From Starting to Scaling

How to foster startup growth in Europe

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Executive summary

Ambitious, innovative startups that scale are recognised as key sources of employment, productivity growth and innovation for Europe. However, evidence suggests that many startups struggle to go from starting to scaling, resulting in a 'scaleup' gap in Europe. Moreover, while the long-term impact of the COVID-19 crisis on startups remains to be seen, many currently face greater constraints than before. At the same time, countries everywhere are likely facing a very deep recession, in which they will need every tool at their disposal to drive employment and economic growth. Continued policy support therefore is crucial.

This report investigates factors that influence startup growth, by identifying some unique features of high growth startups in Europe. While the data for this report was collected prior to the COVID-19 crisis, the findings underscore the role of high growth startups for innovation ecosystems in Europe. We also highlight some ways governments can continue to support startups by encouraging collaborations with startups as an active innovation partner.

We find that European high growth startups:

1. **Are new-to-the-world innovators**. Most European high growth startups report that the most innovative aspect of their business is a new-to-the-world innovation and many adopt innovative technologies (e.g. big data, artificial intelligence) in parts of their business.
2. **Hold the promise of high skilled job creation and growth**. Before COVID-19, a large share of high growth startups expected to increase the demand for high skilled workers and prioritised growth over short term profits.
3. **Are hindered by the availability of finance**. Already before COVID-19, the availability of finance was a major barrier for many high growth startups. In addition, our data reveals that, compared to US startups, European startups attract 54 per cent less private funding nine years after foundation. European high growth startups are also disproportionately hindered by a lack of staff with suitable skills and attitudes.
4. **Seemingly benefit from public startup grants/investment**. High growth startups are more likely than other startups to make use of more than one form of public support and particularly seem to benefit from startup grants/investments.

In times when there is enormous pressure on startups with high growth potential, we highlight some ways in which governments can continue to support them:

1. **Encourage corporate-startup collaboration to boost private investments**, e.g. by creating novel platforms for startups to collaborate with corporates and other partners.
2. **Expand governments' toolbox to engage with startups** through innovative procurement and co-development, e.g. by experimenting with new models of startup engagement.
3. **Promote early enterprise education to improve the availability of suitable staff**, e.g. by building on the Entrepreneurship Competence Framework to design and evaluate enterprise education initiatives.

Introduction

Startups, especially those that achieve high growth, are important sources of innovation and job creation.[1] For these reasons, European policy makers work hard to create effective ecosystems where innovative startups can thrive and scale. Continued policy support for high growth startups is crucial: while the long-term impact of the COVID-19 crisis on startups remains to be seen, many currently face greater constraints than before, whilst economies across the globe will likely need innovation and economic growth more than ever in the coming months.

Despite ongoing efforts to build startup-friendly ecosystems, Europe continues to suffer from a 'scaleup' gap: only 0.5 percent of European startups are estimated to scale.[2] There is also a persistent gap in startup activity between Europe and the United States (US): according to recent estimates, Europe lags behind the US in terms of startups by a factor of three.[3]

This report aims to better understand the factors that may underlie these gaps. We ask:

- What are the differences between European startups with and without high growth (referring to the former as 'high growth startups')?
- What are the differences between high growth startups in Europe and the US?

In recent years, important progress has been made to better grasp key features of European startups and scaleups, by improving data availability both at a European level, for example through the Tech Scaleup Europe annual reports and the European Startup Monitor[4, 5, 6] and at national levels such as through the Annual Scaleup Reviews in the United Kingdom (UK).[7, 8] However, there remain many gaps in our knowledge, such as a detailed understanding of the innovative activity of European startups, their growth and exit ambitions and the role of different types of public support. Moreover, due to a lack of comparable data, we know little about the differences between startups in Europe and in the US.

Based on novel survey data from the European Investment Bank (EIB) collected from startups listed on Crunchbase in Europe (EU27 + UK) and the US, this report offers granular insights into each of these features. For the purposes of this report, we define high growth startups as those that experienced significant levels of turnover growth (for more information about the definitions and sample used in this report, see next section).

While the data for this report was collected prior to the COVID-19 crisis, the findings underscore the role of high growth startups for innovation ecosystems in Europe – something which will be even more important in the coming months or years, as countries struggle to avert deep economic recessions or even depression. We find that startups in general, but especially those with high growth, are highly innovative. Compared to startups with lower growth, high growth startups are more likely to develop new-to-world innovations and to adopt innovative technologies within their business, indicating that innovation drives firm growth. High growth startups also hold the promise of economic growth and job creation. Before COVID-19, a large share of high growth startups expected to increase the demand for high skilled workers and aspired growth rather than short term profits.

However, even before the pandemic hit, high growth startups indicated to be disproportionately hindered by the availability of finance. Importantly, public support seems to help: high growth startups were more likely than other startups to mention the use of more than one form of public support and particularly seemed to benefit from startup grants/investments.

In contrast to common perception, US high growth startups are not more likely to report scaling as their main business ambition. However, compared to their US counterparts, European high growth startup owners differ in their exit openness: our data reveal that they were more likely to be opposed to exiting their business. Interestingly, compared to their US counterparts, European high growth startups are much more likely to use public support, but much less likely to attract private funding. They also report more barriers to the success of their business, especially when it comes to the availability of staff.

Based on these findings, we see room for three policy actions to support European startups in achieving their growth ambitions:

1. Encourage corporate-startup collaboration to boost private investments.
2. Expand governments' toolbox to engage with startups through innovative procurement and co-development.
3. Promote early enterprise education to improve the availability of suitable staff.

Methodology and data

This report uses novel data sources to improve our understanding of startups. We view **startups** as businesses that are looking to grow in terms of market access, revenues and number of employees, but are still in search of a repeatable and scalable business model.[9] In order to understand what may drive the higher growth rates of some startups, we specifically examine the subset of **high growth startups**.

Typically, high growth firms are defined in line with the Organisation for Economic Co-operation and Development (OECD) definition as 'enterprises with average annual growth in employees or turnover greater than 20 per cent per annum over a three-year period, and with more than ten employees at the beginning of the period.'[10] In recent years, the term **scaleups** has become more prevalent and is often used interchangeably with high growth firms. Other definitions have also emerged that factor in the amount of capital raised by companies to define them as scaleups.[9]

This report mirrors the OECD definition, but refers to 'high growth startups' rather than 'high growth firms' or scaleups to denote the report's focus on startups as a specialised subset of the wider business population. Specifically, we define high growth startups as startups that experienced significant growth in terms of turnover.

The main data sources used in this report are:

- **Crunchbase**.
- **EIB's Start-up and Scale-up Survey 2019**.
- **EIB Survey on Investment and Investment Finance (EIBIS) 2019**.

Crunchbase is a commercial database of innovative startups and the founders, employees and investors behind them, maintained by Crunchbase Inc. It is an online platform where young firms around the world can present their businesses and their current financing needs. The phenomenal growth of Crunchbase in recent years means that it now accounts for close to the entire universe of young firms with high growth ambitions (see EIB and OECD for more details). A big advantage of Crunchbase is that data is sourced from two main channels: first, a large network of global investment firms and second, executives, entrepreneurs, and investors who update and revise their Crunchbase profile.

