is a Digital Health Company that advances healthcare through advance remote patient monitoring (RPM) solutions. Our cloud-based RPM system, HCAlert, utilizes predictive algorithms and artificial intelligence, providing healthcare professionals with near-real-time insights.	Company
Cesadi - Centro de Saúde Digital	https://www.cesadi.pt/	Telemedicine; Home-Care	Company
MedicineOne	https://www.medicineone.net/	Telemedicine	Company
UpHill Health	https://www.uphillhealth.com/	Hilli - digital assistant for health professional, Simulate - the clinical simulation tool for behavioral changes	Company
Centro de Telemedicina Prof. Dr. Marcio Navalho	https://www.centrodetelemedicina.co	Our goal is to provide high-quality tele-imaging care, mainly of the most differentiated technique, Magnetic Resonance	Company
KnokCare	https://knokcare.com/about	A white-label solution with 50+ togglable internal apps and an open API that fully integrates with any of your existing systems.	Company
S4Med	https://s4med.pt/sobre/	S4MED has been recognized for the care shown in the selection of high quality devices and equipment that it provides to its customers, as well as in the maintenance and technical assistance service in a preventive and corrective way.	Company
Virtual Care	https://virtualcare.pt	EMR gynecology, EMR breat pathology, VC SIRAI - adverse effect to medication, VC PsychCare - prescription of antipsychotics	Company
iLOF	https://ilof.tech/	Transnational Engterprise (London and Porto). Patient centric drug development	Company
Critical Software S.A.	https://www.criticalsoftware.com/pt/	We test and develop software in highly regulated markets, ensuring compliance with the most demanding international standards.	Company
Instituto Nacional de Saúde Doutor Ricardo Jorge	https://www.insa.min-saude.pt/	Epidemological Studies; Health Information Dissemination	Company
PDMFC Group	https://www.pdmfc.com/	Consulting Enterprise	Company
VirtualLeap-Improve your brain health with VR	https://virtuleap.com/	Enhance the cognitive assessment and training industry with the help of VR and AR technologies	Company
Sword Health	https://swordhealth.com	Transnational Enterprise - Utah, USA. Sword combines proprietary artificial intelligence with rigorous clinical expertise to achieve a 60% reduction in surgery intent and an engagement rate of 5x traditional physiotherapy. Provide Sensors for Remote Monitoring of physiotherapy. Today, Sword is the leading patent-holder in digital solutions addressing physical pain and serves more than 1,300 employers and health plans across three continents, including many Fortune 500 companies.	Company
Actif	https://www.actif.online/about	Actif is a digital platform that promotes the quality of life of older people, providing personalized and optimized physical and cognitive activity sessions for groups and individuals, automatically generated taking into account the health conditions of each user and the institutions' available resources. The contents are presented through recorded videos, with different intensities and durations.	Company
Nuada:Your Life Hands-On	https://nuada.pt	Nuada Exo Glove for remote motor rehabilitation	Company
PLUX Wireless Biosignal S.A.	https://www.pluxbiosignals.com/	Wearable devices for heart and respiratory function monitoring	Company
Best Health4U	https://besthealth4u.pt/	Apps for remote wound monitoring	Company
Ablute	https://www.ablute.pt/Medical-device	Apps for remote analysis of urine (device included in toilet)	Company
Wisify Tech Solutions	https://wisifytech.com/pages/about-u	Apps for body composition analysis	Company
Synthetic User	https://www.syntheticusers.com/	Transnational Enterprise - Los Angeles, USA; Lisbon, Portugal; London, UK. Artificial Intelligence based synthetic user.	Company
VOH Colab - Value for Health Colab	https://vohcolab.org/pt/	Association between VOH Laboratory from Nova University of Lisbon, Franhoufer, CUF - Healthcare, Vodafone. Our activities combine research and service delivery, given our goal of transferring knowledge and technology from academia to society. Multi-disciplinaity and digital transformation are the disruptive forces that guide Value for Health CoLAB to achieve innovative results with added value for society and the health market. Contribute to a Global Value-Based Healthcare Network Defending and respecting the voice of citizens Transfer knowledge Promoting Health Literacy Working for the sustainability of health systems Innovating to bring added value to Health Ensuring data integrity, security, and reliability.	Association that Promotes e-Health
AI4PA-Artificiall Intelligence&Data Science for Public Administration	https://ai4pa.pt/	The AI4PA Digital Innovation Hub aims to optimize public policies in the various areas of governance, through the promotion of innovative digital solutions based on Artificial Intelligence and Data Science. The objective of the Hub is to support the digital transformation in the various areas of intervention of the State, through the development of innovative management services and solutions, and to increase the skills of public entities and small and medium-sized enterprises (SMEs) that provide services to them. The Pole's activities are guided by five axes of activity: Experimentation (testing before investing); Skills and training; Strategies for digital transformation; Facilitation, intermediation and networking; Access to finance.	Association that Promotes e-Health

Name of Organizations	Web Link	Summary Description of e-Health Product or Service	Type of Institution
Altice Labs - Enabling Digital Society	https://www.alticelabs.com/solutions	Smart Life; Digital Business and Operations; Advanced Connectivity; Industry Digitalization. Smart Life - Focused on smart environments and interactions, smart life solutions designed by Altice Labs bring together smart connectivity with intelligent integrated personal and home devices, making digital an enabler for enhanced wellbeing and life experience.	Company
