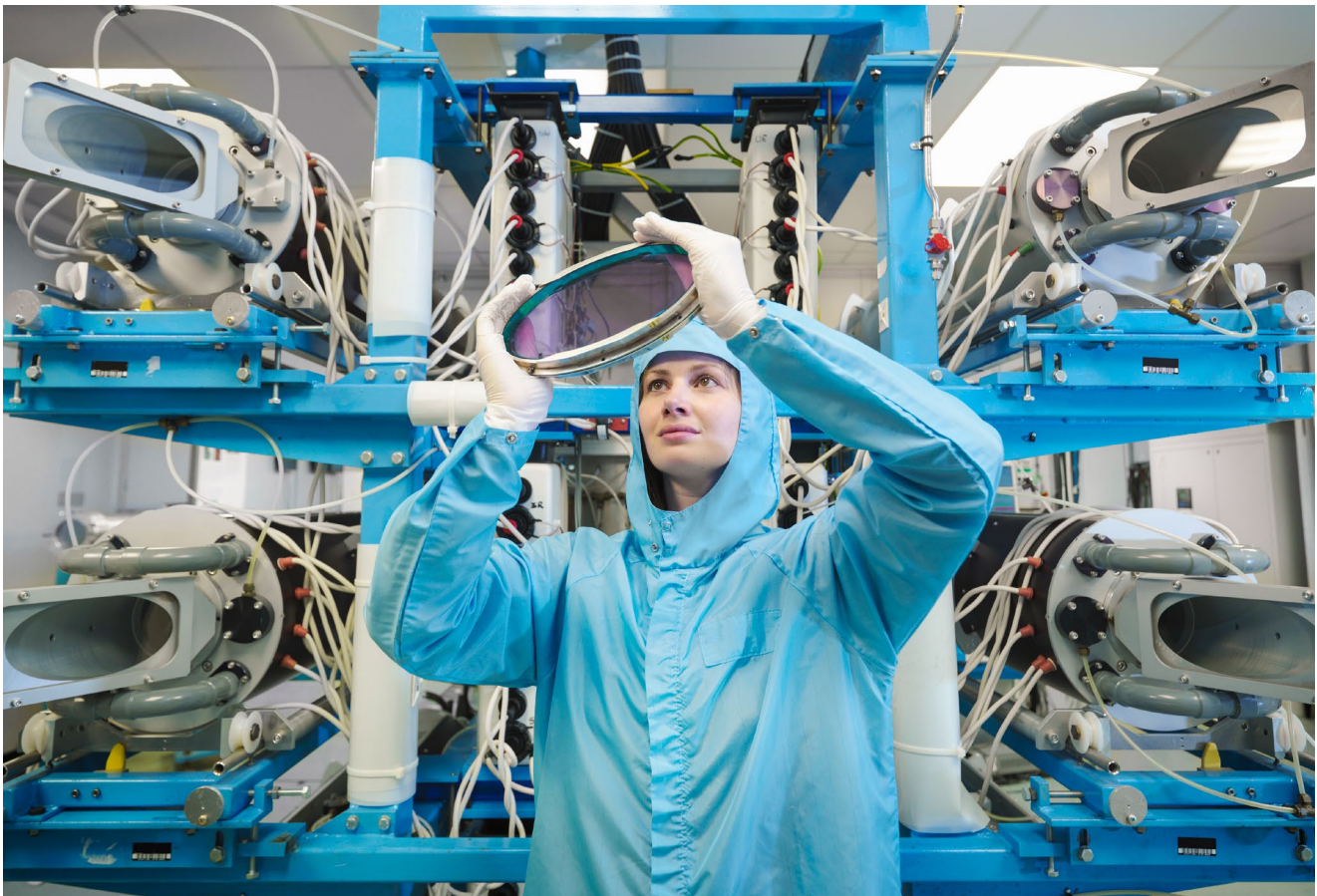




Innovation and technology are the beating heart of human progress. They improve well-being, drive prosperity and work for the benefit of future generations. For much of history, life expectancy was around 30 years and until the 19th century, the average working week was over 60 hours. Technology and innovation changed this dramatically and brought longevity and more leisure time to most of humankind.