EIB Start-up and Scale-up Survey 2019. The starting point of data collection for the EIB Start-up and Scale-up Survey is the Crunchbase database. 1,100 startups younger than ten years, which are registered either in the EU28 or the US were invited to participate in a 20-minute telephone interview (in the local language). Eligible respondents were chief executive officers, financial managers and heads of accounts. The fieldwork for the survey started in April 2019 and continued until July 2019. The main aim of the interview was to ask firms about their phase (startup or scaleup), business activities and what, in their view, went well in addition to what hampered their growth in recent years. This information gives a unique perspective on the success factors of young firms when it comes to realising their growth ambitions. Survey answers based on the EIB Start-ups and Scale-Ups survey 2019 in this report are aggregated using firm weights based on the Crunchbase Database.

EIBIS is an EU-wide survey that gathers qualitative and quantitative information on investment activities by small businesses (5 to 250 employees) and large corporates, their financing requirements and the difficulties they face. The survey involves interviews with 12,500 businesses in the EU and 800 businesses in the US. It is designed to be representative at the country level; and for most countries, the sector group level (manufacturing, services, construction and infrastructure) as well as firm size class level (micro, small, medium and large). Survey answers based on EIBIS 2019 are aggregated using firm weights that are based on value added.

In this report, we use the three data sets described above in order to differentiate between the following types of firms:

Small and medium enterprises (SMEs) are micro, small and medium firms employing fewer than 250 people. The definition does not take firms' age into consideration. This group represents the largest share of all businesses in Europe and is very heterogeneous. Whenever numbers on SMEs are represented, we draw on data from EIBIS 2019, unless otherwise specified.

We define **startups** as young firms with high growth ambitions. They are a specialised subset of SMEs. The startups referred to in this report were listed on Crunchbase, were less than ten years old and were still active at the time of data collection (in 2018).

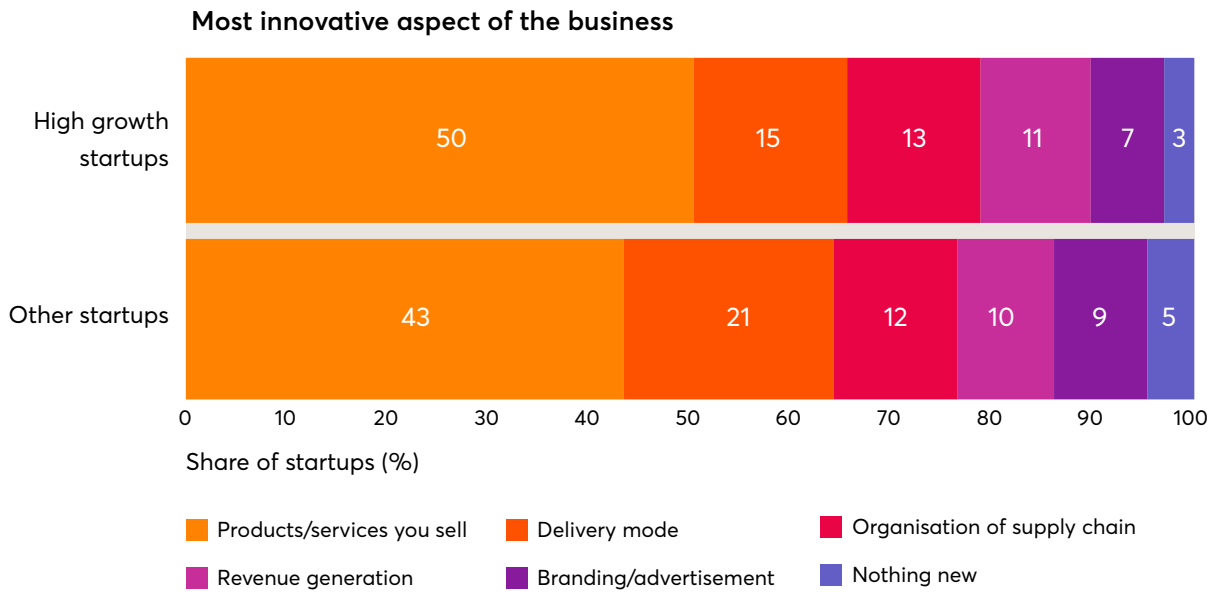
Throughout the report, we define **high growth startups** as 'any startup that reported an average turnover growth of greater than 60 per cent over the last three years' in the EIB Start-up and Scale-up Survey 2019. To guarantee the soundness of our definition, we did several robustness checks such as including employee and turnover thresholds, as well as examining higher turnover growth rates. All results presented are robust to alterations of the definition.

Key finding 1

High growth startups are new-to-the-world innovators

Startups, especially those that achieved high levels of growth, are typically innovators. **Only 3 per cent of high growth startups (and only 5 per cent of other startups) report there is nothing new about their business** (Figure 1). 'Product or service' innovation is the most prominent type of innovation activity, followed by process innovation (i.e. the delivery mode of products or services, or the organisation of the supply chain). 'Marketing' innovation is less common; a minority of startups report that their branding/advertising models or the way they generate revenue is the most innovative aspect of their business.

Figure 1: The most innovative aspect of the business reported by high growth and other startups

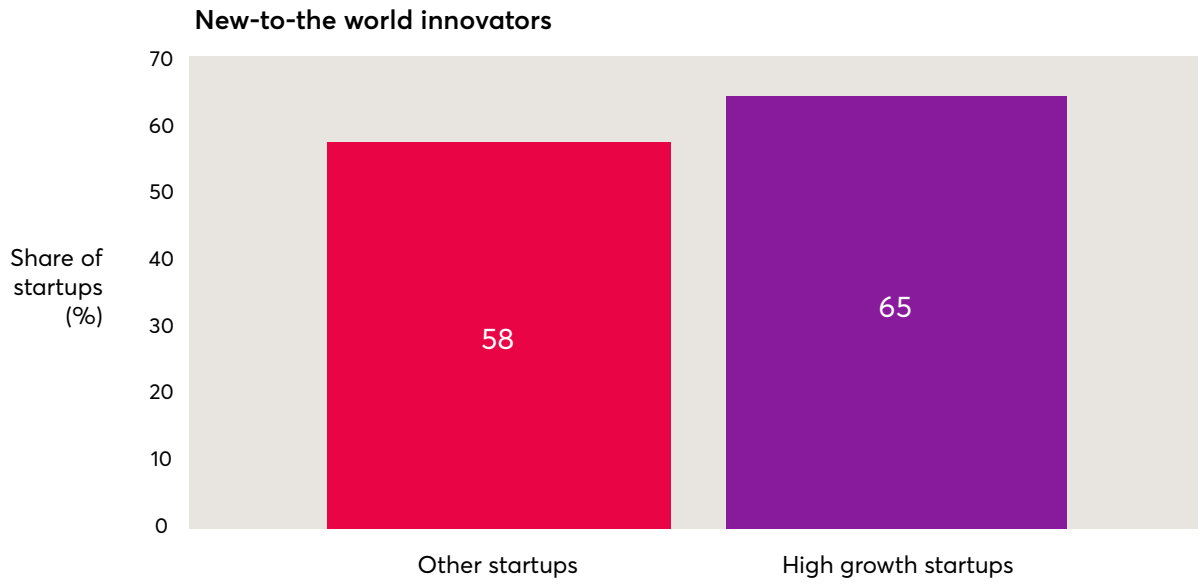


Baseline: all startups in EU27+UK. Source: EIBIS Start-up and Scale-up Survey 2019, firms sampled from Crunchbase.

