

April 2024. Technological snapshot.

3D printing in Catalonia

3D printing in Catalonia. Technological snapshot.

ACCIÓ
Government of Catalonia



The contents of this document are subject to a Creative Commons license. Unless otherwise indicated, reproduction, distribution and public communication is permitted as long as the author is cited, no commercial use is made and derivative works are not distributed. A summary of the license terms can be found at:

<https://creativecommons.org/licenses/by-nc-nd/4.0/>

The use of brands and logos in this report is merely informative. The above-mentioned brands and logos belong to their respective owners and are not owned by ACCIÓ in any way. This is a partial illustrative representation of the companies, organizations and entities that form part of the 3D printing ecosystem. There may be companies, organizations, and entities that have not been included in the study.

Carried out by

Strategy and Competitive Intelligence Unit of ACCIÓ

Barcelona, April 2024

Contents

Executive Summary

1. Definition and applications of 3D printing

2. World 3D printing market

3. 3D printing trends

4. 3D printing in Catalonia

5. Success Stories in Catalonia

Executive summary: definition of 3D printing and key data

3D printing, also known as additive manufacturing, refers to a set of technologies that can create volumetric objects using digital models.



Featured categories

- Material extrusion
- VAT photopolymerization
- Binder jetting
- Material jetting
- Powder bed fusion
- Sheet lamination
- Directed energy deposition



Main applications

- Aerospace
- Energy
- Health
- Electronics
- Fashion
- Mobility
- Food
- Construction



Trends

- Sustainability
- Artificial intelligence
- Bioprinting
- Health
- GVC resilience
- 4D printing

3D printing is **cross-industrial** in nature and feature both **flexibility** and the capacity to **personalize**. Moreover, it gives **added value** to the making of parts and can **streamline** the product design, development and manufacturing processes.



World Market

The 3D printing market is expected to be worth around **69.5 billion dollars** by 2030.

The main applications of 3D printing are **prototyping (66%)** and **end-use parts (21%)**. **Polymers** are most widely used, with an increase in the using of **metals**.

North America is the **world leader** in the 3D printing market due to its rapid adoption of the technology.

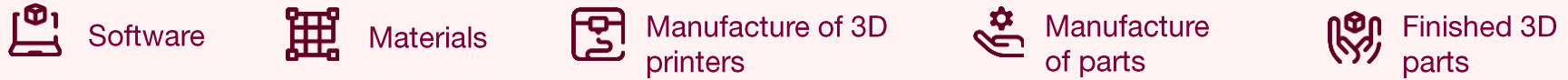
Europe is one of the major **hubs** for 3D printing technologies in the world. **Germany** has the largest market share in Europe.

The **FDI** in 3D printing has totaled **3.5 billion euros** in the last 5 years, leading to the creation of over **15,000 jobs**.

Executive summary: 3D printing in Catalonia

Segmentation of the business value chain

Technology providers



Service providers



156 companies along the value chain



32% more companies than in 2019.

Turnover totaling **€560 M (+72%)** and **2,092 jobs (+58%)**.

Companies include:

- Parts manufacturing (30.8%)
- Engineering, consulting and certification (13.5%)
- Distribution services (12.8%)
- Materials (10.9%)



Attractive for leading international 3D printing companies

2nd largest foreign investment destination in the world in the last five years



R&D excellence

4th largest region in terms of **Horizon Europe** funding

17 leading technological and research centers

Benchmarking Initiatives



Catalonia has a **powerful network** of technology centers, incubators, hospitals, companies and startups that innovate in the field of 3D printing applied to **health**.

