Economic miracle 2.0?

How startups and scaleups can boost the German labor market

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Foreword

In Germany, startups and scaleups are prized for their innovative prowess. Their payment apps simplify monetary transactions. Their novel vaccines protect our health. Their new software revolutionizes business processes. One benefit that has so far attracted less attention, however, is that startups and scaleups in Germany play a significant part in creating and protecting jobs.

We – the German Startup Association, Deutsche Börse, the Internet Economy Foundation and Roland Berger – joined forces to produce this study and for the first time shed light on how startups and scaleups affect employment. To do so, we naturally looked at the number (and the quality) of jobs created directly by such players. But we also examined those jobs that, indirectly, exist because of these young, fast-growing companies.

The findings are impressive – especially when juxtaposed with corresponding developments in other categories of companies, such as DAX 30 enterprises: Whereas Germany's blue chips have seen employment levels decline in the past two years, the number of jobs at startups and scaleups has risen forcefully.

So everything is rosy in the garden, then? Well, not quite, because Germany still lags way behind in international comparison. Our data shows just how much potential is currently being squandered: If we as a country chart the right course, close to four million people could be on the payroll of startups or scaleups as early as 2030. If that is to happen, however, Germany's next government – due to be elected in September of this year – must take further focused action to enable startups and scaleups to actively contribute to positive employment development. To master the dual challenges of digital transformation and climate change and strengthen Germany's position in the global competitive arena, we need an "economic miracle 2.0".

Our country must remain appealing to startup entrepreneurs in the long term. As a society, it is in our own best interests to keep serial entrepreneurs in particular on our home turf. Why? Because they not only invest in new companies, but also pass on their knowledge and sow the seeds of the next generation of company founders. Again, if this is to happen, adequate late-stage financing and exit options must be available, alongside a robust national capital market that draws more IPOs to Germany.

This study spells out the data that underscores the economic importance of startups. It also provides concrete recommendations for action. Armed with a comprehensive "startup strategy" focused sharply on talents, capital and fair competition, the forthcoming government can stake out the framework of conditions that an economic miracle 2.0 would presuppose.

We wish you an enjoyable and enlightening read.

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PREFACE

Any doubts about the innovative capability of Germany's startup community have been dispelled once and for all. Evidence is there in abundance. Take, for example, the number of unicorns – startups valued at upward of USD 1 billion. This figure has been rising in Germany for years, as has the number of their smaller siblings: With valuations from USD 250 million to USD 1 billion, "soonicorns" have the potential to join the family of unicorns in the near future. There is also a more diverse array of new business models than ever before, spanning everything from flying taxis and innovative software solutions to fintech innovations and completely new kinds of industrial applications. Such models are largely responsible for driving innovation throughout the country.

That said, it is much more difficult to assess the startup scene's importance to the German labor market. Startups and scaleups[1] do not constitute a separate industry, so they can easily slip through the gaps in official statistics. As a result, the significance of many young, fast-growing companies for the country's employment is underestimated – on two counts: While the vibrant startup and scaleup landscape is indeed creating a plethora of jobs, it also harnesses demand and location effects to spawn fresh employment beyond the confines of startups and scaleups themselves.

This study sheds light on how German startups and scaleups genuinely affect employment. The stand-out finding is that, in recent years, the number of employees in this segment has risen constantly and now stands at around **415,000 people.** If this dynamism can be sustained and accelerated, the proportion of new jobs can quickly rise to the kind of magnitude one would associate with DAX 30 companies.

Moreover, every new job at a startup or scaleup also creates new jobs outside the company's immediate milieu. Faster growth here accelerates the overall employment effect, in other words. Based on cautious estimates of the multiplier effect for jobs at startups and scaleups, these companies directly create or indirectly underpin roughly **1.6 million jobs** in Germany. And as impressive as this figure is, it could rise far higher in the future.

If Germany were to reach US levels by 2030 (in terms of employees of startups and scaleups as a percentage of the entire employed population), then **3.7 million people would be on the payrolls of startups and scaleups** in this country – not including the positive impact on the economy as a whole.

However, this employment potential will be realized only if Germany's startup base is broadened as a whole. To achieve this goal, the conditions for female startup entrepreneurs in particular must be improved. It is equally imperative to at last make better use of "snowball" effects, which first requires an increase in the number of startup exits. Valuable capital could then flow back into the startup community, effectively setting a virtuous cycle in motion. Studies show that, following a successful exit, startup entrepreneurs often invest in other startups or become "serial founders". At the same time, the return on IPOs would enable investors to cope with larger financing rounds in the future. Essentially, a positive, self-reinforcing dynamism would ensue – to

the benefit of the entire technology ecosystem in Germany.

For that to happen, however, the political echelons must create conducive conditions. Given the employment effects that would result, promoting a startup ecosystem that is of relevance to the whole of the economy must figure high on the next German government's agenda. The pace at which jobs are multiplying in the country's startup space demonstrates that the efforts undertaken in recent years are now bearing fruit. We must not rest on our laurels, though: Much more still needs to be done for scaleups in particular. Other countries – France being one of them – have understood this and made up lost ground. Germany must learn from them: It cannot afford to have successful companies spring up here with compelling business cases, only to move abroad when the growth phase sets in. International competition for startups, scaleups and the associated jobs has never been fiercer.

The recommendations for actions presented at the end of the study map out how Germany's startup community can realize its full potential in terms of its effect on employment. These recommendations are rooted in the content of the intervening chapters: Chapter 2 examines the differences in how startups and scaleups affect macroeconomic employment. A quantitative investigation of the change in employment at startups and scaleups over the past three years follows in the third chapter, before chapter 4 discusses the importance of successful exits.

It is important to make better use of "snowball" effects, which first requires an increase in the number of startup exits.

2

INNOVATIVE COMPANIES CREATE GOOD AND SUSTAINABLE JOBS

2.1
Startups are important knowledge developers and trend scouts

In a high-wage country such as Germany, only competitive and innovative companies create new, well-paid jobs. This assertion alone raises two questions: How can existing firms become more innovative? And how can new, innovative companies be supported in such a way that they create as many jobs as possible?

Companies tend to raise their innovative game in an environment where they come under pressure from individual "pioneers". Startups are precisely these kind of innovation pioneers, but not only with regard to the goals they set themselves: They also provoke incumbent players to be innovative in their own right. And they do this not only in their capacity as unicorns, but also – in the event that they fail – in the role of trend scouts and of knowledge developers with an educational function. Established firms keen to sharpen their own innovative edge have long since recognized this capability of startups, which is why they invest in or closely cooperate with them.

There are two basic ways in which startups can disrupt the economy and, in so doing, help existing companies to constantly strive to develop and improve.

First, startups drive technological progress. A glance at the automotive industry shows that, for a long time, the development of alternative drive concepts (fuel cells, electric motors) stagnated in deference to the slower innovation cycles that prevail for traditional combustion engines. It took the US company Tesla to reanimate the development of alternative drive systems in Germany – a good example of startups' indirect innovation effect, i.e. their ability to strengthen the innovation activities of a whole industry.

Second, startups drive the economy – and hence also incumbent companies – by creating markets that are new even for existing players. Established firms sometimes shy away from such a step in order to avoid or minimize the risk of setbacks and/or bad investments. In other words, startups commit more readily than incumbents to new technologies. This helps them gain a foothold in the market and introduce new and unprecedented products or business processes. While adding tremendous value, this practice also spurs competitors into action, forcing them too to develop and advance. A good example here is Facebook, which started life 17 years ago as a student platform in a residence hall. From there, it went on to turn the market for social media platforms and (online) advertising on its head.

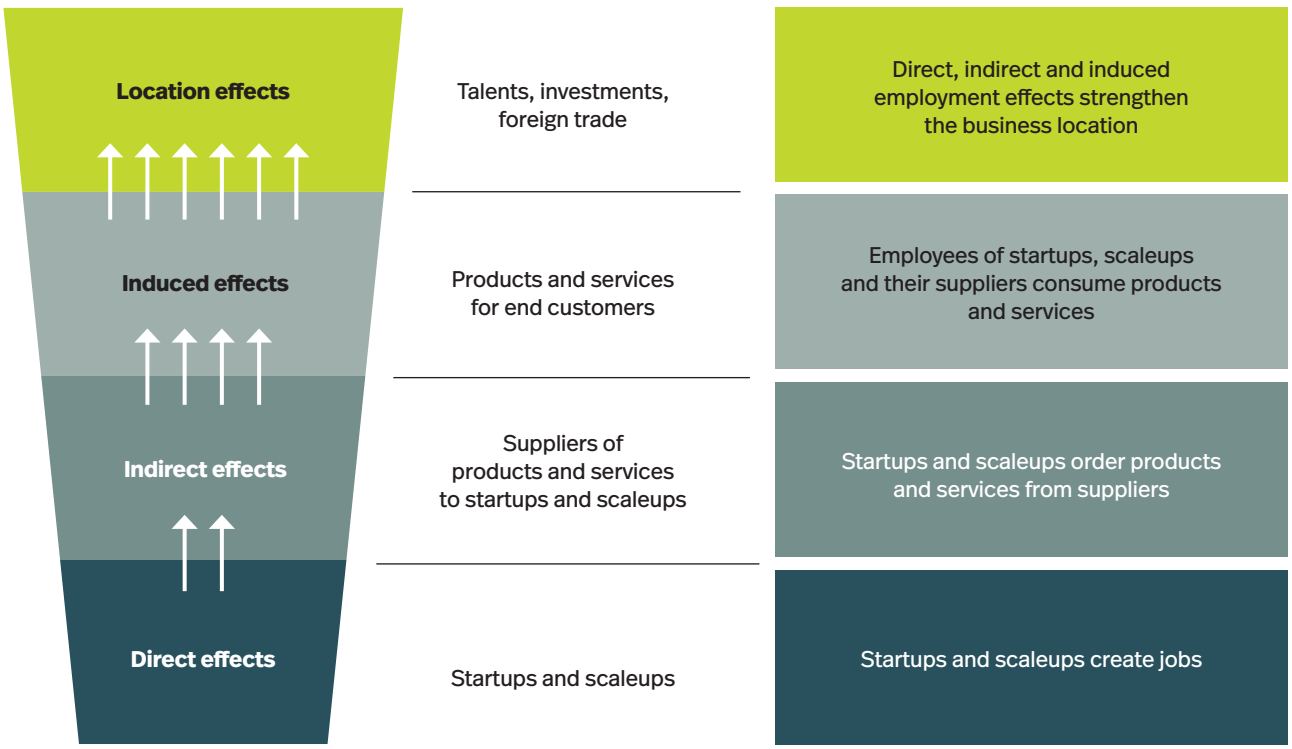
2.2
Direct and indirect employment effects

