

Accessing Synthetic Health Data for SMEs: A Greek Perspective

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Health Data Thematic Innovation Ecosystem | Accessing Synthetic Health Data for SMEs | 19.04.2023 11:00-13:00 CET

Hellenic Digital Health Cluster | Vision and Objectives

Vision

To strengthen the Greek digital health ecosystem and include Greece among the leading countries in the field worldwide

Objectives

- Fostering cooperation, development of synergies and complementary partnerships
- 2. Networking among key stakeholders in the field of digital health
- 3. Supporting companies to attract funding
- 4. Promoting collaboration with national and international clusters and organizations active in the field of digital health
- 5. Supporting the development of a national digital health strategy













EPANEK 2014-2020
OPERATIONAL PROGRAMME
COMPETITIVENESS
ENTREPRENEURSHIP
INNOVATION

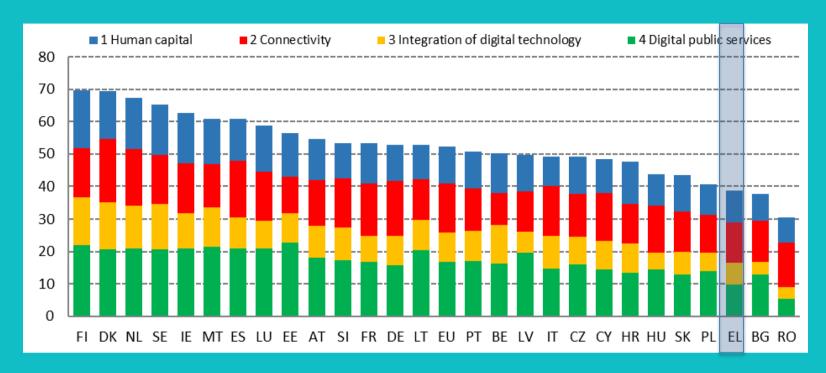


Co-financed by Greece and the European Union

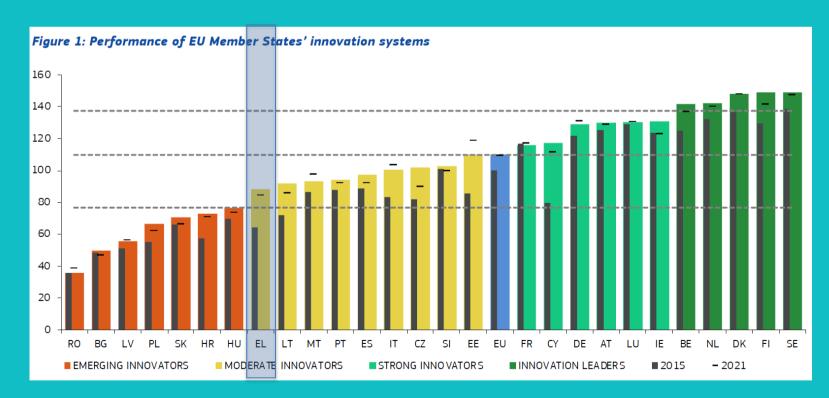




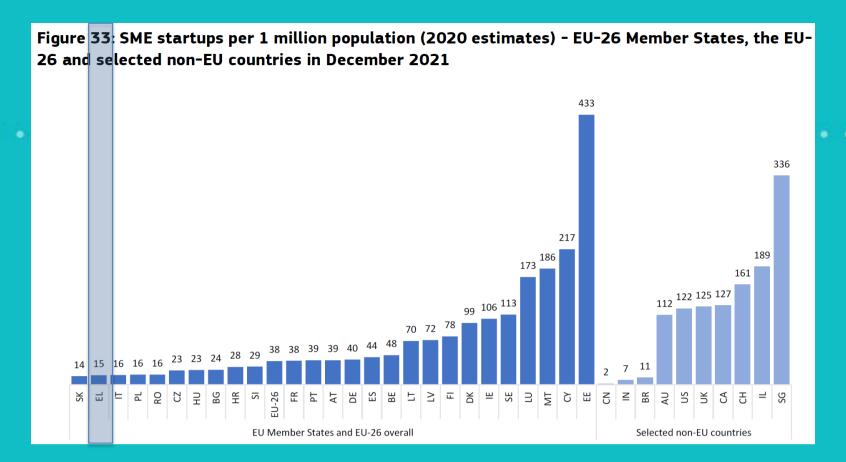
Greek Ecosystem | How it is evaluated



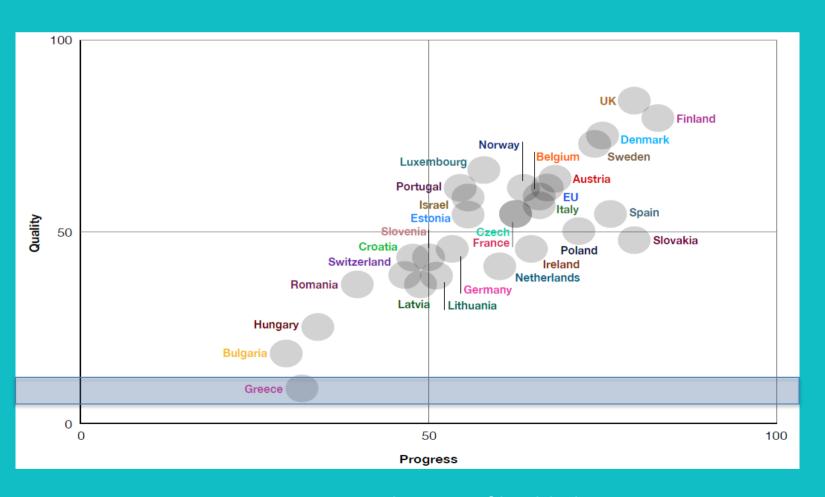
SOURCE: Digital Economy and Society Index (DESI) 2022, European Commission



SOURCE: European Innovation Scoreboard 2022, European Commission



SOURCE: Annual Report on European SMEs 2021/2022, European Commission



SOURCE: Open Data Institute, Secondary use of health data in Europe. 2021.



