

Industrial Tech

Key to solving the climate crisis

 Speedinvest

 dealroom.co





Speedinvest - The VC for European Industrial Tech Startups

Speedinvest is a leading European, early-stage VC with focused investment teams, in-house expert support, and the networks needed to build category-defining tech companies.

The future of industry is digital and green. Europe is entering a new industrial era driven by transformative technologies, new business models and the common goal of decarbonization. The Industrial Tech team invest in startups pushing Europe into the future. And our investors are leading industrial corporations eager to collaborate with our portfolio companies.

Learn more about our Industrial Tech, Fintech, Deep Tech, Network Effects, and Health and Consumer Tech teams and our +250 portfolio companies at speedinvest.com.

200+ portfolio companies



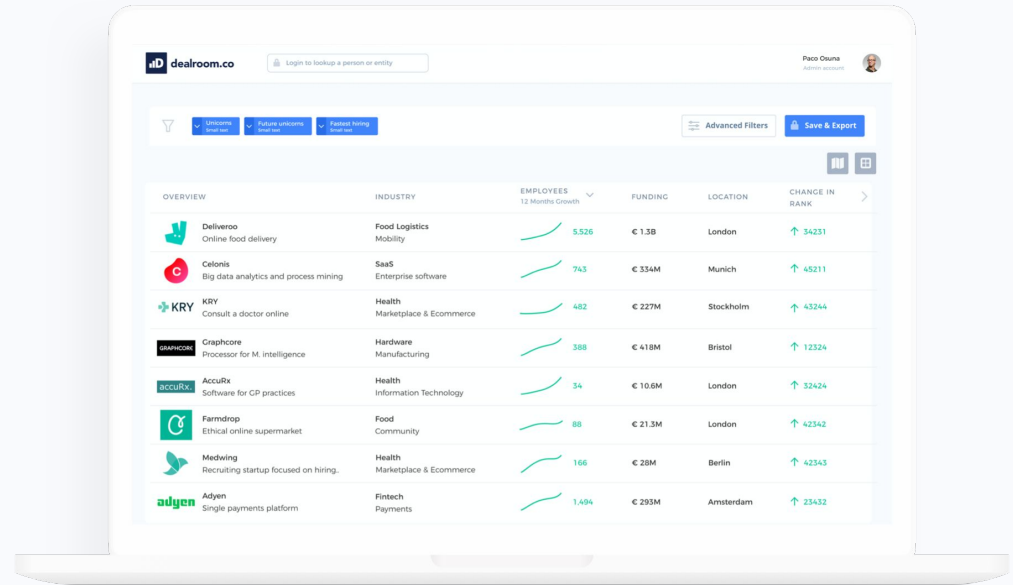


Global intelligence about promising companies, from startups to unicorns

Dealroom.co is the foremost data provider on startup, early-stage and growth company ecosystems in Europe and around the globe.

Founded in Amsterdam in 2013, we now work with many of the world's most prominent investors, entrepreneurs and government organizations to provide transparency, analysis and insights on venture capital activity.

Our offerings include data sets via SaaS and API as well as custom reports and bespoke ecosystem platforms.

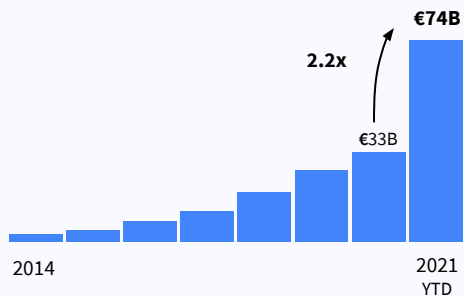


Industrial Tech ecosystem more than doubled in value to €74B with 13 unicorns created so far.

European Industrial Tech is now a major ecosystem in its own right. The combined enterprise value of European Industrial Tech startups has grown 2.2x from last year, reaching €73.9B.

There are now 13 unicorns and \$1B+ exits in European Industrial Tech. Despite being a younger ecosystem, Industrial Tech startups are just as likely to grow into unicorns.

Combined enterprise value of European Industrial Tech companies ⁽¹⁾



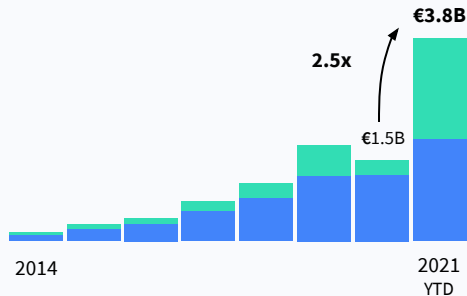
The acceleration is driven by US and corporate money. Covid-19 and climate crisis are major catalysts.

56% of investment came from the US and Asia, up from 27% in 2020. Alternative investment grew from 35% in 2020 to 49% in 2021.

Industry and logistics are responsible for at least 38% of CO2 emissions. Corporates are keen to innovate to become cleaner.

Meanwhile, Universities remain a key breeding ground for Industrial Tech, given its R&D heavy nature.

Investment in European Industrial Tech
Investment from outside Europe ⁽¹⁾

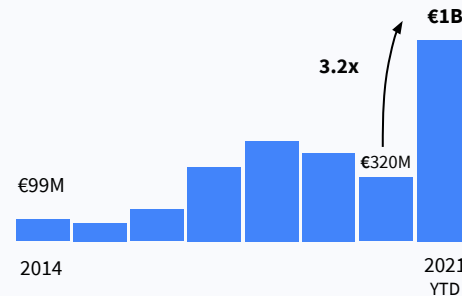


The immediate urgency of the climate crisis is likely to catapult Industrial Tech into 2022.

Industrial Tech, Deep Tech, and Climate Tech are natural allies with strong overlap.

From additive manufacturing to logistics and robotics, startups are directly combating the climate crisis, with some niches being almost 100% climate-aware. In 2021, VC investment in this space has already grown 3.2x from last year.

VC investment in European Industrial Tech startups addressing the climate issue ⁽¹⁾



This is the 2nd Industrial Tech report by Speedinvest x Dealroom.co

One year ago, Speedinvest and Dealroom launched [the first edition of the Industrial Tech report](#). Back in 2020, Industrial Tech was already a fast-growing ecosystem. But it was also still relatively small with just over €1B in VC invested in the year. Meanwhile, a third of the global economy is industrial, representing \$23 trillion in output.

A major digitization wave is underway. European Industrial Tech could soon be a €300 billion market. Key trends accelerating Industrial Tech include: the convergence of Operational Tech and IT, decentralization, consumerization, and decarbonization.

Last year, we called Industrial Tech [a sleeping giant awakening](#). Has it fully awakened yet? In 2021, Industrial Tech has shifted gears and is becoming a major ecosystem in its own right, driven by Covid-19, strong appetite from US and Asian investors, increased focus on Climate Tech and a heightened sense of urgency from corporate investors. This year, we've identified 18 core segments in Industrial Tech (up from 14 last year) and our analysis covers 685 European Industrial Tech companies with at least €1M in VC funding (up from 531 last year).



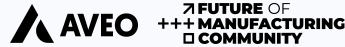
Big thanks to the contributors to this report



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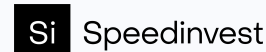
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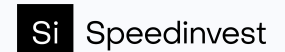


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Industrial Tech update

The combined European Industrial Tech ecosystem is now worth €74B.

Along with venture capital investment, also the combined enterprise value of all Industrial Tech companies more than doubled to €74 billion.

This rapid increase was driven by a number of unicorns across different sub-segments including logistics, procurement and cybersecurity.

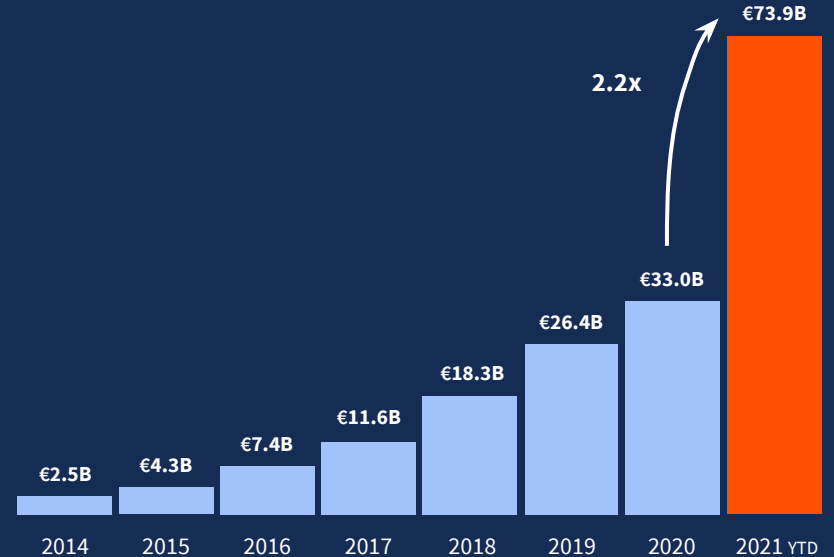
The most valuable is Celonis, process mining software applicable in logistics and procurement, among other areas. The company is now worth €10B, up 4.4x in just 1.5 years.

Autostore, Norwegian warehouse robotic automation solution, is now valued at €7.0B after a minority stake acquisition by Japan's SoftBank few months ago.

Darktrace, which successfully went public earlier this year, has tripled its valuation in just 6 months to €6.6B.

InPost, whose parent company was originally founded in 1999 in Poland, went public in Amsterdam and is now valued at €6.5B.