3D printing in Catalonia

1. Definition and applications of 3D printing

Definition of 3D printing

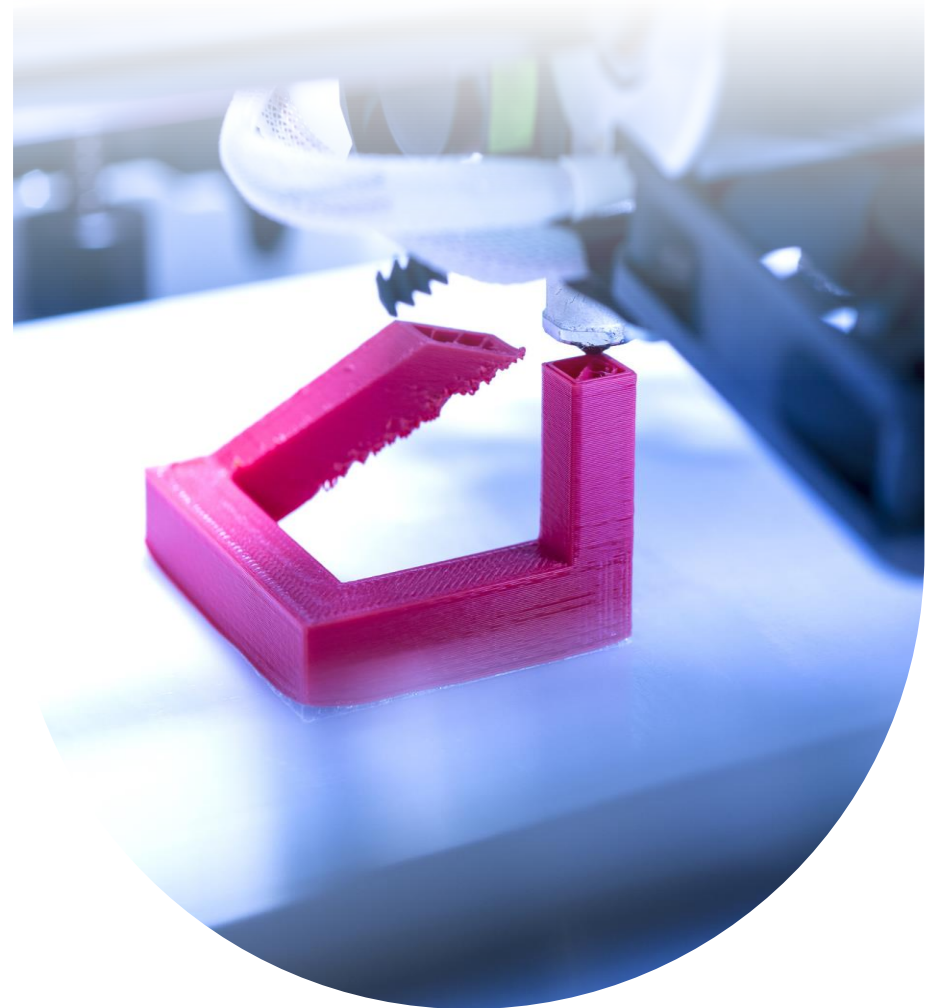
3D printing, also known as additive manufacturing, refers to a set of technologies that can create volumetric objects using digital models.

Manufacturing is carried out with 3D printers which deposit the material, usually in layers, and consolidate it with different technologies until the end part is obtained.

There are seven **major 3D printing categories**:

- Material extrusion
- VAT photopolymerisation
- Binder jetting
- Material jetting
- Powder bed fusion
- Sheet lamination
- Directed energy deposition

Most widespread **use** of 3D printing:



Sources: 3D Hubs, GE Additive and Roland Berger

Applications of 3D printing



HEALTH

- Dental implants
- Pre-surgical models
- Prostheses
- Bioprinting
- Medicines



INDUSTRY

- Prototypes
- Robotics
- Components
- Spare parts



FOOD

- Chocolate
- Confectionery
- Printing of dishes using fresh food
- Printing of ice cream



CONSTRUCTION

- Precast concrete
- Prefabricated infrastructures
- Ceramic items with complex geometries
- Prefabricated homes



FASHION

- Bags
- Bespoke glasses
- Customized technical footwear
- Dresses
- Jewels



ENERGY

- Prototypes and spare parts
- Connectors
- Solar panels
- Components of wind turbines
- Casings



AEROSPACE

- Spare parts
- Satellites
- Rockets
- Planes
- Drones



ELECTRONICS

- Electrical components and circuits
- Conductive ink
- Touch sensors
- Electronic devices



MOBILITY

- Prototypes and spare parts
- Lightweight car parts
- Customized parts
- Racing cars and motorbikes