BMD Software	https://www.bmd-software.com/	PACScenter - access medical imaging studies from any device with native-like experience, including advanced diagnostic tools, reporting, sharing, pre-fetching and multi-monitor support; NeoScreen - complete platform for decision support in newborn screening programs based on MS/MS technology, allowing the detection of abnormalities related to metabolic diseases; Cardiobox - access ECG studies from multiple institutions with native-like experience, including advanced diagnosis and reporting tools.	Company
F3M Information Systems	https://www.f3m.pt/	F3M is a company with more than 30 years of experience in IT sector, providing software and services to the areas of social economy, healthcare, scouting and training.	Company
iCognitus	https://www.icognitus.com/services/	ADS app - is a tool designed to suggest a personalized treatment based on the user's symptoms and the best evidence in medicine in mild to moderate depression scenarios; Biosensors aims to develop mobile apps based on bio-signals acquisition (IoT, wearable sensors) in order to provide intelligent biofeedback systems for stress and brain aging management; CovidLearning is an online platform that incorporates intelligent interaction tools (ML, NLP) to identify and provide access to the latest scientific evidence regarding COVID-19; Educational Digital Assessment.	Company
Promptly Health	https://promptlyhealth.com/en/compa	Data Collection; Data Harmonization; Data Analytics; Consulting	Company
Unipartner	https://www.unipartner.com	Consulting and Advisory Services; Cloud, Infrastructure and Security; Application Services; Managed and Outsourcing Services	Company
Alert Life Science Computing	https://www.alert-online.com	The ALERT® clinical software is a touchscreen global Electronic Medical Record (EMR) with Health Information Exchange (HIE), Personal Health Record (PHR), Patient Data Management System (PDMS), Planning System (PS) for healthcare and a Business Intelligence (BI) clinical system. Web and cloud enabled, adopted in several countries and deployed in nationwide, statewide and enterprise-wide projects, in both public and private settings, ALERT® software complies with local and international product certifications and requirements. ALERT® solutions are locally configured in each market, and their commercialization and implementation is performed by ALERT or local partners. A 24-hour/day and 7 days/week Network Operations Center (NOC) for preventive and reactive support is provided to ALERT clients around the world.	Company

Annex II. Finnish e-Health companies (partially list)

Name of Organizations	Web Link	Summary Description of e-Health Product or Service	Type of Institution
iSTOC	https://istoc.io/istoc-solution-faster-cheaper-more-efficient/	iSTOC has developed a disruptive mobile solution IDA (immediate diagnostics and analytics). IDA mobile application allows the smartphone user to rapidly record outcome of Lateral flow tests (LFTs) by using the device camera. In addition to a digital storage of the measurement data, the IDA IDR mobile application provides a safely stored image of the LFT test outcome.Variety of lateral flow tests are supported. New test types can be configured onto the system in just a matter of days. Currently the following tests are included: Malaria; Covid-19; Dengue; HIV; HAV; HBV; HCV.	Company
Medixine	https://medixine.com/	Medixine's software platform integrates with measuring devices to provide real-time insights for healthcare providers and improved outcomes for patients with chronic conditions.	Company
Vivago	https://www.vivago.com/	The Vivago solution covers the entire care chain from home care to assisted living, hospitals and rehabilitation.The Vivago solution measures the user's activity levels and movement as well as the amount and quality of sleep. Automatic reminders and alerts on any significant changes to the customer's condition help the nursing staff to react quickly and allocate the resources to where they are needed. The Vivago solution automatically calls for help if the customer is unable to do so. Vivago's technology and patented solutions support the renewal of care processes and the real-time, objective review of treatment results. The precise analytics produced by the Vivago solutions reduce unnecessary policies and make the monitoring of wellbeing data easy and effortless.	Company
Ascom Healthcare Platform	https://www.ascom.com/fi/	Ascom is a global supplier of mobile workflow and ICT solutions, focusing especially on health care. Our goal is to improve the flow of digital communications and enable you to make the best decisions anywhere, anytime. We offer mission-critical and almost real-time solutions for mobile operating environments requiring fast response.	Company
Benete	https://benete.com/	BeneCare is designed to support elderly care staff, nurses, doctors and the daily work of physiotherapists. The service is used to ensure that customers round-the-clock, safe follow-up, making nursing work more efficient and meaningful. A person's daily activities and practices are modelled with agile sensor technology and using intelligent algorithms. With this information, professionals detect their clients changes in health, well-being, functional capacity and cognition, and can respond to the needs of customers in need of immediate care at an early stage.	Company
Cardiolyse	https://cardiolyse.com/	Cardiolyse is a cloud ECG & HRV analytics platform, that enables real-time remote heart health monitoring, providing plain personalized reports, detection and up to two months data-based prognosis on dangerous heart events	Company
Predicell	https://predicell.com/en/	Collecting, processing, and understanding wellbeing data	Company
Soenia Medical Diary and Cloud	https://soenia.fi/	Soenia@Medical Diary - track symptoms any time anywhere; When the healthcare professional has SOENIA® Cloud in use, the symptom inputs sync straight to the cloud, where the professional can see them in real-time. The medical personnel get comprehensive statistics of the symptom activity at any given time.	Company
Buddy Healthcare	https://www.buddyhealthcare.com/en/	Engage patients with na app; Improve operational efficiency with automated care; Follow up patient progress with remote patient monitoring; Patient data collection and reporting; Standardized questionnaires digitised in Buddy Healthcare Platform.	Company