The world is facing challenges that threaten our very way of life and the progress we have achieved. The climate crisis, ageing and growing populations, and dwindling resources are prompting us to transform the way we live, learn, work and produce. Innovation and technology are crucial to making this transformation happen.

Innovation is also key to economic growth and employment. It has driven about two-thirds of Europe's economic growth over the last few decades. Going forward, emerging technologies such as artificial intelligence, quantum computing and advanced manufacturing – just to mention a few – will have a profound impact on the economy and employment. These technologies are already driving global competition and a race for global technological leadership. For Europe to thrive in this competitive, digitalising and decarbonising world it needs to keep up with and lead new technological developments. Without such a robust and innovation-driven economy, and a highly-skilled workforce, Europe will have a hard time playing a decisive global role and building a vibrant, sustainable and greener society that enables us to live the kind of lives we have reason to value.

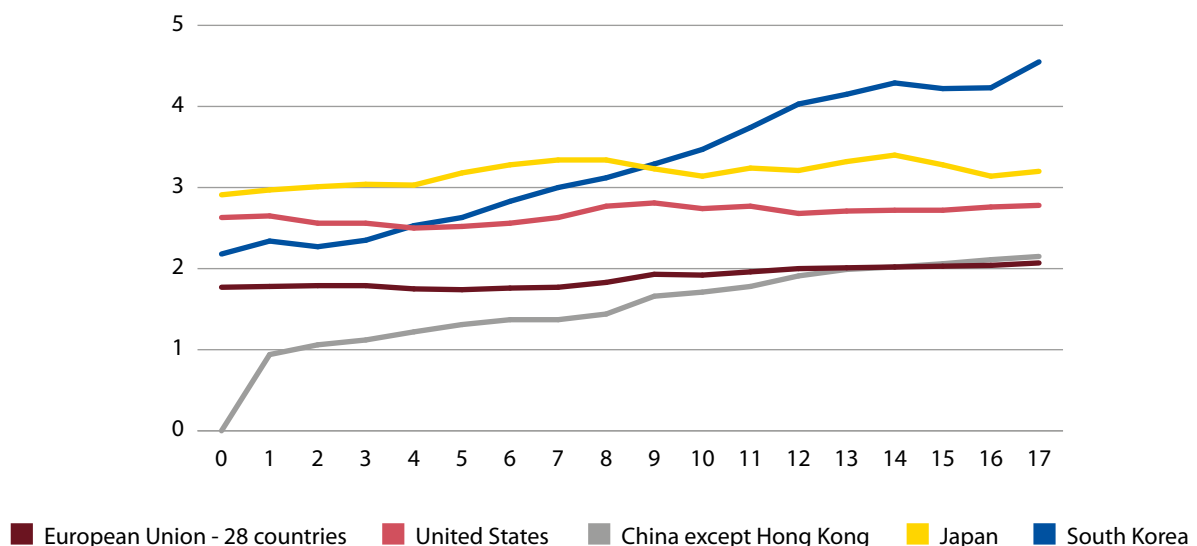


INNOVATION IN THE EUROPEAN UNION

Europe is a global research and innovation powerhouse and a leading economy in terms of investment in research and development (R&D) and its number of researchers. With only 7% of the world's population, Europe accounts for 20% of global R&D investment, produces one-third of all high-quality scientific publications, and still holds a world-leading position in many industrial sectors.^[1]

Notwithstanding its public R&D investment capacity and scientific performance, the European Union lags behind competitors such as the United States and China in R&D investment levels and has fewer "new" world-leading companies.^[2] The European Union will also not reach its self-set target of 3% of GDP invested in R&D by 2020.^[3]

Research and development investment intensity, 2000-2017 (% GDP)



Some parts of the continent are falling behind in developing digital infrastructure and providing the training needed to benefit from emerging technologies that improve our lives and productivity.^[4] Europe, it seems, is currently limited in its ability to capitalise on its excellent scientific base to spur innovation, adopt new technologies and bring its ideas to the market.

