The VC factor

Data-driven insights about VC-backed start-ups in Europe
Foreword

Venture capital is a crucial and growing part of Europe’s investment ecosystem, contributing to innovation, jobs and growth across the continent. For Invest Europe, the voice of the private equity and venture capital industry, it has been a privilege to cooperate with the European Investment Fund (EIF) on the production of The VC Factor report.

Providing authoritative data is a core function of Invest Europe. Our research helps demonstrate the reach and influence of venture capital in Europe, educating and informing policymakers, press, entrepreneurs and the public at large. As the source of the most comprehensive activity data on European VC, we are delighted to have collaborated with the EIF, the largest investor in European VC funds. The VC Factor is the result of an ambitious research initiative by the EIF – it increases the body of knowledge and provides new data-driven insights into VC’s impact on start-ups.

The report’s findings do recognise that not all start-ups survive, nor are those that survive as successful as their founders might have hoped. However, it also shows that high-achieving start-ups can grow further and faster with VC support, boosting jobs, innovation, assets and sales growth. Furthermore, it provides evidence that VC backing helps more companies to succeed while limiting the failure of others. In short, VC investment and expertise is an essential part of the recipe for start-up success.

Today, the industry is going through a golden age, helping create world-leading companies in Europe like music streaming service Spotify and Dutch payments processor Adyen. These successes are attracting increased investor interest, which in turn helped VC raise and invest record levels of capital in 2018. The EIF has played a central role in supporting European VC funds over the last 25 years. The VC Factor underpins that track record of support by offering a clear picture of VC’s positive impact on some of the continent’s most dynamic companies.
The core mission of the European Investment Fund (EIF) is to reduce barriers for small and medium-sized enterprises (SMEs) that wish to access financing. By developing and offering targeted products to a number of different financial intermediaries, the EIF enhances SMEs' access to finance in all four corners of Europe. To achieve this, the EIF partners with entities such as banks, guarantee and leasing companies, micro-credit providers, diversified debt funds, crowdfunding platforms, venture capital and private equity funds.

Through its pan-European venture capital (VC) activity, the EIF supports the formation of a resilient VC ecosystem and the emergence of new European VC hubs. Taking cornerstone investments in VC funds – as the EIF has been doing over the last 25 years – translates into vital support to small businesses with a high innovative and growth potential, which further enhances the attractiveness of European venture capital as an alternative asset class.

However, the EIF’s prominent role in the European VC ecosystem is not only the result of its significant investment volumes. It is also due to the measurable economic effects of its public policy mission. Through its publications and rigorous research, the EIF strives to support an informed policy debate about the merits of public intervention in the European VC market.

Fortunately, the EIF is not alone in its efforts to shed light on a historically opaque industry. This study, a cooperation between Invest Europe and the EIF, is an example of the two institutions’ unity of purpose when it comes to analysing the impact of VC investments on economic growth. Invest Europe’s authoritative data and market overview paired with the EIF’s expertise in the field of SME performance analysis and economic impact assessment offers an almost unique opportunity. In this setting, numerous and long-standing wisdoms about venture capital in Europe can now be proofed against data-driven insights.

The assessment of the economic effects of its policy instruments will continue to be a key long-term commitment for the EIF. Through data-driven analyses and transparent communication, the EIF will pursue its ambition to assess thoroughly the impact of its activities, thus supporting a flourishing financing market for SMEs in Europe. Not only in this context, we look forward to continuing our fruitful cooperation with Invest Europe.
The VC factor in a nutshell

European venture capital (VC) investments are reaching a new all-time high. In the last decade alone, around EUR 51bn was directed to innovative start-ups in Europe, while VC fundraising has overcome pre-crisis levels. The European Union (EU) venture capital industry is thriving, but what has happened to investees? What, exactly, is VC’s role in the growth of the companies it has financed?

This report is the first large-scale study of EU-based start-ups backed by VC. The novelty is twofold: first, we link invested businesses with their specific financial outcomes and second, we cover the entire EU market. We look at almost 9,000 European firms invested in 2007–15 and analyse their characteristics as well as subsequent performance. In order to study firms’ financial growth we need to allow for some time after the investment, which is why our analysis stops after 2015.

