



JRC SCIENCE FOR POLICY REPORT

# European Start-up Hotspots: An Analysis based on VC-backed Companies

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**Title:** *European Start-up Hotspots: An Analysis based on VC-backed Companies*

**Abstract**

This study focuses on the locations in Europe where there are the most Venture Capital-backed companies: i.e. start-up hotspots. It aims to provide evidence on start-up activity in Europe and to describe European VC activity over the last two decades. The study reports the following:

- *Europe receives 15% of global VC investments. After the dot.com burst, VC activity in Europe decreased and has never come close to the levels of 2000. VC funds have also moved away from seed funding to later stage funding.*
- *28% of all European VC-backed companies are based in 21 cities. Paris, London and Berlin lead the city ranking and have the highest number of VC-backed companies in Europe.*
- *Location is likely to have a major influence on the amount of VC funds a start-up receives and the number of funding rounds it goes through.*
- *Most European VC-backed companies are up to 8 years old and have up to 100 employees.*
- *The majority of VC-backed firms in Europe belong to the Business, Consumer and Retail industries.*

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## Foreword

This report was prepared in the context of a three-year research project on European Innovation Policies for the Digital Shift (EURIPIDIS), jointly launched in 2013 by JRC-IPTS and DG CONNECT of the European Commission. EURIPIDIS aims to improve understanding of innovation in the ICT sector and of ICT-enabled innovation in the rest of the economy.

The project's objective is to provide evidence-based support to the policies, instruments and measurement needs of DG CONNECT for enhancing ICT Innovation in Europe, in the context of the Digital Single Market for Europe and of the ICT priority of Horizon 2020. It focuses on the improvement of the transfer of best research ideas to the market.

EURIPIDIS aims to:

- better understand how ICT innovation works, at the level of actors such as companies, and also of the ICT "innovation system" in the EU;
- assess the EU's current ICT innovation performance, by attempting to measure ICT innovation in Europe and by measuring the impact of existing policies and instruments (such as FP7 and Horizon 2020); and
- explore and suggest how policy makers could make ICT innovation in the EU work better.

This report focuses on the locations in Europe where there are the most Venture Capital-backed companies: i.e. start-up hotspots. It provides a ranking of the European start-up hotspots together with a detailed analysis of the number of VC-backed companies and amount of financing and the top cities by the number of VC-backed companies. In addition, it looks into the size and continuity of financing available to companies in various locations and their technological specialisation. This exercise builds on the efforts of taking stock of R&D, innovation and business activity of Europe thoroughly made in the [European ICT Poles of Excellence](#) project.

## Acknowledgements

This analysis was produced in the context of the European Innovation Policies for the Digital Shift ([EURIPIDIS](#)) project, jointly launched in 2013 by JRC-IPTS and DG CONNECT of the European Commission.

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## Executive summary

### Policy context

This report was written in the context of the research project on European Innovation Policies for the Digital Shift ([EURIPIDIS](#)). The purpose of the EURIPIDIS project is to provide evidence-based support to the policies, instruments and measurement needs of [DG CONNECT](#) for enhancing ICT innovation in Europe. This objective forms part of the Digital Agenda for Europe and the ICT priority of [Horizon 2020](#), and focuses on improving the transfer of best research ideas to the market. Here, financing innovation and entrepreneurial and start-up activity are among the key issues. This report focuses on the locations in Europe where there are the most Venture Capital-backed companies: i.e. start-up hotspots. It aims to provide evidence on start-up activity in Europe and to describe European VC activity over the last two decades.

### Key conclusions

#### Global, European and national concentrations of VC activity

**Around two thirds** of the world's VC is invested in companies based in the US. As a region Europe comes second, but receives only 15% of global VC investments. Within Europe, UK-based companies represent nearly one quarter of all European VC-backed companies and they receive one third of all VC money invested in Europe. Altogether, the **top 10 European countries account for 90%** of the total number of VC-backed companies and the total amount of Venture Capital raised in Europe. This pattern continues at the country level. **The European start-up hotspots account for 28%** of all European VC-backed companies. Paris, London and Berlin lead the ranking of cities with the highest number of VC-backed companies in Europe.

#### Changes in VC activity and VC orientation in Europe

The golden age for VC activity in Europe took place during the dot.com hype. In 2000, over 3,200 companies received 19 billion Euro from VC funds. After the dot.com burst, VC activity in Europe **considerably decreased** and has never come close to the levels of that period. In 2014, fewer than 1,000 European companies received 5.8 billion Euro from VC funds.

Not only has VC financing sharply decreased, but **VC funds have also moved away from seed to the later stages** of funding. In 1995, 7% of all VC funds were allocated to seed funding, and only 10% to later-stage funding. Two decades later, 56% of all VC financing was allocated to the later stages and only 0.5% to the seed stage. Moreover, the median **amount raised by VC-backed companies in Europe dropped** or remained constant across all funding rounds except the later stage rounds. The characteristics of VC-backed companies have also changed over the last twenty years. For example, their age has increased. As a result, around 90% of these companies are up to **8 years old** and have **up to 100 employees**.

#### Success breeds success

In 1995, the European start-up hotspots accounted for 33% of all VC-backed companies in Europe and 48% of VC money received by all European companies. Over the last two decades, this number has continued to grow. In 2014, 58% of VC-backed companies in Europe were based in the European start-up hotspots. These companies accounted for over two thirds of the money invested by VC funds in Europe. In other words, the European start-up hotspots have continuously increased their attractiveness to VC-funds, as compared to the rest of Europe.

#### Stronger concentration of capital rather than start-up activity

VC-backed companies based in the European start-up hotspots represent 28% of all European companies that received VC financing in the last two decades. However, the European start-up hotspots attracted 57% of all VC money invested in Europe in the

same period. In other words, location is likely to have a major influence on the amount of money a start-up receives from VC funds.

### **Location matters for volume and continuity of VC financing**

Start-ups based in the major European start-up hotspots have better chances of both **receiving more VC-money** and **being backed by VC more frequently**, as compared to an average European VC-backed start-up. The median amount raised by European VC-backed companies was nearly 1.5 Million Euro. In contrast, the same value for a company based in the European hotspots was close to 2 Million Euro. Location also matters for the continuity of financing, i.e. the average number of funding rounds a VC-backed company goes through. For example, an average number of funding rounds for a European VC-backed company is 1.6. A company based in any of the European start-up hotspots goes through, on average, 1.8 funding rounds.

### **Business, Consumer and Retail industries dominate the European start-up landscape**

Companies from the IT industry dominated the pool of VC-backed companies in Europe twenty years ago. Currently, 44% of VC-backed firms in Europe belong to the Business, Consumer and Retail industries and 26% to the IT sector. 2.7 Million Euro is the median amount raised, and the Health industry has the highest levels of VC-financing at the company level. In the Business, Consumer and Retail and IT industries, the median amount raised oscillates around 1.5 Million Euro.

### **Implications**

Observations of VC financing in Europe over the last two decades and the role it plays in financing innovation are important from a policy-making point of view. The following points and their consequences are likely to have a strong effect on the availability of financing for the commercialisation of novel technologies and products in Europe:

#### **Volatility**

In 2014, VC-backed companies in Europe received **only 30%** of the amount invested by VC funds in 2000. Hence, VC funding is very sensitive to investment cycles. This increases and reduces the chances of being funded for companies created in "hot" and in "cold" periods. This raises an issue of the availability and continuity of financing of innovation in the economy independent from investment cycles.

#### **Scarcity**

VC-backed companies represent a very special and extremely small group of companies in the economy. They account for approximately **0.05% of all newly-created companies** or **0.005% of all active companies in Europe**. At the same time, nearly 60% of VC-backed firms in Europe in 2014 were based in one of the European start-up hotspots. In other words, a large share of European companies needs to rely on sources of funding other than VC to finance their innovative activity.

#### **Increasing risk aversion**

VC funds have increasingly focused on mature companies with established technologies and market presence. This challenges the image of VC funds as providers of financing to young, innovative and high-risk enterprises and raises questions about the position of VC funds in the process of financing innovation in general, and innovative ventures without previous commercial records. This raises the issue of other sources of innovation financing. The **public sector, for example, plays a central role in supporting early-stage** innovative activity by small firms, given the tenuous nature of the venture capital cycle at this preliminary, yet critical, stage of firm activity (Gompers & Lerner, 2001; Lerner, 1999).



## 1. Introduction

This report was written in the context of the research project on European Innovation Policies for the Digital Shift ([EURIPIDIS](#)). One of the aims of the EURIPIDIS project was to identify drivers and barriers for the transfer of research ideas to the market. Here, the issue of innovation financing is one of the key elements. Therefore, the EURIPIDIS project looked into Venture Capital (VC) principles in the European ICT ecosystem and crowdfunding (Gabison, 2015a, 2015b). This report focuses on the locations in Europe where there are the most Venture Capital-backed companies: i.e. start-up hotspots. By introducing the regional dimension into the analysis of VC-backed companies, the current report builds on the [European ICT Poles of Excellence](#) project (Nepelski & De Prato, 2014) which took stock of R&D, innovation and business activity in Europe.

The report focuses on the main locations of start-up activity in Europe, i.e. European start-up hotspots, defined as:

**European start-up hotspots are the 20 European cities with the highest number of VC-backed companies.<sup>1</sup>**

Besides looking at the evolution of European start-up hotspots over the last two decades, the current analysis provides a number of insights into the background of each start-up hotspot. First, it records the number of VC-backed companies in each city, listing the top cities which have the most, and the amount of financing they receive. Second, it shows the average sum of financing provided by VC to start-ups and the average number of funding rounds per company in a city. This last piece of information gives us an insight into the continuity of start-up financing, an indicator for the growth potential of firms (Gompers & Lerner, 2001). Third, the analysis looks at characteristics of VC-backed companies such as their size, measured by number of employees, and age. Lastly, information on the evolution of the technological specialisation of each hotspot is provided.

In order to complement the analysis of European start-up hotspots, the current report starts with some key elements related to overall VC activity in Europe in the last two decades. It shows the evolution of the number of VC-backed companies and the amount they raised; and the distribution of VC financing by funding round and industry. Moreover, it reveals key characteristics of VC-backed companies such as their size measured by employment, and age.

The analysis is based on [Venture Source](#) by [Dow Jones](#) and covers the period from 1995 to 2014. Dow Jones' Venture Source provides comprehensive data on venture capital-backed and private equity-backed companies in every region, industry sector and stage of development throughout the world. This database contains information on VC transactions, the companies that receive finance and the firms that provide it. According to Kaplan et al. (2002), who provide a detailed overview of this database and compare it with Venture Economics, the data from Venture Source are generally more reliable, more complete, and less biased. A comparison of Venture Source with [Crunchbase](#) for the purposes of the current analysis showed that Venture Source is a more comprehensive data source that offers longitudinal and standardized information on VC deals with all the detailed information on financed and financing entities (see Section 5.1).

Due to the very high level of detail provided by Venture Source, the analysis is based on primary data on VC activity. It is based on aggregated measures, made up of individual transactions between financed and financing firms. The aggregation took place at

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<sup>1</sup> The start-up hotspot definition is based on the ranking calculated on the number of backed companies until 2014. The list of top 20 start-up hotspots includes 21 cities, because Manchester and Göteborg have the same number of VC-backed companies and they are placed in the same position in the ranking. The remaining analysis uses data for years 1995-2014.

country or city level, depending on the focus of analysis. A city is defined as a Functional Urban Area (for further methodological details, see Section 5).

The rest of the report is organized as follows: Section 2 gives an overview of VC financing in Europe. Section 3 shows the ranking of the European start-up hotspots. Section 4 takes a detailed look at the hotspots themselves. Section 5 provides details on the data and methodology used.

## 2. An overview of VC financing in Europe

This section presents some of the main facts about European VC-backed companies and VC financing in Europe over the last two decades. It includes:

- A comparison of VC financing in Europe with the rest of the world,
- Number of VC-backed companies and the amount raised in Europe,
- VC financing by funding round,
- Volume and continuity of VC financing per company,
- VC-backed companies by industry,
- Size and age of VC-backed companies.

The analysis covers the period between 1995 and 2014.<sup>2</sup>

Box 1 summarises the key facts about VC financing and VC-backed companies in Europe over the last two decades.

### **Box 1: Key facts about VC financing and VC-backed companies in Europe**

- Companies based in the US receive around 2/3 of VC funds invested globally. Europe is the second largest region in terms of VC investments. European VC-backed companies receive around 15% of global VC investments.
- The golden age of VC activity in Europe began during the dot.com hype. In the mid-90s, only around 100 European companies were backed by VC funds. In 2000, over 3,200 companies received 19 Billion Euro from VC funds. After the dot.com burst, however, VC activity in Europe decreased considerably and has never regained the levels of that period. Between 2002 and 2014, European companies received on average 4.4 Billion Euro annually. In 2014, this number increased to 5.8 Billion Euro.
- The UK, Germany and France have the highest shares of European VC-backed companies and of the total amount raised. For example, UK-based companies represent nearly one quarter of all European VC-backed companies. In the period 1995 – 2014, these companies also received one third of all VC funds invested in Europe.
- The top 10 European countries account for 90% of the total number of VC-backed companies and the total amount raised in Europe between 1995 and 2014.
- Regarding the volume of VC financing, the median amount raised by European VC-backed companies was nearly 1.5 Million Euro.
- Regarding the continuity of VC financing, there are 1.6 funding rounds per VC-backed company on average. Firms based in Sweden and Denmark are the most likely to receive subsequent rounds of financing, whereas Lithuanian and Latvian companies are the least likely.
- VC funds have moved away from seed to later stage financing. In 1995, 7% of all VC funds were allocated to seed, and only 10% to later stage financing. Two decades later, 0.5% of all VC funds were allocated to seed and 56% to later stage financing.
- The median amount raised by VC-backed companies in Europe dropped or remained constant across all funding rounds except the later stage. The median amount raised in the later stage doubled from 2.5 Million in 1995-99 to 5 Million Euro in 2010-14.
- Companies from the IT industry dominated the pool of VC-companies in Europe twenty years ago. In the 2010-14 period, 44% of VC-backed firms in Europe

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<sup>2</sup> An exception: due to data availability, the comparison of Europe with the rest of the world covers the period from 2006 to 2013 (Section 2.1).

belonged to the Business, Consumer and Retail industry and 26% to the IT sector.

- The Healthcare industry raises the highest levels of VC-financing per round (a median of 2.7 Million Euro per company). The Business, Consumer and Retail and the IT industry raises a median of around 1.5 Million Euro per company.
- 92% of all VC-backed companies based in Europe have up to 100 employees. Only 1% of the European companies that received VC capital in the last 20 years has 450 or more employees.
- The size of VC-backed companies is decreasing, while their age is increasing. While the median size of a VC-company in the later financing stage in the period 1995-99 was 74 employees, in 2010-14 this number dropped to 35 employees.
- Nearly 90% of all VC-backed companies based in Europe are up to 8 years old. In general, the age of VC-backed companies has increased over the last twenty years.

## 2.1 Europe vs. the rest of the world

Figure 1 shows the global annual amount raised by VC-backed companies in Billion Euro by world regions and number of rounds in the period 2006 - 2013. In 2006, VC-backed companies around the world raised 34 Billion Euro in 4,991 funding rounds. Seven years later, in 2013, the total amount raised was 36.5 Billion Euro. This represents an increase of 7%. The total number of funding rounds grew by 15% to 5,753.

VC-backed companies based in the US received the largest share of VC fund investment. Between 2006 and 2013, this share ranged from 63% in 2009 to 73% in 2006. Although there are some fluctuations from year to year, in general, two thirds of the money invested by VC funds globally goes to companies based in the US.

Europe received the second largest share of global VC investments. European VC-backed companies received annually around 15% of the global amount invested by VC funds. In the period between 2006 and 2013, this figure oscillated between 13% in 2012 and 16.2% in 2009.

In general, it can be concluded, that in the period 2006 - 2013, there was no clear trend in the global amount raised by VC-backed companies and the number of funding rounds. Although the global amount invested by VC funds grew by 14% and the total number of funding rounds by 15%, there was a sharp decrease in VC investments in 2009 and 2012, as compared to previous years. The same applies to the share of individual countries and regions in the global amount raised by VC-backed companies.

**Figure 1: Global annual amount raised by VC-backed companies by world regions and number of rounds**



Note: The graph presents the shares of the major world regions in the amount raised by VC-backed companies in Bln Euro and number of VC funding rounds in the years between 2006 and 2013. Original figures in US Dollars were converted to Euro. Source of historical currency conversion rates: <http://www.oanda.com/>

Calculations: JRC-IPTS based on (EY, 2014)

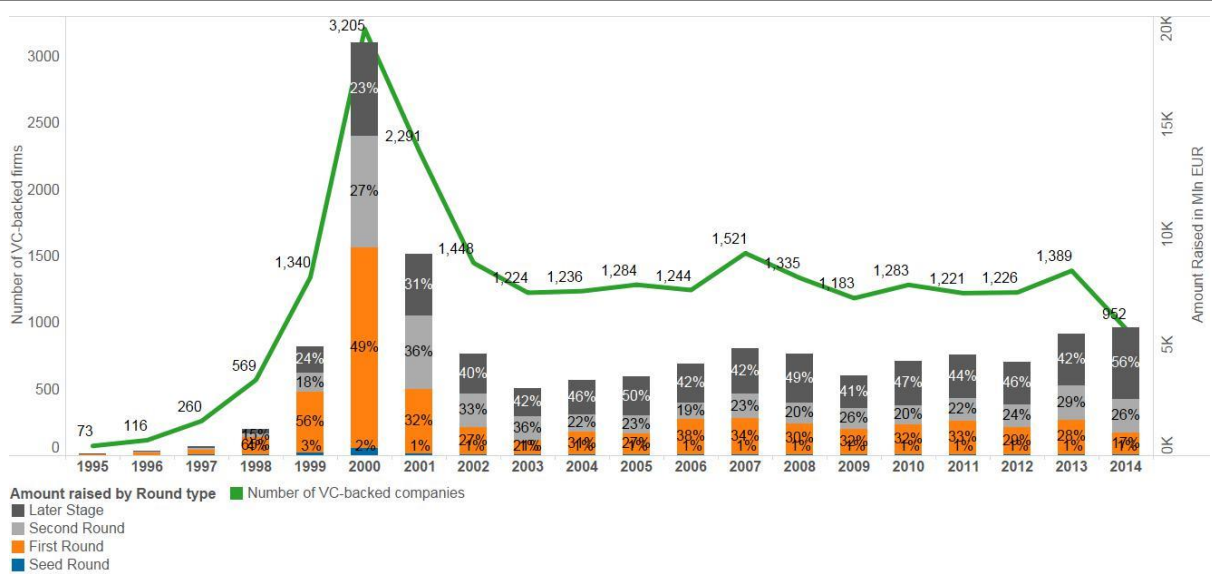
Data: [VentureSource](#) by [Dow Jones](#) for further details please see Section 5.1.

## 2.2 Number of VC-backed companies and amount raised in Europe

Figure 2 shows the number of VC-backed companies and amount raised in Million Euro by year and round type in Europe for the period 1995 - 2014.<sup>3</sup> In general, VC activity in Europe began during the dot.com hype. While only around 100 European companies were backed by VC funds in the mid-90s, this number increased to over 3,200 companies in 2000. In this year, VC funds invested nearly 19 Billion Euro in companies based in Europe. A year later, the amount was halved. Between 2002 and 2014, the average annual amount raised by European companies from VC funds oscillated around 4.4 Billion Euro. In recent years, this has increased to 5.5 and 5.8 Billion Euro in 2013 and 2014 respectively. However, Europe still represents a relatively small share of global VC activity, i.e. 15% (EY, 2014). In comparison, US-based companies receive nearly 70% of money invested by VC funds globally.