Greek Ecosystem | Services available for health and welfare

National Initiatives

- E-Servises IDIKA (COVID-19 registry and vaccination, e-prescribing, Atlas, e-booking, citizen EHR, κλπ)
- E-Services EOPYY
 (admission/ discharge notification, eDAPY, hemodialysis, radiotherapy, disease registries, etc.)
- E-Services grnet (Harmoni, user directory for hospitals, etc.)
- Ministry of Health BI System (Bi-Health)

- Hospitals (public and private)
- Diagnostic Centres
- Telematics Applications
- Regional Health Authorities' Initiatives
- Private Initiatives
- Research projects

 (non-clinical applications, e.g. for clinical trials)
- Cross-Border Services (CEF, eHDSI, etc)

Health and welfare



Benefits

Child/housing allowance, social dividend, heating oil allowance, etc.

Coronavirus COVID-19

Free checks, date for vaccination, certificate of vaccination.

Health professionals

Electronic prescribing, electronic pre-authorisation of medicines, EKPY benefits, etc.

Healthcare

Drug search, contracted providers with EOPYY, High Cost Medicines, Atlas health etc.

Hospital visits and hospitalisation

Availability of appointments with EOPYY doctors, Individual Electronic Health File (AHFY) for citizens

Medical file

Immaterial prescribing, National Blood Donor Register, registration with a personal doctor, etc.

Persons with disabilities and chronic illnesses

KEPA request management, free fare ATH.ENA card, multimodal digital library AMELib etc.





