

Community Paper

Bridging the Gap in European Scale-up Funding: The Green Imperative in an Unprecedented Time

In collaboration with KPMG

June 2020



Contents

Preface	3
Executive Summary	4
The Crisis: Europe wants to go digital and go green, but struggles to scale	6
The Challenge: Surviving the “valley of death” to contribute on sustainability	9
The Ideas: Four ways to grow Europe’s sustainable scale-ups	12
1. Streamline access to public funding for innovation	12
2. Apply blended finance to scale Europe’s industrial transformation	15
3. Create public and private procurement opportunities	18
4. Give European growth companies a voice on policy and standards	19
Concluding Remarks	21
Acknowledgements	22
Endnotes	25

Preface



Børge Brende,
President, World
Economic Forum



Martina Larkin,
Head of Regional
Strategies,
Europe and
Eurasia; Member
of the Executive
Committee,
World Economic
Forum

In 2019, European innovation looked primed for unprecedented growth. Startup Genome found that 14 of the world's top 30 innovation ecosystems were European, while Sifted and Dealroom credited the region's start-ups for creating over 2 million jobs and 10% of job growth. Factors across the board indicated that Europe was finally closing that gap in company valuation, the number of unicorns and even the amount of capital, while political support for both the digital and green agenda had taken priority with the European Commission. But just as new companies were forming at an unprecedented rate, raising 38% of global seed-stage funding, COVID-19 brought unprecedented upheaval. In the first months of 2020, most start-ups have seen fundraising efforts stall and many have had to release full-time staff.

One of the main challenges both before and in the wake of COVID-19 has been Europe's ability to develop technological innovation in global companies, which requires complex and long-term investments. This is particularly poignant now, as the European Green Deal launched a race towards climate neutrality, but reaching its ambitions relies in large part on new technologies that are just coming out of the lab. These growth companies (or "scale-ups") should have a strategic advantage given Europe's legacy of industrial excellence but are in danger of succumbing to the funding "valley of death" as they navigate towards commercialization in what promises to be a very difficult economic environment. Digital Europe's Innovate Europe report identified innovation funding for such companies as one of the greatest challenges facing European ecosystems and this report builds on that assertion.

In this paper, we address the triple challenge facing European innovation just as it seemed that governments, founders and investors were finally getting aligned – access to growth-stage funding, the ability to channel such funding towards building technology that works toward climate goals, and doing so during the pandemic and economic disruption. We propose four ideas: treating innovators as customers; using new methods of funding; redesigning procurement; and giving founders a voice on regulation. We would like to thank the Digital Leaders community and its board for their invaluable contributions and insights into this report, and KPMG for its thought leadership and enthusiasm in developing these proposals.

The World Economic Forum, as the International Organization for Public-Private Collaboration, is committed to improving the state of the world by providing the platform for multistakeholder engagement and impactful action that shapes global agendas for a sustainable and responsible future. Digital Europe, as part of the Forum's work, brings together a community of innovators, policy-makers, corporate leaders and academics to promote a pan-European approach to innovation, one that will stand ready to overcome today's challenges and embrace the opportunity for a global reset that can rebuild for a better and greener tomorrow.

Executive summary

Before COVID-19 put the global economy on hold, the European innovation ecosystem had made remarkable gains, with European tech IPO returns even surpassing those in the United States. European companies still, however, trail their American counterparts in their ability to scale. This is especially true for those involved in developing the new technologies needed to meet Europe's ambitious sustainability goals.

Recovery from the COVID-19 pandemic will also pose economic challenges. However, Europe has strong fundamentals, from high-quality education systems to engaged regulators, and the COVID crisis has reinforced political ambition to accelerate the twin transitions towards digitization and decarbonization.

The challenge now is to catalyse the policies and programmes needed to lift the European innovation ecosystem to the next level. Building on the [Innovate Europe](#) report, this paper looks at systemic and structural issues and proposes four ways to more effectively fund growth-stage start-ups (scale-ups), reaching beyond the common panacea of "more funds":

1. **Streamline access to public funding for innovation.** Governments want public money to attract the smartest entrepreneurs, but heavy bureaucracy sends the opposite message. Start-ups must invest significant resources to understand the different offers of diverse European and national institutions that provide innovation funding. Their accessibility and efficiency must be streamlined.
2. **Apply blended finance to scale Europe's industrial transformation.** Start-ups working on cutting-edge technology characterized by a long R&D phase (deep-tech) need long-term funding and in many cases have large capex needs to finance production lines or computing power. European Venture funds alone do not have the size to provide adequate funding amounts and in some cases can't provide funding for the time periods needed for development. Smarter financing structures are needed to address this mismatch. Blended finance approaches – using a sophisticated mix of public and private investment – remain niche in Europe but are a promising solution to address the funding gap.
3. **Create public and private procurement opportunities.** Procurement processes in both the public and private sectors in Europe favour established corporations, making it difficult for young companies to sell products and services – especially novel technologies. If integrated into COVID-19 support packages, these can have greater impact than direct funding alone and promote closer, ongoing collaboration.
4. **Give European growth companies a voice on policy and standards.** European technology companies need to participate more actively in shaping their political and regulatory environments if they are to evolve into world leaders. Investment in industry associations for scale-ups can build alliances among companies and help decision-makers to understand the potential of new technologies.

Although this report is based on interviews and workshops with founders, corporate executives, investors and policy makers, it is not a research paper. It is intended as a guide for decision-makers in the public sector and an inspiration for corporate and start-up leaders.

The report does not aim to list all barriers to VC investment in Europe; it proposes solutions to the overarching themes that recurred in interviews, workshops and literature. Its aim is not to propose short-term regulatory changes or programmes but to build knowledge and long-term capacities in the European innovation ecosystem.

The Crisis: Europe wants to go digital and go green, but struggles to scale

Before COVID-19 put the global economy on hold, investment in European tech companies was growing. According to the *State of European Tech 2019* report, capital invested in Europe had more than doubled in five years to €32 billion. European start-ups achieved greater deal sizes and higher valuations: 53 raised more than €92 million and more than six – including GetYourGuide, Northvolt, Greensill, Deliveroo, UiPath and Checkout.com – raised over €462 million. These successes are usually known as scale-ups or growth-stage companies. While there is no universal definition, scale-ups are start-ups that have demonstrated a product-market fit and are on an accelerated growth pathway, seeing revenues rise in double digits over several years, and growing increasingly through profits rather than solely via funding rounds.^{1,2} In 2019, the number of European scale-ups or “unicorns” – valued at \$1 billion – rose to 99, hailing from 20 countries, and was set to double in the next few years.^{3,4,5} While London, Paris and Berlin led the way, unicorns from Lithuania to Spain attracted €100 million+ rounds as well.⁶ In the past six years, Europe produced more tech IPOs than the US; and while their market valuations were smaller, they delivered better returns.⁷ In the UK, the tech sector has been growing six times faster than the rest of the economy.⁸ Across Europe, start-ups provided 2 million jobs.⁹

Despite the current crisis, Europe has all the fundamentals for innovation, growth and prosperity. European policy-makers have proven capable of forward thinking and innovation. For example, the General Data Protection Regulation (GDPR) is being adopted globally. The European

Commission’s Sustainable Finance Action Plan is set to transform the financial sector, while the Green Deal aims to decarbonize the European economy by 2050 through decisions taken in the next five years.¹⁰

“

The twin transitions to tackle climate change and adapt to a digital future can offer companies of all sizes the chance to become more productive and competitive. It’s also one where the waves of new technology will come ever faster – so our ability to innovate will make the difference between taking the lead and falling behind. The great task that we face today is to [...] help get European industry ready to grasp those opportunities.¹¹

”

Margrethe Vestager, Executive Vice-President for a Europe Fit for the Digital Age, European Commission

Political will to foster the green transition has been enhanced by COVID-19. Politicians across Europe are calling for a Marshall Plan aligned with the Green Deal.¹² The original Marshall Plan removed trade and regulatory barriers, encouraged the adoption of modern business procedures and designated funds to purchase goods and services to foster production. A Green Deal could be as comprehensive and the foundations for both transformations have been laid. Five of the world’s top 10 engineering and technology programmes are European, including ETH Zurich, University of Cambridge, Imperial College London, University of Oxford, and École polytechnique fédérale de Lausanne.¹³ Relatively

low tuition costs at most European universities enable students from diverse backgrounds to receive an excellent education as the next generation of innovators and tech workers. Across Europe, R&D and seed funding have created a pipeline of innovative start-ups that are hungry to scale.



Achieving a climate-neutral and circular economy requires the full mobilization of industry. It takes 25 years – a generation – to transform an industrial sector and all the value chains. To be ready in 2050, decisions and actions need to be taken in the next five years.



