

November 2022. Technology Snapshot

Digital health

in Catalonia

## Digital health in Catalonia

**ACCIÓ**  
Government of Catalonia



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**Cooperation**

Biocat

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# 1. Definition and importance of digital health

## Definition of digital health

Digital health is the set of tools and services that use ICTs to improve the prevention, diagnosis, treatment, monitoring, and management of diseases and health conditions, as well as to monitor and manage lifestyle habits that impact individuals' health

Examples of technological solutions, products and services in different categories:

### mHealth (mobile health)

- Nutrition and diet apps
- Access to health data
- Apps to improve medication adherence

### Digital Therapeutics

- Diabetes care support app that reduces risk events.
- Mental health solution that reduces depression symptoms

### Health Information Technology

- IT apps
- Electronic health records
- Electronic prescriptions

### Devices, sensors and wearables

- Biometric sensors
- Products for diagnostics

### Personalized Medicine

- Predictive analyses
- Support for clinical decision-making

### Telehealth

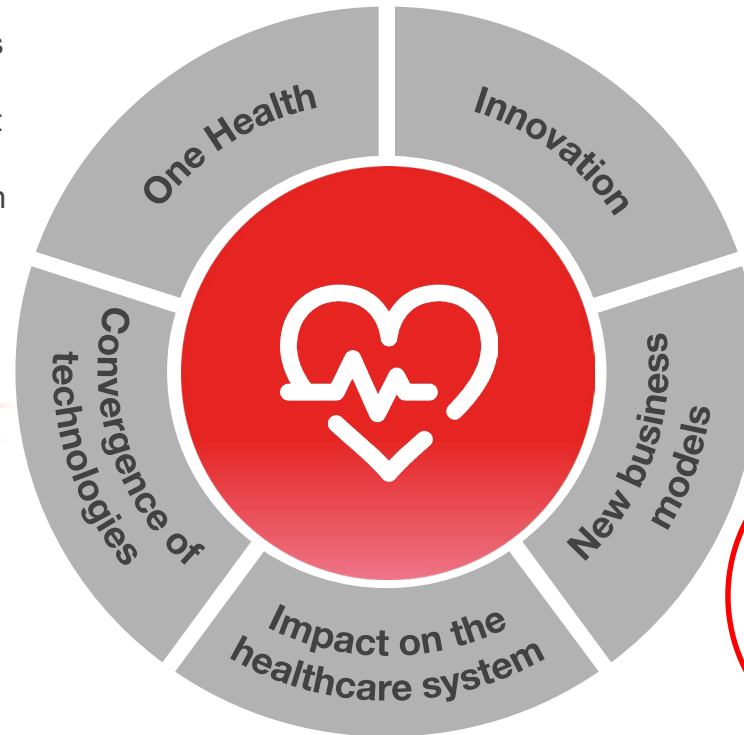
- Remote visits
- Patient monitoring
- Remote health programmes



# Importance of digital health

The use of technologies in health practices allows us to align with the concept of **One Health**, which is based on the premise that human, animal and planetary health are all interdependent. The nature of digital health can help strengthen good practices that foment this idea in a way that is multisectoral, cross-cutting, and above all, digitally interconnected.

Digital health itself represents a comprehensive, hybrid approach that enables synergies between a large variety of key technologies such as the use of big data, robotics, genomics, cybersecurity and wearables. These give rise to both a high added value and reduced healthcare costs when it comes to prediction, forecasting and quality improvement.



Health-related digital applications and technologies are experiencing strong growth in research and **innovation** in response to serious new public health, biological, and climate-change-related threats that require action on a global level. Health treatments supported by ICTs offer new pioneering methodologies and uses to establish a comprehensive view of healthcare (after building a solid foundation through research).

The use of digital technologies in health also entails the appearance of **new businesses and business models**, through which new market sectors are attracted. These models involve the challenge of creating new, financially sustainable health strategies, platforms and ecosystems, examining the role of insurance, and fostering new forms of public-private collaboration.

Digital health also makes it possible for **healthcare systems** to become more agile and responsive while promoting optimal care with a balance of speed and efficiency. With the aim of avoiding work overload, the use of digital technologies in healthcare also enables a human-centred approach that seeks to improve quality.

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## 2. Global digital health market

## Size of the global digital health market

The global digital health market will grow at a rate of **16.5% per year** and will be worth more than **\$550 B** by 2027.

### Growth factors

The impact of COVID-19

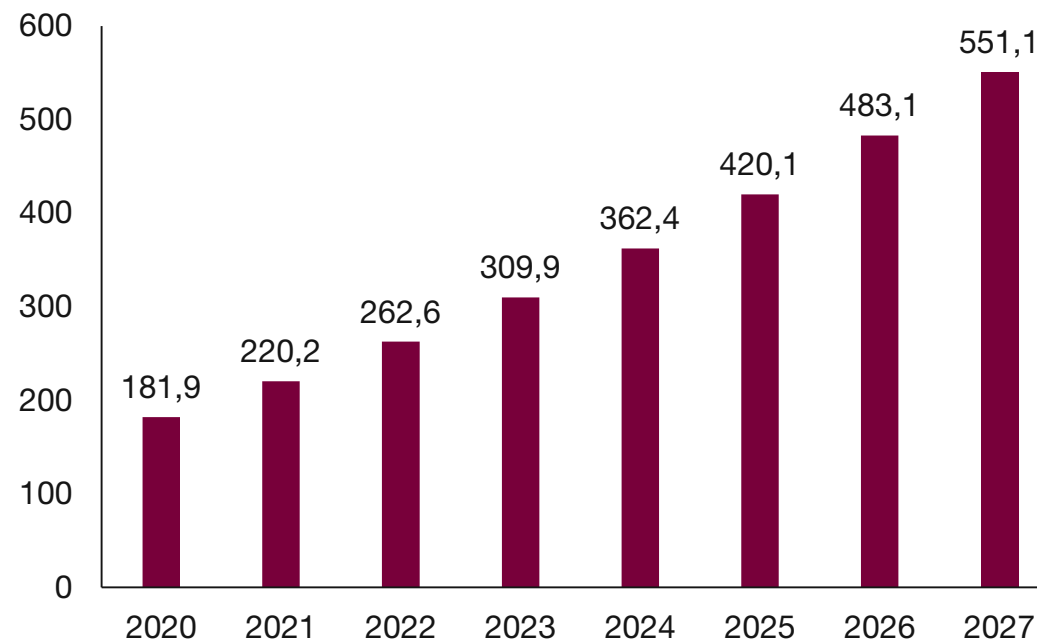
Demand for remote solutions

Rapid expansion of ICT infrastructure

Increase in smartphone users

Greater awareness of physical and mental wellness

Global digital health growth (\$B). 2020-2027



Source: Precedence Research

CataloniaConnects



# Top digital health companies and startups, globally

## Provider Directories & Care Navigation

Alma carrumhealth Headway ribbon  
 + rightway springhealth Stork Club Transcient