<sup>3</sup> For details on geographic coverage, see Section 5.5.

**Figure 2: Number of VC-backed companies and amount raised**



Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Europe. The amount raised is broken down by four stages of financing, i.e. seed, first, second and later stage as defined in Section 5.2.

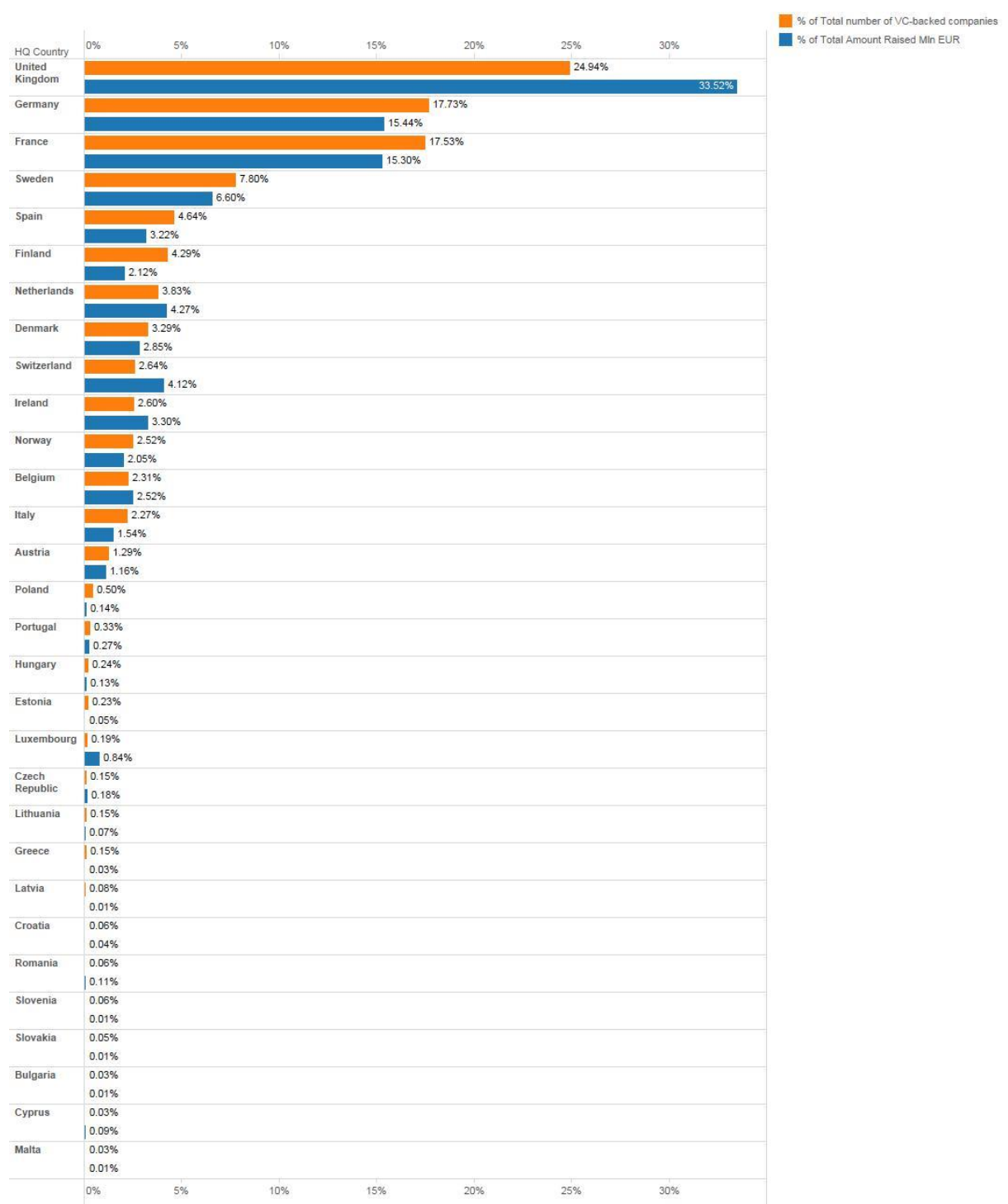
Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

Figure 3 shows the distribution of the total number of VC-backed companies and the total amount raised in Million Euro between 1995 and 2014 in Europe by country. Of the 30 countries, the UK, Germany and France have the highest shares of the total number of VC-backed companies and the total amount raised. For example, UK-based companies represent nearly one quarter of all European VC-backed companies. These companies also received one third of all VC funds invested in Europe between 1995 and 2014. In comparison, Germany and France account for around 17% of VC-backed companies based in Europe and 15% of VC funds each.

Another sign of a very strong concentration of VC activity is the fact that the top 10 European countries account for 90% of the total number of VC-backed companies and the total amount raised in Million Euro in Europe between 1995 and 2014.

**Figure 3: % of VC-backed companies and amount raised by country**



Note: The graph presents the distribution of the total number of VC-backed companies and the total amount raised in Mln Euro over the period between 1995 and 2014 in Europe by country. For the list of countries included see Section 5.5.

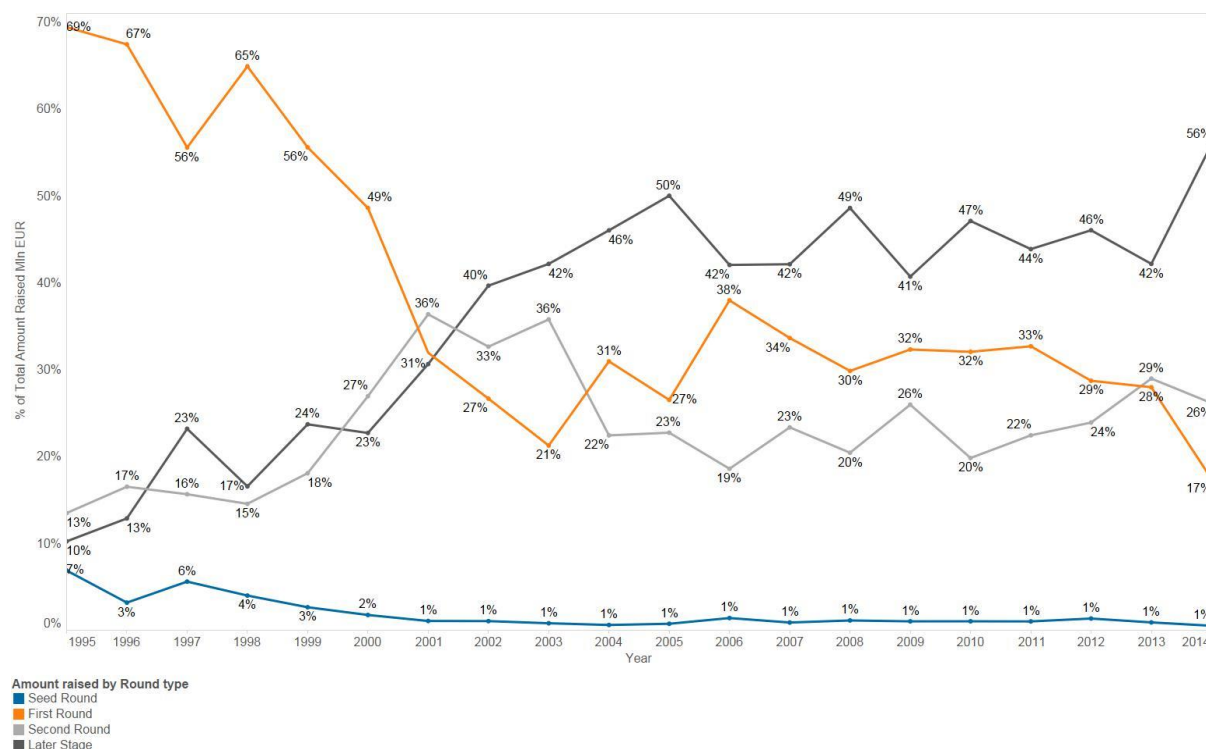
Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 2.3 VC financing by funding round

Figure 4 shows the distribution of VC financing by funding round, which is related to a company stage of development (see Section 5.2). In 1995, 7% of all VC funds were allocated to seed, 70% to first, 13% to second and 10% to later stage funding rounds. Two decades later, these proportions were significantly changed. In 2014, 0.5% of all VC funds were allocated to seed, 17% to first, 26% to second and 56% to later stage funding rounds. Thus, it can be clearly seen that VC funds have moved from very young towards more mature companies.

**Figure 4: Distribution of VC financing by funding round by year**



Note: The graph presents the distribution of VC financing by funding round in Europe in the period between 1995 and 2014. The amount raised is broken down by four stages of financing, i.e. seed, first, second and later stage as defined in Section 5.2.

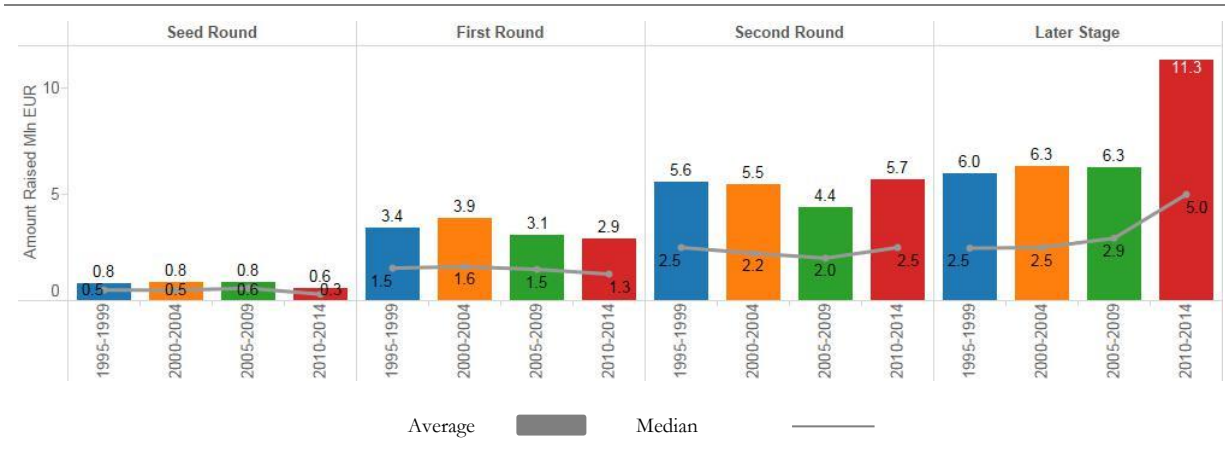
Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#) for further details please see Section 5.1.

Figure 5 shows the average and median values of VC financing by funding round in Europe in the period 1995-2014 by 5-year time windows. The median amount raised by VC-backed companies in Europe dropped or remained constant in all but the later funding rounds. For example, while the median amount of financing in seed rounds between 1995 and 1999 reached 0.5 Million Euro, it dropped to 0.3 Million Euro in the period 2010-2014. The median of the first round of financing dropped by nearly 14% and the median for the second round of financing remained unchanged. Only the median raised in later stage of financing doubled from 2.5 Million in 1995-99 to 5 Million Euro in 2010-14. This is another indication that VC funds moved their attention to companies in the later stages of development.



**Figure 5: Amount of VC financing by funding round**



Note: The graph presents the average and median amount of VC financing by funding round and by five year periods between 1995 and 2014 in Europe. The amount raised is broken down by four stages of financing, i.e. seed, first, second and later stage as defined in Section 5.2.

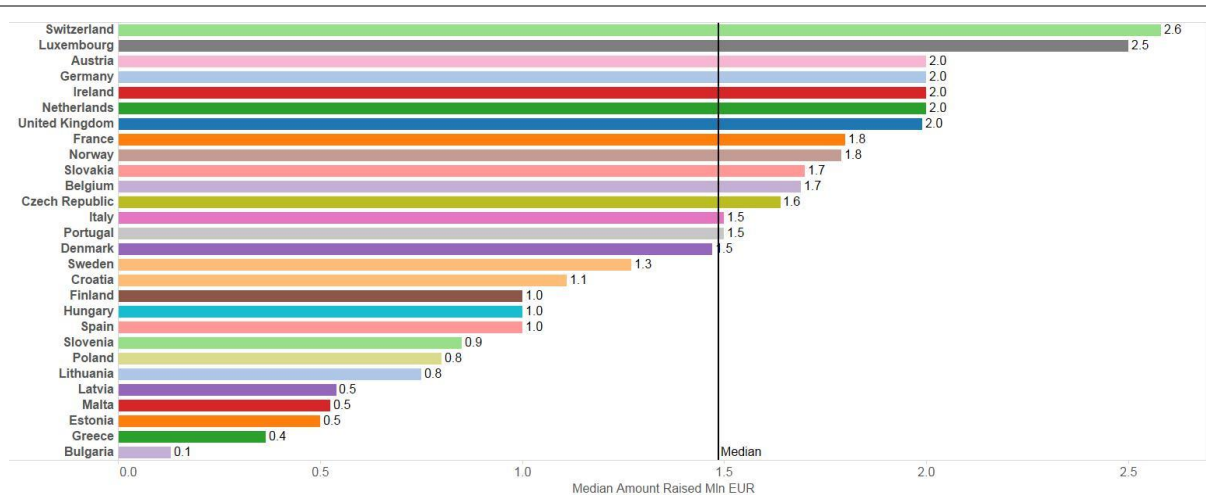
Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#)

## 2.4 Volume and continuity of VC financing

Figure 6 shows the median amount raised by companies based in Europe between 1995 and 2014 in Europe by country. This is a proxy for the volume of VC financing per company. The European median for this period was nearly 1.5 Million Euro. However, there are large differences between the countries. At one end of the scale, the median amount raised from VC funds companies based in Switzerland or Luxemburg was around 2.5 Million Euro. At the other end of the scale, the countries where the median amount raised by companies was equal or less than 0.5 Million Euro include Latvia, Malta, Estonia, Greece and Bulgaria.

**Figure 6: Volume of VC financing per funding round by country**



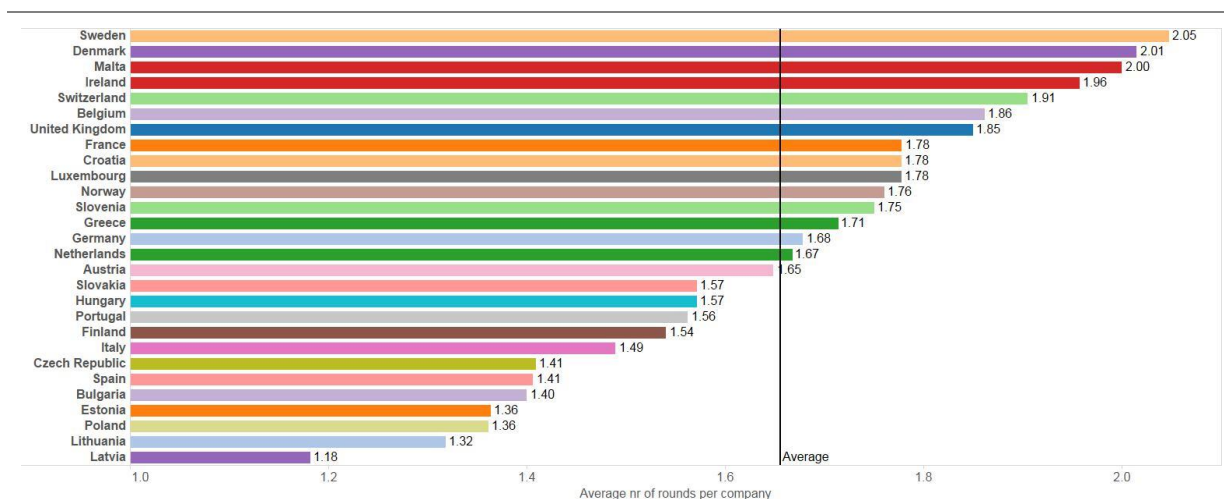
Note: The graph presents the median amount of VC financing broken down by country in the period between 1995 and 2014 in Europe. Romania and Cyprus excluded due to a low number of observations.

Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#)

Figure 7 shows the average number of VC funding rounds per company in Europe between 1995 and 2014 by country. This is a proxy for the continuity of VC financing per company, an indicator for the growth potential of firms (Gompers & Lerner, 2001). On average, a VC-backed company went through slightly over 1.6 funding rounds. Companies based in Sweden and Denmark go, on average, through 2 funding rounds, the most in Europe. At the other extreme, firms based in Italy, Czech Republic, Spain, Bulgaria, Estonia, Poland, Lithuania and Latvia, go through fewer than 1.5 funding rounds. Thus, VC-backed companies from these countries are the least likely to go through subsequent VC funding rounds.

**Figure 7: Continuity of VC funding per company by country**



Note: The graph presents the average number of VC funding rounds per company by country in the period between 1995 and 2014 in Europe. Cyprus excluded due to a low number of observations.

Calculations: JRC-IPTS

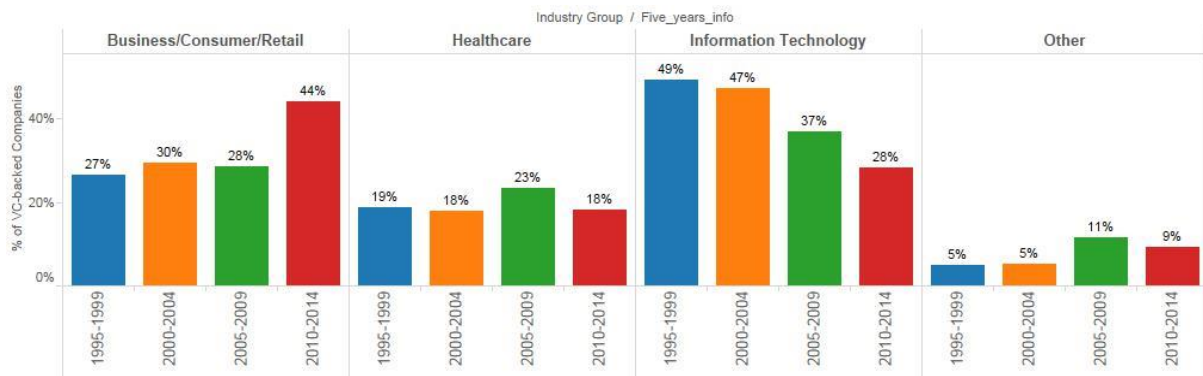
Data: [VentureSource](#) by [Dow Jones](#)

## 2.5 VC-backed companies by industry

Figure 8 shows the distribution of VC-backed European companies by 5-year time windows and industry.<sup>4</sup> At the beginning of the analysed period, nearly half of all VC-backed companies belonged to the Information Technology (IT) industry. The Business, Consumer and Retail industry had the second largest number of VC-backed companies. Two decades later, in the 2010-14 period, these shares were reversed and the Business, Consumer and Retail industry had the largest number of VC-backed companies. Over the analysed period, the Healthcare industry share remained relatively stable. In the 2010-14 period, 18% of VC-backed companies based in Europe belonged to this industry. Companies classified as belonging to other industries increased their share in the number of VC-backed companies by 80%.

<sup>4</sup> For details on industry classification, see Section 5.3.