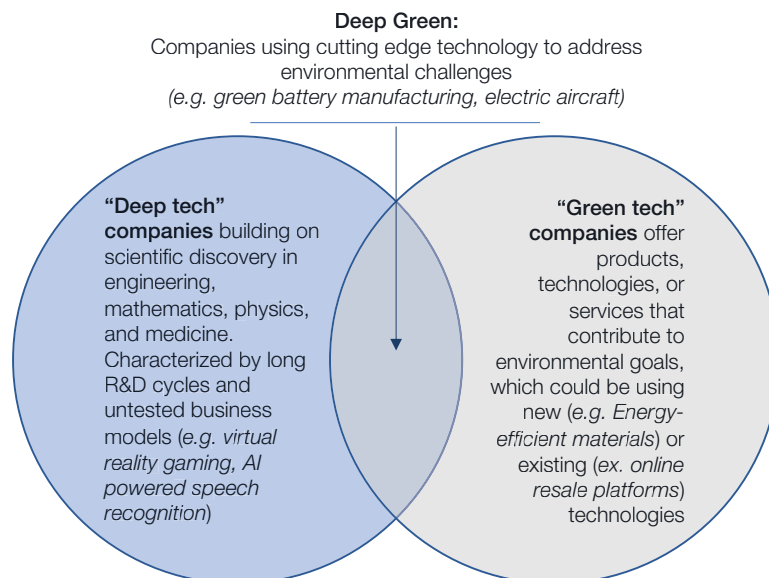
European Green Deal

However, European start-ups still trail their American counterparts in ability to scale and exit. Start-up investment in the US remains 3.4x the level in Europe.¹⁴ Only one in eight European companies scale compared to one in four in the US.¹⁵ The greater liquidity offered by the New York Stock Exchange (NYSE) and NASDAQ means the US has seen 2.8x more billion dollar tech IPOs than Europe since 2015.¹⁶ This is also due to the strong participation of US institutional investors in the sector, which have traditionally

been more willing to engage in VC: US pension funds have just 2.7x more assets under management than European institutional investors but make 11x the commitments to VC.¹⁷

Europe’s natural market fragmentation still hinders growth¹⁸ and the VC ecosystems differ in maturity; about a quarter of capital comes from the mature London ecosystem while other regions are less developed.¹⁹ At the moment, foreign investors provide access to capital, networks, expertise and markets that local VCs cannot²⁰ – especially in smaller hubs such as Tallinn and Bucharest.²¹ But dependence on primary foreign investors can lead to relocation and they can prove to be less committed when times get hard.²² Due to the distribution of their network, foreign investors also make an exit to a foreign buyer more likely. The best-performing companies have a mix of foreign and domestic investors.²³ Therefore, Europe needs to mobilize domestic investors to participate more actively in the European VC market.

Deep-tech’s need for higher levels of investment over a longer period has made foreign funding inevitable. The “valley of death” between development of promising new technologies and its application at scale is particularly dangerous for deep-tech innovation and many technologies relevant to achieving Europe’s Green Deal ambitions are precisely



these – that is, they build on scientific discovery in engineering, mathematics, physics and medicine.²⁴ These companies need more time and capital to reach market maturity, which makes them a poorer fit for the business model of traditional European VC funds.²⁵ American VCs reach larger fund sizes and have more experience funding deep-tech companies and their assets, financing successes such as Tesla, Beyond Meat, and Impossible Foods. Funding and experience make them an attractive partner for European deep-tech start-up founders as well.

The COVID-19 pandemic makes it more urgent to support Europe’s advanced technologies focused on sustainability.

Companies’ plans to launch or scale products have been thrown off-track. Supply chains have been disrupted. Curtailed travel is limiting fundraising and sales activities²⁶ making fast-growing companies especially vulnerable:²⁷ Their costs are largely locked in, while new sales and funding opportunities are constrained.^{28,29} Over a third of growth-stage start-ups have less than six months’ worth of cash and are running out of time if they don’t get adequate support to outlive the crisis.³⁰

Start-ups and scale-ups have less political power than established companies – which today can access billion-euro loans to stave off mass layoffs – but they are precisely the industries that could employ a majority of tomorrow’s workers. European Commission President Ursula von der Leyen has called for recovery to involve more investment in digital technologies, infrastructure and innovation to build “a more modern and circular economy that [...] will make us less dependent and boost our resilience”.³¹

Some European countries are supporting start-ups and scale-ups in their stimulus packages. Germany, for example, includes a €2 billion allocation for VC and start-ups, deferred taxes and social security payments, and the state paying up to 60% of salaries when employees are not working.³² Another potentially very effective programme is the UK’s Future Fund that will provide convertible loans to scale-ups.³³ However, even more support might be needed. After the 2008-2009 financial crisis, VC investments in late-stage ventures declined by almost 50% and took another 10 years to reach pre-crisis levels across Europe;³⁴ and there are concerns that the support provided is, in some cases, not tailored appropriately to the needs of scale-ups.³⁵ European countries without the fiscal power of Germany, the UK, or France may also require greater cross-European solidarity to secure the survival of their innovation ecosystems and to return quickly to a pre-crisis trajectory.

The Challenge: Surviving the “valley of death” to contribute on sustainability



Companies that offer products, technologies, or services that contribute to environmental goals are green-tech companies.



German Startup Monitor

“Green-tech” companies exist across a range of sectors, including energy, electricity, raw materials, transport, agriculture, textiles, chemistry and pharmaceuticals,³⁶ offering products, technologies or services that contribute to environmental goals.³⁷ The EU Taxonomy on Sustainable Finance defines six environmental objectives (see Figure 1). Sustainable products, services or infrastructure investments need to contribute to at least one of these objectives and must not significantly harm others.³⁸

Digital deep-tech is critical to achieving the green transition. For example, virtual and augmented reality can reduce business and leisure travel, blockchain can help track carbon emissions, and robotics is a requirement for vertical indoor farms that help us adapt to climate change.³⁹

Deep-tech companies, in general, are more difficult to scale than traditional start-ups. Their need for more time and capital makes them a poor fit for VC investors, who typically seek exit after three to five years. Most start-ups go to market at the seed stage and use series A, B, C and D to grow sales, market share, or product range (see Figure 2). Deep-tech start-ups often still develop their technology through series A funding and use series B, C and D to build “pilot plants” – first-of-their-kind factories to manufacture new and innovative products or factories that use innovative machines

Figure 1: Six objectives of the EU taxonomy defining sustainable economic activities and focus sectors defined by the European Commission

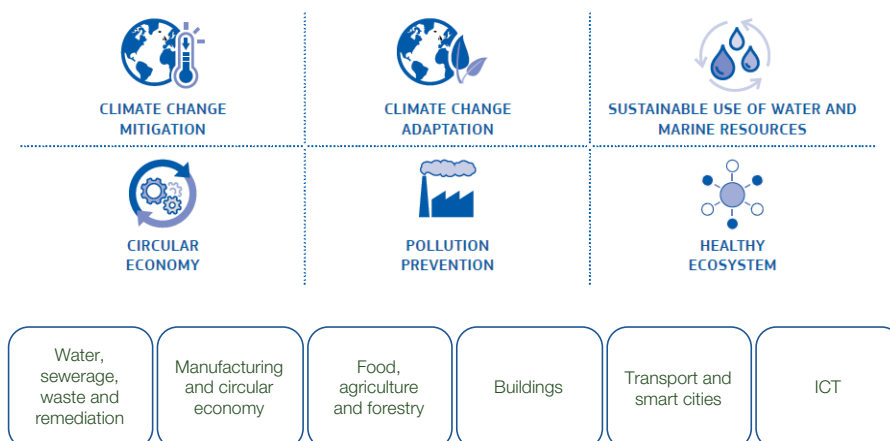


Figure 2: Comparing the pathway to maturity of traditional start-ups and deep-tech start-ups

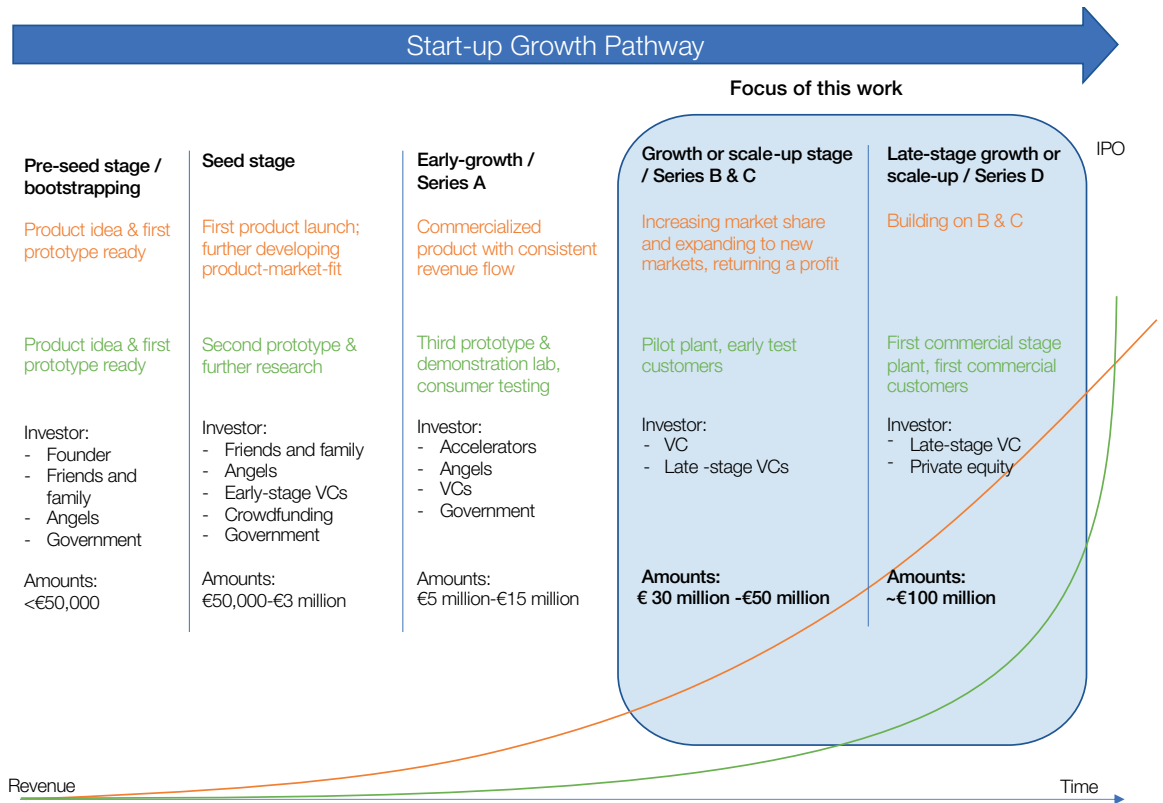
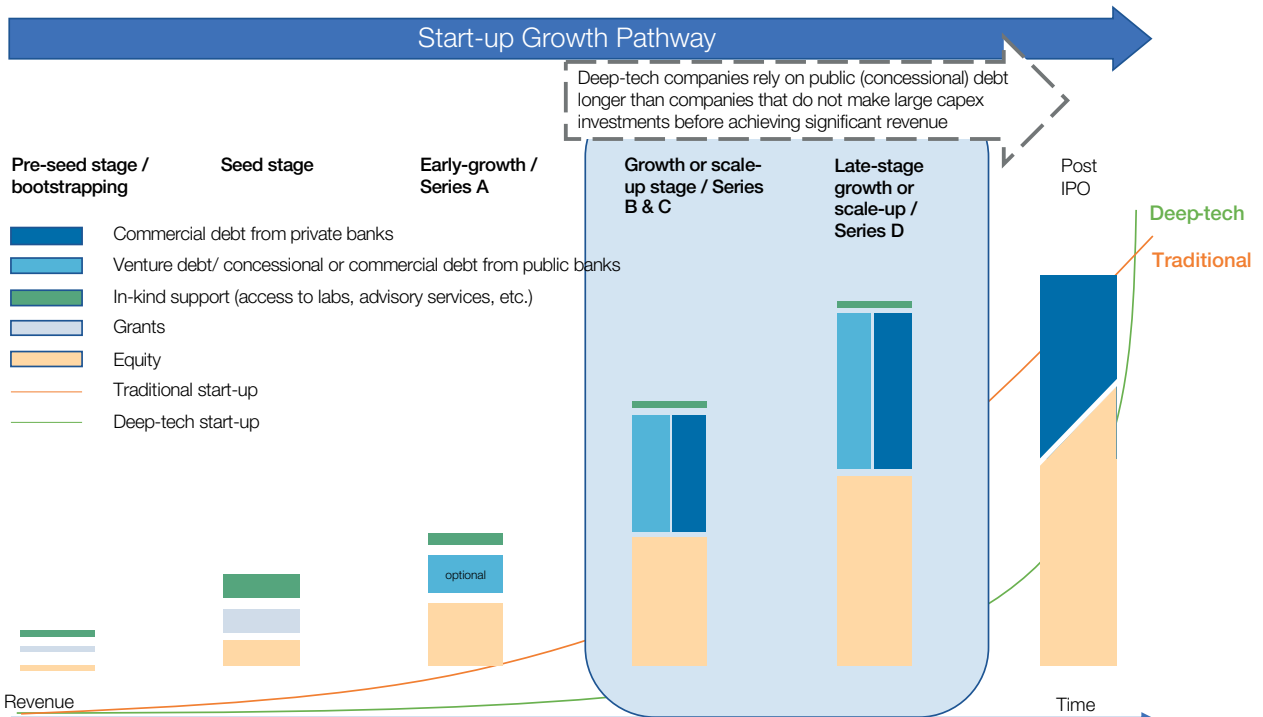