Sources: 3D Hubs, Stratasy and Formlabs

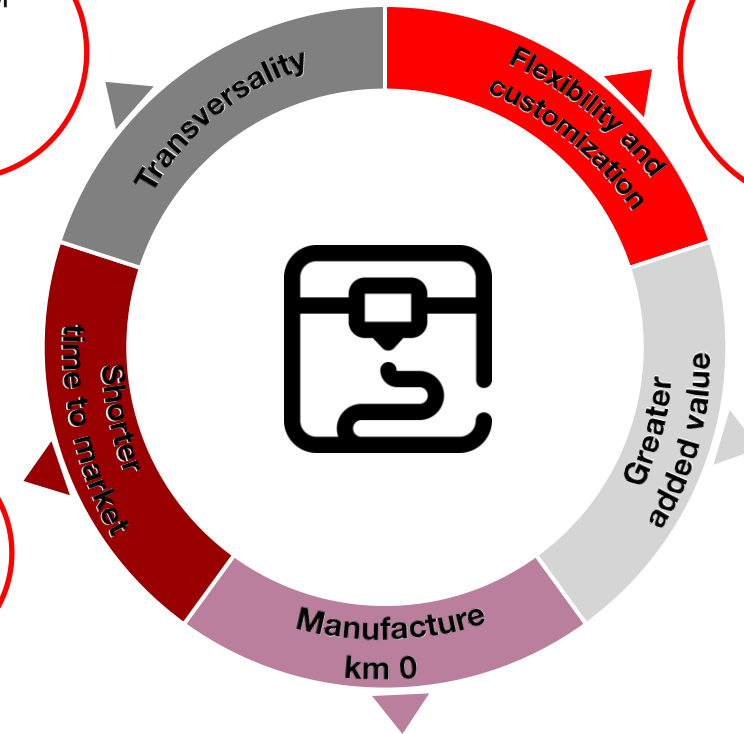
Importance of 3D printing in industry

This is a technology that can be applied to numerous fields, especially industry, either for end production or the manufacture of prototypes and tooling, but also to research, to conduct tests before looking for other means of production.

Both in terms of the size of the series and the materials used, or even the possibility of adjusting the manufacturing orders to handle design changes. It can meet the needs of the global trend of personalizing products in fields such as health and sport, in which it has acquired a clear competitive edge.

It can streamline the product's design and development process and the manufacturing. It is a highly attractive process for industrial sectors seeking to constantly innovate their products.

This technology can manufacture complex three-dimensional geometries that cannot be manufactured with other technologies and can reduce the number of parts in a set. It can also manufacture light structures and use special materials. It is therefore very important for an industry that wishes to manufacture more value-added parts.



The option of manufacturing short product runs that are highly adapted to the user provides for greater competitiveness in terms of quality, innovation and flexibility. The use of recycled materials, particularly plastics, is also important.