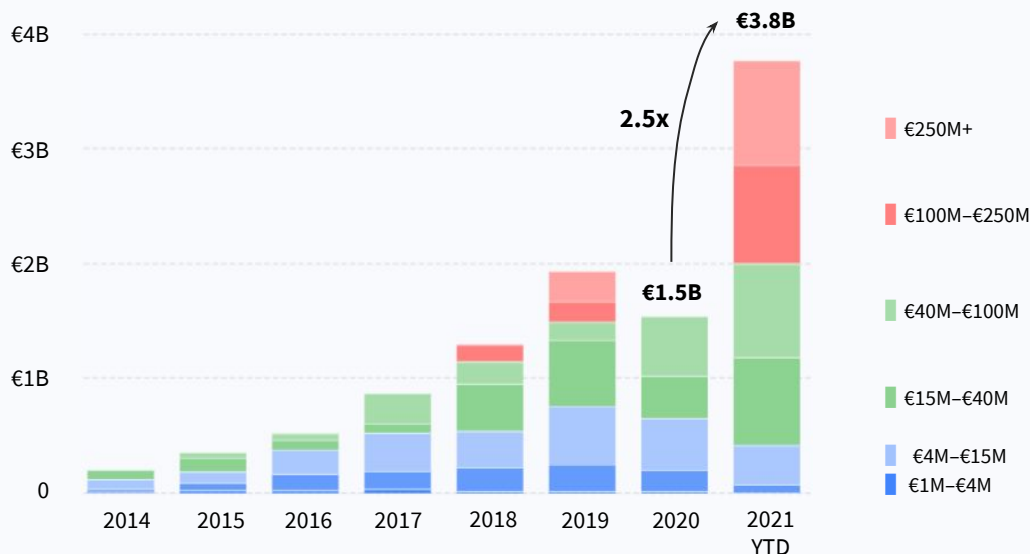
Combined enterprise value of European Industrial Tech companies ⁽¹⁾









Source: Dealroom.co and Yahoo Finance. 1. Using estimated valuations based on most recent VC rounds, public markets and publicly disclosed valuations as of October 17th, 2021.

Record investment in European Industrial Tech, driven by late-stage investment rapidly accelerating, and a number of mega-rounds taking place in 2021.

European Industrial Tech investment (2014-2021 YTD)

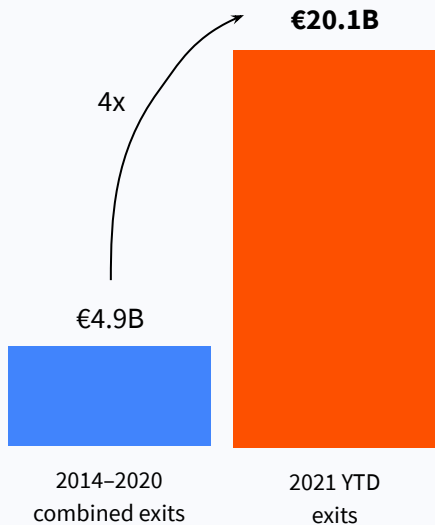


Mega-rounds in 2021














 Logistics, procurement \$1.0b Series D	 Logistics \$240M Series C
 Robotics \$220m Series C	 Logistics \$177m Series C
 Logistics \$160m Series D	 Data analytics \$150m Series B

Exits in 2021 are worth 4x more than all exits in the preceding seven years combined, thanks to big IPOs like InPost and Darktrace, as well as a number of other exits.

European Industrial Tech exit value (based on enterprise value at exit)



Top 2021 exits (enterprise value at exit shown)

 €8.0B IPO Jan 2021 	 €7.0B Secondary Apr 2021 	 €909M Secondary Jul 2021 	SPINNOVA® €390M IPO Jun 2021 
 €2.0B IPO Apr 2021 	ARQIT €1.3B SPAC IPO May 2021 	HUBS A PROTOCLABS COMPANY €255M Acquisition Jan 2021 	 €89M Buyout May 2021 

There now are 13 European Industrial Tech unicorns & \$1B+ exits.

Procurement



France

Founded: 2000. Valuation: \$1B
A platform to enable efficiency in spend management and supplier relationships

Robotics



Germany

Founded: 2018. Valuation: \$1B
Intelligent solutions to facilitate safe human-robot interaction

Logistics



Poland

Founded: 2006. Valuation: €6.5B
Manufacturer & operator of automated parcel lockers for e-commerce logistics

Cybersecurity



Germany

Founded: 1997. Valuation: €3B
IT security for production & infrastructure, from smart grids to cloud-connected shop floors

Other



Luxembourg

Founded: 2009. Valuation: \$1B
High-purity graphene nanotubes



Germany

Founded: 2011. Valuation: €10B
Process mining widely used in procurement, inventory & order management



Norway

Founded: 1995. Valuation: €7B
Automated storage and retrieval system for warehouses



Germany

Founded: 2016. Valuation: €1.1B
Digital freight forwarding and other supply chain solutions



United Kingdom

Founded: 2013. Valuation: €6.6B
'Industrial immune system' powered by self-learning AI



Netherlands

Founded: 2009. Valuation: \$1B
Energy commodities trading platform



Germany

Founded: 2015. Valuation: €1.1B
Digital freight-forwarder platform for full truck loads



United Kingdom

Founded: 2017. Valuation: €1.3B
Quantum encryption for industrial IoT, fixed line networks, 5G and other areas



Norway

Founded: 2016. Valuation: €1.5B
DataOps platform enabling digitization of asset-heavy industries. Subsidiary of Aker ASA

We've identified 18 core segments in Industrial Tech (up from 14 last year) ...

Logistics

Novel technologies and business models in B2B logistics

Robotics

Robotics for the industrial use, both hardware robots & software tools to train & operate them. Robotic process automation is not included.

Connectivity & IoT

Industrial site / shop floor connectivity & data gathering

Energy

Software (incl. IoT-enabled) for the B2B energy space. The niche does not include hardware (power generation & energy storage, EV charging, CO2 capture, etc.) & B2C energy.

Advanced materials

Materials with unique or enhanced properties, novel sustainable materials & technologies to obtain them

Data analytics

Tools that use a massive amount of data in the industrial space to drive business outcome (predictive maintenance, process parameter optimization, etc.)

Construction

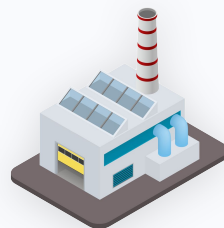
Novel technologies (software, hardware & materials) & business models in construction

Additive manufacturing

Hardware (3D printers), software to enable them, marketplaces to connect buyers & producers; novel materials for 3D printing

Workflow & project management (new)

Industrial ERP (enterprise resource planning) - inventory, order management; industrial project management tools



Drones & drone software

Part of industrial robotics. Includes aerial & sea/subsea drones for industrial use, & related software (drone operation, drone fleet management, etc.)

Workforce management (new)

Industrial employee education & management tools, including connected worker platforms, to boost safety, quality & productivity

Simulation

Simulation technology tools for the industrial space

AR/VR

AR / VR technologies for industrial use, both hardware & software

Marketplaces

Marketplaces that serve the industrial space

Cybersecurity

Cybersecurity tools with the primary focus or relation to the industrial space

Procurement

Digital procurement tools targeting the industrial space (supplier discovery, material search, etc.)

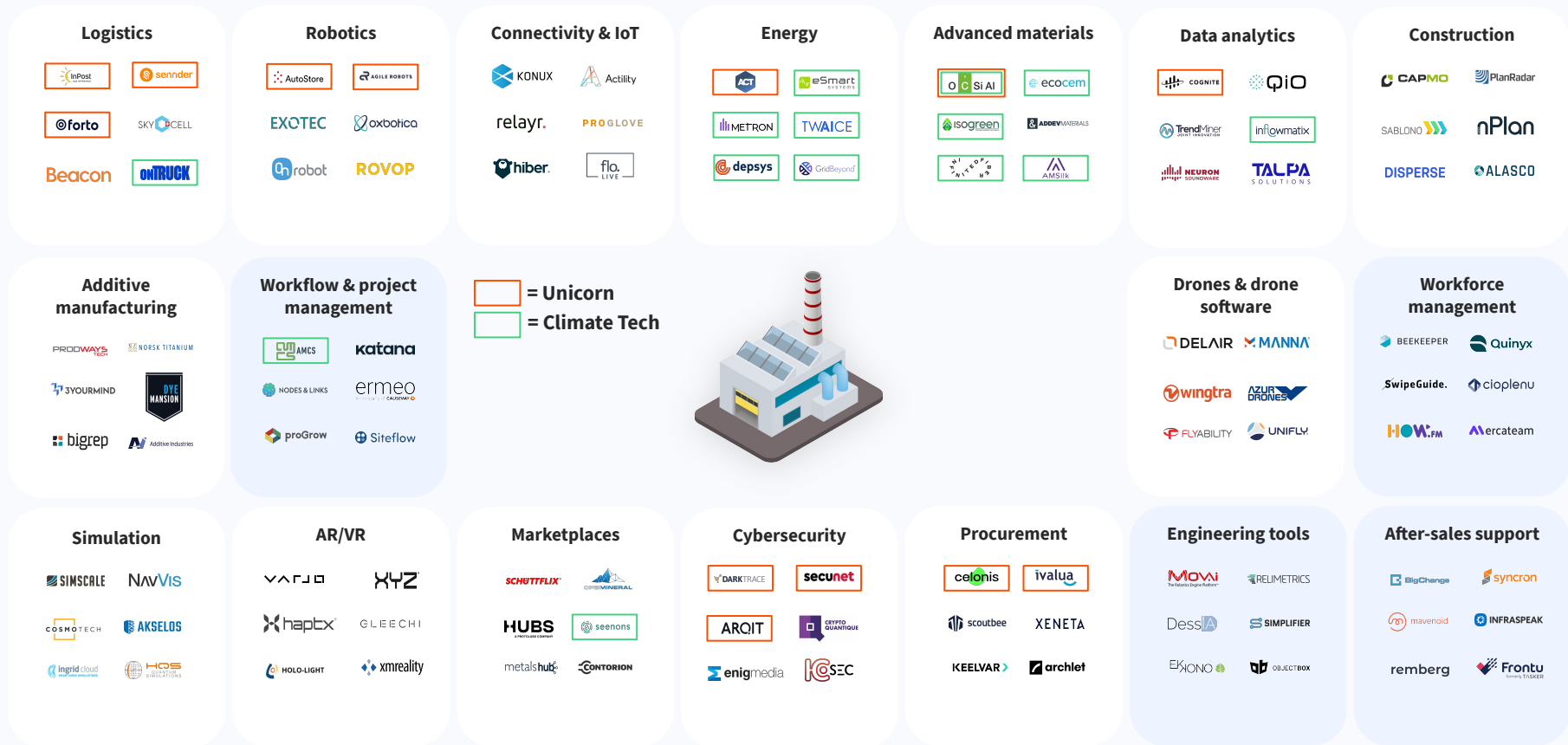
Engineering tools (new)

Developer tools with the primary focus on the industrial market (databases for industrial IoT, robot programming & training tools, etc.)