High growth startups differentiate themselves as developers of innovations that are new to the world (Figure 2). Most high growth startups (65 per cent) report that the most innovative aspect of their business is a new-to-the-world innovation (compared to 58 per cent of startups with lower growth). Compared to startups with lower growth, they are less likely to develop innovations that are new to the country or new to the local

market. This is in stark contrast to new-to-the world innovation rates reported by SMEs in general, which are typically less than 15 per cent.[11] These findings mirror previous research demonstrating that innovation is linked to firm growth.[12, 13]

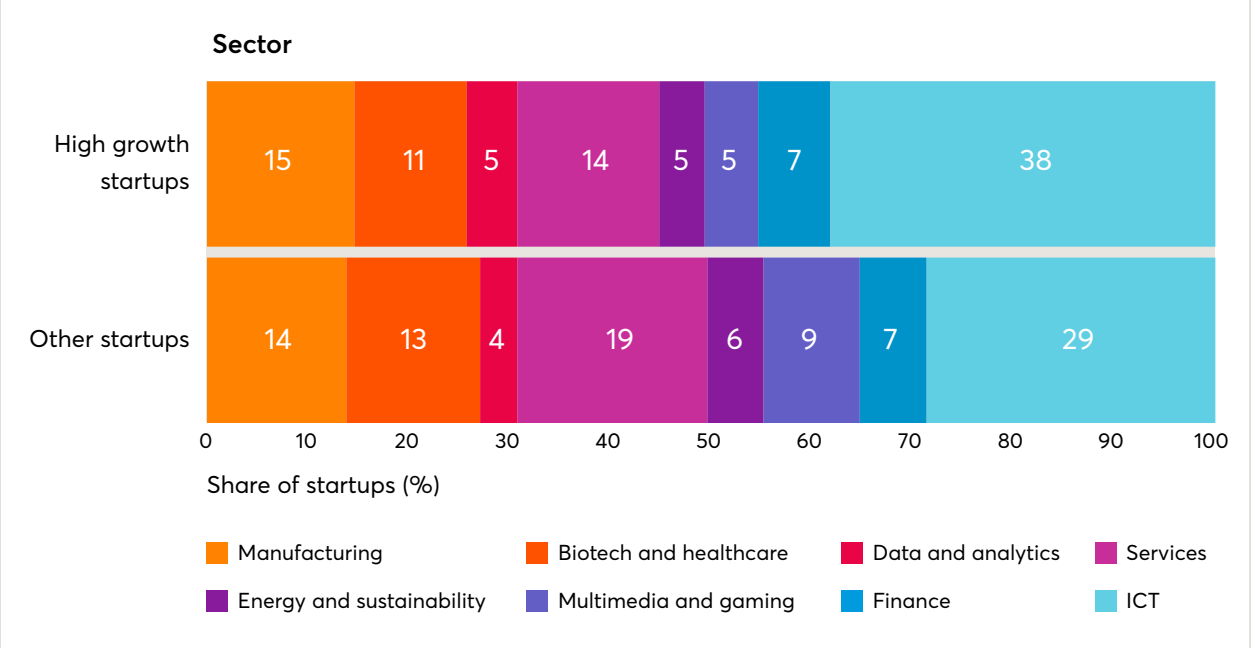
Figure 2: The percentage of innovative high growth and other startups that develop new-to-the-world innovations



Baseline: all startups that stated an innovative aspect in EU27+UK. Source: EIBIS Start-up and Scale-up Survey 2019, firms sampled from Crunchbase.

The highly innovative activity of high growth startups **seems to be supported both by their business models and the innovative business practices they adopt**. Compared to startups with lower growth levels, high growth startups seem to have a greater focus on intangible assets: they are more likely to develop intellectual property (40 vs. 31 per cent) and less likely to develop physical things (20 vs. 28 per cent). High growth startups are also more likely to be active in sectors that enable innovations to scale quickly, most notably the Information and Communications Technology (ICT) sector (Figure 3).

Figure 3: The share of high growth and other startups by sector



Baseline: startups founded between 2008-2018 that are still active, present in EIBIS Start-up and Scale-up Survey 2019 in EU27+UK. Source: Crunchbase, authors' calculation.

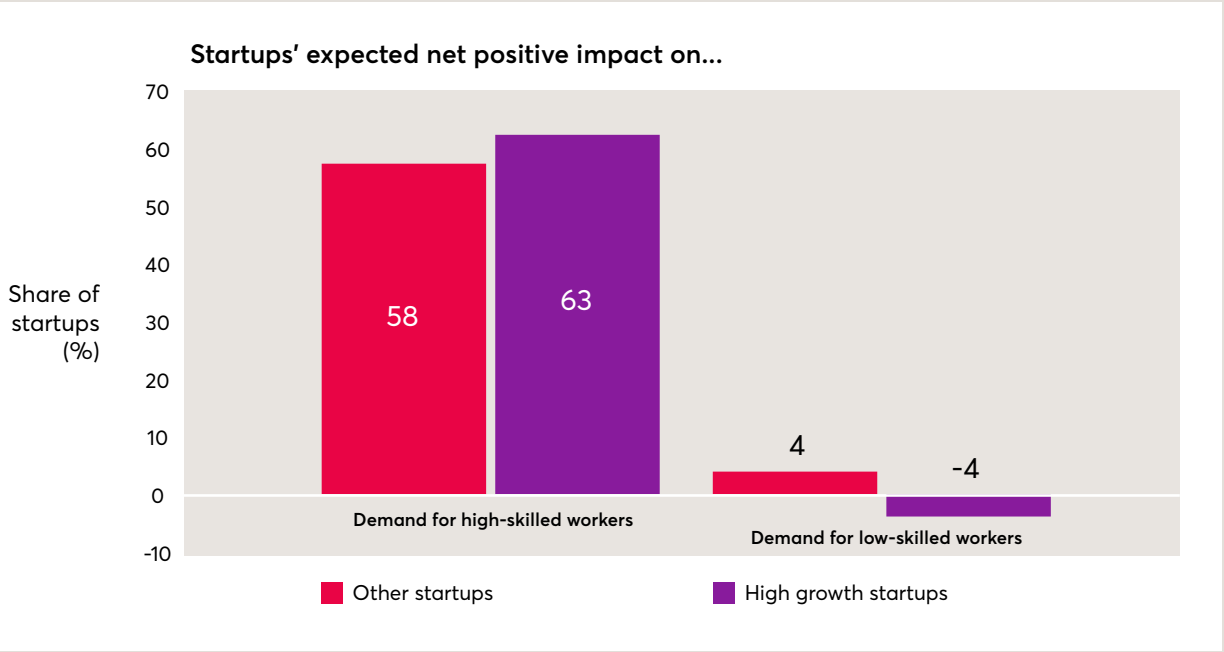
In addition, compared to other startups and SMEs in general, high growth startups are more likely to adopt innovative technologies. Specifically, 53 per cent of high growth startups implement cognitive technologies such as big data or artificial intelligence in (parts of) their business, compared to 40 per cent of other startups and only 11 per cent of SMEs. Given the widely debated impact of the adoption of such digital technologies on jobs, this raises the question: what is the impact of startups on labour demand?

Key finding 2

High growth startups contribute to high-skilled job creation, but have a strong gender imbalance

Startups in the sample have a median of six employees (high growth startups have a median of nine employees). Looking ahead, **startups, in particular high growth startups, expect to create more jobs by increasing the overall demand for workers in their market** (Figure 4). This is in line with an established body of research showing the disproportionate role of young high growth firms in employment growth.[1]

Figure 4: High growth and other startups' expected net positive impact on the demand for high-skilled and low-skilled workers. Net balance shows the difference between the share of firms expecting an increase and firms expecting a decrease



Baseline: all startups in EU27+UK. Source: EIBIS Start-up and Scale-up Survey 2019, firms sampled from Crunchbase.