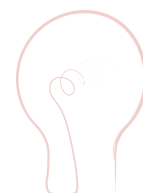
Investment plays a crucial role in explaining Europe's constrained innovation performance. European investors appear far more risk-averse than their counterparts elsewhere, adopting a wait-and-see attitude, and tending to hold back investments. This matters, as innovation today is happening at a faster pace, has a deeply transformative character and is increasingly science-based and complex. The lack of risk capital and other investment makes it difficult for European innovators to adopt new technologies or grow new, disruptive businesses. It also hampers the European Union's competitiveness and delays Europe's transformation into a greener and digital economy.

[1] https://ec.europa.eu/info/sites/info/files/srip-report-full_2018_en.pdf

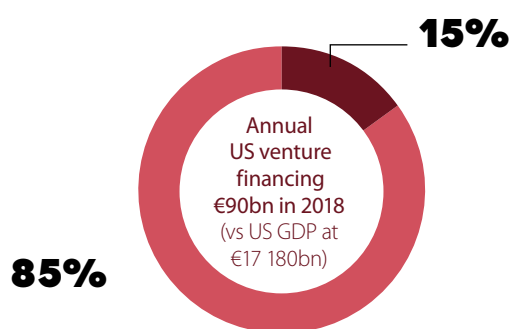
[2] <https://www.eib.org/en/publications/econ-eibis-2018-eu-overview>

[3] https://www.eib.org/attachments/efs/economic_investment_report_2019_key_findings_en.pdf p. 8

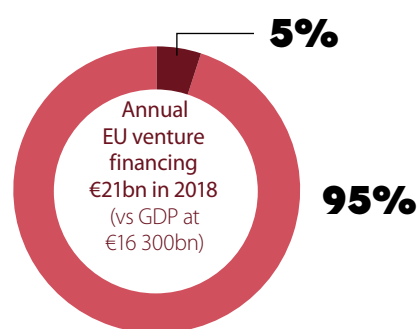
[4] <https://ec.europa.eu/digital-single-market/en/desi>



Venture financing in the United States



Venture financing in Europe



■ Venture debt ■ Venture capital

Compared to the United States, Europe's venture financing market – a driving force of entrepreneurial and innovative activities – is relatively small, often forcing companies to move to ecosystems where they have better chances to grow quickly. While annual venture financing in the United States amounts to €90 billion, it is only €21 billion in Europe, despite the US economy being not much bigger than the European Union's.^[5] The situation is even grimmer for smaller companies developing key future technologies: in 2016, Europe attracted only 11% of all venture capital and corporate investment in artificial intelligence, while the United States and Asia captured 50% and 39%, respectively.^[6]

The lack of investment also affects the underlying infrastructure needed for a thriving digital economy. In terms of deployment and quality of broadband infrastructure, the European Union on average lags behind competitors like South Korea, Japan and the United States.^[7]

The EIB Group is committed to breaking down investment barriers and enabling the European Union to lead the next wave of innovation. Our goal is to drive new technologies that solve the challenges of our time and help Europe's innovators to become global technology leaders.

EIB AND INNOVATION

The European Investment Bank Group is one of the largest public supporters of innovation in the European Union. It provides long-term capital and advisory support.

Since 2000, the Group has invested €210 billion in innovation and skills to unleash and connect the millions of innovative minds across the European Union and beyond, advance innovation and address the social and economic challenges of today and tomorrow.

Through the European Investment Fund (EIF), the Group is also the largest provider of venture capital in the European Union. The EIF has supported almost half of the European unicorns (young companies valued at over \$1 billion) that have emerged in the past 15 years, mostly in the early stages of their development. Skype, Skyscanner, WeTransfer and Transferwise, Blablacar, Spotify, Shazam, Just Eat, Farfetch, Rovio and Zalando are all examples of companies supported by the EIF.