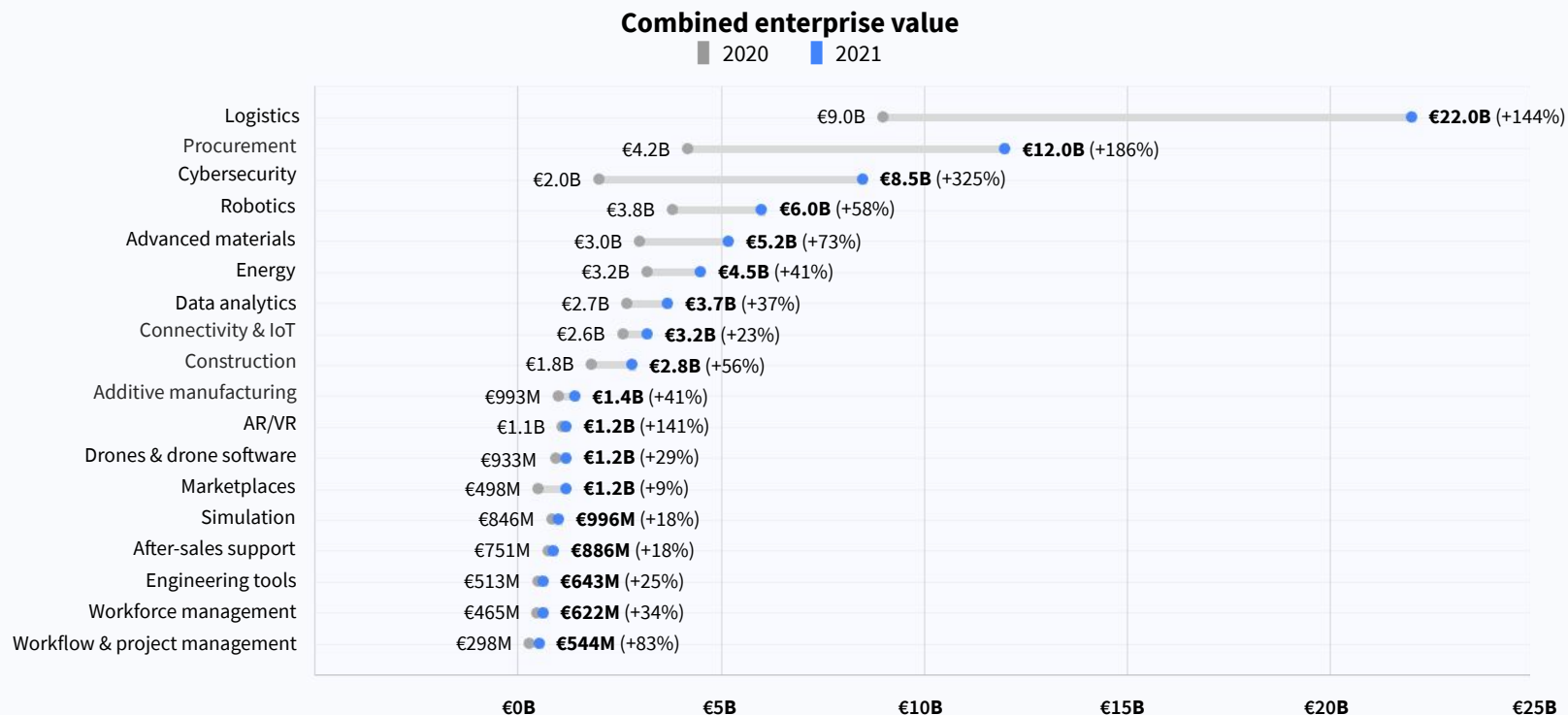
After-sales support (new)

Software tools for industrial maintenance, after-sales services & tech support

... covering 685 European Industrial Tech companies with at least €1M in VC funding.

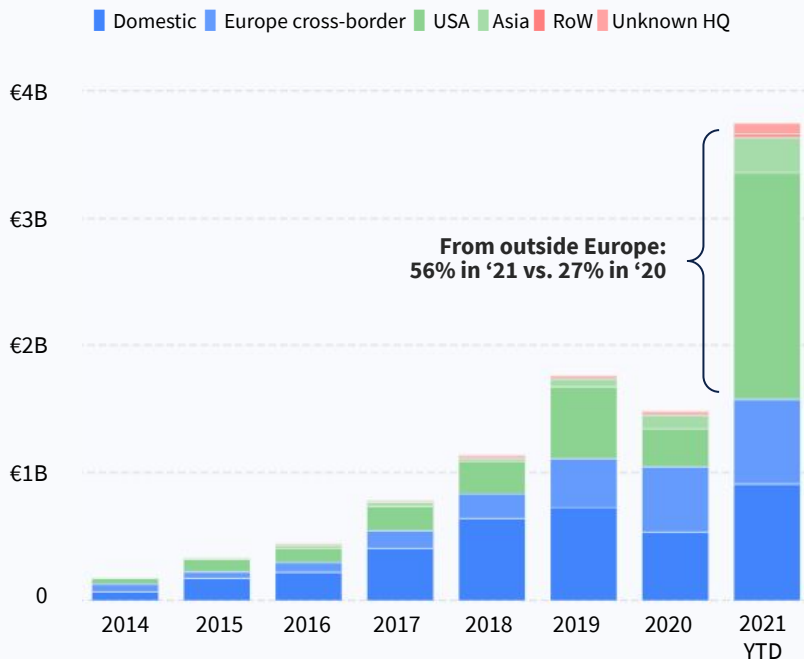


Logistics, procurement, security, advanced materials are some of the hottest sectors.

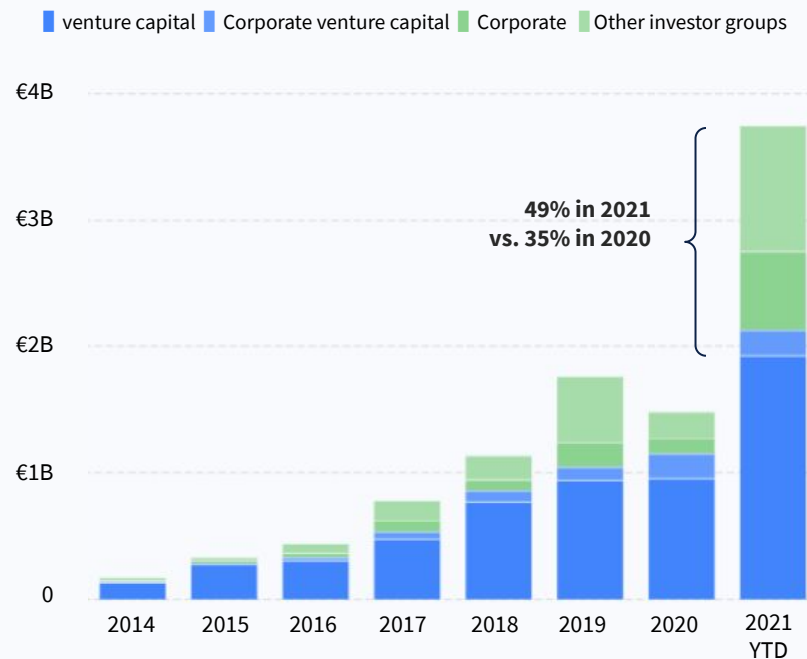


Investment coming in from outside Europe is the highest ever, now at 56%. Funding from alternative investor groups is also at record levels, now at 49%.

Investment in European Industrial Tech by source [» view online](#)



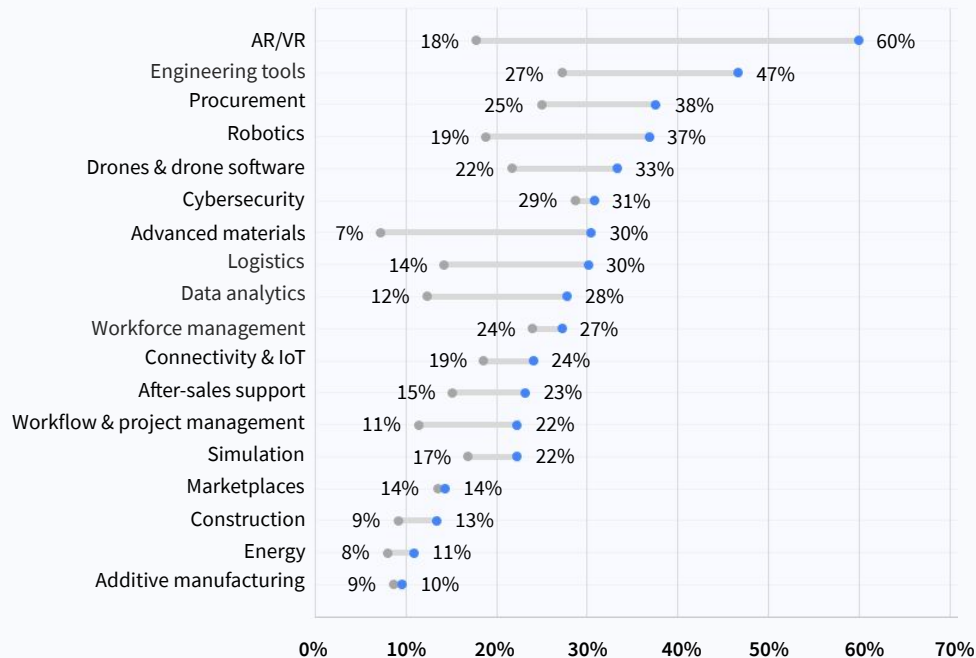
And by investor type [» view online](#)



The influx of US and Asian capital has happened across all sub-categories.

