

HealthTech 2030: Catalonia's contribution to disruptive innovation

November 2022



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The main goal of this report...

...is identify the main trends and challenges in HealthTech

Specific objectives

1

Map the top 5 global trends in the HealthTech sector

2

Quantify the number of Catalan HealthTech startups engaged in each of the identified trends

3

Assess the influence of the trends and their driving forces (Technology, Data and Capabilities), as well as their impact on healthcare provision

4

In-depth analysis of some of the most successful startups in Catalonia for each trend

5

Gain insight into the future of healthcare delivery from the interviewed key opinion leaders

Scope

5 global trends in HealthTech

Catalan HealthTech startups

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This report focuses on HealthTech in Catalonia



HealthTech innovation

HealthTech innovations and business models will profoundly **improve people's lives, improving healthcare delivery** and **transforming** health systems



What is considered HealthTech?

- ▶ HealthTech covers the **intersection** of the **medical** and **engineering fields**
- ▶ A **health technology** is the application of organized knowledge and skills in the form of **devices, medicines, vaccines, procedures and systems** developed to **solve a health problem** and **improve the quality of life**

HealthTech ecosystem



HealthTech startups foster innovation



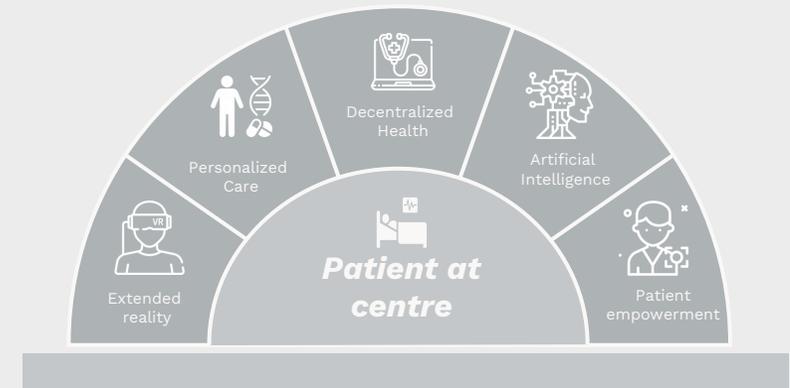
In Catalonia there is a **HealthTech ecosystem** with a **well-established** and **growing base**



The **innovation** developed by HealthTech companies is **enabling** an **evolution** in the healthcare system



