EUROPEAN STARTUPS

The **definitive data** behind the past, present and future of **European tech**

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EUROPEAN STARTUPS

Created by Dealroom and Sifted, and supported by the European Commission and European Parliament, European Startups is a two-year project aimed at facilitating informed conversation and collaboration among European tech ecosystem stakeholders, in order to take Europe's startup economy to the next level. At the centre of the joint venture is the European Startups database, a definitive platform providing macro-level trends and trusted insights for data-driven policymaking, complemented with investment-grade research and inclusive events.

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FOREWORD

EUROPEAN TECH MAKES LEAP ONTO LARGER STAGE

From tech underachiever to competitor, Europe has made great strides over the past few years. The continent now brings in the kind of money it used to lack, while building some impressive startup hubs in its national capitals. The gap between Silicon Valley and Europe is closing, when measured by startup formation and venture capital-backed cash outs (otherwise known as exits). Tech jobs are now appearing everywhere, to the extent that startups have become one of the leading job engines in Europe.

The big bucks are increasingly finding European companies, with funding rounds and valuations hitting record levels.

Our mission with this project was to dive into the data to figure out what's finally going right for the region, as well as the things that are still going wrong. We wanted to raise awareness of tech's upwards trajectory and instil a sense of urgency across the 27 EU member states, through powerful insights and narratives that highlight the strengths and address the weaknesses in a constructive manner.

We also aimed to support an informed two-way discussion between public and private sectors, to help facilitate insight-driven policy making and potentially direct EU funding decisions.

European Startups provides a trusted and easily accessible source of open access intelligence to fulfil that purpose.

WHAT THEY SAID ABOUT EUROPEAN STARTUPS

"The next big thing in tech can come from anywhere in Europe. This is truly an exciting time for European entrepreneurship. It's great to see this project come to life, mapping out European startups with great ideas, inspiring policymakers, entrepreneurs and innovation ecosystem stakeholders."

Eva Kaili, member of the European Parliament
and chair of the Panel for the Future of Science and Technology

"Policymaking without data is like driving blindfolded. Not ideal when you have a crisis that needs you to floor the gas pedal. EuropeanStartups.co comes at a time pro-startup governments will need it most."

Kat Borlongan, ex-director, La French Tech

"You need great data to properly understand, grow and benchmark startup ecosystems. Dealroom and Sifted have been laser focused on a city, regional, national and continental level, helping to shine a light on the amazing companies being developed in Europe as well as the increasingly robust and sophisticated ecosystems that support them."

Saul Klein, partner and cofounder, LocalGlobe

INTRODUCTION

EUROPE BATTLES ITS WAY INTO THE GLOBAL TECH RACE

Technology companies in Europe and around the world have been on a bit of a tear recently.

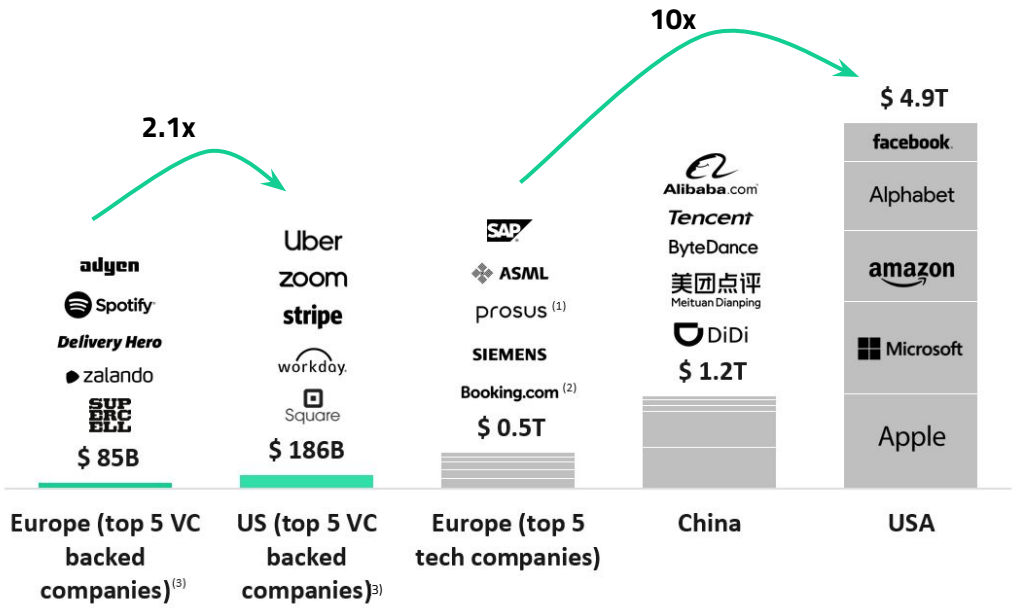
Covid-19 forced many businesses to go digital, and fast, in ways that could ultimately help them to thrive. Restaurants have invested in online sales and delivery, while education and car sales went online and doctors made the leap into telemedicine.

The influence of tech companies on how we communicated, worked, stayed entertained, not to mention shopped, also ballooned over the pandemic.

Europe's share of the tech money tree has grown accordingly. The fundraising gap between US and European tech persists — but it's narrowing for younger venture capital-backed companies.

The big five US tech companies — Facebook, Alphabet, Amazon, Microsoft and Apple — are collectively worth 10x their five most valuable European peers: SAP, ASML, Prosus, Siemens and Booking.com.

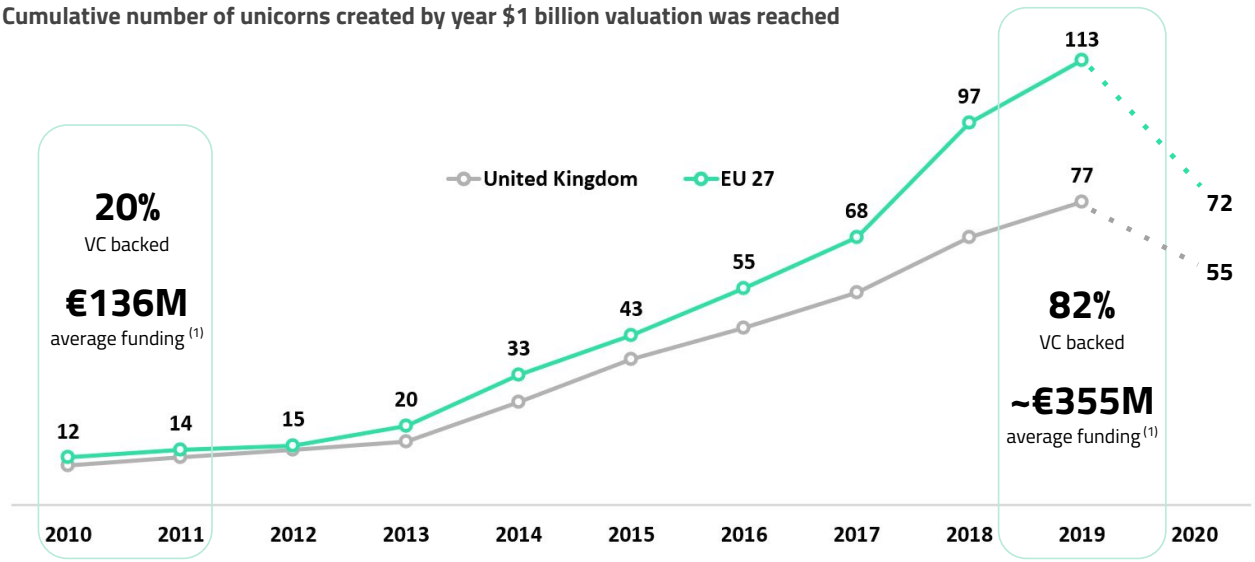
But perhaps American tech is not as invincible as it once seemed. The five biggest companies founded in the US since 2005 — Uber, Zoom, Stripe, Workday and Square — are worth just 2.2x the five biggest companies founded in Europe over the same period, which are Adyen, Spotify, Supercell, Delivery Hero and Zalando.



Valuation as 1st of March 2020.

1. South African company and most of its value is from Asian Tencent.
2. Acquired by Priceline (U.S.) in 2005.
3. Europe's most valuable VC backed starts founded since 2005 and the top most valuable USA VC backed companies from the same period.

Cumulative number of unicorns created by year $1 billion valuation was reached



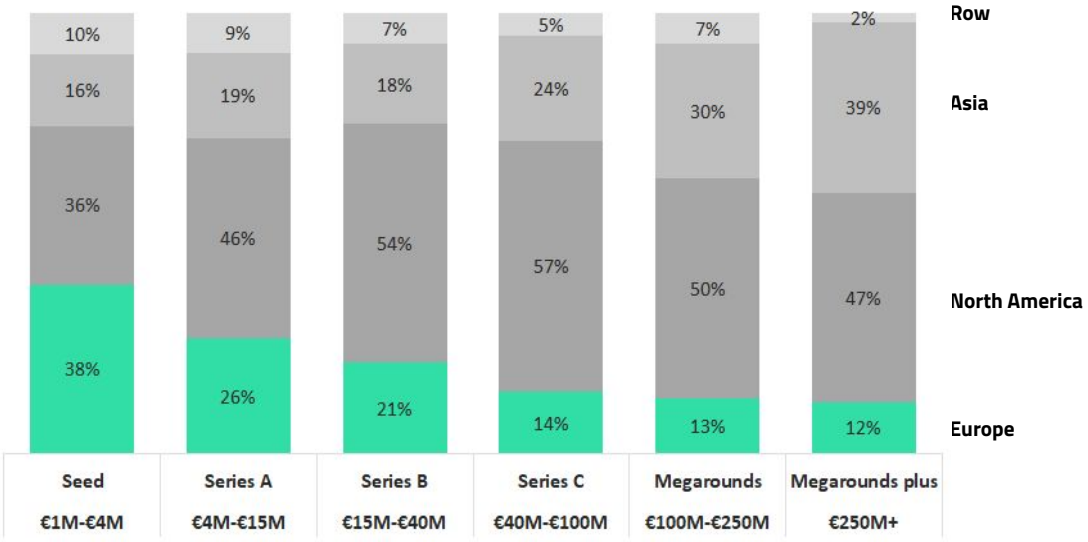
Illustratively assuming a 30% valuation decrease on average, the number would drop to around **72** unicorns in the EU 27 and to **55** unicorns in the UK. In reality, valuation changes will diverge: see next chapter.

1. Funding when reaching unicorn status.

To be sure, the continent is still playing catch up in the digital economy. But while there are only a handful of European consumer tech companies that can match the stratospheric market caps of America's Big Tech, European tech has been a quietly positive story over much of the last two decades.

Over that time we've seen the emergence of some 200 "unicorn" companies, valued at over $1bn. VC investment is now central to unicorn creation — today, 82% of these billion-euro behemoths are VC-backed, compared with just 20% a decade ago.

% investment in 2019 per round size and per region



Source: Dealroom.co
Note: the labels "Seed", "Series A" are standardised labels per Dealroom.co method, not the reported labels as they are not consistently applied.

BUILDING PIPELINES AND MOMENTUM

European tech is starting to attract larger shares of global VC.

In 2015, 11% of global venture capital was invested in European startups. By 2019, this had risen to 16%. European startups raised €39bn in 2019, compared with €116bn raised in North America and €66bn in Asia. In other words, North American VC investment today is 3x higher than in Europe, compared with 5x higher in 2015.

The jump in money available in Europe is partially the result of Chinese investment slipping, following a months-long regulatory crackdown on tech companies by the Chinese government. This slide provides a valuable lesson for Europe: it takes time to build an ecosystem, but quick gains can also be quickly lost.

When it comes to the number of VC rounds greater than €2m, Europe has also increased its share: in 2019, 26% of those rounds were raised by European startups, up from 18% in 2015.

Meanwhile, 38% of all global seed capital is being raised by European startups. Europe's share of total startup funding declines as rounds get bigger, which is unsurprising given Europe's startup ecosystem is younger than the American one.

FOREIGN INVESTORS EYE EUROPE

European startups are attracting greater interest from global funds. In 2019, 19% of funding rounds for European startups included an American investor, up from 7% in 2018 and 3% in 2013. American money, meanwhile, accounts for more than half of all funding invested in Central and Eastern Europe startups.

Japanese conglomerate SoftBank's venture fund accounted for roughly 6% of VC money flowing into European startups in 2019, with investments in companies including UK deeptech startup Kami, which develops language processing artificial intelligence, and Greensill, a finance company that was briefly one of the UK's most valuable startups (before filing for insolvency in March 2021).

Other significant global players are also firmly planting their flags. Temasek, the Singaporean state investment company, established a European advisory panel in 2016 to guide its dealmaking in the region, while Sequoia, an American VC firm with a track record that includes Apple, Google, PayPal, Dropbox, LinkedIn, Airbnb and WhatsApp, announced the opening of a London office in early 2021.

CENTRAL AND EASTERN EUROPE SEES GAINS, TOO

Tech spoils are not just going to the obvious European markets – the net has been cast wider. Startups from central and eastern Europe are now valued at more than €186bn, a 19-fold increase since 2010. Already in 2021 startups from the region have raised over €4bn in VC funding. If it continues at this pace, this year would see more than double the amount raised in 2019, the previous record high.