Startups and scaleups generate not only direct employment effects by creating jobs internally: They also trigger indirect and induced employment effects among suppliers and service providers for whom the new internal employees generate demand across the economy as a whole. Location effects are likewise in

evidence: As a robust venue for startups and scaleups, Germany attracts both talent and investment from abroad, thereby giving a boost to the overall economy.

A concrete example illustrates how startups drive employment above and beyond the jobs they create directly (i.e. internally): The staff of a startup order goods and make use of both specialized and basic services (everything from legal counsel to cleaning staff). This sets in motion a "virtuous cycle" of indirect and induced effects, which in turn produces the employment stimulus described above. →A

A Vast upside potential: The different ways in which startups and scaleups affect employment



Source: Roland Berger

That, at least, is the theory. In practice, quantifying these indirect, induced and location-based employment effects is difficult and is the subject of wide-ranging academic debate. There are nevertheless numbers and tendencies that do reveal conspicuous similarities. Berkeley economist Enrico Moretti, for example, identifies a multiplier effect of five for this kind of quantification in his award-winning book *The New Geography of Jobs*. For every new job created at a startup, Moretti calculates that five more follow outside the startup itself.[2] In its 2019 study *Updated employment multipliers for the U.S. economy*, *the Economic Policy Institute* investigated corresponding multiplier effects for a broad selection of industries in the USA, drawing a distinction between "supplier jobs", "induced jobs" and the sum of both, i.e. "total indirect jobs". For the category *professional, scientific and technical services,* the study arrives at a factor of 4.2.[3] Years earlier, the *Bay Area Council Economic Institute* had similarly concluded that four additional jobs were created for every "high-tech" job in the Bay Area alone.[4]

Applying these US-specific estimates to Germany and erring deliberately on the side of caution, it is reasonable to assume a multiplier effect of three. In other words, every new job at a startup or scaleup leads to the creation of three additional jobs beyond the company concerned. Taking into account both direct employment effects and the associated multiplier effects, we thus find that startups and scaleups in Germany currently create and underpin around 1.6 million jobs. →B

Variation in the labor market effects prompted by startups and scaleups is reflected in the diversity of the jobs created. Startups and scaleups give work not only to a certain "clientele", but in fact give rise to a broad spectrum of employment opportunities. The positive employment effects range from highly qualified jobs (in IT, data science, marketing and communication, for example) to more basic employment (such as transport and cleaning services). Due in particular to the indirect and induced effects, all social strata can thus benefit from a wide array of jobs resulting from the growth of startups and scaleups.

B A powerful lever: Startups and scaleups create direct jobs but also drive employment effects above and beyond the startup community

EMPLOYMENT EFFECTS OF GERMAN STARTUPS AND SCALEUPS
[estimate for 2020, millions of employees]

Source: Dealroom, Roland Berger

2.3
The "trickle-down" effect: Impetus from the US startup space

Does analysis of the general development and structure of the labor market reveal empirical evidence for this multiplier effect? And what kinds of jobs emanate from this "trickle-down" effect?

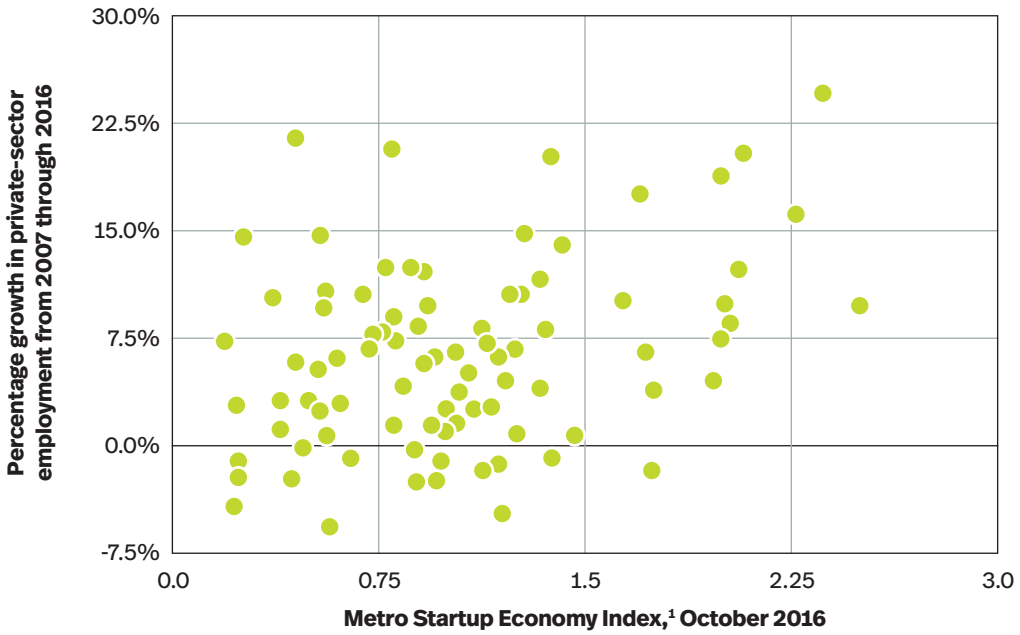
Here again, it's worthwhile to examine developments in the US labor market over the past five years. During this period, new and future-oriented jobs were not created in the formerly labor-intensive branches of today's industrial society, even though this was a stated aim of Donald Trump's government. Such jobs rather emerged in those states with a large proportion of startups and scaleups. A glance at the *Quarterly Census of Employment and Wages* shows that what is termed the "rust belt" experienced no significant gain in employment during Trump's tenure.

Technology entrepreneur Vivek Wadhwa believes that, without startups, the last few decades would have yielded no net employment growth at all in the US economy. According to his calculations, established enterprises shed a net total of roughly a million jobs per year between 1977 and 2005. By contrast, newly launched companies added an average of three million jobs per year in the same period.[5]

Published in 2017, the findings of a study by the *Progressive Policy Institute* point to a very similar trend.[6] This study furnishes evidence that employment growth is substantially stronger in regions with a wealth of startup activity. The study – *How the Startup Economy is Spreading Across the Country* – is in turn based on numbers derived from the *Metro Startup Economy Index*, which measures the number of job advertisements containing the term "startup" as a proportion of all job advertisements.

> Without startups, the last decades would have yielded no net employment growth at all in the US economy.

C More startup activities, more jobs: In the USA, a stable correlation exists between startup activity and employment growth