Top trends in HealthTech



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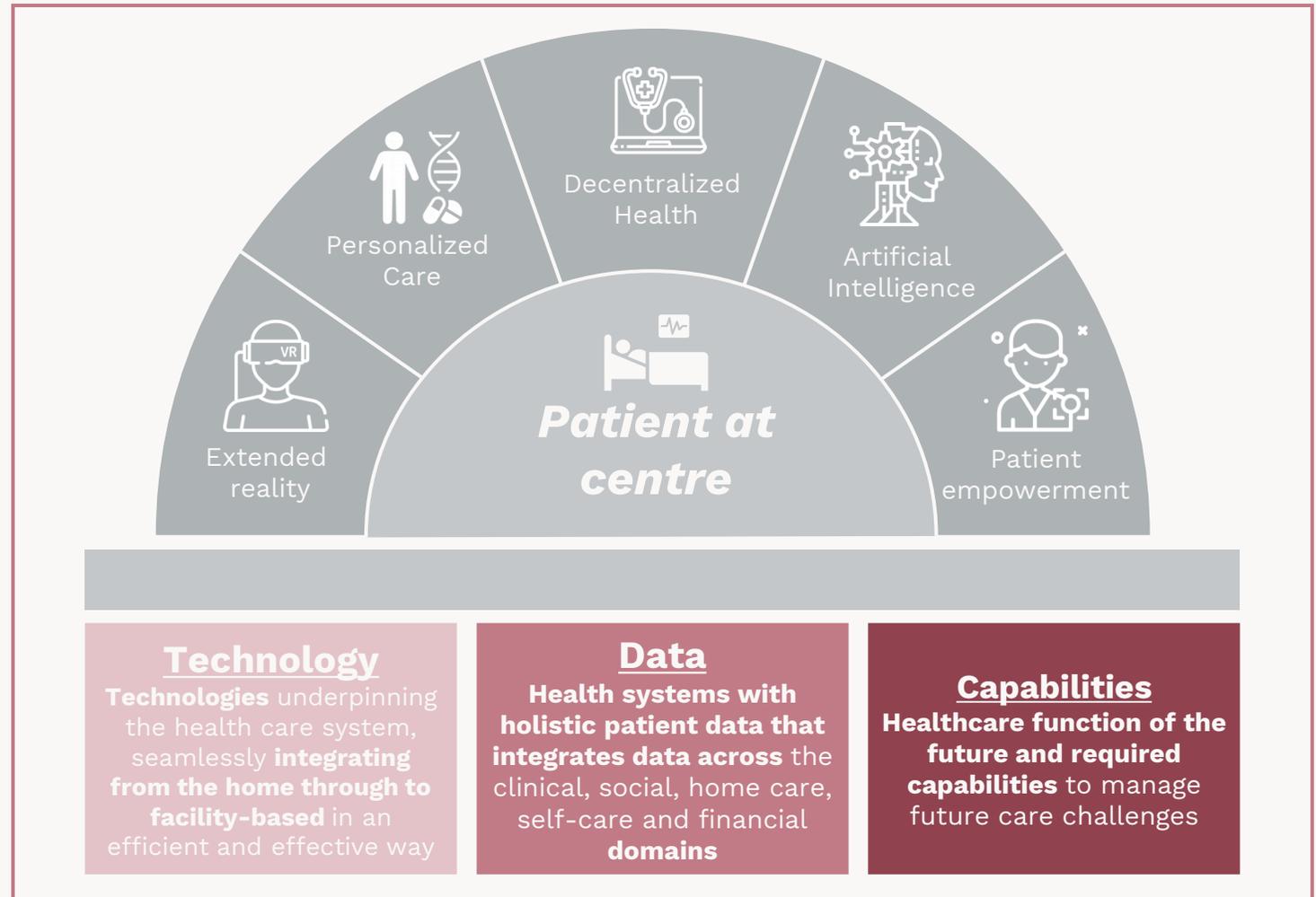
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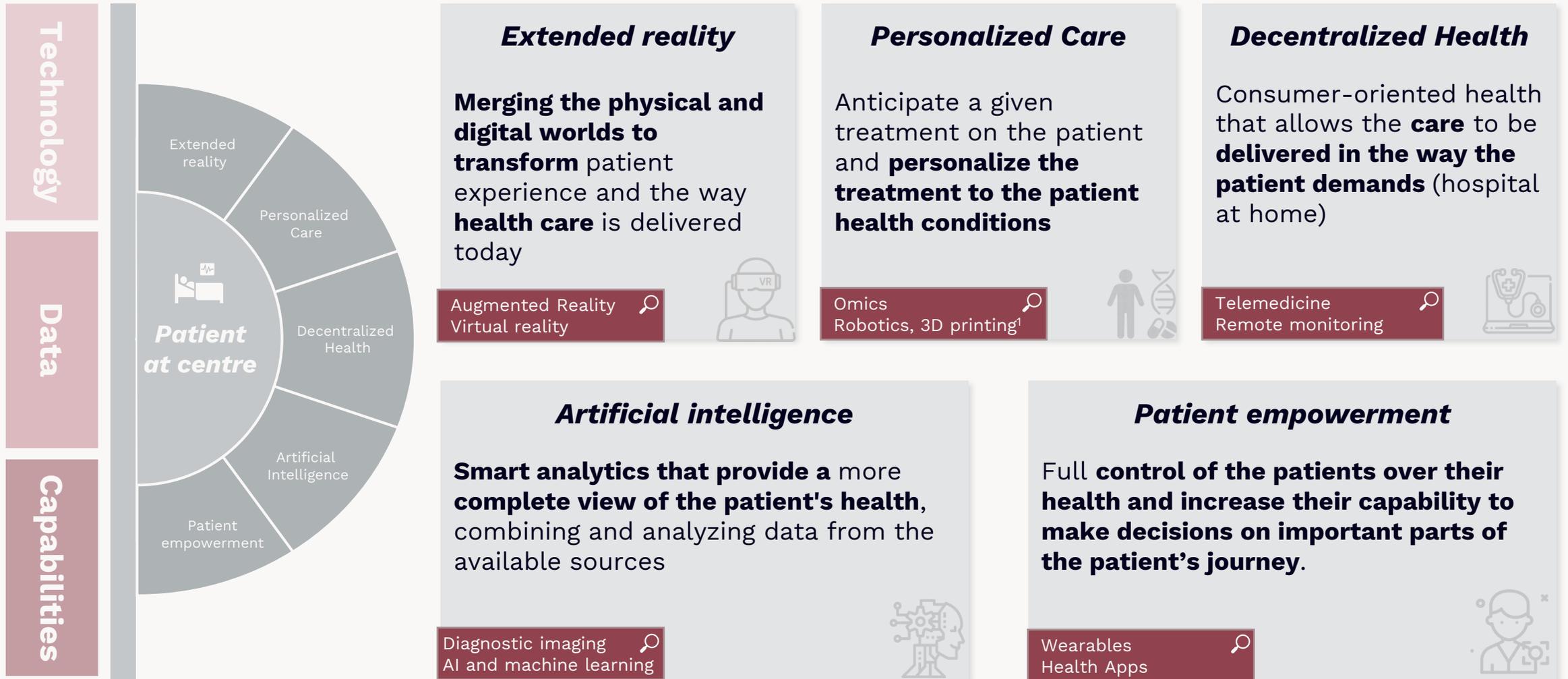


Overview of the trends of the HealthTech sector and the main drivers that will enable these trends to emerge

- ▶ The main objective of the report is to analyze which are the **system-changing innovation trends** present in the **Catalan HealthTech sector** and its relative weight
- ▶ **EY has identified five system-changing global trends** (Extended Reality, Personalized Care, Decentralized Health, Artificial Intelligence and Patient Empowerment) and has proceeded to **identify in which trend Catalan HealthTech startups are working on**
- ▶ The five innovation trends identified are **patient centered** and lead by three main drivers: **Technology, Data, and Capabilities** (right figure)
- ▶ The trends focus on **prevention over treatment**, seek **patient wellbeing** and put **patient-doctor engagement** above all else



Five trends in the HealthTech sector have been identified with their corresponding enabling technologies highlighted



¹ Only analyzed two examples per trend | EY analysis



158 startups have been found in Catalonia working on the selected trends, meaning a 66% of the total Catalan Health Tech ecosystem