The success of companies like UiPath in Romania, InPost in Poland and GitLab in Ukraine, not to mention Baltic-founded unicorns like Wise, Skype, Bolt and now Vinted, have raised global awareness of central and eastern Europe as a startup hub.

> **"Startups from central and eastern Europe are now valued at more than €186bn, a 19-fold increase since 2010"**

The region now counts 34 unicorns, up from just six in 2015, with Poland topping the list (with eight), followed by Estonia (six) and the Czech Republic (four). The combined value of earlier stage startups has also grown significantly in recent years, to roughly €21bn.

Estonia, one of the smallest countries in the region, leads the whole of Europe when it comes to VC investment per capita, as well as startup creation — €1,967 per capita raised and one startup per 1,048 inhabitants — which won't come as a surprise to many of our readers.

COMING UP

This report condenses some of the highlights of a two-year deep dive into Europe's tech performance, charting the massive sums raised in competitive fields like deeptech, biotech and blockchain, along with the rise of "unicorn cities".

In Chapter I, we look at the growing bench of leading edge "deeptech" companies in Europe. Chapter II maps the giant sums of money spinning around European VC, while Chapter III spotlights startup investments made by big corporations. In Chapter IV, meanwhile, we delve into the growing ranks of unicorn cities in Europe, with Chapter V featuring insight from experts on our blockchain and crypto future and the leading role the EU could play in its development.

CHAPTER I

DIVING INTO THE DEEP END

We explore what deeptech actually is, how the sector works, how it can compete, what it's lacking, and what desirable policy goals might look like

The term deeptech invokes great excitement for some, scepticism for others, and sometimes both simultaneously.

Excitement because of areas like quantum computing, autonomous vehicles and protein folding solutions. In fact, AI alone could add another $13tn to the global economy over the next decade, according to management consultancy McKinsey. The potential value of nuclear fusion or curing cancer is hard to overstate.

Meanwhile, there's also scepticism, not about these innovations, but about the term "deeptech".

Firstly, it's rather vague. "For a startup to earn the deeptech label, there must be science or engineering risk in getting the idea to actually work and, assuming it does, risk in proving market demand for that product," says Nathan Benaich, founder and general partner of Air Street Capital. "If there is only one of these risks, but not both, then we're not talking about a deeptech startup."

Secondly, some argue that deeptech implies a too-narrow focus on technologies for their own sake, while losing sight of commercialisation and competitiveness. The EU is heavily investing in strengthening Europe's deeptech and blockchain ecosystem. But there is a worry that this effort is insufficiently supported by efforts to make Europe more competitive and entrepreneurial overall.

> **"Most investors find it hard to back businesses with product-market fit risk, yet that is what deeptech entails"**
>
> **Siraj Khaliq, partner at VC firm Atomico**

"Most investors find it hard to back businesses with product-market fit risk, yet that is what deeptech entails," says Siraj Khaliq, partner at VC firm Atomico. "This failure of imagination is costly: by not empowering bold entrepreneurs we're not 'productionising' the innovation needed to solve the critical, planet-scale problems facing all of us."

A PIVOTAL YEAR FOR DEEPTECH

Tech is entering a new era. The last decade has created $17tn of value on the Nasdaq index alone, mainly driven by enterprise cloud and consumer internet. In the decade we're now entering, tech's impact on our lives might become even more pronounced; major technological breakthroughs have been accumulating at an accelerating pace.

To name just a few recent milestones: in 2019, Google (with NASA) achieved "quantum supremacy", only to be topped by China by a factor of 10bn in 2020. The CRISPR-Cas9 genome editing technique was awarded the Nobel prize in 2020, with one of the companies that grew out of that effort, Crispr Therapeutics, seeing its market cap soar.

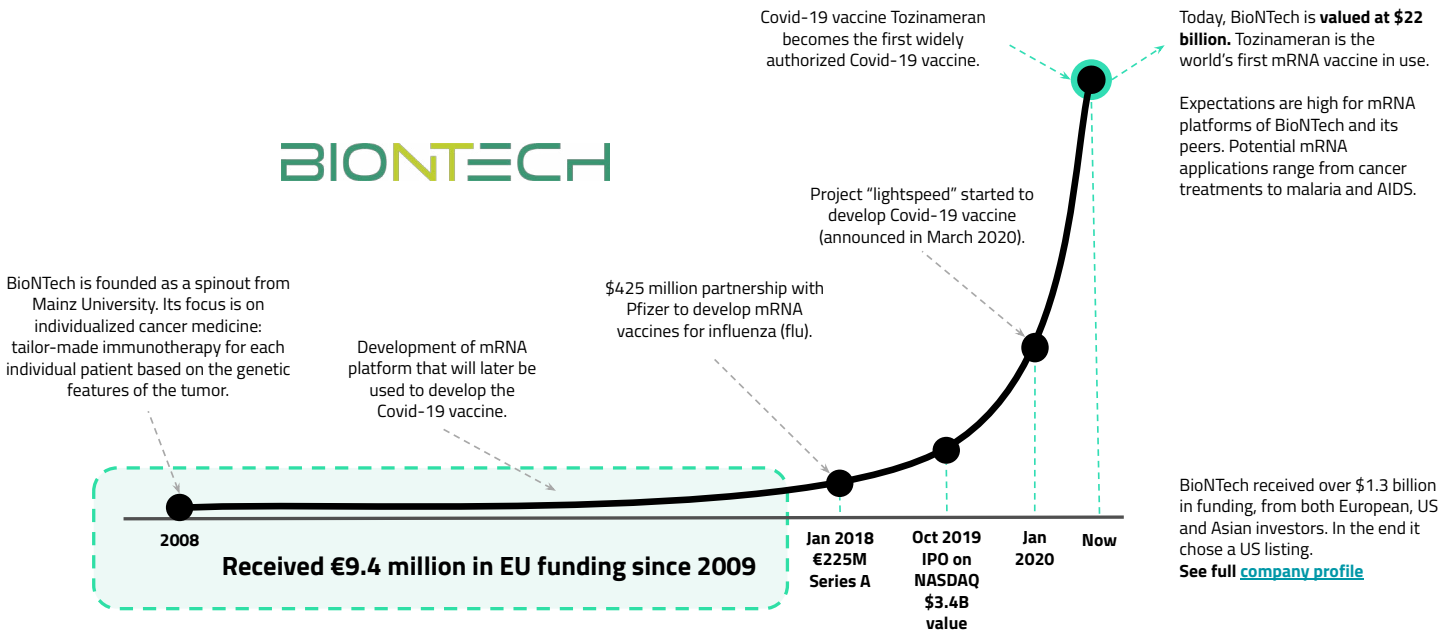
Alphabet-owned DeepMind solved a major protein folding challenge (AlphaFold), while its MuZero programme marked another milestone in self-learning AI (MuZero can teach itself to play Go, chess, and Atari games). OpenAI, a research institute backed by Silicon Valley luminaries including Elon Musk and Peter Thiel, released GPT-3, a language model that uses deep learning to produce human-like text. The list goes on.

While these examples might seem abstract to outsiders, deeptech has been making headlines too. The first ever mRNA-based vaccine was used to combat Covid-19, while the spectacular rocket launches and landings of SpaceX, Blue Origin and Virgin Galactic are also firing up the imagination. Deeptech is starting to become much more visible to a wider audience.

We can expect further breakthroughs in 2022, dominating headlines and becoming much more tangible by directly solving global, social and business challenges.

BIONTECH'S RISE

The success of German biotech firm BioNTech — which produced a Covid-19 vaccine in record time — not only demonstrates the importance of long-term R&D, but also the role of governments in backing breakthrough innovation.



Notable Deep Tech companies founded since 2000

BIONTECH
€20B valuation
Biotech

UiPath
€9.3B valuation
Robotic process automation

CRISPR THERAPEUTICS
€9.5B valuation
DNA sequencing

ARRIVAL
€3.0B valuation
Automotive

GRAPHCORE
€1.8B valuation
Semiconductors

NANOPORE
€2.0B valuation
Semiconductors

mindmaze
€1B valuation
Neuroscience and digital therapeutics

babylon
€1.8B valuation
Health platform

Benevolent
€1B valuation
Biotech

IMPROBABLE
€1.8B valuation
Game development platform

DARKTRACE
€1.5B valuation
Enterprise cybersecurity

blueprism
€1.8B valuation
Robotic process automation

LILIUM
€1B valuation
Flying vehicles

CMR SURGICAL
€1B valuation
Minimally invasive surgery robots

celonis
€2.3B valuation
Robotic process automation

Notable Deep Tech companies founded before 2000

ASML
€162B valuation
Semiconductors

NXP
€45B valuation *
Semiconductors

arm
€44B valuation **
Semiconductors

SIEMENS Healthineers
€46B valuation
Medical devices

PHILIPS Healthcare
€44B valuation
Medical devices

ERICSSON
€34B valuation
Telecommunications

NOKIA
€18B valuation
Telecom

life.augmentec
€28B valuation
Semiconductors

HEXAGON
€28B valuation
Geospatial apps

Infineon
€42.3B valuation
Semiconductors

HEPTAGON
€1.8B valuation
Semiconductors

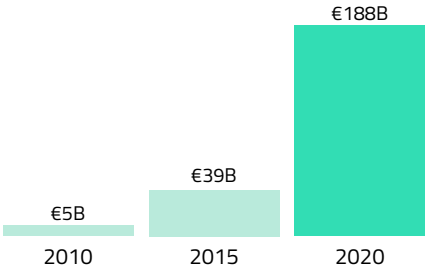
soitec
€5.0B valuation
Semiconductors

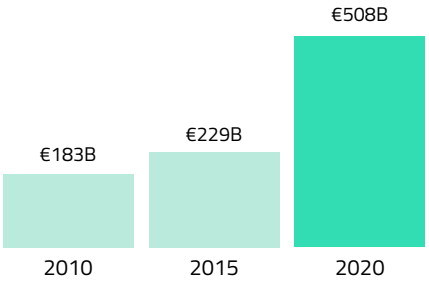
abcam
€3.4B valuation
Biotechnology

* NXP was close to being acquired by Qualcomm.

** ARM is about to be acquired by Nvidia.

Combined value of European-founded Deep Tech companies is nearly €700 billion and growing





NOTABLE DEEPTECH COMPANIES FOUNDED SINCE 2000

London-based Improbable, in its early days, had to solve hard technical problems around distributed computing. It has since matured into a games software infrastructure company and studio.

Another UK-based company, Darktrace, developed foundational unsupervised learning methods for network security in its early days. Once it had proven success and return on investment (ROI) with early customers, it earned trust, built its brand equity and scaled from there.

Romania's UiPath, meanwhile, is a global market leader in robotic process automation (RPA) and a flagship European example of successfully commercialised enterprise automation. Today, the ROI potential appears so significant that robotic automation has become a must-have for industry.

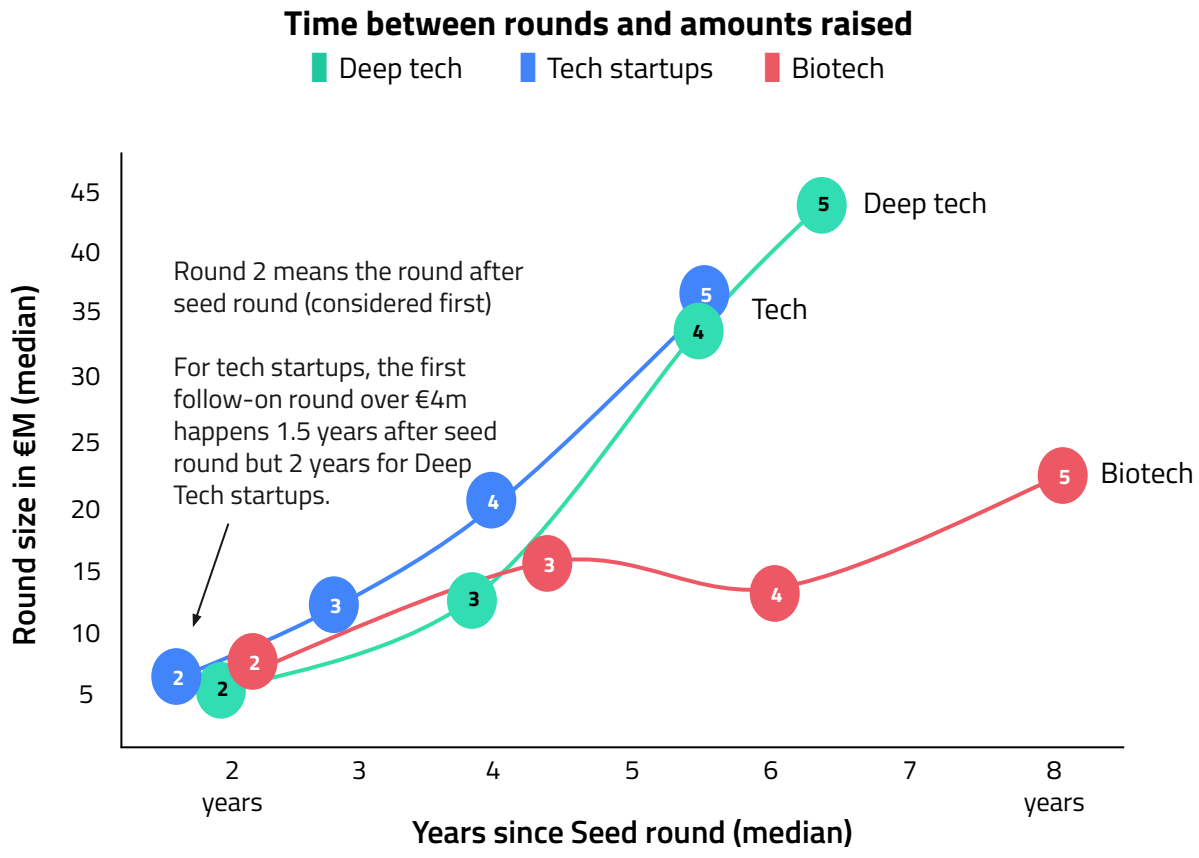
Company	Category	University	Grants	VC funding
BIONTECH	Biotech	Mainz	European H2020 programs	€1.3b
onfido	Identity verification	Oxford	Eurostars SME Programme, Tech Nation	€192m
Aledia	Light-emitting diodes	CEA	European Innovation Council (EIC)	€171m
ICEYE	Satellites	Aalto	European Commission, Eurostars SME Programme	€123m
climeworks	Carbon sequestration	ETH Zurich	Eurostars SME Programme	€114m
XMOS	Edge AI chips	Bristol	EIC	€102m
Exscientia	AI-based drug discovery	Dundee	Bill & Melinda Gates Foundation	€96m
IQM	Quantum computing	Aalto	EIC	€68m
MAGAZINO	Intralogistics robots	TUM	EXIST	€41m
KALRAY	Intelligent microprocessors	CEA	Eurostars SME Programme	€34m
oxbotica	Autonomous vehicle software	Oxford	Innovate UK	€70m
wingtra	Professional drones	ETH Zurich	EIC	€27mp
ULTROMICS	AI-based diagnostics	Oxford	Government of the UK, NIHR	€24m
paragraf	Graphene-based electronics	Cambridge	ERDF	€23m
Recycling Technologies	Plastic recycling	Warwick	EIC, UKRI	€20m
river lane	Quantum computing	Cambridge	Government of the UK	€4m
vaccitech	Biotech (Oxford's Covid vaccine)	Oxford	UKRI	€43m
ONi	Super resolution microscopes	Oxford	n/a	€27m