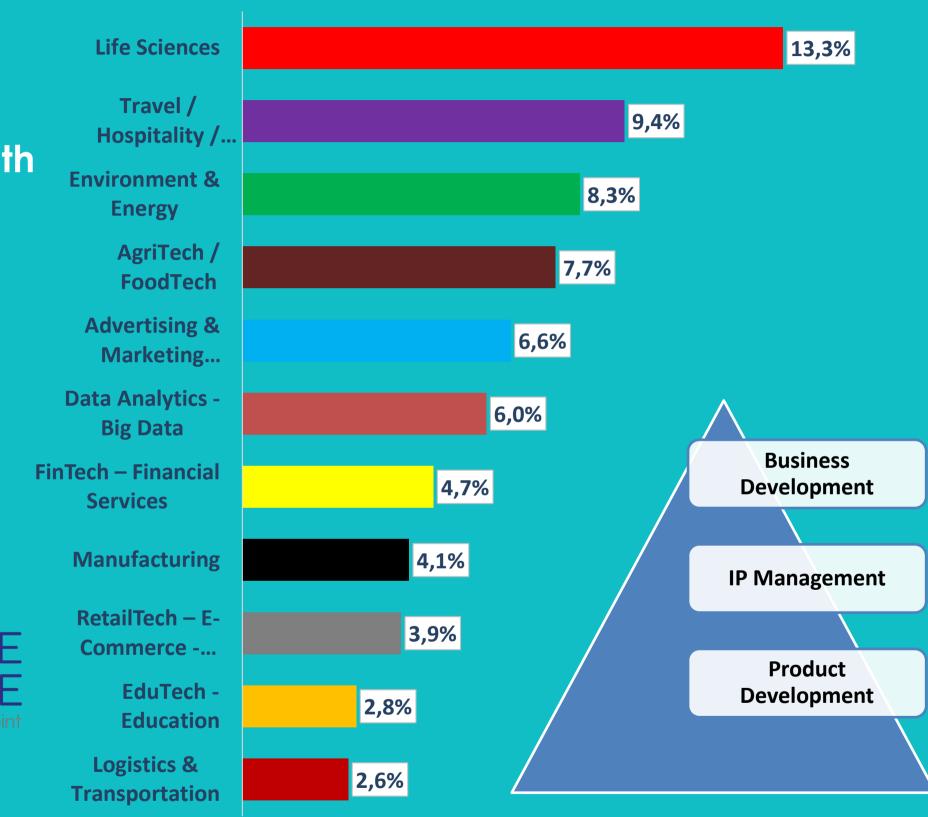
Greek Ecosystem | Startups in MedTech, HealthTech, BioTech

Needs and Challenges

- More than 50% of the startups are related to digital health solutions mainly for disease management, telemedicine and wellness. (investments + expertise)
- More than 65% of companies are in the initial stages of development (seed funding round)
- 57% look for mentors and advisors.
- 40% of companies consider that state intervention is needed:
 - improving access to government funding programs
 - facilitation of clinical trials.

