

July 2023 Technological report

Exponential Leaders

in Catalonia, 2023

Exponential Leaders in Catalonia, 2023

ACCIÓ
Government of Catalonia



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Technological Transformation and Disruption Unit of ACCIÓ

Barcelona, July 2023

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Prologue

LLUÍS JUNCA

DIRECTOR GENERAL FOR INNOVATION, DIGITAL
ECONOMY AND ENTREPRENEURSHIP OF THE
GOVERNMENT OF CATALONIA.

CONTRIBUTOR TO THE CATALONIA EXPONENTIAL
LEADERS PROGRAM.

This third report on disruption is a call to action and change. We realize the urgent need to address humanity's greatest challenges through the most disruptive innovation. In Catalonia we have huge potential to become a hub for global business competitiveness while generating a positive impact on the world.

This report guides us towards a fairer and more sustainable future and highlights the key methodologies to facilitate it, the emerging technological trends and the Catalonia Exponential Leaders companies, inspiring benchmarks that lead us along this path.

Let's be agents of change and build an uplifting future!

JAVI CREUS

FOUNDER OF IDEAS FOR CHANGE.

CREATOR OF PENTAGROWTH.

CONTRIBUTOR TO THE CATALONIA EXPONENTIAL
LEADERS PROGRAM.

We've worked hand in hand with the thirty candidates for the Catalonia Exponential Leaders selected in keeping with the contrast and reflection of their business models.

A group of people with highly diverse talents who're aspiring to generate a radical and significant impact on our lives and our relationship with the planet.

We've learned a lot; it's one thing to design disruption, and another quite different to find the way to produce it without failing in the attempt. It's a difficult balance between maintaining the final vision and accumulating rapid victories that accelerate its development.

Thank you!

Prologue: collaborating entities

The Economic Development Board (EDB), the government agency that is responsible for developing Singapore's economic strategies, was invited to be part of the selection process for Exponential Leaders' 23.

Having engaged globally leading corporations and startups to facilitate their presence in Singapore to expand into Asia, we lent our global perspective to select the 10 most disruptive companies with the potential to scale up and internationalize globally.

EDB is honored to have contributed to this prestigious event. We look forward to continuing our support for Catalan companies in their journey to internationalize and explore opportunities in Singapore and the Asian region.

NAOMI TAN

SENIOR ACCOUNT MANAGER EDB
COLLABORATING ENTITY OF THE CATALONIA EXPONENTIAL LEADERS PROGRAM



Our presence in several territories (Europe and Israel) allows us to judge startups against the world's leading ecosystems. Among ACCIÓ's startups we found some that could become global leaders.

GONZALO MARTÍNEZ DE AZAGRA

FUNDADOR I GENERAL PARTNER CARDUMEN CAPITAL
COLLABORATING ENTITY OF THE CATALONIA EXPONENTIAL LEADERS PROGRAM



Exponential Leaders in Catalonia

1. Definition

Disruption [dɪsˈrʌp.ʃən]



disruption (break, fracture)

Disruptive innovation

Disruptive innovation is a kind of innovation based on the creation of new products, services and business models that render what's been done until now obsolete and achieve a change in consumer habits.

- Disruptive innovation focuses on improving the customer experience and generating new value. It tends to destabilize markets.
- It goes far beyond sustainable innovation and is capable of revolutionizing an industry in such a way that it changes completely, to the extent that products and services that have formed part of the market before its irruption disappear.

Mentality
and change
of
perspective

Technology
as a
facilitator of
the solution

Generating
new markets

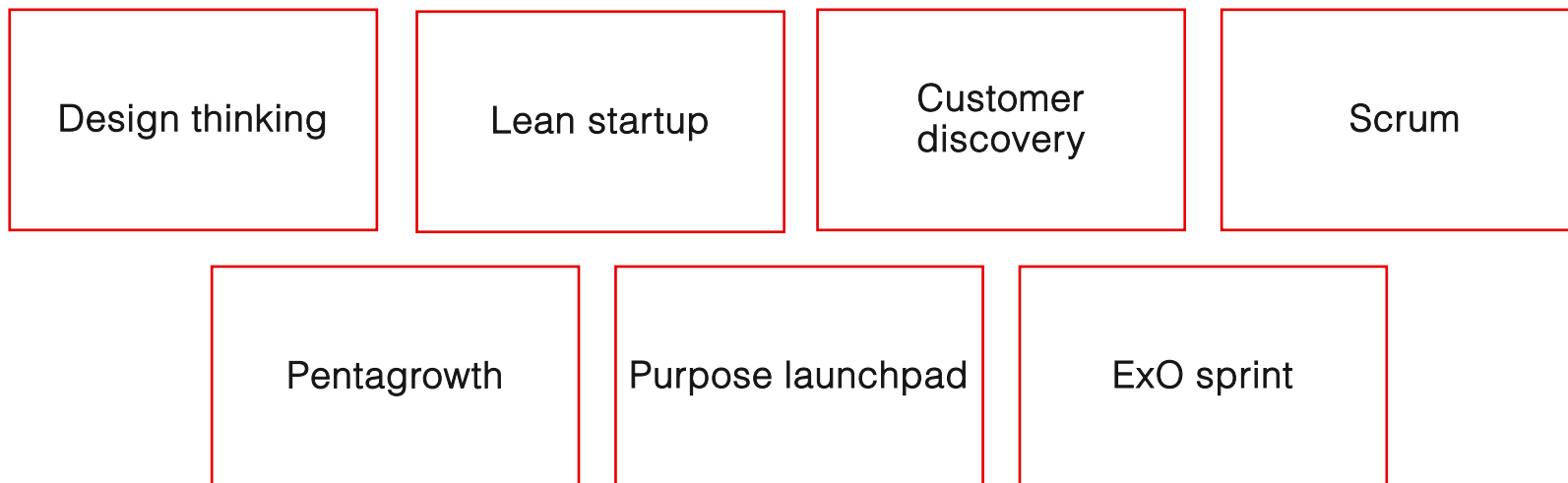
Scalable
solutions

New
business
models



Methodologies and frameworks of work

Disruptive innovation can be accelerated by using different frameworks, tools and methodologies for innovation so as to generate new initiatives and make it easier for them to reach the market.