Where did investments go? The European VC market is mostly concentrated, with the six largest hubs receiving one third of all investment activity. However, new emerging hubs are shaking up the status quo. Interestingly, 40% of the financed start-ups are located in cities with more than a million inhabitants while, at the other extreme, 25% operate in smaller cities, with a population of less than 100,000.

By zooming further into VC-financed start-ups, we try to identify other commonalities. Is there a typical European start-up and what does it look like? We find that companies operating in the Nordics region are the most innovative with respect to both their patenting activity and intangible assets. We also discover that early-stage companies are more innovative than their later-stage peers and what is more, they grow faster in terms of revenue and total assets. Our efforts to identify the stereotypical European start-up prove rather futile – there is simply too much variation in the growth patterns.

This is why we need to bring in the heavy statistical artillery. We employ cluster analysis to evaluate and group VC-backed firms according to their four-year growth rates in five financial indicators – revenue, staff numbers, assets, intangibles and costs. Our results show that the 93% of start-ups, which did not default by their fourth year, can be sorted in five distinct profiles – laggards (3%), commoners (56%), all-rounders (19%), visionaries (7%) and superstars (8%). What characteristics define these profiles?

Laggard companies are the slackers, so to say, but luckily they are few and far between. In four years, their financial performance drops to levels lower than those they initially started with. Then come the commoners – nothing too...
"VC-backed profiles, apart from laggards, grew considerably more than their non-VC counterparts, in every financial measure."

"Almost half of high growth start-ups would have fallen into a much less successful profile or defaulted without VC."

exciting about them (as the name may suggest), though they grow, especially in revenue (20%) and costs (11%). The all-rounders are definitely worth your attention, with great performance across the board and growth rates ranging from 39% for intangibles to 141% for revenue. However, visionaries and superstars are the headliners in this show. Visionaries progress soundly in all indicators but intangibles where their growth simply skyrockets with an impressive 534%. Superstars not only grow remarkably in turnover (358%), but also record the highest growth rates across all the rest of the indicators, with the exception of intangibles, where visionaries remain on the top.

After identifying the companies which will give you the most bang for your buck, we take it a step further. To determine the true impact of VC on start-ups' growth, we construct a comparable group of firms (the so-called counterfactual group), which could have received VC financing, but did not. To start off, this analysis reveals that VC-backed start-ups grew faster in total assets during the six years after investment and consistently recorded a higher share of intangible assets than their non-VC-backed counterparts, highlighting VC's role in spurring innovation.

By applying our clustering model to non-VC-invested start-ups, we notice that the same five profiles emerge. However, in the absence of VC, there would be more than four times the number of laggards. This already provides some evidence for the merits of VC financing in uplifting some start-ups to more promising growth trajectories.

We also look at the differences between VC and non-VC-backed start-ups in terms of their financial growth rates. VC-backed profiles, apart from laggards, grew considerably more than their non-VC counterparts, in every financial measure. For one, all-rounders recorded 118 percentage points (pp) higher turnover and 36 pp higher costs. In the visionary and superstar clusters, VC-backed start-ups beat their counterparts in intangibles growth by an impressive 331 pp and 190 pp respectively. This proves that VC's role in the development of start-ups is substantial.

Finally, we use the group of comparable non-VC-backed firms to construct a "what if" scenario, revealing where VC-backed start-ups would have ended up had they not received the investment. Almost half of high-growth start-ups (the all-rounders, visionaries and superstars) would have fallen into a much less successful profile or defaulted without VC. In a nutshell: when an entrepreneurial idea has a high potential for success, the "VC factor" expands opportunities for growth and allows excelling start-ups to unleash their full potential.
Table of contents
Foreword

Chapter 1
The European VC ecosystem at a glance

Chapter 2
Start-up profiles: the Big Five

Chapter 3
The added value of VC

References

Appendices

The VC factor in a nutshell
Chapter 1

The European VC ecosystem at a glance

What does the last decade of VC investing in Europe reveal?