**Figure 8: Distribution of VC-backed companies by industry**



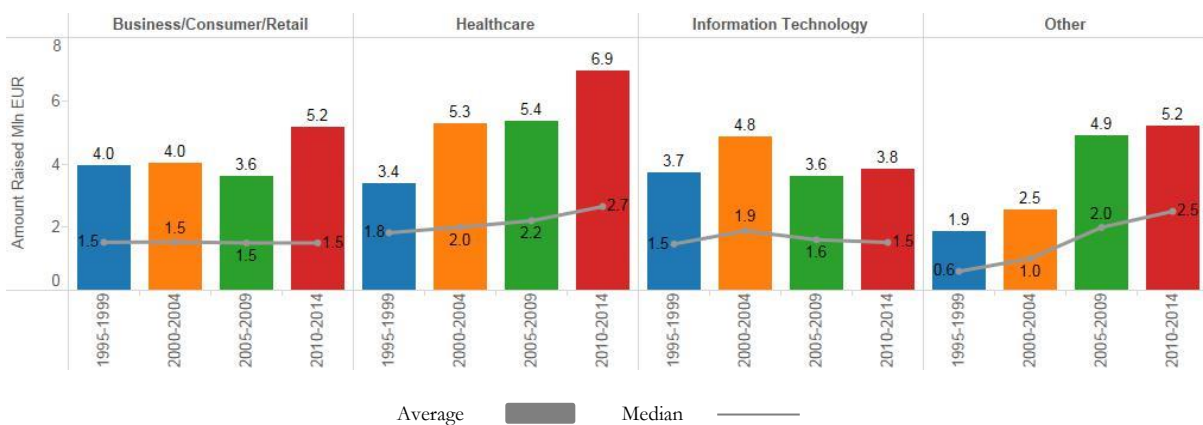
Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014 in Europe. The industry sectors are based on [VentureSource](#) industry classification as defined in Section 5.3.

Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#) for further details please see Section 5.1.

Figure 9 shows the average and median amount of VC financing by industry in Europe in the period between 1995 and 2014 by 5-year time windows. In the 1995-99 period, the Healthcare industry had highest median amount of VC financing and the category 'Other industries' had the lowest. In the 2010-14 period, the Healthcare industry continued to have the highest median amount of VC financing and the Other industries category moved to second place. The median value of financing in the Business, Consumer and Retail and the IT industries did not change. In both industries, the median amount raised oscillated around 1.5 Million Euro.

**Figure 9: Amount of VC financing by industry**



Note: The graph presents the average and median amount of VC financing by sector of VC-backed companies and by five year periods between 1995 and 2014 in Europe. The industry sectors are based on [VentureSource](#) industry classification as defined in Section 5.3.

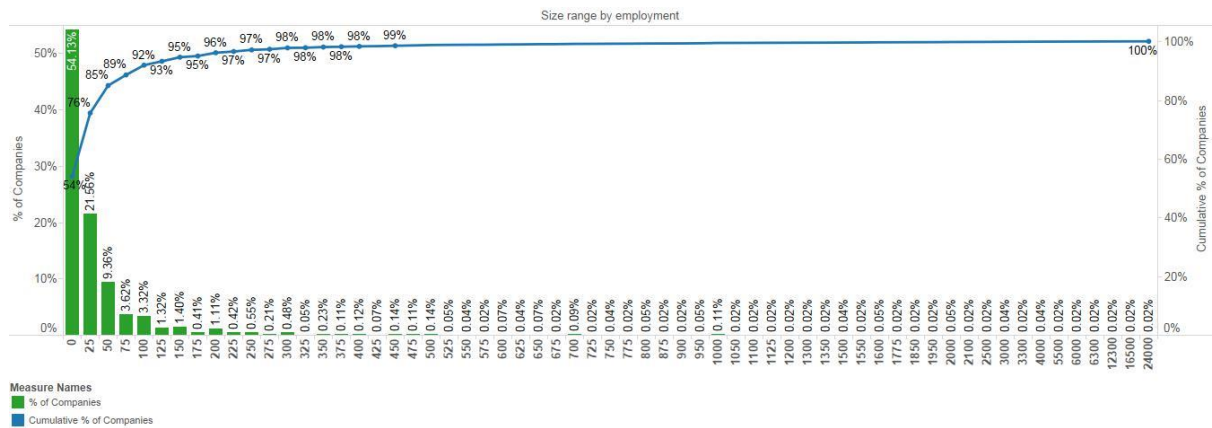
Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#)

## 2.6 Size of VC-backed companies

Figure 10 shows the distribution of VC-backed companies by size in the period 1995 - 2014 in Europe. Nearly 55% of all companies have fewer than 25 employees. 92% of all VC-backed companies based in Europe have up to 100 employees. Only 1% of the European companies that received VC capital in the last 20 years have 450 or more employees.

**Figure 10: Distribution of VC-backed companies by size**



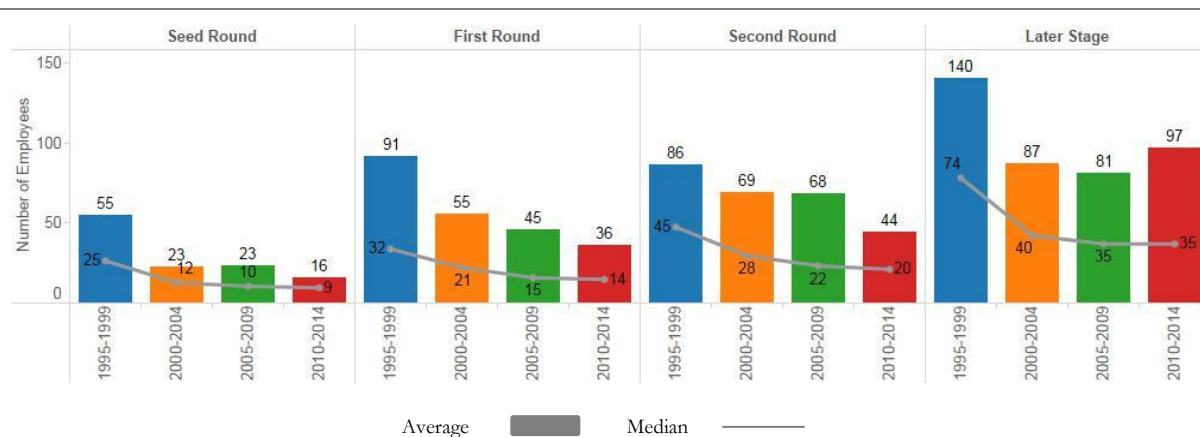
Note: The graph presents the distribution of VC-backed companies by size measured by number of employees (histogram and cumulative count as % of companies), total count of VC-backed companies in Europe and in the period between 1995 and 2014.

Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#)

Figure 11 shows the average and median size of VC-backed companies by funding round in the period 1995 - 2014 in Europe. The size of companies increases with each funding round, and is strongly related to the development phase of a company. In 2010-14, VC-backed companies in the seed phase employed 9 people on average and in the later stages, 35 people. Over the last twenty years, the size of VC-backed companies has decreased. In the period 1995-99, a median-sized VC-backed company receiving seed funds had 25 employees, but in 2010-14, this number dropped to 9 employees. In 1995-99, a median-sized company in the later financing stage in 1995-99 had 74 employees, where as in 2010-14, this dropped to 35 employees.

**Figure 11: Number of employees of VC-backed companies by funding round**



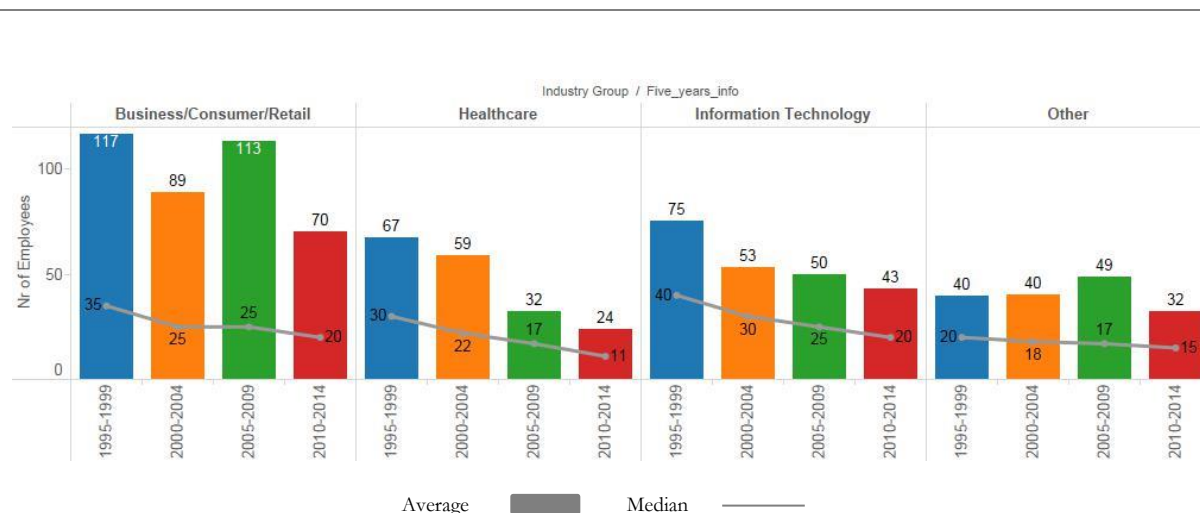
Note: The graph presents the average and median size of VC-backed companies measures by number of employees, broken down by funding round and by five year periods between 1995 and 2014 in Europe. The four stages of financing are seed, first, second and later stage (see Section 5.2 for details).

Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#)

Figure 12 shows the average and median size of VC-backed companies by industry in the period between 1995 and 2014 in Europe. In 1995-99, a median-sized VC-backed company active in the Business, Customer and Retail industry had 35 employees and in 2010-14, this decreased to 20 employees. In comparison, a median-sized company in the IT sector had 40 employees in 1995-99, and 20 in the 2010-14 period. In general, a significant decrease in company size took place across all the industries.

**Figure 12: Number of employees of VC-backed companies by industry**



Note: The graph presents the average and median size of VC-backed companies measured by number of employees, broken down by sector of activity and by five year periods between 1995 and 2014 in Europe. The industry sectors are based on [VentureSource](#) industry classification as defined in Section 5.3.

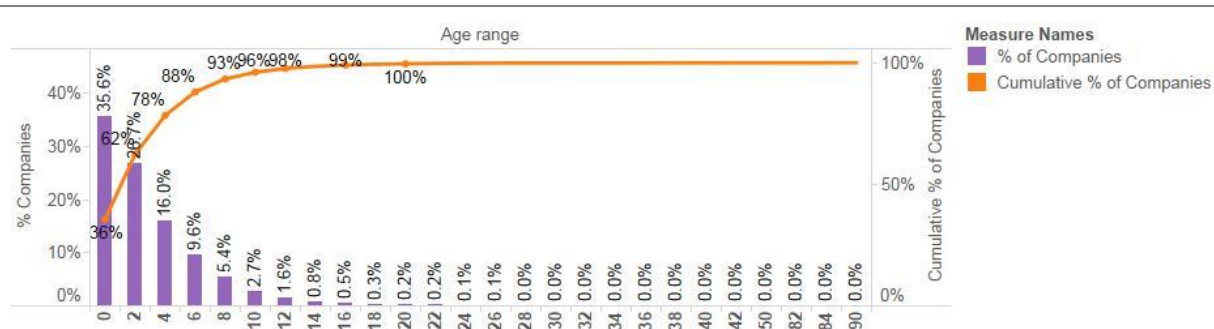
Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#)

## 2.7 Age of VC-backed companies

Figure 13 shows the distribution of VC-backed companies by age in the period between 1995 and 2014 in Europe. 36% of these companies was less than 2 years old. Companies up to 8 years old accounted for nearly 90% of all VC-backed companies based in Europe. Only around 1% of the European companies that have received VC capital in the last 20 years are 18 or more years old.

**Figure 13: Distribution of VC-backed companies by age**



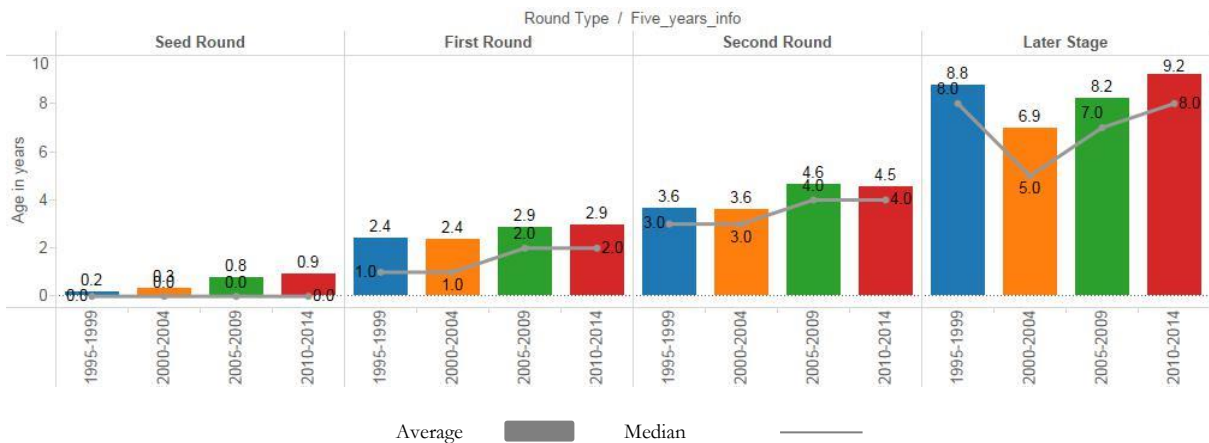
Note: The graph presents the distribution of VC-backed companies by age (histogram and cumulative count as % of companies) in Europe and in the period between 1995 and 2014.

Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#)

Figure 14 shows the average and median age of VC-backed companies by funding round in the period 1995-2014 in Europe. The age of companies increases with the subsequent funding rounds, which is strongly related to the development phase of a company. In 2010-14, the median age of a VC-backed company in the first phase was 2 years and in the later stage 8 years. With the exception of the seed and later stages of financing, over the last twenty years, the median age of VC-backed companies has increased. While the median age of a VC-company going through the first funding round in the period 1995-99 was 1 year, in 2010-14 this number doubled. The median age of a company financed in second stage in 1995-99 was 3 years and in 2010-14 it was 4 years.

**Figure 14: Age of VC-backed companies by funding round**



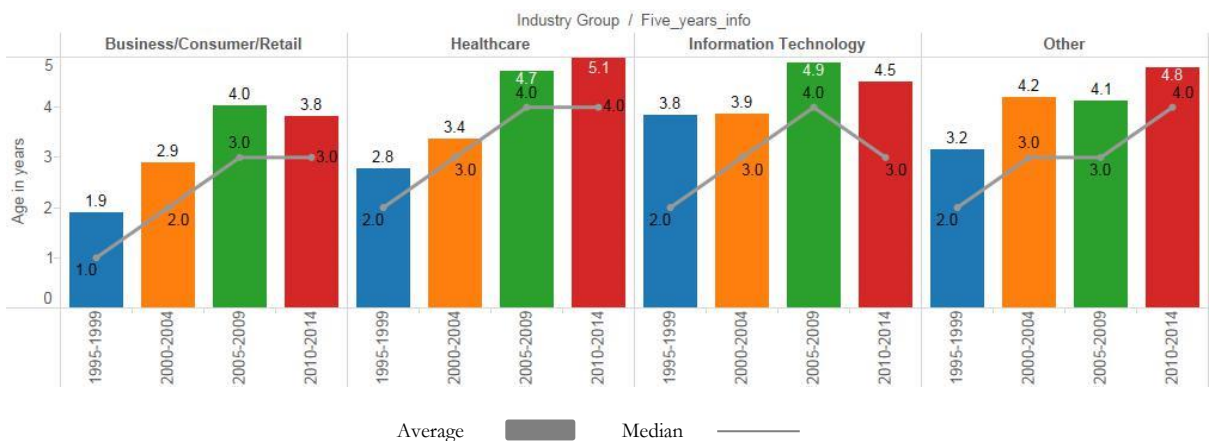
Note: The graph presents the average and median age of VC-backed companies broken down by funding round and by five year periods between 1995 and 2014 in Europe. The four stages of financing are seed, first, second and later stage (see Section 5.2 for details).

Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#)

Figure 15 shows the average and median age of VC-backed companies by industry in the period between 1995 and 2014 in Europe. The median age of a VC-backed company active in the Business, Customer and Retail industry in 1995-99 was 1 year, which increased to 3 years in 2010-14. In comparison, the median age of companies from the IT sector was 2 years in 1995-99 and 3 years in the 2010-14 period. In general, across all the industries, the age of VC-backed companies increased significantly.

**Figure 15: Age of VC-backed companies by industry**



Note: The graph presents the average and median age of VC-backed companies broken down by sector of activity broken down by five year periods between 1995 and 2014 in Europe. The industry sectors are based on [VentureSource](#) industry classification as defined in Section 5.3.

Calculations: JRC-IPTS

Data: [VentureSource](#) by [Dow Jones](#)

### 3. European start-up hotspots

This section presents an analysis of the European start-up hotspots defined as:

**European start-up hotspots are the 20 European cities with the highest number of VC-backed companies.**

The main elements of this section include:

- Ranking of the European start-up hotspots by the total number of VC-backed companies,
- The total number of VC-backed companies and amount of VC financing,
- Volume and continuity of VC financing per company,
- Size and age of VC-backed companies.

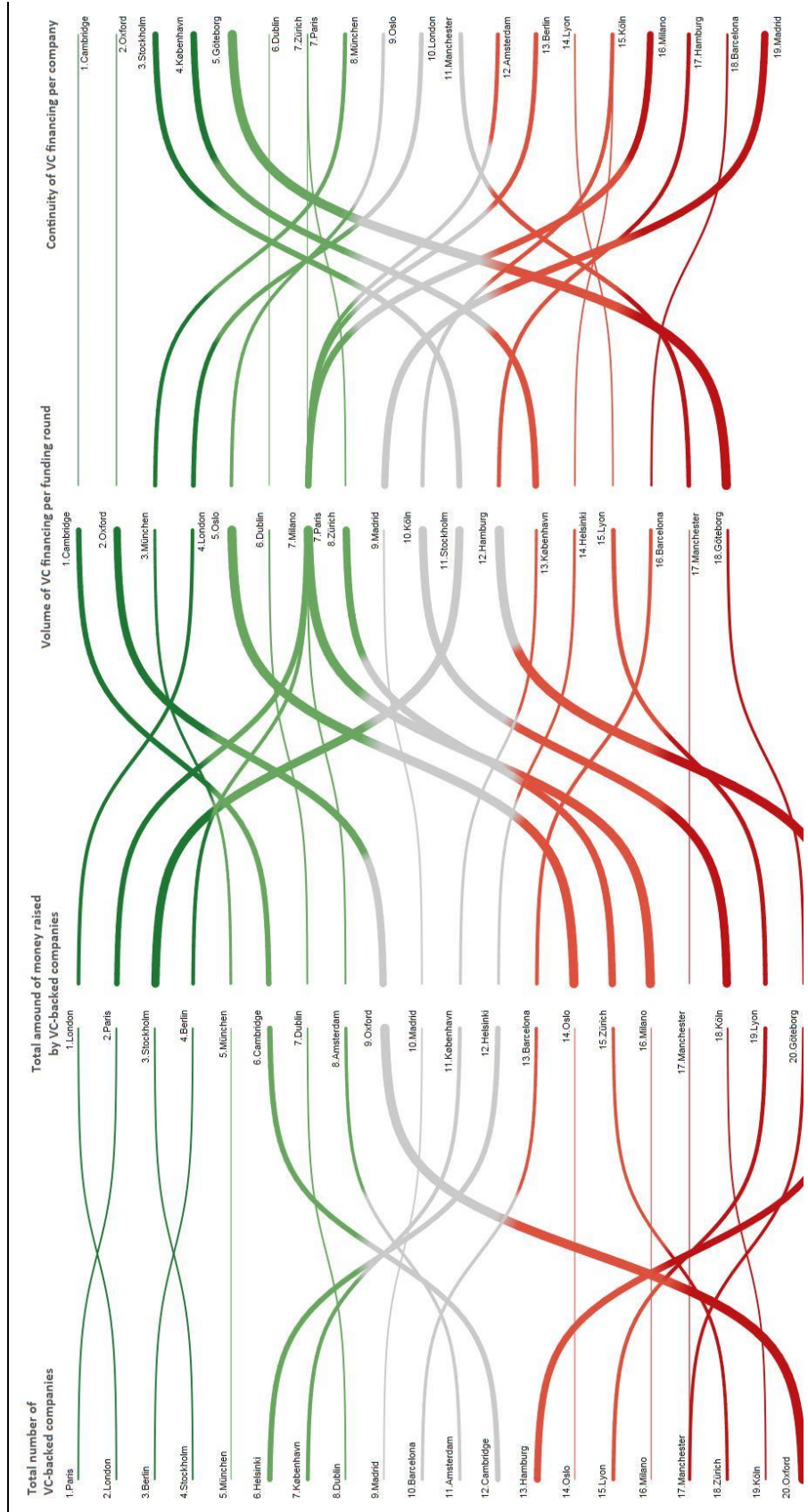
Figure 16 presents the rankings of the European start-up hotspots by (1) the total number of VC-backed companies, (2) the total amount of VC financing received, (3) the volume of VC financing per funding and (4) the continuity of VC financing per company. Figure 17 shows an overview of European start-up hotspots technological specialisation. Box 2 summarises the main results of this analysis.