In this methodology the users are placed center stage and innovative solutions are generated to meet their needs.

It's divided into the following series of **stages**, which can be iteratively returned to:



Empathize: Identify the wishes and needs relevant to the user.



Define: Organize all the information that's collected to identify all the areas of opportunity that can offer relevant solutions to the user.



Devise: Provide as many ideas as possible that address the challenge that's posed.



Prototype: Give shape to the ideas in order to show them to users, who can provide their own feedback and say how well the solution suits their needs.



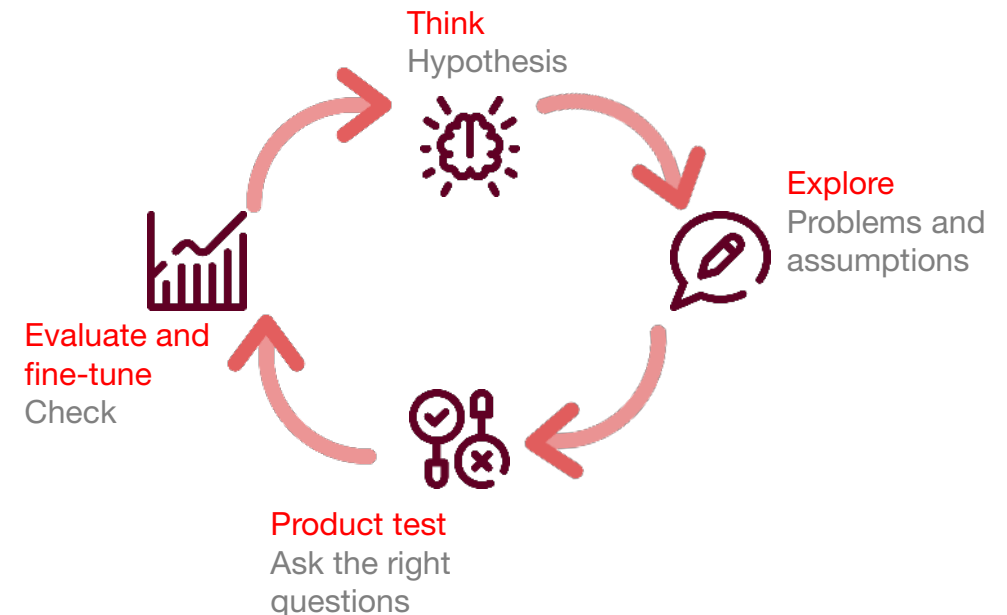
Validate or test: Show the solution to users with the aim of finding out whether it answers their problems and whether it addresses their needs.

Customer discovery is the initial iterative process to understand the customers' situations, needs and critical points.

Customer discovery involves defining and prioritizing people, and is applicable to both startups and large companies as they develop new products, target new people and seek to enter new markets. The process encompasses the customer's entire journey.

It's based on **four stages**:

1. **Defining the hypothesis.** The first step is to form a hypothesis that defines both the problem and the proposed solution.
2. **Checking the problems and assumptions of the hypothesis.** A good way to set out these assumptions is to create a hypothetical person to represent a customer. He/she must be specific; give this person a name, an age, a career, hobbies, interests and prospects.
3. **Asking the right questions.** In this phase it's a matter of checking with the customers whether the devised service or product serves to solve their problem and whether it has a real market.
4. **Evaluating and fine-tuning.** This phase can reaffirm concepts and reveal new aspects that haven't been taken into account in the hypothesis, ones that can be incorporated to reformulate it and thus improve the product or service.



Source: Steve Blank

Lean startup

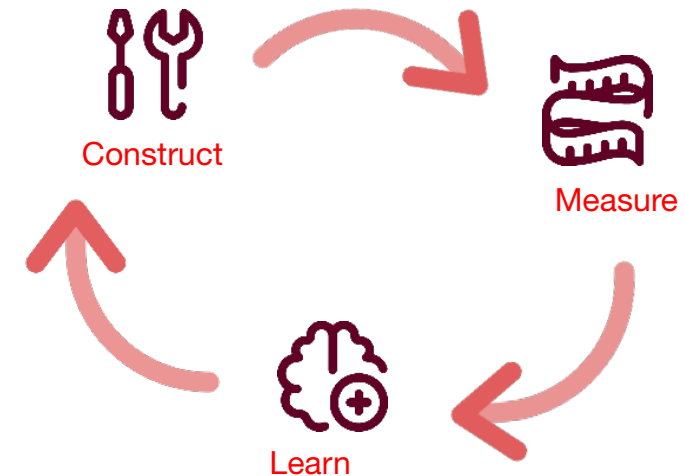
Lean Startup focuses on the customers' needs, and relies on their feedback to modify the product until the final version is developed.

The lean startup methodology can check the validity of the product throughout the creation process. The customers' needs are identified on the basis of a prototype and, since it isn't a finished product, the investment can be lower.

The main **goal** of this methodology is to create a scalable business model through an iterative process based on which the functional, social and emotional needs required to reach the target audience are gradually revealed.

The lean startup method is applied in three steps: **construct, measure and learn**. These steps allow constant motion, as the product that's created is tested with the customers and, once the results are analyzed, it can be constructed again.

- **Construct:** In this initial phase it's essential to transfer the idea to a material product. The result obtained is a minimum viable product (MVP).
- **Measure:** Information on the product and consumer reactions are requested.
- **Learn:** In the last step the company learns from the results collected throughout the process. The cycle then starts to produce the final product again.



Source: *The Lean Startup*, Eric Ries

This tool provides a collaborative work framework across teams to find adaptive solutions for complex problems.