Kaiku Health	https://kaikuhealth.com/	Digital therapeutics platform for cancer care. It enables digital patient-reported outcome monitoring and intelligent symptom tracking, real-world data for clinicians and seamless care experience for patients.	Company
Medanets	https://medanets.com/	A nurse can retrieve patient EMR/EHR data, manage bedside documentation and access evidence-based practice via a mobile device at the point of care. The solution enables safe, effective and more hygienic information flow. The app is currently used in more than 50 hospitals and primary health care units in Finland, Sweden, and Norway.	Company
Medicubex	https://www.medicubex.com/fi/	The self-check station allows the measurement of vital signs and risk factors enabling enhanced remote appointments, which helps maintain social distancing. MedicubeX is working closely with the University of Helsinki and international partners on the implementation of UV-C based sterilisation technology.	Company
Movendos	https://movendos.com/en/	Is a company focusing on digital and remote healthcare solutions. The digital solutions enable access to care and improving health from any location. Movendos Health Platform enables selected easy to use services related to need- and symptom-based time reservation, remote appointments, chat and non-urgent messaging, data collection, surveys and reporting. The solution enables easy access to right care at the right time and gives professionals fluent daily tools, being it traditional reactive sick care or emerging preventive care. In Finland, more than 100 service providers trust Movendos services	Company
HealthFox	https://healthfox.fi/en/	Imaging Room will provide service to surrounding areas within a 2-10 km radius. This will be developed together with the local teleoperators and HealthFOX ecosystem partners, to enhance connectivity and service to the area. By integrating patient information from multiple data sources into one-snapshot view. HealthFOX are creating an eco-system to provide the best solutions to doctors and patients for everyday use. From medical hardware devices to software innovations and other smart technologies we provide an integrated collaboration opportunity for local and international markets.	Company
Mumo	https://mumo.care/?lang=en	Is a secure communication platform designed especially to the healthcare and homecare sectors. AI powered virtual assitant. The service is already widely used in hospitals, care homes and companies operating within the medical and healthcare sectors. MUMO is a KELA (The Finnish Social Insurance Institution) approved and recommended provider of services.	Company
M24Connect	https://www.m24connect.com/en_US/	M24Connect is a complete solution for healthcare organisations that want to complement their physical practice with a virtual one	Company
Near Real	https://www.near-real.com/	Teleconsultation: video, audio, chat, screen sharing. Telehealth	Company
Somia Reality Oy	https://ninchat.com/	Ninchat app offers secure messaging for healthcare and other demanding industries. Is a secure messaging platform that supports chat and video communication between healthcare providers and their patients. The product includes one-to-one messaging, group messaging, internal team messaging, support for bots and automated pre-screenings, and suomi.fi strong identification. It is fast to deploy and adjustable to customer's look & feel.	Company
Olwel	https://olwel.com/en/	Olwel is a Finland based company aimimg to improve the healthcare system in developing countries. The operating location is in Dhaka, Bangladesh. Olwel platform supports two-way follow-up mechanism with patient data at doctors' fingertips to monitor patients' progress and referral to the right hospital at the right time	Company

Name of Organizations	Web Link	Summary Description of e-Health Product or Service	Type of Institution
OivaHealth	https://oivahealth.com/	Virtual Care platform is designed for primary healthcare, social care, hospital healthcare and long-term care services.Offers a complete remote care platform with all necessary tools for social- and healthcare service providers for care beyond hospital walls, and also for communication between patients in service homes and their family.	Company
9Solutions	https://9solutions.com/en/	Home Care solution; Care Home solution; Hospital Solution; Personal Safety solution. Leading provider of indoor location-based safety, communications and smart care solutions. Nurse Call Lite is a Plug&Play nurse call system with voice connection designed for the acute and temporary needs of hospitals and care homes. Voice communication enables the patients to contact the nurses and vice versa and allows minimising physical contact with infectious patients.	Company
Aiforia	https://www.aiforia.com/	Is a first-in-class, versatile cloud-based software that increases the speed, accuracy and consistency of analysing large and complex medical images in medical research, drug development, and more. The company's deep learning AI can be deployed easily to analyse any feature or pattern in a matter of seconds — for example lesions or inflammatory cell infiltrate in lung tissue caused by acute respiratory distress syndrome (ARDS) such as in cases of coronavirus infection.	Company
Popit	https://popit.io/	Has released a research extension called POPIT INSIGHTS™, providing real-time data on how the medications being researched are taken. At the same time data quality is improved, since patients in the study take their medications more consistently thanks to Popit's clinically validated adherence improvement impact. The new tool basically reduces missed pills and makes studies faster.	Company
Hygga	https://hyggasolutions.com/en/	Hygga is offering a solution for smoother real-time resource allocation for public and private dental and general healthcare units. The smart model is built around an ERP system, Hygga Flow, which increases control over functionality, makes operations smoother and more transparent with real-time data to support operations and continuous development.	Company