#### **Box 2: Key facts about European start-up hotspots**

- European start-up hotspots account for 69% of the VC investments received by European firms in the last two decades and for 58% of all European VC-backed companies.
- Germany and the UK have the highest number of European start-up hotspots.
- Paris, London and Berlin have had the highest number of VC-backed companies in Europe in the last two decades.
- Although Paris hosts 0.3% more VC-backed companies than London, there is no doubt that London receives more VC money. London receives over 25% of the VC money allocated to firms based in the Europe's top start-up hotspots or 14% received by all firms based in Europe in the last two decades. The two ratios for Paris are 16% and 9.6%.
- Over the last two decades, Barcelona and Madrid have risen to the top of the ranking, whereas Göteborg and Köln have lost position among the European start-up hotspots.
- Median VC financing in all of the hotspots was close to 2 Million Euro. This median varies considerably according to location: it is highest in Cambridge (median 3.8 Million Euro) and lowest in Göteborg (median 0.8 Million Euro).
- There are significant differences in the volume of VC financing between locations. Firms based in London, Dublin, Amsterdam and Cambridge receive, on average, significantly higher amounts of funding than firms in other European start-up hotspots. The reverse pattern can be observed in Paris, Helsinki, København and Barcelona.
- Also the continuity of VC financing varies widely among locations. VC-backed companies based in Cambridge and Oxford have the highest and in Barcelona and Madrid the lowest probability of going through subsequent rounds of VC funding.
- The median size of a VC-backed company based in any of the European start-up hotspot is 25 employees. VC-backed companies based in Madrid, Cambridge, London, München and Oxford are the largest and those in Göteborg and Manchester are the smallest.
- The median age of a VC-backed company based in any of the hotspots is 2 years. The oldest companies are in Oslo and the youngest in Milano and Hamburg.
- Hamburg is the most specialised in Business, Consumer and Retail, Oxford in Healthcare and Other industries, and Dublin in IT.



**Figure 16: An overview of the European start-up hotspots performance**



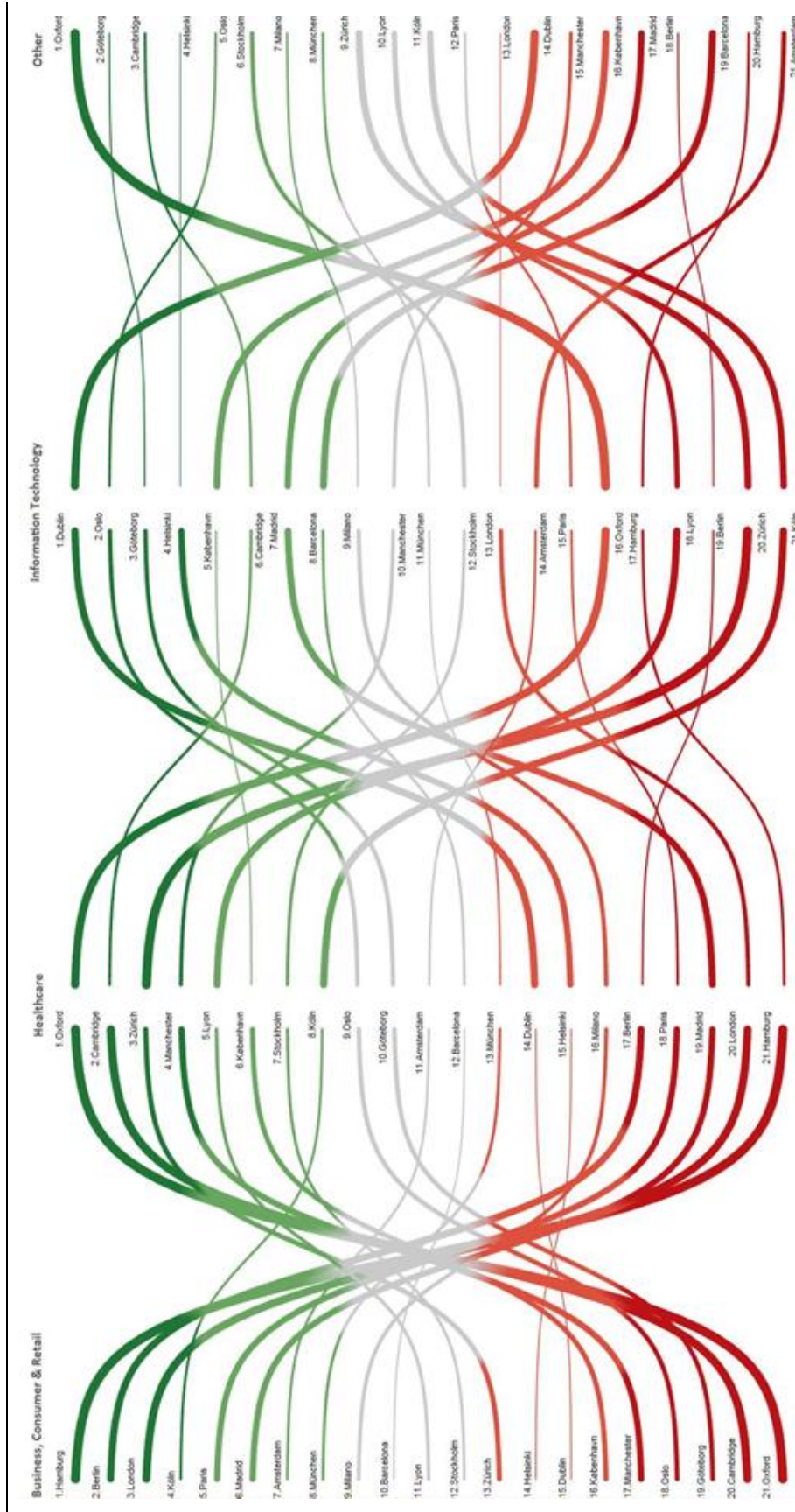
Note: The figure presents rankings of European start-up hotspots in the last two decades, (1) the total number of VC-backed companies in a city in the last two decades, (2) the total amount of VC financing received by VC-backed companies in a city in the last two decades, (3) volume of VC financing proxied by the median amount per financing received by a VC-backed company in a city in the last two decades and (4) the continuity of VC financing proxied by average number of funding rounds per company in a city in the last two decades.

A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

Calculations: JRC-IPTS

Data: [Venture Source by Dow Jones](#)

**Figure 17: An overview of European start-up hotspots technological specialisation**



Note: The figure presents an overview of European start-up hotspots technological specialization expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 2010 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

Calculations: JRC-IPTS

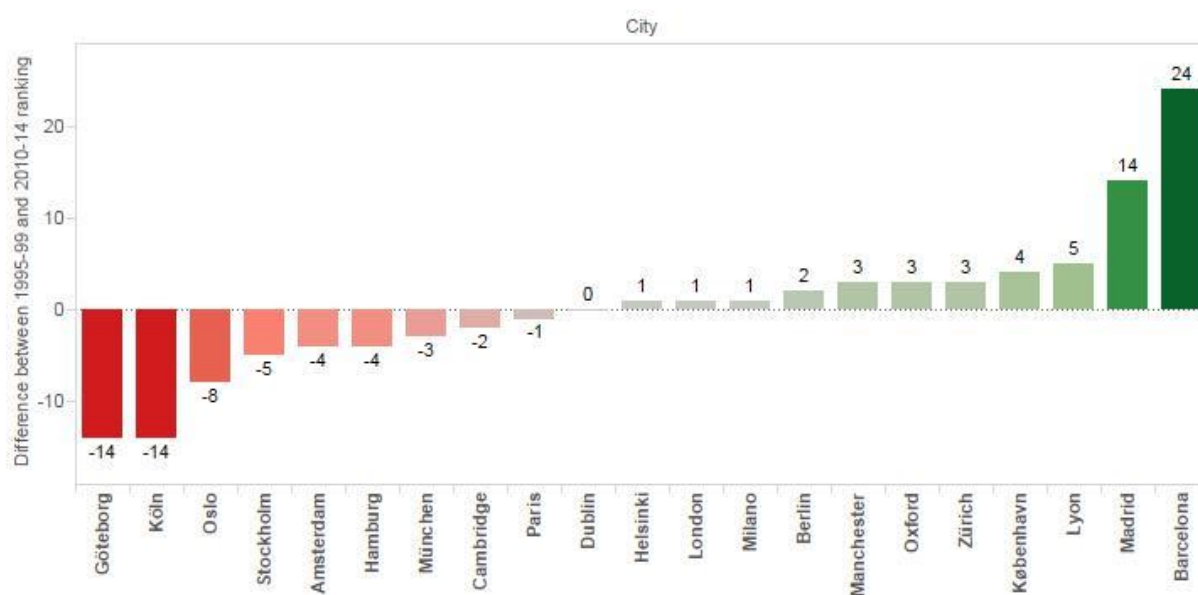
Data: [Venture Source](#) by [Dow Jones](#)

### 3.1 Ranking of the European start-up hotspots

Figure 19 presents the ranking of the European start-up hotspots. In order to illustrate the dynamics and evolution over time, 4 five-year period rankings are included. According to this information, Paris, London and Berlin lead the overall ranking. With the exception of Barcelona, Lyon, Manchester, Milano, Cambridge, München, Hamburg, Köln and Göteborg, the rest of the list is composed of other Western European capital cities. Countries with the highest number (4) of the top European start-up hotspots include Germany and the UK. France, Spain and Sweden host 2 hotspots.

Figure 18 shows the differences in cities' positions between the 1995-99 and 2010-14 rankings. It illustrates changes in cities' ranking in the European start-up hotspots by the number of VC-backed companies, over the last two decades. The biggest drop in the ranking, by 14 points, was experienced by Göteborg and Köln. Dublin, in contrast, did not change its position and remained 7<sup>th</sup> in the 2010-14 ranking (i.e. as in the 1995-99 ranking). However, between these two time periods, its ranking fell between 2005 and 2010 and then rose after 2010. Barcelona and Madrid recorded the largest rise in ranking among the top European start-up hotspots. Madrid went from 22<sup>nd</sup> in 1995-99 to 8<sup>th</sup> in 2010-14, and Barcelona advanced from 28<sup>th</sup> to 4<sup>th</sup> in the same period. These changes show how turbulent and dynamic the European start-up hotspots are.

**Figure 18: Tops and flops among the European start-up hotspots: Difference between the position in 1995-99 and 2010-14 rankings**



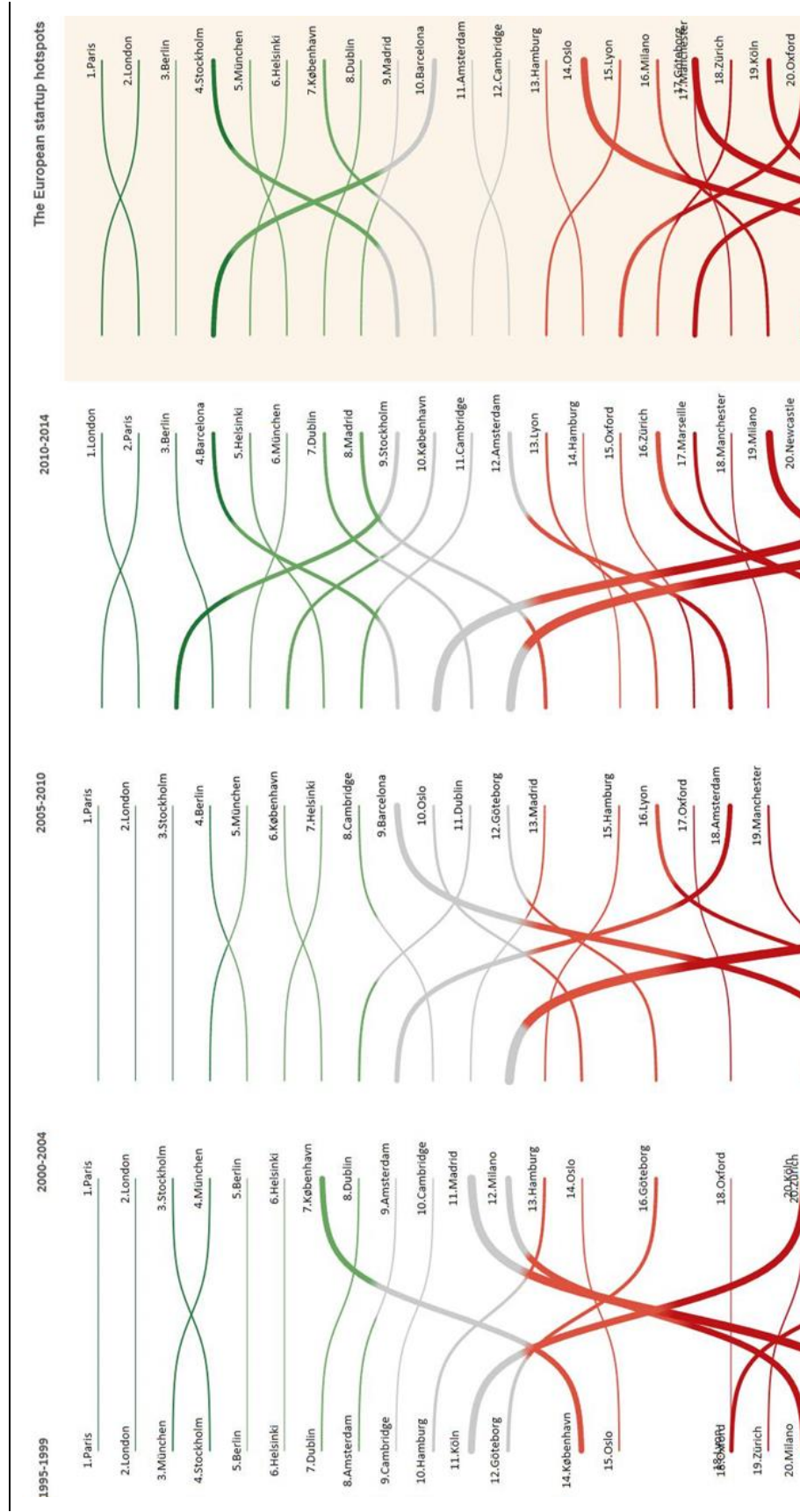
Note: The figure presents changes in positions in the ranking of the European start-up hotspots in 1995-99 and 2010-14.

A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#)

**Figure 19: Ranking of the European start-up hotspots by the number of VC-backed companies across time**



Note: The figure presents the evolution of the ranking of the European start-up hotspots across time over the last two decades. The rankings are based on the total number of VC-backed companies in a city. A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

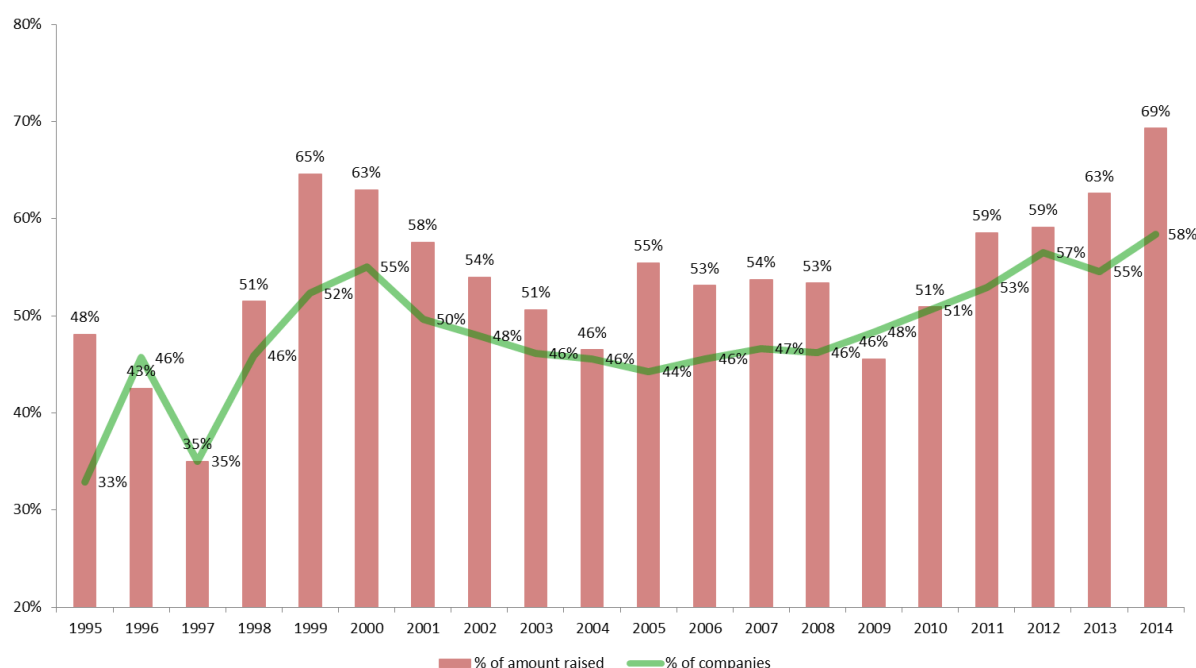
Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#)

### 3.2 Number of VC-backed companies and amount of VC financing

Figure 20 shows the shares of the European start-up hotspots in the total number of VC-backed companies and amount raised by year in the period between 1995 and 2014 in Europe. In 1995, the European start-up hotspots accounted for 33% of all VC-backed companies in Europe and 48% of the VC funds they received. Over the last two decades, this number has continued to grow. In 2014, 58% of VC-backed companies in Europe were based in one of the 21 European cities. These companies accounted for over two thirds of the money invested by VC funds in Europe. This upward trend has continued during the last few years.

**Figure 20: % of the European start-up hotspots in the total number of VC-backed companies and amount raised in Europe**



Note: The figure presents the share of the European start-up hotspots in the total amount raised by VC-backed companies and the total number of VC-backed companies in Europe in the period between 1995 and 2014.