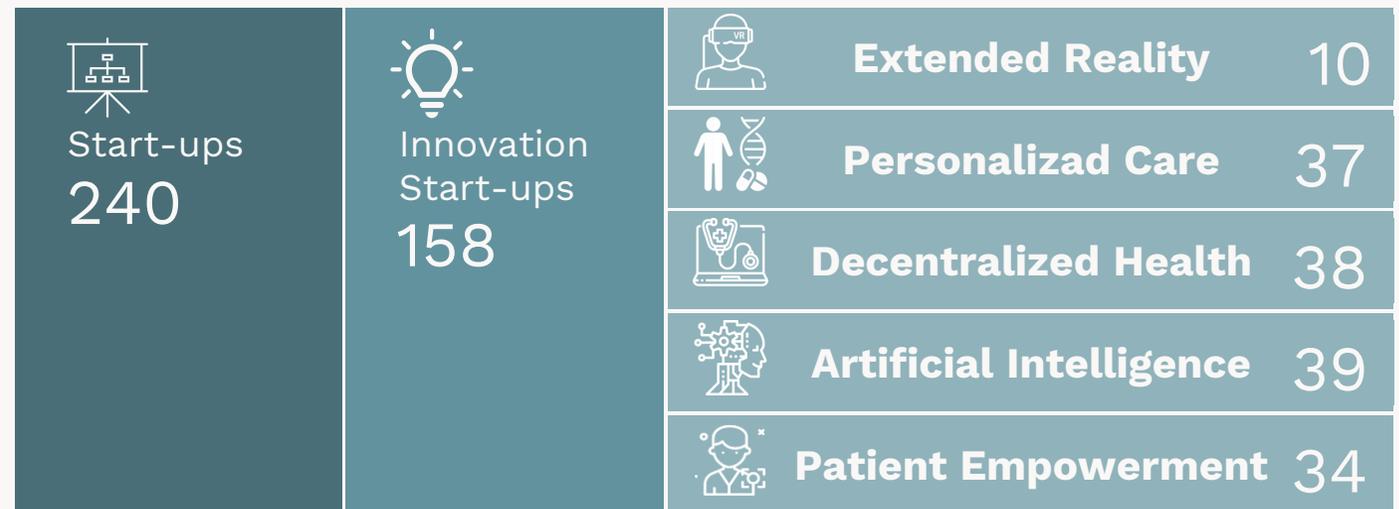
Catalonia as a HealthTech ecosystem

- ▶ Catalonia is currently considered one of **the leading innovation ecosystems in the health and life sciences**, due to the high quality of education, talent and research centers. Investors see **Catalonia** as a **niche for start-ups**
- ▶ In **2021, global HealthTech investment** reached an all-time high of **\$57.2 billion**. HealthTech market **will be worth \$426.9 billion in five years** and is expected exceed **\$790 billion by 2030**¹
- ▶ **In Catalonia**, HealthTech startups have registered a record investment of **€296 million up to June 2022**, exceeding the total funding raised in 2021, following the global upward trend
- ▶ Of all the 240 start-ups in the Catalan Health Tech ecosystem, **158 have been categorized as system-changing innovative start-ups**, which is **66%** of the total
- ▶ **Personalized Care, Patient Empowerment, Decentralized Health** and **AI** have the **largest market niche** among the trends categorized above
- ▶ **Extended Reality** still has a long way to go in Catalonia, **only 6%** of the innovative startups have revolved around this trend

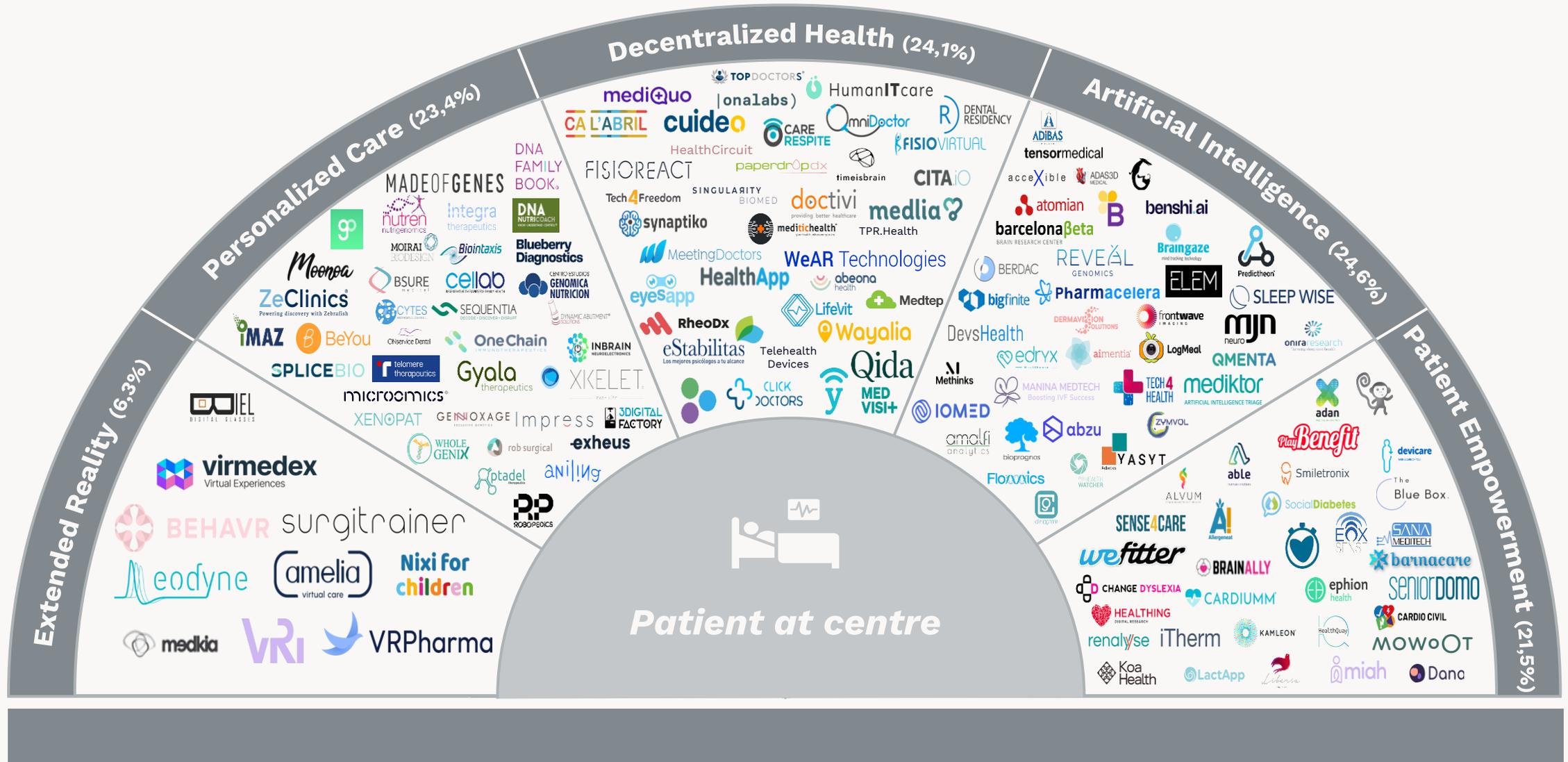
Global HealthTech market evolution



Overview of Catalan HealthTech innovation trends



Map of Catalan HealthTech startups on the main trends



Classification based on trends, if any company does not feel comfortable with the categorization, please notify for its correction