KlinikHealth	https://klinikhealthcaresolutions.com/	A healthcare technology company delivering AI-based solutions for intelligent patient flow management. Their flagship solution Klinik Access used by over 400 healthcare units in Finland, UK and Portugal. The goal is to keep patients and professionals safe by directing patients to appropriate care based on their urgency whether it is self-care instructions, contact to the primary care unit or an emergency care.	Company
Steerpath	https://www.tech.steerpath.com/smart-hospital	Indoor Navigating and Positioning App. A leading provider of digital wayfinding solutions, is helping hospitals with their operational comms and orientation of new temp staff. Steerpath Campus Guide for Hospitals is using the latest digital mapping and wayfinding technology to transform hospital facilities into interactive digital space. It is an easy to use mobile tool for searching, navigating, and working across the hospital campus – from the parking lot to the patient room.	Company
UHC-Unitary Healthcare	https://unitary.fi/	Uoma is a patient logistics system that connects all the professionals related to patient transfers and acts as a secure communication platform between organisations	Company
TrueMed	https://truemedinc.com/	Detect counterfeits and verify medication authenticity across your supply chain using just a mobile phone camera	Company
LabQuality	https://www.labquality.com/	RA/QA expert team offers support in getting products available in the market. With vast expertise in registering medical devices, IVD solutions, PPE, and medical software, the company helps device manufacturers acquire CE markings and global regulatory approvals.	Company
Secapp	https://www.secapp.fi/	Is a SAAS platform used to send out millions of emergency alerts and mass notifications every year. Secapp helps save lives by reaching vital professionals faster and more secure way than e.g. communications channels made for consumers. In addition, Secapp allows to collect and report critical data such as the number of patients per region, ICU capacity and occupancy and the adequacy of personnel and protective gear.	Company
MyNavigo	https://mynavigosolutions.fi/	Human-centred operating models and user-oriented digital solutions for promoting well-being. Mynavigo-guider enables initial guidance to promote customer well-being to the required support; and mynavigo-effect evaluation of the effectiveness of support measures. The solutions can be used together or separately and can be formulated for different uses according to customer needs.	Company
Oura	https://ouraring.com/	The company behind the smart ring that provides personalised insights on sleep and overall health, measuring body temperature directly from the skin rather than estimating it from external environment. Temperature is a vital component of accurate sleep analysis, athletic performance, and the ability to uncover potential signs of illness.	Company

Annex III. Greek e-Health companies and associations that promotes e-Health

Name of Organizations	Web Link	Summary Description of Product or Service	Type of Institution
HDHC-Hellenic Digital Health Clus	https://www.hdhc.gr/en	The Hellenic Digital Health Cluster - HDHC - was founded in March 2021 and is based in Athens, Greece. It is a dynamic initiative of the Foundation for Research and Technology – Hellas (FORTH) that aims to include Greece among the leading countries in the field of digital health internationally. HDHC includes 30 innovative and dynamic companies of the digital health ecosystem in Greece and internationally, as well as FORTH.	Association that promotes e-Health
Capemed	https://www.capemed.gr/	Its core sectors of expertise are medical software, e-health, with emphasis on telemedicine, and medical informatics, focusing on machine learning. NetMed360, a web-based, cross platform Electronic Medical Record (EMR) and office management solution, addressed to health care providers. A RIS solution which is DICOM compliant and seamlessly integrated with NetMed360, for exchanging information with different modalities in the clinic, addressed to Radiologists.	Company
Cogninn	https://cogninn.com/	Solutions that can be found in Telecommunications and Internet, biomedical, finance, electronics and energy industries. Employ AI to enhance existing or building new computational science and engineering tools solving important problems of this century thanks to the advances in computing technologies. PRIMA -Privacy preserving IoT data analysis using federated machine learning protocol; CoLAA - Cooperative proactive resource management for 5G in unlicensed spectrum; DeepWAR -Deep learning enabled Web AR application; 5G SaaS -5G Software-as-a-Service; Cybersecurity for Telecommunication and Internet; AR45G - AR applications for 5G network; 6G URLLC - 6G for Ultra Low Latency Communications; MoDASH -Mobile DASH services using NFV for small cell networks.	Company
Computer Solutions	https://www.csl.gr/	Computer Solutions S.A. (CSSA) was founded in Athens in 1987, as a result of the cooperation of experts in the fields of Information Technology and the Health Care Sector. CSSA is one of the leading Health IT solution providers in Greece. CSSA's portfolio consists of many successful software products, including a complete IHIS platform (ASCLEPIOS™ HOSPITAL) that covers all functional areas of a modern Health Care institution and a mature cloud Personal Health Record (MedIndoBook™ for web, Android® and iOS®). It's ongoing Research & Development (R&D) projects mainly focus on the areas of Artificial Intelligence (A.I.), Machine Learning, Big Data Analysis & Administration, Chronic Disease Monitoring, Biosignals and Computer Vision & Image Processing, Distributed Networks and Safety/Data Security-Privacy.	Company