Source: ACCIÓ

3D printing in Catalonia

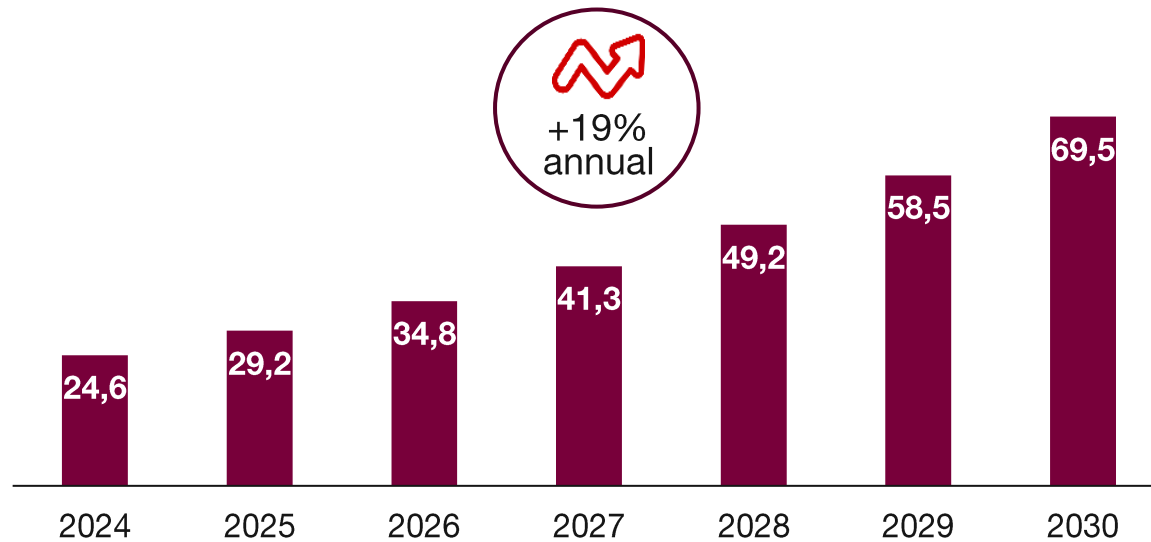
2. World 3D printing market

Global data and prospects for 3D printing

The growing contribution of 3D printing to the GDP will be determined by the technology's ability to streamline production and reduce dependence on international supply chains.

Size of the global 3D printing market

(billions of dollars)



With annual growth amounting to **19%**, 3D printing is expected to achieve a **69.5 billion dollar** market value by 2030.

Polymer printing is the type with the largest market share, but the one expected to grow the most in the coming years is **metal printing**.

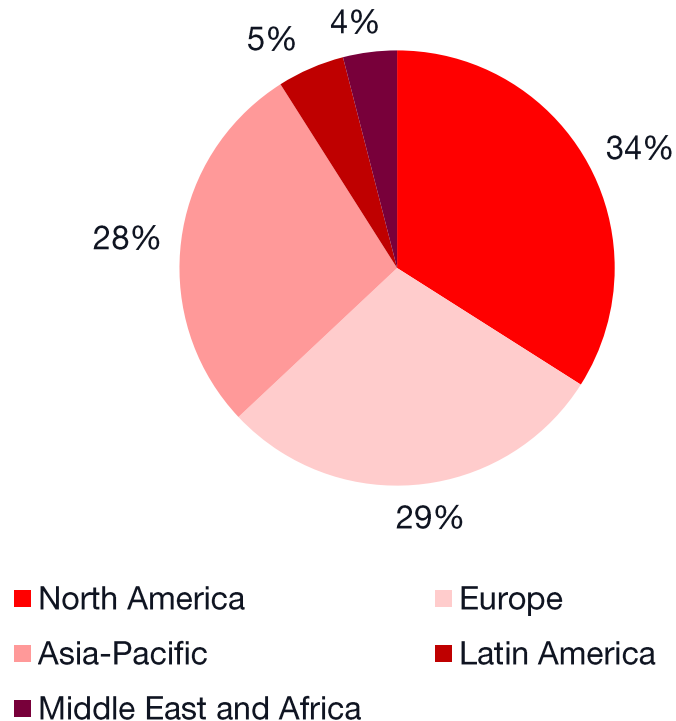


Sources: European Patent Office and Precedence Research

Global data and prospects for 3D printing by regions

North America is the world leader in the 3D printing market, chiefly due to its rapid adoption of the technology.

3D printing market volume, by regions (2022)



Canada and the **United States** are the leaders and pioneers in innovations in different manufacturing processes. The two countries have established several national initiatives to promote research, technological development and the creation of startups.

North America



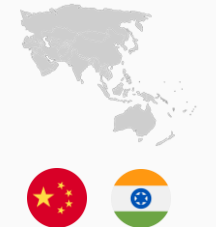
Europe is undergoing rapid market growth and becoming one of the largest global hubs. **Germany**, with the largest market share in Europe, is home to the major innovative companies in this field. **France** has emerged in recent years and it excels in machinery and materials.

Europe



China is becoming increasingly competitive in 3D printing technologies, while **India** is expanding thanks to its aerospace industry.

Asia-Pacific



Sources: Precedence Research, Mordor Intelligence, Inkwood Research and Voxel Matters

Main global 3D printing hubs



Source: the authors, based on IN3DTEC, Voxel Matters and ACCIÓ

3D printing in Catalonia

3. 3D printing trends



Sustainability

3D printing delivers more **sustainable** production through the **reduction of waste**, enabling **local manufacturing** and the use of **recycled materials**. It also improves efficiency and contributes to the extension of the products' service life. The use of biodegradable materials reinforces global sustainability.