ACADEMIC ROOTS

Many of Europe's top deeptech companies have their roots in academia and drew early support from government grants.

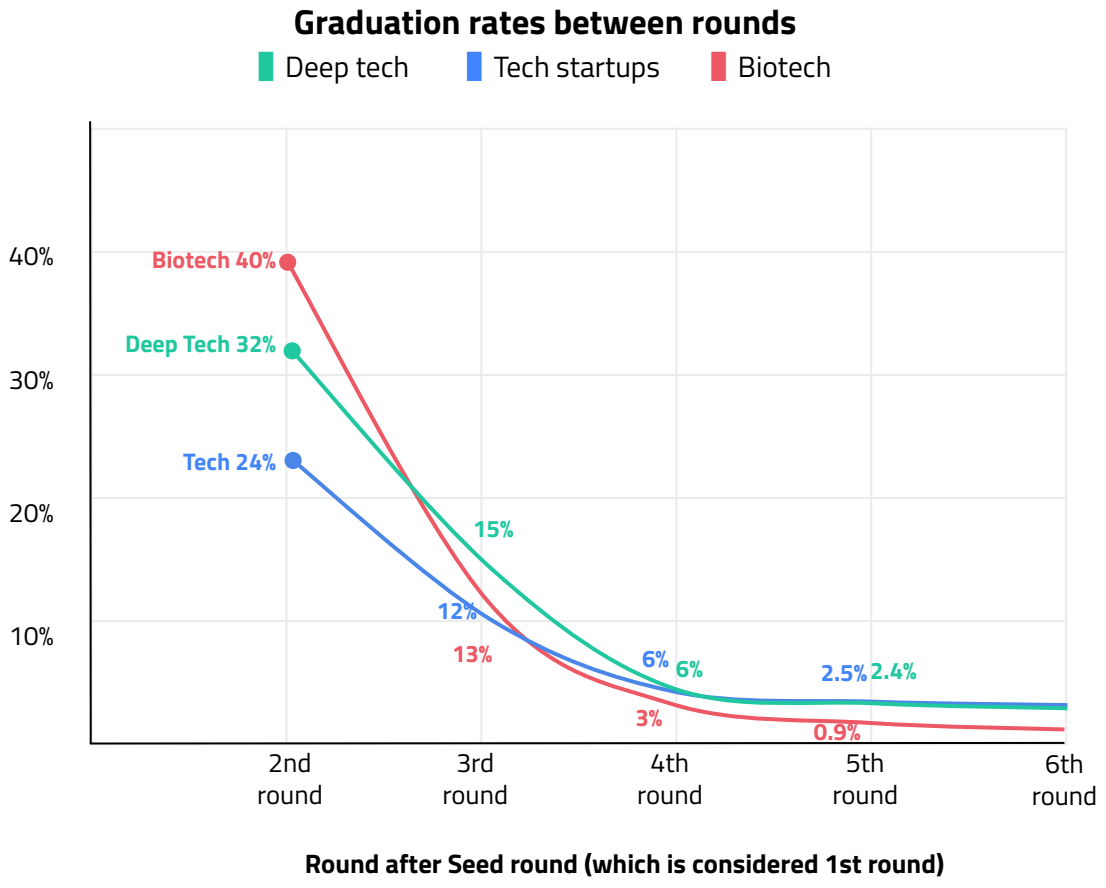
IT TAKES (A BIT) MORE TIME AND CAPITAL TO BUILD A DEEPTECH STARTUP

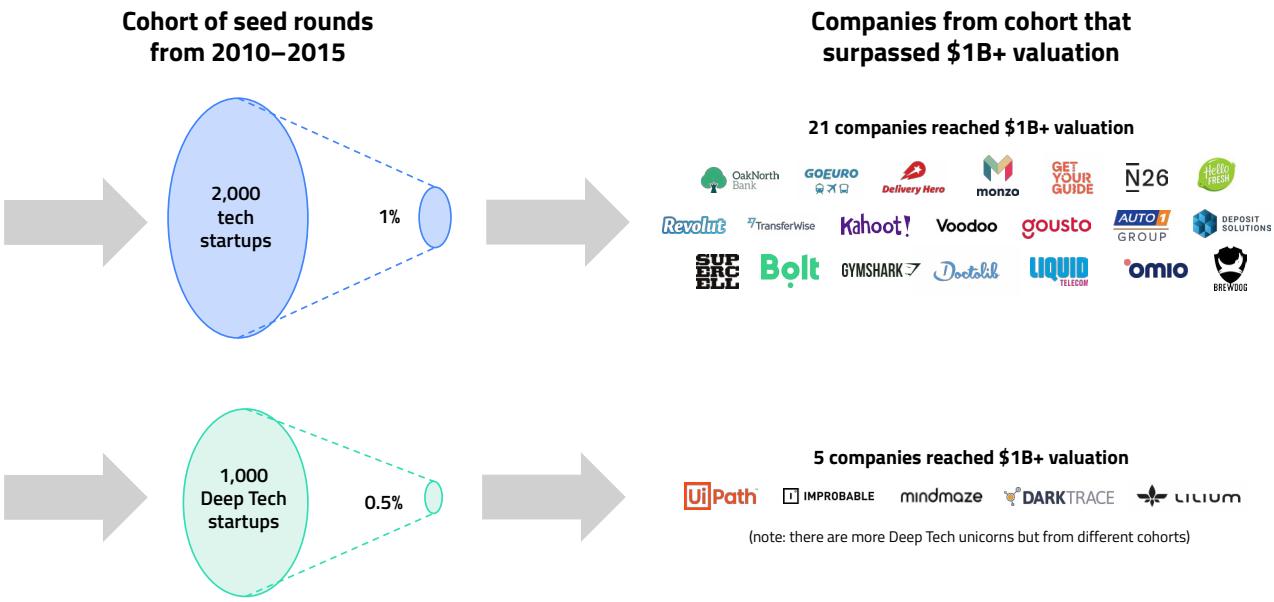
In our research, we narrowed down our list of European startups to those that raised a seed round of >€200k between 2010 and 2015, and closed a second round of at least €4m. This left us with 1,700 startups across a range of fields. We were intentionally restrictive to ensure we only looked at companies that had potential and were growing. The result was a clean, high-quality dataset.



GRADUATION RATES OF DEEPTECH STARTUPS ARE HIGHER INITIALLY, BUT THEN FALL IN LINE WITH THE BROADER MARKET

The same 1,700 startups were analysed to compare graduation rates — the percentage of startups with a seed round that successfully raised a subsequent round. Again, we included only startups that had a first round after seed of at least €4m. Across Europe, 24% of startups with a seed round made it to the next round; for deeptech, nearly 32% made it.





SIMILAR PROBABILITY OF CASHING OUT

Deeptech companies have the same or even higher probabilities of exiting than regular startups. New technology is an attractive bolt-on acquisition for companies with existing large datasets and/or huge amounts of money, and there have been several notable deeptech exits in Europe already.

Some of these exits may have been painful to watch for governments. And yet, the temptation to block acquisitions in this space is probably best resisted: it would only discourage entrepreneurs (and VCs).

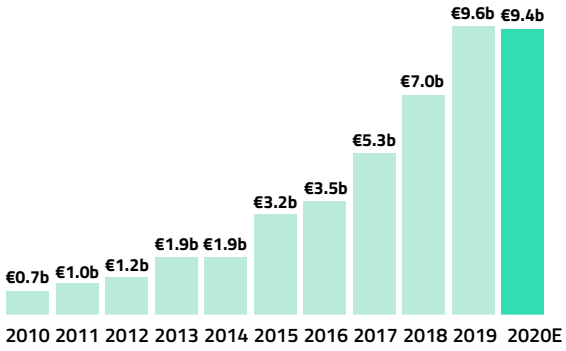
Europe should aim to be the continent to attract the next Elon Musk or Satya Nadella. Better to address the root causes of "premature exits" such as a lack of late-stage growth capital (more on this later in the report).

So far, a relatively small proportion of deeptech startups have reached $1bn+ valuations. But it's also a young ecosystem.

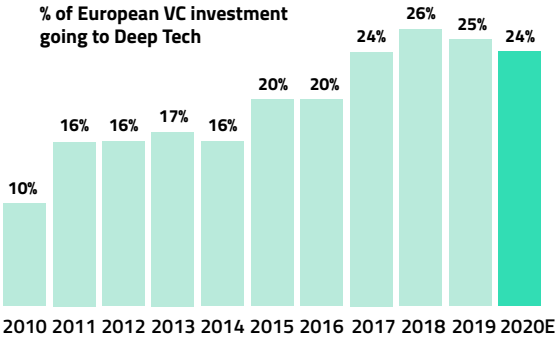
Notable Deep Tech investors by capital deployed in Europe (random order).

atomico PsiQuantum (US), Lilium, Graphcore, Varjo, Arculus	LAKE STAR Isar Aerospace, FiveAI, Auterion, Eigen Technologies, Soul Machines (US), Terra Quantum	Draper Esprit UiPath, Graphcore, Movidius, ICEYE, Ledger, Endomag	Balderton. capital Darktrace, Sophia Genetics, Infarm, Healx, Tessian, ComplyAdvantage, Cleo, Rahko, The Curious AI Company, Furhat Robotics
TEMASEK BioNTech, BenevolentAI, Improbable, SenseTime (China), Magic Leap (US)	EQT VENTURES Varjo, Cleo, Cytora, Wandelbots, Einide, Riskmethods	LocalGlobe Improbable, Tessian, Cleo, Streetbees, Signal AI, Faculty	Index Ventures Collibra, Comply Advantage, Aurora (US), Scale (US), Behavox (US), Kayrros
bpifrance Kineis, Carmat, Aledia, Bioserenity, Owkin, Balyo	Amadeus Capital Partners Improbable, Graphcore, Healx, Five AI, XMOS, Paragraf	idinvest PARTNERS Sophia Genetics, Onfido, Bioserenity, Kaia Health, WeRide.ai (China)	SoftBank Improbable, Energy Vault, Roivant Sciences (US), Cruise (US), Nuro (US), View (US)
octopus ventures Quantum Motion, Altitude Angel, WaveOptics, Ori Biotech, Phoelex, AudioTelligence, Swiftkey, Rangespan, Evi, Magic Pony, UltraSoC, Zynstra	BAILLIE GIFFORD Northvolt, Graphcore, Lilium, Aurora (US)	PRIMEVENTURES AImotive, CybelAngel, Intrinsic ID, Ipdia	HV CAPITAL Isar Aerospace, Vaha, Verbit (US)