Figure 3: Example for financing sources of a company and its pilot plant



or procedures to produce existing products. While these companies take longer to achieve their first revenue than B2C start-ups or those that rely on existing technologies, they can ultimately disrupt established markets and are more competitive due to their underlying IP or non-replicable technology.

Deep-tech start-ups depend on a more diverse set of funding sources. Deep-tech start-ups typically need to make large capex investments before scaling their revenue as they invest in physical production lines before moving from the “lab” to economies of scale. These “pilot plants” for new technologies usually cannot access commercial debt because banks are unfamiliar with the technology’s risk structure and do not yet allow for balance sheet financing. Thus, these companies need additional venture debt or debt from public banks at commercial rates. Public banks such as the EIB, KfW and Bpifrance provide loans for such factories or infrastructure projects if they are seen as strategic by the local government. Figure 3 shows the funding flows for

a start-up and its pilot plant. Start-ups innovating on business model rather than technology are less complex to finance as they do not have to raise the financing for their pilot production lines, while deep-tech start-ups usually need a consortium of investors to cover this.

European deep-tech scale-ups face different regulatory and sales barriers than traditional start-ups. Businesses can sell to retail customers (B2C), other businesses (B2B), or through intermediaries (B2B2C). Table 1 provides examples for traditional tech and deep-tech companies, and an overview of the most important challenges for deep-tech start-ups in each category.⁴⁰ B2B and B2B2C scale-ups in Europe, for example, struggle with public and corporate procurement processes that can take up to 18 months, when most start-ups have a runway of only three to six. While regulation can be a barrier or opportunity for any company, it is fundamental to B2B2C businesses, which often operate in the medical tech space, for example.

Table 1: Examples of traditional and deep-tech start-ups in B2C, B2B and B2B2C^{41,42}

Type of start-ups	B2C	B2B	B2B2C
Traditional/existing technology (business model innovation)	Online commerce, food delivery, carsharing, streaming, etc.	Customer service software, AI-based advertising, data-mining solutions	Companies, predominantly in health tech, providing, for example, telemedicine services
Deep technology (scientific innovation)	Alternatives to animal-based foods, VR solutions, consumer AI (e.g. speech recognition and automated translation)	Cybersecurity, alternative energy, electric batteries, vertical (indoor) farming, robotics, sensors (e.g. water efficiency)	Companies, predominantly in health tech, providing new medical treatments based on AI, VR, new drugs, etc.
Challenges for deep-tech companies that need to be addressed	Capex investments in large production facilities that are not usually financed by VC investors	Capex investments in large production facilities that are not usually financed by VC investors Lack of sales to/procurement from corporates and the public sector in Europe	Capex investments in large production facilities that are not usually financed by VC investors Lack of sales to/procurement from corporates and the public sector in European regulations (e.g. standards)

Europe has a potential strategic advantage at the intersection of “deep-tech” and “green tech”. Europe has fallen behind in information technologies and digital platform companies.⁴³ Even in the overall green tech space, from 2014 to 2019 investment in the US was four times higher than in Europe. However, the current crisis can potentially play to a strategic European strength – its frugal

entrepreneurial culture, which prizes cash efficiency over aggressive expansion. Silicon Valley investors are used to fast-paced high returns,⁴⁴ while Europe’s investor base is more familiar with big industrial investments and highly trained engineers. Although this strategic opportunity has not yet been pursued, deep tech could offer a better strategic fit for Europe than digital platform investments.

The Ideas: Four ways to grow Europe's sustainable technology scale-ups

Digital Europe's 2019 **Innovate Europe** report describes 10 fundamental building blocks for the competitiveness of the European innovation ecosystem. Among others, it highlights the need for increased innovation funding, more corporate-start-up collaboration, harmonized legislation and standards, and enabled government and public institutions. The report also defines four catalysts to achieve scale: (1) leverage industrial assets, funding digital platforms and technologies for strategic European industries; (2) change data dynamics, leading on governance for data access and trust; (3) boost talent, competing with digital skills and diversity; and (4) create demand at scale, leveraging public-sector leadership in procurement and standardization.⁴⁵ These ideas build on those recommendations to discuss four viable proposals for more effectively funding scale-ups whose technological innovation is critical to achieving environmental sustainability in Europe.

They aim to accelerate top start-ups and increase connectedness within Europe: not simply to increase the number of transactions, but to foster greater expertise and sophistication in the continent's entrepreneurial ecosystem with each round of funding.⁴⁶ Successful mechanisms will need to be strategic, supporting the objectives of the Green Deal in how they mobilize private investment for scale-ups. They need to promote a pan-European approach and business expansion to increase the effectiveness of public funding. They are also in line with the EC's new SME strategy for a sustainable and digital Europe.⁴⁷

1. Streamline access to public funding for innovation

Governments providing public money hope it will attract the smartest and quickest entrepreneurs, yet heavily bureaucratic methods and overlapping programmes send precisely the opposite message. A diverse set of European and national institutions provide innovation funding to start-ups – but to find the right offer, start-ups need specialized skills such as grant-writing, and time to put into interacting with multiple agencies to understand their criteria. It is a tough choice for founders to dedicate staff to understanding processes instead of building technology.

Europe aims to make its economy carbon-neutral by 2050, but green start-ups have no clear pathway from early-stage funding to growth-stage investment.

Europe has pledged to reach carbon neutrality while creating sustained economic growth and high-quality jobs. This requires support for innovative green technologies at the scale-up stage, but consistency and continuity among various funding mechanisms are still missing.

In the past, the European Innovation Council (EIC), for example, supported potential scale-ups through access to high-profile mentors such as Jim Hagemann Snabe, Chairman of Siemens, and Ingmar Hoerr, Chief Executive Officer of CureVac, a company currently developing a coronavirus vaccine.^{48,49} The European Commission designated at least €300 million for breakthrough Green Deal innovations under the EIC.⁵⁰