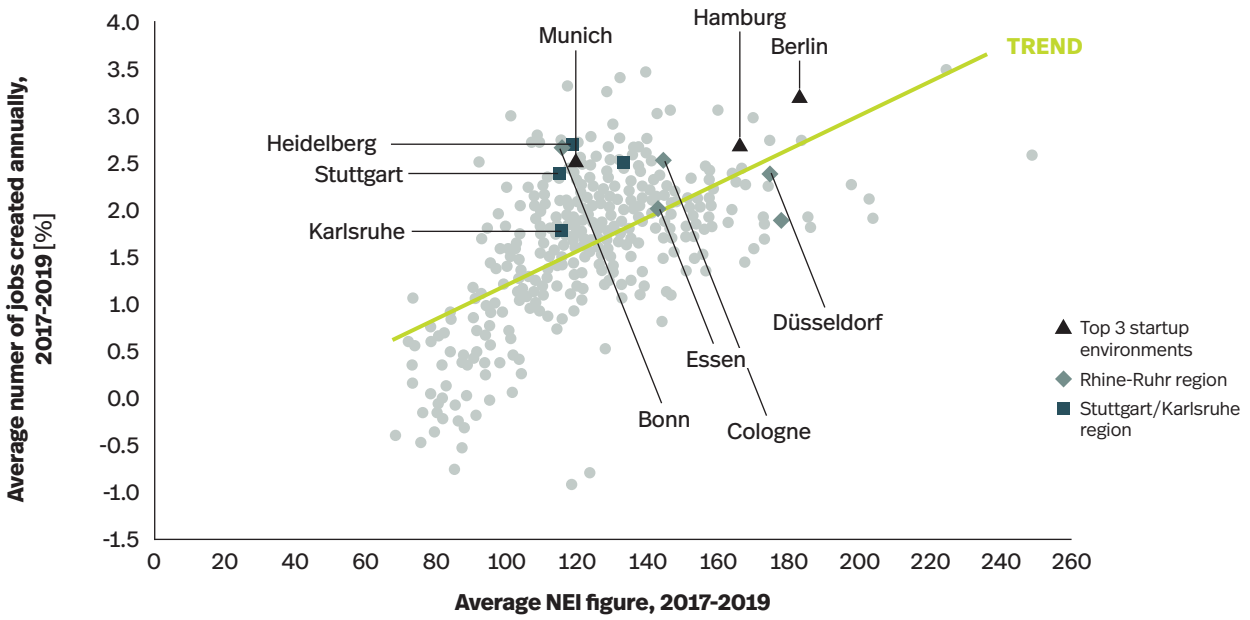
The **Metro Startup Economy Index** is derived from the percentage of job advertisements in a metropolitan region containing the word "startup". This percentage is then normalized by dividing it by the median percentage of all analyzed metro regions, resulting in a **Metro Startup Economy Index** for each region. The 100 largest metropolitan regions in the USA were investigated. The data was analyzed in October 2016 and again in March 2017. The mean of the findings was then assumed.

[1] Excluding the top 10 metropolitan regions

Source: Metro Startup Economy Index, Progressive Policy Institute

The top 25 regions in the *Metro Startup Economy Index* reflect average job growth of 11.9% in the private sector – compared to only 5.6% in the second quartile and 4.6% in the fourth quartile. Critics could object that this finding is attributable to the outstanding economic performance that is a regular feature of major conurbations. For this reason, the study excludes the ten metropolitan regions with the strongest economies in the USA from any correlation between employment growth and the *Metro Startup Economy Index*. Even without these top ten regions, there is thus a verifiable correlation between job growth and the *Metro Startup Economy Index* values. →C

D More startups mean more employment growth: The observable trend in Germany is similar to that in the USA



[1] IfM's figures include not only new business launches, but also the set-up of new business operations, acquisitions and the influx of commercial operations, plus the commencement of secondary commercial activities as new entrepreneurial initiatives (NEIs).

Source: Institut für Mittelstandsforschung, Federal Employment Agency, Roland Berger

The same correlation between startup activity and job growth can be proven in Germany too. A glance at the years 2017 through 2019 shows that the NEI Index, which measures the number of newly established companies per 10,000 inhabitants and is compiled by the *Institut für Mittelstandsforschung (Center for SME Research)*, correlates to an increase in socially insured jobs. The horizontal axis in Figure D depicts the average number of annual startups per 10,000 inhabitants between 2017 and 2019. The vertical axis shows the average annual percentage change in socially insured jobs per administrative district between 2017 and 2019. The rise in the regression lines illustrates the link between vigorous startup activity and employment growth. →D

A verifiable and strong correlation thus exists between startup activity and job growth in both the USA and Germany. However, do startups also create wealth for the whole economy, for the whole country?

To answer this question, let us return to the USA. In a study published in 2019, the *Brookings Institute* examined the correlation between innovative metropolitan regions with large proportions of startups and a variety of macroeconomic factors.[7] The study concludes that the regions in which large concentrations of high-tech startups have accumulated often have higher salaries and better productivity figures than regions where this is not the case.

Brookings uses its own *Startup Complexity Index* (SCI) to explain this phenomenon. The SCI combines startup diversity and startup ubiquity metrics. Startup diversity refers to the number of technological categories in which the startups in a given urban region demonstrate a competitive advantage and/or an above-average propensity to innovate. Startup ubiquity denotes the total number of metropolitan regions that have an advantage in a given category of technology. The SCI index thus reflects the complexity of the startup ecosystem by pinpointing the point at which diversity and ubiquity intersect.

In the study, the *Brookings Institute* compares the SCI's correlation to income and productivity with the correlation between the *Patent Complexity Index* and the percentage of the population that has completed higher education. *Brookings* concludes that pronounced startup activity correlates more closely to high salaries/incomes and higher productivity than does the percentage of the population with university degrees or the number of patents, for example. →E

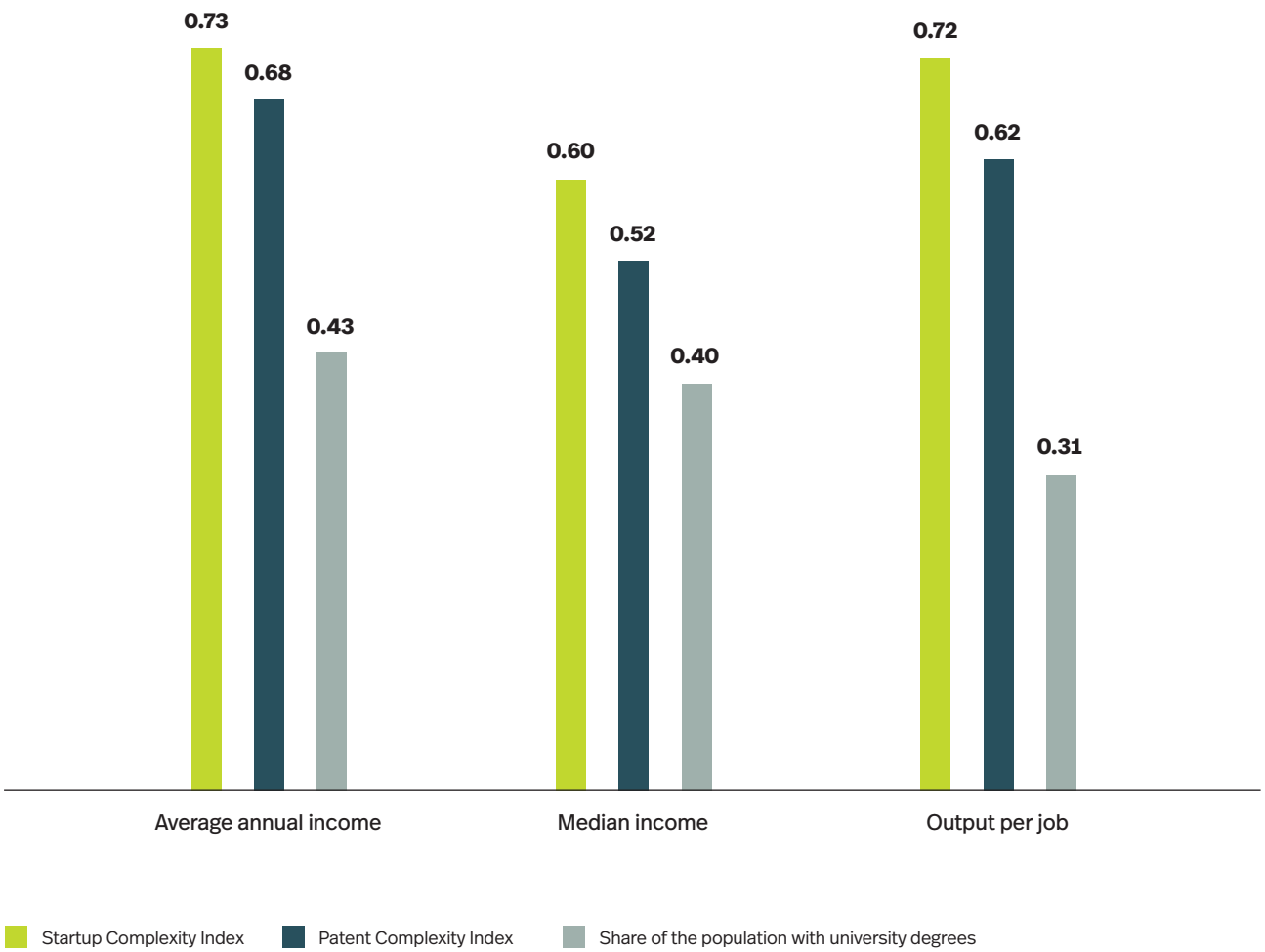
The following conclusions can thus be drawn for the USA: Evidence shows that a high proportion of startups correlates to strong growth in employment and, in many cases, leads to the creation of very well-paid jobs.

While generally valid statements about salary levels at startups and scaleups obviously cannot be drawn from this kind of statistical snapshot, the above findings nevertheless provide a weighty indication that vigorous startup and scaleup activity does indeed go hand in hand with high regional income levels. Especially as startups grow, they come to depend on a broad variety of different specialists.

Another consideration is that a job at a startup also leads to a raft of cultural and intangible benefits – self-determination, flexible working hours, the feeling of being able to create something new – that are of ever greater importance to Generation Y in particular. Startups have proven to be the trendsetters toward a new culture of work – a culture to which traditional incumbents must adapt if they too want to attract young talent.