Bioprinting

Bioprinting has transformational potential to offer **new therapeutic and personalized options** in the field of **medicine**. The main applications are regenerative medicine, transplants and pharmaceutical, cosmetic and food products.



GVC resilience

The **disruptions** stemming from events such as COVID-19 and **rising protectionism** make 3D printing an alternative when it comes to **securing global value chains (GVC) in business**. At the same time, it makes a formidable ally for state **reindustrialization** policies.



Artificial intelligence

The convergence of 3D printing and AI is heralding a new era of **smart and efficient production**. It can minimize errors and optimize the 3D printing supply chain. Generative AI also facilitates the development of customized designs for 3D models.



Health

3D printing promises a **transformational impact** on the health sector. Its use extends to anatomical models, surgical guides, prostheses, implants and personalized medicines. It brings significant improvements to personalized treatments, patient care and the optimization of surgical interventions.



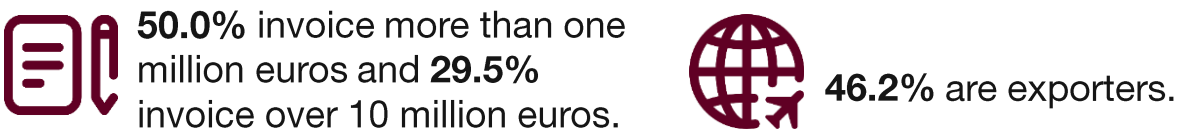
4D printing

4D printing can create **objects that change shape or properties** through the use of sensitive materials that react to external elements. It will extend to the fields of health, fashion, the automotive industry, aeronautics and packaging.

3D printing in Catalonia

4. 3D printing in Catalonia

Business mapping of 3D printing in Catalonia



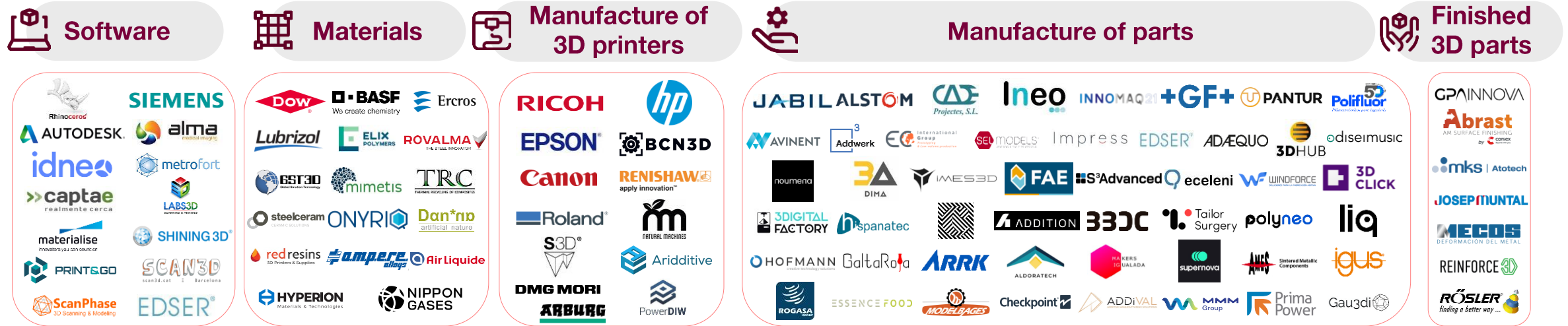
The value chain features companies engaged in **parts manufacturing** (30.8%), **engineering, consulting and certification** (13.5%), **distribution services** (12.8%) and **materials** (10.9%).

*With respect to the mapping data obtained in 2019.