We are used to the European venture capital (VC) industry making headlines. Investments in innovative start-ups are rampant, on course to reach a new all-time high. From 2007 to 2015, investors poured about EUR 35bn into early and later-stage start-ups located in the 28 EU countries.2,3

Where did all this money go? Mostly into a handful of places: out of the 272 sub-national regions in Europe targeted by VC investors, the largest six made up one third of all investment activity (in comparison, two thirds of the total activity took place in 31 regions instead).

The start-up ecosystem in Europe remains heavily concentrated. However, seven new regions have replaced others in the top 20 ranking by investment volumes since 2007. All in all, emerging hubs have started to shake up the status quo.

1 See, for instance, Kraemer-Eis et al. (2019).
2 We group EU28 countries as follows: British Isles (United Kingdom, Ireland); Central and Eastern Europe, CEE (Bulgaria, Croatia, Cyprus, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia); DACH (Austria, Germany); France and Benelux (Belgium, France, Luxembourg, The Netherlands); Mediterranean countries (Greece, Italy, Malta, Portugal, Spain); Nordics (Denmark, Finland, Sweden).
3 The cumulated investment volumes in the years 2007-2018 were downward of EUR 51 bn.
What does this mean for the typical start-up?
The average amount received in an initial VC round was EUR 1.45m, but due to the high variation, this number doesn’t apply to most start-ups. Availability of capital and investment preferences in the region play an important role: ventures in the France and Benelux region secured on average 40% more funding than those in the Nordics and Germany and Austria (DACH) regions. Meanwhile, start-ups in the British Isles received a 25% higher average investment than France and Benelux.

Interestingly, start-ups in the Central and Eastern European (CEE) and Mediterranean countries received the highest average investment volume. This result is likely driven by the smaller size of the VC industry in these regions, which reduces the opportunities to create well-diversified portfolios.

---

**Top NUTS\(^a\) regions by received VC volumes 2007–2015**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Region</th>
<th>Reference Hub/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>France</td>
<td>Île-de-France</td>
<td>Paris</td>
</tr>
<tr>
<td>2</td>
<td>UK</td>
<td>Inner London</td>
<td>London</td>
</tr>
<tr>
<td>3</td>
<td>Germany</td>
<td>Berlin</td>
<td>Berlin</td>
</tr>
<tr>
<td>4</td>
<td>Sweden</td>
<td>Stockholm</td>
<td>Stockholm</td>
</tr>
<tr>
<td>5</td>
<td>Germany</td>
<td>Upper Bavaria</td>
<td>Munich</td>
</tr>
<tr>
<td>6</td>
<td>UK</td>
<td>Berkshire, Buckinghamshire and Oxfordshire</td>
<td>Reading, Abingdon and Oxford</td>
</tr>
</tbody>
</table>

| Total received investments (EUR m) | 3,127 | 2,801 | 1,683 | 1,388 | 1,358 | 912 |

\(^a\)Nomenclature of Territorial Units for Statistics. \(^b\)Most frequent location of start-ups invested in the region.

---

**Fastest growing NUTS regions 2007–2015**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Reference Hub/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Germany</td>
<td>Berlin</td>
</tr>
<tr>
<td>2</td>
<td>Spain</td>
<td>Barcelona</td>
</tr>
<tr>
<td>3</td>
<td>UK</td>
<td>Leeds</td>
</tr>
<tr>
<td>4</td>
<td>Austria</td>
<td>Vienna</td>
</tr>
<tr>
<td>5</td>
<td>Belgium</td>
<td>Louvain-la-Neuve</td>
</tr>
</tbody>
</table>

| Share of total received investments in 2015 (vs. share in 2007–2008) | 8.0% vs. 2.4% | 3.2% vs. 0.7% | 2.8% vs. 0.6% | 1.8% vs. 0.7% | 1.1% vs. 0.1% |

---

“Emerging hubs have started to shake up the status quo.”
Aside from geography, the amount of money a start-up will receive is also shaped by its stage and industry. It is no surprise that later-stage ventures tend to receive significantly more money than seed and start-up firms. Similarly, the life sciences industry’s strong needs for capital translate into larger investment rounds than information and communications technology (ICT), which in turn gets about as much money as manufacturing or green technologies on average. Meanwhile, the services industry\(^4\) records the smallest average amounts.