MyCancer	https://mycancer.gr/	CureCancer is a patient-centered and patient-driven platform, offering patients and their families comprehensive support in cancer care and prevention. Patients organize their files, record their symptoms in real time and in real world, and with one click communicate with their doctors. Early reporting of patients' symptoms leads to early diagnosis, and successful treatment. Furthermore, patients' data, real world, and real time, increase the accuracy of clinical trials and map social/work/economic issues following cancer diagnosis to assist health care policy. At CureCancer, users have access to a list of health care professionals and high-quality products.	Company
e-Trikala	https://www.e-trikala.gr/	e-Trikala S.A., an emerging company, formed within the Municipality of Trikala. The Municipality is the basic stakeholder owning 99% while the remaining 1% is owned by the local Chambers of Commerce. By creating infrastructure and by providing services, e-Trikala continuously aims to the development of Information and Communication Technology (ICT) based applications, oriented to the improvement of all citizens' everyday life, in a medium sized city, simplifying public transactions, reducing telecommunication costs and delivering new services related to the local way of life. Moreover, these ICT applications offer new ways and methods that enable citizens participate on policy-making, while in parallel establish local Government and Public Authorities as guarantors of local society's every day proper, digital and distanced operation. E-Trikala S.A. operates upon a fully integrated base while, as the First Digital City in Greece (proclaimed in 2004 by the Minister of Economics), it establishes high technological and broadband National standards by using and offering its "know-how" to other municipalities within Greece. Our company's main areas of expertise are: e-Health; e-transportation; e-education; e-government & e-democracy; networks; Geographical Information System; event planning& organizing.	Company
Gnomon	https://www.gnomon.com.gr/	It provides solutions for patient empowerment and assisted independent living. Gnomon is the creator of eHealthPass, the patient centred platform that enables frictionless data flow across systems and clouds. ClickZois - is a social service supporting the permanence at home of people who are at risk because of age, disability, illness or social isolation, providing a range of personalized attention that can improve their security conditions and company in everyday life, enhance independence and facilitate the integration of the person in their usual environment of coexistence, and to detect, prevent and, if necessary, intervene in possible risks.	Company
HealThink-Medical Research and I	https://www.healthink.info/	Provides the following services: health technology assessment (incl. health economics, market access and reimbursement services); outcomes research (incl. evidence review, development and communication); data analytics (incl. databases and registries, RWD analytics, advanced statistics and simulation); digital Health (incl. design and coordinate ICT-enabled care services, revision of care pathways, HTA and service optimization); legal & Bioethics including GDPR; executive training on the above topics. The company has already been involved in tenths of projects in oncology, hematology, cardiovascular, diabetes, respiratory, neurology and rare diseases.	Company
IKH -IKnowHow	https://www.iknowhow.com/	IKH is organized into three units: Digital Government, Digital Health, and Robotics. In the field of Digital Health, exclusively develops and distribute the certified clinical software Evorad®, comprehensive RIS / PACS / WORKSTATION suite that covers all the software needs of a radiology department. Evorad®, with over 35 installations in Greece and abroad, has become the premier PACS solution of Greek public hospitals, used not only to process thousands of examinations per day, but also as the main teaching tools in medical schools and university hospitals. Evorad® is CE marked as a Class IIa medical device. Other of our business projects in Digital Health include the development and operation of the Business Intelligence (BI) system for the Ministry of Health and the COVID-19 Reporting system to the Office of the Prime Minister.	Company

Name of Organizations	Web Link	Summary Description of Product or Service	Type of Institution
JOIST Innovation Park	https://joistpark.eu/	JOIST is the biggest and most contemporary Business Innovation Park in Greece and across Southeastern Europe. It fosters the transfer of innovation and research data from academic and research institutions to the business community, and houses human capital of diverse backgrounds, generating in this way added value. JOIST supports and meets the needs of a broad mix of companies, organizations, and stakeholders, offering within it places to learn, network, co-work, develop cutting-edge technology, grow, exhibit, and play. Through a wide range of integrated services and the continuous creation of new opportunities, JOIST enhances knowledge distribution, boosts entrepreneurial spirit, establishes collaborative networks, and promotes inclusive working practices in four thematic clusters, comprising of eHealth, Educational Technology, AgroTech, and eTourism. In the field of eHealth JOIST will be the Headquarters of the Designated European Digital Innovation Hub (EIDHs) in Greece titled: "Health Hub: Healthcare and Pharmaceutical Industry Transformation through Artificial Intelligence Digital Services". The Health Hub will act as a one-stop-shop that will help companies in the Health & Pharma sector to boost their outreach, precision, innovation and networking efforts, partnering in their digital transformational journeys.	Association that promotes e-Health