SOURCE: SEV, Hellenic Federation of Enterprises, 2022



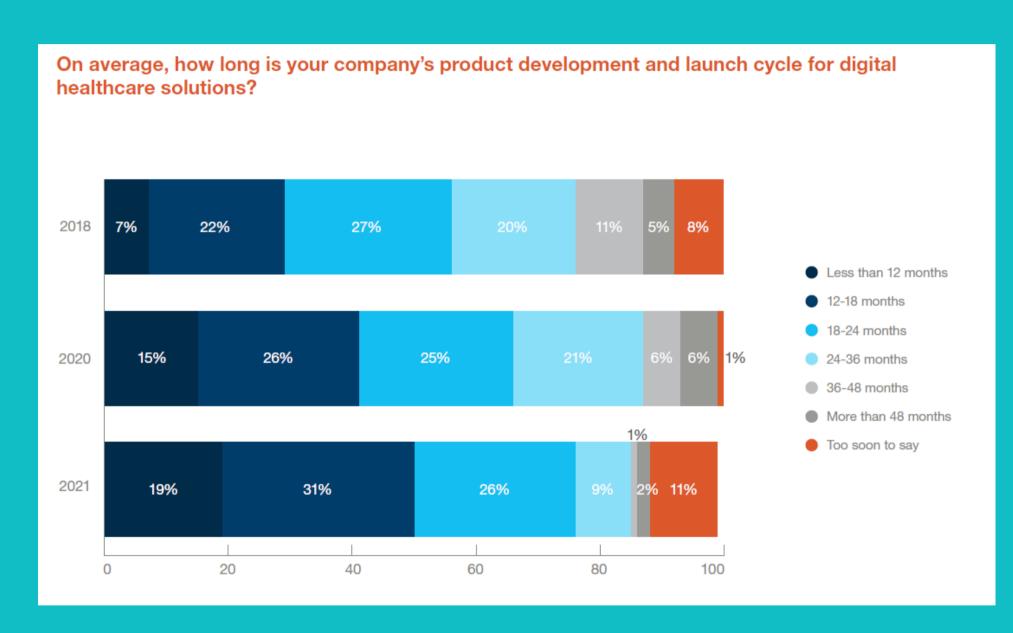


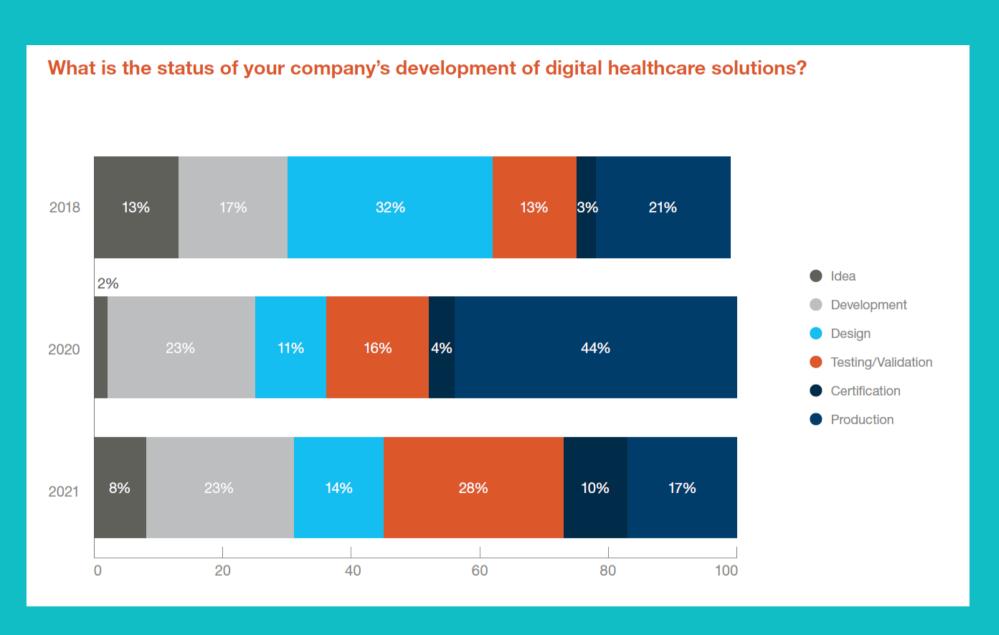




Digital Health Solutions | International Trends

Evolution of situation / speed of development in the period 2018-2021



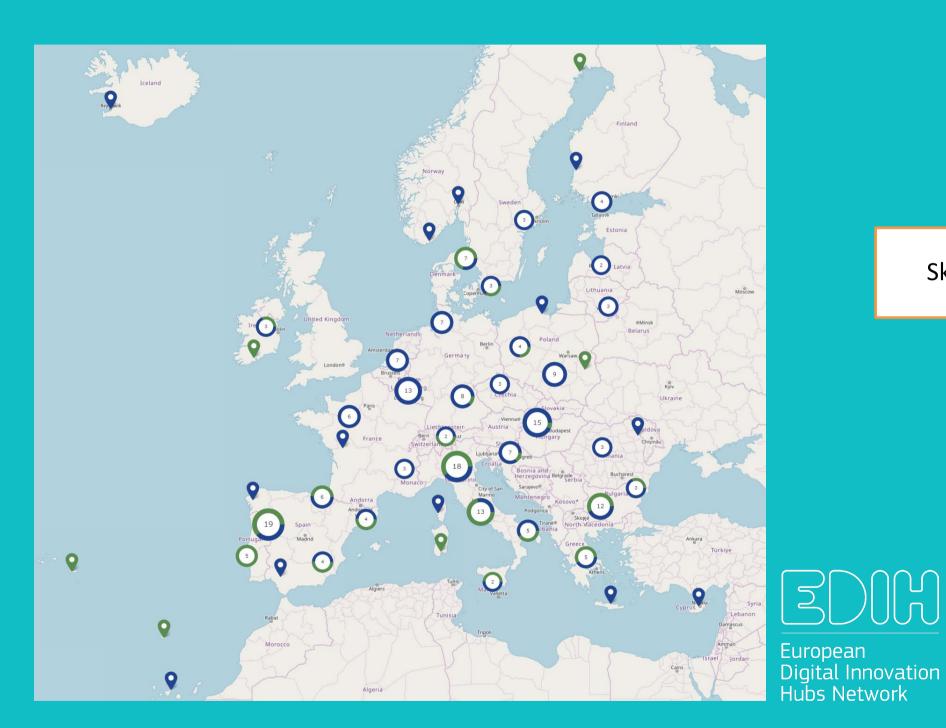


SOURCE: JABIL, Digital health technology trends. A Survey of Digital Healthcare Decision-Makers. September 2021.



European Digital Innovation Hubs | Services Offered

One-stop shops for digital transformation



Skills and training

Digital Innovation Hub

Support to find investments

Innovation ecosystem & networking

SOURCE: https://european-digital-innovation-hubs.ec.europa.eu/



HEALTH









High-Performance

Computing

Artificial

Intelligence

Cyber

security

Advanced

Digital Skills

Co-funded by the European Union





European Digital Innovation Hubs | DMA framework for SMEs

Digital Maturity

BUSINESSES USING ONE OR MORE

Cloud computing services NOW 34%
TARGET 75%

Big data
NOW 14%

Artificial Intelligence NOW 8% TARGET 75%

SOURCE: European Commission,
COMMUNICATION FROM THE
COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE
EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF
THE REGIONS, 2030 Digital Compass: the
European way for the Digital Decade,
COM(2021) 118 final, Brussels, 9.3.2021

Digital Business
Strategy

Digital
Investments per
Business Areas
(Done &
Planned)

Enterprise Readiness for Digitalisation Digital Readiness

Digital
Technologies &
Solutions

Advanced Digital Technologies Human-Centric Digitalisation

Staff Training & Up-skilling

Staff
Engagement &
Empowerment

Data Management

Data Storage, Integration, Access & Analytics

Data Security

Automation & Intelligence