When asked about the expected impact of their business in the next three years, respondents expect a strong impact on the demand for high-skilled workers. Most high growth startups expect a net positive impact (63 per cent), slightly higher than startups without a high growth phase (58 per cent). Specifically, 70 per cent of high growth startups expect to increase the demand for high-skilled labour, 7 per cent expect to decrease the demand and 23 per cent expect no impact.

When it comes to the demand for low-skilled labour, no substantial impact is expected by the respondents. Most high growth startups expect no impact on the demand for low-skilled labour (60 per cent), 18 per cent expect to increase it and 22 per cent expect to decrease it – cancelling out any substantial positive or negative potential impact. High growth startups are slightly more likely to expect a net negative impact, contrary to startups without a high growth phase (-4 per cent vs. 4 per cent).

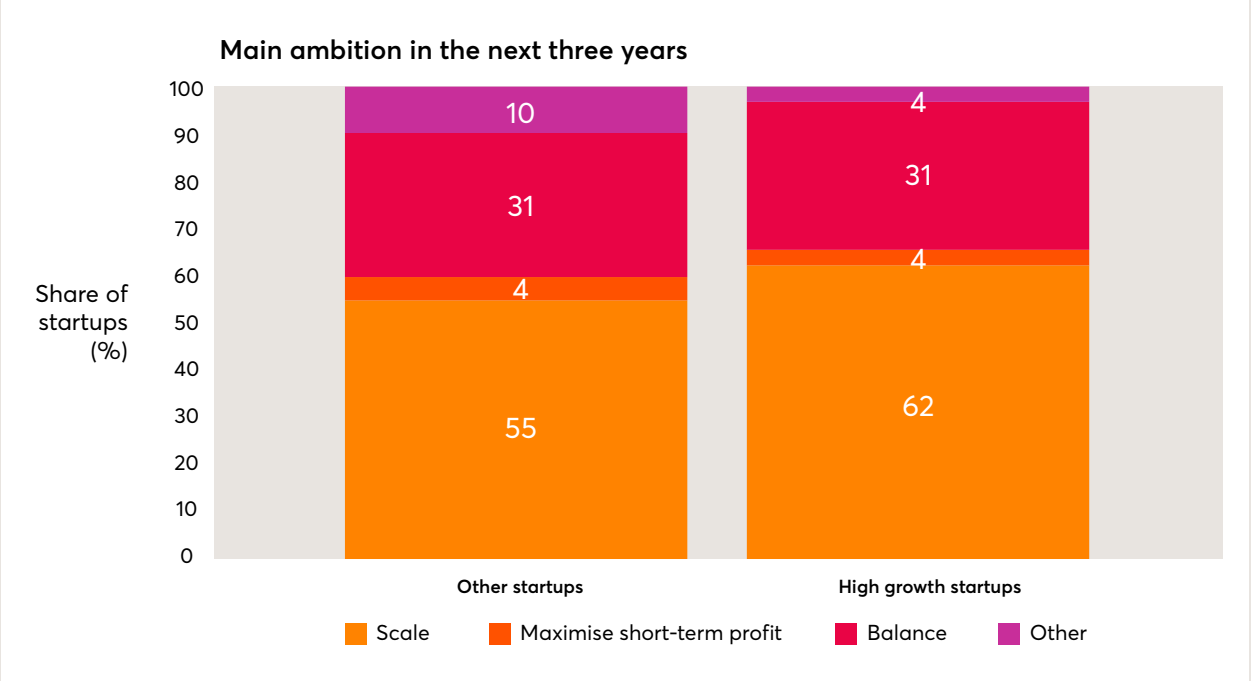
Although startups are considered to be important drivers of job creation, our findings suggest **a strong gender imbalance in who occupies these jobs**, particularly in high growth startups. Startups that were founded by women are strongly underrepresented: in only 10 per cent of high growth startups (compared with 16 per cent in other startups), half of the founders are women (or the sole founder is a woman). Moreover, in 73 per cent of high growth startups (compared to 66 per cent in other startups), fewer than half or none of the employees are women.

Key finding 3

High growth startups are ambitious to scale, not focused on short-term profits or exits

Startups are highly ambitious: **the majority of startups report that their main ambition in the next three years is to scale (further) by growing turnover** (Figure 5). The ambition to grow is correlated with achieved growth: startups that recently experienced a growth episode are more likely to have a strong growth ambition (62 per cent) compared to startups without a growth episode (55 per cent). Remarkably, only a minority (4 per cent) of high growth startups are strictly seeking to maximise short-term profits. Startups' high growth ambition is in stark contrast with the general SME population, where typically only around one in four, or one in six, report a substantive ambition to grow.[14, 15]

Figure 5: The main ambition of high growth and other startups



Baseline: all startups in EU27+UK. Source: EIBIS Start-up and Scale-up Survey 2019, firms sampled from Crunchbase.

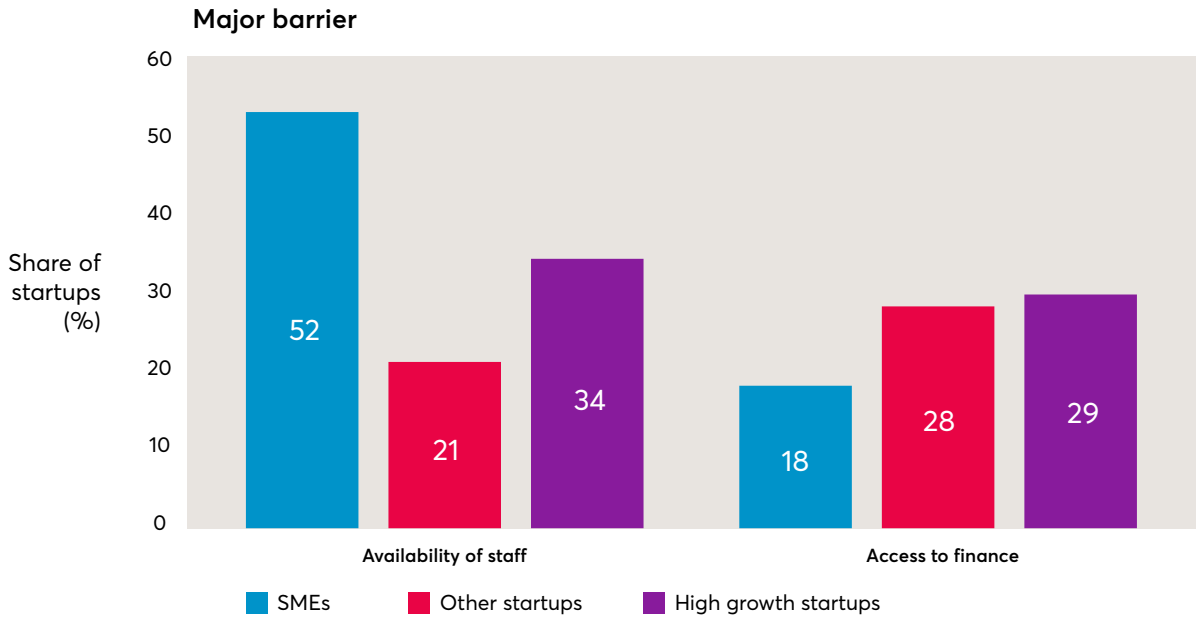
Startups' growth ambition is also reflected in their international outlook. More than half of startups are highly international, primarily operating within Europe (around 24 per cent) and beyond Europe (around 33 per cent). The remaining startups primarily operate in their home market. We find no clear differences between high growth startups and other startups.