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Augmented reality definition



Technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view

Augmented reality impact analysis



Integrating digital transformation with the user environment in real time

Extended reality is becoming a reality in the world

Augmedics



Augmedics

- ▶ Augmedics is a pioneer in augmented reality surgical navigation that aims to improve surgical outcomes with AR technologies that solve clinical needs and instil technological confidence in the surgical workflow



Proprio



Proprio Vision

- ▶ Proprio advances surgery through a proprietary platform that synthesizes artificial intelligence, computer vision and augmented reality

Disruptions

Elimination of cognitive overload

Prevents the user from having to process excessive information to reach the solution

Real-time analytics

Enables to improve processes on-site through visual representation of data

Heightens user engagement

The innovative nature of this information delivery technology makes it attractive to users

Impact on driving forces



Technology

Tech creation of that allows capturing data from the outside world for the AR



Data

Creation of huge data pools to manage all information captured



Capabilities

Software developers and graphic designers

Use cases

1. **Surgical Procedures:** During an operation, they may be more aware of the location of the organ, vein meshes and diagnostic reports, which appear right in front of their eyes
2. **Augmented Practice:** AR technologies can allow medical students to visualize and practice theories during their training

Virtual reality definition



Real-and-virtual combined environments and human-machine interactions generated by computer technology and wearables

Virtual reality impact analysis



The virtual reality driving forces will demand changes in the way technology and data is used and human capabilities required

Extended reality is becoming a reality in the world



Vicarious surgical

- ▶ Vicarious is a startup that combines VR with robotics, controlling the robot's movements through VR glasses, allowing surgeons to perform minimally invasive surgery with 3D visualization and accurate control



Osso VR

- ▶ Osso VR is a surgical training platform that gives health professionals better ways practice and learn new skills and procedures

Disruptions

Improve patient outcomes

Intervene more effectively on anxiety, phobias, depression, trauma, stress, etc.

Enhance provision of care

Allows greater control of exposure therapy without logistical effort

Better care solutions

VR is cost-effective compared to regular physical setups

Impact on driving forces



Technology

High-capacity equipment to process users' activity



Data

Development of programs to process the large amount of Health Data



Capabilities

New HCPs¹ capabilities required to work in VR

Use cases

- 1. Surgical Planning:** When using virtual reality, surgeons can get a three-dimensional operated body part model, allowing better planning for its operations
- 2. Medical training:** Virtual reality offers future clinicians to sharpen skills by taking virtual reality journeys
- 3. Phobias dealing:** Using virtual reality medical training in a safe, controlled, patient-tailored environment is of great help to relieve stress and deal with fears

¹HCP: physicians | EY analysis



Amelia Virtual Care



Amelia Virtual Care has developed one of the largest and most complete virtual reality platform in mental health, allowing professionals to treat a wide range of mental health disorders from common phobias to anxiety and depression

+ 15000
patients
treated



+ 2000
mental
health prof.
use Amelia



Amelia Virtual Care competitive advantages

- 1 **27% of patients suffering from phobias and anxiety reject live exposure** as too intense, only 3% of patients rejects exposure to VR
- 2 Exposure therapy with VR allows mental health professionals the opportunity to **reproduce real-life scenarios** and adapt and control these environments
- 3 The platform has **more than 100 virtual environments and scenes**

Virtual reality added value for mental health

Enables mental health professionals to assess, identify and apply different intervention protocols more effectively

Patients notice improvement faster, increasing its adherence to therapies

Advance research and promote evidence-based care for better mental-health practices

% Other relevant information

Year of foundation

2013

Total money raised

14,4M€

Market presence

Globally

Number of financing rounds

4



Xavier Palomer
Chairman & Founder—
Amelia Virtual Care

Vision of the HealthTech sector in 2030?

We are seeing that **there are many real use cases**, for example having meetings within the health sector could be done in virtual reality or mental health treatments in extended reality, we see the **general public having** this type of **technology** in their **everyday environment**

Future of Extended Reality?

We see this **extended reality** technologies **reaching the mass market** and becoming increasingly commonplace, as virtual reality has therapeutic value in its own right

Roles required by the HealthTech sector?

We have the classic profiles, but we also have **two figures** that are **difficult to find**, which are a **doctor with extensive technological training and the other are technicians with training in virtual reality**, which requires different skills to those of an application developer



“Clinical data must become much more blockchain-based as this greatly increases data privacy and promotes trust in decentralization”

Which technologies will revolutionize medicine?

This **technology** has been **used** in the **scientific academic area** for a **lot of years** and there are hundreds of publications that talk about it. But **nobody is bringing all this know-how** from validated scientific publications **into a market-ready product**

Who are your role models?