Technologies and Business Application for Automation & Intelligence

Green Digitalisation

Environmental Sustainability in Business Areas (ICT for Green)

Aspects of Digital Choices (Green ICT)

SOURCE: https://european-digital-innovation-hubs.ec.europa.eu/events/deep-dive-dma-tool



smartHEALTH EDIH | Test Before Invest Areas of Expertise



Data Sources



Clinical

Demographics, EHR Data, Lab Test Results, Diagnoses, Procedures, Pathology/ Histology Data, Radiology Images, Microbiology Data, Provider Notes, Admission/ Discharge and Progress Reports, Performance Status



Medication

Medication Orders, Administration (Dose, Route, NDC/RxNorm codes), Concomitant Therapies, Point of Sale Data, (Prescription & OTC) Prescription Refill, Allergies



Claims

Medical Claims. Prescription Drug Claims, Other Drug and Treatment Use Data



Molecular Profiling

Genomic and Genetic Testing Data (SNPs/Panels), Multi-Omics Data (Proteomics, Transcriptomics, Metabonomics, Lipidomics), Other

Biomarker Status



Family History

Historical Data on Health Conditions and Allergies Relating to Patient and Extended Family, Smoking Status, Alcohol Use



Mobile Health

Fitness Trackers, Wearable Devices, Other Health Apps Measuring Activity and **Body Function**



Environmental

Climate Factors. Pollutants, Infections, Lifestyle Factors (diets, stress), Other Environmental and Occupational Sources



Patient Reported

Patient Reported Outcomes, Surveys, Diaries (diets, habits), Personal Health Records, Adverse Event Reporting, Quality of Life Measures



Social Media

Patient Communities, Twitter, Facebook, Blogs



Literature

Disease Burden, Clinical Characteristics, Prevalence/Incidence. Rates of Treatment, Resource Use and Costs, Disease Control, Quality of Life Measures