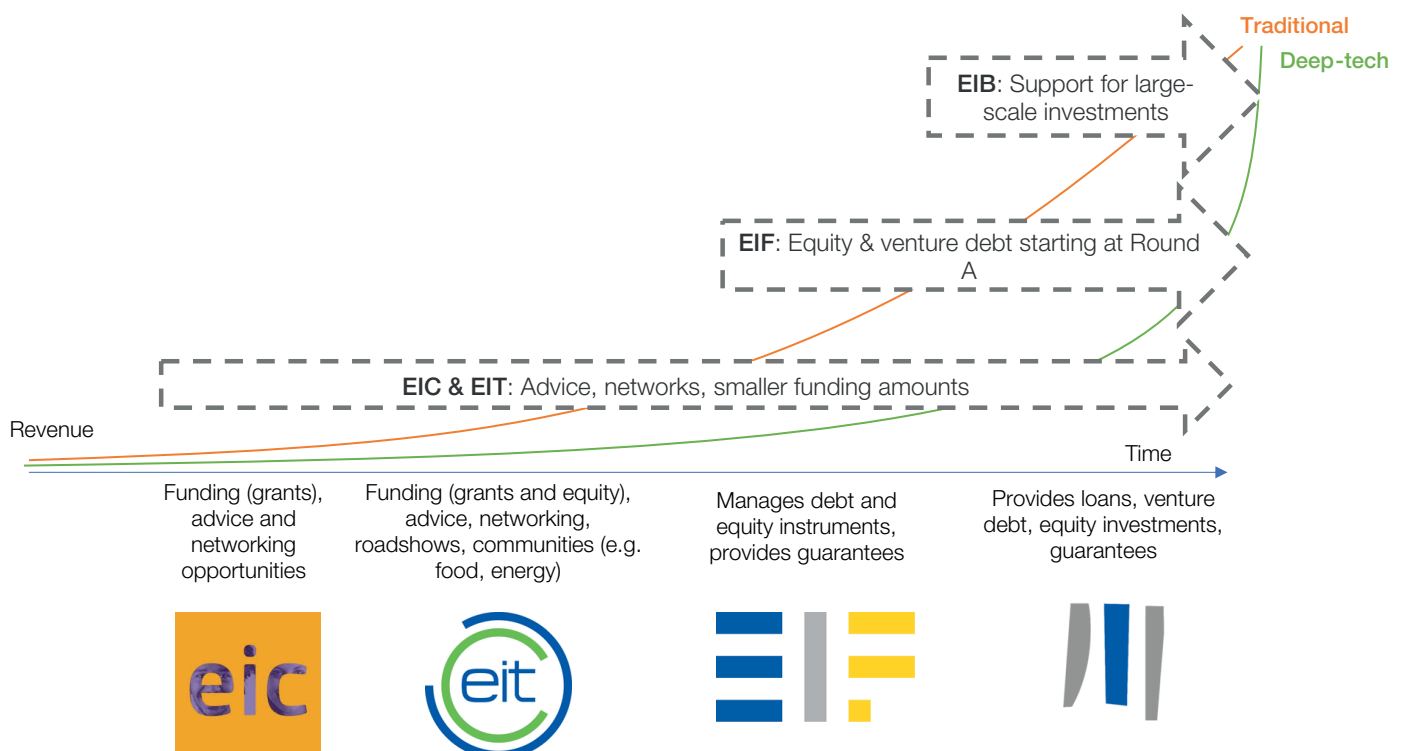
Meanwhile, the European Institute of Innovation & Technology (EIT) nurtures companies that address societal challenges.⁵¹ It accelerates seed-stage start-ups by organizing events such as roadshows in the US and Israel^{52,53} and knowledge and innovation communities (KICs) that help start-ups within strategic areas such as climate, food and energy. The EIT often lays the groundwork for proof-of-concept in deep-tech companies, getting them ready to raise funding from the European Investment Fund (EIF), EIB and private investors.⁵⁴

The EIF invests in European VC funds, provides venture debt directly to start-ups and connects investors with start-ups.⁵⁵ The Venture Centre of Excellence (VCoE) is a new initiative driven by EIF and EIT-Health to foster networking between corporates and start-ups in the life sciences sector. Corporates that want to participate in the programme need to participate in a life-sciences VC fund managed by the EIF and get the opportunity to work directly with promising start-ups. Start-ups, on the other hand, receive access to the value chains of corporates and benefit from their experience in navigating the regulatory requirements in life-sciences.⁵⁶

The EIB is the largest of these institutions. Beyond loans, it provides venture debt, invests in private equity funds, and provides guarantees to improve the costs of financing for strategic projects or sectors. Direct funding from the EIF and EIB into companies usually provides ticket sizes of €50 million and under, but tickets over €100 million are needed for scaling. The conditions of these instruments may also be more restrictive than typical VC funding.

The European Commission recently launched the successor to its popular Horizon 2020 programme that focused mostly on innovation and early-stage start-ups with Horizon Europe (2021-2027), which will specifically address scale-up funding. As part of the new Horizon Europe concept, the EIC will become a one-stop shop to help innovators create markets, leverage private finance and scale-up their companies. Some 70% of the budget is earmarked for SMEs. While some of their offerings overlap, these institutions are designed to complement each other across the start-up's life-cycle (see Figure 4).

Figure 4: European public funding providers for innovation funding and how they fit into the start-up lifecycle (Illustrative)



European public funding institutions have shown they can lead green innovation excellence. The EIC, EIT, EIF and EIB have proved they can effectively support the deep-tech development that Europe needs to achieve its sustainability goals. EIT's Climate Knowledge and Innovation Community (Climate-KIC), for example, supported the proof of concept of Lilium, a company that develops electric airplanes⁵⁷ (see Box 1^{58,59,60}). EIB provided a €350 million loan to Northvolt to finance Europe's first green battery plant (see Box 2⁶¹). However, European public funding for commercialization of new technologies and scale-ups still lags behind the US.⁶² The US Department of Energy Loan Program Office provided Tesla with a €430 million (\$465 million) loan to build its EV car manufacturing plant in 2010 – before the company had ever made a profit.⁶³ In 2019, the Defense Advanced Research Projects Agency (DARPA) alone had a budget of \$3.427 billion to fund technology research and scale-ups at all stages.⁶⁴ No European institution provides tech funding at that scale. Investing public money in growing private sector companies is still controversial in Europe, with electorates preferring to support traditional enterprises and existing jobs. However, to achieve Green Deal ambitions, Europe needs to finance hundreds of Liliums and Northvolts across all phases of development.

Public funders have diverse requirements and start-ups must spend valuable resources navigating the system. European public-funding institutions provide a broad range of services and types of financing to start-ups – which may also have different options for support from national institutions such as KfW in Germany and Bpifrance. Navigating this wide array of options is resource-intensive. Application processes for each institution can take six or more months. Requirements vary and application materials cannot easily be reused – especially for deep-tech start-ups concerned with IP where technical descriptions are vital. Founders spend valuable resources on specialized staff or consultants to seek public funding instead of growing sales. Another complication is that public institutions regularly replace reviewers. Although intended to ensure neutrality, this makes adapting rejected applications based on a committee's recommendations difficult as the new group may also have new preferences. These inefficiencies are especially critical for start-ups in the green space, with business models that rely on public funding for longer periods, as they cannot be commercialized as quickly.

Box 1: European green deep-tech success stories: Lilium

Lilium built the world's first electric vertical take-off and landing jet, laying the groundwork for emissions-free aviation. Founded in 2015 by former TU Munich students, the company closed a €224 million funding round in March 2020. Private air travel is growing due to COVID-19 fears, creating an opportunity as the company initially targets high-income individuals and business travellers. Climate-KIC helped the company to demonstrate the viability of its technology.

Box 2: European green deep-tech success stories: Northvolt

Northvolt is a Swedish green battery company founded in 2016 by two former Tesla engineers. The company is building the first European commercial-scale battery plant in Sweden and raised €1.2 billion in financing in June 2019. EIT supported the company to put together a consortium of investors and access EIB funding: the €350 million loan from EIB is accompanied by €886 million from VW, BMW, Goldman Sachs, AMF, Folksam Group and IMAS Foundation. After the first plant in Sweden, Northvolt plans a joint venture with VW to build a battery plant in Germany. The EIB loan was critical to ensure the participation of the private investors, according to Northvolt co-founder Peter Carlsson.

Box 3: Definitions

Public investment: Investment provided by government and through public-funding institutions such as EIB, KfW, Bpi, EIF, etc.

Private investment: Investment by all types of private investors such as institutional investors (pension funds, insurance), banks, VCs, corporates, angel investors, etc.

Green start-ups need a clear public funding pathway from early-stage innovation funding to growth-stage investment. European public funding institutions would benefit from a common platform through which start-ups can access their offerings. They – and possibly also national institutions – should be able to place their offerings on one website with one application portal for start-ups to apply to several programmes by providing the same financial documents and other information. The European Commission’s website for funding and tender opportunities is a step in the right direction but needs to become more user-friendly.⁶⁵ Effectiveness in public funding could also be improved by collecting growth data on start-ups. Verified private investors or banks could then view these numbers with greater confidence in their legitimacy, potentially mobilizing additional private investment.

Overall, clear communication is needed to create greater access to growth-stage funding. European public funding institutions could work together to streamline a pathway for companies similar to Northvolt and Lilium, preparing companies vetted at early stages to receive scale-up funding from EIB and private investors when the time comes.

2. Apply blended finance to scale Europe’s industrial transformation

Smart financing structures are needed to address the mismatch of the VC model and deep-tech investment. Blended finance uses a mix of public and private investment to meet the needs of deep

tech for high capex and long investment cycles. In Europe, however, it remains niche. Mainstreaming blended finance tools is critical to funding deep-tech companies that provide green technologies.

Deep-tech start-ups face a financing “valley of death”. Defined by a need for higher amounts of capital and longer time periods to commercialization, they are not naturally aligned with the traditional VC model.⁶⁶ While such companies may be prime candidates for public investment in initial R&D, their funding opportunities at the scale-up stage from public and private investors are more rare in Europe due to smaller VC fund sizes and less experience with the sector than in the US.

Rather than direct grants or subsidies, deep tech needs blended finance – but expertise in structuring deep-tech deals is scarce in Europe. Blended finance is a structuring approach which uses public funding to de-risk private funding and, by doing so, acclimatize private investors with a new technology, sector, region or asset class. The objective is to create a financial track record for the new investment area, enabling private investors to assess their risk more accurately and increasingly invest without public support. Convergence, the global network for blended finance, outlines four common structures:⁶⁷

1. **Public or philanthropic investors provide funds on below-market terms as protection to private investors.** For example, a government might provide a €10 million junior equity investment that is used as the first-loss tranche in a €100 million fund. Private investors lose their investment only if the €10 million first-loss is used up. However, if the venture is successful, the government tranche can be the first repaid or even repaid at a premium.