E Startups raise not just the quantity but also the quality of jobs: High incomes and productivity correlate to startup activities more closely than the number of patents and/or educational qualifications

CORRELATION COEFFICIENT



Source: Brookings Institute

3

ECONOMIC MIRACLE 2.0? THE IMPACT OF STARTUPS AND SCALEUPS ON EMPLOYMENT IN GERMANY

3.1
Above-average job growth in recent years – At startups and scaleups, employment is growing much more strongly than at DAX 30 companies

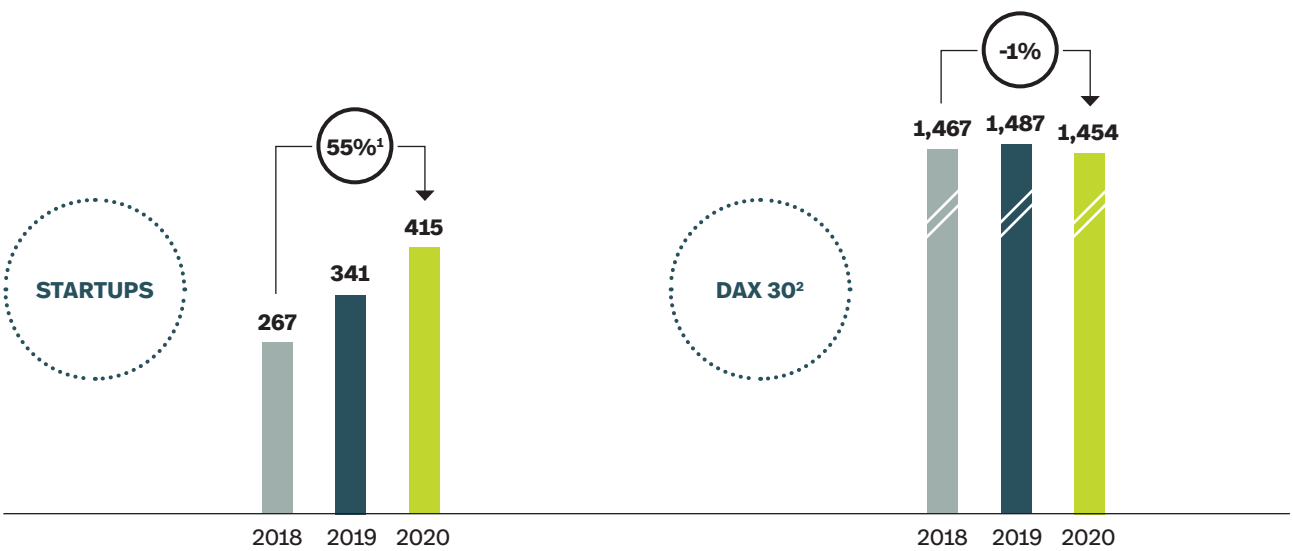
The impact of German startups and scaleups on employment goes unnoticed by the public at large because it is not recorded as a separate category in official statistics. The simple truth is that fast-growing companies do not constitute a "branch of industry". As such, they do not appear in the numbers. To nevertheless estimate how many people in Germany work at startups and scaleups, we therefore obtained access to information supplied by database provider Dealroom.

Our analysis spanned all fast-growing companies with a tech focus that were founded later than 2004, employ at least two people and are headquartered in Germany. These parameters mean that both new startups and scaleups that are already in the growth phase were included in our assessment. The list of these startups and scaleups was then verified by hand to eliminate incorrect entries.[8] We were left with a good 11,300 startups and scaleups in total, which enabled us to analyze their employment numbers for the years 2018 through 2020.[9]

Analysis of the direct employment effect in 2018-2020 created by startups and scaleups established since 2005 reveals a relative increase of around 55% and an absolute increase of roughly 148,000 jobs, bringing us to the figure of 415,000 jobs referenced in Chapter 2.[10] Due to variations in the quality of data across the years investigated, it is reasonable to assume that the absolute number of employees was underestimated in 2018 in particular, leading to an overestimate of subsequent growth. The numbers cited should therefore be understood as indicative of a general trend. In recent years, employment levels have increased rapidly at startups and scaleups. While other areas experience stagnation, startups and scaleups are delivering continuous growth in employment. To provide some context: The number of employees at DAX 30 companies rose by just 1.3% between 2018 and 2019, before declining by 2.2% between 2019 and 2020 due to the pandemic. →F

Government policy measures seeking to improve conditions for startups and scaleups in Germany are one reason for this dynamic development in recent years. The measures include better options for early-stage venture capital (VC) funding. Data from the German Private Equity and Venture Capital Association (BVK) shows that VC investments in Germany increased by an annual average of only 4% between 2010 and 2015, before surging by 28% per year from 2015 through 2019 – ahead of and in tandem with the observable employment effects described above. Growth in VC financing has been a central driver of employment growth.

F Startups and scaleups as an engine of employment: In both relative and absolute terms (thousands of people), startups and scaleups are growing very fast



[1] Due to variations in the quality of data across the years investigated, it is reasonable to assume that the absolute number of employees was underestimated in 2018 in particular, leading to an overestimate of subsequent growth
[2] Number of employees at DAX 30 companies in Germany

Source: Annual reports, Dealroom, Roland Berger

3.2 Where are most jobs created? Differentiation by age, number of employees and sector

Where exactly are these jobs created? What do the individual slices of this ever larger cake look like if we compare startups and scaleups based on three criteria: age, number of employees and sector?

As a general rule, we can state that the number of employees has grown more forcefully at companies founded in 2015 or later than at incumbent enterprises. These younger companies in particular are clearly benefiting from the improved conditions witnessed in

recent years. That said, there is certainly no room for complacency. On the contrary: Such rapid growth merely illustrates what is possible in Germany's future – and what potential is wasted when politicians lose their taste for continuing to improve the prevailing conditions.

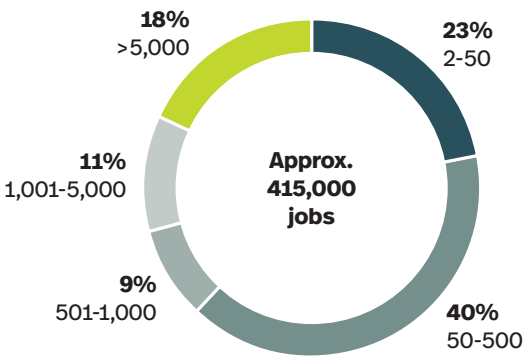
Since the age of a startup or scaleup is not a general indicator of its size, we must ask the question: How does employment stimulus break down across these firms when we draw distinctions between startups and scaleups in terms of their employee numbers?

Companies that employ between 51 and 500 employees account for 40% of the 415,000 jobs referenced above, even though companies in this size bracket represent only 12% of the total study population. In other words, a small number of players create exceptionally strong employment stimulus. By contrast, companies with between two and 50 staff represent 87% of the study population but give work to only 23% of the 415,000 employees. Taken together, almost two thirds of the 415,000 jobs are created at companies with between two and 500 people on their direct payroll. →G

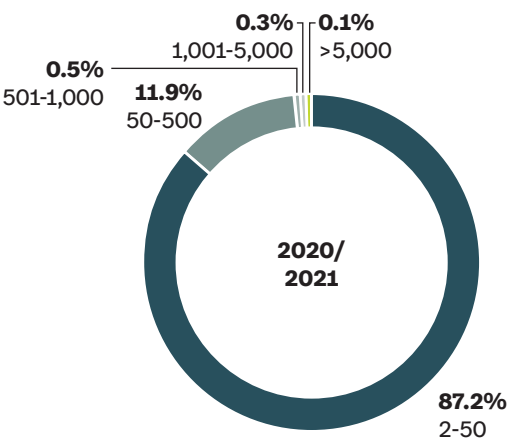
Lastly, it is important to identify the lines of business in which startups and scaleups operate and create jobs most frequently. Figure H shows that the number of employees in the "consumer goods" sector is the highest in absolute terms. However, that could soon change, because the sectors "fintech", "enterprise software" and "transport and travel" are growing rapidly in percentage terms. Gains in employment of 83% and 68% respectively give them a stand-out position even among what are generally high growth rates. →H

G Strong stimulus from medium-sized companies: Employment trend at startups and scaleups by company size