The European start-up scene might very well be at its most vibrant, but the road to prosperity hasn’t exactly been smooth. After rising from the ashes brought by the dot-com crash, the European VC industry suffered another crunch following the 2007 financial crisis. The crisis severely affected the VC market with both the number of invested start-ups as well as total activity volumes decreasing. The data shows that VC investments peaked in 2008 before a decline, which reversed only in 2014.

\[\text{Number of VC-backed start-ups by stage}
\]

2007–2015

\[\text{The EU start-up scene might be at its most vibrant, but the road to prosperity hasn’t been smooth.}\]

\(^4\) This is a collection of service-oriented industries such as consumer and business services, financial services and transportation.
The downturn affected all VC financing stages, although later-stage investments suffered somewhat more, decreasing by 46% from 2008 to 2014. Investments in the start-up stage (a type of early-stage investment) represented more than half of total investment between 2007 and 2015.

In the aftermath of the crisis, the average VC round fell by almost 50% in volume.

In the aftermath of the crisis, the average VC round fell by almost 50% in volume compared to the pre-crisis levels in 2007. As a result, the median VC-backed company has shrunk in size. This could be a reflection of VC firms reverting to earlier stage investment opportunities, due to a lack of follow-on opportunities induced by the financial crisis itself.

As the effects of the financial crisis started to subside, there has been a reversed upward trend in VC financing. The average VC investment round since 2013 has been in line with pre-crisis figures. Overall, the industry picked up pace again, with total number of invested companies continuing to increase.

We analysed a sample of 8,960 EU start-ups, which received for the first time an early/later stage VC investment during 2007-15. Our dataset is the result of a partnership between EIF and Invest Europe. For financial and industry activity data, we used Bureau Van Dijk’s Orbi database.

We aggregated countries and sectors into macro-regions and macro-sectors. We weighed the sample according to the total population of invested firms for better result representation. See Appendix A for the details of our methodology. Furthermore, to ensure comparability over time, all monetary amounts in the report are expressed in 2010 Euro.

8,960 European start-ups analysed

1 Seed

Before mass production/distribution has started with the aim to complete research, product definition or design, also including market tests and creating prototypes.

2 Start-up

Once the product or service is fully developed, to start mass production/distribution and to cover initial marketing. Companies may be in the process of being set up or may have been in business for a shorter time, but have not sold their product commercially yet.

Seed and start-up stages can also be combined under the collective term early-stage investment.

3 Later stage

Targeting operating companies, which may or may not be profitable and which are likely to have already been VC-backed.

---

5 A table of correspondence from sectors and countries to macro-sector and macro-region respectively can be found in Appendix A.

6 Population figures are taken from Invest Europe’s internal database.

7 Detailed investment stage definitions can be found in Appendix A.
Is there a “typical” European VC-backed start-up?

Two thirds of European VC-backed start-ups operated in the ICT and services sectors from 2007 to 2015. This was the case in most geographic regions, with the British Isles exhibiting the highest share of ICT start-ups (50%). The Nordics region boasted the highest share of life sciences firms, representing 28% of total investment, distinctly higher than the European average of 17%.

“ICT is the sector with most VC-backed firms.”

Later-stage investments focused more on the manufacturing and services sectors, where companies are usually more likely to look for funds to expand their business rather than set it up. In all other industries, the general trend was maintained, with early-stage investments taking the lion’s share of overall activity.

---

*This is also the case for companies without sector affiliation, categorised as "Unknown", however the size of this class is negligible.*
The highest concentration of investees was recorded in the DACH and France and Benelux regions, 33% and 22% of total companies invested during the observed period, respectively. Throughout this time, the CEE and France and Benelux regions increased their share of overall new investments, while the relative importance of DACH and the Nordics decreased.