Scrum is based on **empirical evidence** and **lean thinking**. It uses an iterative and incremental approach to optimize predictability and control risk.

It involves groups of people who collectively have all of the skills and knowledge to do the work and share it.

Scrum enables partial and regular deliveries of the final product to be made, prioritized in accordance with the benefit they bring to the recipient of the project. Scrum is therefore particularly suitable for projects in complex environments in which results are needed quickly, the requirements change or are poorly defined and innovation, competitiveness, flexibility and productivity are essential.

Scrum is also used to resolve situations in which customers don't get what they need: when deliveries take too long, costs skyrocket or the quality is not acceptable, and also when responsiveness to competition is required, when team morale is low and turnover high, when inefficiencies need to be systematically identified and resolved or when it is desirable to work using a specialized process in the product development.



Source: *Scrum*

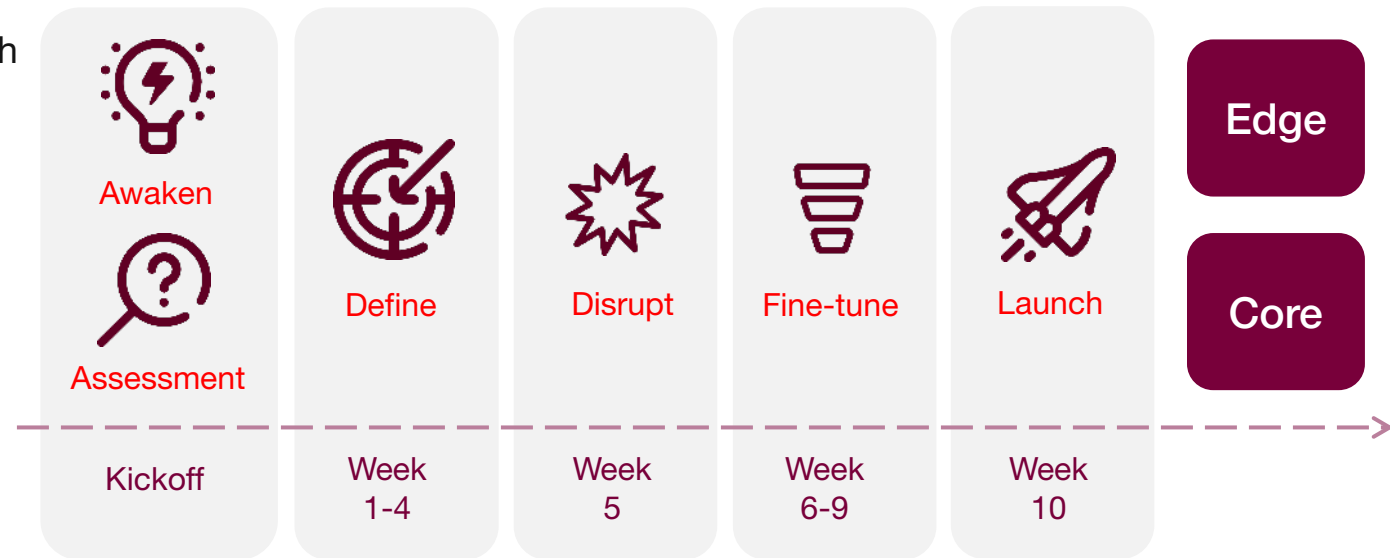
ExO sprint

The ExO sprint process includes various techniques and methodologies that help an organization faced with disruptive changes in the environment transform its current business and generate new initiatives.

In the ExO sprint process, organizations prepare to combat the corporate immune system that prevents innovation and change. They also learn to use a practical and continuous learning approach that allows them to develop their internal capabilities.

The process of executing an ExO sprint, which lasts ten weeks, can generate **two groups**:

- **Core**, which will generate initiatives focused on innovation without seeking to change the business model to deal with external disruptions.
- **Edge**, which will generate initiatives that are different from the company's current business model.



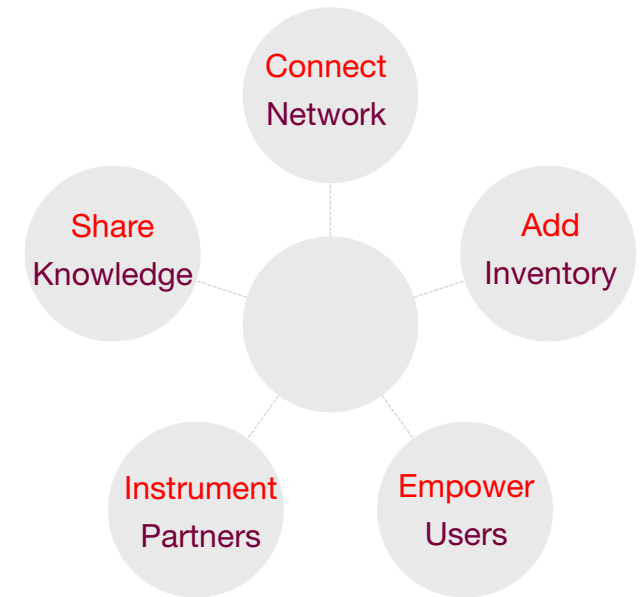
Source: *ExO Sprint*, Francisco Palao

The pentagrowth methodology helps organizations visualize and create accelerated growth strategies generated from the recombination of their internal assets and other elements available in the ecosystem.

It's based on **five levers**:

- 1 Connect - network:** The number of nodes to which a company or organization is connected is directly proportional to its capacity for growth.
- 2 Add - inventory:** The less internal effort an organization makes to expand its available supply, the greater its potential for growth.
- 3 Empower - users:** The more user capabilities the organization leverages, the greater its potential for growth will be.
- 4 Instrumentalize - partners:** The more an organization makes it easier for third parties to develop their own business proposals for their business, the greater the potential for growth will be.
- 5 Share - knowledge:** The larger the community that regards the shared resources as its own, if the organization makes it easier for third parties to develop their own commercial proposals for their business, the greater the potential for growth will be.