A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

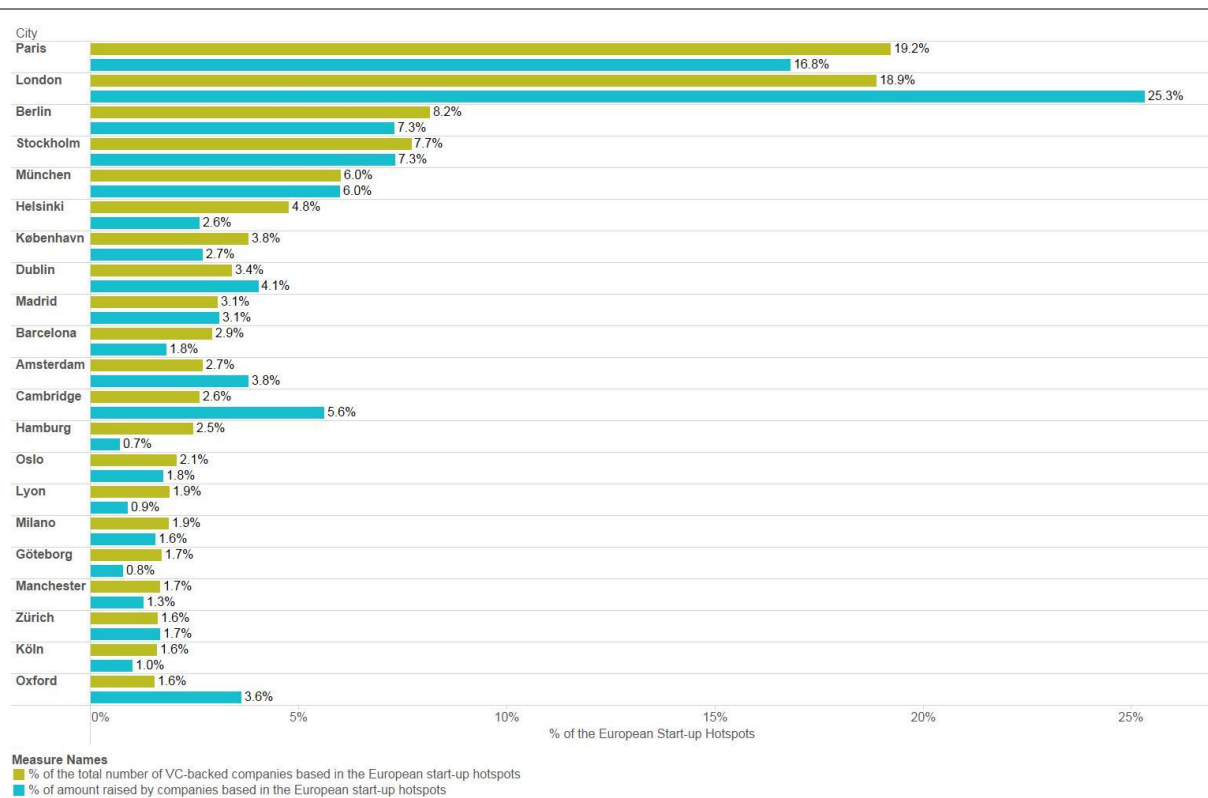
Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#)

Figure 21 shows the distribution of VC-backed companies and the amount raised among the European start-up hotspots between 1995 and 2014. Paris and London each account for 19% of VC-backed companies based in the European start-up hotspots. However, the leader in terms of the amount of money received from VC funds is unquestionably London. The UK capital accounts for over 25% of VC money allocated to firms based in the European start-up hotspots, and 14% of the funding received by all firms based in Europe in the last two decades. In contrast, Paris accounts for 16% of the funding received by all firms based in the European start-ups hotspots, and 9.6% of the funding received by all firms based in Europe between 1995 and 2014. Berlin and Stockholm, which come 3<sup>rd</sup> and 4<sup>th</sup> in the ranking, account for around 8% of VC-backed companies based in the European start-up hotspots and around 7% of the total VC financing they received in the last two decades. Oxford comes last in the current ranking. Only 1.6% of all firms located in the European start-up hotspots are based in this city. However, their

share of VC financing is significantly higher. Oxford-based VC-backed firms account for 3.6% of the total funding received by firms based in the European start-up hotspots. In other words, companies from this city receive, on average, significantly more money than firms based in other European start-up hotspots. Other cities with above average financing per company include Dublin, Amsterdam and Cambridge. The reverse pattern can be observed in, for example, Helsinki, København and Barcelona.

**Figure 21: Distribution of the number of VC-backed companies and amount raised among the European start-up hotspots**



Note: The figure presents the distribution of the number of VC-backed companies and amount raised among the European start-up hotspots in the period between 1995 and 2014.

A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

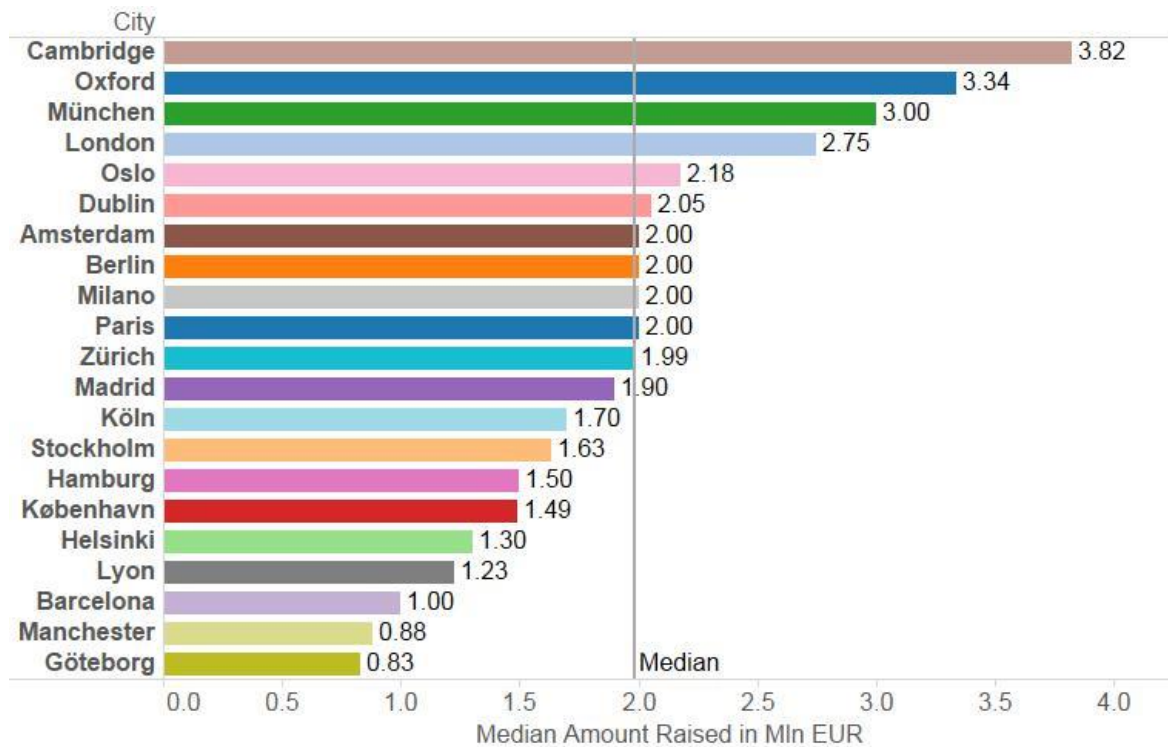
Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#)

### 3.3 Volume and continuity of VC financing

Figure 22 shows median amount of VC financing received by companies in the European start-up hotspots in the period between 1995 and 2014. This is a proxy for the volume of VC financing per company. In general, the median for all deal rounds and companies based in all of the hotspots was close to 2 Million Euro. However, there are very considerable differences in the amount of money received by companies in different hotspots. For example, while the median value of VC financing for firms based in Cambridge was over 3.8 Million Euro, for firms from Barcelona, Manchester or Göteborg the median amount of VC financing was around 1 Million Euro.

**Figure 22: Median amount of VC financing received by companies in the European start-up hotspots**



Note: The graph presents the median amount of VC financing by The European start-up hotspots in the period between 1995 and 2014 in Europe.

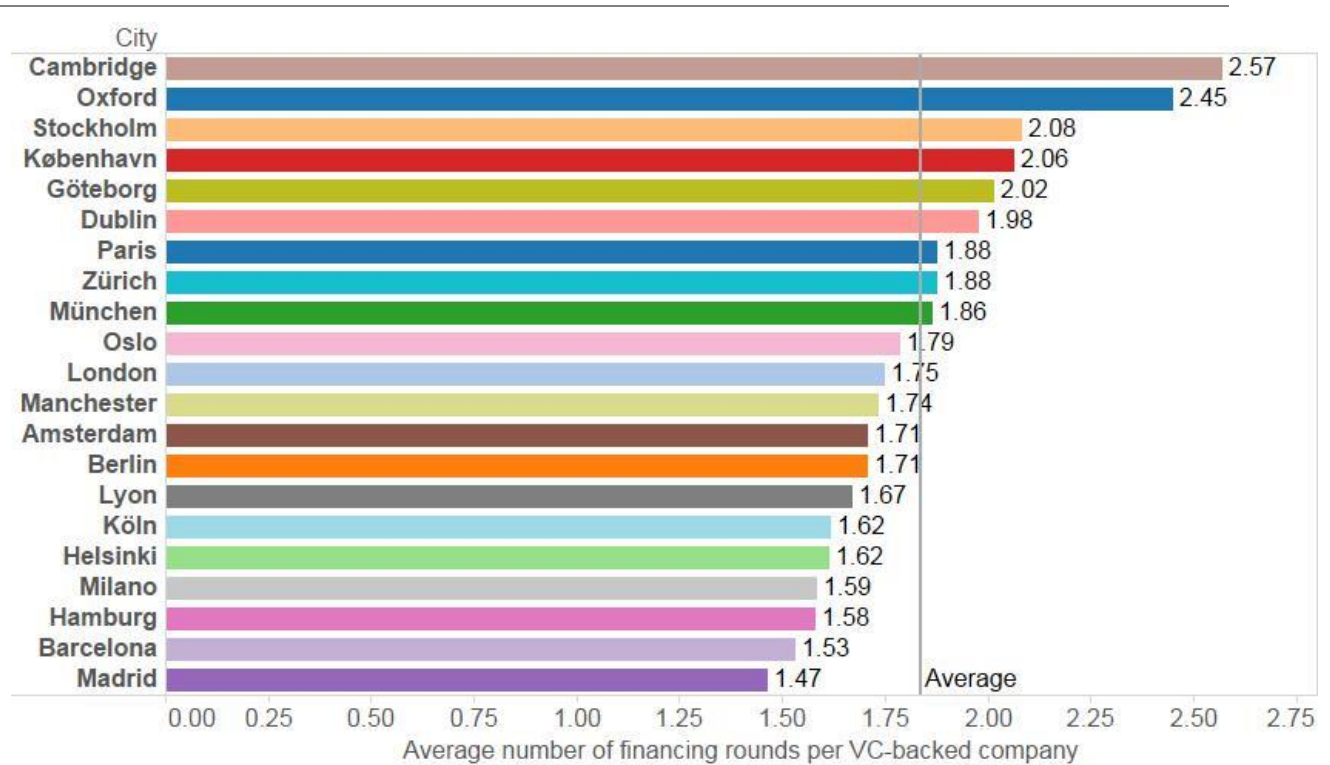
A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#)

Figure 23 shows the average number of VC funding rounds per company in the European start-up hotspots in the period 1995-2014. This is a proxy for the continuity of VC financing per company. On average, a VC-backed company based in any of the hotspots receives VC funding 1.8 times. However, there are considerable differences in the continuity of VC involvement among the hotspots. While VC-backed companies based in Cambridge or Oxford go through, on average, 2.5 funding rounds. VC-backed companies based in the Spanish start-up hotspots go through only 1.5 funding rounds. In other words, companies based in certain locations have a higher probability of receiving subsequent VC funding.

**Figure 23: Average number of VC funding rounds per company in the European start-up hotspots**



Note: Average number of VC funding rounds per company in The European start-up hotspots.

A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

Calculations: JRC-IPTS

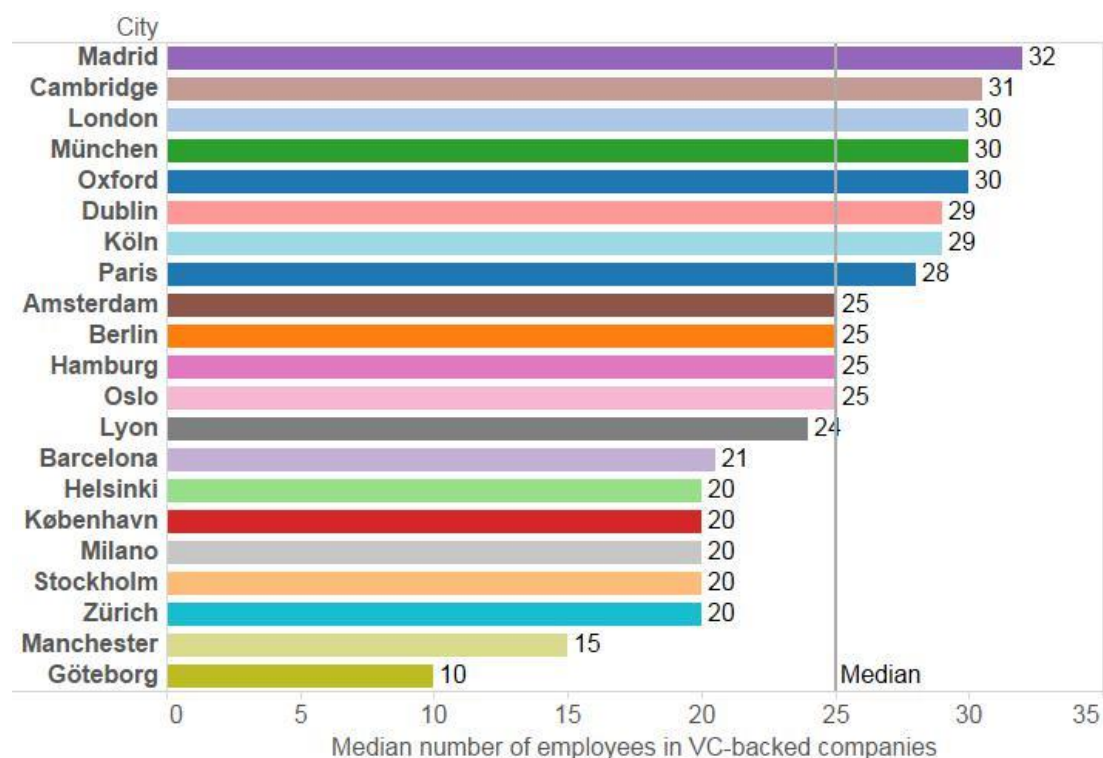
Data: [Venture Source](#) by [Dow Jones](#)

### 3.4 Size and age of VC-backed companies

Figure 24 shows the median number of employees in VC-backed companies based in the European start-up hotspots. In general, the median size of a VC-backed company based in any of the start-up hotspots is 25 employees. The largest VC-backed companies are in Madrid, Cambridge, London, München and Oxford. The median size of companies in these hotspots is at least 30 employees. In contrast, this value is the lowest in Göteborg and Manchester. The median size of VC-backed companies in these locations is 10 and 15 employees respectively.



**Figure 24: Median number of employees in VC-backed companies in the European start-up hotspots**



Note: The graph presents the median size of VC-backed companies measured by number of employees in The European start-up hotspots in the period between 1995 and 2014.

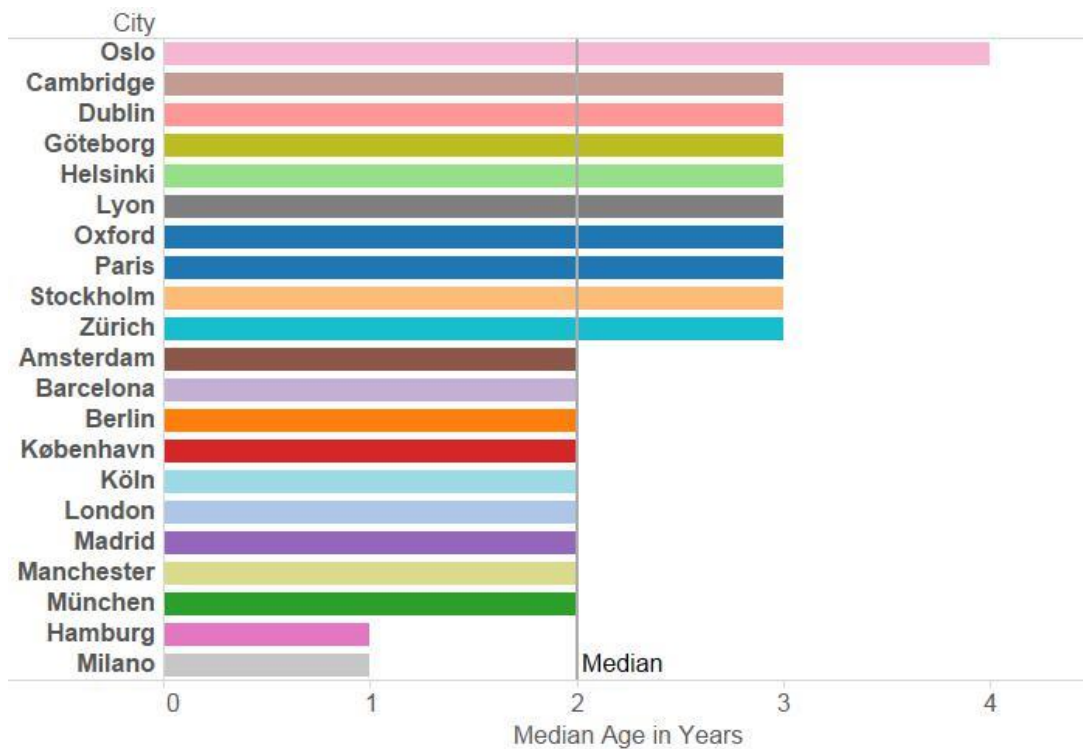
A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#)

Figure 25 shows the median age of VC-backed companies based in the European start-up hotspots. In general, this is 2 years. The oldest VC-backed companies are in Oslo. The median age of companies in the capital of Norway is 4 years. In contrast, the median age of VC-backed companies in Milano and Hamburg is 1 year.

**Figure 25: Median age of VC-backed companies based in the European start-up hotspots**



Note: The graph presents the median age of VC-backed companies in The European start-up hotspots in the period between 1995 and 2014.

A city is defined as a Functional Urban Area (for methodological details see Section 5.5)

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#)

#### 4. A detailed look at the European start-up hotspots

This section presents a detailed look at the European start-up hotspots:

**A European start-up hotspot is one of the 20 European cities with the highest number of VC-backed companies.**

For each of the European start-up hotspots, the following information is provided:

- Amount raised and number of VC-backed companies based there,
- Distribution of VC-backed companies by industry,
- Technological specialisation of VC-backed companies,
- Top 20 VC-backed companies based on the total amount raised.

The analysis takes into account information on amount and continuity of VC financing of start-ups presented in Section 3.3 and on size and age of start-ups presented in Section 3.4.

The analysis covers the period between 1995 and 2014.

## 4.1 Paris

### Key facts

#### Relative size of a start-up hotspot

VC-backed companies based in Paris represent 19.2% of all VC-backed companies based in the European start-up hotspots or 9.4% of all European companies backed by VC between 1995 and 2014.