BREAKDOWN OF JOBS ACROSS STARTUPS AND SCALEUPS BY NUMBER OF EMPLOYEES



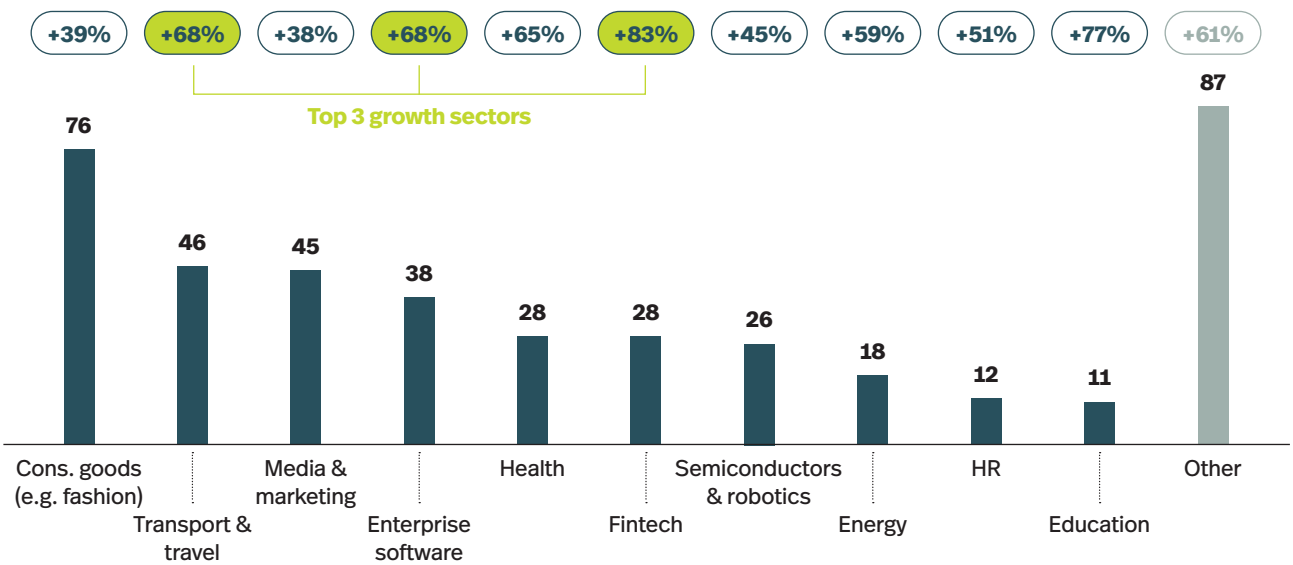
STARTUPS AND SCALEUPS BY NUMBER OF EMPLOYEES



Source: Dealroom, Roland Berger

H Tomorrow's digital world of work: Most employees work in the core "consumer goods" sector, while growth is fastest in the "fintech" sector

EMPLOYEES BY SECTOR IN 2020 ['000] AND GROWTH RATES FROM 2018 THROUGH 2020 [%][1]



[1] As in Figure F, the absolute employment figures for 2018 are likely to have been underestimated here too, leading to an overestimate of growth. The rates of growth presented here nevertheless give an indication of which industries have experienced stronger and weaker growth.

Source: Dealroom, Roland Berger

3.3 International comparison: Germany lagging behind

How do German startups and scaleups stand up to international comparison in terms of the jobs they create? To put it bluntly: Germany lags behind the leading startup nations, both in Europe and worldwide. The country falls well short of the US benchmark in particular – though this gap also reflects Germany's vast reserves of untapped potential.

At the present time, 415,000 people work for German startups and scaleups. That is a good start. As things stand, however, this number equates to just about 0.9%

of the country's total working population of 44.7 million. The corresponding figure is nearly 8.4% in the US and about 5.4% in Israel. →I

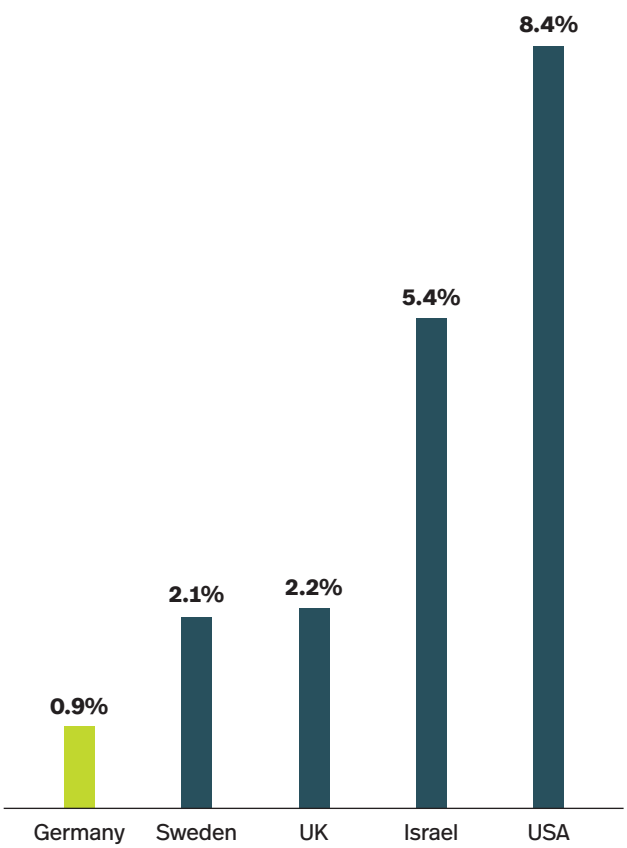
These figures, too, underscore the huge potential that can be realized by dynamic development in a startup community, above all if due consideration is given to the indirect employment effects discussed earlier.[11]

The German economy as it stands would be inconceivable without startups and scaleups as an engine of employment. To the extent that new jobs emerge in the years ahead, there is every chance that they will be created in one of the many booming tech spaces – at startups in B2B software, fintech or the health sector, for example.

This assumption applies all the more given that conditions have never been more favorable if the tech space is serious about translating potential into actual growth. The extrapolation in Figure J illustrates the momentum with which jobs at startups and scaleups could increase in the next few years. →J

The baseline comprises employees who worked at startups and scaleups in 2020 as a share of all employees in the given country (as discussed earlier in this chapter). We then placed this share in relation to the total employment predicted for Germany in 2030. The findings do not constitute a forecast of the employment effects expected from startups and scaleups by 2030: The purpose of the analysis is to open our eyes to the potential that a vibrant startup ecosystem could unlock for the German economy as a whole.

I Germany lags behind: In both the USA and Israel, a far higher percentage of employees work at startups and scaleups

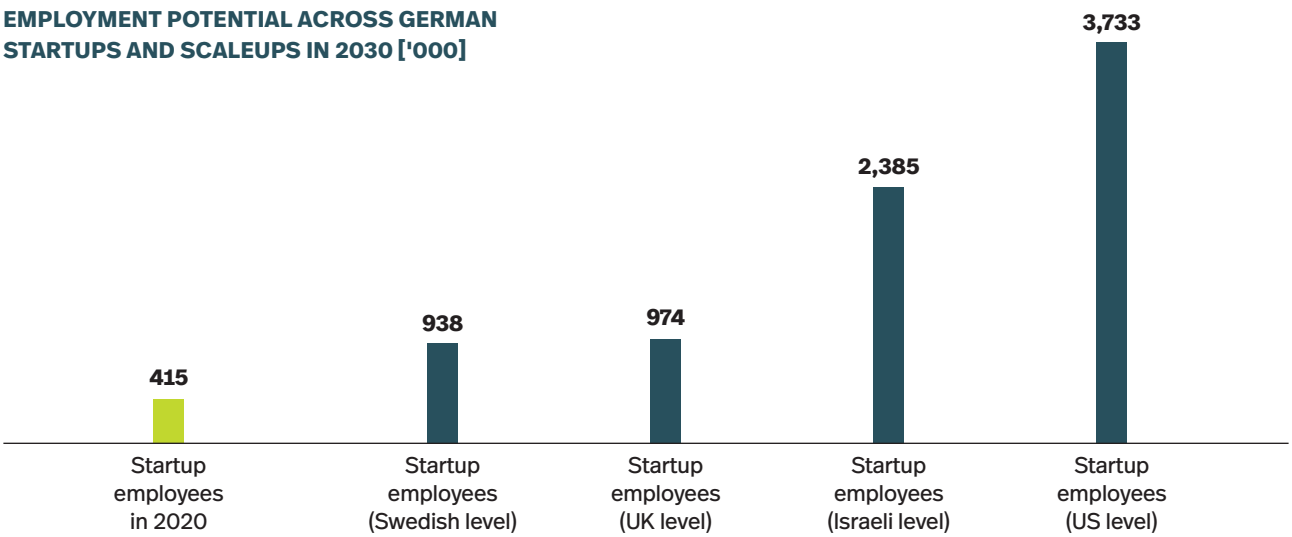


[1] The Dealroom data set was adjusted for spin-offs and the German offices of international corporations, for example. In total, the number of employees at startups in Germany was thus reduced by 22.6%. Corresponding corrections were also made for the peer countries.

Source: Dealroom, Oxford Economics, Roland Berger

J Huge potential for Germany: As many as 3.7 million jobs could be created in German startups and scaleups by 2030

EMPLOYMENT POTENTIAL ACROSS GERMAN STARTUPS AND SCALEUPS IN 2030 ['000]



The baseline for these calculations comprises employees who worked at startups in 2020 as a share of all employees in the given country (see the bars in the above bar chart). Startups founded as of 2005, employing at least two people and domiciled in the given country were included in the calculation.

Source: Oxford Economics, Dealroom, Roland Berger

Over the past two years, startups and scaleups have created an average of 74,000 new jobs per year. As impressive as this number sounds, however, it must be seen in perspective: If the same rate of growth in employment at startups and scaleups were to continue, it would take Germany a good seven years to arrive at more or less the same proportion of employees at startups and scaleups as Sweden and the UK.[12] On the other hand, if the startup ecosystem were to acquire a similar level of importance on the labor market to that in Israel or the USA, startups and scaleups in Germany ought to be churning out 200,000 new jobs (in line with the percentage of employment in Israel) or even 330,000 new jobs (in line with the percentage of employment in the USA) each year. Assuming the "Israel scenario", something like 2.4 million people in Germany would work at startups or scaleups in 2030. In the "US scenario", the number would be around 3.7 million people.