## Hybrid Virtual/In-Person Care

CITYBLOCK eleanor health eley monogram health  
 papa Pristyn Care SOMATUS Tia vori health

## Digital Therapeutics & Self-Help Tools

AppliedVR happify health HelloHeart Koa Health  
 Limbix mahana MEDRhythms RENDEVER  
 sidekick sweetch Sympatient twin  
 unmind Woebot zeen TRIPP

## Billing & Payments

cedar SEMPRE HEALTH soda health

## App Development & Deployment

BrightInsight Centaur Labs commure League xhealth

## Screening, Monitoring, & Diagnostics

54gene ablacon altoida Astarte Medical binx  
 BiolIntelliSense C2i Genomics Eko iXlayer  
 LetsGetChecked lumen NEUROFLOW oxehealth  
 šeer SONDE STRATA VocalisHealth

## Data Integration & Analytics

1upHealth bwell Clarify  
 ClosedLoop HEALTH CORILLA innovaccer  
 komodo SEQSTER SYNTEGRA

## Clinical Intelligence

ACTIV SURGICAL caresyntax LeanTaaS  
 OVERJET theatr



## Home Health Tech

birdie honor

## Virtual Care

adyn Allara brightline cleo  
 empathy. EQUIP FOLX genome  
 Hinge Health Jasper Loop Health  
 Meru Health nodd Ophelia  
 OSHI HEALTH OVIVA Phable plume  
 Quit Genius wheel

## Digital Front Door & Patient Engagement

oda circulo emocha Health GYANT Linkdoare 领健  
 MEMORA HEALTH nile osana tendo vital

## Digital Pharmacy & DME Fulfillment

better F/ELD MEDLY mPharma  
 Tomorrow Health Truepill

## Care Coordination & Collaboration

accuRx Medically Home PROXIMIE UNITE US Vesta

## Workflow Digitization & Automation

AKASA cohere Congenica DeepScribe element5  
 nym Olive osmind Rad AI stellarhealth  
 ULAB Wellsheet

## Computer-Aided Imaging

Caption Health clearly DIA elucidvivo  
 EXO Iterative Scopes Lunit Paige PathAI  
 Perspectum cure.ai 数坤科技 ULTROMICS

## Clinical Trials Tech

ACCLINATE castor Curebase ELLIGO  
 Hawthorne Effect Medable ObvioHealth ReifyHEALTH

Note: The categories are not mutually exclusive. Companies are mapped according to their main business area.

Among the principal companies and startups, those dedicated to the integration and analysis of data, home health technology, virtual healthcare and clinical intelligence are of special importance.

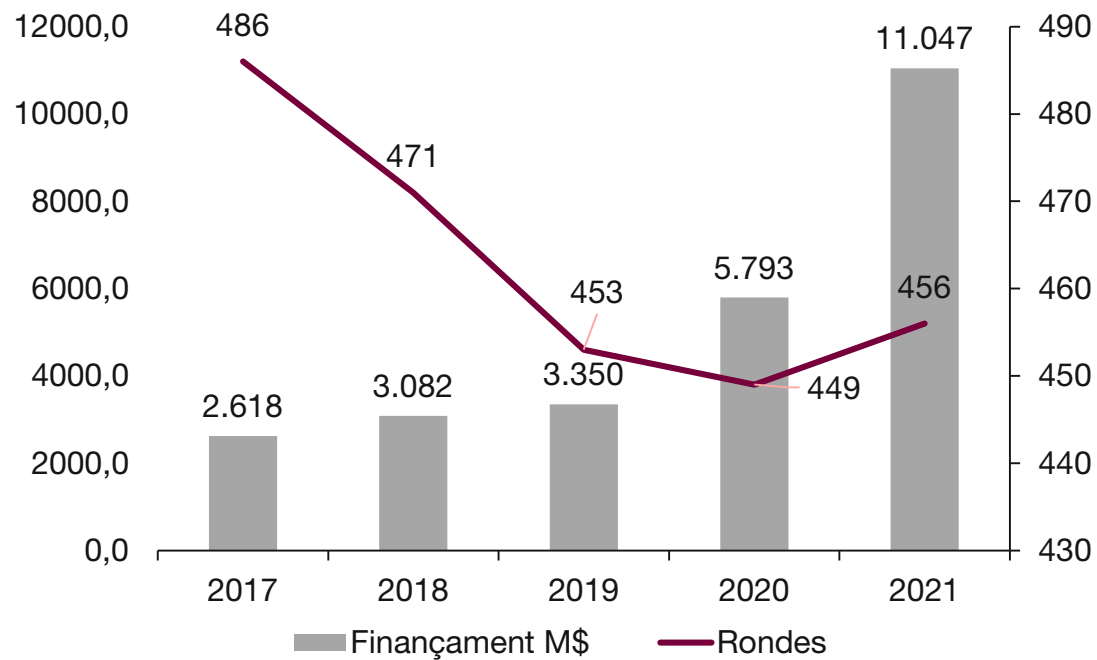
The Catalan company **Koa Health** stands out on a list where most of the companies are North American (117) and only 15 are European.