[5] EIB calculations: <https://www.eib.org/en/press/all/2019-087-eib-remains-the-largest-venture-debt-provider-in-the-eu>

[6] http://www3.weforum.org/docs/WEF_Innovate_Europe_Report_2019.pdf

[7] <https://ec.europa.eu/digital-single-market/en/news/how-digital-europe-compared-other-major-world-economies>

Together with the European Commission and other partners, the EIB Group designs financial instruments that absorb some of the risks that banks and other investors take when they finance riskier, innovative endeavours. In addition to this risk-taking, the EIB's lending to a project is seen as an endorsement or seal of excellence, due to the technical viability and quality assessment we carry out. This backing encourages banks to lend, and funds and other private sector players to invest, thus creating a sustainable financing ecosystem for European innovation.

The EIB Group has a broad portfolio of **financial products** to address different challenges for innovation and skills development. They include loans helping universities build research infrastructure, backing for vocational training, financing for start-ups, and money to help large companies scale up, implement frontier innovation and develop digital infrastructure, particularly in rural areas.

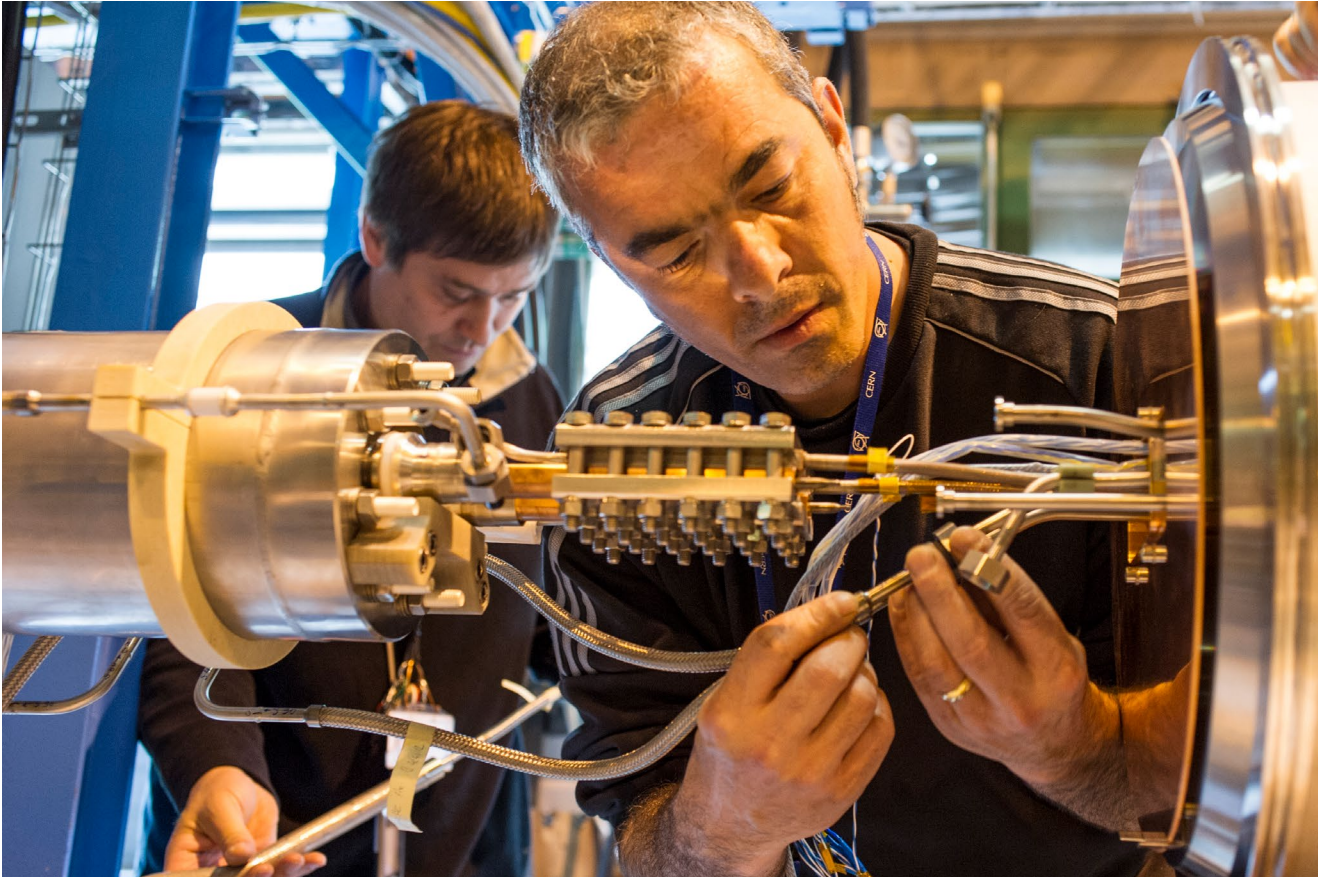
EU-backed financial instruments like the European Fund for Strategic Investments (EFSI) and **InnovFin** have transformed the innovation finance landscape in Europe. They enable the Group to develop new instruments for highly innovative firms such as **venture debt** that combines the advantages of a long-term loan with a remuneration model based on a company's performance.