Although startups have strong growth ambitions, these do not necessarily translate into clear exit strategies. In fact, only 8 per cent of startups are looking for exit options in the next three years and this share is comparable for high growth startups and others. While high growth startups seem to be slightly more open to the idea of exiting, **the majority of startup owners are either neutral (24 per cent) or even opposed to an exit (31 per cent)**, regardless of the startup's growth levels.

Key finding 4

High growth startups are mostly hindered by the availability of staff and finance

Figure 6: The percentage of SMEs, other startups and high growth startups that perceive the availability of staff and finance as a major barrier



Baseline: all firms in EU27+UK. Source: EIBIS 2019; EIBIS Start-up and Scale-up Survey 2019, firms sampled from Crunchbase.

Startups most frequently mention 'lack of staff with the right skills' as a major obstacle to the success of their business (Figure 6). This is potentially related to the gender imbalance discussed above. High growth startups are particularly constrained when it comes to the availability of staff: 34 per cent view it as a major barrier, significantly more than startups without high growth (21 per cent). Of those high growth startups that are hindered by the availability of staff, many **struggle to recruit employees with the right technological skills** (43 per cent). Others report **that job candidates lack the attitude, motivation or personality** (25 per cent) or the right qualifications or experience (20 per cent). A lack of knowledge of products and services is not a key recruitment challenge – only 5 per cent view it as a barrier. High growth startups seem to address the recruitment challenge by paying their employees for performance: compared to startups without a high growth episode, they are more likely to reward good performance with higher pay (55 per cent vs. 67 percent).

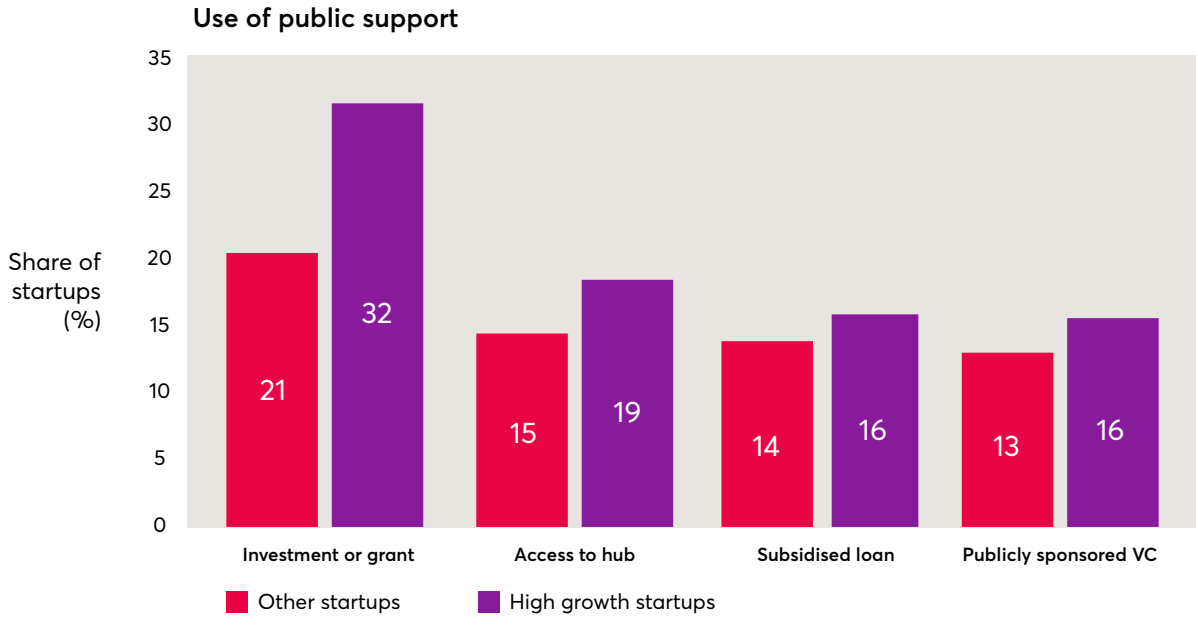
Compared to startups, SMEs are even more likely to perceive a lack of staff with the right skills as a major obstacle. This might be linked to mechanisms by which past success of startups feeds current success, leading to agglomeration tendencies. The EIB finds that startup activities tend to happen primarily in relatively rich regions that attract young talent.[3] In contrast, the typical SME is more likely to be located in less dynamic regions, making it more difficult to attract skilled staff.[16]

An equally important challenge for startups is the availability of external finance. **Nearly one in three startups states that the availability of finance is a major obstacle to the success of their business**. Startups with and without a growth episode are equally likely to report access to finance as a major obstacle (29 per cent of high growth startups vs. 28 per cent of all other startups). However, SMEs are less likely to cite access to external finance as a major obstacle (18 per cent). This is related to the fact that startups tend to have significantly higher rates of investment per employee compared to a typical SME. They also tend to invest more in intangible assets compared to more mature companies. Startups therefore have a greater need for external finance, but at the same time a lower share of tangible assets that can serve as security for the finance.[3]

Key finding 5

High growth startups seem to benefit from public startup investment/grants

Figure 7: The use of public support by startups and high growth startups in the EU. Respondents could select multiple options



Baseline: All startups in EU27+UK. Source: EIBIS Start-up and Scale-up Survey 2019, firms sampled from Crunchbase. Respondents could select multiple options.

Almost one in two startups has used at least one form of public support, such as grants, subsidised loans, publicly sponsored venture capital or access to a publicly subsidised hub or cluster. **High growth startups are particularly likely to use multiple types of public support** (Figure 7): 22 per cent have used two or more forms of public support (compared to 13 per cent of startups without a high growth phase). They seem to benefit most from startup investments or grants – 32 per cent of startups that experienced high growth received a startup investment or grant, compared to 21 per cent of startups without a high growth episode. This is in line with research carried out by the ScaleUp Institute in the UK, which showed that 642 scaleups supported by grants (worth £205m) from the government's innovation agency, Innovate UK, were able to leverage a further £3bn from the private sector.[17]

The data suggests a correlation between public financial support and innovation and growth, although the underlying mechanism is unclear. On the one hand, innovative startups with growth potential could be more likely to attract public funding. This would indicate that public support providers are good at 'picking winners', effectively targeting and identifying highly innovative startups who are likely to grow, perhaps regardless of receiving public support. On the other hand, public financial support could be a fundamental lever for startups to innovate and grow that may otherwise not be able to, effectively addressing a funding gap. Interestingly, there are striking differences between Europe and the US when it comes to public funding (see Key Finding 6 for a more detailed discussion).