The methodology consists of combining the elements available in each lever until a structure that can grow and generate value is found.



Source: *Pentagrowth*

Purpose launchpad

This methodology helps entrepreneurs and organizations develop an idea from the initial stage so as to have a massive impact on a purpose-driven organization.

The methodology is based on **three phases** (exploration, validation and growth) and **eight axes**:

Purpose: This is the reason why the initiative exists.

People: This includes the external communities related to the purpose and the people who make up the internal work team.

Customer: These are the people or organizations that use or pay for the solutions. It's necessary to understand their problems, which will be the challenges related to the purpose, and also how they behave and relate to the initiative throughout the different stages of the market.

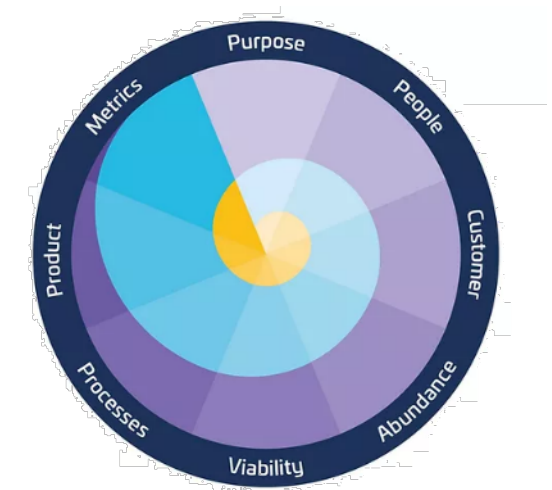
Abundance: This is the appropriate identification of the sources of abundance and exponentiality that should allow the organization to adopt faster growth.

Sustainability: This axis entails three-fold sustainability: planet, people and profit.

Processes: This is the way the initiative is organized to explore possibilities, build the right solution, and run daily operations efficiently.

Products: This is the process of defining and building the right solution for the different customer segments. It envisions different approaches for each of the phases: low-fidelity prototypes for the exploration phase, a minimum viable product for the evaluation phase, and optimized products for the impact phase.

Metrics: These are the indicators that should show how the business is evolving.



Source: *Purpose Launchpad* guide, Francisco Palao

Exponential Leaders in Catalonia

2. Catalonia Exponential Leaders Process (2023)

Catalonia Exponential Initiative

ACCIÓ, the Agency for Business Competitiveness of the Government of Catalonia, believes in the imperative need to convey the message that the business transformation to address disruption must be a much more common practice within the Catalan business fabric.

With this aim in mind, the **Catalonia Exponential** initiative was launched in January 2019, seeking to introduce new user trends, exponential technologies and transformational methodologies to Catalan companies to enable them to address disruptive changes through the adaptation of their own business model and the generation of new business models to make them more competitive.

It gives a voice to major international leaders of the transformational innovation (through ACCIÓ's offices abroad) and identifies Catalan cases involving the transformation of more traditional sectors and fields that are regarded as paradigmatic. This is achieved by:



- Carrying out **sensitization** activities and **placing emphasis on the business culture** required to address current challenges.
- Providing **new business transformation methodologies** to achieve the above.
- Connecting with **trends** through our offices.
- Offering **support** to singular **initiatives** within the ecosystem.
- Providing **support** for **companies** thanks to the **aid** for disruption, the **collaboration** between startups and established companies and the **open innovation challenges**.

Catalonia Exponential Leaders 2023

The **Catalonia Exponential Leaders** program seeks to acknowledge Catalan companies that embark on developing new solutions through transformative projects that aim to create a better future for everyone and generate new markets.

This, the third program, has set up two categories of companies: well-established ones and startups. All Catalan companies that sought the recognition were able to submit their candidatures. A total of two hundred and two applications were received (75% from startups and 25% from well-established companies).

The **thirty most disruptive companies in Catalonia** were selected and this report is based on them. Finally, the **ten companies regarded as the most disruptive and representative in various fields** were selected.

The Catalonia Exponential Leaders are inspiring **examples** for differential, daring and motivating projects with high growth potential **that are currently being undertaken in Catalonia.**



Characteristics of Catalonia Exponential Leaders

- Having a purpose and imagining futures with a positive impact.
- Daring to generate new markets based on disruptive ideas.
- Incorporating exponential technologies into their projects.
- Having a scalable business model that can impact numerous users.
- Inspiring, generating communities and building ecosystems around them.
- Using external assets to allow them to grow exponentially.
- Making use of collaborative tools and encouraging autonomy and gamification.
- Applying experimentation with a customer-centric approach.
- Giving way to a new company culture.



www.accio.gencat.cat/ca/serveis/innovacio/catalonia-exponential/catalonia-exponential-leaders



The **Catalonia Exponential Leaders** are the most disruptive Catalan companies, chosen from those that have submitted applications for the selection process.

With the Catalonia Exponential Leaders we wish to demonstrate that here in Catalonia there are also companies that are examples of transformation and adaptation to new disruptive opportunities, that can provide a source of inspiration for the entire Catalan business fabric.



www.accio.gencat.cat/ca/serveis/innovacio/catalonia-exponential/catalonia-exponential-leaders

Exponential Leaders in Catalonia

3. Finalists of Catalonia Exponential Leaders 2023

Finalists of Catalonia Exponential Leaders 2023



Finalists of Catalonia Exponential Leaders 2023



AldoraTech proposes a last-mile transport service using self-manufactured 3D drones.



Aortyx offers advanced technology in the field of cardiovascular medicine and aortic diseases to perform minimally invasive treatments.



AVINENT Implant System advocates digitalization and 3D printing as a production method in the medical field.



Better Care offers an agnostic technological solution that integrates AI into hospital management to monitor clinical data.



BUSUP Technologies has developed software to optimize corporate transport and contribute to sustainable mobility.