In addition to its financing, the EIB provides technical assistance and advisory services for innovative projects. In cooperation with the European Commission, under the **InnovFin Advisory** programme, the EIB provides guidance to innovative companies on how to structure their research, development and innovation projects to improve their access to finance. InnovFin advisors support EU leadership in specific fields of innovation such as space, deep tech and supercomputing technologies destined to shape the future by providing insights into market needs, gaps and failures from both a project financing and an EU policy perspective.

The EIB's 2019 support of **€14.4 billion for innovation and skills** took a number of forms:

- **supporting** innovative firms in their development and commercialisation of new products, processes and services;
- **promoting** public and private sector investment in R&D;
- **helping** to complete Europe's digital network;
- **investing in fundamental research**, research infrastructure and education;
- **investing in the digital transformation** of industry (Industry 4.0), including upskilling and training;
- **supporting** further digitalisation throughout the economy, and cutting-edge technologies.

PROJECT HIGHLIGHTS



Financing fundamental research

The EIB helped to finance the final phase of construction of the **large hadron collider at CERN**, the European Organisation for Nuclear Research. The large hadron collider reproduces the conditions that existed at the beginning of the Big Bang, taking European research into a new dimension.

The Bank has already expanded beyond its initial CERN deal into other scientific work including:

2015: European Synchrotron Radiation Facility. A €65 million loan to upgrade the facilities in Grenoble, France, and optimise methods for learning about the structure and behaviour of matter at the molecular and atomic level.

2016: European Spallation Source. €100 million for international scientific research infrastructure to be built in Lund, Sweden, and in Copenhagen. With neutron beams 100 times brighter than current facilities, this project uses neutron-scattering techniques that offer the possibility of monitoring material structures and motion at a molecular level. It opens up new opportunities for researchers in multiple disciplines such as life sciences, environment, energy, transport and engineering, as well as physics, chemistry and even archaeology.

PROJECT HIGHLIGHTS



Improving higher education and research infrastructure

Ideas will increasingly power economic growth in Europe. Investment in higher education and research infrastructure provides the basis to generate them. Highly skilled individuals and quality research underpin the European Union's capacity to innovate successfully.

Warsaw and Poznan medical universities, Poland

Design, construction and implementation of new, state-of-the-art medical simulation centres in Warsaw and Poznan improving learning and research conditions for students and researchers.

[More information online](#)

New Hellenic Foundation for Research and Innovation, Greece

The foundation will provide funding for funda-

mental research by universities, higher technology institutes and public science institutions to support the national strategy for research and innovation, itself aligned with the National Growth Strategy. With €180 million from the EIB and an additional €60 million from the Greek government, the foundation is expected to represent around 15% of public research investment in Greece.