## Digital health startup financing rounds (I)

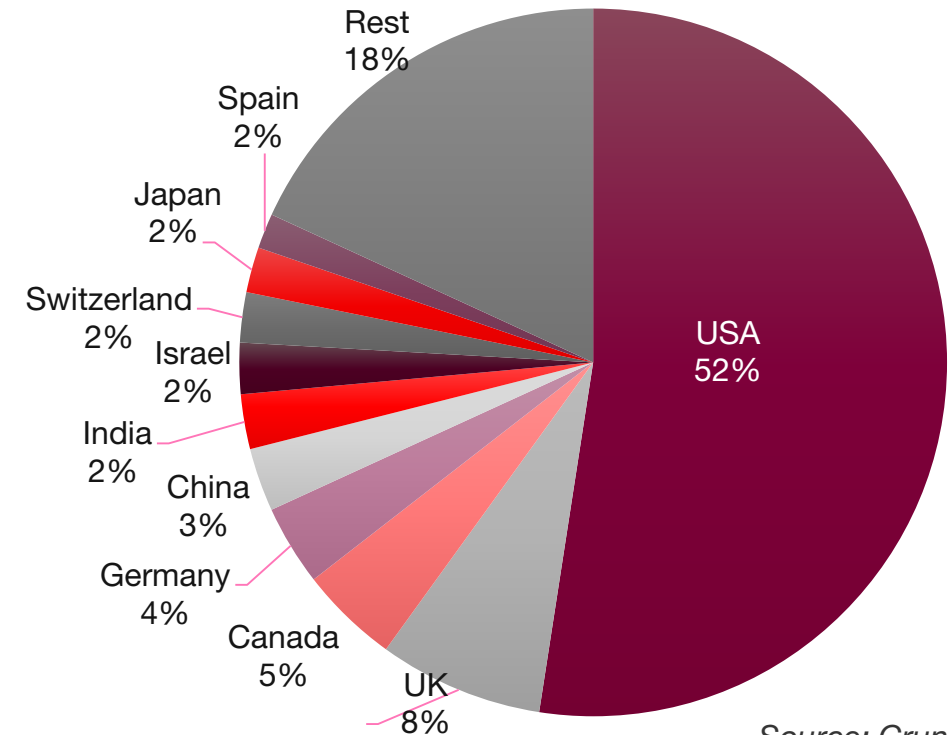
The amount of venture capital being poured into digital health startups skyrocketed in 2021, reaching **\$11.05 B**, almost twice that of 2020.

More than half of these rounds closed in the **United States**. Other important countries are the United Kingdom, Canada and Germany.

### Investment rounds and venture capital financing (2017-2021)



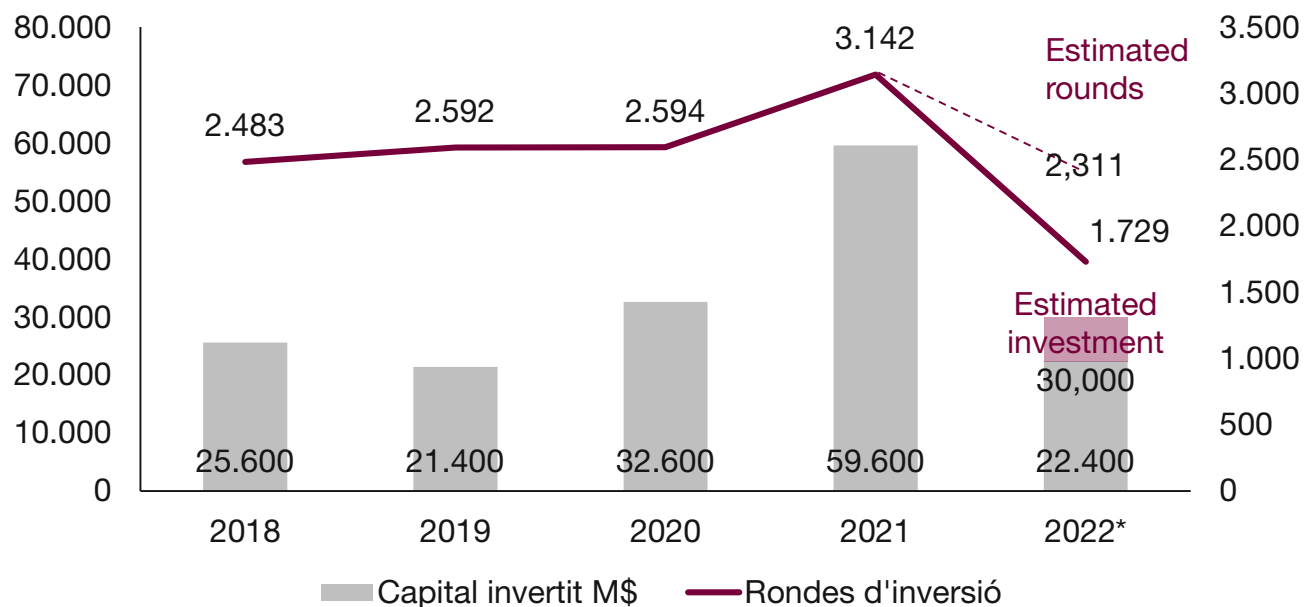
### Geographic distribution of the rounds



## Digital health startup financing rounds (II)

Estimates for 2022 point to a **drop of 50% in investment and 26% in investment rounds** compared to 2021, to levels similar to those seen in 2020.

### Evolution of the capital invested in digital health on a global level (2018 – third quarter of 2022)



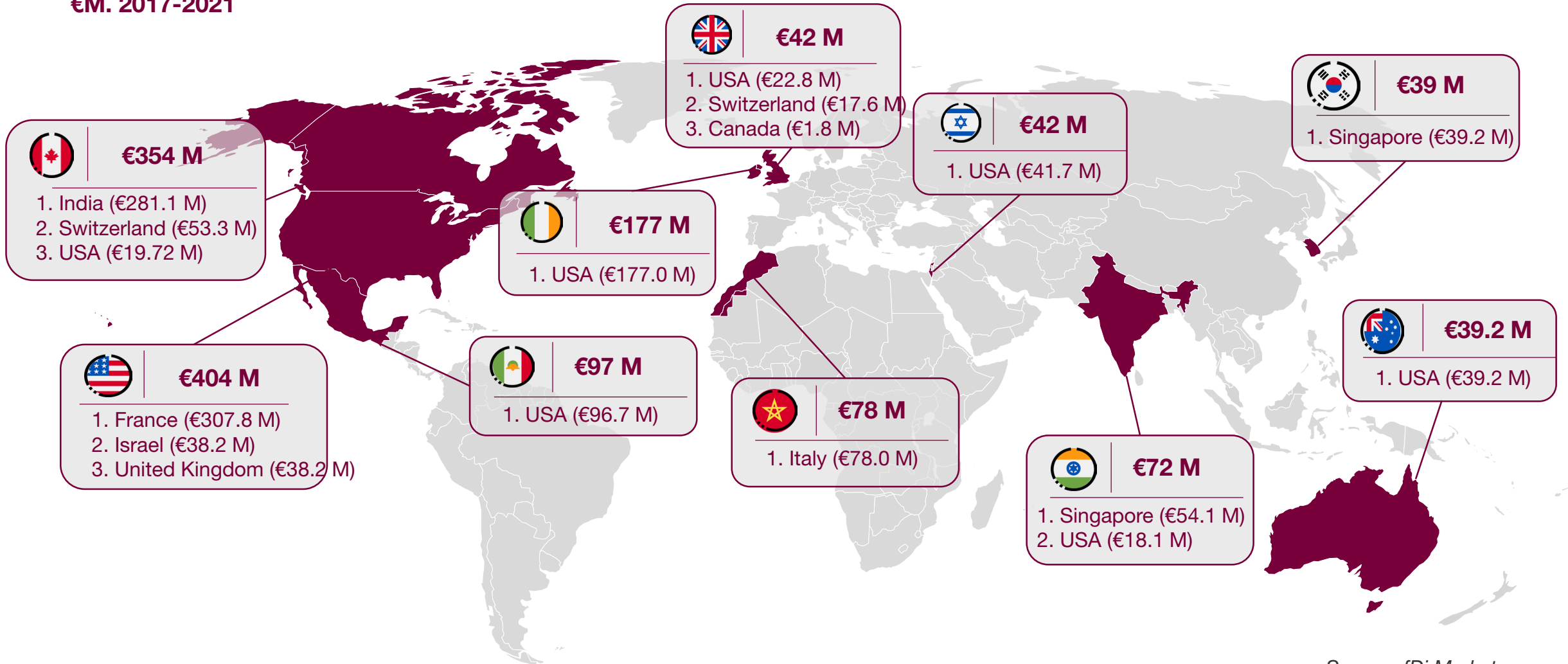
The decrease in rounds and capital invested is in line with a general trend in most technological areas, given the economic situation in 2022 and the uncertainties faced by global investors, coupled with the investment bubble collapse of 2021.