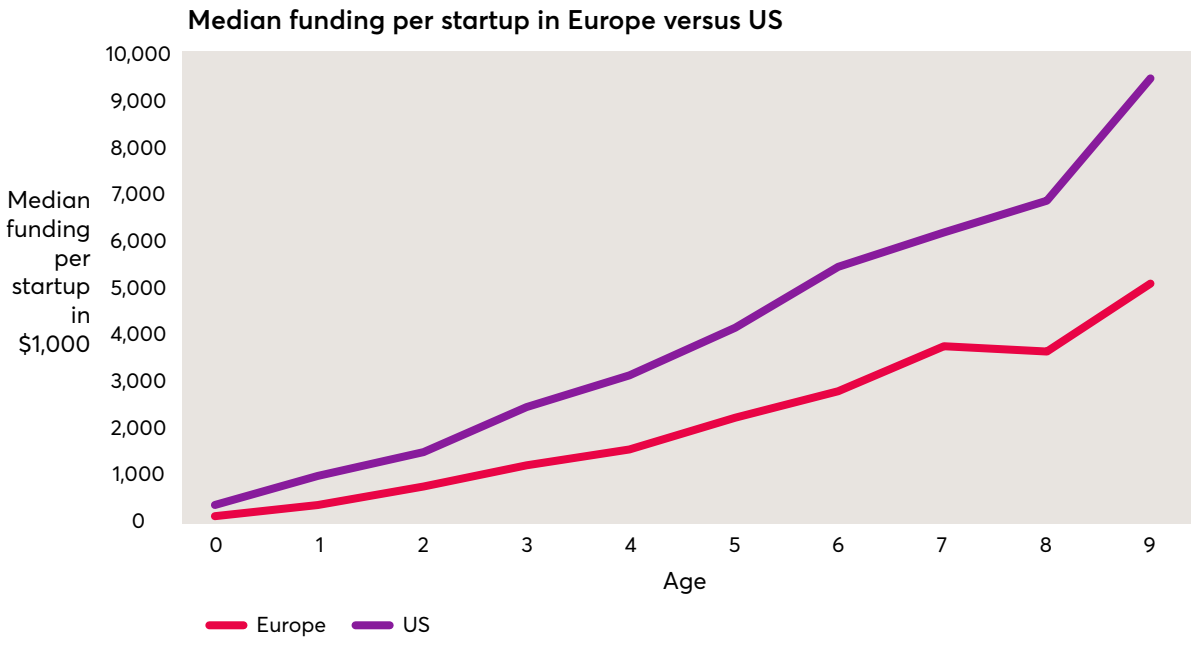
Key finding 6

European high growth startups are more constrained than US startups in terms of access to private funding and talent

Europe lags behind the US in terms of the number of startups by a factor of three, a recent EIB report shows.[3] By contrasting the data on European versus US startups, we highlight three key factors that may contribute to this gap: a lack of private funding, difficulty in attracting talent and a lack of entrepreneurial recycling.

Most notably, there **is a private funding gap between Europe and the US**. The EU is characterised by significantly lower levels of venture capital investment. As highlighted in Figure 8 below, the funding gap grows as startups get older. Nine years after foundation, a European startup has attracted around 54 per cent less funding compared to a US startup.

Figure 8: Median funding per startup

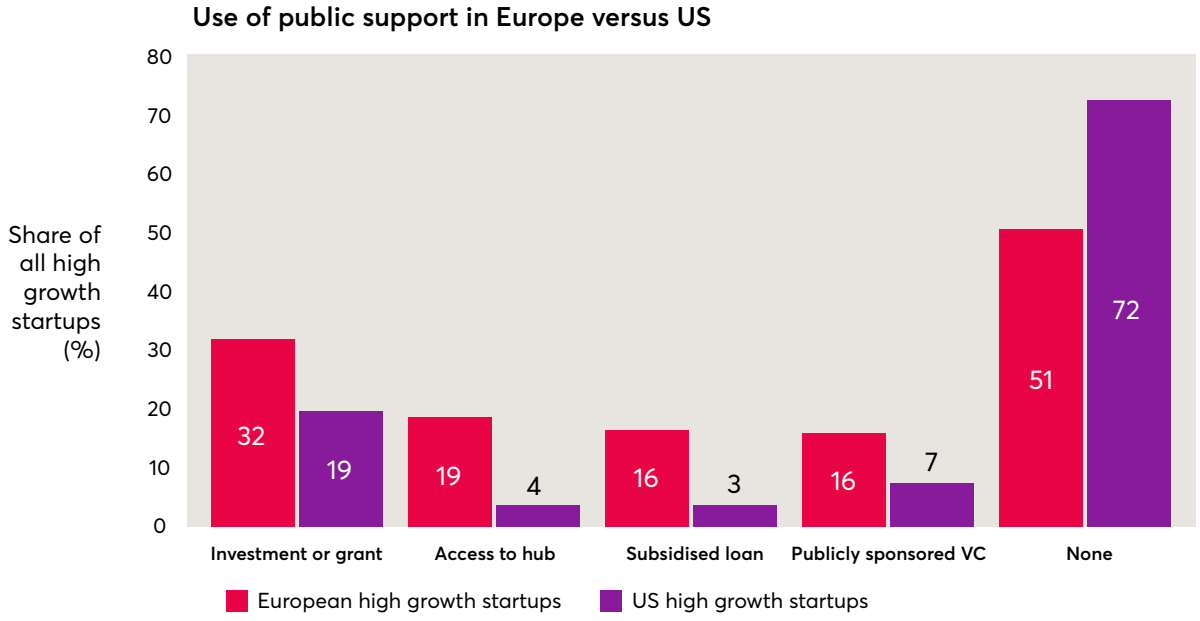


Baseline: startups founded between 2008-2018 that are still active. Source: Crunchbase, authors' calculation.

European high growth **startups are much more likely to use public support than their US counterparts** (Figure 9), especially when it comes to accessing public clusters/hubs (16 vs. 7 per cent) or using subsidised loans (16 vs. 3 per cent). In fact, 72 per cent of US high growth startups have not used public funding, compared to 51 per cent of European startups.

This could be due to fundamental differences between the European and US ecosystem,[18] in terms of availability of public support. Interestingly, using startup grants/investment is correlated with higher growth in both the EU and the US: those who benefited from grants or investment are more likely to have experienced high growth.

Figure 9: The use of public support by high growth startups in the EU and US. Respondents could select multiple options



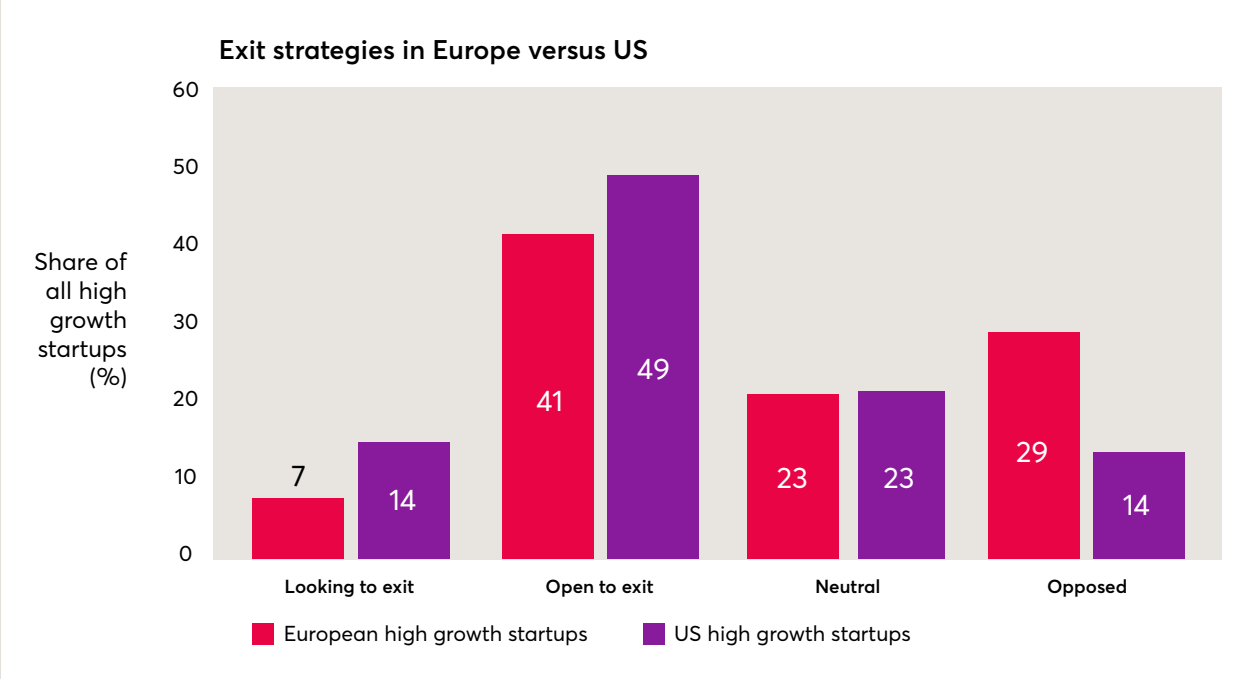
Baseline: all high growth startups. Source: EIBIS Start-up and Scale-up Survey 2019, firms sampled from Crunchbase.