VC-backed companies based in Paris account for 16.8% of the money received by all VC-backed firms based in the European start-up hotspots or for 9.7% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.

#### Technological specialisation of a start-up hotspot

Technological advantage in Business, Consumer Services and Retail.  
Technological disadvantage in IT, Healthcare and Other sectors.

#### Amount and continuity of VC financing of start-ups

Median amount of VC financing in one round by companies in Paris is 2.0 Million Euro.

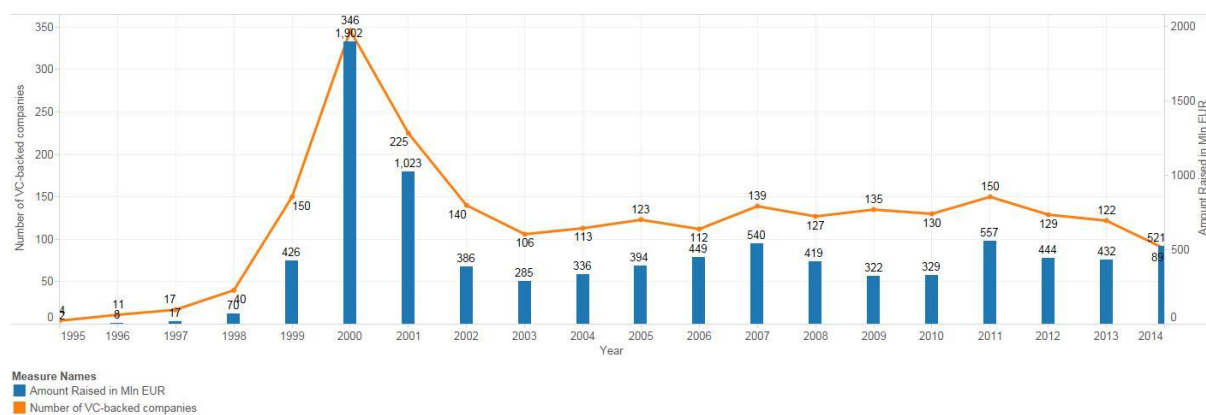
Average number of rounds per start-up based in Paris is 1.9.

#### Size and age of start-ups

Median size of VC-backed start-up based in Paris is 28 employees.

Median age of VC-backed start-up based in Paris is 3 years.

**Figure 26: Amount raised and number of VC-backed companies in Paris**

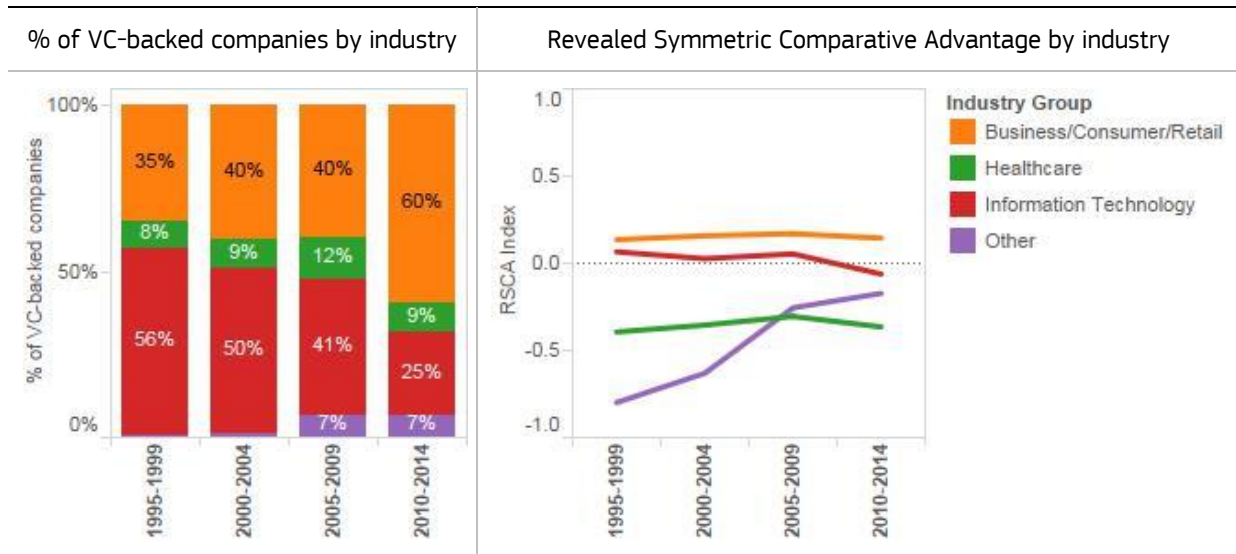


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 27: Technological specialisation of VC-backed companies based in Paris**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

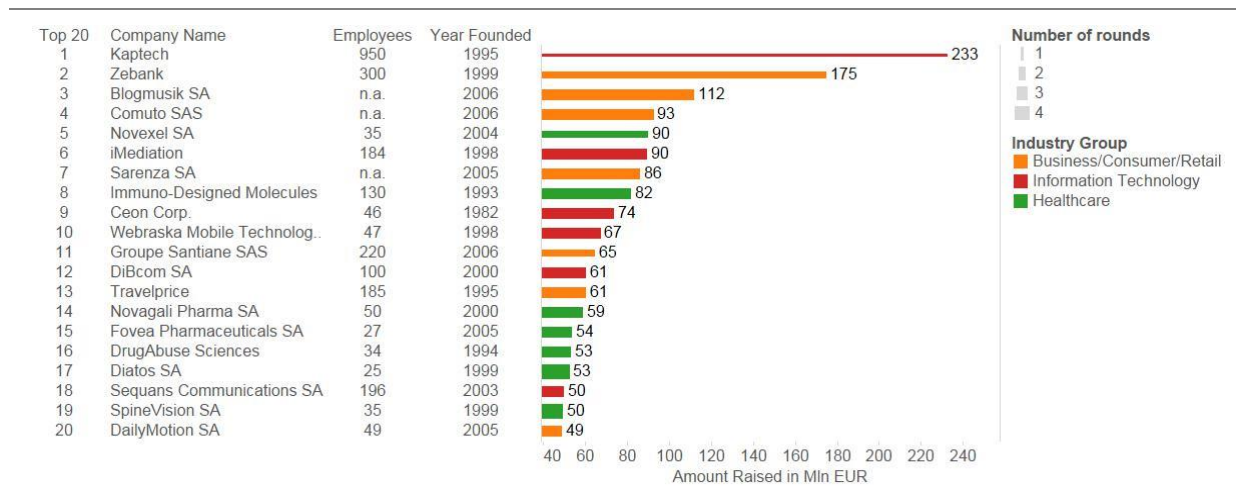
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 28: Top 20 VC-backed companies based in Paris by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in Paris by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

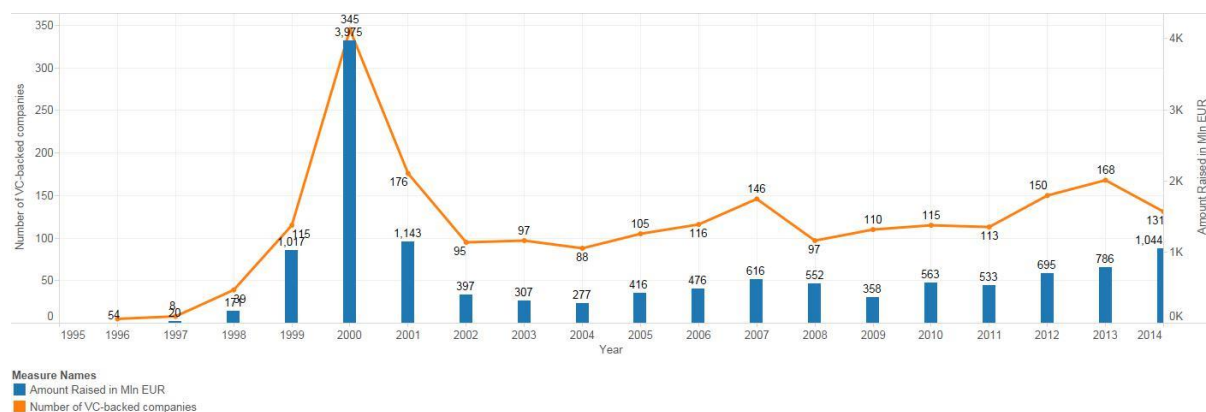
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.2 London

### Key facts about the start-up hotspot landscape

Relative size of a start-up hotspot	<p>VC-backed companies based in London represent 18.9% of all VC-backed companies based in the European start-up hotspots or 9.2% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in London account for 25.3% of the money received by all firms based in the European start-up hotspots or for 14.6% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Business, Consumer Services and Retail.</p> <p>Technological disadvantage in IT, Healthcare and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in London is 2.8 Million Euro.</p> <p>Average number of rounds per start-up based in London is 1.8.</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in London is 30 employees.</p> <p>Median age of VC-backed start-up based in London is 2 years.</p>

**Figure 29: Amount raised and number of VC-backed companies in London**

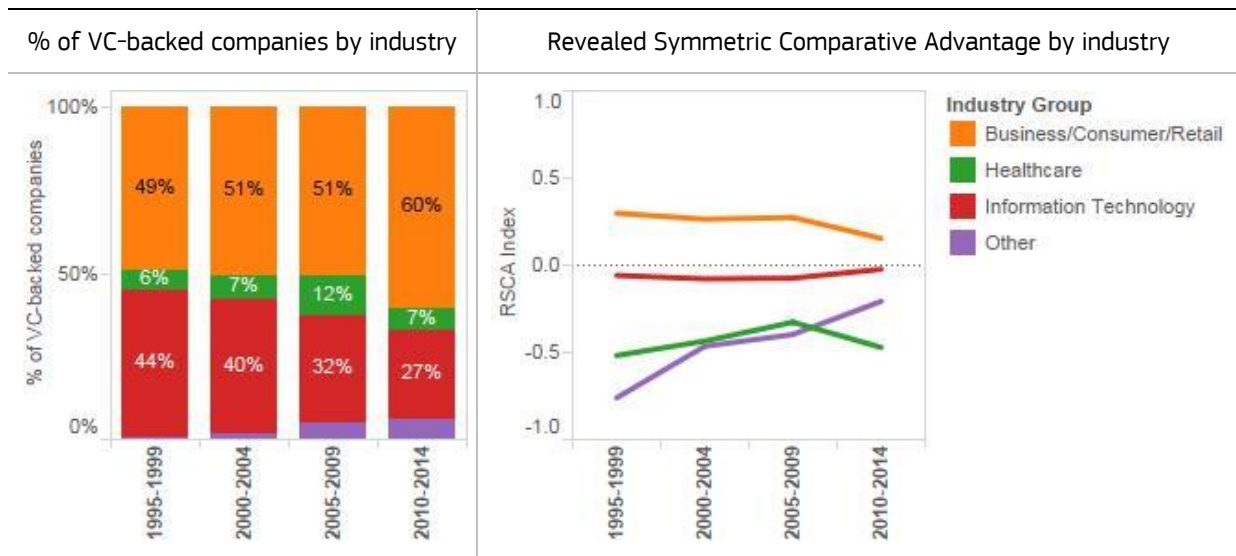


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 30: Technological specialisation of VC-backed companies based in London**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

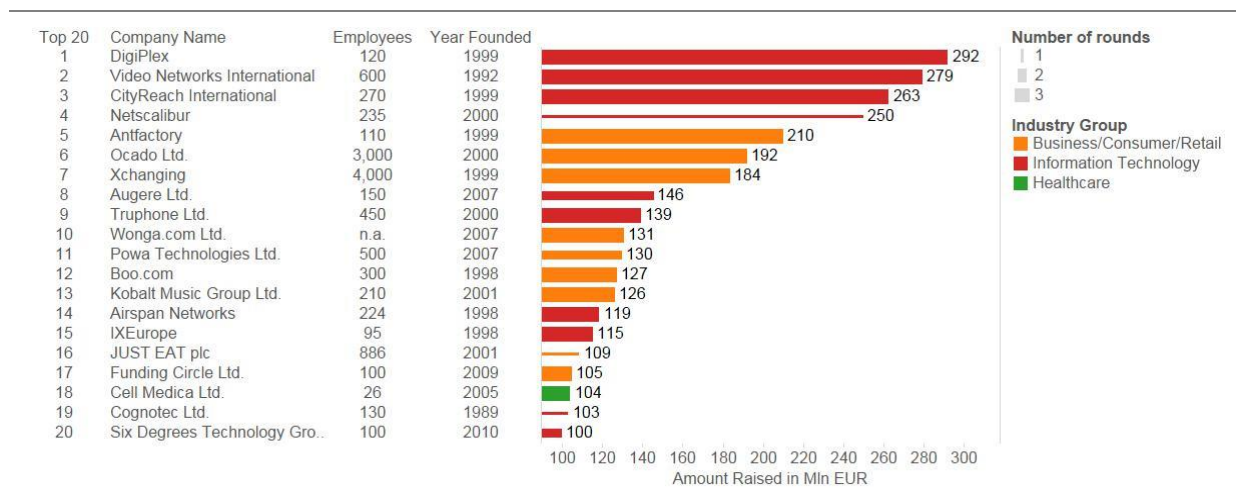
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 31: Top 20 VC-backed companies based in London by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

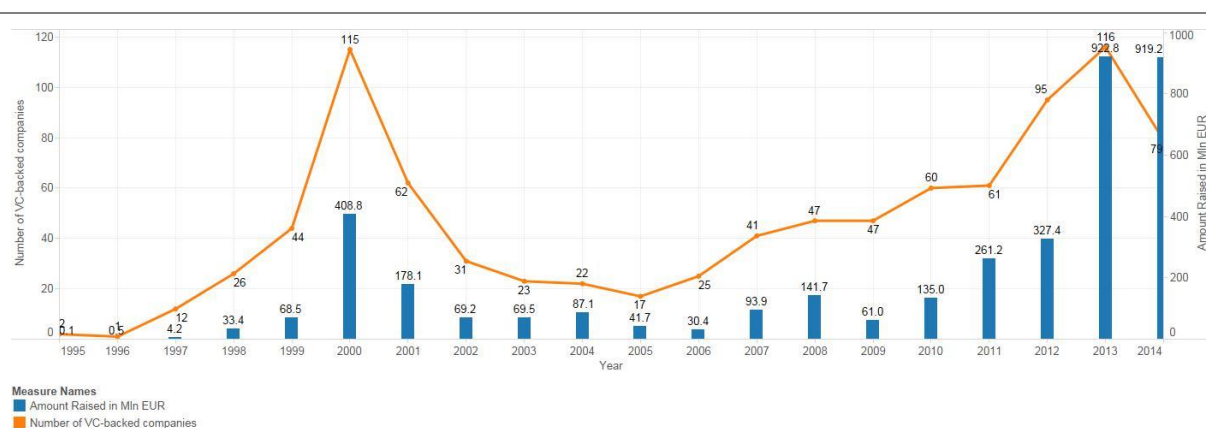
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.3 Berlin

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Berlin represent 8.2% of all VC-backed companies based in the European start-up hotspots or 4.0% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Berlin account for 7.3% of the money received by all firms based in the European start-up hotspots or for 4.2% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Business, Consumer Services and Retail.</p> <p>Technological disadvantage in IT, Healthcare and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Berlin is 2.0 Million Euro.</p> <p>Average number of rounds per start-up based in Berlin is 1.7.</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Berlin is 25 employees.</p> <p>Median age of VC-backed start-up based in Berlin is 2 years.</p>

**Figure 32: Amount raised and number of VC-backed companies in Berlin**

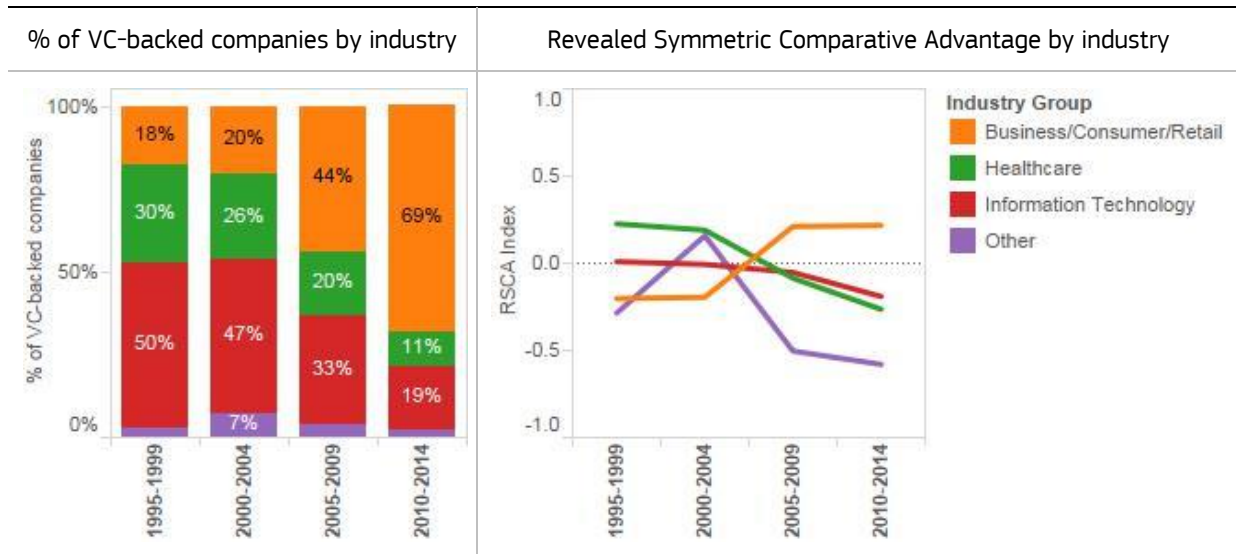


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 33: Technological specialisation of VC-backed companies based in Berlin**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

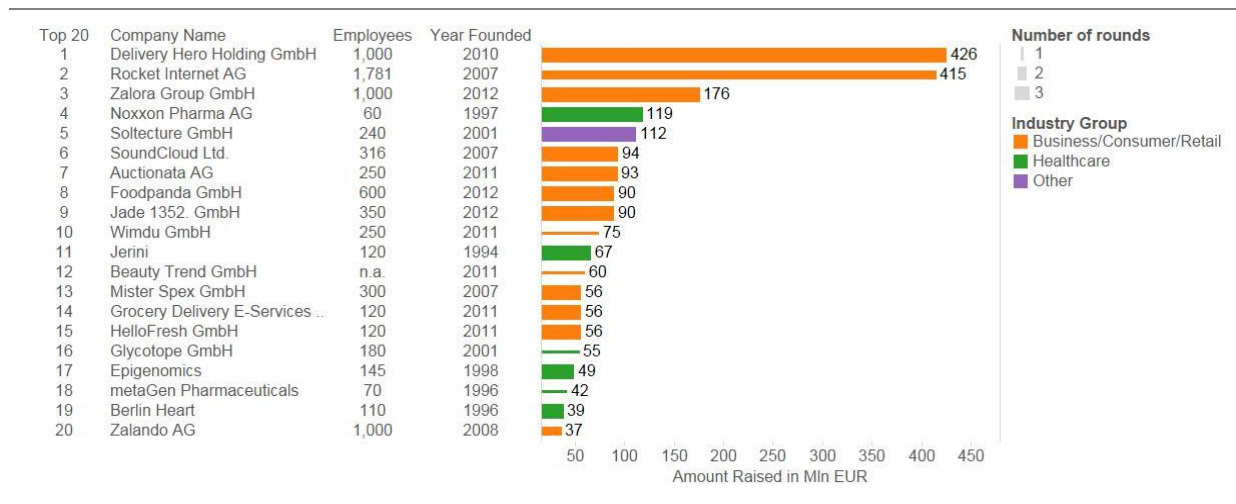
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 34: Top 20 VC-backed companies based in Berlin by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

