<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Objectives</td>
</tr>
<tr>
<td>2</td>
<td>Introduction – HealthTech and ecosystems</td>
</tr>
<tr>
<td>3</td>
<td>Catalonia HealthTech trends</td>
</tr>
<tr>
<td>4</td>
<td>Trends overview</td>
</tr>
<tr>
<td>5</td>
<td>Conclusions</td>
</tr>
<tr>
<td></td>
<td>Objectives</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
The main goal of this report... is identify the main trends and challenges in HealthTech

<table>
<thead>
<tr>
<th>Specific objectives</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 global trends in HealthTech</td>
</tr>
<tr>
<td>2</td>
<td>Catalan HealthTech startups</td>
</tr>
</tbody>
</table>

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
<table>
<thead>
<tr>
<th></th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Objectives</td>
</tr>
<tr>
<td>2</td>
<td>Introduction – HealthTech and ecosystems</td>
</tr>
<tr>
<td>3</td>
<td>Catalonia HealthTech trends</td>
</tr>
<tr>
<td>4</td>
<td>Trends overview</td>
</tr>
<tr>
<td>5</td>
<td>Conclusions</td>
</tr>
</tbody>
</table>
HealthTech innovations and business models will profoundly improve people’s lives, improving healthcare delivery and transforming health systems.

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.

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.

HealthTech startups foster innovation.

Top trends in HealthTech:
- Extended reality
- Personalized Care
- Decentralized Health
- Artificial Intelligence
- Patient empowerment

Patient at centre
Index

1. Objectives
2. Introduction – HealthTech and ecosystems
3. Catalonia HealthTech trends
4. Trends overview
5. Conclusions
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.

---

**Technology**
- Technologies underpinning the health care system, seamlessly **integrating from the home through to facility-based** in an efficient and effective way.

**Data**
- Health systems with holistic patient data that integrates data across the clinical, social, home care, self-care and financial domains.

**Capabilities**
- Healthcare function of the future and required capabilities to manage future care challenges.
Five trends in the HealthTech sector have been identified with their corresponding enabling technologies highlighted:

1. **Extended reality**: Merging the physical and digital worlds to transform patient experience and the way health care is delivered today.
   - Augmented Reality
   - Virtual reality

2. **Personalized Care**: Anticipate a given treatment on the patient and personalize the treatment to the patient health conditions.
   - Omics
   - Robotics, 3D printing

3. **Decentralized Health**: Consumer-oriented health that allows the care to be delivered in the way the patient demands (hospital at home).
   - Telemedicine
   - Remote monitoring

4. **Artificial intelligence**: Smart analytics that provide a more complete view of the patient’s health, combining and analyzing data from the available sources.
   - Diagnostic imaging
   - AI and machine learning

5. **Patient empowerment**: Full control of the patients over their health and increase their capability to make decisions on important parts of the patient’s journey.
   - Wearables
   - Health Apps

---

1 Only analyzed two examples per trend | EY analysis

Example explained in detail
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 to exceed $790 billion by 2030.

- 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.

158 startups have been found in Catalonia working on the selected trends, meaning a 66% of the total Catalan Health Tech ecosystem.
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.
<table>
<thead>
<tr>
<th></th>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Objectives</td>
</tr>
<tr>
<td>2</td>
<td>Introduction – HealthTech and ecosystems</td>
</tr>
<tr>
<td>3</td>
<td>Catalonia HealthTech trends</td>
</tr>
<tr>
<td>4</td>
<td>Trends overview</td>
</tr>
<tr>
<td>5</td>
<td>Conclusions</td>
</tr>
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Extended 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 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 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** 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** 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 HCPs’ 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.

Extended Reality

AR VR

Trends
Personalized Care
Decentralized Health
Artificial Intelligence
Patient Empowerment

New HCPs' capabilities required to work in VR

1HCP: physicians I EY analysis
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.

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
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.

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.

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

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

Metaverse uses

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

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'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.

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.

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 HCPs**
  - Robotics improve visualization and precision during surgery.

- **New solutions for patients**
  - Improving patients’ quality of life through robotic solutions.

- **Accurates 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**

1. **Neurosurgery**: Robot is used to position a digital microscope, allowing neurosurgeons to get the best view of the surgery and increasing their precision.

2. **Robotics for Prosthetics**: Robotic devices to help people with missing limbs and related disabilities controlled by nerve endings at the site of amputation.

3. **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.

**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.

**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.

**% Other relevant information**

- Year of foundation: 2020
- Total money raised: 2M€
- Market presence: Spain
- Number of financing rounds: 3

EY analysis
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.

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

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

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.

Decentralized Health is becoming a reality in the world.

**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

**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

**Impact on driving forces**

- **Technology**: Creation of videoconferencing systems
- **Data**: Web-based apps for uploading data to your HCP
- **Capabilities**: Doctors will need knowledge of Internet technologies

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**

RPM\(^1\) 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.

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**Impacts on driving forces**

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<tr>
<th>Technology</th>
<th>Data</th>
<th>Capabilities</th>
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</thead>
<tbody>
<tr>
<td>Customizable EHR and creation of new web/apps for RPM</td>
<td>Visualization and processing of patient health data</td>
<td>Biomedical and cybersecurity engineers</td>
</tr>
</tbody>
</table>

**Disruptions**

- Faster access to patient data
- Comfort for the patient
- Free up hospital resources

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

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

Maintains those involved out of hospital by freeing up resources.

**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 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.

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

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

% Other relevant information

- **Year of foundation**: 2018
- **Total money raised**: 3M€
- **Market presence**: Europe and LATAM
- **Number of financing rounds**: 2

---

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

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.

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

“Public procurement mechanisms must be in place to facilitate innovation”
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 provides innovative cancer detection and therapy solutions to precisely and effectively detect and treat cancer early.
- 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.

Impact on driving forces

- Technology
  - Powerful computer systems
- Data
  - Handling large amounts of data for accurate forecasting
- Capabilities
  - Data scientist and ML developers

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

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.

Artificial Intelligence is becoming a reality in the world

- **ClosedLoop**: Provides off-the-shelf AI models and automation workflows for healthcare applications and manual processes involving data science tasks.
- **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

1. **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.
2. **Patients Triage and referral**: Automate through AI the evaluation of the degree of emergency to prioritize the most urgent or time-sensitive treatments.
3. **Virtual assistants**: Conversation platforms driven by artificial intelligence (AI), that respond to clinical queries based on algorithms.

ML stands for Machine learning | EY analysis
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.

**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

---

Crunchbase financial data | EY analysis
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.

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.

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**

- **Cycadia Health**
  - Cycadia 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

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**Patient empowerment is becoming a reality in the world**

1. **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

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

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**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

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**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

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**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 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.

Devicare has added value for users' health:

1. **Better follow-up of the patients and a greater adherence to and effectiveness of the treatment**
2. **Enhancing the urology experience by offering a wide range of products, from prevention to solutions**
3. **Ease the life of patients suffering from urological diseases and disorders by avoiding surgery treatment**

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

**% Other relevant information**

- **Year of foundation**: 2012
- **Total money raised**: 11,9M€
- **Market presence**: 50 countries
- **Number of financing rounds**: 6

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1. Devicare is not only a Health app, they develop all kinds of products focused on urology | Crunchbase financial data | EY analysis
Extended Reality
Patient empowerment
Personalized Care
Decentralized Health
Artificial Intelligence

Rosendo Garganta
CEO & Founder – Devicare

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

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.

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 Itinig 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.

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

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.

1 SDR means Sales Development Representative | External interviews
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.