% of investments made from outside Europe

■ 2014-2021 ■ 2021



Asian investors in European Industrial Tech



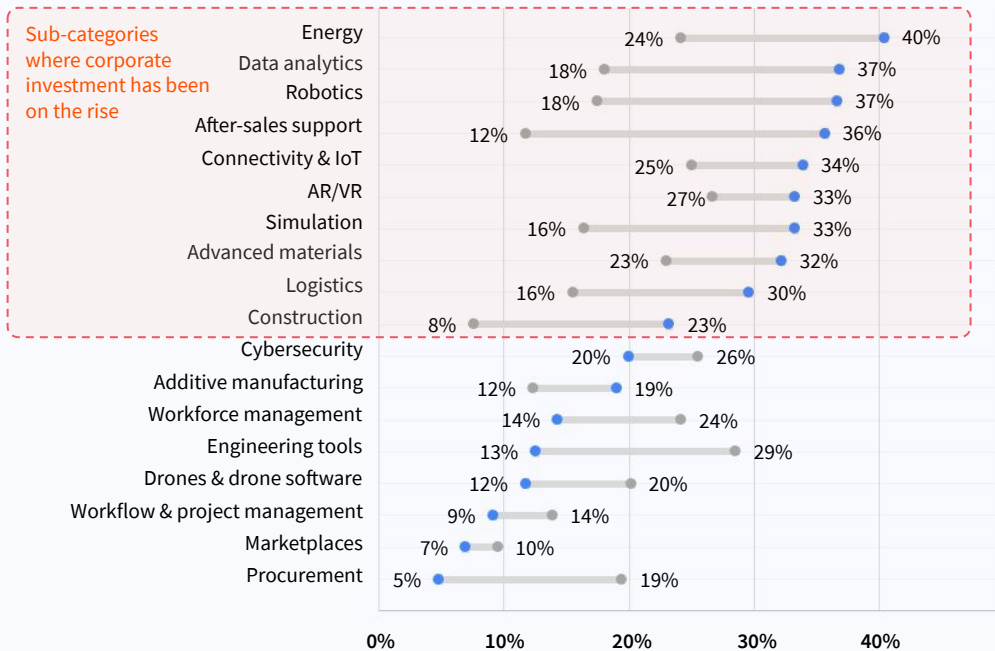
USA investors in European Industrial Tech



Corporate investment has been on the rise in the majority of sub-categories including Energy, Robotics, IoT, Simulation, Advanced Materials, and others.

Corporate investments as % of total VC investments

■ 2014–2021 ■ 2021



Other investor groups



Corporate investors





Working with startups has mutated from ‘nice to have’ for corporates to ‘must have’.

With an accelerated pace of change and innovation, corporates are not able to keep up on their own.”



Franziska Bossart
Global Vice President
At ABB Technology Ventures



Selected corporates actively investing in European Industrial Tech

BNP Paribas 		ABB
Intel 	Scania 	Maersk
Swisscom 		Shell
EDP 		Bosch
Siemens 		KPN

Building on traditional strength sectors, DACH and the Nordics have the most industrial-focussed startup ecosystems in Europe.

	VC investment 2014-'21	As % of total national VC	Enterprise value	Unicorns	Future unicorns
Germany	€3.6B	9%	€20.1B	5	7
France	€1.6B	5%	€6.7B	1	5
United Kingdom	€1.5B	2%	€12.8B	2	4
Switzerland	€654M	5%	€3.2B		4
Finland	€536M	12%	€2.9B		2
Norway	€502M	17%	€9.6B	2	
Sweden	€488M	3%	€3.3B		3
Netherlands	€471M	4%	€2.9B	1	1
Spain	€250M	3%	€1.2B		1
Ireland	€241M	4%	€883M		1
Belgium	€141M	4%	€574M		
Denmark	€133M	3%	€798M		
Luxembourg	€128M	11%	€934M	1	
Poland	€68M	6%	€6.8B	1	
Austria	€61M	3%	€363M		

Aside from the big exits and known unicorns, there is a strong pipeline of rising stars & future unicorns in European Industrial Tech.

Rising stars (valuation: \$100M–250M)

Future unicorns (valuation: \$200M–1B)

Germany	SEVEN SENDERS NAVVIS wandelbots AMSilk CAPMO creapaper WINGCOPTER TWAICE German Bionic	parcellab KONUX scoutbee SIMSCALE SCHOTTFLIX cargo.one PROGLOVE
France	METRON out sight another brain COSMOTECH TRAXENS KAYRROS DELAIR fretlink SHIPP3O WeMaintain	Cubyn Finalcod EASY MILE Actility EXOTEC
United Kingdom	nPlan VORTEKA BigChange flo LIVE XYZ Sorted.	huboo oxbotica Beacon zencargo
Switzerland	OPERMINEAL nexxiot MWbotics	BEEKEEPER SCREENING EAGLE SKY CELL SCANDIT
Finland	NITEOP TACTOTEK	RELEX V^A^P^Q
Norway	eSmart XENETA	
Sweden	Quinyx	synchron einride H2green steel
Netherlands	hiber. shypple	sendcloud
Spain	ONTRUCK	paack
Ireland	UBiqube MANNA ecocem	AMCS
Belgium	UNIFLY	
Denmark	robot	UNIVERSAL ROBOTS
Rest of Europe	INXPECT GIDEON BROTHERS PlanRadar	

2 Tailwinds and challenges

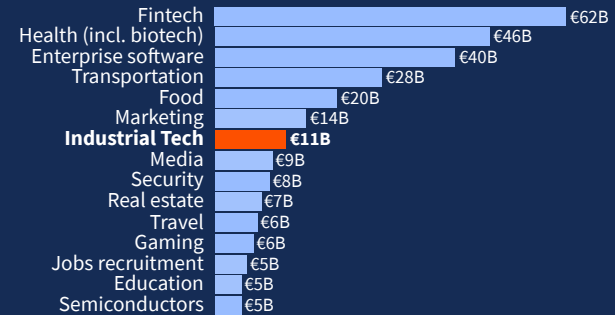
Industrial Tech is at an earlier stage of development, and also among the fastest growing.

With €11B investment during 2014-2021, European Industrial Tech is still a relatively underinvested category.

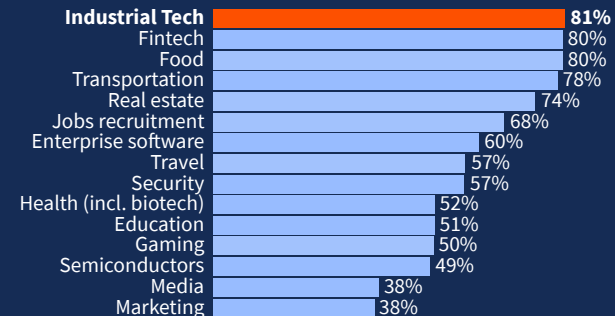
This is especially true considering industrial sectors are also a massive market: 30% of the global economy is industrial; an output of \$23 trillion (see page 10 of the [previous report](#)).

However, it shows the highest growth compared to many industries, by VC investment since 2014, albeit from a smaller base.

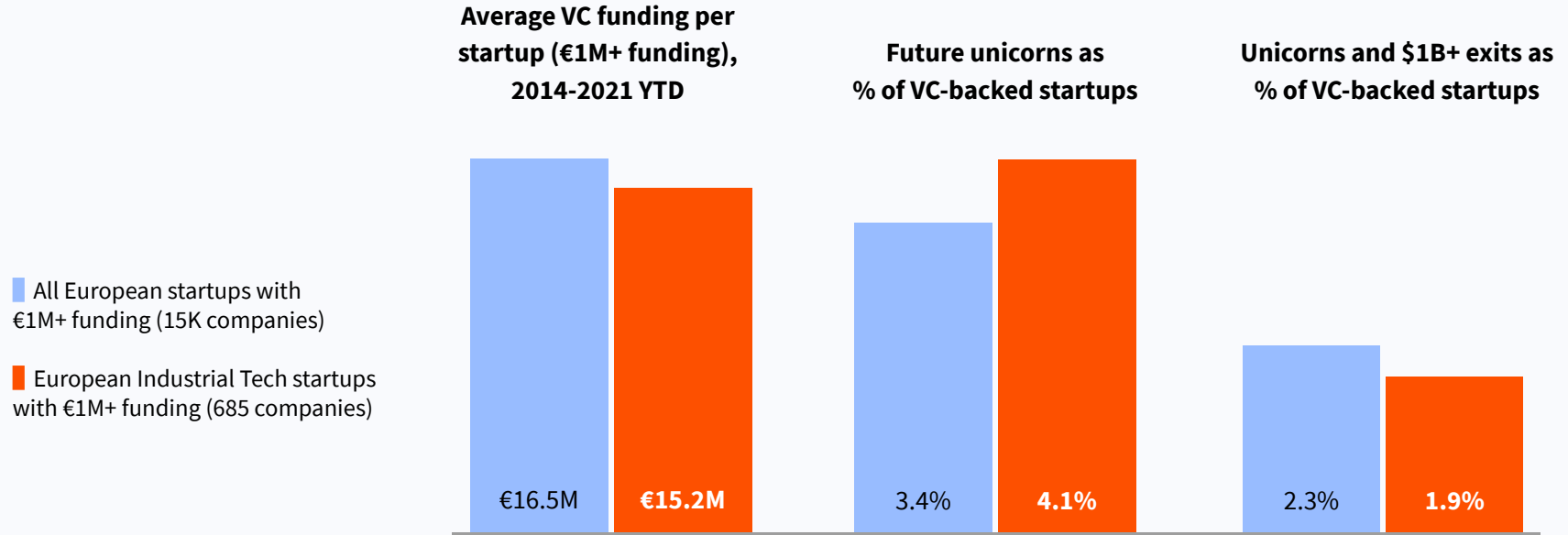
Total amount invested 2014-2021



Annual growth 2014-2021










Despite being a much younger ecosystem, the probability to become a future unicorn is even higher, and the probability to become a unicorn is already very similar.



Many Industrial Tech companies have their roots in academia, due to their focus on scientific work.

Most valuable Industrial Tech spinouts from universities and research institutions:

[» View online](#)

Name	HQ	Founded	Valuation	Segment	University/ research center
 celonis	Germany	2011	€10.0B	Logistics, procurement	TUM
 DARKTRACE	UK	2013	€6.6B	Cybersecurity	Cambridge
 AGILE ROBOTS	Germany	2018	€909M	Robotics	DLR
RENEWCELL	Sweden	2012	€736M	Advanced materials	KTH
SPINNOVA [®]	Finland	2014	€731M	Advanced materials	VTT
SCANDIT	Switzerland	2009	€291-436M	AR/VR	ETH Zurich
 KONUX	Germany	2014	€291-436M	Connectivity & IoT	TUM
 oxbotica	UK	2014	€214M	Logistics, robotics	Oxford
 SIMSCALE	Germany	2012	€205M	Simulation	TUM
 PROGLOVE	Germany	2014	€144-216M	Connectivity & IoT	TUM

32% of all enterprise value created comes from startups with academic roots, versus only 6% for all startups.