\* Data up to the third quarter of 2022

Note: This includes venture capital, asset/investment management, private equity, incubators/accelerators, corporations, CVC, Business Angels and others.

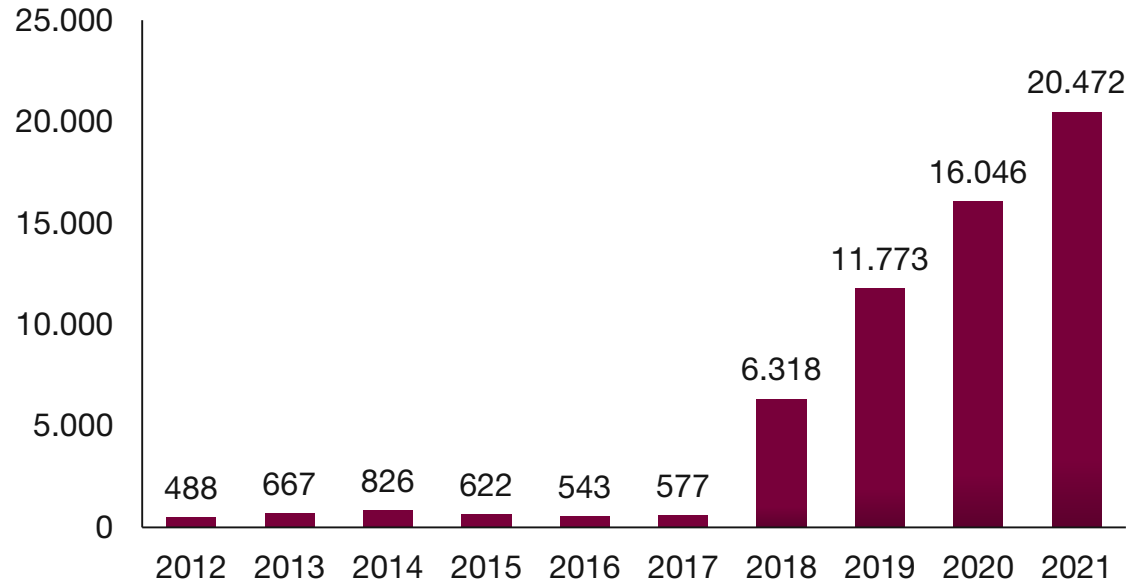
# Foreign direct investment (FDI) in the world of digital health

Top 10 destination countries for FDI in digital health; with the total and the main countries of origin by investment volume in €M. 2017-2021

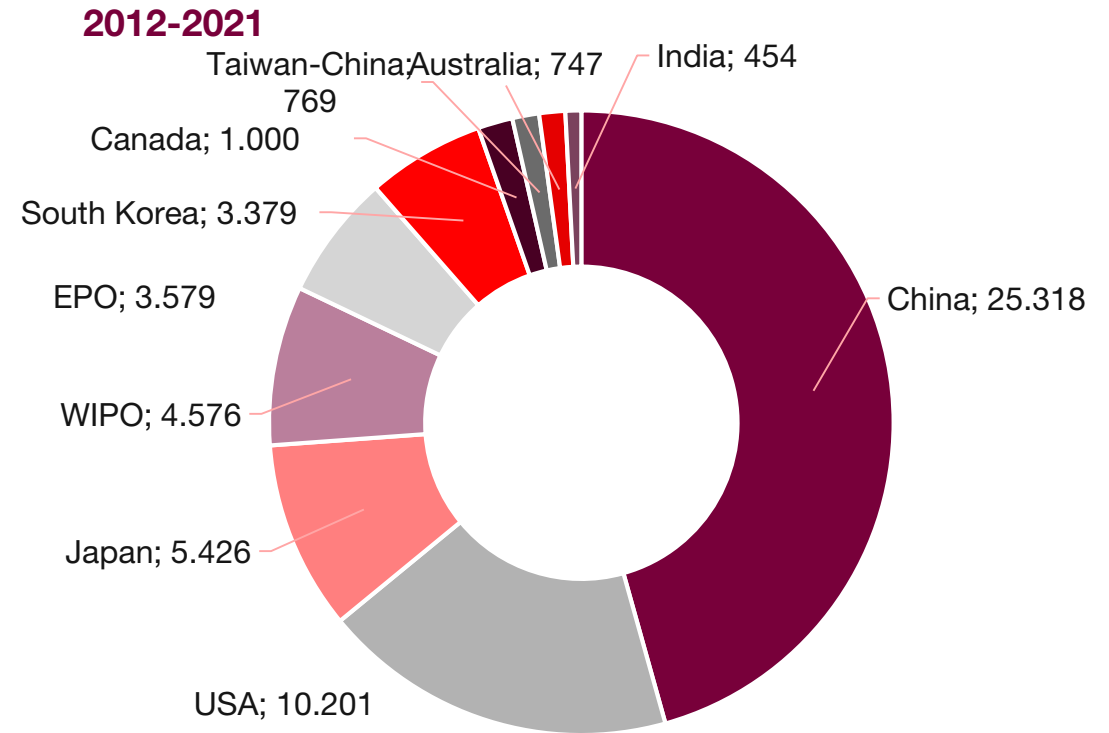


## Patents in digital health

Global registration of patents related to digital health. 2012-2021



Registration of digital health patents by jurisdiction. 2012-2021



### Main Applicants



Note: The G16H codes (ICT adapted to treatment and processing of medical data) of the International Patent Classification have been taken into account.