[More information online](#)

Polytechnic University, Romania

€25 million to increase the quality, efficiency and effectiveness of teaching, learning and research at the Polytechnic University of Bucharest (UPB), a leading university in Romania. More than 5 000 students and 273 employees will benefit from the redevelopment of the main university campus.

[More information online](#)



Investing in new and cleaner energy

To mitigate the consequences of the climate crisis for both current and future generations, nearly all greenhouse gas emissions must be eliminated by the middle of this century. This implies a radical transformation of our energy systems on several levels. That is why the EIB is backing companies that develop cutting-edge technologies to help stop climate change.

Elcogen, Estonia

Elcogen's fuel cell technology converts a range of fuels, mainly hydrogen and biogas, into electrical energy with a very high electrical efficiency compared to other commercially available fuel cells. Elcogen's patented technology has the potential to become less expensive than competing technologies as it uses standard processes and widely available materials in cell manufacturing. Key applications for the systems using this type of fuel cell

technology are residential power generation systems, industrial power generation units and further off-grid power generation. The EIB is supporting Elcogen with €12 million.

[More information online](#)

Northvolt, Sweden

The EIB approved a loan for the construction and operation of a first-of-a-kind demonstration plant in Sweden for the manufacturing of li-ion batteries. Northvolt intends to build the world's greenest battery, with a minimal carbon footprint and the highest ambitions for recycling, to enable the European transition to renewable energy.

[More information online](#)

Windfloat, Portugal

The EIB supported the development of breakthrough wind energy technology in Portugal by providing a €60 million loan. The company Windplus will install a floating wind farm located 20 km off the Viana do Castelo coast. The project will speed up the commercial roll-out of a novel technology called WindFloat that enables the harvesting of abundant wind resources in deep waters where mounting foundations on the sea floor is not possible.

[More information online](#)

Laying the foundations of tomorrow: Financing digital networks

Continuous access to information, commerce, communication, friends and entertainment – among a myriad of other things – has become a daily fact of life for billions and will soon become a reality for billions more. Other areas such as industry, healthcare, education and government services are increasingly becoming digital, too, boosting the demand for fast and reliable networks. The EIB is backing investment in digital networks to support and accelerate the development and deployment of new network technologies such as 5G and improve access in rural areas.

PROJECT HIGHLIGHTS

Connecting Europe Broadband Fund

This EIB-backed infrastructure fund for rural high-speed internet access is expected to unlock additional investments of up to €1.7 billion in broadband deployment in underserved areas, where very high-capacity networks are not deployed yet. The fund aims to invest in 20 countries by 2021.

[More information online](#)

Iliad, France

The EIB granted €200 million of financing to support the roll-out of superfast broadband (FTTH or “fibre to the home”) networks in France. The EIB’s loan supported the roll-out of a fibre-optic network using FTTH access technology across France. By end-2018, FTTH was made available to 9 million connectible lines in areas with medium to high population density.

[More information online](#)

Backing European 5G development

5G technology is expected to enable faster speeds, massive connectivity, decade-long battery life for sensors and super-responsive and reliable networks for customers. This could power on-demand virtual reality (VR) and augmented reality (AR) experiences, driverless vehicles, medical monitoring, advanced industrial automation services, and other applications. To accelerate research and development for 5G tech in Europe, the EIB recently provided two loans totalling €750 million to **Nokia** and **Ericsson**.

Digitalising the economy

The rise of digital technologies, such as artificial intelligence or the internet of things, and their increasing convergence with the physical world has brought about rapid, wide-ranging changes to the way innovation is created and diffused, redefining entire industries. The EIB is backing projects that develop cutting-edge digital technologies and applications to ensure that the European Union has the digital capabilities to keep up and even lead this accelerating transformation.