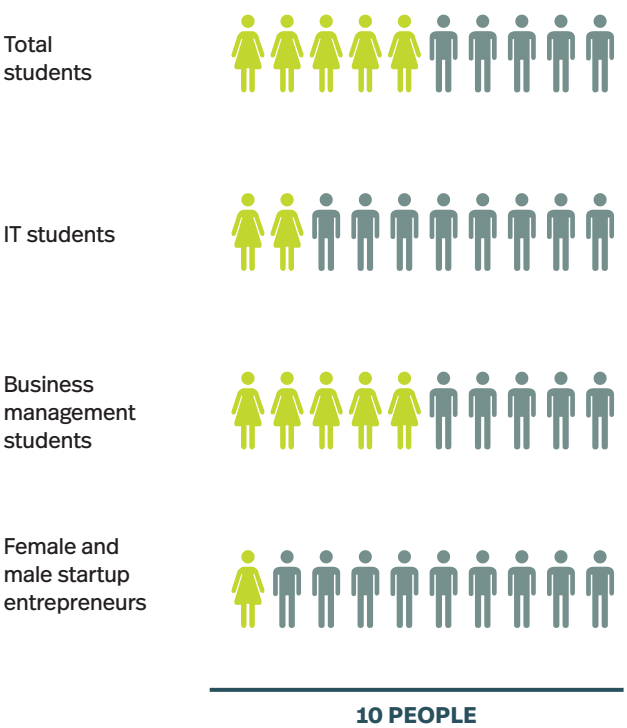
If indirect employment effects were then added, the potential for the German labor market is clearly tremendous.

One thing is for sure: The large scale of employment at startups and scaleups in Israel and the USA is no coincidence. It did not just happen, and nor can it simply be copied like a template. That said, if Germany is serious about creating a wide range of good, sustainable jobs, it must learn from the best and work toward optimizing the use it makes of startup and scaleup potential.

How realistic is the vision of Germany as a startup nation?[13] How we answer this question depends heavily on whether or not the country succeeds in broadening its base of entrepreneurs. Going forward, the objective must be to encourage more and more talented individuals to launch new companies. This principle applies to all segments of the population, but especially to women, who are significantly underrepresented in the startup community at the present time. It is also important to note that more female entrepreneurs would mean not only more startups, but automatically higher levels of employment.

Our database goes back to 2004 and covers only those startups that already employ staff. This data revealed that a mere 10% of these startups were launched by female entrepreneurs. Drawing on its own criteria, the Female Founders Monitor at least put the proportion of female entrepreneurs at 15.7% for 2019. And the share of female founders has indeed been edging upward continually for several years. However, this gradual improvement can at best be only a beginning, because reinforcing the base of female entrepreneurs is one of the most important aspects if an economy is to catch up with successful startup nations such as the USA and Israel. →K

K Too few female entrepreneurs: Proportion of women on selected study courses compared to the proportion of female entrepreneurs [%]



Source: Dealroom, Destatis, Roland Berger

4

A POSITIVE “SNOWBALL EFFECT”: HOW STRONGLY THE GERMAN STARTUP COMMUNITY COULD BENEFIT FROM MORE EXITS

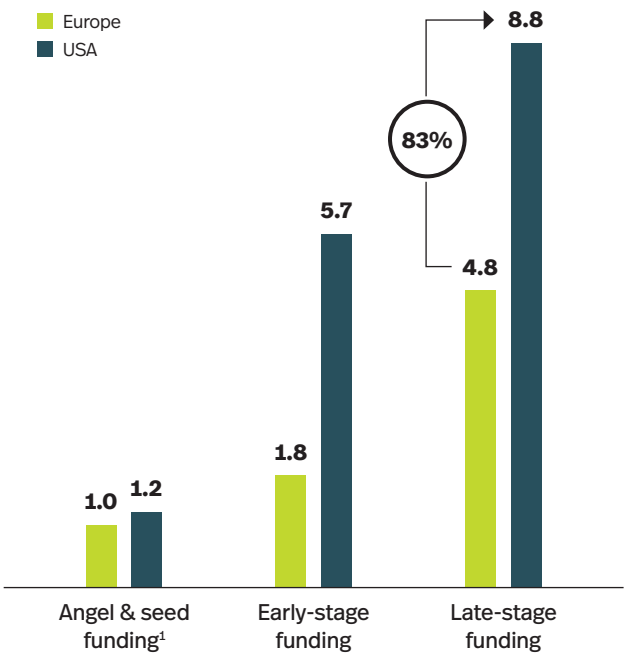
Whether or not a good business idea ever gets off the drawing board depends to a large extent on a startup's capital resources. On this score, Germany has made up lost ground in recent years: It is now more likely that a startup will make it from the seed phase to unicorn status: The probability today is comparable to US levels.[14] That is of course positive news, but it should not give politicians and investors a pretext to rest on their laurels. Ultimately, what determines whether a growing company can realize its full potential is essentially whether or not a successful exit is reached.

4.1
Financing still patchy in the late stage

Regarding the volume of initial financing rounds, Germany has lately shortened its gap with the USA. At least in the angel and seed phases, only minor discrepancies now remain between the two countries. A completely different picture nevertheless emerges in subsequent early-stage rounds, and even more so in the context of late-stage financing rounds. In the latter case, the average deal volume in the USA is 83% higher than in Europe, giving America a crucial competitive advantage. If scaleups lack growth capital at this stage, they can easily be left standing by competitors. This is especially true in the kind of "winner-takes-it-all" markets that are typical of platform business models, for example. However, the principle also applies to the "deep-tech" startups that often take years to develop technologies before ever getting their first product to market.

There is another reason why the late-stage funding gap is so concerning: Insufficient capital resources have a serious and negative impact on employment growth. Conversely, if more generous financing rounds were no longer the exception to the rule in Germany, that would have a powerful and positive effect on employment. →L

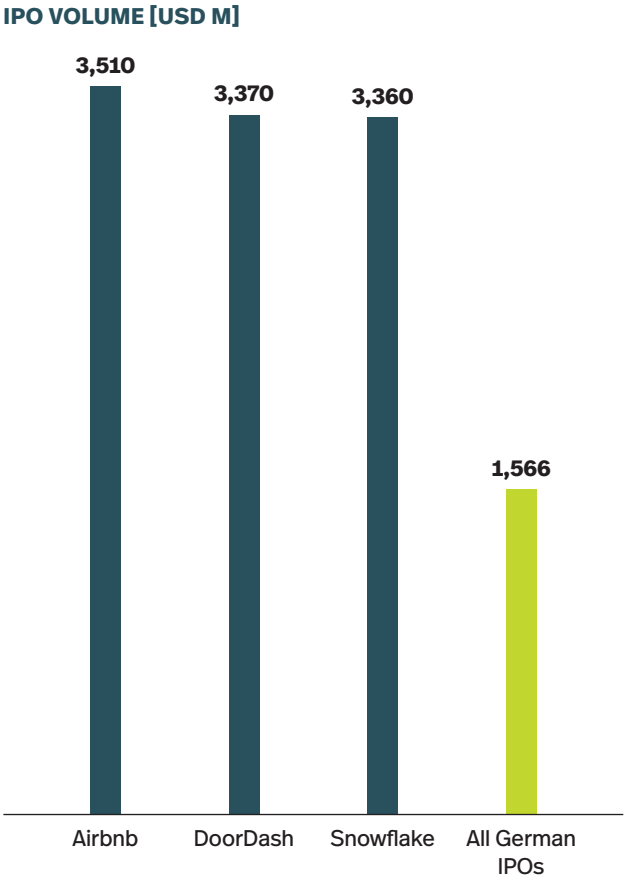
L Limited growth opportunities: Average volume of financing rounds in Europe compared to the USA in 2020 [EUR m]



[1] Since angel funding and seed funding are reported separately in the USA, the average of the two median figures is shown here.

Source: Pitchbook, Roland Berger

M IPOs in Germany: IPO volume in 2020 [USD m]



Source: Morningstar, Deutscher Bundestag, Roland Berger

The shortfall in late-stage financing is not the only problem, however. Compared with the situation in other countries, far too few German scaleups ever find the exit and never reach the stock market. This again is detrimental to their capital resources and, hence, to their prospects for growth. Although the frequency of IPOs has risen in recent years, the country is still failing to realize its full potential. Germany has been unable to keep up with the IPO booms witnessed last year in the USA and China. To put that in context: The three biggest American flotations last year each netted twice as much cash from investors as all German IPOs in 2020 put together. →M

There are plenty of reasons for Germany's lackluster IPO market. The country's comparatively underdeveloped equity culture, regulatory obstacles and a tangible risk aversion are often cited by way of explanation. Whatever the root causes, however, the growth of scaleups remains stunted if the domestic capital market does not work properly. VC rounds thus end up thinner because capital backers instinctively price in the lower probability of an IPO. By the same token, companies become increasingly dependent on individual investors. Both factors adversely affect their growth – and with it their impact on employment.

4.2 "Soonicorns" and the hope of a new IPO boom in Germany

To understand just how much potential is lost to the German economy because of unrealized IPOs, it is important to look at the numbers. Recent analysis by Dealroom and Deutsche Börse shows that the sum of the valuations of publicly traded growth-oriented companies rises considerably faster than the corresponding figure

for unlisted companies. To be precise, the former rose by a factor of 7.5, against a factor of 4.4 for the latter. It is thus reasonable to conclude that publicly traded companies can scale up their business models faster. On the other hand, when an IPO is not an option, companies can find themselves at a critical competitive disadvantage.