European high growth startups perceive more barriers that may undermine the success of their business compared to their US counterparts. Most notably, **European startups are more likely to perceive the availability of staff (34 vs. 15 percent) as a major barrier**. Given that access to talent is an oft-cited ingredient for startup success,[19] the lack of staff could be a possible cause for lower startup activities in Europe. European startups may particularly struggle to recruit the right staff because they are less attractive employers compared to their US peers: they pay lower wages, are less likely to reward good performance and invest less in the training of their workforce.[3]

Finally, European **high growth startups are more opposed to exit than their US counterparts** (Figure 10). This is not always a bad thing: in some cases, there is an overemphasis on exiting, causing startups to exit prematurely often due to investor pressures to cash out.[20] However, in other cases, there may be a missed opportunity for entrepreneurial recycling when the individuals involved could use their experience to further strengthen the European startup ecosystem, either by starting new ventures or by becoming business angels or mentors.[21] A recent report by the EIB confirms that a major barrier to startup activities in Europe is a lack of past success. Past success plays an important role when it comes to fuelling exit markets for new generations of startups, whether it be as acquirers of startups or through their impact on stock market liquidity.[3]

On the one hand, the relative exit opposition of European high growth startups could be driven by 'demand-side' factors, such as different preferences, little awareness of exit options or unwillingness to give up control over the business.[22] On the other hand, it could also be 'supply-based': there may be a lack of desirable exit options, for example in the form of tailored procedures for startups to go public or a harmonised European stock market.

Figure 10: The exit openness of high growth startups in the EU and US



Source: EIBIS Start-up and Scale-up Survey 2019, firms sampled from Crunchbase.

Interestingly, attempts to explain the gap in startup activity between Europe and the US sometimes point to differences in startup or founder characteristics, for example in terms of growth ambition, founder experience or innovation rates, but we find no substantial differences. This indicates that the gap may be best explained by wider ecosystem-level differences. This means that policy makers play an important role in addressing the gap by designing effective ecosystems.

Policy priorities to support startups in scaling their innovations

Based on novel EIB survey data on startups listed on Crunchbase, this report identifies unique characteristics of high growth startups to inform targeted policymaking. We find that startups, especially high growth ones, are key sources of innovation and job creation. However, European high growth startups are also disproportionately constrained compared to their US counterparts, in particular when it comes to the availability of private funding and a lack of staff with the right fit.

These findings suggest that, in Europe, there seems to be a lot of scope for creating supportive ecosystems, enabling startups to scale their innovations. We highlight three ways in which policy makers could play an important role for enabling high growth startups.

1. Promote early enterprise education to improve the availability of suitable staff

One in three high growth startups in our sample perceive the availability of staff as a major obstacle to the success of their business, in particular a lack of fit in terms of technological skills. In order to increase the attractiveness of startups as an employer, many prominent organisations including the European Startup Network and Allied for Startups have called for improved stock-option schemes that will incentivise top talent to work for startups in Europe. Policy makers are taking note and reform is now on the agenda of European countries such as France, Ireland, Germany and Finland.

Another policy option in response to these perceived barriers is to promote science, technology, engineering and mathematics (STEM) skills in order to improve the pool of workers with the right skills. Currently, several initiatives exist. For example, the EU STEM Coalition, a network of national STEM platforms supported by the European Commission and national members, shapes education policies in order to promote STEM among students.[23] Moreover, through the Digital Europe Programme, the European Commission made 700 million euros available for 2021-2027 to advance the digital skills of students and the existing workforce.[24]

The survey results also showed that one out of four high growth startups report that job candidates lack the attitude, motivation or personality for the role. The European Digital City Index[25] shows that positive attitudes to entrepreneurship are associated with a higher level of entrepreneurship, while an entrepreneur's mindset is recognized to boost business profitability and growth.[26] In addition, developmental psychology research suggests that these attitudes and mindsets are best shaped during childhood and adolescence.[27] Therefore, we argue that enterprise education could play an important role in promoting the development of entrepreneurial skills and mindsets, and create a workforce that is fit for entrepreneurial environments. Shaping attitudes and mindsets through education could be crucial, not just to sustain the next generation of entrepreneurs, but to create a workforce that views entrepreneurship as desirable and can thrive in entrepreneurial settings – whether in a startup, SME or large corporate.

However, despite being featured in the Entrepreneurship 2020 Action Plan,[28] there has not been a widespread uptake of early enterprise education initiatives in many European countries, especially during primary and secondary education. According to a 2016 review of education and training entrepreneurship in Europe, 'very few countries include practical entrepreneurial experiences as a regular and compulsory part of the curriculum'.[29] Moreover, the review concluded that learning outcomes linked to enterprise education are often fragmented and do not progress between education levels. Since then, progress has been made to define such common learning outcomes through the development of the Entrepreneurship Competence Framework.[30] While the framework has helped in promoting enterprise education and has sparked a range of individual organisations to adopt it,[31] the framework has not been adopted widely in national education systems. As a result, most European countries (with the exception of the Netherlands) lag behind the United States in the Global Entrepreneurship Monitor index of early enterprise education.[32] A more widespread adoption of early enterprise education programmes could benefit the development of entrepreneurial attitudes and skills. For example, in the UK, the ScaleUp Institute has endorsed practical programmes that expose children and young people to entrepreneurship, such as Founders4Schools.[7]

Of course, the outlined policy suggestions above call for further **evidence building** to assess the impact of enterprise education programmes. Existing evidence reviews report promising benefits for individual students (e.g. higher employability), teaching institutions (e.g. greater teacher engagement), and society and the economy as a whole (e.g. more high-quality startups).[33] However, current evidence predominantly concerns enterprise education at a university level, while only limited evidence exists about what programmes are available on a pre-university level and how they support the development of key entrepreneurial competencies in the long term. Researchers can build on the Entrepreneurship Competence Framework to design and evaluate enterprise education initiatives. Robust evidence may be developed through programmes such as the Innovation Growth Lab, a global initiative that promotes the use of experimental trials to develop and assess interventions that promote innovation and entrepreneurship.

2. De-risk corporate-startup collaboration to boost private investment

Almost one in two European startups in our sample uses at least one form of public financial support, compared to only one in four in the US. Such relatively high use is not necessarily a concern: we find that public financial support can be a boon for growth, especially in the form of startup grants/investment. Moreover, some evidence suggests a 'crowding-in effect', when the provision of public funding leads to higher levels of subsequent private funding,[34] if public funding programmes are properly designed.[35] Instead, we find that there is a private funding gap between Europe and the US, with the EU having significantly lower levels of venture capital investment. In addition, our results suggest that there is a particular deficiency in the later stages of firm development. There seems to be a lack of sufficient private funding in the European startup ecosystem, a finding also confirmed in literature.[36]

There are several ways in which European policy makers can address this gap. The European Commission announced a ten billion euro fund to support early-stage deeptech

companies, to be formally launched in 2021.[37] The fund will be run by the European Innovation Council and will mostly provide grants, but it also aims to co-invest alongside private venture capital funds. While such initiatives to increase public funding are certainly welcome and can indirectly result in more private funding due to crowding-in effects, **more action is needed to directly boost private investments**.