Venture capital investment in European Deep Tech companies



% of European VC investment going to Deep Tech



WITH €10BN ANNUAL INVESTMENT, DEEPTECH ACCOUNTS FOR A QUARTER OF EUROPEAN VC MONEY

EXAMPLES OF VC-BACKED DEEPTECH CATEGORIES AND COMPANIES

Robotics

EXOTEC
Industrial

CMR SURGICAL
Medical

naïo technologies
Agricultural

Karakuri
Restaurant & kitchen

robo wunderkind
Gaming, educational & companion robots

E/NRIDE
Autonomous ground vehicles

VOLOCOPTER
Autonomous flying cars

MANNA
Drones

Auterion
Drone software

FIVE
Autonomous vehicle software

Semiconductors

GRAPHCORE
Processing units for machine intelligence

PROPHESEE
Neuromorphic vision systems

NOVELDA
Sensors for AI-based applications

SCINTIL PHOTONICS
Photonic integrated circuits

TOPOSENS
3D ultrasound sensors

Energy

Tokamak Energy
Fusion energy

McPhy
Hydrogen

SEABORG
Nuclear fission

climeworks
Carbon capture

SKELETON TECHNOLOGIES
Ultracapacitors

Highview Power
Liquid-air energy storage

northvolt
Green battery cells & systems

Advanced materials

Paragraf
Graphene

nanoker
Ceramics

ECONIC
Renewable polymers

Xampla
Plant-based plastic alternatives

ONS
Coatings

parx materials
Antimicrobial plastics

Basilisk
Self-healing concrete

AI-first enterprise software

UiPath
Robotic process automation

DARKTRACE
Cybersecurity

NAVVIS
Simulation & digital twins

KONUX
Predictive maintenance

EigenTechnologies
NLP-based decisions for complex documents

IMPROBABLE
Cloud-based game development platform

SCANDIT
Computer vision & cognitive video automation

TRACTABLE
AI for accident & disaster recovery

AI-first life sciences

healx
Drug discovery & development

OWKIN
Datasets analysis & molecular modelling

IRIS.AI
Analysis on research databases

inato
Clinical trials

LabGenius
Protein engineering

KHEIRON
Medical imaging & diagnostics

babylon
Symptom checker for triage & pre-diagnosis

HUMA
Remote monitoring

kaia health
Digital therapeutics

Space tech

ICEYE
Satellites

Orbital launch vehicles

exotrail
Space propulsion

CISLUNAR INDUSTRIES
Space debris removal

LEAFSPACE
Ground stations

ANYWAVES
Space software

OXFORD SPACE SYSTEMS
Antennas for space use

SATLANTIS
Satellite payloads

SPACE
Space telescopes

Quantum tech

IQM
Computers

Cambridge Quantum Computing
Software

nu QUANTUM
Security

qnami
Sensing

Hafnium Labs
Chemistry

HQS QUANTUM SIMULATIONS
Simulations

QUANDELA
Photonics

kiutra
Cryogenic refrigeration

Various quantum applications

Blockchain

Ledger
Security & infrastructure

bitpanda
Web-based platforms for crypto transactions

SIRIN LABS
Cold storage wallets

ELLIPTIC
Crypto compliance

flipsidecrypto
Business intelligence

SÖGUR
Cryptocurrencies

RADIX
Decentralized finance protocols

HOW TO FOSTER DEEPTECH

European deeptech companies are worth a combined €700bn. Many had their roots in academia, and drew early support from governments in the form of research grants.

"The continent's breadth of scientific research makes it an ideal place to build companies that straddle disciplines — machine learning applied to life sciences, or quantum applied to material sciences, for example. As a result, Europe is home to many of the most interesting deeptech companies in the world, and we expect the opportunities for investment to continue to increase," says Suranga Chandratillake, general partner at Balderton Capital.

> **"Europe is home to many of the most interesting deeptech companies in the world"**
>
> **Suranga Chandratillake, general partner at Balderton Capital**

Belgium, Finland and Norway have the highest concentration of deeptech investment in the 27 EU member states, relative to overall VC investment. Germany (Berlin and Munich) and France (Paris) lead by absolute investment size.

Yet there's a lot more potential to be unlocked. Europe's universities and research facilities are world class. The market gap with China and the US can be closed by focusing more effort on developing an entrepreneurial culture on campuses, upskilling first-time academic entrepreneurs and tech transfer officers, and offering spinout companies simpler and faster deals.

"When it comes to early stage government funding, Finland and Sweden are probably best-in-class," says Rodolfo Rosini, CEO of Undead, an early stage AI company. "[They combine] speed and minimal bureaucracy, and [achieve] some of the best outcomes as a result. EU countries should take a close look at what works there, learn from it, and replicate it."

> **"When it comes to early stage government funding, Finland and Sweden are probably best-in-class"**
>
> **Rodolfo Rosini, CEO of Undead**

Success stories like BioNTech demonstrate the importance of early support from governments and universities. Meanwhile, Europe could further benefit from replicating the large-scale, long-term R&D approaches that have worked in the US — such as DARPA, the Pentagon arm that helped spawn the internet and stealth aircraft — and China, to ensure tech leadership in areas that are going to become important from 2030 onwards.

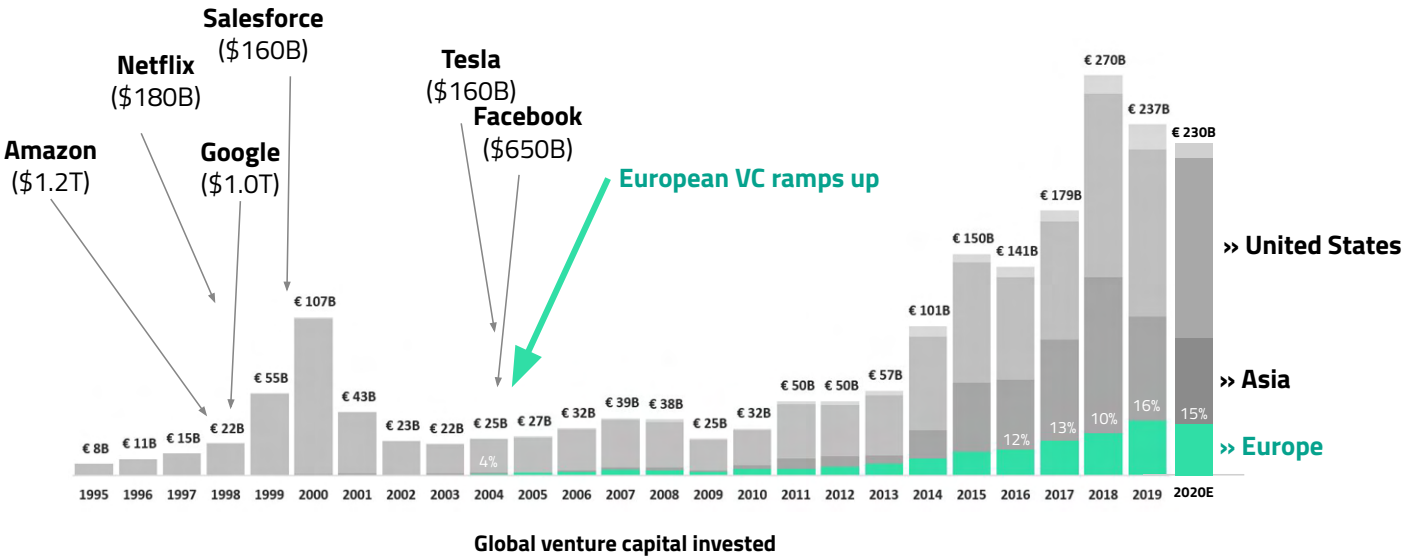
CHAPTER II

CAN EUROPE BECOME AN INNOVATION PACE-SETTER?

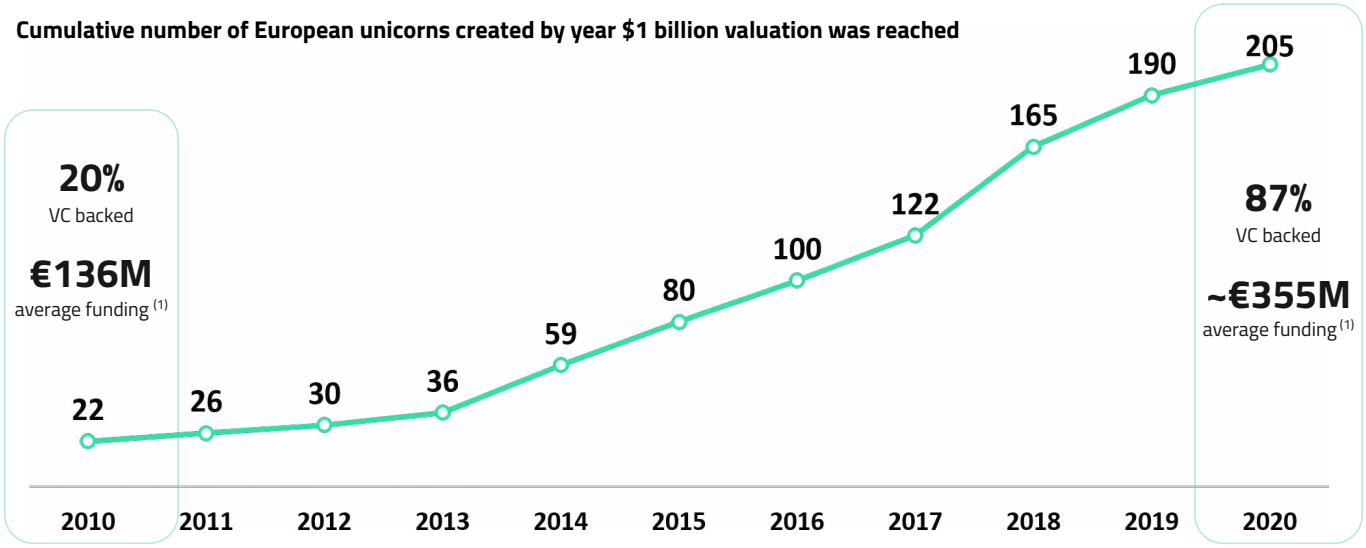
The region is shedding its tech laggard label — but still faces the challenge of raising large volumes of money

SINCE 2005, EUROPEAN VC HAS STARTED TO RAMP UP

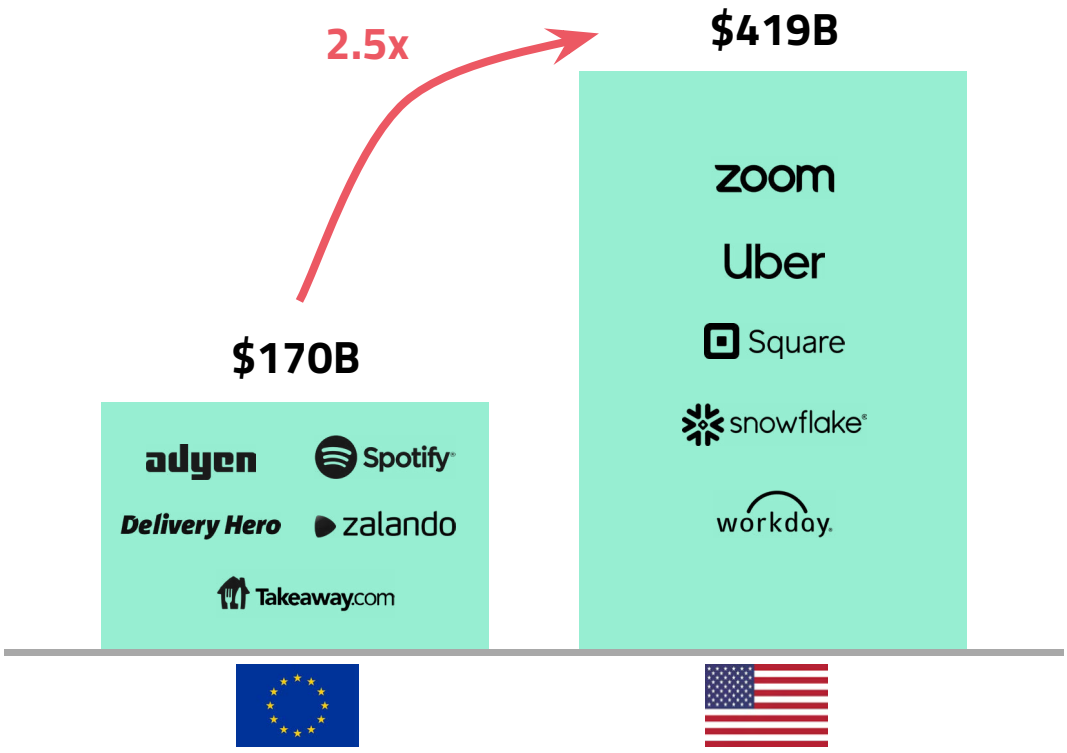
Success breeds success. As the investment scene in Europe grew hotter, the unicorns inevitably followed.