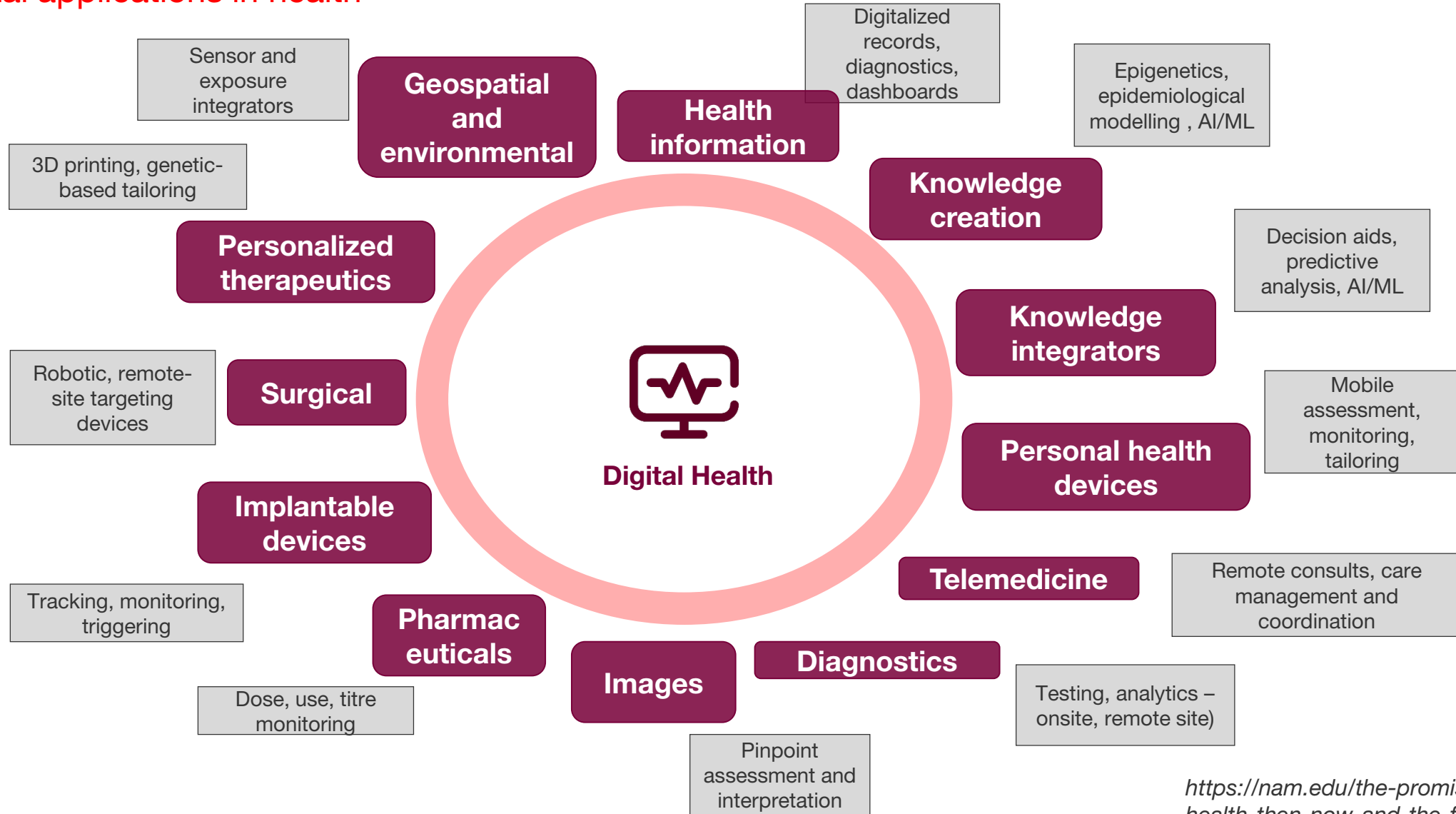
The registration of digital health patents **has increased significantly** in the last four years, reaching a maximum in **2021**. The majority are registered by established technology companies, especially in Europe and North America. China is the principal receiving market for patent registration.

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## 3. Digital health applications and trends



# Digital applications in health



In recent years, technologies have given a boost to the healthcare industry in the detection, prevention and treatment of disease. It has been an extremely beneficial alliance that has helped many fields advance. The introduction of new technologies will help improve efficiency and patient-centred care.

### Artificial Intelligence

- Drug development
- Improved cancer diagnosis
- Mental health
- Use of big data to improve the healthcare system, prevent epidemics and improve treatments



- Connectivity, and the system for secure storage of medical data.
- Interoperability of the different systems
- Integration in the public healthcare systems
- Healthcare continuity
- Closing the digital gap

### Evolution of remote care

### Virtual and augmented reality

- Training for healthcare professionals
- Assistance in surgical interventions
- Treatment of mental health disorders and phobias, and support for the elderly



- Remote patient monitoring through wearables and other systems.
- Smart pills
- Patient empowerment
- Cost reduction

### Internet of Medical Things (IoMT)

### Privacy and cybersecurity

- Ensuring the privacy and security of patients' medical data
- Ensuring that hospitals and healthcare systems work properly.
- Use of blockchain



- Creation of new organs using the patients' cells, thus minimizing the risk of rejection

### Bioprinting



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## 4. Digital health initiatives

The World Health Organization (WHO), in its **Global Strategy for Digital Health 2020-2025**, has established four strategic objectives that will apply to the countries included in a multilateral action plan.

### **Promote global collaboration and advance the transfer of knowledge on digital health**

Establishment of management systems for global knowledge in order to identify and share good practices, tests, opportunities, risks and lessons learned in public and digital health.

Alignment of countries and stakeholders to improve digital health and mitigate threats with the use of digital technologies.

### **Recognize that successful digital health initiatives require an integrated strategy**

Integration and enhancement of digital technologies in established national health strategies through all appropriate legal and ethical frameworks for data security.

Promotion of sustainable financing models for the development of digital health.