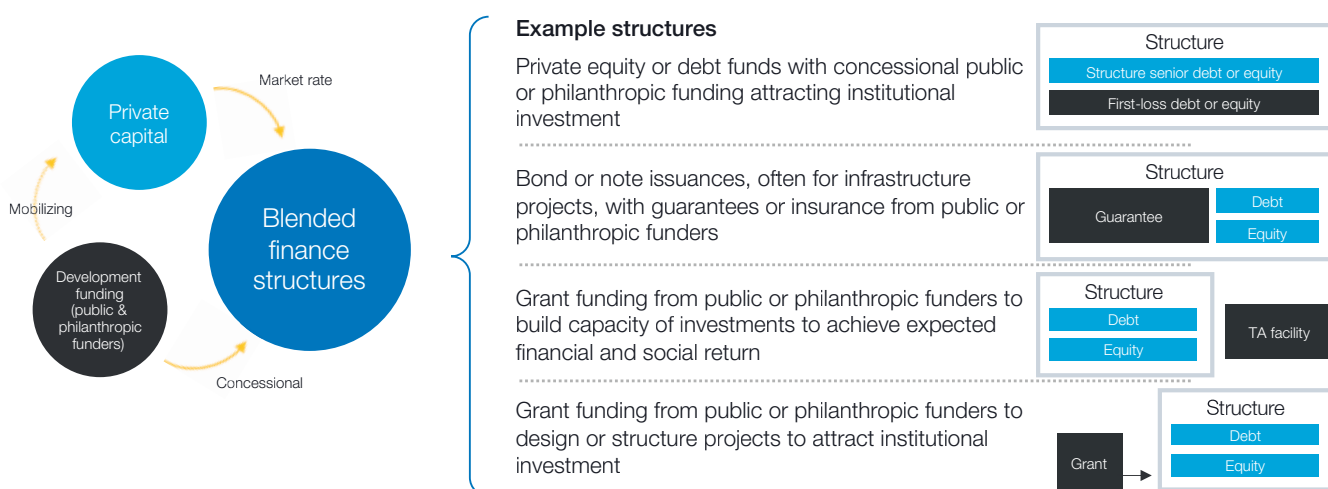
2. **Public or philanthropic investors provide credit enhancement through guarantees or insurance on below-market terms.** For example, a government might provide a guarantee for a pilot plant when a start-up does not have collateral and banks do not know how to assess the plant's value. The guarantee ensures debt payments to the bank in case of failure. No public money is used in case of success.
3. **A grant-funded technical assistance facility strengthens commercial viability and development impact.** Such a facility could provide in-kind support for legal services, product testing, access to research facilities, or adapting the business model for underserved communities.
4. **Grants fund transaction design or preparation.** For example, the government funds legal costs to structure the first bond of a start-up, aiming to reduce its long-term cost of finance.

Figure 5 provides an overview of typical blended finance mechanisms and structures.

Blended finance structures could also incentivize patient capital from the private sector. While patient capital has a high tolerance for risk, a longer time horizon than traditional risk capital, and is more flexible to meet the needs of entrepreneurs, it is still return-oriented.⁶⁸ Patient capital from the private sector has been primarily used in development funding, where social private investors such as church pension funds and foundations will take lower returns in blended structures to crowd in commercial investors.⁶⁹ The public sector could incentivize foundations or other private investors with social missions to participate in deep-tech funds as patient investors. In this case, the funds can be more impact and mission focused, seeking a triple bottom line of financial, environmental and social return. Such scale-up impact funds aligned with the Green Deal could be incentivized by the public sector through tax incentives on the returns for the patient share classes in these blended impact vehicles.

Blended finance is scarcely used in Europe, but it is a highly effective tool to mobilize private investment. Public financing has typically been used to save struggling corporates or has been focused in R&D and early-stage financing

Figure 5: European public funding providers for innovation funding and how they fit into the start-up lifecycle (Illustrative)



Source: Convergence

Box 4: European green deep-tech success stories: Ynsect

The French company Ynsect farms mealworms to produce ingredients for crop fertilizers and animal feed, a market worth €462 billion. Founded in 2011, it raised €115.5 million in its series C funding in 2019. Ynsect is using these funds to move from a pilot production facility to build the largest insect farm in the world. The company is funded by a mix of public and private investors, including Bpifrance.

Box 5: Testbeds to accelerate product uptake

“Testbeds” are facilities used to test new machinery or services, especially in the medical sector. An Ontario hospital set up a 34-bed innovation unit to test novel technologies, such as smart beds and video communication stations. The solutions that work are rolled out to the rest of the hospital and potentially other facilities. The Nordic Test Beds (NoTeB) project developed guidelines for testing solutions in hospitals. Nordic university hospitals often replicate hospital premises for healthcare device-testing purposes.

where public funding can be spread across a large number of innovative companies. Now, larger investments are needed in a smaller number of growth companies. While there are successful examples of public-private co-financing (see Boxes 1, 2 and 4⁷⁰), there is not yet any systematic effort to pursue such opportunities. At least €260 billion of additional annual investment is needed through 2030 to achieve the goals of the Green Deal and the Paris Agreement⁷¹ and blended finance can be much more effective in mobilizing private finance than traditional public investment. The Green Investment Fund, for example, reached a leverage ratio of €0.6 to every €1 invested through regular public investment, while the leverage on blended projects was €6.30.⁷² Blended finance structures are better than subsidies or grants in that the public investment is not automatically lost. If the project is successful, the public investor either does not have to mobilize any funding at all (guarantee) or recovers full funding from the return (first loss). The public provider only “loses” the investment if the project or company fails – and, even then, it may recover up to half of the investment through tax revenue, while generating valuable institutional learning within the new sector or technology.

Some public initiatives are testing the water for blended finance. Germany is creating the €10 billion Zukunftsfonds (“future fund”) with Allianz Global Investors and KfW. It will invest in VC funds and could co-invest directly in start-ups. In discussion is a vehicle where the German government takes on the “first loss” position,⁷³ inspired by similar funds in Denmark and Belgium. President Emmanuel Macron has also announced that French institutional investors will create a late-stage €5.5 billion VC fund,⁷⁴ though it is not yet clear if and how it will use blending tools. The UK’s start-up stimulus package includes a £500 million fund for high-growth companies, made up of funding from government and the private sector.⁷⁵ This first generation of blended finance funds provide an opportunity to increase familiarity with these type of funding vehicles in Europe.

The EIC Accelerator Pilot and Fast Track to Innovation also provides blended finance. However, the funding amounts for the 2018-2020 period were small at about €3 million and scaling Europe’s deep-tech companies will require substantially higher amounts.⁷⁶ Proposals also exist for a European sovereign wealth fund, which would anchor funds managed by the private sector focused on energy, transport, agriculture, food

tech and water. Such a fund would have enough resources to create downstream investment of the size needed for green deep-tech companies to scale⁷⁷ and could employ blended finance.

3. Create public and private procurement opportunities

Start-ups need a market for their technologies to reach scale. However, in Europe it can be very difficult for technology companies in the B2B and B2B2C space to sell their products and services. Procurement opportunities for deep-tech start-ups are especially rare due to the novelty of their products but could be even more valuable than direct funding.

In Europe, start-ups struggle to work with the public sector and corporates. Sales cycles are long and public procurement frameworks often expect to see several years of historical income statements. For start-ups, slow processes and low success rates make applying for government contracts a risky investment, even if they have a superior product. There are successes, such as Estonia's e-governance initiative, that set the goal to digitize 99% of public services,⁷⁸ but they are rare. European corporates are also less likely than their US peers to try new products and services or even to rotate suppliers, but they are making improvements: 62% of European scale-ups in PitchBook's 2019 Tech Tour identified as B2B companies, up from just 24% in 2015.^{79,80}

Public and corporate procurement opportunities can foster long-term growth in strategic sectors. Contracts with established entities such as governments and corporations can create security for investors and credibility for the start-up. It also creates growth through revenues and provides opportunity for start-ups to refine and tailor their products. Such contracts can drive down costs as economies of scale are reached more quickly – especially important with deep-tech applications. In the US, government agencies such as DARPA and NASA provide opportunities for public procurement, while learnings trickle down to the private sector. For example, in 2008, NASA signed a \$1.6 billion contract with SpaceX, which has since replaced

France's Arianespace as the global leader for satellite launches. DARPA also supports deep-tech start-ups to win procurement opportunities across a wide range of public institutions.⁸¹

The European Commission has laid out a new framework for public procurement that can be a first step into the right direction. Among other recommendations, the new procurement framework recommends that governments divide larger contracts into smaller lots, expand strategic procurement, leave intellectual property rights with SMEs so they can commercialize it, and digitize procurement processes.⁸² The Commission is also launching new initiatives to facilitate private procurement for sustainable products as part of the new SME strategy: the Big Buyers and Networks Initiative will collaborate with the private sector to stimulate private procurement, while an "SME-friendly" label aims to spread adoption of new procurement-relevant standards.⁸³

Post-COVID stimulus can create procurement opportunities for sustainable technologies as well as promote the pan-European approach to innovation. The crisis has highlighted insufficient digitalization in the public and private sector, creating pressure on outdated systems and risk-averse managers to adopt new technologies. It has also created opportunities for start-ups to prove they can play a key role in response. For example, healthtech start-ups across Europe are providing critical support to government actions, like British unicorn Babylon Health's symptom-tracking app and Swedish Kry's free web-based platform for healthcare professionals to keep in touch with patients.⁸⁴ Even without a pandemic, European governments would have to ramp up public spending to achieve Green Deal ambitions. The COVID support packages, if applied to procurement of green solutions, can contribute to job growth and technology adaptation in sustainable sectors. Furthermore, if applied at a pan-European level, public procurement can serve as a way to build up the Digital Single Market, supporting innovation across Europe.⁸⁵

4. Give European growth companies a voice on policy and standards

European technology companies need to understand and participate in shaping the political and regulatory environment in which they operate if they are to evolve into world leaders of their industries. The use of funding to form industry associations can have a multiplier effect for building alliances and fostering competition within evolving industries. Companies can work together on common objectives, develop new markets and agree on common operating standards. This tried and tested format could help sustainable sectors in Europe to grow.

European companies face industry-specific barriers related to regulation and standardization. The right regulatory framework can be an industry's foundation for success. For example, Europe boasts a highly cohesive regulatory framework for the financial sector. Fintech companies in Europe need only one licence for the EU market, while in the US, they need a licence for every state.⁸⁶ This has helped fintech companies raise more funding than any other sector in Europe.