Global venture capital invested



EUROPE HAS CREATED OVER 200 UNICORNS, MOSTLY VC-BACKED



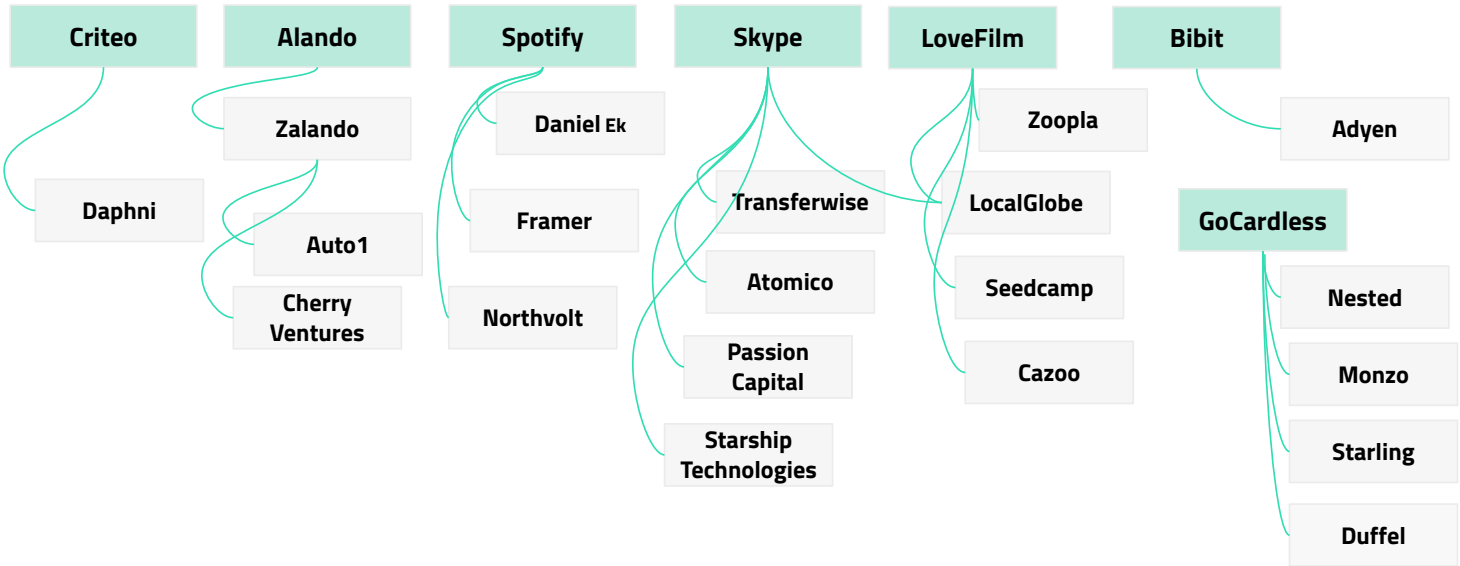
TOP 5
MOST VALUABLE
VC-BACKED COMPANIES*
SINCE 2005

*Top 5 at time of analysis (October 2020)

SNOWBALL EFFECT IS IN FULL FORCE IN EUROPE

Europe's progress in tech — from biotech to cleantech to fintech — has opened opportunities for more people to invent on the digital frontier. For some, working at Europe's biggest tech companies has been a stepping stone for wider career ambitions. That includes the emergence of several tech "mafias": employees from successful companies like Skype, Wise and Monzo who have gone on to launch startups themselves.

In 2018, Adyen, Spotify and Farfetch all listed, marking a watershed moment for the European tech sector. Europe now has a handful of global tech giants and the alumni from those are driving the next generation of companies across the continent, whether by starting new companies or investing in existing ones.

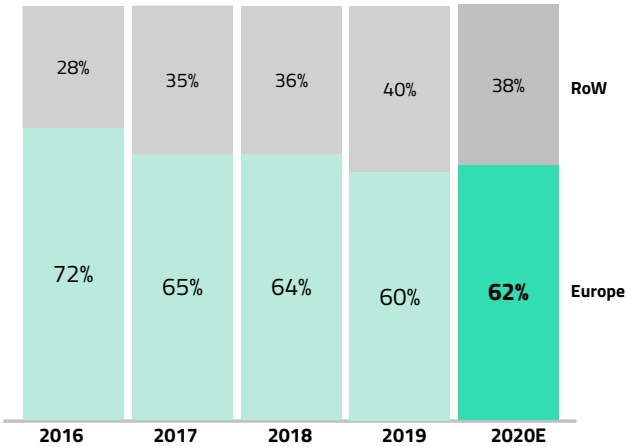


FOREIGN INVESTORS ARE STILL KEY TO EUROPEAN STARTUPS

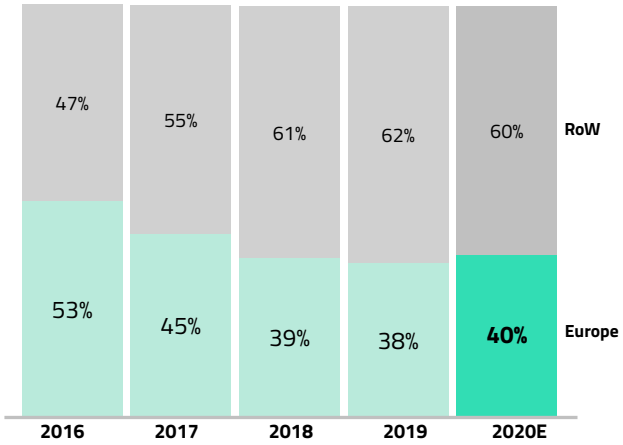
On the money side, foreign backers still play a vital role in the growth of European startups — and are particularly visible in the later and larger fundraising rounds.

For funding rounds beyond Series B, startups generally have to look to investors outside Europe. In 2019, European VCs raised €13bn out of €38bn invested in European startups overall, with the difference coming from foreign investors.

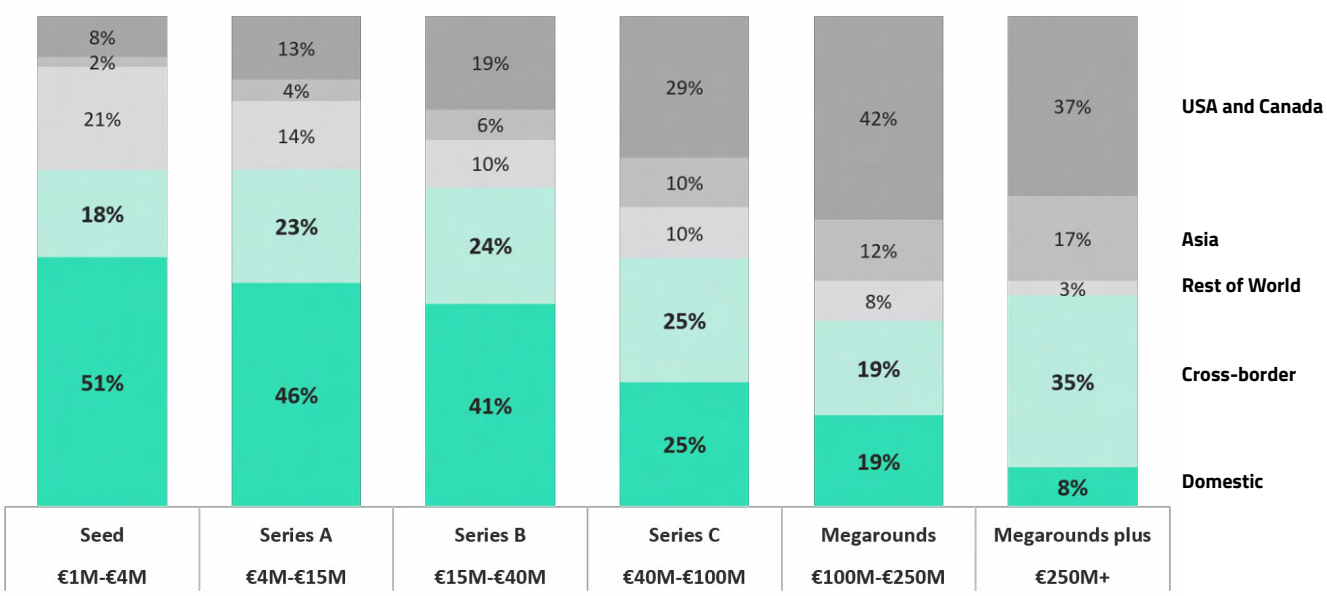
% of total VC investment into Europe, total VC



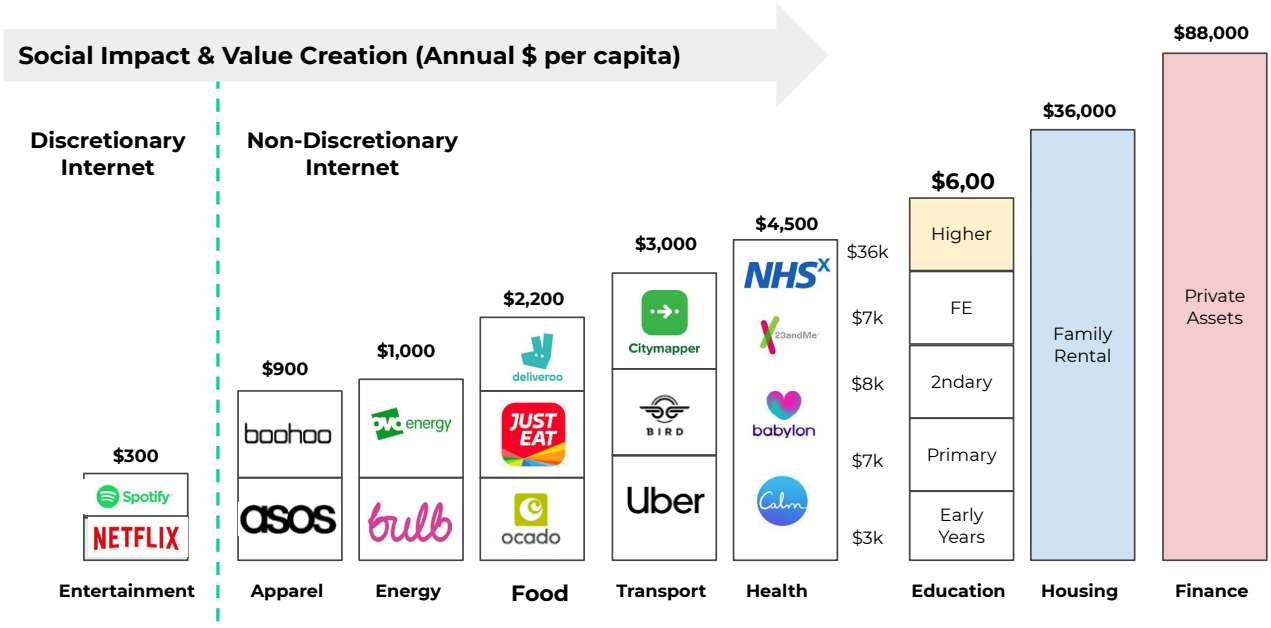
% of total VC investment into Europe, for rounds larger than €100M



% of European investment in 2019-2020 by source and size



EUROPEAN VC INVESTORS ARE LESS INVOLVED IN LARGER ROUNDS



BIGGER TECH COMPANIES WILL BE BUILT IN THE COMING YEARS, NEEDING MORE FUNDING

CHAPTER III

HOW DEEP-POCKETED CORPORATIONS ARE HELPING TO REDRAW THE STARTUP MAP

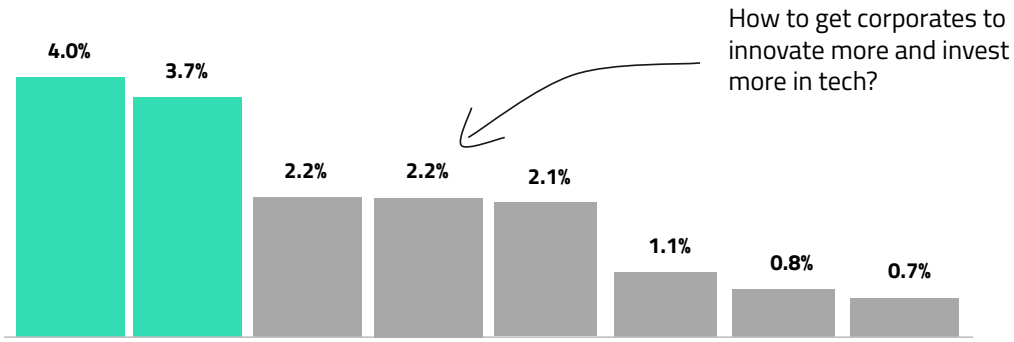
Corporate firepower is a big source of backing for entrepreneurs in Europe

EUROPE'S BIG CORPORATE R&D BUDGETS ARE CONCENTRATED AROUND PHARMA, AUTOMOTIVE AND TELECOMS.

THE US DOMINATES WHEN IT COMES TO INTERNET, SOFTWARE AND ELECTRONIC HARDWARE

Corporate R&D spend in 2018 ($ billions)	United States	EU-27	Japan	China	South Korea	United Kingdom	
Internet, software, hardware (Google, Apple, FB, Amazon, Samsung)	114	9	9	15	17	1	Dominated by USA big tech. These are domains where money is spent on futuristic moonshots.
Semiconductors (Intel, NXP)	39	5	3	1	2	0	
Biotech (Celgene, Abbvie, Gilead, Amgen)	35	4	0	0	0	0	
Pharma (Roche, J&J, Merck)	40	42	13	1	0	12	Europe has strong position in Pharma and Automotive.
Automotive (Volkswagen, Toyota, Ford)	19	46	39	6	4	4	
Telecom (NTT, Nokia, Eriksson)	13	16	2	3	0	1	
Oil & Gas (PetroChina, Exxon, Shell)	1	3	0	3	0	0	Very low R&D spending. And 90% of that low spending goes to fossil fuels. Opportunity to grow?