A possible way to boost direct private investment is by promoting corporate-startup collaboration, a well-known mechanism for helping startups scale.[38] Corporates can improve startups' access to finance, markets and customers, thereby helping build strong startup ecosystems. Some evidence even suggests that corporate investment results in greater benefits for startups, compared to non-corporate investment. For example, startups can receive higher levels of investment from corporates than they would from non-corporate investors, because corporate investors may be willing to pay a 'strategic premium' for startups that are aligned with their goals.[39] Moreover, when startups can leverage additional assets from their corporate investor, they exhibit higher degrees of innovation compared to startups backed by non-corporate investors.[40]

However, setting up meaningful corporate-startup collaborations requires overcoming various internal, relational and environmental barriers.[41] Corporates may struggle to make funds available due to internal risk aversion or lack of an intrapreneurial culture. Key barriers for startups involve differences in speed (e.g. slow corporate decision-making) or coordination challenges (e.g. changing corporate contact points).

Policy makers can support corporate-startup collaboration by minimising these barriers and de-risking the act of collaborating with highly innovative startups. One way to do so is to **devise financial incentives for corporate-startup collaboration**, for example through tax advantages for corporates that invest in startups. To also encourage smaller corporates or SMEs to work with startups, public funders can set up co-investment or loan schemes for startup collaboration.

Policy makers can also create **novel European platforms for startups to collaborate with corporates and other partners**. Typically, platforms are set up to facilitate strategic one-to-one matchmaking between corporates and startups, such as the Scaleup Summits organised at European stock exchanges as part of the Startup Europe Partnership or the European Innovation Council Corporate Days. To better share the risks of working with highly innovative startups, especially those active in emerging technology markets, policy makers can set up broader collaboration platforms that involve multiple private partners (e.g. SMEs, corporates) and/or public partners (e.g. research organisations, regulators). These can take the form of public-private accelerators, test beds, living labs and sandboxes – all designed to de-risk and accelerate the development and adoption of emerging technologies.

More complex collaboration modes require more complex collaboration practices. We therefore recommend **promoting best practices in corporate-startup collaboration**. As part of the Startup Europe Partnership, many of these practices have been identified, for example for startup-friendly procurement or investment.[41] Large corporates that adopt them have been acknowledged as 'Corporate Startup Stars', an annual ranking of large corporates that work well with startups.[42] Such a ranking directs corporates' collaboration practices, but also benefits startups by helping them identify good corporate partners. Expanding the evidence base of best – and worst – collaboration practices and making them transparent are key to further support and de-risk corporate-startup collaboration.

3. Expand governments' toolbox to engage with startups through innovative procurement and co-development

Another way for governments to tackle the private funding gap and to build stronger startup ecosystems is to take a more active role themselves. **Governments typically act as conveners, funders and facilitators in the startup ecosystem, but only rarely engage directly with startups**, for example through co-development or innovative procurement. Only a minority of startups and scaleups currently collaborate with, or sell into, the public sector. According to the European Startup Monitor 2019, only eight per cent of European startups consider public institutions their most important cooperating partner.[4] Likewise, according to the Annual Scaleup Review by the ScaleUp Institute, only one in ten UK scaleups collaborates with governments.[7]

Yet, **in working directly with startups, governments hold important levers for startup growth and government innovation**. From the startup perspective, a government contract could make the difference between starting and scaling. For governments, engaging directly with innovative startups means access to new technologies, enabling the digitalisation and innovation of public services to ensure better outcomes for citizens. Direct government interactions with startups can also be an important innovation policy tool: through startup procurement or co-development, governments can trigger innovation more broadly, by catalysing the development of new technologies that have spillover effects in other sectors.[43]

However, current government processes are often not designed to facilitate innovation. Many barriers inhibit governments' engagement with startups, including risk aversion, a lack of an internal innovation culture, and overly restrictive and complicated procedures.[44, 45] Some of these barriers are deeply rooted and require a significant culture shift and change in the government's mission, so that innovation becomes an essential part of the government's practices and mindset.

We recommend that governments treat direct startup engagement as an innovation tool. One way to do so is to increase the levels of public procurement from startups by **designing more startup-friendly public procurement processes**. Public procurement has long been recognised as a potential driver of innovation.[46] However, current procurement procedures often are not suitable to innovative startups and can even disadvantage them compared to established companies.[45] Lessons learned from improving innovation in public procurement show that it requires adapted practices, compared to traditional procurement.[47] Moreover, actions to create innovation-friendly procurement processes need to span the whole cycle, from defining and formulating the procurement need, to identifying and evaluating suppliers, and finally adopting and diffusing the resulting innovation.[43] For example, rather than specifying the desired end solution or the route to developing a solution, procurement teams should specify the needs that have to be addressed to allow room for creative, unpredictable solutions. In order to achieve this,

procurement teams may need to rely on specialized intermediaries to support complex procurement activities. Such intermediaries can act as an innovation broker and can leverage digital technologies to better connect governments with a wider range of innovative suppliers, including startups.[48] Next to involving specialized intermediaries, procurement teams could also engage end users at an early stage in order to give feedback to innovative suppliers and thereby ensuring wide adoption and diffusion of the solution.[47] All of these actions could allow for more room for innovation, thereby opening more doors for startups to participate in the procurement process.

Governments can also **experiment with new models of startup engagement**. These could include startup in residence programmes, challenge-based programmes and accelerator programmes. Examples of each of these programmes already exist in some countries,[49] although they often remain peripheral to central government actions and their impact is not yet well evidenced.

In the Netherlands, the city of Amsterdam set up a Startup in Residence programme to find new solutions to the city's challenges, modelled after a similar programme in the US. During the six-month programme, startups receive training and get access to government experts and networks. Similar challenge-based programmes – not specifically targeted at startups though – exist in Denmark (e.g. the Danish Govtech Challenge), the UK (e.g. CivTech Scotland) and Poland (e.g. GovTech Polska). The idea of these government programmes is that (startup) companies are invited to solve different problems in innovative ways. Challenge-based programmes are often set up as a type of 'pre-commercial procurement', where startups develop a prototype and governments have the option to procure it, if it fits. Some public bodies also run accelerators, often focused around specific verticals such as health (e.g. the NHS Innovation Accelerator in the UK), defence (e.g. the Innovation Defence Lab in France) and cyber (e.g. the Cyber Innovation Hub in Germany).

Many of these programmes are still in the early stages and **more evidence is needed to further shape them and assess their long-term impact**. A qualitative review of the Amsterdam Startup in Residence programme concluded that while the programme was helpful to instil a culture of innovation in the city departments, the resulting business opportunities for startups were limited and the policy may only be suitable for a specific scope of challenges that are not too simple, but also not too complex.[44] An evaluation of the National Health Service (NHS) Innovation Accelerator also found significant innovation benefits for the public sector, but indicated that startups experienced difficulties in navigating the NHS' commissioning and purchasing structures, which inhibited their ability to scale their innovations.[50]

In summary, a key challenge for government-startup collaboration programmes is to go beyond helping startups for a short period of time by translating the programmes into longer-term business opportunities that can help startups scale. Likewise, for governments to reap wider innovation benefits, the programmes need to be embedded within key government bodies and may require broader stakeholder involvement of multiple public and private actors.

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