Looking at investment amounts, however, paints a slightly different picture. In this case, France and Benelux together with British Isles top the list, hosting around a quarter of total invested volumes each while DACH arrives third with 21.9%. The geographic disparity between investment totals and invested firms is likely a result of Invest Europe’s better coverage of VC-backed companies in the DACH region.9

European VC activity does not only take place in VC hubs. VC-backed start-ups are, in fact, spread all over Europe. Around 40% of start-ups are located in cities with more than one million inhabitants, whereas one quarter operate in small urban areas with a population of less than 100,000.

Since 2011, a higher number of VC-financed firms has set up business in large urban areas, mostly at the expense of start-ups established in smaller cities. This development is driven by the two leading sectors, ICT and services, where companies are more likely to benefit from economies of agglomeration (e.g. larger consumer and workforce base).

---

Share of VC investment amount by region
2007-2015

- **25.5%** France & Benelux
- **25.3%** British Isles
- **21.9%** DACH
- **13.2%** Nordics
- **11.4%** Mediterranean
- **2.7%** CEE

Concentration of VC-backed start-ups across Europe
2007-2015

<table>
<thead>
<tr>
<th>No. of start-ups per km²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
</tr>
<tr>
<td>0.01</td>
</tr>
<tr>
<td>0.05</td>
</tr>
<tr>
<td>0.10</td>
</tr>
<tr>
<td>0.25</td>
</tr>
<tr>
<td>0.75</td>
</tr>
<tr>
<td>1.50</td>
</tr>
<tr>
<td>more than 1.50</td>
</tr>
</tbody>
</table>

---

9 This might also be a reason for the relatively smaller average investment amount observed in the DACH region.
How do we track innovation?

We used two measures. First, the share of intangible fixed assets, which is a broad measure including R&D expenses, patents and trademarks. Second, the number of patents submitted to the relevant patenting authority, which is a narrower, but formally more suitable, indication of innovation.

Anatomy of a start-up at the time of investment

In the end, there might be no ‘typical’ European start-up, but our research has uncovered a few interesting patterns. Companies in the British Isles, for example, record the highest number of employees at investment date, even at a very young stage - 48 employees against an average of 22 for the rest of the regions.

Nordic companies have the highest number of patents and the highest share of intangible assets, both indicators of high levels of innovation. On average, Nordic companies have one patent each, and boast the highest share of intangible assets (29% against an overall average of 15%). Yet, they rank among the worst in terms of operating revenue at the time of investment. This feature is also shared by Mediterranean start-ups, although these companies rank much worse in average number of patents.

On the other hand, France and Benelux and DACH companies record higher levels of operating revenue and, together with Mediterranean start-ups, marginally higher levels of total assets.

“Nordic companies prove to be among the most innovative in Europe.”

Median operating revenue at time of investment by region

<table>
<thead>
<tr>
<th>Region</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Isles</td>
<td>148</td>
<td>715</td>
</tr>
<tr>
<td>France &amp; Benelux</td>
<td>377</td>
<td>1136</td>
</tr>
<tr>
<td>CEE</td>
<td>33</td>
<td>137</td>
</tr>
<tr>
<td>DACH</td>
<td>614</td>
<td>1010</td>
</tr>
<tr>
<td>Nordics</td>
<td>92</td>
<td>153</td>
</tr>
<tr>
<td>Mediterranean</td>
<td>64</td>
<td>132</td>
</tr>
</tbody>
</table>

10 Results reported are at year of investment. Firms with missing data at year of investment are omitted from the analysis. Sample is reweighed for each variable due to different missing patterns.
Seed and start-up stage businesses recorded the highest number of patents\(^4\) and share of intangible assets – both indicators of high levels of innovation - issuing on average 90% more patents than later-stage businesses. Although this suggests that the early, rather than later, stage of a business’s life cycle is particularly innovative, later-stage firms have other means to signal their potential to venture capitalists (e.g. financial growth) thus they might be less incentivised to engage in high levels of patenting.

\(^4\)Only 25% of the sample’s companies have at least one patent at investment date, resulting in an overall average number of patents per company below one.

### Start-up story

#### Octo telematics

Octo Telematics is an Italian company providing usage-based services, stolen vehicle recovery and crash management diagnostics to car insurance companies. It also offers road charging services and real-time traffic monitoring for fleet management and car rental companies as well as public bodies.