Spending on IT as % of GDP (2018)



	US	UK	Germany	France	Japan	South Korea	India	China
IT spending ($B)	$830B	$105B	$89B	$61B	$104B	$18B	$22B	$88B
GDP ($B)	$20T	$2.8T	$4T	$2.7T	$5.0T	$1.6T	$2.7T	$13T

US AND UK CORPORATES ARE SPENDING THE MOST

Active US-based corporations in Europe include GV, Google's venturing arm, and Salesforce Ventures.

Tech

Automotive

Aerospace

Chemical

Health and pharma

Consumer goods

Energy

Finance

Insurance

Marittime

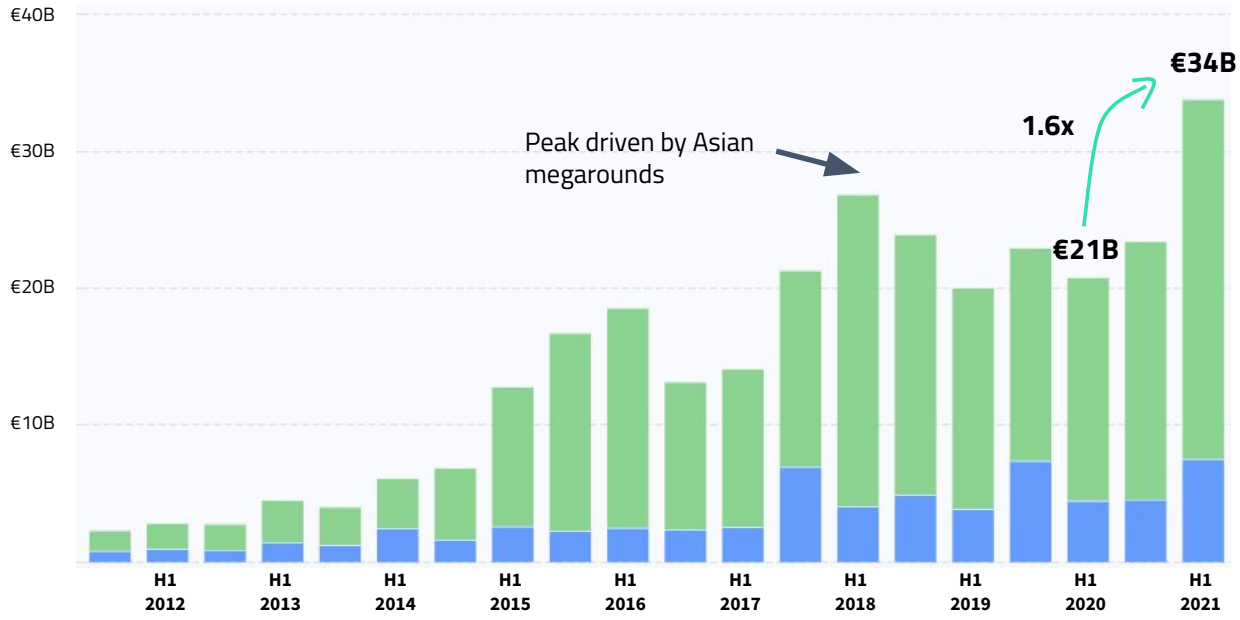
Telco

CORPORATE VCS ARE ACTIVE IN NEARLY EVERY INDUSTRY

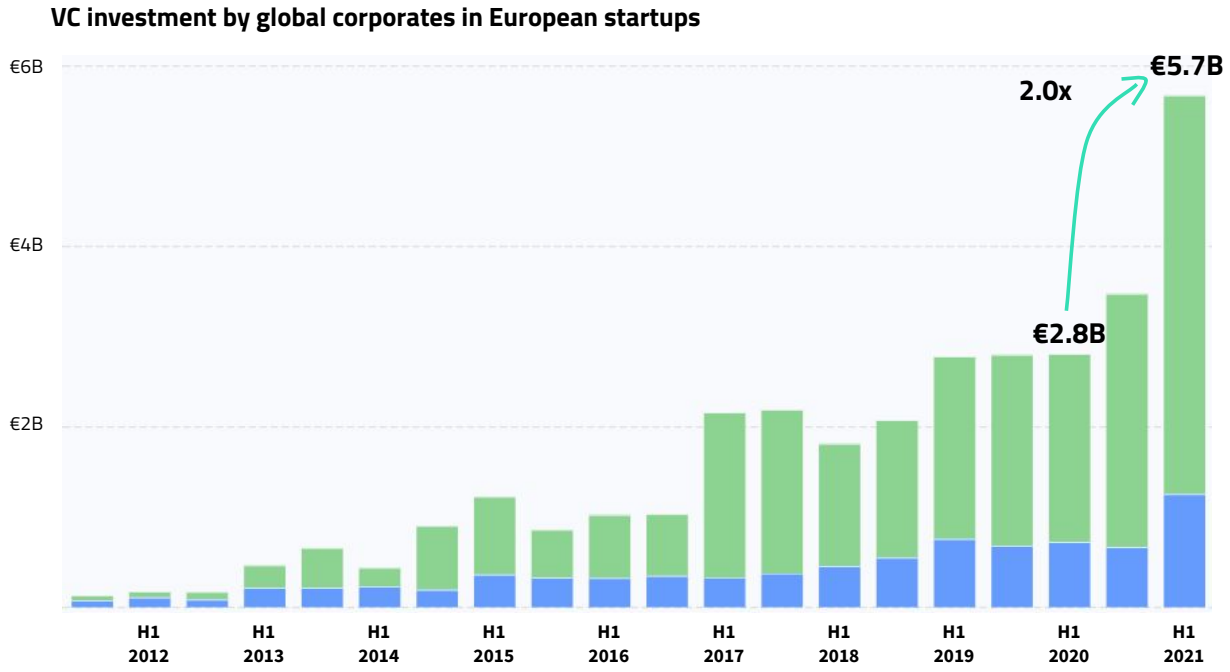
CVC accounted for nearly a quarter of all VC funding in Europe in the first quarter of 2021. Spanish bank Bankinter, SEB Ventures, the investment arm of Swedish bank SEB, and Shell Ventures were among the most active European corporate investors.

VC INVESTMENT BY CORPORATES IS ON TRACK TO REACH AN ALL-TIME-HIGH IN 2021

Global VC investment by corporates



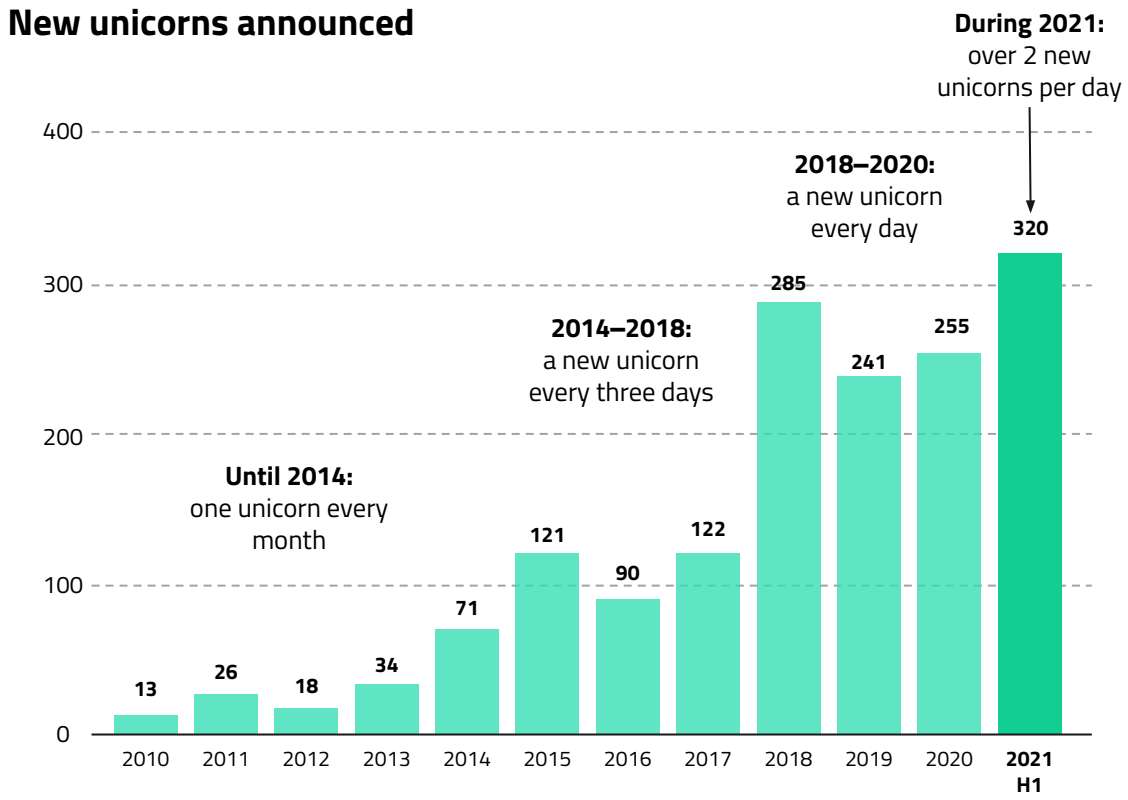
GLOBAL CORPORATES ARE INCREASINGLY INVESTING IN EUROPEAN STARTUPS



CHAPTER IV

EUROPE'S CITIES ARE TAPPING THEIR INNER SILICON VALLEYS

The region is now home to the largest number of "unicorn" cities in the world



OVER TWO NEW UNICORNS WERE ANNOUNCED EACH DAY IN THE FIRST HALF OF 2021

Global VC crushed records in 2021. Over €264bn was invested in Europe in the first six months of the year alone So far, two unicorns have been created every day in 2021, and 170 cities around the world are now home to at least one unicorn. Europe has the most "unicorn cities", while also being the fastest-growing region for VC investment.

WHY SHOULD CITIES CARE ABOUT STARTUPS AND UNICORNS?

Tech companies are reshaping every industry. US tech companies are now worth $24tn, while the entire S&P 500 index is worth $38tn. US tech companies also contribute half of all domestic R&D investment. Meanwhile, about 70% of all AI experts work for just four US companies: Alphabet, Meta (the new parent company of Facebook), Microsoft and Amazon.

"About 70% of all AI experts work for just four US companies: Alphabet, Meta (the new parent company of Facebook), Microsoft and Amazon"

Despite this heavy concentration of economic firepower, entrepreneurialism is on the rise as startups are able to scale faster than ever before. Younger cohorts of startups are also able to take advantage of Big Tech's infrastructure, be it Amazon Web Services, Instagram or Facebook.

"In cities analysed by Dealroom, startup jobs grew by about 10% annually over the past few years, 2 3x faster than job growth in the wider economy."

In recent years startups have become a leading source of new jobs. In cities analysed by Dealroom, startup jobs grew by about 10% annually over the past few years, 2 3x faster than job growth in the wider economy.

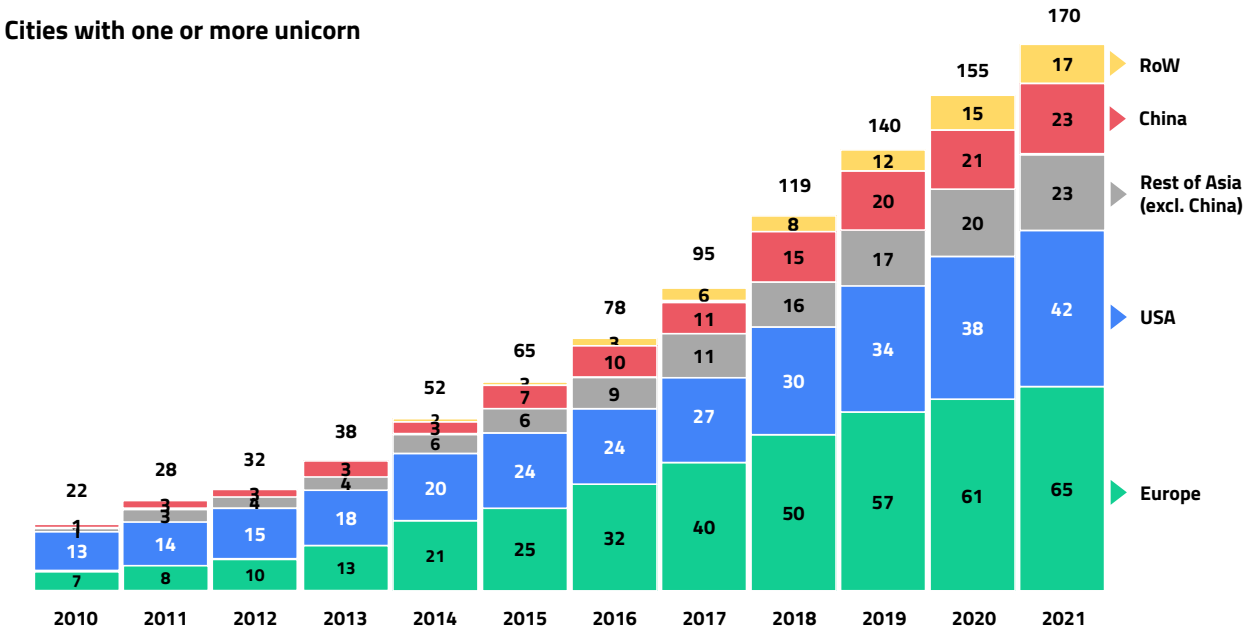
Today, 1% of European jobs are at startups. In the US, where VC has been around for much longer, it is estimated that VC-backed companies are responsible for 10% of all jobs.