FORTH

- Translational bioinformatics for precision
- Drug discovery and/ or safety assessment,
- Biomedical Data related platforms, methods and tools
- Imaging Informatics, Hybrid molecular imaging facility and services
- HPC platforms, methods and services
- Computational Neuroscience
- Smart Hospitals, Intelligent DSS and Virtual
- Administrative Automation & Digitization
- Health Information Infrastructure and eHealth Interoperability
- Integrated Primary Healthcare
- Personalized Care Delivery Care
- Citizen-centred eHealth, mHealth, Personal Health Systems and Pervasive Health Monitoring
- Biosensors for Health or Wellness related Applications
- Social Care and Welfare Management
- Civil protection and emergency management
- Cybersecurity and Trust related tools, platforms and services
- Assisting Digital Transformation in Healthcare
- mPET/ MRI facility for advanced preclinical molecular imaging services
- User experience design and evaluation of ICT products and web-accessibility

UWM

ICT supported Integrated Care

CERTH

- Computational methods for drug
- Integrating Artificial Intelligence (AI) in Healthcare
- Medical Information Security
- · User-centred design for eHealth Applications
- Real-world evidence analysis
- Information management for clinical trials
- · Interoperability on health data exchange
- Medical Big Data visual analytics
- · Core bioinformatics and biostatistics services
- · Training for digital skills
- · Biosensors for Healthcare Applications
- · Personal Health Systems and Pervasive Health Monitoring

- · Distributed infrastructures for precision medicine
- · Privacy-preserving statistical aggregation
- Human activity tracking
- Roboticists' workbench
- · Database querying using soft constraints
- · Spatiotemporal data integration and processing
- Knowledge discovery from biomedical data
- Drug-Drug Interaction (DDI)
- Biomedical question answering

ATHENA

- Data services for precision medicine pipelines
- Data services for clinical analysis, annotation and interpretation
- Knowledge Bases for NGS Diagnostics
- Data-intensive biomedical informatics
- Elastic cloud data services for biomedical informatics
- Biomedical information extraction from scientific
- Blockchain solutions for biomedical applications
- Computational drug design
- · Containerization strategies, consulting, and solutions for biomedical informatics
- Privacy-by-design strategies, consulting, and solutions for biomedical informatics
- Voice assistants for smart hospital applications
- Computer vision for clinical diagnosis support systems
- Speech analysis for disease detection
- · Virtual and augmented reality for smart health
- · Effective patient communication in a smart hospital environment

- · Hi-throughput analytical instrumentation chromatograms and spectrograms management
- Chemical data interpretation through cheminformatics
- · Modelling and simulation of chemical and biological procedures

- Electrophysiological Data Analysis
- Spatiotemporal, multidimensional and multimodal algorithmic analysis

SOURCE: Innovation at the Intersection of Clinical Trials and Real-World Data Science to Advance Patient Care, Clinical Translational Sci, Vol. 11, Issue 5, Pages 450-460, First published: 16 May 2018, DOI: (10.1111/cts.12559)

SOURCE: www.smarthealth-edih.eu





Synthetic Data Uses

In health care, synthetic data could be an electronic health record (EHR) dataset with patient identifiable information replaced with fake data to avoid reidentification.

SOURCE: Gonzales A, Guruswamy G, Smith SR (2023) Synthetic data in health care: A narrative review. PLOS Digit Health 2(1): e0000082.

Data Sharing and Data Access

- Hackathons and data competitions
- Software testing
- Machine learning
- Statistical model development
- Education & training

Data Amplification and Data Augmentation

- Scaling up small datasets
- Correct bias





Conclusions & Challenges | Towards accelerating growth

The introduction of applications and tools to support integrated health and care services is expected to have a significant impact on the quality of life, innovation-based competitiveness and the sustainability of care for individuals, businesses and the society

Advantages of synthetic data:

- overcome regulatory restrictions
- easier to access
- streamline simulation
- avoid statistical problems
- facilitate AI/ML training

... still not a complete replacement for RWD





Thank you for your Attention!!!



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