In the extended reality sector at the local level, I don't have any local references I can tell you about, but **internationally** I follow **Walter Greenleaf** (Virtual Reality, and Digital Health Expert at Stanford University) is **helping the community to continue to improve**

Metaverse uses

Metaverse gives you access to rehabilitation therapies in a super-confidential way

Interview highlights

- ▶ **Future HealthTech vision:** Extended Reality involved in casual environments
- ▶ **Future of Extended Reality:** Extended reality in health is here to stay
- ▶ **Required roles:** Doctor with extensive technological training and technicians with training in virtual reality
- ▶ **Revolutionary technologies:** Bringing all scientific knowledge to reality



Omics definition



Group of biological sciences that seeks to quantify and describe the set of biological molecules and how it determines the structure, function and interactions of the organism or system of which it is a part

Omics impact analysis



Revolutionize the healthcare of a person with a rare disease or cancer by offering rapid, accurate diagnosis and risk stratification based on genotype, epigenome, transcriptome, proteome or metabolome

Personalized care is becoming a reality in the world

MultiplAI



MultiplAI

- ▶ The company offers a whole blood screening test using RNA Sequencing and AI to detect virtually any complex diseases, including cardiovascular disorders and cancer

Congenica



Congenica

- ▶ Congenica's scalable software for end-to-end genomic analysis interprets next-generation sequencing data in as little as five minutes, guiding treatment decisions and improving care to people

Disruptions

Personalized treatment

Every patient receives a different approach depending on their physical conditions

Increased effectiveness

Individualization of the treatment guarantees an increase in success rate

Patient involvement

Patients participate in the decision-making process and make choices about their health

Impact on driving forces



Technology

Development of AI platforms that allow analysis of multi-omics analysis



Data

Blockchain systems that enhance information security



Capabilities

Bioinformatics, data analysts and genetic counselors

Use cases

1. **CAR T:** Treatment in which a patient's T cells (a type of immune system cell) are changed in the laboratory so they will attack cancer cells
2. **Diagnostics and Drug development:** Thanks to individual omics information, treatments can be tailored more specifically by predicting how a person's body will respond to the treatment with the analysis of omics data by computational biology, AI algorithms and blockchain technology, medical doctors will be able to diagnose diseases, identify the right treatment and predict disease progression



Robotics definition



A field of science and engineering dedicated to the design, construction and use of mechanical robots. Robots are described as a programmable machine that can complete a task

Robotics impact analysis



Robots are making the medical processes faster, safer, and smarter for caretakers and patients alike

Personalized care is becoming a reality in the world



Aether Biomedical

- ▶ Aether Biomedical is a medical robotics startup focused on development of rehabilitation robotic devices. Zeus, developed by Aether Biomedical, is a multi action bionic limb filling the gap of low cost - high efficacy bionic limbs



ReWalk Robotics

- ▶ ReWalk Robotics is a medical device company that designs and develops powered solutions that provide gait training and mobility for lower limb disabilities

Disruptions

Greater performance for HCPs¹

Robotics improve visualization and precision during surgery

New solutions for patients

Improving patients' quality of life through robotic solutions

Accurate surgical procedures

Minimizing invasiveness and increasing effectiveness of medical procedures

Impact on driving forces



Technology

Requires high precision engineering in surgical robotics



Data

Overtly complex data required for independent robot motion



Capabilities

Robotics engineers and programmers

Use cases

- Neurosurgery:** Robot is used to position a digital microscope, allowing neurosurgeons to get the best view of the surgery and increasing their precision
- Robotics for Prosthetics:** Robotic devices to help people with missing limbs and related disabilities controlled by nerve endings at the site of amputation
- Rehabilitation Robots:** Helps lessen the physical demands on the therapist

¹HCP: physicians | EY analysis



Exheus



Exheus is provider of direct-to-consumer gene expression report that helps to optimize people's health and quality of life in a highly personalized way

22.000
analyzed
genes



+1123
samples
analyzed



Exheus competitive advantages

1

Increased efficiency by **combining** the advantages of **RNA testing** and **blood testing** in one

2

Latest RNA-Seq sequencing technology and **innovative artificial intelligence algorithms**

3

Revolutionary test that allows patients to see their **active biological parameters**

% Other relevant information

Year of foundation



2020

Total money raised



2M€

Market presence



Spain

Number of financing rounds



3

Genetics added value for quality of life

Allows the user to be aware of their strengths and weaknesses in the field of nutrition and sports performance

Each plan is customized according to the active genes of the users

Offers the user a holistic view of all body parameters for comprehensive health monitoring

**Pol Cervera**

**Chief Operations Officer &
Co-Founder – Exheus**

Vision of the HealthTech sector in 2030?

In the future, the health system will **change** from being more **reactive to proactive**, i.e. we will not wait until we have the disease and then collapse the health system, but we will **prevent it from the start**

Future of Personalized Care?

Democratizing access to personalized medicine for all patients and with a **progressive reduction of costs**, access to personalized medicine for the general population will be achieved

Roles required by the HealthTech sector?

Physicians should **update** their knowledge in more **technological knowledge** or in the **emerging trends**. In terms of new roles, I think that **bioinformatics or biostatistics**, which currently exist mainly in the field of research, are going to be key in the medical field



“The central government and the European Union are giving a great deal of impetus to personalized medicine”

Which technologies will revolutionize medicine?

We have the technological capabilities nowadays.

As soon as we have more clinical data, better predictions will be made and therefore better treatments for patients

Who are your role models?

We look at an **American company** called **Viome** whose objective is to **Make Illness Optional** and **decrease** the **number of chronic patients** around the world

Personalized Care, a matter of time

Personalized medicine will take shape and increase in quality and population reach over time

Interview highlights

- ▶ **Future HealthTech vision:** Focus on prevention over treatment
- ▶ **Future of Personalized Care:** It will reach all the status in the society
- ▶ **Required roles:** Existing doctors with a better technical knowledge and bioinformatics
- ▶ **Revolutionary technologies:** Technologies already exist, but better data needed for better treatments



Telemedicine definition



The practice of medicine that uses technology to provide remote care and therapy, usually centered on the idea of the hospital at home

Telemedicine impact analysis



Gives patients better access to health care by improving convenience and continuity

Decentralized Health is becoming a reality in the world



Teladoc Health

- ▶ Teladoc Health offers the only end-to-end virtual healthcare solution capable of serving organizations and individuals worldwide



Insulet

- ▶ Insulet Corporation is an innovative medical device company dedicated to making life easier for people with diabetes, with devices that automate the administration of injectable medications

Disruptions

Improved disease management

Facilitates connection to a physician, allowing users to have frequent checkpoints