% enterprise value created by university spinouts

6%

All startups

32%

Industrial Tech

Munich's TUM is the academic leader in Industrial Tech. But there are many other academic breeding grounds for industrial innovation and startups across Europe.

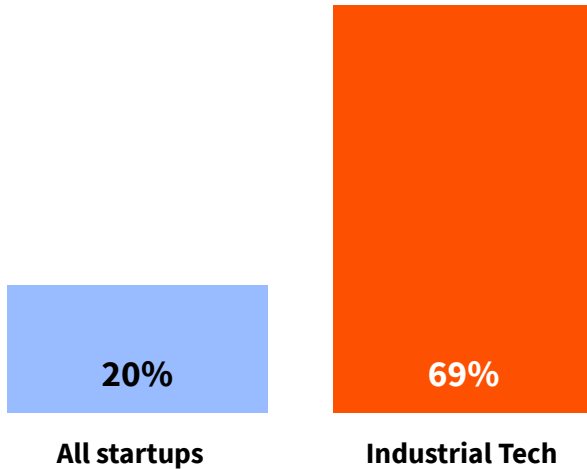
Enterprise value of spinouts

Notable university spinouts and university-affiliated startups

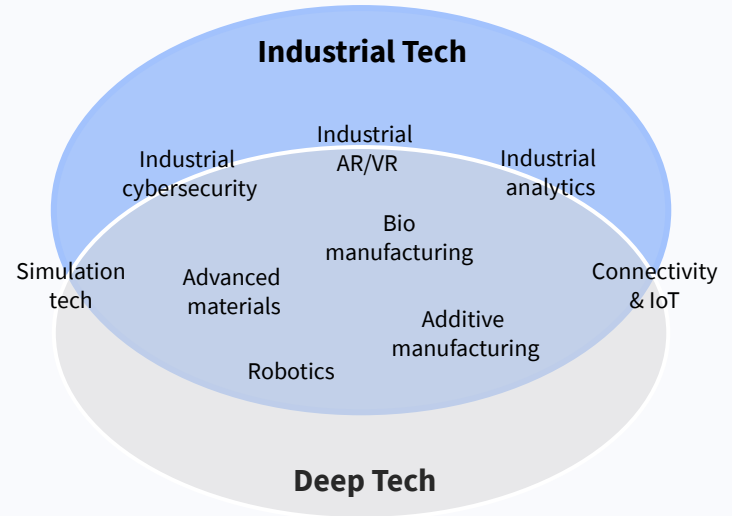
Technical University Munich (TUM)	€12.6B	celonis TWAICE AMSiik PROGLOVE MAGAZINO NavVis SIMSCALE KONUX CAPMO
Cambridge University	€6.6B	DARKTRACE
VTT Technical Research Centre of Finland	€1.1B	UNITED FACTOTEK SPINNOVA®
German Aerospace Center (DLR)	€909M	AGILE ROBOTS
KTH Royal Institute of Technology	€779M	RENEWCELL
ETH Zurich	€579M	AWbotics nexxiot SCANDIT
Oxford University	€214M	oxbotica
IFE Institute of Energy Technology	€155M	eSmart SYSTEMS
Dresden University of Technology (TU Dresden)	€137M	wandelbots
Eindhoven University of Technology (TU/e)	€103M	SECURITY MATTERS
École normale supérieure (ENS) of Lyon	€96M	COSMOTECH
Flemish institute for technological research (VITO)	€85M	UNIFLY

Big overlap with Deep Tech, given the science/engineering risk in getting many Industrial Tech startups off the ground ...

% enterprise value created by Deep Tech startups



... for instance in areas like robotics, advanced materials, and additive manufacturing.



Similar to Deep Tech, Industrial Tech has longer funding cycles than “typical” startups.

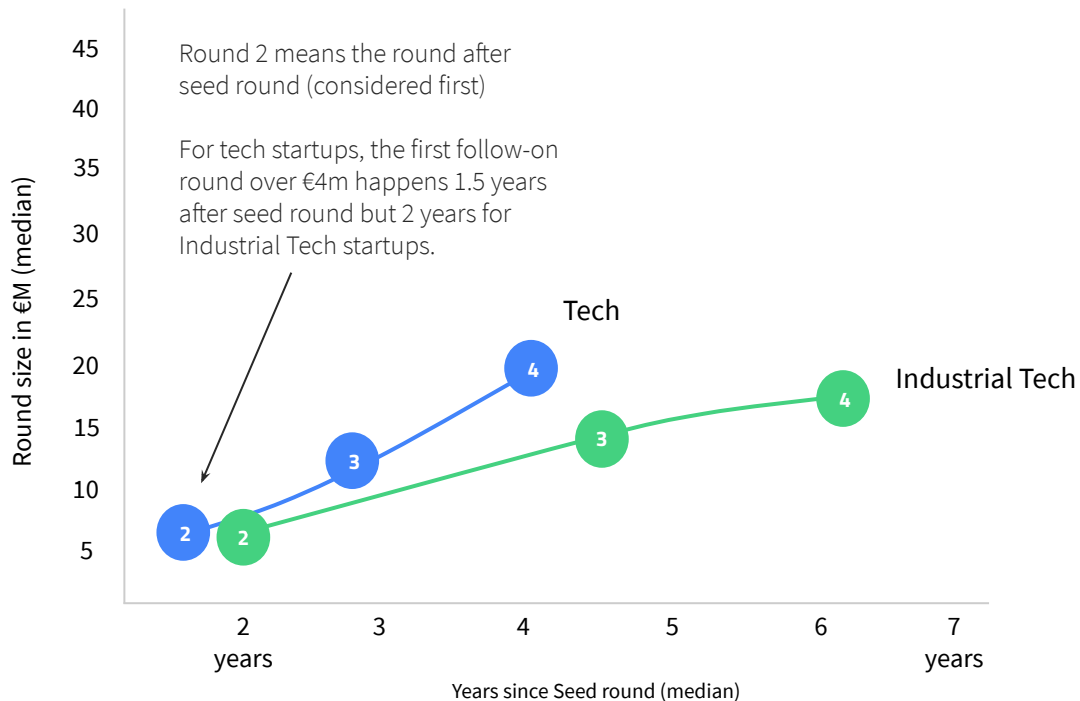
Industrial Tech startups follow a different scaling journey compared to regular startups.

Industrial Tech startups have much longer runway between rounds, on average raising their first post-Seed round 24 months after Seed, and their following round 4.5 years after Seed.

Longer R&D cycles may contribute to extended scaling journey. But Industrial Techs also don't have the marketing-driven adoption (or spend) of consumer-facing peers. Instead, Industrial Tech startups favour corporate land and expand strategies to build momentum over time.

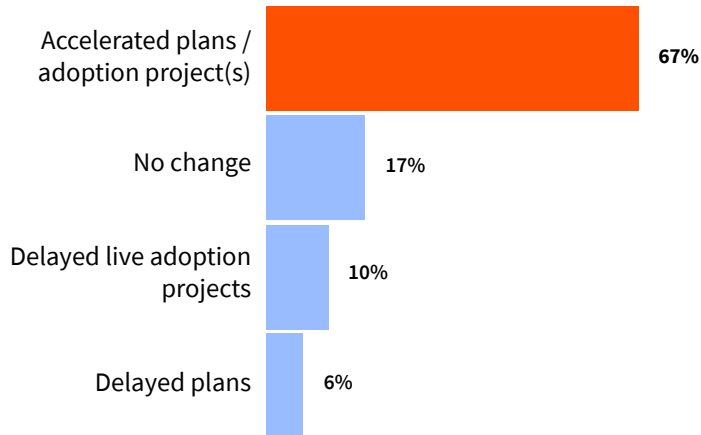
Time between rounds and amounts raised

Tech startups Industrial Tech



Industrial agility became critical during Covid-19, leading to accelerated digital adoption, but in some cases also delays due to cash-flow challenges.

Adoption of digital technologies by manufacturing companies since the start of the Covid-19 pandemic



“**Manufacturing industries are in turmoil and innovators are slowly but surely gaining ground. Covid-19 has given many Industrial Tech applications the necessary tailwind to grow faster.**

I'm very excited about a completely new software stack that gets built specifically for manufacturing companies. I also see large untapped opportunities in areas such as workflow management as well as upskilling and reskilling of the large frontline-worker workforce.”