Casa Amella offers innovative food products by means of organic 100% plant-based farming with local raw materials.



Celsa Group manufactures and markets recycled steel and promotes the revalorization of by-products.



CITIBEATS is an AI platform that provides real-time public opinion data and analysis.



Colorsensing offers a smart packaging solution to improve the efficiency of the food supply chain and reduce food waste.



Concentrol aims to offer a solution for the smart application of its chemical solutions for work in the ecosystem and to make more efficient use of them to reduce the carbon footprint.



Edge Farming uses technology to accelerate the growth of alternative nutrients to combat the food crisis.



Foot Analytics has developed IKNOS, a platform to optimize the use of corporate spaces with algorithmic intelligence.



GOODGUT is working on the implementation of an in vitro diagnostic test to optimize colorectal cancer screening programs.





Invelon provides 4.0 technology solutions for companies (mainly 3D printing and VR/AR).





JOLT Solutions focuses on the manufacture of electrodes for water electrolyzers to achieve efficient production of green hydrogen.


Finalists of Catalonia Exponential Leaders 2023

 **MiMARK Diagnostics** strives to transform gynecological diagnoses through innovative in vitro diagnostic solutions.


 **Mitiga Solutions** enables companies to manage climate risks using AI models based on physical predictions.


 **Neureka Lab** develops tools based on video games and AI for the early detection and intervention of learning difficulties.

 **Newborn Solutions** has developed a non-invasive device to detect infections in serous fluids, and is working with AI to improve the technology.


 **OIMO Bioplastics** offers a range of solvent biomaterials for packaging as an alternative to the use of plastics for marine conservation.


 **Planet Biotech** develops solutions based on biotechnology to promote sustainable agriculture to cope with droughts and other adverse effects of climate change.


 **Reciclatges Escolano** brings together eco-design, 3D printing and AI to optimize the use of manufacturing materials and reduce waste in footwear manufacturing.


 **Remotor** recovers, reviews and markets car parts to give a second life to materials from the automotive industry.


 **Roka Furadada** designs and markets a new generation of smart photosensitive products that protect against solar radiation.


 **Sener** offers a complementary solution to centralized management systems to operate air conditioning systems in different spaces through AI.

 **Sequentia Biotech** has developed a cloud microbiome analysis platform for health professionals.

 **The Predictive Company** offers energy efficiency software for buildings with internal data connectivity to create a digital twin.

 **Universal Smart Cooling** aims to improve the already existing cooling systems of electronic devices through innovation.

 **Vitala Technologies** has developed an innovative platform to optimize and accelerate the drug testing process.

 **Zertifier** provides a Smart-Climate Forestry solution based on the digitalization of forests that can calculate the CO₂ sequestration thanks to blockchain technology.

Exponential Leaders in Catalonia

4. Catalonia Exponential Leaders 2023

Catalonia Exponential Leaders 2023





ALDORATECH

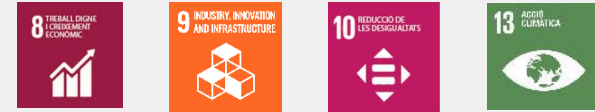
“Advanced drone technology for improving human lives”

Challenge

Sustainable mobility and logistics system

Technology

Drones; AI; additive manufacturing; automation



#InnovativeLogistics #Drones

www.aldoratech.com



Future

Having a drone model to provide a drone construction service based on it for other companies.

Optimizing logistics in isolated rural areas.

Encouraging economic growth and improving the quality of life of the population in under-served areas.

Disruptive project

AldoraTech adds a third dimension to the transport of last-mile goods, as it creates a service to promote logistical models that decongest the sector in rural areas and those with low population densities.

Its technologies, including 3D printing, AI and autonomous vehicle control, allow drones to operate with centralized monitoring, interpret the environment and manufacture aircraft through a proprietary 3D printing process. They make it possible to carry out logistical operations in established health infrastructures and carrier warehouses.

Differentiating factors

- AldoraTech is currently working with Correus to promote logistical accessibility solutions in the territories, and with the Catalan health sector.
- Drones, 3D printing and AI.
- Monitoring and control of large surfaces and infrastructures, obtaining data and carrying out maintenance tasks.



"The ultimate solution for aortic diseases"

Challenge

Health

Technology

Bioengineering and regenerative medicine, frontier materials



#AorticDiseases #MedicalDevices

www.aortyx.com



Future

Changing the paradigm of the treatment of aortic diseases.

Shifting from replacing the aorta to preserving it through minimally invasive local repair in order to decrease patient mortality and the failure rates associated with surgery and the treatment of aortic diseases.

Disruptive project

The patented product is an endovascular adhesive patch that mimics the biomechanical properties of the aorta to allow them to integrate into damaged tissue. It plugs the entrance to the dissection, halts the blood flow of the false lumen and promotes natural repair and biointegration. The release system, which is also patented, reaches aortic geometries inaccessible to current technologies.

Aortyx is thus revolutionizing the field of aortic diseases with solutions requested by both patients and vascular and cardiac surgeons.

Differentiating factors

- Aortyx stems from a partnership between the Institut Químic de Sarrià and the Hospital Clínic de Barcelona, which have recorded significant achievements in the field of health.
- Technology with biomimetic and bioresorbable properties.
- Biomechanics.



"For people in movement"

Challenge

Health

Technology

Additive manufacturing;
bioengineering



#Podiatry #Innovation

www.inmoovs.com



Future

Revolutionizing the business sector with the new digital and additive manufacturing tools.

Providing a smart tool for podiatric templates that meets individual needs in real time.

Disruptive project

The INMOOVs project by AVINENT plays a disruptive role in the podiatry market, because it digitalizes the sector and incorporates new technologies, including 3D printing for the production of personalized insoles.

It incorporates technologies to scan footprints, designing the insole using specialized software and producing it with 3D printing, a totally digital flow that reduces the margin of error in the product and, consequently, improves the patient's response to treatment, either by reducing the pain or by improving sports performance on a case-by-case basis.