Increased patient control

Practitioners can monitor patients medication

Control of infectious illness

Reduces hospital admissions, decreasing costs and infection among patients

Impact on driving forces



Technology

Creation of videoconferencing systems



Data

Web-based apps for uploading data to your HCP²



Capabilities

Doctors will need knowledge of Internet technologies

Use cases

- 1. Cardiology:** Cardiologists can use telemedicine to both prepare patients for surgeries and assess their progress post-surgery
- 2. Geriatrics:** Telehealth ensures that mobility issues won't prevent older adults from keeping their appointments and receiving the care they need
- 3. Nursing:** Triage patients to determine whether in-person care is necessary and prioritize patient needs

¹ RPM stands for Remote Patient Monitoring; ² HCP: physicians | EY analysis

Remote monitoring definition



Technology that allows patients to be monitored outside of conventional clinical settings, such as at home or in a remote area

Remote monitoring impact analysis



RPM¹ can increase access to health care and reduce health care costs by dispersing hospital health services

Decentralized Health is becoming a reality in the world



HealthSnap

- ▶ HealthSnap is an integrated Virtual Care Platform that helps healthcare organizations improve patient outcomes, reduce utilization, and diversify revenue streams



Optimize Health

- ▶ Optimize.health is a provider of a digital healthcare platform that enables the deployment of Remote Patient Monitoring (RPM) programs.

Disruptions

Faster access to patient data

Keeps on record structured patient data and provides real-time information and alerts when patient is at risk

Comfort for the patient

Relieves the user by keeping them in the comfort of their home during monitoring

Free up hospital resources

Maintains those involved out of hospital by freeing up resources

Impact on driving forces



Technology

Customizable EHR and creation of new web/apps for RPM



Data

Visualization and processing of patient health data



Capabilities

Biomedical and cybersecurity engineers

Use cases

- 1. Chronic diseases:** Patients suffering from a chronic disease can be followed by professionals and any variations in their medical variables can be checked between consultations
- 2. Connecting relatives:** Keeping all members of the close family circle updated and informed about the patient's status

¹ RPM stands for Remote Patient Monitoring | EY analysis



HumanITcare



HumanITcare is a remote monitoring platform that allows the clinician to track various biomarkers and vital signs of the patient, including heart rate, blood pressure, weight, oxygen saturation, sleep quality, temperature and glucose levels

+1M
users



HumanITcare competitive advantages

1

Optimizes the healthcare system by **avoiding** unnecessary **trips and hospital visits** and **reducing** healthcare **costs**

2

Broader picture of the patient's **disease** through **traceability of data**

3

Highly customizable, easy integration with other platforms and Electronic Health Records

% Other relevant information

Year of foundation

2018

Total money raised

3M€

Market presence

Europe and LATAM

Number of financing rounds

2

HumanITcare has added value for patients

Optimizes clinical staff efficiency and combats clinical staff shortages

Patients can always be connected to relatives and informed of their health status

Reduces and mitigates the risk of transmission of infections, both for the patient and the practitioner

+20
hospitals
and clinics
implemented



¹ RPM stands for Remote Patient Monitoring | Crunchbase financial data | EY analysis



Nuria Pastor

CEO & Co-founder-
HumanITcare

Vision of the HealthTech sector in 2030?

In 10 years, the **age group of 60-year-old** users will become more prone to **chronic diseases**, and this segment of the population already has a **good technological knowledge base**, which can greatly **help** to the **digitalization of hospitals**

Future of Decentralized Health?

There will have to come a **change** in the **health system** where the **lever will be technology**, because it is **unsustainable** to maintain a system with a **population pyramid** that is growing more and more at the top, not at the bottom, and on top of that there are **no doctors**, so I think that a forced change is going to come

Roles required by the HealthTech sector?

I would highlight **software engineering, development, programming, bioengineering, health engineering** or **cybersecurity**, these profiles are going to be important in the future of digital health



“Public procurement mechanisms must be in place to facilitate innovation”

Which technologies will revolutionize medicine?

I think they will be the ones that **add value**, any device that measures data well, process optimization software, robots that perform all kinds of tasks, including cleaning and disinfection tasks that cost hospitals a lot of money, or even 3D organ printing. In the end, **the ones that solve real problems will remain**

Who are your role models?

On a technological level, I would like to highlight current **HP General Manager** for his **great product vision**. I would also like to highlight the guys at the **Servei Català de la Salut**, who are taking very **important decisions** in the field of **telemedicine**

Decentralization outcomes

Adherence to treatment is improved by up to 90%, which means a reduction in hospital costs and a better evolution of the treatment

Interview highlights

- ▶ **Future HealthTech vision:** Population will have a better understanding of technology that will enable the use of remote medical applications
- ▶ **Future of Decentralized Health:** A revolution accompanied by technology will have to happen to solve the problem of the population pyramid
- ▶ **Required roles:** Software engineering, development, programming, bioengineering, health engineering or cybersecurity
- ▶ **Revolutionary technologies:** Real problem solvers



Diagnostic imaging definition



Digital processing of images to look for typical appearances and highlight distinctive sections in order to provide information to support clinical decision

Diagnostic imaging impact analysis



Provides a data-driven tool that complements professionals in diagnostic imaging by increasing their success rate

Artificial Intelligence is becoming a reality in the world



iCAD

- ▶ iCAD provides innovative cancer detection and therapy solutions to precisely and effectively detect and treat cancer early



EDDA
Tech

- ▶ EDDA Technology Inc. is a provider of innovative clinical informatics solutions in the field of health imaging and analysis that enable early detection and diagnosis of diseases

Disruptions

Less waiting time

Professionals can read images faster and more effectively

Improving clinical decision-making

High diagnostic accuracy and increased diagnosis efficiency

Earlier detection of diseases

Leads to a best chance for successful treatment

Impact on driving forces



Technology

Powerful computer systems



Data

Handling large amounts of data for accurate forecasting



Capabilities

Data scientist and ML developers

Use cases

1. **Computer-aided prognosis:** Combines medical image analysis and patient data analysis to help doctors predict disease outcomes and patient survival
2. **CADx² systems:** Detect and characterize pathology in various tissues, such as tumors, lesions, and polyps