MED.I.S. SA (Medical Information Systems)	https://medis.gr/	The main goal of the company is to develop state-of-the-art, cutting edge technology products and provide high-quality services to health care facilities. Focusing on highly specialized, innovative health-care solutions, MEDIS has developed the software platform eDev and the state-of-the-art information system MedISys. The software platform eDev serves as a software infrastructure for building secure, userfriendly and highly efficient web-based applications and integrates all the necessary modules. The state-of-the-art, integrated health information system MedISys is a fully web-based solution built on cutting edge technology standards (Web Based JEE Platform), which covers a wide range of the functions of a modern health care provider and has been successfully implemented in private and public health care facilities of various sizes, complexity and routines. MEDIS SA provides consulting services to health-care facilities on organizational and technology related aspects as well as support services and IT Service Level Agreements scaling up to a full outsourcing of IT services.However, for MEDIS is very important to provide fully digital project development and support, through all project stages. Furthermore, has been certified according to the ISO9001:2008 and ISO27001 quality assurance standards in the areas of software development, project implementation and software support. From public to private sector, and from large general hospitals of 500+ beds to exclusive clinics, MEDIS' client list comprises an impressive assortment of leading health care providers.	Company
Micro's Leader	https://www.microsleader.gr	Develops applications, exclusively for the medical, financial, and administrative management of hospitals and diagnostic medical units, which are constantly evolving and responding to all the requirements of the most organized units in the market, regardless of size. Micro's Leader conducts research in the general field of Health Informatics which involves systems such as electronic health records (EHR), health information exchange (HIE) standards and portable medical data collection devices.	Company
Neurolingo	https://www.neurolingo.com/	Neurolingo is an innovative software company specializing in the fields of Natural Language Processing Systems (NLP) and text analysis (Business Intelligence focusing on text content), a subject that is knowledge and research intensive. It has created monolingual electronic dictionaries for the Greek language, built control, proof-reading and spelling machines, developed infrastructure tools for optimizing electronic lexicography applications, developed computer system ontologies for various fields of knowledge, implemented word processing and word processing services (customized) for language technology applications. Today, the centre of its services and products is on the Mnemosyne NLP environment, which incorporates all the technologies and dictionaries developed by the company, into an integrated natural language processing system, with remarkable adaptability to different thematic areas and conditions, targeting knowledge extraction and comprehension of text. Mnemosyne is an natural language processing platform integrating technologies from the field of computational linguistics and modern natural language processing with machine learning and deep learning. It has been used in many and complex text analysis projects for finding facts and nominal entities, extracting knowledge, finding causes, constructing interactive conversational interfaces (chatbots).	Company
PD Neurotechnology	https://www.pdneurotechnol	PD Neurotechnology Ltd is a high tech medical device company, founded in London, UK in 2015, by a team of experts in patient monitoring systems for movement disorders. Sales and marketing is based in Athens, Greece, and R&D and production in Ioannina, Greece. The company focuses its activities on the research, development, production, distribution, sales and marketing of systems and services, which include but are not limited to medical devices, sensors and software for the monitoring, diagnosis and treatment of patients suffering from Parkinson's disease and other movement disorders.	Company
SIBA Soft	https://www.sibasoft.gr/	SIBA Soft SA is a pioneering IT company founded in 1997 to develop high technology products in Greece with an emphasis on the Health sector. SIBA Soft is ISO 9001: 2015 certified, is a Federation of Hellenic ICT Enterprises member (SEPE), holds the eHealth Business Award (silver 2018) and Greek Export Award (2018) for its action in the field of Medical Records and the implementation of the VIOS Product. Among the company's clients are big Public Hospitals, such as Sismanogleio GN and Korgialenio-Benakeio, Social Welfare Centres, and private doctors' offices. SIBA Soft offers complete solutions for the design, development, and provision of all software services and specializes in the following areas: health care information systems; enterprise resource planning (ERP) systems; customized IT solutions; public sector expertise (applications for compliance with the Presidential Decrees 205 and 146 (DP 205 and DP 146)); specialized web-based health solutions; specialized portable health solutions. Today the company focuses its research on machine learning tools and artificial intelligence.	Company
Traqbeat	https://traqbeat.com/	Traqbeat's core technology consist of a proprietary – in house – developed novel battery-powered, wearable sensor and methods (patent pending) capable of continuously or intermittently measuring and recording of multiple health related biomarkers such as Heart Rate (HR), Heart Rate Variability (HRV), Blood Oxygen Levels (SpO2), Respiration Rate (RR), Blood Pressure (BP), Temperature and Electrocardiograph (ECG), on a need be basis. This enabling technology consists of precisely designed electronics and optical hardware for optimal signal capture, as well as state-of-the-art signal analysis and machine learning methods. Traqbeat Technologies PC is a fast-growing company with acknowledged excellence in conducting high-level research and development of innovative systems and services. Its activities focus on the development of a novel adaptable wearable health tracking device including quantitative health risk assessment methods and tools focusing on the wider area of medical sensing and informatics, e-health, m-Health, and Internet of Medical Things. Its goal is to develop and apply its novel technology in the wider context of personalized, predictive and preventive medicine aiming at the optimal management of diseases and the development of clinical decision support systems, optimization of diagnosis and disease combating tools and models for enhancing biomedical knowledge discovery.	Company