One even more important factor is the positive snowball effect that kicks in after successful exits. This can be seen from the flotation of young and fast-growing companies. In the wake of successful exits, a significant share of the proceeds of the IPO or sale flows back into the startup ecosystem. Why? Because, in many cases, entrepreneurs then go ahead and launch new companies or become “serial founders”. In so doing, they pass on their knowledge to the next generation of startups, improving the latter’s chances of success. The same goes for investors: After a successful IPO, they too are better placed to launch larger funds and can therefore shoulder larger financing rounds going forward.

Positive exit effects are amplified over time. They help the tech ecosystem as a whole to flourish and grow – ideally along an exponential rather than a linear trajectory. Initial signs of such dynamics are already observable in Germany, even though overall potential is still far from exhausted.

The fact that more and more European tech startups prefer to go public on their domestic capital market is at least one bit of good news. Data published by Deutsche Börse shows that 87% of publicly traded German tech companies opted for an IPO on their home market. It

Publicly traded companies have scaled up their business models much faster than unlisted competitors.

N IPOs drive growth: After going public, German scaleups continue to increase both revenue and their workforce

Source: Dealroom, Deutsche Börse Venture Network

remains to be seen in the years ahead whether this positive trend will be sustained. On the plus side, the proportion of "soonicorns" in German-speaking Europe – over 90 of them at the last count – that are thinking about an IPO or M&A deal is increasing. On the downside, some instances suggest a trend for these companies to move overseas (see box on the German biotech industry). For the reasons already discussed, that could have negative repercussions for the European startup ecosystem.

New studies also highlight the threat of an exodus of value creation if the right balance is not struck between domestic and foreign investors. For example, the

probability of an exit in the USA tends to increase when American venture capitalists participate in European startup financing rounds. A similar trend can be seen regarding the departure of serial entrepreneurs.[15] The German economy thus faces the threat of losing valuable expertise. Another danger is that the virtuous cycle described above could be impeded, which would prevent desirable snowball effects from realizing their full potential.

Notwithstanding, a small group of German unicorns recently demonstrated that things do not have to be this way. The Zalando e-commerce platform; Hello Fresh, which ships boxes of cook-it-yourself meal kits; and food delivery service Delivery Hero have two things in common: First, they have all debuted very successfully on the German stock market in recent years. And second, they have since been creating jobs at a rapid pace. Since their respective IPOs, these three scaleups together have given rise to around 27,000 new jobs – a development from which the domestic labor market too is benefiting handsomely. →N

The litmus test for the German capital market still lies ahead, however. As things stand, some 15 unicorns are chomping at the bit and ready to go. Berlin-based pre-owned car portal Auto1 has already left the unicorn fold and floated its shares: At the start of this year, it completed Germany’s most successful IPO since fall 2019. Its issue volume of EUR 1.8 billion raised enough capital to usher in the next phase of growth. Whether the remaining unicorns will be able to follow its example depends in part on the political course charted in the coming years.

GERMAN BIOTECH FIRMS GO WEST.

German biotech companies have become the darlings of the American stock market – witness the impressive debut put in by Tübingen-based Curevac on the tech-heavy Nasdaq in summer 2020. The vaccine producer’s stock price shot up 250%, raising the bar even by American standards. Yet though this was an exceptional achievement, the Curevac IPO fits a pattern that has long been taking shape. German biotech firms go public with the aid of their US facilities because the USA offers them a more positive market environment. From the companies’ own perspective, significantly higher valuations can be realized on average on Wall Street, because American analysts are better able to assess technological innovations and US investors are generally more willing to take risks. All in all, six German biotech players have thus floated their shares in the USA in the past three years alone. In the same period, Germany has hosted not a single biotech IPO.

5

TALENTS, CAPITAL AND COMPETITION – THREE DRIVERS OF GROWTH AND EMPLOYMENT

The startup and scaleup ecosystem is rooted in conditions that it cannot create on its own. Classical economic theory points to labor, capital and land as the factors of production. Paraphrased to fit the technology-based business models of the 21st century, it would perhaps be more appropriate to speak of talents, capital and fair competition. Taken together, these three factors constitute fertile soil for healthy, vibrant startup and scaleup ecosystems.

We must be absolutely clear about the fact that startups' and scaleups' vast potential to drive growth and employment cannot simply be realized out of thin air. The dynamic development unleashed by the German startup ecosystem in the past few years is attributable in large part to the efforts of the public sector during this period. Especially in the area of financing, the federal government has set powerful levers in motion by launching the HTGF (a high-tech startup fund), the Coparion cofinancing fund and new venture debt offerings, as well as establishing KfW Capital as a fund investor. The critical issue is not to be satisfied with these initial successes, but to resolutely and courageously chart a course for the future. On the one hand, determined moves are needed to strengthen the startup ecosystem. At the same time, potential new burdens – such as the reintroduction of a wealth tax, which would have an acutely negative impact on startups – must be avoided.[16] The goal must be for Germany to become not just a country of ideas, but a nation of startup entrepreneurs. A comprehensive startup strategy is thus needed and should, as a matter of priority, be tackled vigorously by the forthcoming new government in its first 100 days in office.

French President Emmanuel Macron set a worthy example by launching the "Startup Nation" initiative in 2017, his aim being to develop France as an attractive venue for young tech companies. Initial successes are already beginning to show, and Paris has overtaken Berlin as Europe's leading startup metropolis. That said, the "Scaleup Europe" initiative invoked by Macron in March of this year is also giving fresh momentum to calls for better conditions for aspiring companies at the European level.

5.1 Talents for the future: Support startups, promote diversity, simplify equity participation for employees

Innovation needs clever individuals. An energetic, growth-oriented startup landscape – and the employment effects it creates – is therefore inconceivable without a potent education system and an internationally competitive research landscape. The gratifying development we are seeing in startups and the jobs created as a result are thanks in no small measure to Germany's robust university and research landscape. Moreover, leading German universities have – with the aid of incubators and accelerators, in most cases – proven their ability to transform themselves into startup factories. This capability must be encouraged and expanded systematically. Fair conditions for the transfer of intellectual property (IP), for example, will be necessary. Another objective must be to generally establish entrepreneurial thinking and a startup culture

more firmly in the country's higher education landscape. In practice, that means ramping up local collaboration between universities, incubators, accelerators, existing businesses and regional economic development units. While university policy is the responsibility of the individual states in Germany, the federal government has already shown – in the shape of the EXIST initiative, for instance – how federal university promotion programs for more startups can be made to work effectively. Universities have an important part to play, especially before and during a startup's launch phase. At this time, they provide the necessary infrastructure in the form of offices and laboratories. **As in the EXIST initiative, funds must be made available to create an infrastructure for startup entrepreneurs at all German universities, based on the threefold principle: research – launch – grow!**

Every fifth German startup is established by people with a migration background. With this in mind, it would be a mistake to only build on talents that are already on the ground in Germany. On the contrary, Germany must cultivate a magnetic appeal for the brightest minds in the international community. And when these people do decide to come here, unnecessary obstacles should not be placed in their way. Again, we should learn from France's example: The country has introduced what is known as the French Tech Visa for startup employees, company founders and investors – irrespective of their formal vocational or university qualifications. Simply put, anyone who can advance the French startup ecosystem can apply for a tech visa. **Germany should follow its neighbor's example and create a visa tailored specifically to the conditions that prevail in the startup community.**

One key way to invigorate the startup and scaleup landscape is to broaden the base of entrepreneurs. In particular, the small proportion of female entrepreneurs to date demonstrates how much potential is still going to waste. Initiatives such as #startupdiversity and networks such as Grace and Global Digital Women are already actively seeking to support female company founders. That alone is not enough, however: The political framework must likewise be adapted to align with the real-world needs of startup entrepreneurs of either sex. The initiative #stayonboard, for example, has successfully advocated for a new statutory provision that allows members of boards to be exempted from the liability risks associated with their office when they take a sabbatical for family reasons. Yet once again, further steps are needed. Studies show that, given a similar business model, male entrepreneurs have a better chance of attracting venture capital than female entrepreneurs. A more standardized pitching process could be useful here as a way to minimize subconscious prejudices on the part of predominantly male investors. **In its own investments, the government should also set an example and link the funding instruments it creates more closely to the diversity of the startups and scaleups it helps to finance.**

Startups and scaleups obviously need innovative entrepreneurs, but they also need well-trained and educated staff. To compete for the best and the brightest, these companies often play the employee stock ownership card: Teams can then benefit directly as the

value of the company increases, perhaps even offsetting the lower salaries startups often pay in their early stage. Regrettably, the legal framework in Germany places a comparatively large number of obstacles in the way of this kind of equity participation program for employees – a serious disadvantage for German companies seeking to compete for the most talented individuals. The government recently has made some improvements, but nowhere near enough. **The government must quite simply pull out all the stops to back equity participation for employees. A separate share class for this kind of program should be created, for example. Such shares could be issued quickly, in digital form and at low cost – and should be transferable. There is also an urgent need for an internationally competitive tax regime.**[17]

5.2 Capital for growth and employment: Further improve access to late-stage capital, strengthen exit channels and the equity culture

Successful startups – and scaleups all the more so – would be inconceivable without venture capital. Alongside funding, VC investors often also provide newly founded companies with valuable knowledge, startup expertise and established networks. Especially in the critical growth phase, however, venture capital is still in short supply in Germany and Europe. Many venture capital funds on this side of the Atlantic are too small to give successful startups the volume of growth capital they would need to make the decisive breakthrough. One important way to enlarge and add to the number of VC funds is to involve private institutional investors such as insurers and foundations. In this way, capital can be allocated in a more future-oriented manner by promoting innovation rather than merely funding debt. High hopes are thus riding on the umbrella fund planned as part of the German government's "Zukunftsfonds" ("Future Fund"), though these hopes remain to be realized in the years ahead. By mitigating the associated risks, the government can make it easier for large institutional investors such as pension funds and insurers to participate in the umbrella fund.