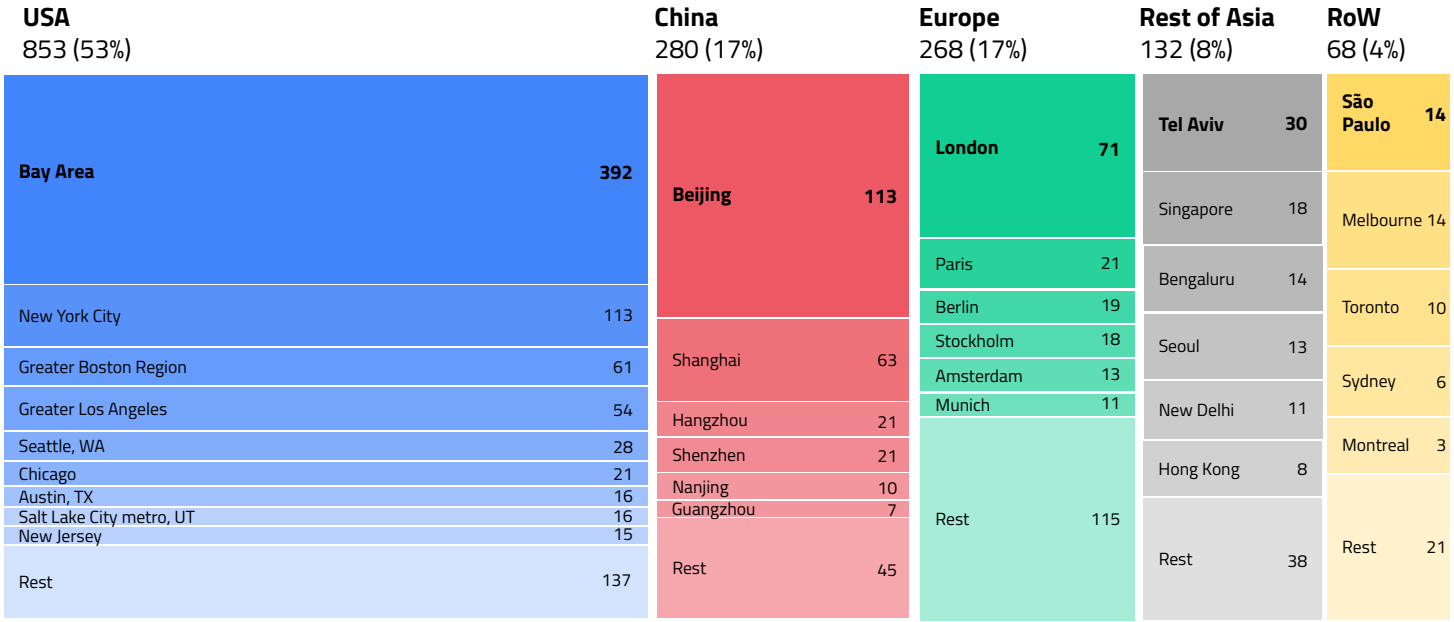
Are analysts too obsessed with unicorns? Perhaps, but they remain a useful metric to measure the development of cities and innovation hubs. The formation of a new unicorn gives a boost to tech hubs and founders, employees and investors, while also creating a positive knock-on effect for other companies — just look at the startup "mafias" who leave successful companies to go on to create other successful startups.

EUROPE HAS MORE THAN 60 'UNICORN CITIES'

There are now 170 "unicorn cities" with one or more $1bn+ companies, of which 65 are in Europe.

Since 2014, the number of cities with one unicorn has grown from 21 to 65. The number of cities with over 10 grew from 2 to 29.





WHERE THE WORLD'S UNICORNS AND $1BN+ EXITS ARE BASED

THE SECRET SAUCE: HOW EUROPEAN CITIES ARE FINDING TECH SUCCESS

That's not to say challenges don't remain.

To be sure, navigating the cultural and legal barriers that persist across Europe remains a headache for startups. An often-heard complaint is that different tech ecosystems are poorly connected. Facing different rules, languages and cultures, investors in France have tended to invest in French startups, Spanish investors in Spanish companies and German investors in German companies.

But there are signs that this is changing, according to Megumi Ikeda, managing director of corporate venture capital firm Hearst Ventures, who cites VC firms like Hoxton Ventures and 42CAP, which have been doing deals right across mainland and eastern Europe. "People are spreading their wings," she says.

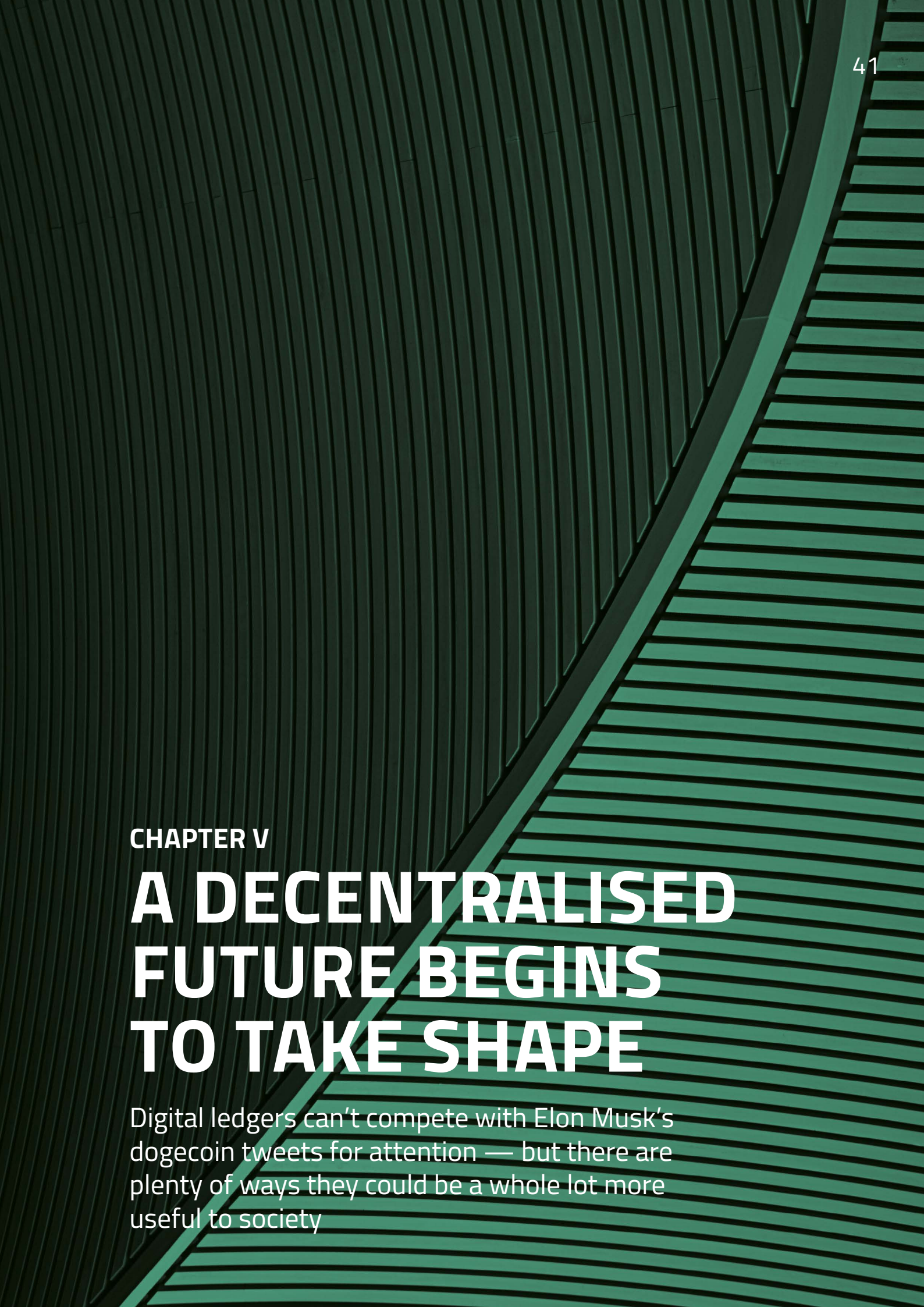
Below, officials pitch some of the key selling points of their cities:

"Startups are attracted to Amsterdam because it's a city with a large talent pool, great infrastructure, ease of doing business and a high quality of life. It's a pocket-sized world city, providing a buzzing business culture and a high level of connectedness. Everybody is just a bike-ride away."
Joël Dori, startup liaison, StartupAmsterdam

"London has the 'finance' of New York, the 'tech' of Silicon Valley and the policymakers of Washington, all within a 15-minute journey by Tube. These factors make London one of the world's most connected tech hubs, with all the necessary ingredients for startups to succeed, from investors to world-class universities and talent to policymakers — this is our secret sauce."
Janet Coyle, managing director of business growth, London & Partners

"We have a massive industry over here and the so-called "Mittelstand" [medium-sized companies], but they can't find all the solutions themselves and need help with their digitisation efforts. Startups also provide a good example of how to deal with failure or bad decisions by trying again and looking for solutions rather than giving up."
Gil Baxpehler, Startup Unit Cologne, KölnBusiness

"There are so many ingredients in the Berlin secret sauce. Two important ones are: Berlin is the epicentre and melting pot for innovators and creatives from all over the world. They come and join the Berlin movement because the city is lovable, diverse and an always changing environment. Also, Berlin has a startup history, beginning with Alando, StudiVZ, gate5 and others. The former founders [of these companies] grew to become important players, educators and investors in today's ecosystem."
Norbert Herrmann, head of startup affairs,
Berlin Senate Department for Economics, Energy and Enterprises



CHAPTER V

A DECENTRALISED FUTURE BEGINS TO TAKE SHAPE

Digital ledgers can't compete with Elon Musk's dogecoin tweets for attention — but there are plenty of ways they could be a whole lot more useful to society

Remember blockchain? That transformative tech ready to upend the internet, the financial system, the world? It's still out there — it's just taking a little longer than promised to achieve total domination.

In July 2021, we heard the latest on a tech that's tiptoeing closer to the mainstream, and beginning to provide services and tasks beyond sending and receiving coins with funny names.

We spoke to Jessi Baker, founder of UK-based blockchain startup Provenance, Nicolas Brand, a partner at Zurich and Berlin-based VC firm Lakestar, and Pēteris Zilgalvis, head of the digital innovation and blockchain unit at the European Commission. Here's what we learned.

HYPE HAS CRESTED

"The whole space has developed slower than I thought — I had a good dose of naivety in 2013," says Jessi Baker, referring to the year she founded Provenance, which tracks the origin of products and their impact. "I learned that this is a multi-decade step-change."

> **"The whole space has developed slower than I thought — I had a good dose of naivety in 2013"**
>
> **Jessi Baker, founder of Provenance**

The hoped-for blockchain utopia is a world unshackled from legacy financial intermediaries — like high street banks — but also from Big Tech institutions, which some argue have evolved into gatekeepers.

Blockchain technology, which is used for verifying and recording transactions, is at the heart of cryptocurrencies like bitcoin and ethereum, but faces hurdles to wider adoption.

"[The internet is] a massive walled garden policed by a few giants," says Baker.

Baker wants to see a decentralised network of blockchains taking control away from the likes of Google and Facebook. "It's a really exciting vision for the future internet that allows a fairer tech ecosystem, one that's in the hands of the many," she says.

TOO MANY BLOCKCHAINS

What would help in achieving this vision is if developers congregated around one or a handful of chains — and if blockchain became far more standardised.

"It's quite overwhelming, there's loads of different blockchains, tonnes of different governance structures — and lots of these structures are quite centralised," Baker says. "One of the things holding back innovation now is the lack of connectivity between chains."

> **"One of the things holding back innovation now is the lack of connectivity between chains"**
>
> **Jessi Baker, founder of Provenance**

GIANT ENERGY HOGS

Crypto critics point to the volatility of digital currencies like bitcoin, which can rise and fall upwards of 10% in any given day, as a reason to steer clear.

Another problem: blockchain's growing carbon footprint. "I find it quite frustrating because there's amazing potential for this tech that at the moment is being overshadowed by the crazy energy-guzzling," says Baker.

Cryptocurrencies are created, or "mined", using enormous computing power, which in turn uses huge amounts of electricity. One bitcoin transaction is the equivalent to the carbon footprint of 1,869,814 Visa transactions or 140,608 hours of watching YouTube, according to Digiconomist.

> **"I find it quite frustrating because there's amazing potential for this tech that at the moment is being overshadowed by the crazy energy-guzzling"**
>
> **Jessi Baker, founder of Provenance**

There have been various efforts to clean up blockchain. Ethereum, the world's second largest cryptocurrency, is investing big money in so-called proof of stake, a mechanism that does away with the energy-intensive mining process required by proof of work.