¹ ML stands for Machine learning | ² CADx stands for Computer-aided Diagnosis | EY analysis



AI and machine learning definition



AI is a field that combines computer science and robust datasets to enable problem-solving. Machine learning focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy

AI and machine learning impact analysis



Adds value by automating or facilitating the work of clinicians and staff

Artificial Intelligence is becoming a reality in the world



ClosedLoop

- Provides off-the-shelf AI models and automation workflows for health care applications and manual processes involving data science tasks



Owkin

- Owkin uses artificial intelligence to find the right treatment for every patient. Their focus is to use AI to discover and develop better treatments for unmet medical needs, starting with cancer

Disruptions

Cost-effectiveness

Automating administrative tasks reduces healthcare costs

Well structured clinical data

Enables predictive analytics, which can support clinical decision making and action

Prevention based

Allows physicians to detect life-threatening episodes at earlier, more treatable stages

Impact on driving forces



Technology

Software and programming equipment



Data

Processing of large amounts of data for the machine learning process



Capabilities

Machine learning engineers, computer vision engineers and data scientists

Use cases

- Drug discovery:** AI algorithms can reduce the cost and time of developing new medicines, identify new drug applications, tracing their toxic potential as well as their mechanisms of action
- Patients Triage and referral:** Automate through AI the evaluation of the degree of emergency to prioritize the most urgent or time-sensitive treatments
- Virtual assistants:** Conversation platforms driven by artificial intelligence (AI), that respond to clinical queries based on algorithms

¹ ML stands for Machine learning | EY analysis



Mediktor



Mediktor is an AI-based medical assistant able to analyze symptoms and assess the user's state of health. It then directs patients to the appropriate level of care that provides them with a solution to their health problems

+ 10 M
users
around the
world



Validated
with 91.3%
in trials with
real patients



Mediktor competitive advantages

1

Efficient and effective triage system, improving medical service delivery and time optimization

2

Personalized, adaptable to any type of client (**insurers, emergency services, Hospital Digital Front Door, the pharmaceutical industry or telemedicine companies**)

3

Easy to implement, it's **white-label SAAS** can be incorporated into the **interfaces chosen by customers**

AI added value for users and professionals

It allows professionals to spend less time on triage and use that time for prevention or treatment

Directs its members to the most appropriate health service in a safe, convenient and cost-effective manner

Enables users to have a basic understanding of the type of disease, improving the patient and physician experience

% Other relevant information

Year of foundation

2011

Total money raised

16.2M€

Market presence

26 countries

Number of financing rounds

3



Cristian Pascual

CEO & Cofounder - Mediktor

Vision of the HealthTech sector in 2030?

The **healthcare sector** will face serious challenges with the changing population pyramid, the biggest **changes will have to come through technology-based tools** that empower the practitioner and the patient **to fill the shortage of healthcare professionals** and the **increase** in the **population** over 70 years of age

Future of the AI technologies?

Doctors will need to rely on AI solutions so that they can **diagnose more and better**. Currently there are not a lot of medical intelligence tools in the public system, so we need to address these structural challenges as well

Roles required by the HealthTech sector?

We will need doctors, but we must train them in technology so that they lose their fear of **adopting** new **technologies** in order to begin the transition to the future of healthcare. Focusing on the AI sector, we are going to compete for technical profiles, such as software developers



“We will need doctors to be able to manage new technologies in order to start the transition to the future of healthcare”

Which technologies will revolutionize medicine?

The two technologies that will have the greatest impact on healthcare and impact the entire value proposition in all use cases, **artificial intelligence** and **telemedicine** because they are applicable to millions of cases. These technologies will empower both the patient and the professional

Who are your role models?

Let's say **we are paving the way for the future**, I founded Barcelona Health Hub, we started 6 startups in 2018 and today we are 350 companies. We bring together the entire digital health sector, pharma, insurance companies, more than 200 startups. In other words, let's say I'm almost doing the opposite, **I'm helping those who are coming**

Future health care provision trends

In the future there are not going to be enough professionals to cover the health care needs

Interview highlights

- ▶ **Future HealthTech vision:** Healthcare sector evolution will have to come through technology-based tools to fill the shortage of healthcare professionals and the increase in the population over 70 years of age
- ▶ **Future of AI technologies:** Doctors will need to rely on AI solutions to diagnose more and better
- ▶ **Required roles:** Doctors with capabilities to manage new technologies
- ▶ **Revolutionary technologies:** Artificial Intelligence and Telemedicine

Wearables definition



Electronic devices that can be worn as accessories, embedded in clothing, implanted in the user's body with the ability to send and receive data

Wearables impact analysis



Proven useful in helping the patient and clinician create a care plan and track outcomes

Patient empowerment is becoming a reality in the world



Cyradia Health

- ▶ Cyradia Breast Monitor (CBM) is a non-invasive wearable device developed to assist in the detection of breast tissue abnormalities in any type of breast tissue



Withings

- ▶ Move ECG is an analogue watch that records an electrocardiogram on demand and detects atrial fibrillation through its application

Disruptions

Supports healthcare system

User's health can be monitored allowing a quicker reaction from health professionals

Enhanced monitorization

Patient enjoys improved traceability of his own medical data

Reduce healthcare costs

Remote knowledge of medical conditions helps minimize hospital costs

Impact on driving forces



Technology

Creation of smart devices used to capture users' activity



Data

Ability to analyze and process the large amount of existing information



Capabilities

Software engineers, ECG analysts and biomedical design engineers

Use cases

- 1. Patient therapy delivery:** Help treat chronic disease symptoms and maintain patients' health, while automatically accumulating data for a doctor's review
- 2. Patient rehabilitation:** Enables physiotherapy delivery and collects data on rehabilitation progress at home or in hospital
- 3. Early disease diagnostics:** Wearable can identify intermittent symptoms that could have been not present during doctor appointments