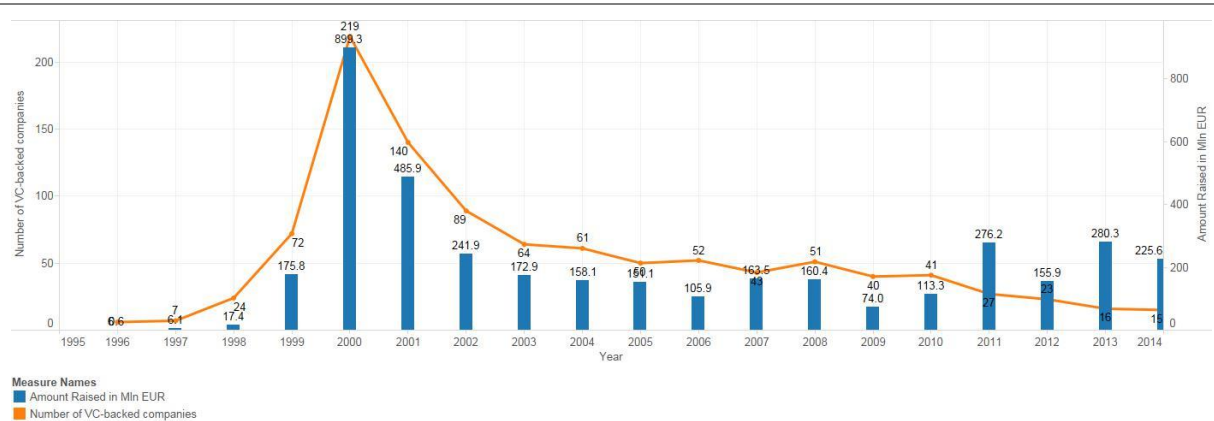


## 4.4 Stockholm

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Stockholm represent 7.7% of all VC-backed companies based in the European start-up hotspots or 3.8% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Stockholm account for 7.3% of the money received by all firms based in the European start-up hotspots, or for 4.2% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Healthcare.</p> <p>Technological disadvantage in IT, Business, Consumer Services and Retail and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Stockholm is 1.6 Million Euro.</p> <p>Average number of rounds per start-up based in Stockholm is 2.1.</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Stockholm is 20 employees.</p> <p>Median age of VC-backed start-up based in Stockholm is 3 years.</p>

**Figure 35: Amount raised and number of VC-backed companies in Stockholm**

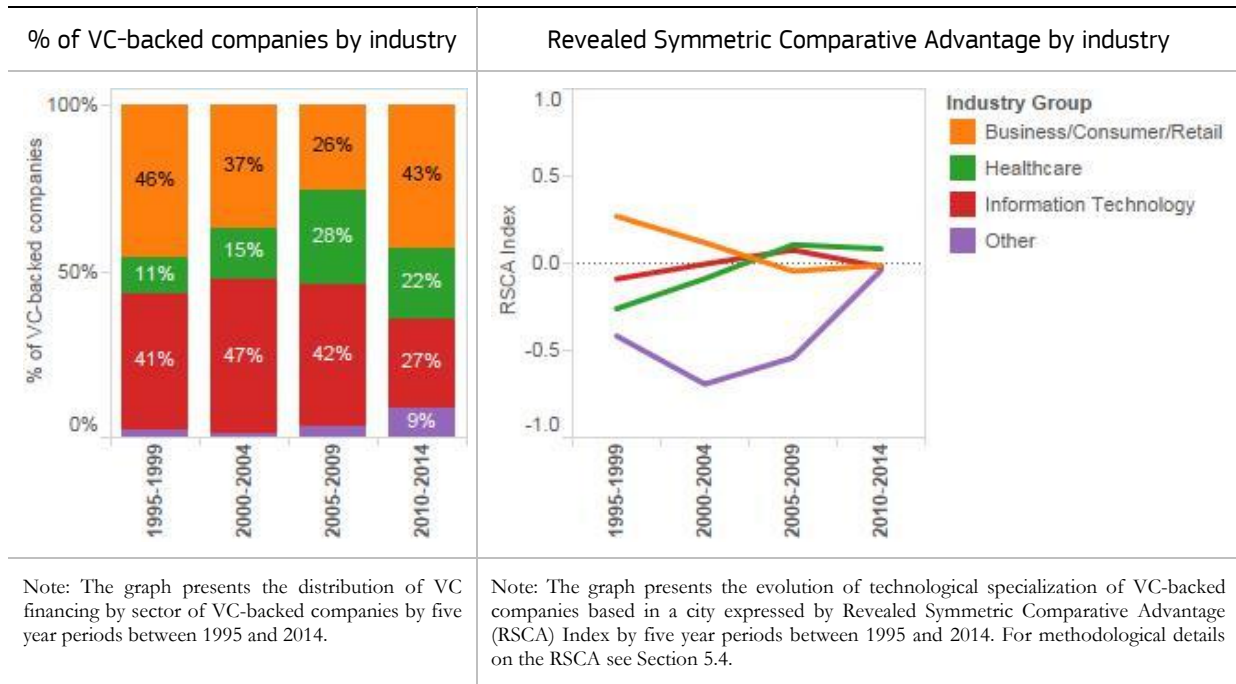


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 36: Technological specialisation of VC-backed companies based in Stockholm**

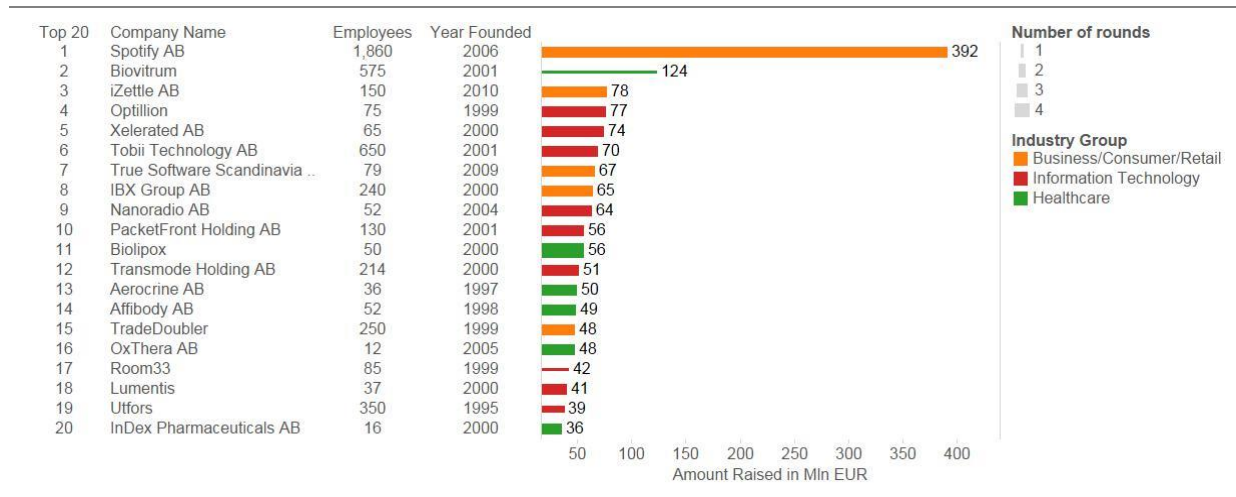


A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 37: Top 20 VC-backed companies based in Stockholm by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

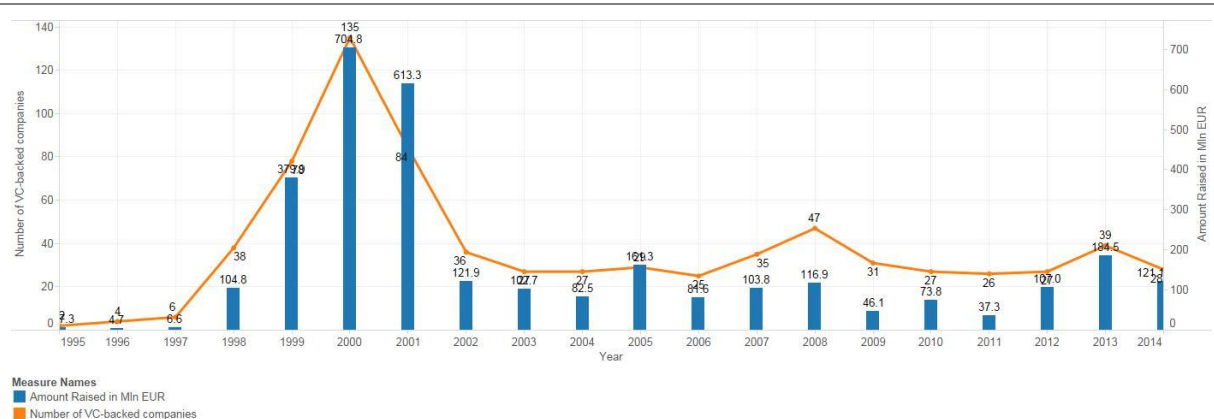
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.5 München

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in München represent 6.0% of all VC-backed companies based in the European start-up hotspots or 2.9% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in München account for 6.0% of the money received by all firms based in the European start-up hotspots, or for 3.5% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Business, Consumer Services and Retail.</p> <p>Technological disadvantage in IT, Healthcare and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in München is 3.0 Million Euro.</p> <p>Average number of rounds per start-up based in München is 1.9</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in München is 30 employees.</p> <p>Median age of VC-backed start-up based in München is 2 years.</p>

**Figure 38: Amount raised and number of VC-backed companies in München**

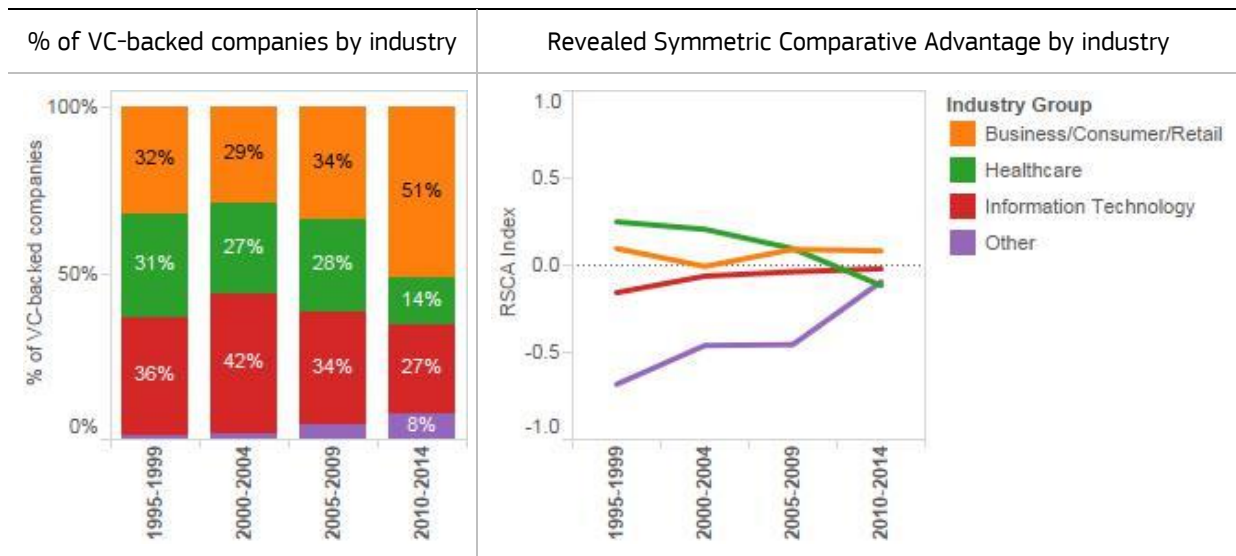


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 39: Technological specialisation of VC-backed companies based in München**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

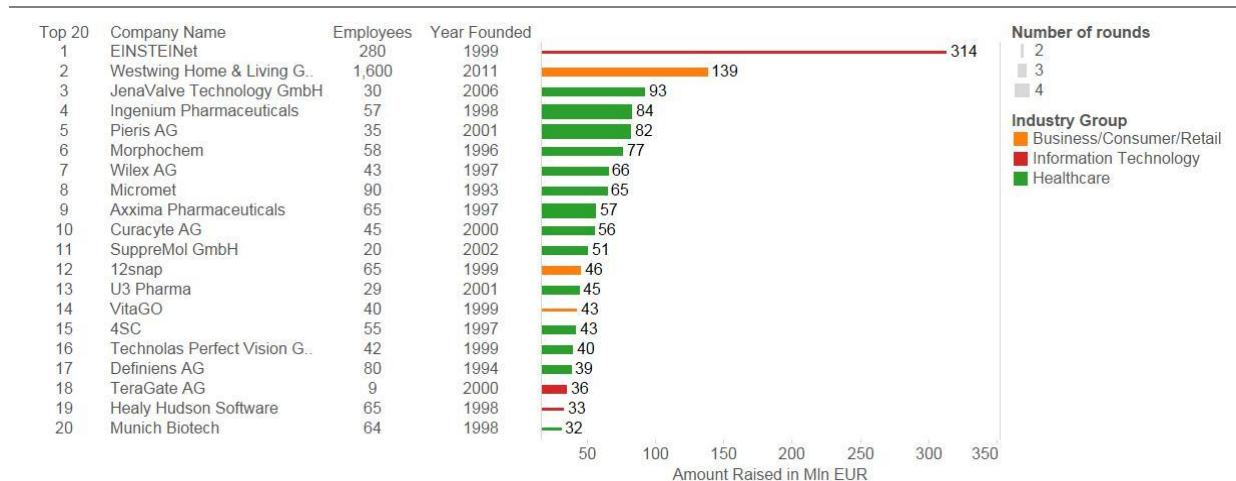
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 40: Top 20 VC-backed companies based in München by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

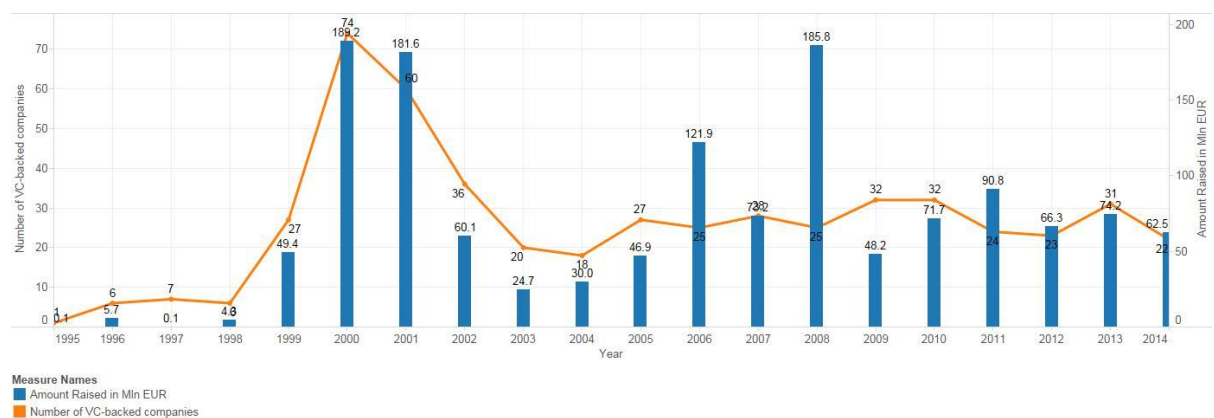
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.6 Helsinki

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Helsinki represent 4.8% of all VC-backed companies based in the European start-up hotspots or 2.3% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Helsinki account for 2.6% of the money received by all firms based in the European start-up hotspots, or for 1.5% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in IT and Other sectors.</p> <p>Technological disadvantage in Healthcare Business, Consumer Services and Retail.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Helsinki is 1.3 Million Euro.</p> <p>Average number of rounds per start-up based in Helsinki is 1.6</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Helsinki is 20 employees.</p> <p>Median age of VC-backed start-up based in Helsinki is 3 years.</p>

**Figure 41: Amount raised and number of VC-backed companies in Helsinki**

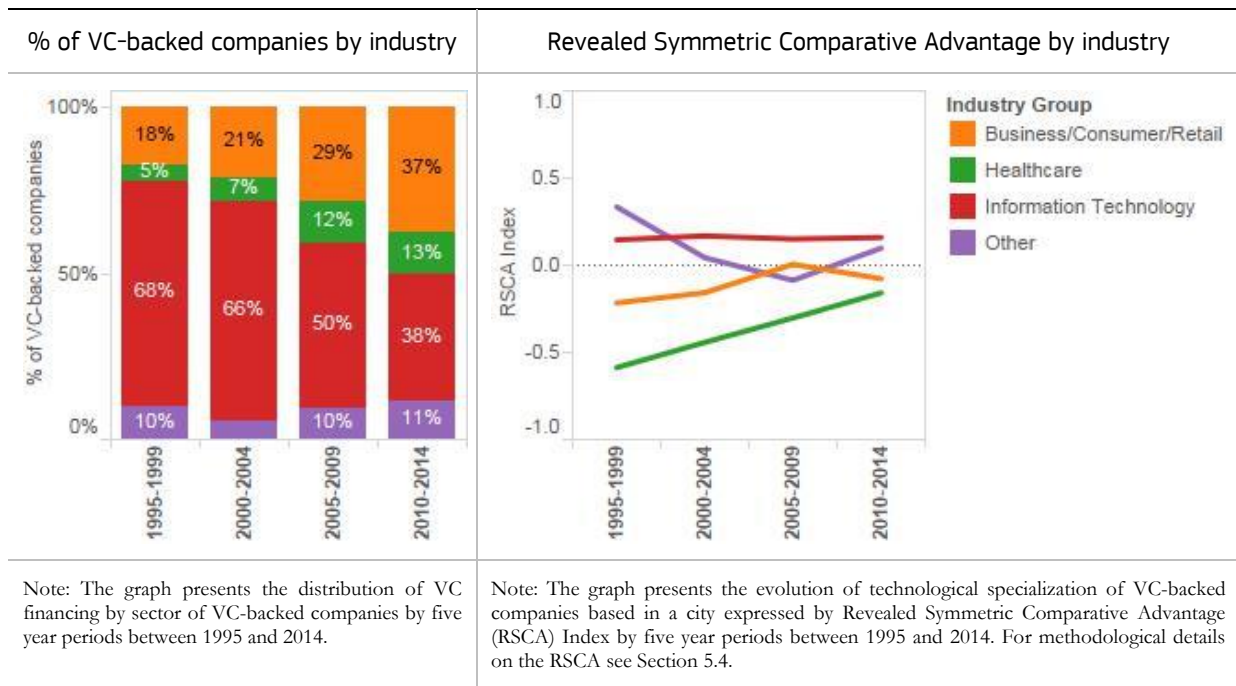


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 42: Technological specialisation of VC-backed companies based in Helsinki**