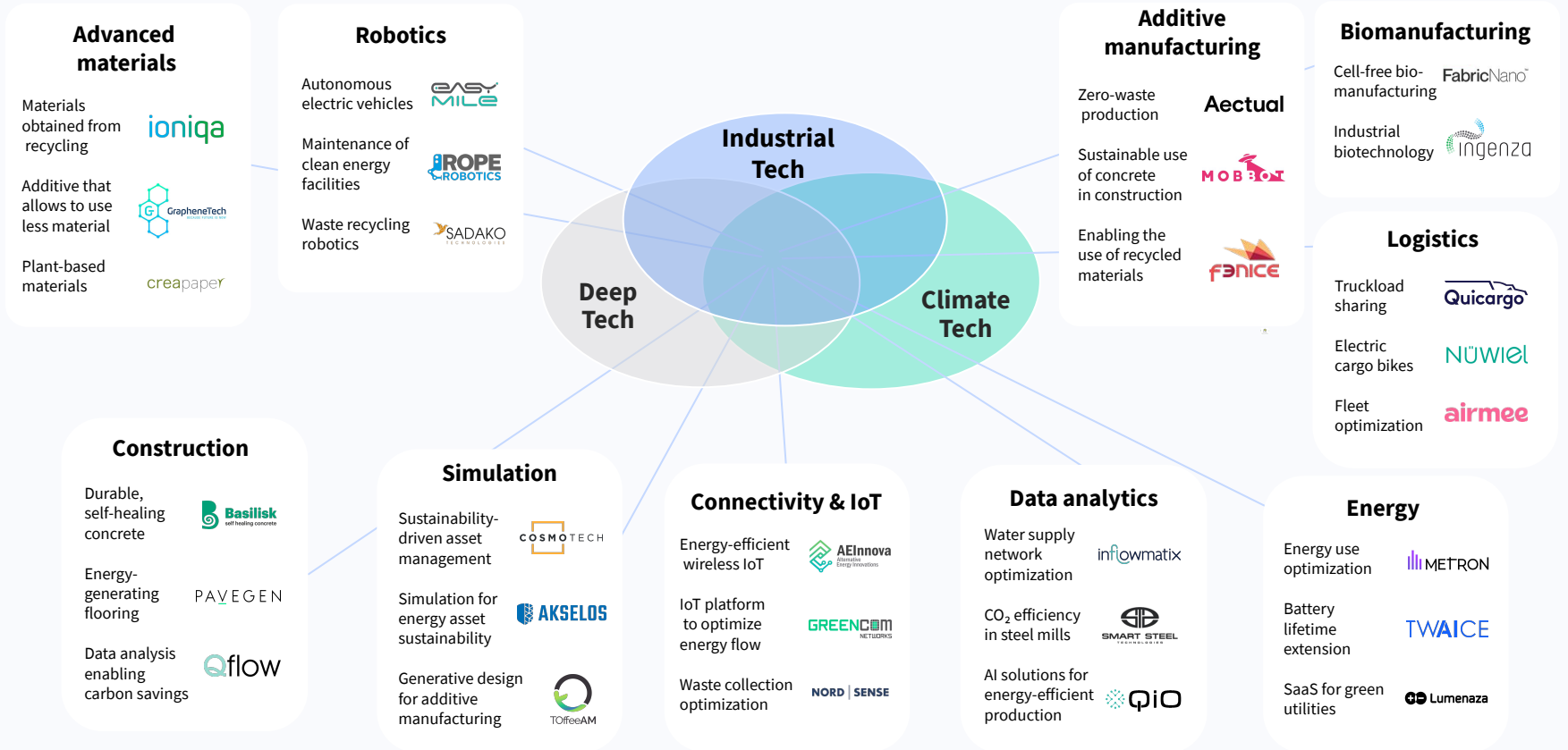
Robin Dechant

Co-Founder of Aveo. Initiator of the Future of Manufacturing community



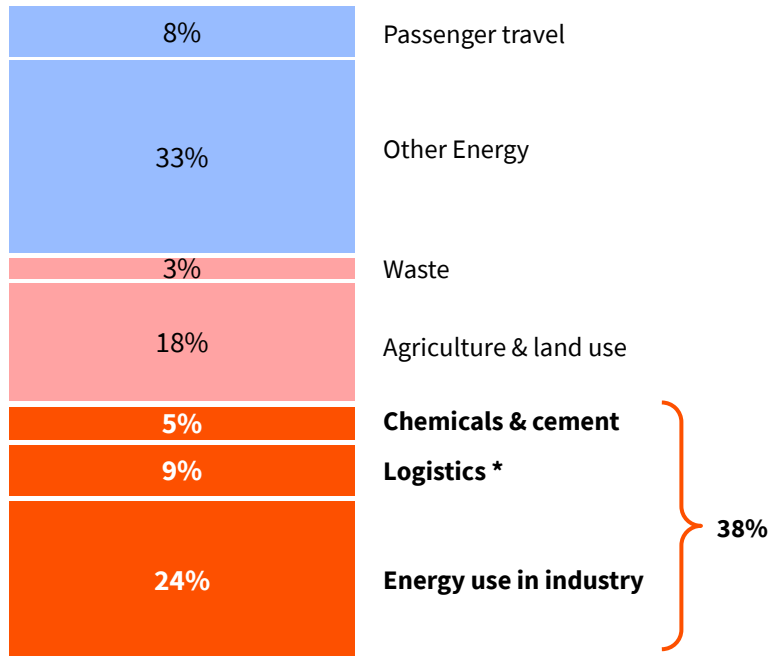
3 Climate & Industrial Tech

There is an inherent overlap between Climate Tech, Deep Tech, and Industrial Tech.



Industry and logistics are responsible for at least 38% of CO₂ emissions. Corporates are keen to innovate to become cleaner.

Global CO₂ emissions by source



“The appetite for sustainable industrial technologies has definitely gained momentum in the past few years, and we're especially amazed by the past few months.”

Lately most major chemical manufacturers are interested in working with us on proof-of-concept biocatalysts for commodity chemicals that have never been made before using biology.”




Grant Aarons
Co-Founder and CEO at FabricNano

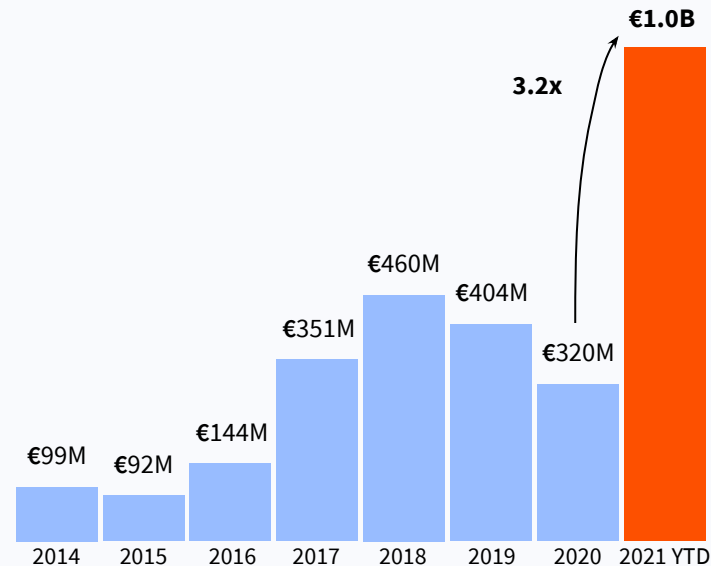
 **FabricNano**[™]

Investment in Industrial Tech + Climate Tech is already at €1.0B, a new record by far.

Notable Industrial + Climate Tech startups that raised funding in 2021

 <p>Comprehensive solutions for energy transition Total funding: €150M</p>	 einride <p>Autonomous electric freight mobility Total funding: €138M</p>	 H2green steel <p>Decarbonization of steel production Total funding: €96M</p>
 <p>Zero-emission autonomous shuttles Total funding: €77M</p>	 TACTOTEK <p>Innovative, sustainable electronics manufacturing tech Total funding: €72M</p>	 <p>Circular, premium textile fiber Total funding: €44M</p>
 <p>Sustainable insulation materials Total funding: €40M</p>	 METRON <p>Digital tools to enable energy efficiency Total funding: €40M</p>	 TWAICE <p>Predictive analytics to increase sustainability of batteries Total funding: €38M</p>
 <p>Vegan silk biopolymers Total funding: €34M</p>	 creapaper <p>Grass fibre raw material And grasspaper products Total funding: €29M</p>	 ecocem <p>Grass fibre raw material And grasspaper products Total funding: €25M</p>

VC investment in European Industrial + Climate Tech startups





Around fifty percent of the emission reductions needed to reach net-zero by mid-century will come from clean technologies that are currently in the demonstration or prototype phase.

Given that many clean technologies take around 20-25 years to go from lab to market, it's crucial to prioritize innovation in less mature technologies. That's why Breakthrough Energy is focusing on technologies like green hydrogen, long-duration energy storage, direct air capture, or sustainable aviation fuels.”



Ann Mettler

Vice President, Europe
at Breakthrough Energy



Breakthrough Energy

A growing list of European climate-focused VCs investing in Industrial Tech has started to emerge.

» [View all impact investors](#)

United Kingdom



Netherlands



Sweden



France



Germany



Belgium



Spain



Finland



Italy



Ireland



Switzerland



Portugal



Lithuania



Czech Republic



Norway



EU countries have committed over €2 trillion* for 2021-2027 to help build a greener and more digital Europe.

Europe strives to be the first climate-neutral continent. An opportunity for Industrial Tech. Its Green Deal backs up bold ambitions with significant capital.

NextGenerationEU consists of €723B in loans and grants, €50B for REACT-EU, and €7B to other instruments.

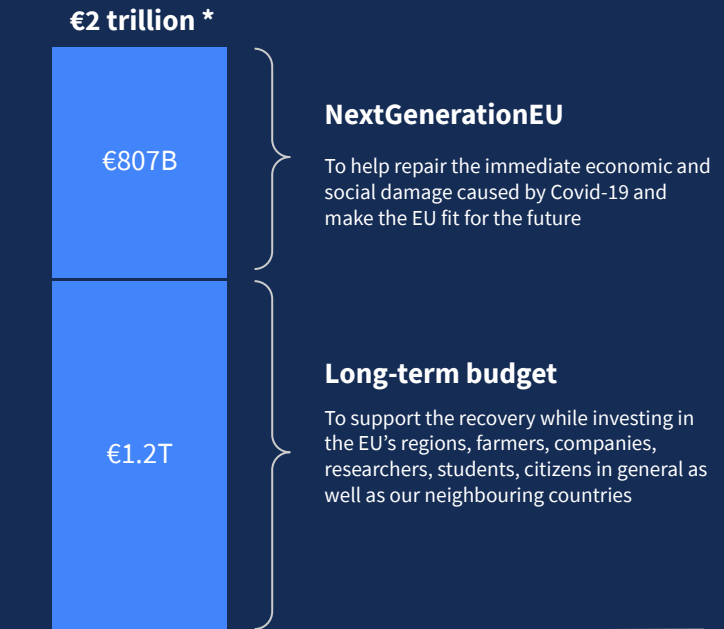
The Long-term budget is to support the recovery while investing in the EU's regions, farmers, companies, researchers, students, citizens in general as well as neighbouring countries.

30 % of the long-term budget and NextGenerationEU will be spent on fighting climate change.

The recovery package aims to strengthen the competitiveness of the EU industry by accelerating the transition to a greener, more digital, and resilient model.

Countries implement, and some supplement, this commitment, through tailor-made programs. Some specifically target startup funding.

Total budget for 2021–2027.



* - Current prices; taking annual adjustment for inflation into account; the amount is equal to €1.8T in 2018 prices. The amount in current prices show how much beneficiaries will actually receive from the budget (1)

Many Industrial Tech startups are directly addressing the EU's Green Deal categories.