Health apps definition



Application programs that offer health-related services for smartphones, tablets, PCs, and other communication devices

Health apps impact analysis



Empowers users to be more autonomous and more motivated to self-regulate their own health

Patient empowerment is becoming a reality in the world



mySugr

- ▶ mySugr is a digital health company that simplifies life with diabetes. The mySugr App empowers people with diabetes through a complete self-management package



Moodfit

- ▶ Moodfit is a mood tracking, cognitive behavioral therapy using, mindfulness meditation, breathing, medication and sleep tracking app

Disruptions

Minimize risks of misdiagnosis

Users have more clinical data to rely on when making a diagnosis

Helps with forgetfulness

Alerts help the patient keep on track with a treatment or routine

Improved Patient Involvement

Facilitate engagement through effective patient-focused care and personalized experiences

Impact on driving forces



Technology

Software creation that enables traceability of clinical variables



Data

Ability to analyze and process the large amount of existing information



Capabilities

UX designers and software developers

Use cases

1. **Lactation:** Dedicated to breastfeeding and maternity that solves your doubts in a personalized way
2. **Mental health:** Tools that help focus on improving different aspects of mental health and well-being



Devicare



Devicare is a research company developing products for the medical treatment of urological diseases. Its activity focuses on developing innovative solutions to improve and ease the life of patients suffering from urological diseases and disorders

10 products
launched



Devicare competitive advantages

1

Most advanced and effective medical treatment for the **prevention and treatment of kidney stones**

2

Global, helps a large group of affected by cholelithiasis (10% of the population affected)

3

Pioneer solution, they're the first digital therapeutic company focused on Urology

35
registered
patents



Devicare has added value for users' health

Better follow-up of the patients and a greater adherence to and effectiveness of the treatment

Enhancing the urology experience by offering a wide range of products, from prevention to solutions

Ease the life of patients suffering from urological diseases and disorders by avoiding surgery treatment

% Other relevant information

Year of foundation



2012

Total money raised



11,9M€

Market presence



50 countries

Number of financing rounds



6

¹ Devicare is not only a Health app, they develop all kinds of products focused on urology | Crunchbase financial data | EY analysis



Rosendo Garganta

CEO & Founder – Devicare

Vision of the HealthTech sector in 2030?

Some of the trends mentioned in the report are already a present reality. **Patient empowerment**, unfortunately, **is not a reality today**, we believe that **in the future we will put the patient at the centre** and giving him the leading role, **give them information**, give them data and **allow them to decide with that information** and data

Future of Patient Empowerment?

All chronic pathologies need to learn from companies dedicated to diabetes patient empowerment. Diabetes companies have been leading the way providing the patient with a wealth of information

Roles required by the HealthTech sector?

We have had to develop a medical application, so we have incorporated a **product manager, a product owner, programmer, UX and UI designer.** We are now starting to test an **SDR¹** to improve the efficiency of the medical visitors



“Public sector must buy innovation to transition to the future of healthcare”

Which technologies will revolutionize medicine?

The **technologies** already **exist**, but they are focused on other pathologies, so it is necessary to **adapt them to each pathology**, in our case urology

Who are your role models?

On a **local level**, I pay special attention to the guys from **Itnig** and all the people who are going through their interviews. On an **international level**, I am very inspired by **Alivecor**, an American company that has developed a device to monitor patients with atrial fibrillation

Disinformation revolution

Companies and hospitals must generate quality health information content so that patients can make good decisions and do not go to unreliable media outlets

Interview highlights

- ▶ **Future HealthTech vision:** Aim to give the patient as much information as possible to let him decide
- ▶ **Future of Patient empowerment:** All pathologies having similar infrastructure and tech as diabetes
- ▶ **Required roles:** All these roles can be found, but finding them with experience in the health sector is very difficult
- ▶ **Revolutionary technologies:** Adapt existing technologies to each pathology

¹ SDR means Sales Development Representative | External interviews

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Key factors for the future of healthcare



Catalonia HealthTech startups are focusing on top 5 global trends

Of all the 240 startups in the Catalan Health Tech ecosystem, 158 are focused on the 5 biggest Healthcare trends (Extended Reality, Personalized Care Decentralized Health, Artificial Intelligence and Patient Empowerment) (66% of the total)



Baby boomers will change the system

In the coming years, the older generation, the most prone to chronic diseases, will already have a deep foundation in basic communication systems that will enable mass technology adoption in healthcare



Extended Reality is the least consolidated trend

Extended Reality is the innovation trend with the most room for improvement and the other trends are already more consolidated in the ecosystem



Digital Transformation is the revolutionary change healthcare needs

Countless technologies required already exist, but they are focused on other sectors, therefore they need adaption to the healthcare system and pathologies



Innovation as leverage

Innovation trends must be the lever of change in the healthcare system, because in the future there will not be enough professionals to cover the healthcare needs due to the changing population pyramid



New roles are emerging in HealthTech

With this change taking place in the healthcare system, new employees will be required, in addition to doctors and nurses, such as software developers or data scientists that enable the digitization of healthcare



Public sector procurement of innovation

The role of public administrations is crucial, more investment is needed and health technologies must be purchased in order to incentivize HealthTech startups to innovate



Importance of data quality

Data is one of the main drivers of innovation in health. Data will have to be integrated, interoperable and easy to process for this content to be valuable for the healthcare provision



HealthTech startups are fostering innovation

HealthTech innovations are transforming health systems from being reactive, to becoming proactive, predictive and preventative. HealthTech startups are going to develop the next generation of technological solutions in the health sector



Guarantee privacy of data is key

Cybersecurity and blockchain will be key in the near future to ensure the security and privacy of patients' clinical data, which will foster trust in HealthTech tools