The European Commission's 2019 Rolling Plan for ICT Standardization also defines a roadmap for setting quality standards and minimum requirements which would allow consumers to compare products, with many of the listed priorities relevant for deep-tech and green-tech companies. Other policy efforts pertinent to

entire industries include the taxation of employee shares in start-ups (Box 6^{87,88,89,90,91}), which poses an ongoing challenge to attracting and retaining niche technical talent.⁹²

SMEs and growth-stage start-ups rarely participate in policy-making and standardization processes. Other obstacles for SMEs when operating in the Single Market are complex administrative procedures, different national rules and lack of access to information on policies. These barriers deter cross-border business and scaling.⁹³ The Commission's SME Strategy launched in March 2020, for example, provides an opportunity for start-ups to participate in addressing these issues and creating a regulatory framework that works for them.⁹⁴ However, even growth companies do not usually see participation as a priority.⁹⁵ Although these are powerful tools for corporates to improve their competitiveness, it is time-consuming and requires expertise that start-ups, even during growth stage, may lack. This challenge is particularly significant for deep-tech companies in highly regulated sectors such as energy, health, food and transport. VC investors do not generally finance participation in regulatory processes and policy-makers can find conversations with consolidated industry players to be more efficient.⁹⁶

Box 6: Policy challenges

The European Commission's Rolling Plan for ICT Standardization defines priority areas including environmental impact, advanced manufacturing, smart cities, smart grids, robotics and autonomous systems, and water management digitization. Developing standards will increase private and public demand for these technologies by setting quality benchmarks for what buyers can expect.

Taxation of employee stock options comes up when the European talent pool is discussed. Talent with deep-tech scaling experience is especially hard to attract and retain. Index Ventures highlights Estonia, Israel and Canada as best-practice examples of fostering the use of stock options by start-ups for employee compensation at all stages of growth.

Box 7: Start-up industry associations and network organizations: IPIFF

The **International Platform of Insects for Food and Feed (IPIFF)** is an EU non-profit organization, with 64 members, which represents the insect production sector. IPIFF promotes insects as an alternative source of protein for human consumption and animal feed. In 2017, it successfully worked with EU legislators to open the market for aquaculture feed to insect producers, creating an extraordinary opportunity for growth.

Box 8: Start-up industry associations and network organizations: Innovation Superclusters Initiative

The Canadian government is investing \$950 million over five years into five **“innovation superclusters”** – digital technology, protein industries, next-generation manufacturing, AI and oceans. Located in areas of Canada where there is already a cluster of companies, they aim to foster cooperation and exchange. Over 10 years, they are expected to grow regional economies by more than \$50 billion and create 50,000 jobs.

Industry associations are a powerful tool for start-ups to participate in regulation, effectively open markets and create network effects. Industry associations traditionally participate in policy-making processes on behalf of SMEs and corporations,⁹⁷ thereby lowering the barriers to entry for smaller companies as they share costs and capacities. However, current industry associations often do not adequately represent the interests of very innovative companies or smaller, newer members because they are dominated by incumbents. For example, dairy industry associations lobbied for a 2017 EU judgement that the plant milk industry ban the words “milk”, “cream”, “butter”, “cheese”, or “yoghurt”.⁹⁸ Scale-ups powering the green transition are likely to face similar legal and regulatory battles and need to work together to have their voices heard. Industry associations can also help regulators understand the benefits and challenges of emerging technologies, as well as why and how to support certain sectors⁹⁹ (Box 7^{100,101,102}). Beyond engagement on policy, industry associations can help start-ups connect with skilled people, technology centres and organizations to accelerate knowledge diffusion and integrate value chains.¹⁰³ Canada’s support for the Innovation Superclusters Initiative (Box 8) is one attempt to achieve this.

Public funding for industry associations could prove excellent value for money. Even relatively small funding – up to €500,000 – could significantly support competition by enabling start-ups with similar interests to connect with policy and standardization authorities, countering the bias towards incumbents. Building decision-makers’ capacity to understand deep-tech sectors could create long-term sustainable change. To create the ICT Roadmap for Europe, the EU funded the participation of 239 individuals across the EU, who were able to build capacities in cybersecurity, big data, IoT, and other themes essential to Europe’s competitiveness.¹⁰⁴ Individuals working at start-ups that are able to participate through public funding will also develop new skills and be able to provide ongoing value for the European innovation ecosystem as a whole. Some best practices for innovative industry associations could include: (1) limiting membership to growth-stage, not early-stage, companies already active in the market; (2) setting criteria for technical excellence, to assure engagement from the best-in-class companies; (3) aligning interests and common objectives that are specific to the particular industry; and (4) ensuring member companies are represented directly by their founders for a real-world understanding of business needs.

Concluding Remarks

Europe has the opportunity to create a strong and sustainable post-COVID recovery by prioritizing green technologies. This means finding better ways to support scale-ups through sophisticated funding – an area in which Europe continues to lag behind the US. Investors, entrepreneurs and policy-makers must all work together in exploring innovations in finance, procurement and regulations that assure vital technologies are able to develop and reach scale.

This report has identified four possibilities: streamlining access to public funding for innovative start-ups; applying blended finance models; making it easier for new companies to partake in public and private procurement; and improving the voice of European growth companies in policy-making and standardization. Europe's ambition to decarbonize by 2050 depends on it.

Acknowledgements

Digital Europe Board

Alain Roumilhac, President, ManpowerGroup

Alexander De Croo, Deputy Prime Minister and Minister of Finance and of Development Cooperation, Ministry of Finance of Belgium

Bas Beekman, Director StartupAmsterdam, Government of Amsterdam

Brent Hoberman, Executive Chairman, Founders Factory

Diana Biggs, Global Head of Innovation, Private Bank, HSBC Holdings Plc

Dorothee Bär, State Minister for Digital Affairs, Federal Chancellery of Germany

Elena Alfaro Martínez, Global Head, Data Strategy and Data Science Innovation, BBVA SA

Eva Kaili, Member of the European Parliament

Eva Maydell, Member of the European Parliament

Felix Staeritz, Founder and Chief Executive Officer, FoundersLane

Gerard Grech, Chief Executive Officer, Tech Nation

Gillian Tans, Chairwoman, Booking.com BV

Gisbert Rühl, Chief Executive Officer, Klöckner & Co SE

Henk Siebren de Jong, Chief, International Markets; Executive Vice-President; Member of the Executive Committee, Royal Philips

Iliyana Tsanova, Deputy Managing Director, European Fund for Strategic Investment (EFSI)

Jonathan Lavender, Global Head, KPMG Private Enterprise, KPMG International

Jüri Ratas, Prime Minister of Estonia

Klaus Hommels, Founder and Chief Executive Officer, Lakestar Advisors GmbH

Mariya Gabriel, Commissioner for Innovation, Research, Culture, Education and Youth, European Commission

Michael Altendorf, Co-Founder and Chief Executive Officer, Adtelligence GmbH

Nicolas Colin, Co-Founder and Partner, The Family

Serpil Timuray, Chief Commercial Operations and Strategy Officer, Vodafone Group Plc

Taavet Hinrikus, Co-Founder and Chief Executive Officer, TransferWise

Tom Wehmeier, Partner and Head of Research, Atomico

Digital Leaders of Europe Community

Adela Zabrazna, Home Affairs Officer, Slovak Republic Government

Ali Parsa, Chief Executive Officer and Founder, babylon

Ana Trbovich, Chief Operating Officer & Co-Founder, Grid Singularity GmbH

Anat Bar-Gera, Chairperson, Cyverse AG

Andreas Kunze, Chief Executive Officer and Co-Founder, KONUX Inc.

Andy Shannon, Partner and Head of Global Operations, Startupbootcamp

Anjali Ramachandran, Co-Founder, Ada's List

Anya Navidski, Founder & Chief Executive Officer, Voulez Capital

Ashleigh Ainsley, Co-Founder, Colorintech

Bindi Karia, Member of the High-Level Group, European Innovation Council
Bogdan Ceobanu, Policy Officer, Communication Networks, Content & Technology (DG CNECT)
Brigitte Baumann, Founder and Chief Executive Officer, Go Beyond
Carmen Bermejo, International Affairs, Asociación Española de Start-ups
Christoph Bornschein, Co-Founder and Chief Executive Officer, TLGG
Claus Moseholm, Executive Chairman, Spiri & Drivr
Cristina Fonseca, Global Shaper, Lisbon Hub
Daniel Sachs, Chief Executive Officer, Proventus AB
Diana Paredes, Chief Executive Officer and Co-Founder, Suade
Eurico Neves, President, Inova
Felix Haas, Co-Founder and Executive Chairman, IDnow
Ferdinand Grapperhaus, Chief Executive Officer, PHYSEE
Florian Leibert, Chief Cloud Officer, Mesosphere
Florian Nöll, Chairman of the Board, Bundesverband Deutsche Start-ups e.V.
Gianluca Dettori, Executive Chairman, Primomiglio SGR
Haley Murphy, Network Development, Index Ventures SA
Harry Briggs, Managing Director, OMERS Ventures
Husayn Kassai, Chief Executive Officer, Onfido Ltd
Igor Tasic, Founder and Chief Executive Officer, Startup Europe Week
Julie Ranty, Managing Director, Vivatech
Kristina Lagerstedt, Chief Executive Officer, Founder, 1928 diagnostics AB
Luca Verre, Chief Executive Officer and Co-Founder, Prophesee SA
Michael Stephanblome, Founding Partner, FoundersLane
Nicole Büttner-Thiel, Founder, Merantix
Patrick Gruhn, Co-Founder, Replex
Pip Jamieson, Chief Executive Officer and Founder, The Dots Global Ltd
Raghu Movva, Managing Director of SEI, CDI & Fondazione Agnelli
Ramona Liberoff, Independent Angel Investor
Ray Walshe, Assistant Professor, Dublin City University
Rob Leslie, Chief Executive Officer, Sedicii Innovations Limited
Robin Wauters, Founding Editor, Tech.eu
Roxanne Varza, Director, Station F
Ruben Nieuwenhuis, Director, Government of Amsterdam
Stavriana Kofteros, Co-Founder, Startup Cyprus
Stephan Morais, Managing General Partner, Indico Capital Partners SCR
Sunnie Groeneveld, Global Shaper, Zurich Hub,
Tabitha Goldstaub, Co-Founder, CognitionX
Tanya Suarez, Founder, IoT Tribe
Till Ohrmann, Chief Executive Officer, Co-Founder, PIRATE.global
Wolfgang Gründinger, Cyber Innovation Hub, German Armed Forces
Jan Goetz, Founder, IQM Quantum Computers