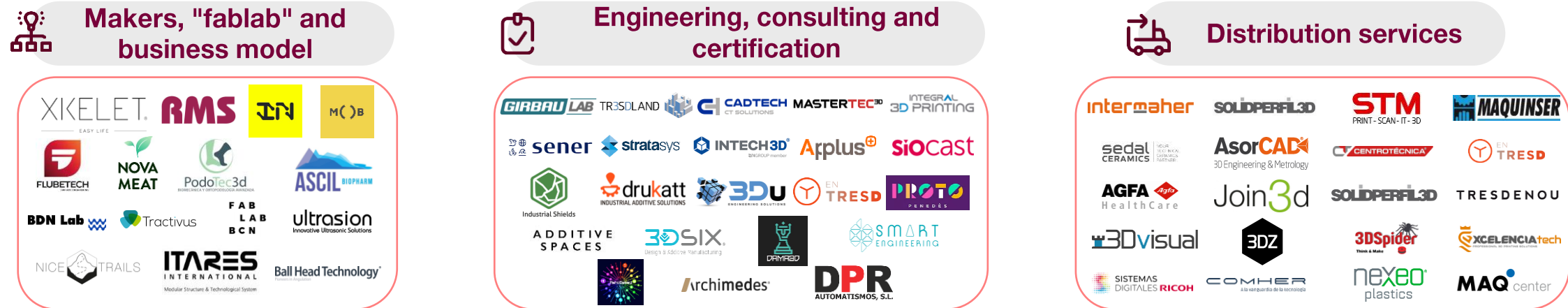
Source: ACCIÓ (2024 company data; turnover and number of employees in 2022)

Catalan companies in the 3D printing value chain

Technology providers



Service providers



Agents of the 3D printing ecosystem in Catalonia



Technology and Research Centers



Universities and Training Centers



Smart labs and accelerators



Business associations and fairs



Institutions and Public Administration



Initiatives to promote 3D printing in Catalonia



A network that brings together 28 research groups from 14 Catalan entities with the aim to streamline the transfer, valorization and internationalization of Catalan research into additive manufacturing.



A digital innovation center specializing in additive manufacturing whose mission is to speed up its adoption in the EU industrial sector.



An initiative whose aim is to promote the growth of innovative projects by creating a unique space for the incubation of companies and startups advocating 3D printing.



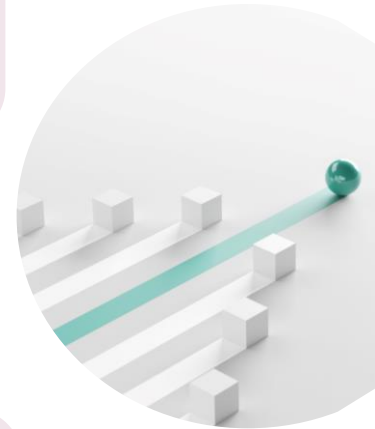
An accelerator that seeks to promote the adoption of 3D printing as a vector of competitiveness and innovation through a distinctive environment.



A collaborative space that seeks to promote knowledge transfer in 3D printing technologies, as well as the development of new technological solutions.



A connected network of assets, infrastructures and knowledge in Catalonia geared towards testing and experimenting with advanced digital technologies, including 3D printing.



The application of 3D printing to the health sector in Catalonia

Catalonia has a powerful network of **technological centers, incubators, hospitals, companies and startups** that innovate in health applications of the field of 3D printing.

Relevant cases

1 Hospitals with specific units and laboratories



In 2013 the **Sant Joan de Déu Hospital** planned an oncological surgical intervention with three-dimensional printing for a pediatric patient for the first time. Ten surgical specialties at the center currently use this type of technique.

2 Technological centers working in RDI



The **CIM-UPC** provides services that include pre-surgical model-making and prosthetic printing, tissue 3D bioprinting and customized 3D printing machinery design and development and also works on the feasibility of specific new materials.

3 Incubators and smart labs that encourage knowledge transfer



The **IAM3DHUB** specializes in the medical sector and excels in the creation of all kinds of anatomical models designed to facilitate surgery planning, reduce intervention times and improve post-operation results. It does so in partnership with the Parc Taulí Hospital.

4 Companies and startups excelling with new business models



Tailor Surgery, a spin-off of the I3PT (Parc Taulí Hospital), offers a comprehensive 3D digital surgery service for orthopedic surgical interventions and supplies specific instruments for each patient and fully customized implants.

Note: partial illustrative image








Source: the authors

Foreign Direct Investment (FDI) in 3D printing in Catalonia

Catalonia was the **2nd largest destination for FDI in the world** and the **largest in southern Europe** in the 2019-2023 period, with investment totaling **87.5 million euros** and over **400 people employed** in **8 projects**.