Differentiating factors

- The INMOOVs project has two podiatry and advanced biomechanics centers in Barcelona and Manresa and two podiatry units in Berga and Cardona.
- Digitalization and 3D printing.
- Customized insoles.
- Advanced biomechanics.

BUSUP

“World leader in shared corporate transport”

Challenge

Sustainable mobility and logistics
Technology

AI Big Data



#MobilitySolutions #Sustainability

www.busup.com



Future

Promotion of sustainable mobility in the social, economic and environmental dimensions.

A transportation solution shared by companies.

Disruptive project

BUSUP provides technologies and applies algorithms that allow companies in the same area to share their routes, thus optimizing the use of their buses and reducing both the cost per passenger and the carbon footprint.

It provides a solution that's suited to mobility needs (transportation on demand) and users with hybrid and flexible working hours. It brings security and control to the shared model while reducing transportation costs and bringing benefits to employees. BUSUP is revolutionizing a traditional sector to offer a corporate transport service benefiting all the parties.

Differentiating factors

- BUSUP is currently operational on three continents, in six countries (Spain, Portugal, USA, Brazil, Mexico and Peru) and in more than forty cities.
- Digitalization and algorithms.
- Route optimization and increased employment.
- It enables companies to measure and reduce their emissions.
- A global project that's fully scalable to any kind of company or sector.



Challenge

Sustainable and competitive industrial system

Technology

IoT; AI Big Data; Machine Learning



#ChemicalSolutions #Innovation

www.concentrol.com



Future

Digitalization and the adoption of advanced technologies to optimize processes and improve the ability to develop and offer a service based on chemical solutions suited to the specific needs of each customer.

A change in the company's business model.

Disruptive project

Servitization of chemical solutions through the IoT to assist customers in making decisions based on big data in real time, with the aim of making more efficient use of solutions and reducing the carbon footprint.

Concentrol innovates with chemistry to add value and guarantee the present and future well-being of society.

Differentiating factors

- Concentrol innovates with chemistry to add value and guarantee the present and future well-being of society.
- Concentrol has extensive experience in research and the development and production of chemical solutions.
- Servitization of chemical solutions that permit more efficient and sustainable use of chemical solutions.



"Next generation electrodes for enhanced electrolyzers and fuel cells"

Challenge

Neutral energy in emissions system

Technology

Hydrogen



#GreenHydrogen #SustainableEnergy

www.jolt-solutions.com



Future

Contributing to the hydrogen economy as a key player in the planet's energy needs.

Stimulating an innovative sector in the field of new materials to reduce raw material costs.

Succeed in offering green hydrogen at €1/kg.

Disruptive project

JOLT's technology is a new, ultra-fast and safe way of coating metal surfaces in one step in order to make more robust and efficient industrial electrodes.

Its patented technology, **combustion in solution**, is a low-temperature reaction of a solution that directly forms a catalytic layer on the substrate in less than five minutes. This solution complies with the climate regulatory framework and implements a sustainable and efficient process to obtain a renewable energy source.

Differentiating factors

- JOLT is a spin-off of the Institute of Chemical Research of Catalonia (ICIQ), which has recorded significant achievements in the energy sector.
- Ultra-fast coating of electrodes.
- High degree of durability.
- Increased efficiency for hydrogen production.



“Reshaping gynecological diagnostics”

Challenge

Health

Technology

Digital Health; Bioengineering



#WomensHealth #TransformingHealthcare

www.mimark.es



Future

Eliminating the existing barriers that prevent women from receiving a quick, accurate and accessible diagnosis and positively impacting the lives of women who suffer from gynecological diseases.

Improving the diagnosis and management of patients in the field of gynecology thanks to the use of gynecological fluids.

Disruptive project

MiMARK will open a new market for minimally invasive diagnostic tests based on the use of gynecological fluids for gynecological pathologies, which is currently non-existent.

WomEC, its first product, is an in vitro diagnostic test based on an algorithm that quantifies a panel of protein biomarkers in the uterine fluid to detect endometrial cancer in a minimally invasive, rapid, accurate and accessible manner.

WomEC will improve patient management while ensuring cost savings.

Differentiating factors

- MiMARK is a spin-off of the Vall d’Hebron Research Institute (VHIR) with unique knowledge of gynecological fluids.
- Accurate and accessible minimally invasive and non-invasive diagnostics.
- Protein biomarkers for in vitro diagnostics.
- Highly scalable technology.



Challenge

Climate change

Technology

AI Big Data; supercomputing



#Innovation #ClimateChange

www.mitigasolutions.com



Future

Preventing natural hazards from becoming disasters.

Making the world a safer and more resilient place under the pressure of climate change.

Standardizing the use of its technology in society and becoming a benchmark.

Disruptive project

Mitiga's **Climate Risk Score** is a tool that enables companies around the world to proactively manage their climate risks. It uses physics-based models to analyze sixteen different hazards, providing a comprehensive view of the risks an organization faces.

The projection of the timeline extends up to a hundred years, and the early warning function warns of potential risks. The Mitiga score guarantees compliance with the climate regulatory frameworks.

Differentiating factors

- Mitiga is a spin-off of the Spanish National Supercomputing Center and it has achieved significant milestones in the risk management sector.
- Proprietary physical models.
- It's available on desktop and mobile devices.
- It includes physical and transitory risks and offers an easy-to-understand traffic light system.



“A new revolution in the sun protection market”

Challenge

Health

Technology

Frontier and sustainable materials



#SmartUV #Skin

www.rokafuradada.com



Future

Creating new products that are able to provide protect against solar radiation more efficiently, without any toxicity for humans or the environment.

Reducing the incidence of skin cancer and other skin diseases related to solar radiation.

Disruptive project

Roka Furadada develops and markets smart photosensitive products that provide protection against solar radiation (ROKA Smart UV®). They mimic the ability of plants and other living organisms to respond to solar radiation. In other words, they're activated when they're exposed to sunlight, thus providing high and long-lasting protection and adapting to the environmental conditions.