Digital Europe would also like to thank the following contributors for sharing their ideas and experience:

Hubert Cottogni, Director & Head of Mandate Management, European Investment Fund (EIF)

Guenia Gawendo, Managing Director, Telefonica Innovation Ventures

Thomas Hellmann, DP World Professor of Entrepreneurship and Innovation, Saïd Business School, University of Oxford

Martin Kern, Director, European Institute of Innovation and Technology (EIT)

Jörg Sievert, Independent Board Member

Strategic Direction

Martina Larkin, Head of Regional Strategies – Europe and Eurasia, Member of the Executive Committee, World Economic Forum

Jonathan Lavender, Global Head, KPMG Private Enterprise, KPMG International

Maren Schmitz, Partner, Head of Asset Management, Financial Services, KPMG AG

Project Team

Karoline Hallmeyer, Assistant Manager, KPMG Germany (lead author)

Julie Ziskind, Project Lead, Digital Europe, Centre for Regional and Geopolitical Affairs, World Economic Forum

Endnotes

1. Tech Nation, What is a scaleup?, 6 August 2019, <https://technation.io/news/what-is-a-scaleup/>
2. Rocket Space, 7 Key Differences Between Startups and Scale-ups, 3 January 2018, <https://www.rocketpace.com/tech-start-ups/7-key-differences-between-start-ups-and-scale-ups>
3. Atomico (2019). State of European Tech. At <https://2019.stateofeuropeantech.com/chapter/investments/article/investmentsnapshot/>
4. Tech Nation – UK Tech For a Changing World Report, 2020, <https://technation.io/report2020/>
5. Sifted, European tech has record quarter with €9.3bn VC investment, 1 July 2019, <https://sifted.eu/articles/european-tech-record-e3bn-vc-investment/>
6. KPMG, Venture Pulse Q4 2019, 15 January 2020, <https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/01/venture-pulse-q4-2019-europe.pdf>
7. Atomico, State of European Tech, 2019, <https://2019.stateofeuropeantech.com/chapter/investments/article/european-exit-landscape/>
8. Tech Nation – UK Tech For a Changing World Report, 2020, <https://technation.io/report2020/>
9. Sifted/Dealroom, What does it take? Europe's Startup Ecosystem Navigating the COVID-19 Crisis, 2020, <https://weforum.box.com/s/zzq9jbipknpsk0yuqubewgvivq8fzq1q>
10. European Commission, The European Green Deal, 11 December 2019, https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf
11. Vestager, M., Keeping the EU competitive in a green and digital world, 2 March 2020, https://ec.europa.eu/commission/commissioners/2019-2024/vestager/announcements/keeping-eu-competitive-green-and-digital-world_en
12. Speech by President von der Leyen at the European Parliament Plenary on the EU coordinated action to combat the coronavirus pandemic and its consequences, 16 April 2020, https://ec.europa.eu/commission/presscorner/detail/en/speech_20_675
13. The Best Schools, Top 10 Engineering Technology Programs in the World, 27 July 2019, <https://thebestschools.org/features/best-engineering-technology-computer-sciences-programs-in-world-today/>
14. Atomico, State of European Tech, 2019, <https://2019.stateofeuropeantech.com/chapter/investments/article/investment-snapshot/>
15. Slush Workshop, 21 November 2019
16. Atomico, State of European Tech, 2019, <https://2019.stateofeuropeantech.com/chapter/investments/article/european-exit-landscape/>
17. Axon, Participation of Institutional Investors in European Venture Capital, 2019, https://www.axonpartnersgroup.com/wp-content/uploads/2019/06/Participation_of_Institutional_Investors_in_European_Venture_Capital.pdf
18. Tech.EU, Blooming Late: The rise of late-stage funding for European technology scale-ups, 2019, https://tech.eu/wp-content/uploads/woocommerce/uploads/2019/05/Blooming-Late_FA.pdf
19. Atomico, State of European Tech, 2019, <https://2019.stateofeuropeantech.com/chapter/investors/article/vcs-and-lps/>
20. Bradely et al, Cross-Border Venture Capital Investments: What is the Role of Public Policy, 2019, <https://ecgi.global/working-paper/cross-border-venture-capital-investments-what-role-public-policy>

21. Forbes, Why Silicon Valley Investors Are Bonkers For European Startups, 2 December 2019, <https://www.forbes.com/sites/alexkonrad/2019/12/02/inside-silicon-valleys-european-startup-rush/#43ae0c9946f8>
22. Bradely et al, Cross-Border Venture Capital Investments: What is the Role of Public Policy, 2019, <https://ecgi.global/working-paper/cross-border-venture-capital-investments-what-role-public-policy>
23. Bradely et al, Cross-Border Venture Capital Investments: What is the Role of Public Policy, 2019, <https://ecgi.global/working-paper/cross-border-venture-capital-investments-what-role-public-policy>
24. Gaddy, B., Sivaram, V., O'Sullivan, F., Venture Capital and Cleantech: The Wrong Model for Clean Energy Innovation, MIT Energy Initiative Working Paper, 2016, <https://energy.mit.edu/wp-content/uploads/2016/07/MITEI-WP-2016-06.pdf> and Network Digital 360, What is Deep Tech and which startups are marking the road (not Uber), 20 April 2018, <https://www.startupbusiness.it/what-is-deep-tech-and-which-startups-are-marking-the-road-not-uber/96448/>
25. Gaddy, B., Sivaram, V., O'Sullivan, F., Venture Capital and Cleantech: The Wrong Model for Clean Energy Innovation, MIT Energy Initiative Working Paper, 2016, <https://energy.mit.edu/wp-content/uploads/2016/07/MITEI-WP-2016-06.pdf>
26. Sequoia, Coronavirus: The Black Swan of 2020, 5 March 2020, <https://medium.com/sequoia-capital/coronavirus-the-black-swan-of-2020-7c72bdeb9753>
27. Pitchbook, Coronavirus updates (April 6-April 12): Coronavirus effects on private markets, 12 April 2020, <https://pitchbook.com/news/articles/coronavirus-updates-latest-news-and-analysis-april-6-april-12#start-ups>
28. Based on various interviews
29. Based on various interviews
30. Gauthier J. F., Morelix A., The Impact of COVID-19 on Global Startup Ecosystems: Global Startup Survey, April 2020, <https://startupgenome.com/reports/impact-covid19-global-startup-ecosystems-startup-survey>
31. Speech by President von der Leyen at the European Parliament Plenary on the EU coordinated action to combat the coronavirus pandemic and its consequences, 16 April 2020, https://ec.europa.eu/commission/presscorner/detail/en/speech_20_675
32. France Digitale, Covid-19 Startup policy in the EU, https://tilkee.view-docs.com/v/997f71b6f9_6014bec2dbd6c4bec40781d1c4c967be3c07d4c2
33. Davis Polk, UK Announces £500 Million Convertible Loan Scheme for UK Start-ups Hit By Coronavirus (COVID-19), 22 April 2020, <https://www.finregreform.com/single-post/2020/04/22/uk-announces-500-million-convertible-loan-scheme-for-uk-start-ups-hit-by-coronavirus-covid-19/>
34. Bpifrance, Building Momentum in Venture Capital across Europe, 2016, <https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Studien-und-Materialien/Building-Momentum-in-Venture-Capital-across-Europe.pdf>
35. Seed Legals, The government's Future Fund won't help UK startups, 21 April 2020, <https://seedlegals.com/resources/the-governments-future-fund-wont-help-uk-start-ups/>
36. Fichter, K., Olteanu, Y., Green Startup Monitor 2018, Borderstep Institut, 2019, <https://www.borderstep.de/wp-content/uploads/2019/03/GreenStartupMonitor2018.pdf>
37. Fichter, K., Olteanu, Y., Green Startup Monitor 2018, Borderstep Institut, 2019, <https://www.borderstep.de/wp-content/uploads/2019/03/GreenStartupMonitor2018.pdf>
38. EU Technical Expert Group on Sustainable Finance, Taxonomy: Final report of the Technical Expert Group on Sustainable Finance, 2020, https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf
39. Tech Nation, UK Tech For a Changing World Report, 2020, <https://technation.io/report2020/>
40. Based on various interviews