Zero pollution

A zero pollution ambition for a toxic-free environment



Biodegradable packaging material



Robotic waste recycling

Clean & circular economy

Industrial modernization and circular economy



Grass fibre material for green packaging



Sustainable fibre for the textile industry

Cleaner energy

Supplying clean and secure energy



Battery lifetime extension software



Coating, solar, and sensor solutions for the energy transition

Sustainable building

Building and renovating in an energy and resource efficient way



Durable, self-healing concrete



Data analysis enabling carbon savings

Smart mobility

Sustainable and smart mobility



Electric vehicles



Electric cargo bikes

Healthy & affordable food

"Farm to fork" - a healthy and environmentally friendly food system



Passive cooling system to transport frozen goods



Transport refrigeration system for EV fleet

Biodiversity

Preserving and restoring ecosystems and biodiversity



Cold water soluble bioplastic from milk protein



Bio-packaging from sustainably-farmed seaweed

Sustainable finance

Sustainable finance and investment



Software to reduce and offset carbon footprint











Back and middle office software for renewable energy

European governments have developed extensive programmes for Industrial Tech startups to take advantage of.

Significant grant and support opportunities for (industrial) tech startups in Europe

 [click on the logos](#) to find out more on the **Implementing Institutions**

European Union						
	Horizon Europe (2021/2027)	Digital Europe Programme	Euratom Research and Training Programme	Programme for the Environment and Climate Action		BoostUp!
	€95.5B	€7.6B	€1.38B	€5.4B		n/a
EU + 14 partner countries		United Kingdom		Germany		
	Clusters Programme		Industrial Strategy Challenge Fund (public + private funds)		EXIST Business Startup Grants	
	n/a		£2.6B + £3B		n/a	
France		Sweden		The Netherlands		
	Industrial Strategy Challenge Fund (public + private funds)			Vehicle Strategic Research and Innovation (FFI) programmes		Dutch Future Fund, DeepTech Fund
	€3B+€2B (2020-2030)			€10M+/year		€500M
Austria		Switzerland				
	Various Programmes		Innosuisse	Various Programmes		
	n/a			n/a		

Explore the ecosystem industrial.dealroom.co

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The screenshot shows the homepage of the Industrial Tech ecosystem database. At the top, there is a search bar and a navigation menu. The main content area features a large banner with the title "Explore the Industrial Tech ecosystem" and three key statistics: 1,500 STARTUPS, 3,869 ROUNDS, and 11,905 JOBS. Below the banner, there are four columns of content: MANUFACTURING TECH, ADVANCED MATERIALS, INDUSTRIAL MARKETPLACES, and INDUSTRIAL ROBOTICS. Each column contains a list of relevant topics and reports. At the bottom, there is a "Latest Reports" section with three featured reports: "2021: the year of Deep Tech.", "Industrial innovation: the next big opportunity in tech.", and "The State of the Robotics Investment Landscape".

Industrial tech
Database by dealroom.co

Search for companies, investors, people, lists & innovations

Yoram Wijngaarde
Admin account

Home
Dashboard
Curated content
Startups & Scaleups
Jobs
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Funding rounds
Exits
New startups
Investment heatmap
Themes
Matching tool
Blog
Reports

Explore the Industrial Tech ecosystem

1,500 STARTUPS 3,869 ROUNDS 11,905 JOBS

MANUFACTURING TECH

- Connectivity & IoT for manufacturing
- Manufacturing tech
- Simulation & advanced engineering tools for manufacturing
- AR / VR for the factory floor
- Additive Manufacturing

ADVANCED MATERIALS

- Recent rounds in European advanced materials startups & scaleups
- Polymers and polymer alternatives
- Graphene
- Coatings, composites and ceramics

INDUSTRIAL MARKETPLACES

- Industrial marketplaces
- Recent rounds in European industrial tech marketplaces
- Shipping marketplaces

INDUSTRIAL ROBOTICS

- Industrial robotics
- Warehouse automation
- Facility inspection and maintenance
- Robot programming, training & call
- Manufacturing and assembly robots
- Construction robots

Latest Reports

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- 2021: the year of Deep Tech.** EURO PEAN START UPS
- Industrial innovation: the next big opportunity in tech.** Speedinvest | dealroom.co
- The State of the Robotics Investment Landscape** ODenSe | dealroom.co

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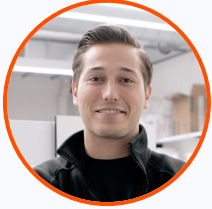
4 Full interviews

“ The appetite for sustainable industrial technologies has definitely gained momentum in the past few years, and we're especially amazed by the past few months.”



Grant Aarons
Co-Founder and CEO
at **FabricNano**





Grant Aarons
Co-Founder and CEO
at FabricNano

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What does DNA have to do with industrial chemicals?

There is a long history of DNA being used to "program" microbes for enhanced profitability in industrial scale biomanufacturing. Traditionally, these genetically modified organisms (GMOs) have been used to produce high-value chemicals, proteins and antibodies. Ginkgo Bioworks, Zymergen and Genentech are all examples of companies using DNA in just that way.

At FabricNano we want to challenge people to think of DNA not just as code, but as the smartest building material in the world. We weave DNA into fabrics to make highly ordered and spatially-addressable scaffolds for the assembly of enzymes to produce chemicals. So instead of reprogramming microbes, in our application, DNA is used almost like a silicon wafer where enzymes can be placed like transistors.

What impact can bioengineering have on industry and sustainability?

If it isn't glass, ceramic or wood, odds are the material you're using is derived from petroleum — if we want to make any of these petroleum chemicals using biology, we will need a cell-free bioreactor to produce substitute commodity chemicals sustainably. Industry needs to champion cell-free technology that can be easily deployed in existing packed bed flow reactors. Industry is quickly

adopting the cell-free implementation layer that FabricNano has built for flow reactors, but industry will increasingly rely on smart and ambitious engineers that can design entirely new chemical processes around these cell-free flow reactors. The opportunity for new bioengineering is vast, given the incredible reduction in downstream purification when using cell-free systems.

What kind of companies are you looking to work and partner with as you scale?

We're looking to partner with enzyme manufacturers and industry leaders in biochemistry (e.g. Novozymes, BASF, DSM, DuPont, etc.) who are eager to improve their reaction efficiency and meet their sustainability goals. All we need is a client familiar with the operation of a standard packed bed flow reactor, and we can then supply our drop-in powdered biocatalyst.

How have you seen the appetite for sustainable industrial technologies change in the last few years?

Momentum has surely gained in the past few years, but more than anything we're amazed by the past few months.

Lately it has started to seem that most major chemical manufacturers are interested in working with us on proof-of-concept biocatalysts for

commodity chemicals that have never been made before using biology. This is early early R&D work for processes that will take a couple of years to come to market, but they are not at all deterred. Their enthusiasm comes from their conviction that cell-free flow reactors are far easier to scale and far more efficient, and we couldn't agree more.

In terms of talent, what are the most challenging positions and skills to find?

As with any technical role, it's a challenge to find brilliant minds with the necessary expertise and grit to go after something so bold as to reinvent commodity chemical manufacturing. I am lucky to work with 22 such scientists, engineers and theoretical physicists and if all of the above sounds like your cup of tea, come find us on [FabricNano.com/careers](https://fabricnano.com/careers).

“What is good for our business and what is good for people and our planet need to and can go hand in hand – and that is and will be at the heart of everything we do.”



Jenny Bofinger-Schuster
SVP Sustainability &
Operational Excellence at **Siemens**





**Jenny
Bofinger-Schuster**
SVP Sustainability &
Operational Excellence at
Siemens

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What are the most important initiatives you're in at the moment related to climate and industrial innovation?

Back in September 2015, we became one of the world's first global industrial companies to announce our intention to achieve net zero in our operating business by 2030. We exceeded that interim goal in September 2020 and have already reduced our emissions by 54 percent.

And we're accelerating our sustainability approach with our new framework **DEGREE**.

Each letter in DEGREE represents an area where Siemens is committed to advancing sustainability and where we are giving ourselves measurable and specific long-term targets: Decarbonization, Ethics, Governance, Resource efficiency, Equity and Employability. This framework will apply to all activities across the company's businesses worldwide. Just take an example for Resource efficiency: by 2030, we plan 100% of all relevant product families at Siemens to be covered by a robust eco-design approach.

What's the motivation behind getting involved, is it to do with Corporate Social Responsibility, efficiency, or are you seeking potential new revenue streams?

For us at Siemens, innovation and sustainability really are deeply rooted in our DNA. From the very beginning when Siemens was founded, the company sought to solve societal and technological challenges – and successfully did so ever since.

Today, we are addressing one of the biggest challenges of our planet: reducing carbon emissions in all industries while sustaining sustainable growth, showing our customers and partners that these two can work perfectly together.

What is good for our business and what is good for people and our planet need to and can go hand in hand – and that is and will be at the heart of everything we do. For us at Siemens, promoting sustainability is not an option – it's a business imperative.

Which areas of industry and industrial processes do you generally think can be most impacted by innovation and startup solutions to become more sustainable?

Through digitalization we can truly connect the real and the digital world. We can bring physical solutions into virtual environments. We create their digital twins and simulate and test them starting already in the R&D phase. This connection can be established for almost all industries and customer solutions. This is a tremendous area to innovate and grow in almost infinite ways – and foster sustainability. Especially in the area of energy generation, we can create big improvements with technology that is already available today, be it with our storage solutions and which microgrids, for example. Creating energy supply, which is more decentralized, more digital and more flexible, with the aim of being able to use more renewable energies and, of course, to minimize energy losses. The next step is energy efficiency in industry, in buildings, and also in mobility, where you can already increase efficiency very significantly today. But it's also about digitization in particular. If you have a Digital Twin, for example, you can test virtually and save on materials and energy. That is just one example of the many possible applications.

What kinds of startups are you specifically looking to work with, and what parts of your journey to Net Zero do you think they can impact?

Every startup working in a similar area as Siemens, is welcome to connect with us – ranging from digital factories to smart infrastructures.

A first step for startups could be having a look into our new collaboration space – the Siemens Innovation Ecosystem, where we continuously provide concrete opportunities and needs to be solved in connection with our **Ecosystem partners**.

Here startups can find the connection to our supplier innovation channel that is always open for new and interesting solutions. One further example could be our Tech4Sustainability Challenge, which was launched in July. Here we formulated challenges where we sought help from students to jointly develop sustainable solutions. All individual challenges are very specific, but each solution is important and a step in the right direction to achieve our overall goal to live in a sustainable future.

Looking ahead, when engaging with startups, are you typically looking to partner, invest or acquire?