Main FDI destination regions in the world, by projects (2019-2023)

	Region	Projects
	1 Bavaria	11
	2 Catalonia	8
	3 Texas	8
	4 Massachusetts	7
	5 Baden-Württemberg	6

€87.5 M of invested capital.
423 jobs created.



- Catalonia, **3rd** most important European region in terms of invested capital (6.5%).
- Barcelona, the top European city in terms of 3D printing projects.

Agents investing in Catalonia (2019-2023)



In 2023, **100%** of the investment in 3D printing projects in **Spain** was assigned to **Catalonia**.

Technological hubs in Catalonia focused on 3D printing in 2023



140 technological hubs
of foreign companies

+11% compared with the previous year

5,200 new jobs **€500 M** turnover

Hubs in Catalonia focused on 3D printing:

ALSTOM

AVINENT

BASF
We create chemistry

FORWARD AM
Innovating Additive Manufacturing

Checkpoint

hp

IAM3DHUB

PEPSICO

United States

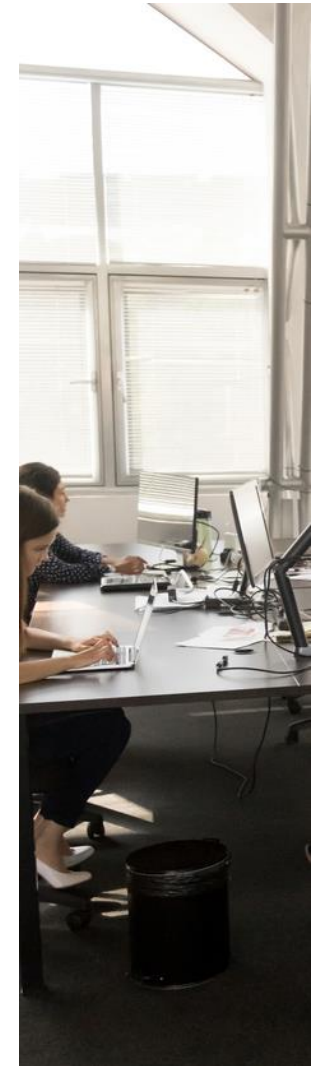
(with 28% of all hubs) the main source country for investment in these centers, followed by Germany (17%).

59% of hubs

come from companies in European countries.

3D printing (4%)

is one of the technological fields in which hubs are developing their services.