41. TechCrunch, Identikits Of The European Unicorns, 3 November 2015, <https://techcrunch.com/2015/11/02/identikits-of-the-european-unicorns/>
42. EU Startups, 27 European startups that have reached unicorn status, 16 April 2019, <https://www.eu-start-ups.com/2019/04/27-european-start-ups-that-have-reached-unicorn-status/>
43. Investopedia, The Top 10 Technology Companies, updated 14 May 2020, <https://www.investopedia.com/articles/markets/030816/worlds-top-10-technology-companies-aapl-googl.asp>
44. European Straits, Israel, The Original Startup Nation, 21 November 2019, <https://europeanstraits.substack.com/p/nicolas-colin-israel-trips-next-year-18-11-21>
45. World Economic Forum, Innovate Europe Competing for Global Innovation Leadership, 2019, http://www3.weforum.org/docs/WEF_Innovate_Europe_Report_2019.pdf
46. Bradely, W., Durufle, G., Hellmann, T. F., Wilson, K., Cross-Border Venture Capital Investments: What is the Role of Public Policy?, 2019, <https://ecgi.global/working-paper/cross-border-venture-capital-investments-what-role-public-policy>
47. European Commission, An SME Strategy for a sustainable and digital Europe, 10 March 2020, https://ec.europa.eu/info/sites/info/files/communication-sme-strategy-march-2020_en.pdf
48. European Commission, EIC pilot advisory board, <https://ec.europa.eu/research/eic/index.cfm?pg=hlg#what>
49. European Commission, Horizon Europe, May 2019, https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/presentations/horizon_europe_en_investing_to_shape_our_future.pdf
50. European Commission, An SME Strategy for a sustainable and digital Europe, 10 March 2020, https://ec.europa.eu/info/sites/info/files/communication-sme-strategy-march-2020_en.pdf
51. <https://eit.europa.eu/who-we-are/eit-glance/eit-strategy-2021-2027>
52. Based on several interviews
53. European Institute of Innovation and Technology, EIT Strategy 2021 – 2027, <https://eithealth.eu/in-your-region/innostars/eit-hub-in-israel/>
54. European Commission, Horizon Europe, May 2019, https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/presentations/horizon_europe_en_investing_to_shape_our_future.pdf
55. EIF, What We Do, https://www.eif.org/what_we_do/index.htm
56. European Institute of Innovation and Technology, EIF and EIT Health collaborate, 18 September 2019, <https://eit.europa.eu/news-events/news/eif-and-eit-health-collaborate>
57. European Institute of Innovation and Technology, Liliium, <https://eit.europa.eu/news-events/success-stories/liliium>
58. EU Startups, Volkswagen leads €886 million investment in Northvolt to power Europe with its gigafactory for lithium-ion batteries, 14 June 2019, <https://www.eu-start-ups.com/2019/06/volkswagen-leads-e886-million-investment-in-northvolt-to-power-europe-with-its-gigafactory-for-lithium-ion-batteries/>
59. EU Startups, Volkswagen leads €886 million investment in Northvolt to power Europe with its gigafactory for lithium-ion batteries, 14 June 2019, <https://www.eu-start-ups.com/2019/06/volkswagen-leads-e886-million-investment-in-northvolt-to-power-europe-with-its-gigafactory-for-lithium-ion-batteries/>
60. EU Startups, Volkswagen leads €886 million investment in Northvolt to power Europe with its gigafactory for lithium-ion batteries, 14 June 2019, <https://eit.europa.eu/news-events/news/eit-innoenergy-supported-northvolt-secures-eur-350-million-loan-european-investment>
61. EU Startups, Munich-based Liliium raises €224.2 million to expand its air taxi service, 23 March 2020, <https://www.eu-start-ups.com/2020/03/munich-based-liliium-raises-around-e224-2-million-to-expand-its-air-taxi-service/>

62. Axon, Participation of Institutional Investors in European Venture Capital, 2019, https://www.axonpartnersgroup.com/wp-content/uploads/2019/06/Participation_of_Institutional_Investors_in_European_Venture_Capital.pdf
63. Department of Energy, Tesla, <https://www.energy.gov/lpo/tesla>
64. Defense Advanced Research Projects Agency, Budget, archived from the original on November 13, 2015, retrieved April 2, 2019, <https://web.archive.org/web/20151113025428/http://www.darpa.mil/about-us/budget>
65. European Commission, Fast Track to Innovation, 27 Oct 2017, <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/eic-fti-2018.-2020;freeTextSearchKeyword=;typeCodes=0,1;statusCodes=31094501,31094502;programCode=null;programDivisionCode=null;focusAreaCode=null;crossCuttingPriorityCode=null;callCode=Default;sortQuery=openingDate;orderBy=asc;onlyTenders=false;topicListKey=topicSearchTablePageState>
66. Gaddy, B., Sivaram, V., O'Sullivan, F., Venture Capital and Cleantech: The Wrong Model for Clean Energy Innovation, MIT Energy Initiative Working Paper, 2016, <https://energy.mit.edu/wp-content/uploads/2016/07/MITEI-WP-2016-06.pdf>
67. Convergence, The State of Blended Finance 2019, https://assets.ctfassets.net/4cgqlwde6qy0/58T9bhxExlNh2RilxWxSNe/ba56fa36c81349640179779ddd68cc99/Convergence_-_The_State_of_Blended_Finance_2019.pdf
68. Acumen, Patient Capital, <https://acumen.org/about/patient-capital/>
69. OECD, Making Blended Finance Work for the Sustainable Development Goals, 2018, <https://www.oecd-ilibrary.org/docserver/9789264288768-10-en.pdf?expires=1590135310&id=id&accname=guest&checksum=B5BA18880EF680B1F671C4AE9DE784FB>
70. AgFunder News, French Insect Farming Startup Ynsect Raises \$125m Series C Breaking European Agtech Record, 20 February 2019, <https://agfundernews.com/breaking-french-insect-farming-startup-ynsect-raises-125m-series-c-breaking-european-agtech-record.html>
71. European Parliament, Europe's one trillion climate finance plan, 15 January 2020, <https://www.europarl.europa.eu/news/en/headlines/society/20200109STO69927/europe-s-one-trillion-climate-finance-plan>
72. Global Environment Facility, Blended Finance, <https://www.thegef.org/topics/blended-finance>
73. Breinich-Schilly, A., Future funds for start-ups do not tolerate a delay, Springer Professional, 22 January 2020, <https://www.springerprofessional.de/finanzierung/unternehmensgruendung/zukunftsfonds-fuer-start-ups-duldet-keinen-aufschub/17569338>
74. Tech Crunch, Macron announces €5 billion late-stage investment pledge from institutional investors, 17 September 2019, <https://techcrunch.com/2019/09/17/macron-announces-e5-billion-late-stage-investment-pledge-from-institutional-investors/>
75. HM Treasury and Innovate UK, Billion pound support package for innovative firms hit by coronavirus, 20 April 2020, <https://www.gov.uk/government/news/billion-pound-support-package-for-innovative-firms-hit-by-coronavirus>
76. European Commission, How to find available funding, <https://ec.europa.eu/research/eic/index.cfm?pg=funding#fti>
77. Independent, EU draws up plans for €100bn investment fund to compete with US and China, 23 August 2019, <https://www.independent.co.uk/news/world/europe/eu-sovereign-wealth-fund-investment-industrial-champions-commission-france-germany-a9076421.html>
78. E-Estonia, e-Governance, <https://e-estonia.com/solutions/e-governance/>
79. Tech Tour Growth 50, Redefining Ambition 2019: Meet Europe's Super Scale-Ups, 2019, https://techtourgrowth50.com/binaries/content/assets/publications/2019_ttg50_redefining-ambition
80. TechCrunch, Identikits Of The European Unicorns, 3 November 2015, <https://techcrunch.com/2015/11/02/identikits-of-the-european-unicorns/>

81. Defense Advanced Research Projects Agency, Transition & Commercialization, <https://www.darpa.mil/work-with-us/for-small-businesses/commercialization-continued>
82. European Communication, Innovation Procurement, <https://ec.europa.eu/digital-single-market/en/innovation-procurement>
83. European Commission, An SME Strategy for a sustainable and digital Europe, 10 March 2020, https://ec.europa.eu/info/sites/info/files/communication-sme-strategy-march-2020_en.pdf
84. Sifted, How startups are supporting Europe's coronavirus efforts, 30 March 2020, <https://sifted.eu/articles/startup-initiatives-coronavirus/>
85. Blog: Fragmentation of the European market – Nicolas Colin the family WEFORUM 15.01.2020
86. Tech.EU, Blooming Late: The rise of late-stage funding for European technology scale-ups, 2019, https://tech.eu/wp-content/uploads/woocommerce_uploads/2019/05/Blooming-Late_FA.pdf
87. Index Ventures, Rewarding Talent: A guide to stock options for European entrepreneurs, 2018, <https://www.indexventures.com/rewardingtalent/when-are-employees-taxed>
88. Bradely et al, Cross-Border Venture Capital Investments: What is the Role of Public Policy, 2019, <https://ecgi.global/working-paper/cross-border-venture-capital-investments-what-role-public-policy>
89. European Commission, 2019 Rolling Plan for ICT Standardisation, 25 March 2019, <https://ec.europa.eu/docsroom/documents/34788>
90. Tech.EU, Blooming Late: The rise of late-stage funding for European technology scale-ups, 2019, https://tech.eu/wp-content/uploads/woocommerce_uploads/2019/05/Blooming-Late_FA.pdf
91. Based on various interviews
92. Not Optional, Not Optional—Europe must attract more talent to startups, January 2019, <https://notoptional.eu/>
93. European Commission, An SME Strategy for a sustainable and digital Europe, 10 March 2020, https://ec.europa.eu/info/sites/info/files/communication-sme-strategy-march-2020_en.pdf
94. European Commission, An SME Strategy for a sustainable and digital Europe, 10 March 2020, https://ec.europa.eu/info/sites/info/files/communication-sme-strategy-march-2020_en.pdf
95. Based on various interviews
96. Based on various interviews
97. Tech.EU, Blooming Late: The rise of late-stage funding for European technology scale-ups, 2019, https://tech.eu/wp-content/uploads/woocommerce_uploads/2019/05/Blooming-Late_FA.pdf
98. Food & Wine, EU Court Says Almond, Rice and Soy Beverages Can't Be Called 'Milk', 16 June 2017, <https://www.foodandwine.com/news/eu-court-says-almond-rice-and-soy-milks-cant-be-called-milk>
99. Based on various interviews
100. International Platform of Insects for Food and Feed, General Information, <https://ipiff.org/general-information/>
101. European Interest, Interview: Why European insect sector is an alternative source of proteins, 13 January 2020, <https://www.europeaninterest.eu/article/interview-european-insect-sector-alternative-source-proteins/>
102. International Platform of Insects for Food and Feed, General Information, The voice of the insect sector in the European Union, <https://ipiff.org/about-ipiff/>
103. European Commission, Investing in a smart, innovative and sustainable Industry: A renewed EU Industrial Policy Strategy, 2017, https://eur-lex.europa.eu/resource.html?uri=cellar:c8b9aac5-9861-11e7-b92d-01aa75ed71a1.0001.02/DOC_1&format=PDF
104. StandICT.Eu, Legacy And Road Ahead Towards 2023, <https://www.standict.eu/news/legacy-road-towards-2023>



COMMITTED TO
IMPROVING THE STATE
OF THE WORLD

The World Economic Forum, committed to improving the state of the world, is the International Organization for Public-Private Cooperation.

The Forum engages the foremost political, business and other leaders of society to shape global, regional and industry agendas.

World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744

contact@weforum.org
www.weforum.org