### **Strengthen governance for digital health at global, regional and national levels**

Strengthening digital health governance structures, including regulatory frameworks and the ability to implement evidence-based solutions.

Using a people-centred approach to facilitate actions and investments based on informed decisions and promoting competence development, and creating skills for leaders and political actors.

### **Advocate people-centred health systems that are enabled by digital health**

Development of proper literacy in technological and/or digital app and data skills for users and healthcare workers, including continuous training and encouraging citizen participation (forums, etc.)

Introduction of digitized follow-up and assessment forms to reduce saturation at primary care centres and reinforce gender equality and equity.

Digitalization of health systems is a key aspect in the digital transformation of the economy and society, one of the six political priorities of the European Commission for the 2019-2024 period.

**The European Commission's Communication on enabling the digital transformation of health and care in the Digital Single Market (April 2018)** set the theoretical precedent for technologically rising to the challenges of the ageing population, chronic diseases, unequal access to healthcare and training of healthcare professionals. It set the following objectives:



Citizens' secure access to and sharing of health data across borders

Better data to advance research, disease prevention and personalized health and care

Digital tools for citizen empowerment and person-centred care

## European Health Union

The European Health Union's current project is part of the objective of improving protection, prevention, preparation and response as regards dangers to human health at EU level. The French presidency of the Council of the European Union in the first half-year of 2022 aims to publish a digital health barometer to monitor the development and appeal of the sector. The use of technologies is included in **current initiatives** such as:



**European Health Emergency Preparedness and Response Authority (HERA).** Medical countermeasures for health crises.



**Pharmaceutical strategy.** Access to drugs and medical needs that are not covered.



**Europe's Beating Cancer Plan.** Prevention, detection and patient quality of life.

# Digital health initiatives in Catalonia

## SISCAT's Master plan for information systems

The plan identifies, agrees on and executes the opportunities for healthcare improvement with the application of ICTs and develops digital health and process re-engineering solutions in different healthcare areas.

## Shared clinical history

Catalonia's shared clinical history is a tool that compiles the set of documents containing data and important information about patients' situation and the evolution of their healthcare process.

## Electronic prescriptions

An electronic prescription is a tool that allows for comprehensive management of pharmaceutical services by progressively incorporating the prescriptions made in different healthcare areas.

## Innovative public procurement (IPP)

IPP is a public procurement tool that fosters innovation as a key instrument to make strides towards a more intelligent, sustainable and integrative growth model. It contributes to the transformation and improvement of public services and therefore to citizens' quality of life.

## La Meva Salut

La Meva Salut (My Health) is a personal digital health space that makes it easy for users to consult clinical and diagnostic reports and the results of clinical analyses and tests that are part of their clinical history.

## Health services integrator iS3

iS3 is an interoperability technology platform for the management of healthcare processes through integration of the different information systems used by health providers and social services.

## Capture and integration of clinical images

This digital service is geared towards primary care and specialized outpatient healthcare professionals, integrated with ECAP (Primary Care Clinical Station, a computerized clinical history program). It allows clinical photographs taken on mobile devices to be added to the clinical history of patients and to referral requests between healthcare areas.




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## 5. Digital health in Catalonia





## Mapping the digital health ecosystem in Catalonia (I)

 267 companies  €438.3 M  3,085 jobs

 91.0% are SMEs.

 72.6% are less than 10 years old.

 24.6% have turnover of more than €1 M and 3.6% have more than €10 M.

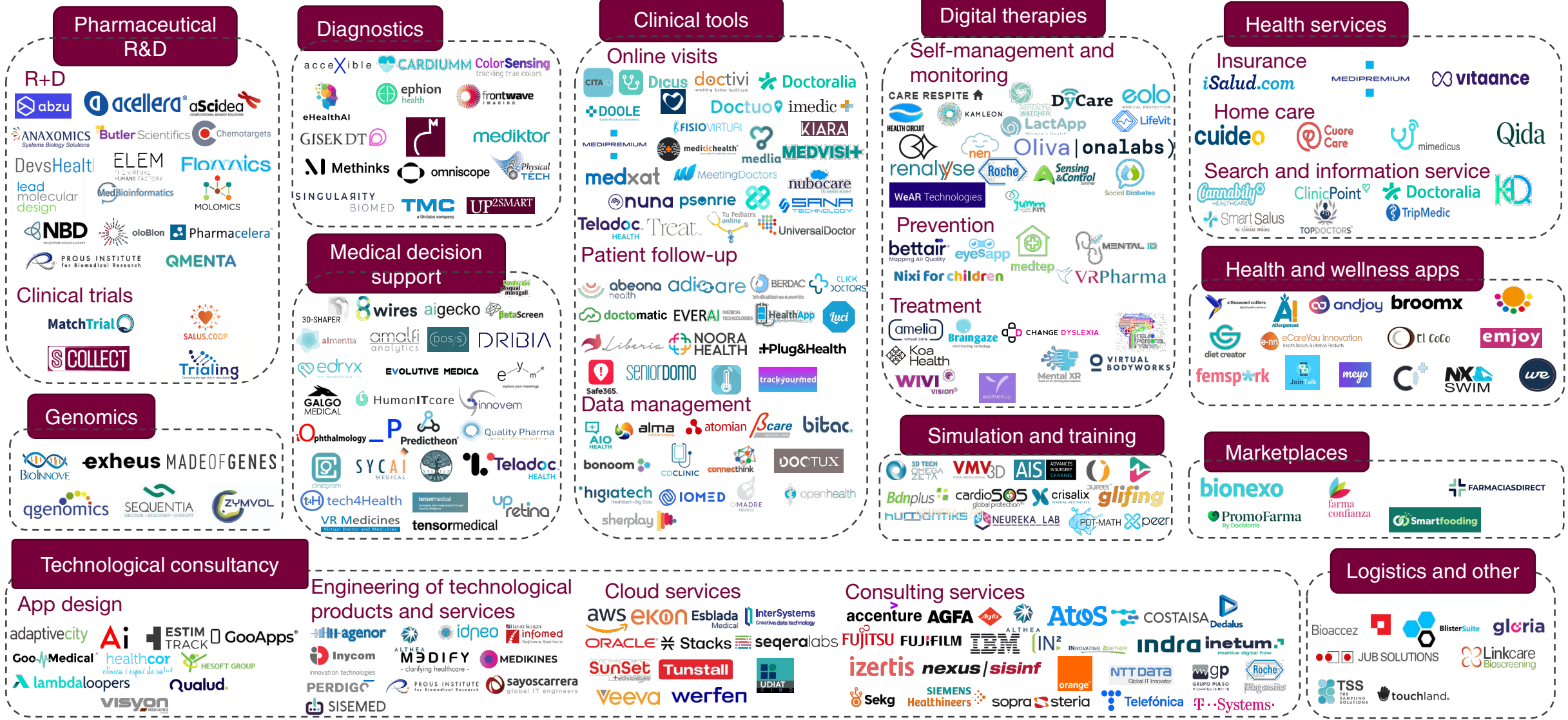
 22.0% have women in C-level positions (executives).