The support of venture capital allowed Octo to become independent following its spin-off from the Italian Meta System Group. The investors helped with strategic hires necessary for Octo’s development as well as with the optimisation of its supply-chain: for example, the company diversified its supply sources for the manufacture of on-board box units. VC also accelerated Octo’s international expansion across Italy, UK, Spain and the US and helped with enlarging its product range through acquisition targets. The company’s sales grew by 27% annually while profits increased by 235% over four years following the VC financing. With a European market share of over 80% and an expanded service range, Octo was acquired by Renova in April 2014.
When it comes to start-up performance across industries, there are only a handful of noteworthy differences. Manufacturing and services firms boasted the highest revenue and staff levels at the time of investment, partly due to their higher rate of later-stage ventures. Start-ups in the ICT sector required relatively modest levels of assets to kick-start their business.

Life sciences companies were the champions in patented innovations, followed by firms in the manufacturing sector. This is driven by the vastly different incentives to patenting across industries, as testified by the much more nuanced picture drawn by the share of intangibles at the date of investment. Here, no sector clearly overshadowed the others, while ICT start-ups are on par with life sciences businesses, slightly topping the rest.

---

**Start-up story**

**Beddit**

Beddit is a Finnish start-up offering a sleep tracker with a cutting-edge technology to monitor sleep quality, heart rate and breathing without any disturbing wearable sensors. It is an ultra-thin sensor placed under the bed sheet instead, which transmits a detailed sleep analysis wirelessly to a smartphone. Beddit’s data accuracy and patented sleep tracking methodology have been clinically validated and published in peer-reviewed scientific articles. After less than 3 years on the market, Beddit significantly surpassed its sales expectations towards the end of 2015.

An early-stage venture capital fund invested in Beddit after appreciating its cutting-edge technology and innovation as well as its applicability in the everyday life of the average person. Also thanks to that initial VC investment, Beddit currently employs a team of more than 19 enthusiastic developers, scientists, marketers and designers in two offices, located in Helsinki (Finland) and the Silicon Valley (United States).
What happens a few years after the VC investment?

Most key financial indicators increased over time, with some small differences across sectors. Turnover increased the most in ICT start-ups, while growth in total assets and capital was comparable across industries. Patent activity did not follow an increasing trend but is stable over time, with an average of 0.4 patents generated per year. The share of intangible assets increased following the VC investment but started to decline after a couple of years. Therefore, total assets increased proportionally more than the intangibles.

Early-stage companies grew faster than their later-stage counterparts in all indicators but the share of intangible assets. In general, smaller firms exhibited a higher growth rate since they mainly focused on scaling up their business.

After three years, early-stage firms’ sales and staff had grown by 227% and 100% respectively. In comparison, these measures grew by 32% and 30% for later-stage firms.

High variation in performance trends makes it difficult to identify a “typical” European start-up.

High variation in performance trends makes it difficult to identify a ‘typical’ European start-up. We need more powerful analytical tools if we want to dig deeper into the nature of VC-backed start-ups.

Mind the... missing data

Since we followed companies across time, we restricted our sample to a subset of firms with available data for multiple years. We allowed a company in our sample if at least one data point was available at baseline and in the follow-up period. The baseline is defined as the period one year prior to investment date to one year after, i.e. three years in total. The follow-up is composed of any year after the investment date.

Mind the ... survival bias

We were only able to analyse companies that remained in business at any given moment in time. The further away we move from investment date, the higher number of firms default and only better ones “survive”. Average results further away from investment year are, therefore, higher since they exclude firms that went out of business.
Infarm: urban farming (r)evolution

Our food has a long journey to make before it reaches our plate. “Approximately 1500km through 28 pairs of hands,” says Martin Weber, CFO of Infarm, a Berlin-based vertical farming company. Fortunately, vertical farming means that it is possible to grow food closer to home, cutting out unnecessary energy waste for transportation and refrigeration, while reducing the need for pesticides and fertilisers.

The impact? The CO₂ footprint of an Infarm-grown lettuce in Berlin is 0.35kg, compared to up to 3.7kg for lettuce imported from abroad.