The very design of the umbrella fund will also enable substantially larger investments to be made. Public funding will thus enable "dormant" private capital to be leveraged to effectively address the problem that "ticket sizes" (funding volumes) for individual deals have so far often been too small. In return for cushioning risks, the government is the first stakeholder entitled to a share of any realized returns. The bottom line, however, is that all parties will benefit from the umbrella fund: Startups will enjoy better financing terms. Institutional investors will benefit from the yields. And the government will strengthen the country's innovative capabilities while also participating in profits. **The billion euros earmarked for the umbrella fund by the German government as part of the Future Fund will be money well spent. Startups, scaleups, Germany as a venue for startup activity, and ultimately taxpayers too all stand to benefit. The decisive factor is that "fresh" capital from private institutional investors is being channeled into the innovation cycle. The program**

will be subject to ongoing evaluation, and the volume should be increased if necessary.

Growth capital alone will not unlock the potential of startups and scaleups. Above all, it offers them no long-term safety net. If we want to see more (and above all more successful) growth companies, they will also need access to capital at later stages of development. Once successful scaleups have established their business model and are earning profits, that is the time when venture capitalists usually sell their stake. This "exit" can take place via various channels. If the VC fund does not sell its shares to another investment company or back to the startup itself, two other possible exit strategies lend themselves: The equity stake can either be sold to a strategic investor in the form of a "trade sale" to what is normally an established company, or an initial public offering can be organized. It is important to note that the appeal of a startup ecosystem as a whole hinges on the attractiveness of these exit channels. To make them more attractive in Germany, the examples of successful German startups and scaleups that we have seen to date must be emulated much more widely and much more actively. Established firms need to see cooperating with and buying up startups as an opportunity to sharpen their own innovative edge and safeguard their future.

To make IPOs in particular more attractive in this country, the capital market too must change. Stocks and shares are still something of a rarity in the portfolios of German savers. To create more attractive exit conditions, we need a different investment culture. Furthermore, the failure to invest more money directly in stocks, or to do so indirectly via insurers and/or company pension plans, deprives citizens of the chance to participate in gains generated by the economy in general and profits earned by growth companies in particular. Wider popular participation in the growth of the digital economy can be achieved above all by modernizing the pension system. If insurers, pension funds and company pension plans invest more heavily in stocks and investment companies, that will bolster the German capital market, make exits (and especially IPOs) more attractive in Germany, and will thus draw new experts and analysts into the arena. These effects in turn will foster a healthy ecosystem in which startups and scaleups can realize their full potential benefits to the labor market and the macroeconomy. For these reasons, **more equity products must be included in providential savings, for example by stepping up capital-based elements in statutory pensions.**

5.3 Fair competition for innovation and growth: Regulate platforms, reform public procurement

Capital and talents are a good thing. But it takes more than that to accelerate the growth of startups and scaleups. Fair competitive conditions and equal opportunities are just as imperative, especially in light of the rising importance of digital platforms: The digital heavyweights – Google, Amazon, Facebook, Apple, Microsoft and the like – have crafted extensive ecosystems that yield huge benefits not only for end customers, but also for other companies. Yet these

digital platforms also possess tremendous market power that they can use to combat up-and-coming rivals.[18] If German and European startups and scaleups are to have a chance of standing up to international competition, then the digital world too requires clear, fair and enforceable market rules. **In the shape of the Digital Services Act and the Digital Markets Act, the European Commission has tabled proposals to give smaller providers a fair chance in the digital space. It is vital for these proposals to be anchored in law in 2022 without being watered down.**

However, young, fast-growing companies can be stifled not only by online platforms and their dependence on these giants. Startups and scaleups must also be given a fair chance to compete with other established companies. This is especially true in the context of public calls for tender, which often tend to place young technology companies at a disadvantage. For example, companies often have to provide evidence of substantial revenue from prior years in order to qualify for public tenders. In effect, however, that is a fast way to sift out startups that have only been on the market for a few years – and thus to eliminate innovative products that might have proved highly beneficial to the public authority in question.

There are several ways to tackle this issue. The suitability criteria formulated in calls for tender should be reviewed and reconsidered, for example. Exceptions could be defined that allow even young companies to qualify. In addition, efforts should be made to nurture innovation partnerships between government agencies and startups or scaleups that would give the public sector recourse to the knowledge and expertise of growth companies. This kind of cooperation and partnership can also support and accelerate a change of mindset toward more agile ways of working at the level of public administrations. In many cases, collaboration between startups and administrations breaks down due to a lack of understanding of the conditions and constraints faced by both sides. **It would therefore make sense to provide specific help to both startups and public procurement agencies regarding the formulation of applications and the design of calls for tender. Innovative solutions could be more readily accepted as a result, as public administrations and young tech companies come to understand how each can benefit from the other.**

Germany can remain a viable, going concern in the future only if it commits rigorously to innovation and growth. Crucially, the political echelons must take startups' and scaleups' potential to drive innovation and growth seriously – and must move now to map out the road ahead. The overriding goal must be to exploit the opportunities afforded by a vibrant startup ecosystem – not just for startup entrepreneurs themselves, but for the whole of the German labor market.

Footnotes

1 For the purposes of this study, startups and scaleups are defined as newly launched companies with an innovative business model and a focus on rapid growth. The study population comprises only companies that have been founded since 2005, have at least two employees and are headquartered in Germany. Unlike startups, scaleups have already reached a phase of especially rapid growth. At this stage, external capital is urgently needed to scale up the business model.

2 Enrico Moretti, The New Geography of Jobs [Houghton, Mifflin & Harcourt: 2012]

3 https://files.epi.org/pdf/160282.pdf

4 https://www.bayareacouncil.org/community_engagement/new-study-for-every-new-high-tech-job-four-more-created/

5 See Wadhwa's original statements: https://medium.com/@ericcorl/how-startups-drive-the-economy-69b73cfbae1

6 http://www.progressivepolicy.org/wp-content/uploads/2017/05/How-the-Startup-Economy-is-Spreading-Across-the-Country-%E2%80%94-and-How-It-Can-Be-Accelerate-final.pdf

7 The findings of the study are summarized here: https://www.brookings.edu/research/how-startups-help-cities-measure-their-economic-development-frontier/

8 Spin-offs, the German offices of international corporations and clubs and associations were among those entities removed from the list. These adjustments reduced our estimate of the number of people employed at German startups and scaleups by 22.6%.

9 Since the validity of the data for the years prior to 2018 and for the still-incomplete year 2021 was deemed too uncertain for our analysis, we concentrated solely on the years 2018 through 2020.

10 A recent study of the startup community in Berlin pointed to employment growth of 32% between 2017 and 2019. A similar magnitude of job increases nationwide therefore appears realistic.

11 Since Dealroom has no lists of companies for the countries investigated, it was not possible to make corrections by hand as in the case of Germany. To nevertheless account for the possibility of incorrect entries, we therefore reduced the total number of employees at startups and scaleups in each country by the same proportion as in the dataset for Germany (22.6%).

12 Since the data available for 2018 is of a poorer quality, the actual rate of employment growth over the past three years is likely to be lower, as described in Chapter 3.2. This means that, if the rate of increase remains constant, Germany could in reality require a longer period to catch up with Sweden's current level, for example.

13 The term startup nation alludes to the book Startup Nation: The Story of Israel's Economic Miracle (2010). In this publication, authors Dan Senor and Saul Singer trace the successful development of Israel's high-tech sector. For the purposes of this study, however, the term is used more generally to denote countries that realize above-average employment levels in the startup space.

14 1.2% of all seed-funded startups in German-speaking Europe achieve unicorn status – a probability level equivalent to comparable US cohorts.

15 Braun et al. (2019), Foreign Venture Capital Supply in Europe: Consequences on Ventures' Exit Locations and Entrepreneurial Migration, 2019

16 See "Die Vermögenssteuer – Wachstumsbremse für das deutsche Startup-Ökosystem" ("Wealth tax – Putting the brake on Germany's startup ecosystem"), according to which nearly 90% of respondent startup entrepreneurs fear that a wealth tax would cause startup activity to decline. Although three quarters of the respondents said they would still start more businesses even if a wealth tax were imposed, more than half said they would do so outside Germany.

17 See the "#ESOPasap" study spearheaded by the IE.F in 2020.

18 See the IE.F study "Fair play in the digital world" and the IE.F policy paper on the Digital Services Act and the Digital Markets Act.

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