We have a very broad portfolio of collaboration opportunities. All these connections are possible, depending on the technology and partnership.



“ Working with startups has mutated from ‘nice to have’ for corporates to ‘must have’.



Franziska Bossart
Global Vice President at
ABB Technology Ventures



Franziska Bossart
Global Vice President at ABB
Technology Ventures

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How does ABB assess its impact on helping to prevent climate change? (operations vs. product portfolio)

ABB strives to cut emissions across our entire value chain: minimizing our own carbon footprint and increasing energy efficiency in our operations, reducing the impact of our supply chain and engaging customers by showing them how our technologies can reduce their GHG emissions. ABB has a clear measurement system that is tracking progress against set targets. ABBs 2020 target was to reduce its GHG emissions by 40% from a 2013 baseline, a goal which we have achieved a year ahead of schedule.

How will the goal to mitigate climate change direct the corporate strategy in the forthcoming decade?

In line with ABB's new operating model, our divisions are now fully accountable for their GHG performance. That being said, ABB has given a clear '2030 commitment' to a) support our customers in reducing their annual CO2 emissions by at least 100 megatonnes b) achieve carbon neutrality across our own operations and c) engage with our suppliers to extend our impact in reducing emissions across the entire supply chain.

In addition to enabling a low-carbon society, we've given an equally important commitment to preserve resources. It is important to say that while it is critical to continue reducing ABB's own GHG emissions, our leading technologies represent ABB's main contribution to the global effort to mitigate climate change. Many of ABB's products, services and solutions directly address the causes of climate change by facilitating increased energy efficiency, the integration of renewables into the energy mix, and the conservation of natural resources.

Having executed on different startup-collaboration structures in the past, which learnings can you share when working with startups in general?

Working with startups has mutated from 'nice to have' for corporates to 'must have'.

With an accelerated pace of change and innovation, corporates are not able to keep up on their own. It has become increasingly important for them to think carefully about their build, partner, buy strategy. Whereas previously, companies tended to 'build' most of their innovations in house in their R&D departments and the 'Not invented here syndrome' was widespread, a reckoning has taken place that the 'partner' and 'buy' elements have become equally important. That mindset change within the corporates has tilted the balance in favor of the startups and, in my view, led to an improved and closer collaboration with the startups.

Where can startups facilitate new approaches and support the innovation process in your industry to fight climate change?

Startups, especially well-funded ones, often have more disposable capital than R&D departments within large corporations. Whilst this may sound counterintuitive, startups can be better positioned than corporates to tackle high-risk, long-term innovations. Taking the example of the capital intense carbon capture and storage technology, where for example the Swiss startup Climeworks is leading in direct air capture or also in the area of new battery developer. An equally important contribution from startups is in the area of new business models, where we see for example battery swapping as an emerging trend in E-Mobility.

Looking at ABB's Venture Capital Arm, which areas of technology are of particular interest and how is ABB working with startups today?

ABB Technology Ventures is currently looking into three main areas: 1. The future of industry, which is covering Robotics, Industrial IoT and in general horizontal emerging technologies (such as AI solutions on the edge and in the cloud) applied to traditional industries. 2. The future of cities, buildings and homes and 3. The future of transportation, which is covering E-mobility on the road (ABB is a leading provider of EV chargers) and also in other sectors such as rail and shipping. The way ABB today works with startups is through three main channels.

Firstly, ABB's 21 fully accountable divisions work directly with startups. ABB being a truly global player with offices in every corner of this world, there is an uncountable number of local and global collaborations ongoing and these can and shall not be centrally orchestrated.

Secondly, we have ABB Technology Ventures and we have been in existence since 2010. With an active portfolio of close to 30 companies and \$250M of assets under management, we have been a leading player in the 'industrial tech ecosystem' over the past decade and hopefully will be also in the coming decade. Thirdly, we also have an internal innovation growth hub called Synerleap, where startups can sign up for membership and which is helping to connect startups to ABB internal divisions and other players.

“ Given that many clean technologies take around 20-25 years to go from lab to market, it’s crucial to prioritize innovation in less mature technologies. That’s why Breakthrough Energy is focusing on technologies like green hydrogen, long-duration energy storage, direct air capture, or sustainable aviation fuels.”



Ann Mettler
Vice President, Europe
at **Breakthrough Energy**





Ann Mettler
Vice-President, Europe
at Breakthrough Energy

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Why are dedicated impact or climate funds necessary?

To reach net zero emissions by 2050, we need to develop and massively scale up a suite of clean technologies – quickly. One of the biggest challenges these clean technologies face is that they are often such risky financial bets. That’s why it’s so critical to have patient, risk-tolerant capital that is primarily driven by potential climate impacts rather than short-term financial returns. In the case of Breakthrough Energy Ventures, that means only investing in companies with the potential to reduce the equivalent of one percent of global annual greenhouse gas emissions.

In which area or sector is innovation most needed?

According to the International Energy Agency, around fifty percent of the emission reductions needed to reach net-zero by mid-century will come from clean technologies that are currently in the demonstration or prototype phase. **Given that many clean technologies take around 20-25 years to go from lab to market, it’s crucial to prioritize innovation**

in less mature technologies. That’s why Breakthrough Energy is focusing on technologies like green hydrogen, long-duration energy storage, direct air capture, or sustainable aviation fuels.

You spent many years in the field of digital innovation. What do you see as the main differences between scaling a Climate Tech and a digital tech company?

Three differences immediately come to mind. First, the innovation cycle in Climate Tech is much longer. Take the example of solar. R&D began in the 1970s, but the technology only became cost competitive very recently. Second is the innovation itself. Digital tech companies create new, differentiated products that create or fill a novel need. In Climate Tech, product differentiation is limited. Green cement and carbon-intensive cement are basically the same product. The only big, palpable difference is the price, or what Bill Gates calls the “Green Premium”. And lastly, Climate Tech is much more capital intensive. Instead of a laptop, a code, or data, Climate Tech companies need costly equipment and lots of space. Their products can’t be developed in someone’s garage!

How can we best ensure the successful development of climate technologies in the coming decades?

If we are going to develop the climate technologies we need to get us to net-zero, there needs to be a focus on pursuing a portfolio of technology options across a range of sectors. There’s no silver bullet for wholesale decarbonization. And while some of these technologies will succeed it’s also important to be honest that at least some of them will fail. A portfolio approach is therefore critical to spread this risk and ensure that we develop and scale a range of the key technologies we need to reach our climate goals.



“ Industrial farming contributes 17% of global carbon emissions and leads to soil degradation, food waste and nutritional loss.”



Sudhanshu Sarronwala
Chief Impact Officer
at **Infarm**



**Sudhanshu
Sarronwala**
Chief Impact Officer
at Infarm

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Generally, what challenges do you see in agriculture to keep up with demand in the coming decade?

It's become increasingly clear that our current food system is unsustainable for the planet.

Industrial farming contributes 17% of global carbon emissions and leads to soil degradation, food waste and nutritional loss.

Current farming methods will not be able to produce enough to provide the growing urban population for fresh, nutritious produce. By some estimates, using traditional farming methods only in the future would require an extra planet's worth of resources to feed the seven billion people living in cities by 2050. Hence a new, sustainable form of farming is critical and necessary.

Why are startups crucial for fighting climate change and where does infarm's solution tackle the problem?

Start-ups and scale-ups like Infarm are laboratories for experimentation, innovation, and disruption. Infarm's founders, Erez and Guy Galonska and Osnat Michaeli are autodidacts and learned hydroponic growing on their own, experimenting in their living room in Berlin.

The willingness to boldly experiment and push the boundaries of vertical farming have enabled them to rapidly scale up in response to demand, building the world's largest cloud-connected farming network in the process. Infarm is now selling our fresh, affordable and nutritious produce in 11 countries on 3 continents. Infarm's produce is more sustainable than crops cultivated by industrial agriculture - and its business is targeting carbon neutrality. The company's farming method is up to 400 times more efficient than open farming. Infarm consumes 95%

less water, our crops travel significantly fewer food miles to consumers' plates - all in comparison with traditional agriculture. Additionally, the controlled environment systems use zero chemical pesticides. All of this means food is healthier, fresher and grown locally.

Has climate change changed in importance when talking to potential clients? How about investors?

In the past decade, sustainability and exposure to climate change-related risks have become a crucial aspect that VCs, institutional investors and others must take into consideration before backing a new company or business model. This change has been driven in large part by an increase in awareness regarding the climate impact of what we eat. Infarm's investors and retail partners recognize that anthropogenic climate change is becoming more of a focal point - and consumers are increasingly demanding healthier, locally grown and more sustainable food. From the beginning, our strategy has been to focus on cultivating strong partnerships with both retailers and ESG-oriented investors.

Infarm has built strong commercial partnerships with more than 30 of the world's leading food retailers in 11 countries on 3 continents.

Unlike other food producers which have been forced by circumstance to adapt and incorporate more sustainable processes, Infarm has made environmental sustainability a core focus from the very beginning and we are taking many steps towards carbon neutral food production.

Recently we have undertaken a life cycle assessment to understand our resource use and carbon emission, and we are also in the application and verification process to obtain B-Corp certification. We are currently using 90% green-certified energy in all of our production hubs, with a target to reach 100% by the end of 2022.

Where are you still experiencing a lot of friction - be it commercially, regulatory or around financing?

Vertical farming is a capital intensive business. There are significant upfront costs to building a farming network that provides efficiencies of scale in terms of both the data we collect from our cloud-connected farms to help improve operations and unit economics of the crops we grow. As our tech continuously improves, so does our efficiency and ability to scale - since 2018, we have reduced unit costs by 82% and improved yield by 240%.

Tell us about your vision for infarm in the long-term?

Infarm's ultimate ambition is to grow and expand our cloud-connected global farming network to serve every client in any geography and we've seen the demand exists. We're currently investing heavily in R&D, hardware infrastructure and crop science research to eventually be able to grow consumers' entire vegetable and fruit baskets. Our crop science team of scientists and researchers is working hard to expand our existing product portfolio of saleable crops. In the past 3 years alone we've gone from 4 to more than 75 varieties.

In commercial terms, by 2030 we aim to open cloud-connected growing centers in 100 locations, and expand to new geographies. The goal is to increase our square footage of growing capacity from 500k sq ft to over 2m sq ft.