Catalan 3D printing research activities at Horizon Europe



Research into 3D printing in Catalonia within the framework of Horizon Europe

17 projects

9.1 million euros

4th

largest European region in terms of Horizon Europe funding

3.4% of the European total
21.6% of the total in Spain

14 institutions

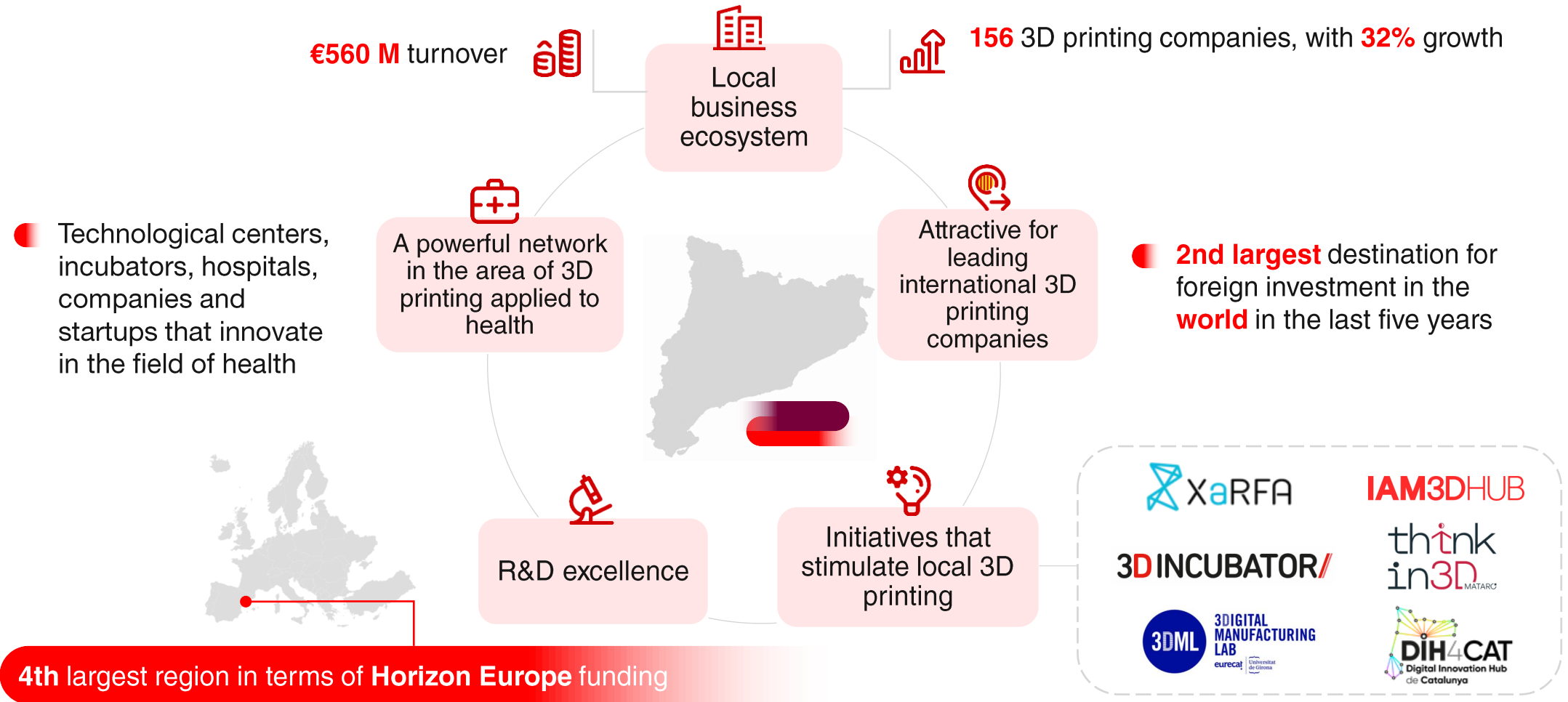


Note: includes Horizon Europe (2022-2023) projects related to 3D printing.



Source: Horizon Europe
CataloniaConnects

Catalonia, a dynamic 3D printing ecosystem



3D printing in Catalonia

5. Success Stories in Catalonia

Success stories on Catalonia



Aridditive, the spin-off of the CIM-UPC seeking to revolutionize the construction sector with 3D printing



AsorCAD brings 3D scanning, engineering and metrology to the construction of a nuclear fusion reactor.



BCN 3D, a leader in 3D printing solutions, has created **Supernova**, specializing in VLM



HP is consolidating its 3D printing hub in Catalonia with the opening of a new innovation and design center



AldoraTech, the Catalan startup that creates drones using 3D printing for last-mile package deliveries



Stratasys is arriving in Barcelona to join the industry 4.0 ecosystem



A 3D laboratory enables the doctors at **Tortosa Hospital** to simulate complex surgeries



Ocean Ecostructures uses 3D printing for the construction of marine ecosystem regeneration structures based on an innovative biomaterial



Avinent proposes digitization and 3D printing in the health and dental implant sector



INTECH3D creates software which quadruples the speed of networked 3D printers

Acknowledgments of institutions

We would like to thank the following for the availability and provision of data and information for the drawing up of this technology report:



Aridditive



AsorCAD



BCN3D



Intech3D



CIM-UPC



Thinkin3D



XaRFA



Thank you!

Passeig de Gràcia, 129
08008 Barcelona

accio.gencat.cat
catalonia.com

 @accio_cat
@Catalonia_TI

 [linkedin.com/company/acciocat/](https://www.linkedin.com/company/acciocat/)
[linkedin.com/company/invest-in-catalonia/](https://www.linkedin.com/company/invest-in-catalonia/)

More information about the sector, news and opportunities:

<https://catalonia.com/key-industries-technologies/technologies/3d-printing-in-catalonia>