Its use is also being considered for materials with insufficient sun protection, ranging from car paint to windows and clothing.

Differentiating factors

- Roka Furadada is a deeptech company which, with its patented technology, has the potential to replace the existing sunscreens on the market.
- Smart photosensitive products with applications in the cosmetics and materials sectors.
- Unique, efficient, non-toxic and environmentally friendly molecules.



"We're experts in providing solutions to the most complex challenges"

Challenge

Sustainable energy and industrial system

Technology

AI Big Data; IoT; cloud computing



#Software #Future

www.group.sener



Future

Modifying the way air conditioning installations are used.

Improving the environmental conditions of spaces by using as little energy as possible, as well as improving people's health and well-being.

Becoming a benchmark for optimal energy management in buildings and infrastructures.

Disruptive project

Respira is a solution that's implemented in a manner complementary to the centralized management systems to operate the HVAC systems autonomously and through AI to obtain the maximum performance of the installation thanks to its predictive capacity.

The technology can be applied to any infrastructure that has air conditioning systems, including factories, airports, subways, shopping malls and exhibition areas. It uses algorithms and data to correlate the information and obtain the thermal behavior of each space and thereby adjust the functioning of the machines.

Differentiating factors

- Sener has implemented its technology on the Barcelona Metro since 2020, resulting in major progress for the optimal conditions of its infrastructures.
- AI for optimal management of HVAC systems.
- Unlimited technology regarding the number of buildings or infrastructures to be controlled.
- Savings of between 15% and 35% of the energy consumed by air conditioning.

Exponential Leaders in Catalonia

5. Global trends

Introduction

The combination of economic crises and global instability beset by the pandemic, geopolitical crises, supply chain disruptions, inflation, lack of resources, blockades, rising fuel prices and the confirmation of climate change are characterizing 2023. These problems will have profound implications for industry and look set to continue through 2023 and beyond.

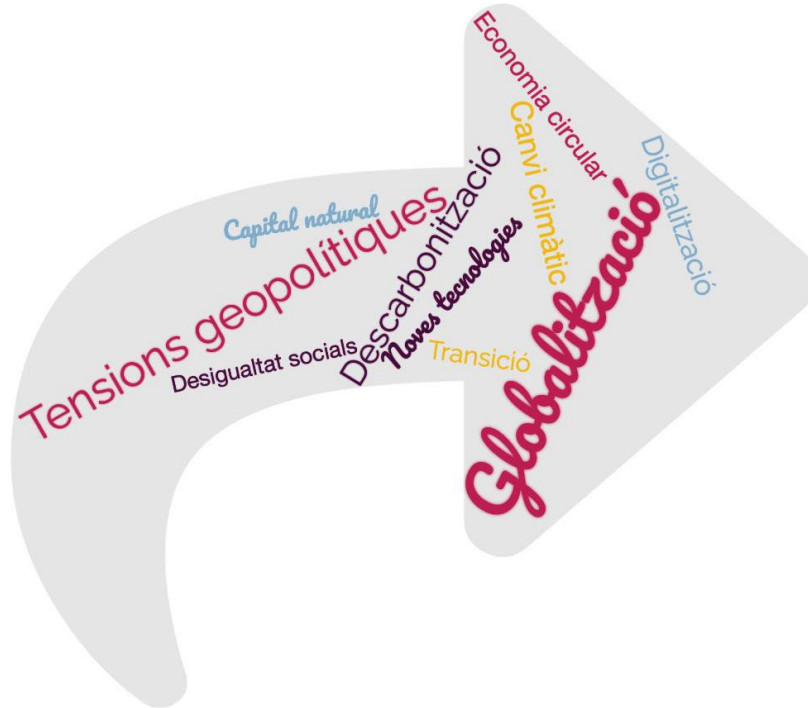
Despite this daunting reality, 2023 may prove an excellent time to explore new technological solutions to help businesses overcome their challenges.



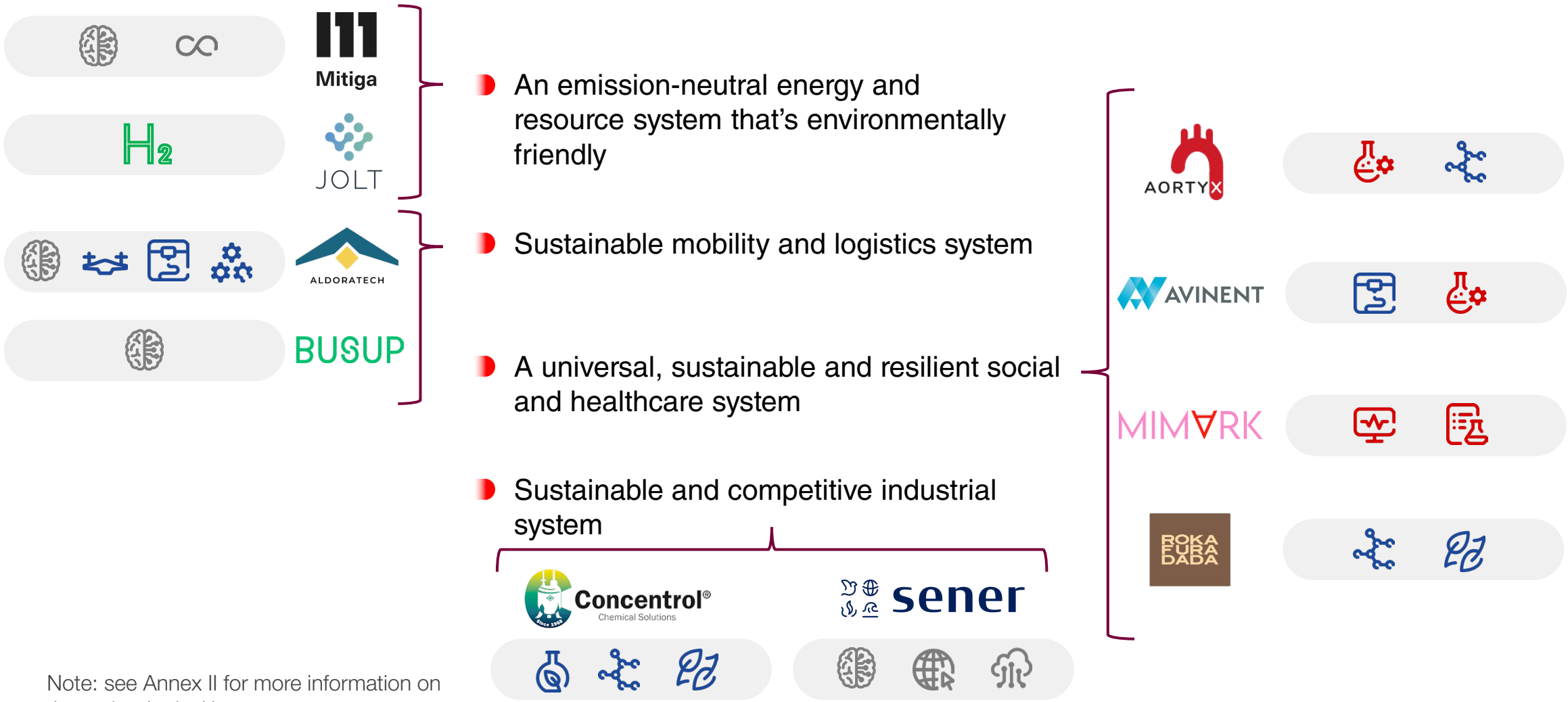
The RIS3 (research innovation strategies for smart specialization) are integrated agendas for territorial economic transformation. The aim is for innovation and knowledge to become drivers to move towards a greener, digital, resilient and fair socio-economic model.