Almotive, Hungary

The EIB provided a €20 million loan for AI-based systems for self-driving cars. Almotive is working on technologies including modular, AI-based software for self-driving cars, as well as a virtual simulation environment to help accelerate the testing and verification of self-driving technologies. Almotive also developed an IP chip for high-performance, low-power AI-optimised computing. The EIB loan will enable Almotive to further mature its technology and bring automotive-grade products to the market in the coming years.

[More information online](#)

Clavister, Sweden

With more and more elements of the economy and society becoming digital, cyber-attacks are an evolving danger to organisations, employees, and consumers. That is why the EIB is backing cyber-security companies like Clavister. Clavister is an innovative Swedish company that develops, manufactures and sells network security solutions. The €20 million EIB loan supports the development of highly advanced software addressing the field of cyber-security for enterprise and telecom markets with Next Generation Firewalls. Recent product development also features pro-active detection technology, including fourth generation artificial intelligence that monitors the behaviour of malware in addition to classic anti-virus engine techniques.

[More information online](#)



Financing the industry of the future

As technology and digitalisation become increasingly transformative forces across the economy, there is a huge opportunity to reignite Europe's traditional industries, with trillions of euros of value at stake.

Datalogic, Italy

Datalogic S.p.A. is a global technology leader in automatic data capture and process automation. The company specialises in the design and manufacturing of barcode readers, radio frequency identification (RFID), detection, measurement and security sensors, vision systems and laser marking. The promoter's products are mainly used in the retail, manufacturing, healthcare and transportation and logistics sectors. The €30 million EIB loan backs the company's R&D activities, generating over 100 patent applications related to new products and technologies and creating 47 new permanent positions for researchers and experts so far. The EIB support helped to maintain Datalogic's position as a leader in the automatic data capture and industrial automation industry, strengthening European presence in the sector and enabling the further adoption of European industrial automation.

[More information online](#)

Materialise, Belgium

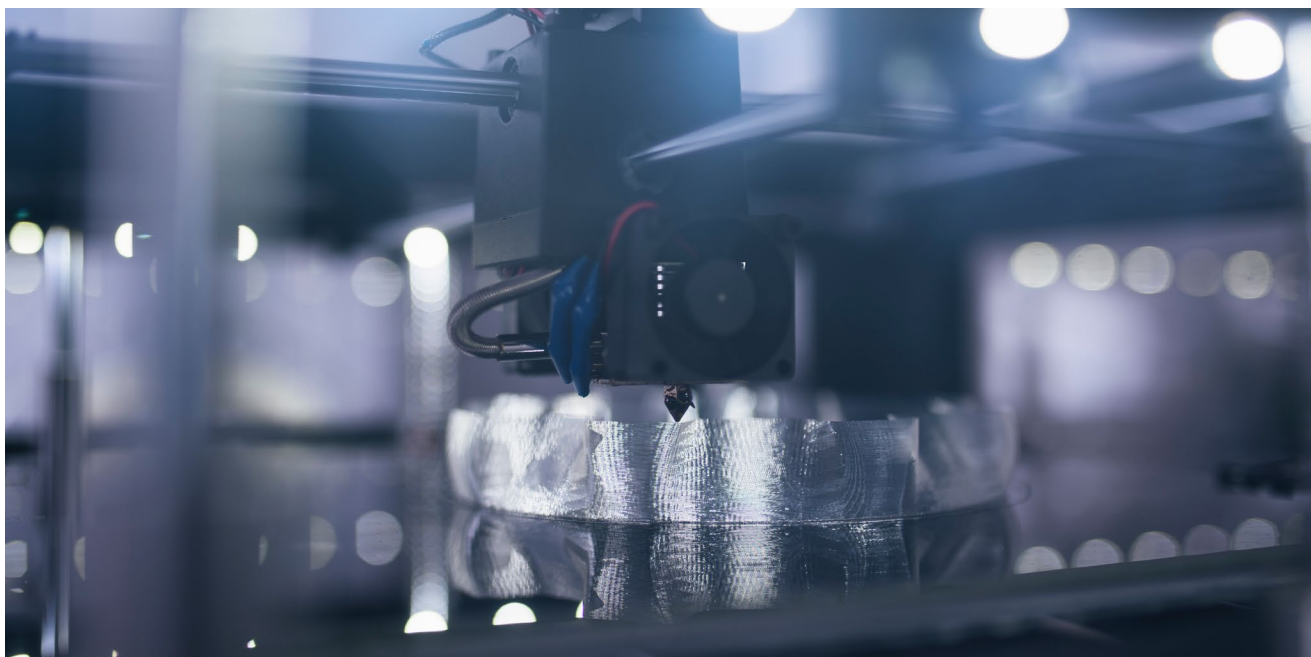
A €35 million EIB loan will support the development of new products and services and new software solutions for 3D printing. Materialise NV provides additive manufacturing software and 3D printing services, offering proprietary software worldwide through programmes and platforms that enable and enhance the functionality of 3D printers and of 3D printing operations.