In April, a coalition of crypto bodies announced the Crypto Climate Accord, an industry-driven pact in which signatories vowed to switch to renewable energy sources by 2025, and to go completely net zero — eliminating greenhouse gas emissions altogether — by 2040.

VIRTUAL SNEAKERS

Digital currencies are slowly invading art, sports and entertainment. They're also playing a part in the emerging virtual fashion world.

You can now buy blockchain-compatible trainers, for example, meaning the physical shoe you own also has a digital twin with a unique identity token. What this potentially does is kickstart a market for rare digital trainers. "Some of this stuff clearly is mind-bending," says Brand. "But those sneakers can be proven to be truly yours; that's powerful."

Aglet, one of Brand's portfolio companies, has created its own digital sneakers. The company, based in Los Angeles and Düsseldorf, wants to create a "metaverse for commerce" where online and offline consumer experiences fuse together.

"Pokemon Go for sneakerheads" is how Aglet describes its concept, which involves limited edition "drops" of virtual sneakers at locations around a city and players going to those spots to add the virtual sneakers to their collection.

It may sound a bit crazy, but virtual brands are a natural extension of our increasingly digital existence, Brand explains. The pandemic has been a "tailwind for the crypto world, with people hanging out more online now," he says. "If you talk to Gen Z and ask: 'When are you offline, when are you online?', they don't get the question. They don't make that distinction."

THE EU: REGULATORY BLOCKCHAIN TRAILBLAZER?

Experiments with digital ledger technology continue apace in Brussels and Luxembourg. In April 2021, the European Investment Bank sold the world's first syndicated digital bond. To carry out the deal, the bank issued bond tokens registered on the public Ethereum blockchain network. Investors paid for the tokens using traditional currency.

The next big EU project involves building up blockchain infrastructure in the 27 member states. The Commission is also throwing its weight behind plans to introduce a digital euro.

Crypto's libertarian wing would likely baulk at the enthusiasm displayed by EU institutions for this new decentralised tech. But actually, blockchain is a great fit for the EU, argues Pēteris Zilgalvis, head of the Commission's blockchain unit. "Because it is multi-level, it enables multi-level governance," he says.

> **"Because blockchain is multi-level, it enables multi-level governance"**
>
> **Pēteris Zilgalvis, head of the digital innovation and blockchain unit at the European Commission**

Zilgalvis sees a future where EU citizens save time and money by accessing public services on the blockchain. Third-level diplomas will go on a public chain, for example, he says, ending secondary school leavers' awkward and tedious tracking down of exam results from university administrators.

Legislation — though much feared by core blockchainers — could perhaps even empower the tech. A new German law, for example, allows for hefty fines starting at several hundred thousand euros for companies if their contractors abroad are found to breach human rights or environmental rules. What better way to demonstrate that your supply chains are free of human rights abuses than using the transparency of the blockchain?

Still, this shift won't happen overnight. "Supply chains are not digitally native networks — they're almost the furthest away from that of all the things you can imagine. It's not like a bunch of gamers connected on Twitch [the streaming platform]. It's more like '80/'90s-era teletext tech they're using," says Provenance's Baker.

OUR OWN PERSONAL CURRENCIES

Ultimately, Baker sees a world where more interactions will be turned into transactions — or "tokenised" — via the blockchain.

She hopes this method can someday help conserve at-risk assets: you could tokenise — essentially selling shares of — a forest, for instance, via an initial coin offering, selling cryptocoins or tokens to the public.

> **"I think we will tokenise our own personal data in the future to health companies [for example]. Why not?"**
>
> **Jessi Baker, founder of Provenance**

Humans may also one day receive tokens as a kind of money from companies in exchange for access to our time or data. "I'm a die-hard believer in tokens. Whatever you can link to finance, the potential is enormous. I think we will tokenise our own personal data in the future to health companies [for example]. Why not?" Baker says.

TOP ENGINEERS ARE JOINING BLOCKCHAIN COMPANIES

Blockchain companies are magnets for talent. Lakestar keeps track of the movements of engineers after they leave top tech companies like Apple and Amazon. "They're [mainly] going to AI and blockchain companies," Brand says.

As market signals go, it's not a bad one. "The desire to experiment in decentralisation today, independent of the [blockchain] hype cycle, has never been higher," he adds.

SOME BLOCKCHAIN IDEAS ARE 'MILDLY INSANE'

Blockchain's appeal lies in the way it can theoretically streamline complex processes. Still, the barriers to wider use remain significant, says Baker.

The tech's underlying principle is there is no central authority controlling a single ledger. Everyone who is part of the system controls a shared record.

Baker's early blockchain pitch, then, was to create a fully transparent supply chain between food producers and retailers, with everyone able to see each other's records. She now calls that idea "mildly insane in hindsight. It's such an unequal supply chain — the fisherman in Indonesia in no way has the same power as the supermarket in the UK," she says.

"We have a mechanism but that network doesn't want to be fully transparent. What we've seen over seven [or] eight years is real systems butting up against the new decentralised model," she explains.

After Baker's main idea was put on hold, her company, Provenance, performed "a major pivot". Now the focus is on tracking product impact.

"We created a feature called 'proof points', which looks at things like whether a product is carbon neutral. This is a much easier application for us to run on a blockchain and that impact could become a financial asset [to a company] one day. We could use it to drive loyalty [to a brand] or things like that," she says.

ELON MUSK AND DOGE

There is plenty of fun and madness in the crypto world. You have Reddit forums bubbling with financial advice. There's an annual celebration to mark the day that a guy first bought a Papa John's pizza using bitcoin. Tesla founder Elon Musk, meanwhile, keeps tweeting about Dogecoin, a currency that started as a joke based on a meme about a Shiba Inu (it's a breed of dog).

All of this constant noise surrounding cryptocurrency is not really doing blockchain techies any favours, however.

"It's a shame that people focus on the price [of cryptocurrencies] and what Elon [Musk] thinks when this could be the future of the internet. It could recalibrate capitalism. I wish more people could see it like that," Baker says.

THE FUTURE

HAS THERE EVER BEEN A BETTER TIME TO ESTABLISH A STARTUP OR SCALE IN EUROPE?

All of a sudden, things are not looking so bad for European tech.

Tech is emerging from the pandemic lean and mean, having benefited enormously from the accelerated shift to digital over the past year and a half. Lack of venture capital used to be the top complaint among Europe's startup founders. Now, the tech scene is better capitalised than ever, with 2021 on track to set a new record for capital invested in European tech.

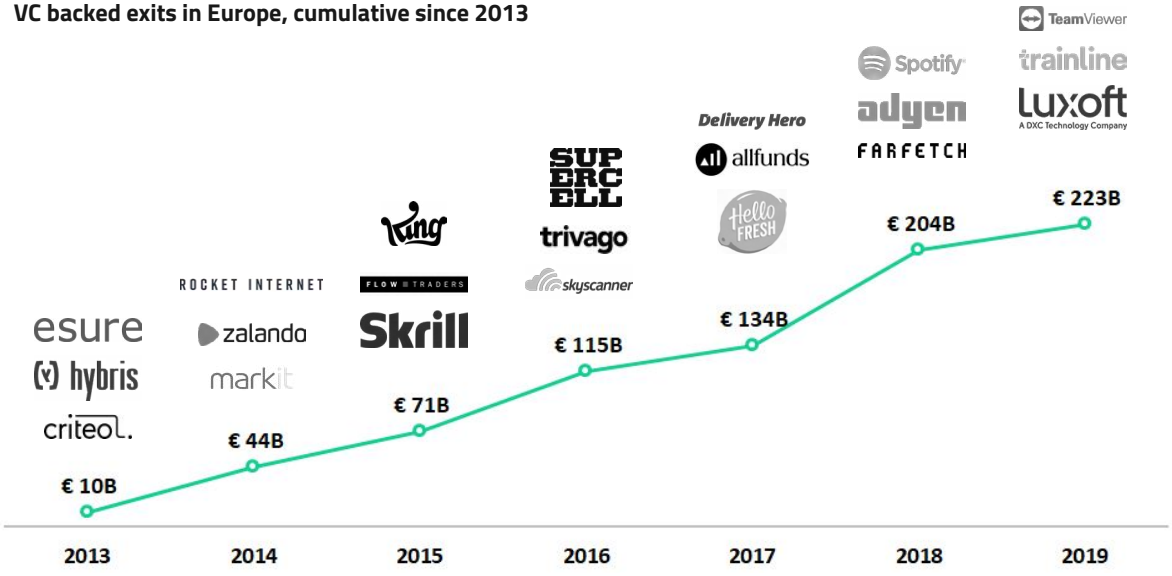
The continent has also nurtured its largest tech-minded generation through growing startup hubs across the region.

European startups and scaleups employ 2m people as of 2019 and have created €223bn in venture capital-backed exits since 2013. Gone are the days when the big tech success stories hailed from the obvious places: 21 different European countries have given birth to unicorns, companies valued at more than $1bn, and the next one could come from anywhere.

With the wind at the backs of Europe's tech players, the next two years are going to be crucial. One of the critical success factors will be the ability of Europe's public and private sectors to work together.

That's why the European Startups platform and reports showcase macro-level trends and insights across all EU member states: to help direct funding decisions, drive discussion, and inform policy making around the current pandemic crisis, and the wider ecosystem.

VC backed exits in Europe, cumulative since 2013



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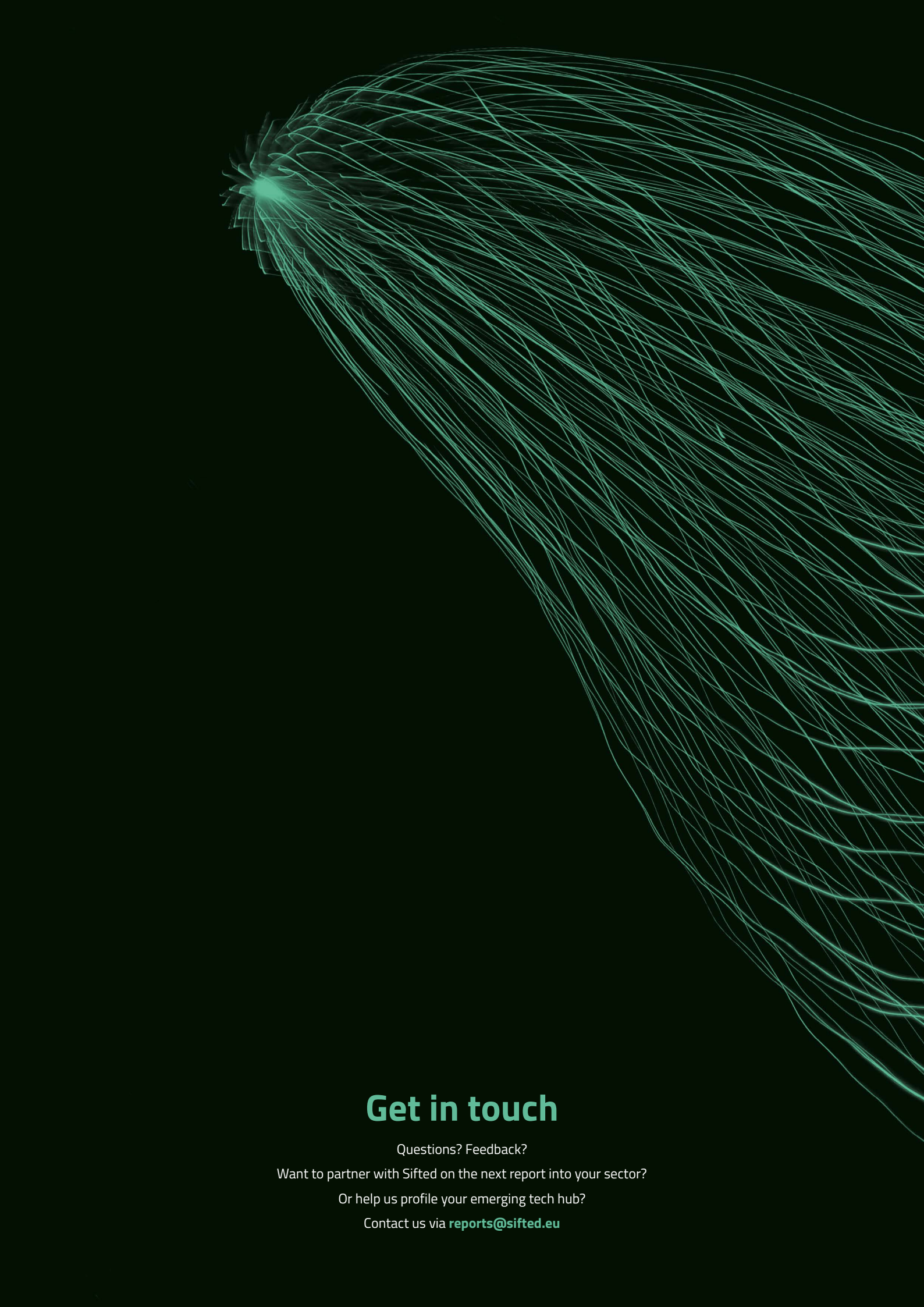

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