Name of Organizations	Web Link	Summary Description of Product or Service	Type of Institution
Collaborate Health Cloud	https://collaborate247.com/	EHR; Patients' Health management, Diseases management & Collaboration tool for Health Care Providers, Clinics, Doctors, Hospitals, Research Organizations; Facilitation of scientific research and clinical trials. Collaborate Health Cloud, a Patient Management & Collaboration Platform helps HCPs in the effective prevention, management, and treatment of patient cases through smart, intuitive and collaborative electronic health records. The platform supports care team collaboration among physicians (within the same or various clinics or external private practice office and between several doctors specialties), as they can easily invite each other to collaborate on the patient's case and make holistic and more informed decisions through collaborative clinical reasoning directly on the patient's full records, that they can share instantly even in urgent cases. The additional patient portal app, designed to streamline patient follow-up & care team coordination during rehabilitation, is a communication tool that allows patients and physicians to stay connected after hospital discharge as well as between their visits in outpatient hospital departments or private practices. The patients' portal app is built to facilitate engagement, personalized, insightful, data-driven, automated, and collaborative patients' engagement. The platform's qualitative and precise information records, provide Real World Data, thus is also used by Physicians, Clinic, CROs and Research institutes for clinical research.	Company
Ergobyte	https://www.ergobyte.gr/portal/ergobyte/en/home	Digital health, Clinical decision support, Business process automation, Expert systems. The company's portfolio of commercial products assists health professionals at the point of care. The following solutions constitute Ergobyte's flagship product line: Galinos.gr, the leading online pharmaceutical knowledge base in Greece; RxReasoner, an AI-powered service that recommends suitable medications based on patient's medical conditions and cross-checks them for adverse reactions; DataLife HIS, a modular, cloud-based hospital information system customized for psychiatric hospitals and rehabilitation centers; Galen Office, a fully featured electronic medical record and practice management system. Clinical decision support: Ergobyte has developed a cutting-edge inference engine, which combined with a rich semantic pharmaceutical knowledge, is able to offer medication recommendations for specific patient cases. Healthcare process automation: Ergobyte employs BPMN, a low-code notation for business modeling, to author workflows with high flexibility and execution visibility. At critical workflow junctions, machine learning is utilized to lessen the number of human-driven tasks.	Company
Mental Health Solutions	https://mentalhealthsolutions	Mental Health Solutions is a partner of Monsenso A/S, and has developed the greek scalable version, cloud-based, mHealth digital solution for mental health. The solution is a CE-marked, Class 1 Medical Device that holds the TGA Certification and Cyber Essentials Certification. It captures real-world health data from smartphones and wearables, empowering patient-centric care. RWD can enable the early intervention, and facilitate disease management and treatment while empowering patients to be more active. Solution enables data-driven treatment, contributes to the opportunity to create a significant advance toward better quality and coverage for mental health by providing patients, carers and experts with a scalable digital tool that allow them to be more active, aware and independent. The Solution has entered Germany's Diga for patients with bipolar disorder. Company participates as a supplier in the 'Digital MME Tools' program of Greece 2.0 2022, with the first digital mental health tool. We have participated at the WPA 2022 Congress on Early Intervention in Psychiatry in collaboration with Monsenso in Athens. We have completed our first implementation of digital solution in a greek psychiatric clinic.	Company
Michalopoulou&Associates	https://lawgroup.gr/	Healthcare Compliance, GDPR, Intellectual Property & Patents, Cybersecurity, Bioethics, Litigation	Company
MYO HTA Solutions	https://myohealth.eu/	MYO HTA Solutions is a boutique healthcare consulting group providing solutions using the methodologies and principles of Health Economics and Health Technology Assessment	Company
Predicta	https://predicta.gr/who-we-a	Data Integration, Advanced Analytics, Data visualization, Big Data, Artificial Intelligence. Provide software, professional services and training.	Company
PYTHeIA Competence Center	https://pytheia.gr/en/	Pytheia Competence Center provides a framework of supportive, educational and consulting services that include actions such as: (a) the management and implementation of research programs for the utilization of artificial intelligence technologies in the field of health; (b) the implementation of a know-how and information transfer office; (c) the implementation of specially designed physical digital corner/collaboration spaces in which actions related to health innovations, as well as consulting actions, will be carried out; (d) the development and provision of ad-hoc and lifelong training programs in various thematic subjects; (e) the organization of events related to the utilization of artificial intelligence technologies in the field of health; (f) writing publications to raise awareness of those involved in the health value chain; (g) the design, implementation of research and the provision of consulting services as well as the implementation of educational programs for the promotion of Clinical Studies in Greece. PYTHeIA Competence Center provides a framework of supportive, educational and consulting services that include actions such as: (a) the management and implementation of research programs for the utilization of artificial intelligence technologies in the field of health; (b) the implementation of a know-how and information transfer office; (c) the implementation of specially designed physical digital corner/collaboration spaces in which actions related to health innovations. Consulting actions, will be carried out; (a) the development and provision of ad-hoc and lifelong training programs in various thematic subjects; (b) the organization of events related to the utilization of artificial intelligence technologies in the field of health; (c) writing publications to raise awareness of those involved in the health value chain; (d) the design, implementation of research and the provision of consulting services as well as the implementation of educational programs for the promotion of Clinical Studies in Greece.	Company