RIS3CAT 2030 shared agendas

- A sustainable, fair, equitable and healthy food system
- An emission-neutral energy and resource system that's environmentally friendly
- A sustainable mobility and logistics system
- A universal, sustainable and resilient social and healthcare system
- A reflexive, anticipatory, inclusive and responsive education and knowledge generation system
- A sustainable and competitive industrial system
- A cultural system integrating people, territory and history

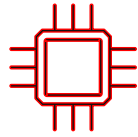


Relationship between the Catalonia Exponential Leaders and the main RIS3CAT trends



Note: see Annex II for more information on the technological icons.

Selection of ACCIÓ technological trends in 2023



Chips and
semiconductors

The key to
digitalization



Hydrogen

From the Big
Bang to the
future



Batteries

Storing energy
for tomorrow



Decarbonization

Towards climate
neutrality



Blue
economy

The new
challenges



Artificial
intelligence

Accelerating the
transformation in all
areas



Cyber security

Digital trust



Quantum

The future is
getting closer



Immersive
technologies

Breaking the
boundaries

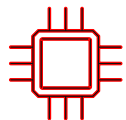


Cloud/Edge

The leap to the
cloud

Chips and semiconductors

- New transistor designs
- Improved lithography processes
- Advanced packaging and finishing
- Layered architectures
- Improved efficiency
- Disruption in materials
- Photonic chip
- Quantum chip
- Open architectures
- Reimagining electronics and computing for the next generations



H₂

- Hydrogen Fuel Cells
- Advanced electrolysis technologies such as solid state electrolyzers and exchange membranes
- Hydrogen carriers
- Biohydrogen
- Developing distribution infrastructures

Hydrogen

Batteries

- More sustainable and safer batteries with more autonomy
- Increased loading speed
- Solid state batteries
- Sodium ion batteries
- Research into cathode chemistry
- Recovery, recycling and second life of batteries



- Carbon footprint and carbon rates
- Hybridization of renewable energy facilities with hydrogen production, biorefineries, etc.
- Replacement of raw materials of fossil origin
- CO₂ capture and reuse technologies

Decarbonization / Capture and use of CO₂

Blue economy

- Aquaculture
- Ensuring biodiversity and marine ecosystems
- Related industries: tourism and sports
- Blue bioeconomy



Artificial intelligence

- Generative AI
- Creative AI
- AI-based decision-making
- AI-based biometrics and facial recognition
- Ethical and responsible AI
- Adaptive AI to improve the consumer experience



- A fundamental factor for the transformation of other technologies, including AI and IoT
- Facilitator of immersive technologies
- Hybrid cloud and diversification
- Increased migrations and concern for cyber security
- Deployment of 5G and 6G on the horizon

Cloud / Edge computing

Immersive technologies

- Breaking down the barrier between the digital world and the physical world
- Avatars and holograms
- Haptic sensors and spatial sound
- Deployment of mobile applications
- Impact on health and care services
- Standardization and interoperability



- Hybrid systems
- Acceleration of quantum applications
- Quantum sensors
- New qubits
- Cryptography and cyber security
- Quantum chip
- Quantum AI
- Frontier materials

Quantum

Cyber security

- Ensuring data privacy and security
- More granular attacks
- Zero trust
- Cybersecurity mesh
- Cloud-based cyber security



Exponential Leaders in Catalonia

Annexes

Annex 1: Catalonia Exponential Leaders 2021-2023

2021

















2022



2023



Annex 2: list of technologies

Digital society	Industrial resilience	Green transformation	Health
 Artificial intelligence	 Automation	 Hydrogen	 Bioengineering and regenerative medicine
 Supercomputing	 Additive manufacturing		 Digital Health
 Internet of things	 Drones		 New biological designs
 Cloud computing	 Green chemistry		
	 Frontier materials		
	 Sustainable materials		

Thank you!

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More information about Catalonia Exponential Leaders:
<https://www.accio.gencat.cat/en/serveis/innovacio/catalonia-exponential/catalonia-exponential-leaders/index.html>