[More information online](#)

Prophesee, France

€20 million in EIB financing will enable Prophesee to further develop and market a technology for imaging sensors that enables extremely fast and reliable reading and interpretation of scenes in industrial, consumer and automotive applications. The technological advantage versus the competition is significant. By bypassing inherent limitations in conventional computer vision, Prophesee's products are disrupting current technology in fields such as automotive vehicles, artificial intelligence and deep learning, industrial automation, the internet of things, security, surveillance and healthcare.

[More information online](#)



PROJECT HIGHLIGHTS

Pushing the frontiers of life sciences

Small and medium-sized companies account for most of the innovation that takes place in the life sciences industry today. These innovative businesses are developing new medicines for life-threatening diseases and health management devices and solutions that significantly improve quality of life and longevity. However, innovation, particularly in the life sciences, is a lengthy and complex process and requires adequate funding. The transformation of promising research into commercial products takes time and resources, which can deter investors from pursuing life sciences innovations in favour of lower-risk ventures with faster payback. That is why the EIB is helping to provide long-term financing for life science innovations.

MagForce, Germany

MagForce is a German company that is among the early developers of nanotechnology-based cancer treatments. Its technology relies on an injection of nanoparticles into the solid tumour. The therapy is the first and only nanotechnology-based therapy with European regulatory approval (CE conformity marking) for the treatment of brain tumours. Aided by a €35 million EIB loan, MagForce is now working on a roll-out plan to make its therapy available outside Germany.

[More information online](#)

Antibiotix, Denmark

Multi-drug resistant bacteria are an increasing global public health concern. They threaten our ability to treat common infectious diseases, resulting in prolonged illness, disability, and even death. Greater innovation and investment are required in the research and development of new antimicrobial medicines, vaccines, and diagnostic tools. That is why the EIB is investing in companies such as Antibiotix from Denmark.

Nuritas, Ireland

The EIB provided Nuritas with €30 million to further develop its pioneering application of artificial intelligence to revolutionise medical research. The company uses artificial intelligence and genomics to help pharmaceutical and food companies discover new health products based on compounds found in nature. Launched in 2015, the Dublin-based company began building a platform that could analyse thousands of research papers a day. That included writing a series of proprietary algorithms to be able to search and predict which properties in certain substances might have specific impacts on certain health issues. With the cost of medical research soaring in recent years, Nuritas' technology has shown the potential to drastically lower costs by enabling medical research to be conducted with phenomenal speed and high accuracy.



RESOURCES

CORPORATE INFO

- **EIB Innovation Homepage**
- **European Fund for Strategic Investment**
- **InnovFin**
- **InnovFin Advisory**
- **EIB Venture Debt**
- **EIB Investment Report and Survey**

EDITORIAL

- **Future Europe (Podcast)**
- **“I got a job”-series**
- **Blog stories**

VIDEOS

- **EIB Venture Debt**
- **Small business support**
- **Innovation in the Mediterranean**
- **Clean energy**



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