ManagiDiTH
ADVANCED DIGITAL SKILLS

Annex IV. Digital Health Companies' Classification by Products and Services

Name	Country	M-Health	EMRs	EHRs	Situational Awareness	E-prescription	TeleConsultation	TeleDiagnosis	TeleTreatment	TeleRehabilitation	AAL	Questionnares for Health Included	IMS	Artificial Intelligence	Simulation	E-Health Tech Consulting	E-Learning	Nurse Call	Wearable Devices	In-Home sensors	Physiological signals Monitoring	Activity Monitoring	Physical Exercise Planning	Fall detection	Medication Management	Messaging	Video Connection	Event Log and Reporting	Alert sent to Physician	Alert Button	Call Center	Mobile app for Helpers
9Solutions	FI										☒							☒	☒	☒		☒		☒		☒	☒	☒		☒	☒	☒
Ablute	PT						☒													☒									☒			
Accenture	PT															☒																
Actif	PT						☒					☒										☒	☒									
Aiforia	FI							☒																								
Alert Life Science Computing	PT	☒	☒										☒															☒				
Ascom Healthcare Platform	FI	☒	☒		☒		☒																									
Benete	FI																				☒	☒	☒		☒							
Best Health4U	PT						☒		☒								☒															
Buddy Healthcare	FI	☒	☒									☒					☒				☒											
Capemed	GR	☒	☒	☒				☒					☒																			
Cardiolyse	FI	☒					☒	☒											☒		☒											
Centro Dr.Marcio Navalho	PT						☒	☒																								
Cesadi	PT	☒		☒		☒	☒	☒	☒				☒	☒																		
Cognimi	GR												☒	☒																		
Collaborate Health Cloud	GR	☒		☒			☒	☒										☒								☒	☒					
Computer Solutions	GR		☒										☒																			
Critical Software	PT															☒																
Ergobyte	GR		☒										☒	☒											☒							
e-Trikala	GR															☒																
Glintt Global	PT															☒																
Gnomon	GR	☒					☒	☒	☒								☒									☒	☒					
HealthFox	FI												☒	☒		☒																
HealThink	GR												☒			☒																
Healthy Systems	PT												☒			☒																
Hope Care	PT	☒		☒	☒																					☒	☒					
Hygga	FI												☒																			
Iberdata Hospitalar	PT												☒			☒																
IKH -IKnowHow	GR							☒					☒			☒																
ILOF	PT							☒						☒						☒	☒				☒							
INS Dr Ricardo Jorge	PT												☒				☒															
iSTOC	FI	☒						☒																								
JOIST Innovation Park	GR															☒																
Kaiku Health	FI	☒	☒		☒		☒	☒	☒			☒		☒												☒	☒					
KlinikHealth	FI	☒											☒	☒																		
KnokCare	PT	☒					☒	☒	☒			☒	☒	☒			☒				☒					☒	☒	☒			☒	
LabQuality	FI															☒																
LinkedCare	PT	☒		☒		☒	☒	☒	☒				☒																			
M24Connect	FI						☒																				☒					
MED.I.S. SA	GR			☒									☒																			
Medanets	FI	☒						☒	☒												☒	☒			☒	☒						
MedicineOne	PT					☒	☒						☒																		☒	
Medicubex	FI							☒					☒																			
Medixine	FI		☒				☒	☒				☒	☒								☒					☒	☒					
Medtronic	PT				☒														☒		☒											
Mental Health Solutions	GR	☒	☒				☒	☒	☒			☒					☒		☒		☒				☒	☒	☒	☒				☒
MichalopoulouAssociates	GR															☒																
Micro's Leader	GR		☒	☒					☒	☒			☒																			
Movendos	FI	☒		☒			☒			☒		☒	☒													☒	☒					
Mumo	FI													☒		☒											☒					
MyCancer	GR												☒				☒									☒						
MyNavigo	FI				☒								☒													☒		☒				
MYO HTA Solutions	GR															☒																
Near Real	FI	☒					☒						☒						☒								☒					
Neurolingo	GR												☒	☒		☒																
NTT Data Group	PT												☒	☒		☒																
Nuadia:Your Life Hands-On	PT																		☒													
OivaHealth	FI	☒		☒	☒		☒	☒			☒		☒						☒		☒					☒	☒		☒			
Olwel	FI						☒						☒																		☒	
Oura	FI	☒		☒															☒		☒	☒										
PD Neurotechnology	GR	☒					☒			☒									☒			☒				☒		☒				☒
PDMFC Group	PT															☒																
PLUX Wireless Biosignal	PT																		☒		☒											
Popit	FI				☒																				☒	☒						
Predicell	FI															☒																
Predicta	GR															☒	☒															
Prologica	PT												☒	☒		☒	☒															
Pulmocor	PT				☒																☒											
PYTHeIA Competence Center	GR							☒					☒	☒		☒	☒															
S4Med	PT															☒																
Secapp	FI	☒			☒																					☒	☒	☒				
SPMS	PT	☒		☒		☒	☒						☒																			
SIBA Soft	GR	☒											☒	☒		☒												☒				
Soenia Medical Diary and Cloud	FI	☒					☒												☒		☒	☒										
Somia Reality Oy	FI	☒																								☒						
Steerpath	FI	☒											☒									☒										
Sword Health	PT	☒					☒			☒				☒			☒			☒		☒	☒									
Synthetic User	PT													☒	☒																	
Traqbeat	GR	☒			☒			☒			☒			☒					☒	☒	☒	☒										
TrueMed	FI												☒	☒											☒							
UOMA UHC-Unitary Healthcare	FI			☒									☒																			
UpHill Health	PT											☒	☒	☒	☒																	
Virtual Care	PT			☒									☒				☒								☒							
VirtualLeap	PT															☒			☒													
Vivago	FI	☒	☒		☒					☒	☒							☒	☒	☒	☒	☒					☒		☒		☒	
Wisify Tech Solutions	PT	☒			☒														☒		☒											
Attice Labs	PT															☒																
BMD Software	PT			☒			☒	☒								☒																
F3M	PT															☒																
iCognitus	PT															☒	☒		☒													
Promptly Health	PT															☒																
Uniportner	PT															☒																