 26.2% are exporters.

The work areas with the most companies are **technological consultancy** (20.6%), **clinical tools** (19.9%), **digital therapies** (12.7%) and **support for medical decision-making** (9.7%).



# Mapping the digital health ecosystem in Catalonia (II)

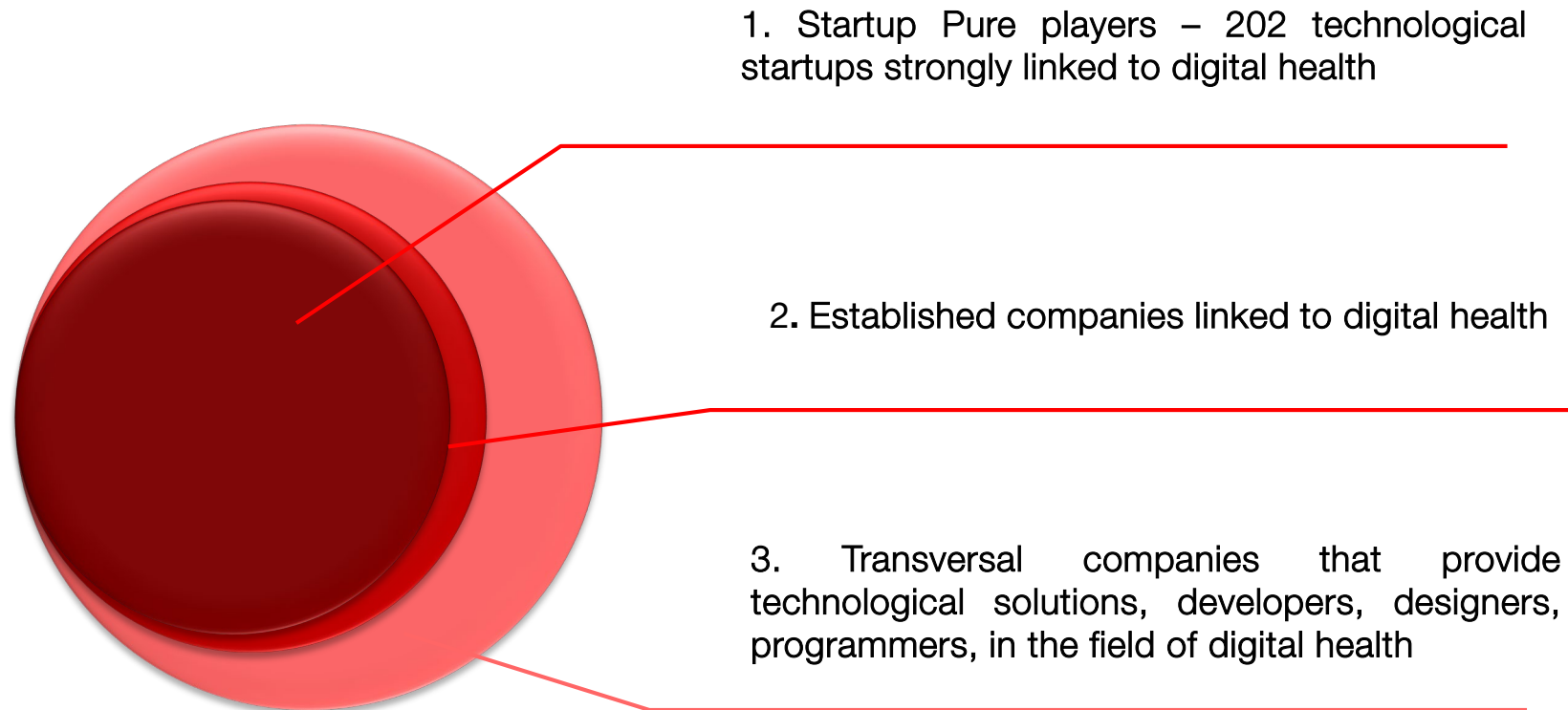


Font: ACCIÓ i Biocat. Informe de la bioregió 2021

Fem avui l'empresa del demà

## Mapping the digital health ecosystem in Catalonia (III)

A total of **267** companies shape the mapping of digital health activity in Catalonia, where **202** startups fully dedicated to digital health stand out, turning this into an emerging and very dynamic sector





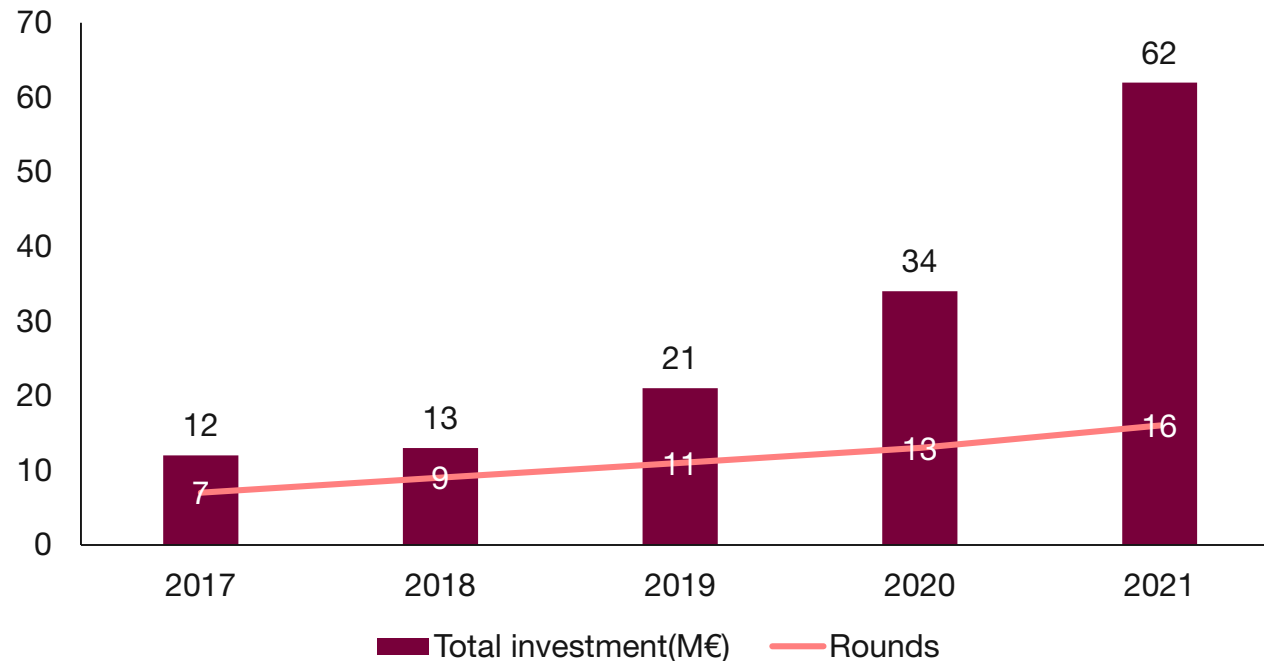
# Actors in the digital health ecosystem in Catalonia

	<p>Centres for research and technology, hospital research institutes and hospitals</p>	
	<p>Universities and training centres</p>	
	<p>Acceleration programmes</p>	
	<p>Associations and networks</p>	
	<p>Government institutions and administrations</p>	

## Investment in Catalonia

**Digital health investment in startups increased five-fold over the past five years** and the number of rounds doubled

### Investment in digital health startups in Catalonia (€M). 2017-2021









- The mean private capital round value **doubled in five years**, going from €1.5 M in 2017 to more than €3 M in 2021.
- We are starting to see **large venture capital operations (over €10 M)** with one operation in 2020 and three in 2021.
- The number of different **international venture capital funds** investing in digital health companies in Catalonia **increased six-fold in five years**, going from five in 2017 to 30 in 2021.

Source: Biocat

## 10 principal investments in digital health startups in Catalonia (2021-2022)

Key digital health investments in 2021-2022

 <b>Koa Health</b>	 <b>TOPDOCTORS</b>	 <b>mediktor</b>	 <b>Durcal</b>	 <b>amelia</b> virtual care
€15.9 M 2021	€11.2 M 2021	€11.2 M 2021	€8.0 M 2022	€7.0 M 2022
 <b>Oliva</b>	 <b>cuideo</b>	 <b>HumanITcare</b>	 <b>Oliva</b>	 <b>DyCare</b> DYNAMIC CARE SOLUTIONS
€5.7 M 2022	€5.0 M 2022	€2.5 M 2021	€2.0 M 2021	€1.3 M 2022

Note: Checked on Dealroom (19/10/2022) using Catalonia as the founding or HQ location. Venture capital was taken into consideration.

# Main digital health investors in Catalonia

## Established in Catalonia



## International



Catalan universities offer bachelor's and master's degree programmes on knowledge applicable to digital health. Comprehensive care, data analysis and biomechanics technologies will allow us to have innovative products and services that will offer personalized, preventive, predictive and participative healthcare.

## Bachelor's degree

- Bioengineering
- Biomedical Engineering
- Bioinformatics
- IT Engineering
- Biotechnology
- Health Engineering
- Human Biology
- Artificial Intelligence
- Applied Data Science
- Software Application Techniques
- Data Science and Engineering

## Master's degree

- Data Analysis in Omics
- Biomedical Data Science
- Automation and Robotics
- Medical Imaging Computing
- Bioengineering
- Cybersecurity
- Bioinformatics
- Biomedical Engineering
- Bioinformatics and Biostatistics
- Computational Biomedical Engineering
- Bioinformatics for the Health Sciences
- Big Data Engineering
- Advanced Biotechnology
- IT Engineering
- Principles of Data Science

## Catalan universities that offer digital health training



**UAB**  
Universitat Autònoma  
de Barcelona



Universitat  
de Girona



**UVIC**  
UNIVERSITAT DE VIC  
UNIVERSITAT CENTRAL  
DE CATALUNYA



In 2022, the UB launched the UB Siemens Healthineers Chair in **Digital Healthcare**


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## 6. International opportunities





# International business opportunities in digital health


Principal markets with business opportunities identified by ACCIÓ:


 China  
The Chinese market for elderly care will grow in the coming years.


 Thailand  
The healthcare sector has grown at a rate of 8% per year. Thailand imports 80% of its medical equipment.


 Austria  
The pandemic accelerated the search for medical solutions for remote patient treatment and support.


 Hong Kong - China  
Hong Kong-China is a strategic location for medical equipment and healthcare companies.


 Japan  
Japan has a shortage of medical care and nursing resources, despite an increase in the elderly population.


 Canada  
The strong need for health digitalization makes for fertile ground for Catalan SMEs.


 Hungary  
The Hungarian market represents an excellent opportunity for applied healthcare technologies.

 Netherlands  
The Netherlands requires remote medical solutions that patients and healthcare staff can use.

 Colombia  
Colombia imports 81% of its medical devices from the rest of the world, mostly Europe.

 Brazil  
Brazil will introduce new technologies that will allow for more efficient management of healthcare resources.

 United Kingdom  
The evolution towards digital solutions for patient care makes this country a global reference.

 Ireland  
Ireland offers opportunities in the area of medical devices and equipment and digital health.

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## 7. Success stories



## Success Stories in Catalonia



**Koa Health** is a company offering therapies for mental health.



**Mediquo** is a comprehensive telemedicine platform for professionals.



**Amelia Virtual Care** provides access to the advantages of immersive technology for mental health.



**Top Doctors** is a platform to find and contact medical specialists in the private healthcare system.



**Mediktor** has developed an AI algorithm that recognizes symptoms using language recognition.



**Trialing** is a platform that helps healthcare staff to connect their patients with clinical trials that treat their conditions



**Sequentia** analyses genomic data to create and improve diagnostic and therapeutic solutions.



**ELEM** creates populations of avatars to predict the result of pharmacological therapies and medical devices.



**Human IT Care** is a platform based on artificial intelligence that provides monitoring and remote care.



**Teladoc Health** offers ICT services for digital medical care to healthcare organizations and individuals around the world.



**Cuideo** is a company offering home care, mobile telehealth and medical and psychological consultations.



**Zur Rose-Profarma** specializes in e-commerce, drug distribution and online sale of parapharmacy products.

# Thank You!

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**More information about the sector, news and opportunities**  
<https://catalonia.com/key-industries-technologies/health-life-sciences>