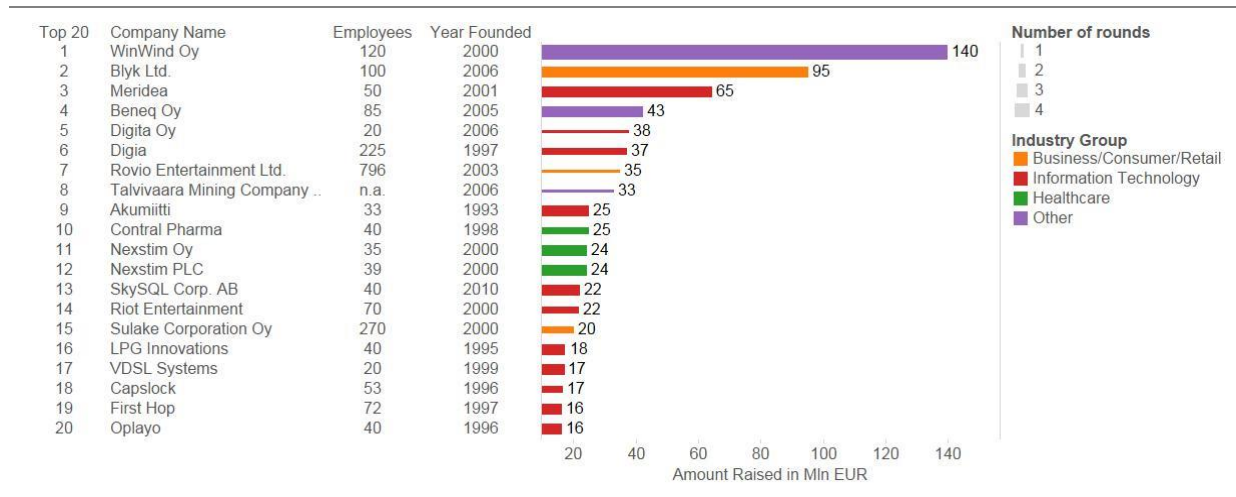


A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 43: Top 20 VC-backed companies based in Helsinki by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

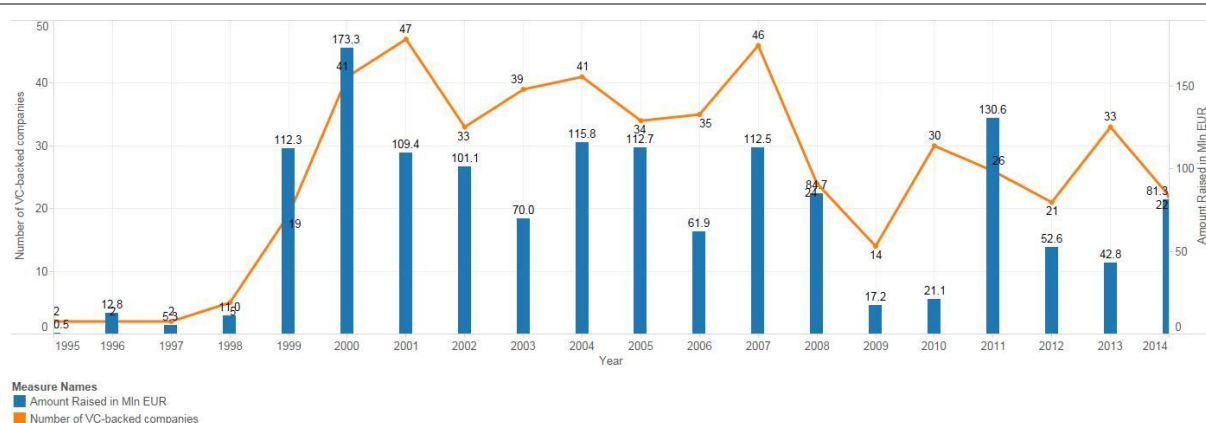
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.7 København

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in København represent 3.8% of all VC-backed companies based in the European start-up hotspots or 1.9% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in København account for 2.7% of the money received by all firms based in the European start-up hotspots or for 1.6% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in IT and Healthcare</p> <p>Technological disadvantage in Business, Consumer Services and Retail and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in København is 1.5 Million Euro.</p> <p>Average number of rounds per start-up based in København is 2.1</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in København is 20 employees.</p> <p>Median age of VC-backed start-up based in København is 2 years.</p>

**Figure 44: Amount raised and number of VC-backed companies in København**

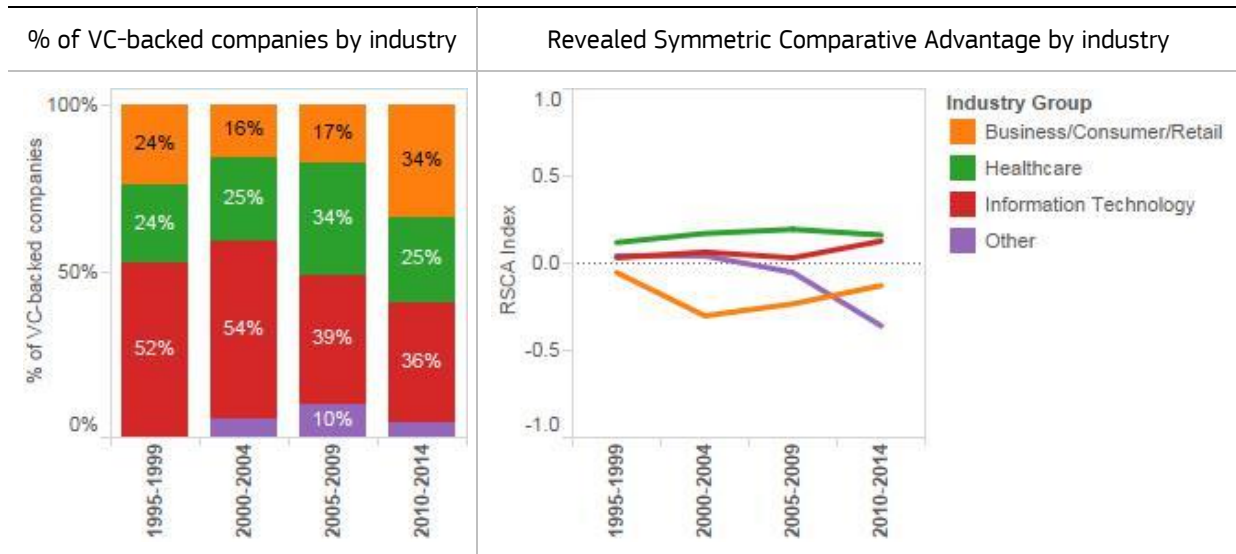


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 45: Technological specialisation of VC-backed companies based in København**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

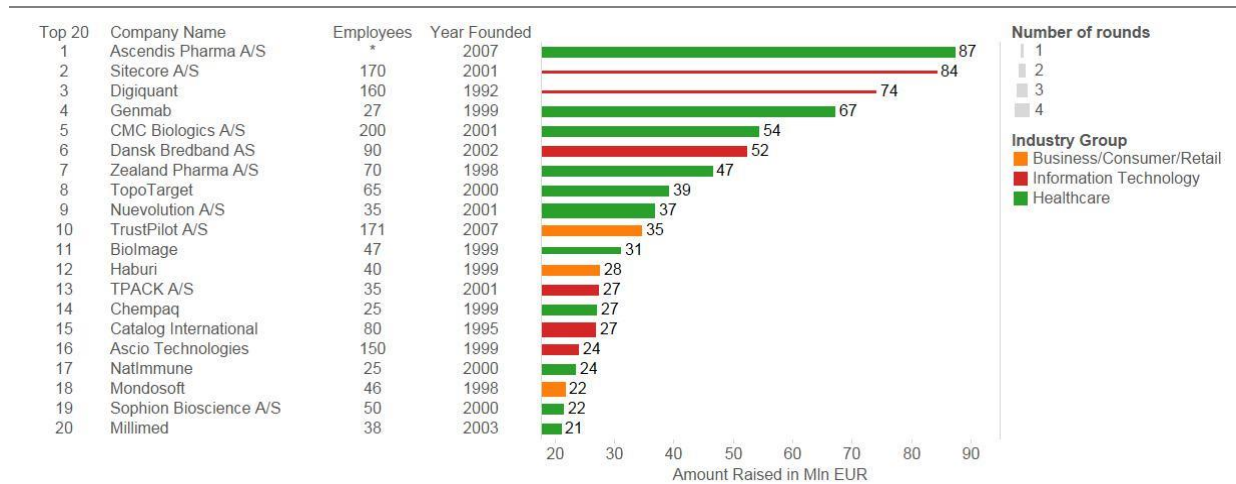
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 46: Top 20 VC-backed companies based in København by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

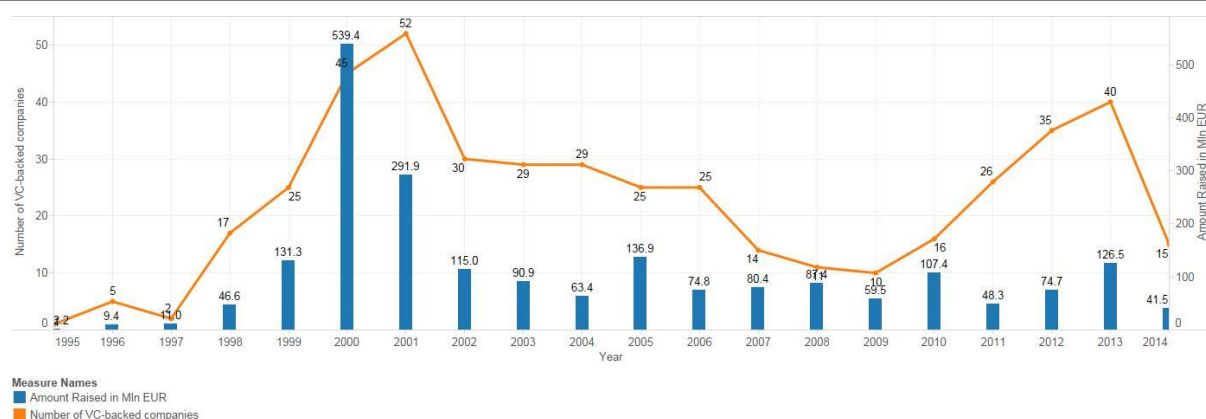


## 4.8 Dublin

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Dublin represent 3.4% of all VC-backed companies based in the European start-up hotspots or 1.7% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Dublin account for 4.1% of the money received by all firms based in the European start-up hotspots, or for 2.3% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in IT.</p> <p>Technological disadvantage in Business, Consumer Services and Retail, Healthcare and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Dublin is 2.1 Million Euro.</p> <p>Average number of rounds per start-up based in Dublin is 2.0</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Dublin is 29 employees.</p> <p>Median age of VC-backed start-up based in Dublin is 3 years.</p>

**Figure 47: Amount raised and number of VC-backed companies in Dublin**

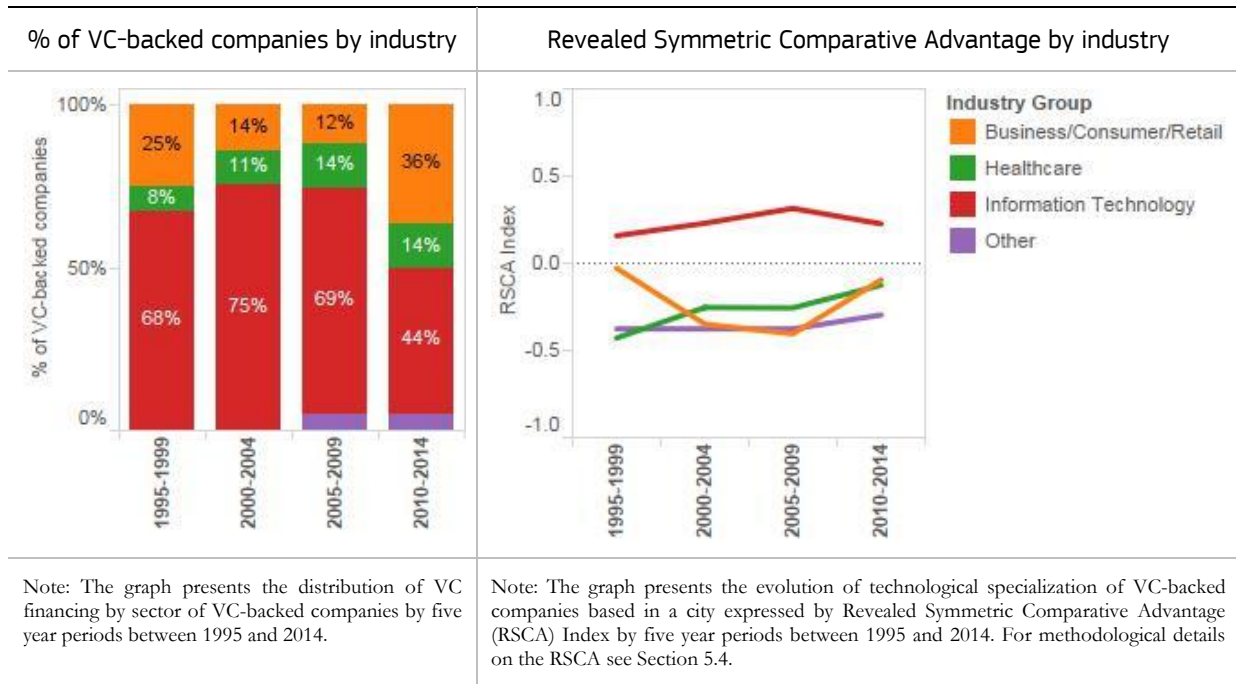


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 48: Technological specialisation of VC-backed companies based in Dublin**

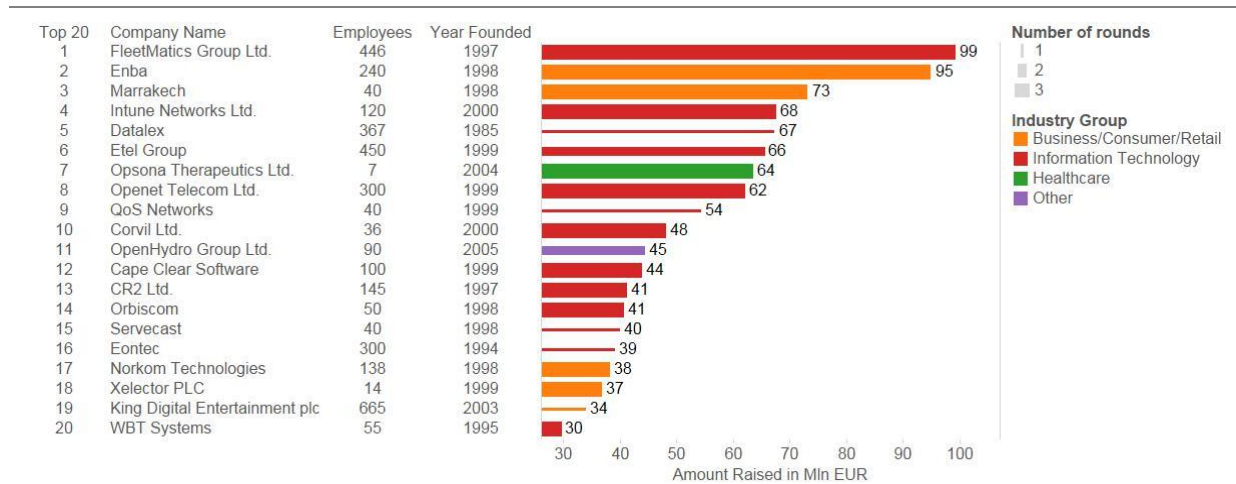


A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 49: Top 20 VC-backed companies based in Dublin by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

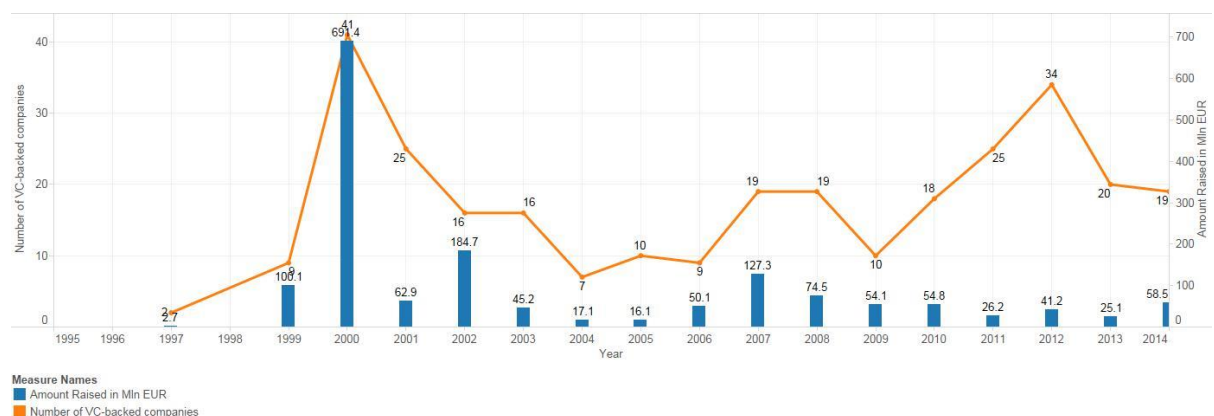
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.9 Madrid

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Madrid represent 3.1% of all VC-backed companies based in the European start-up hotspots or 1.5% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Madrid account for 3.1% of the money received by all firms based in the European start-up hotspots, or for 1.8% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in IT and Business, Consumer Services and Retail.</p> <p>Technological disadvantage in Healthcare and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Madrid is 1.9 Million Euro.</p> <p>Average number of rounds per start-up based in Madrid is 1.5</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Madrid is 32 employees.</p> <p>Median age of VC-backed start-up based in Madrid is 2 years.</p>

**Figure 50: Amount raised and number of VC-backed companies in Madrid**

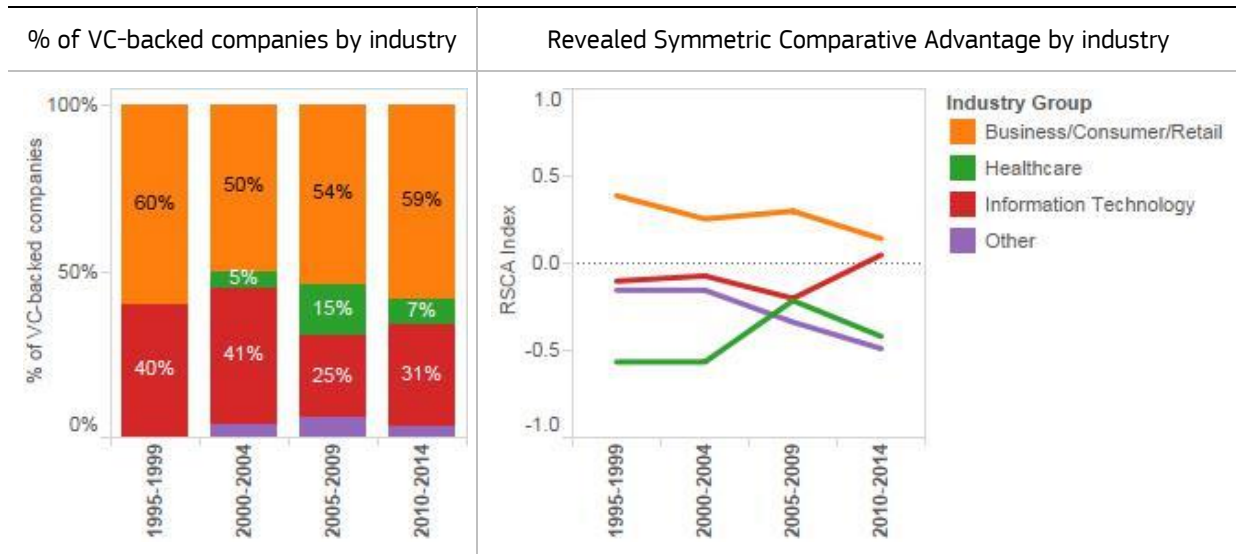


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 51: Technological specialisation of VC-backed companies based in Madrid**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

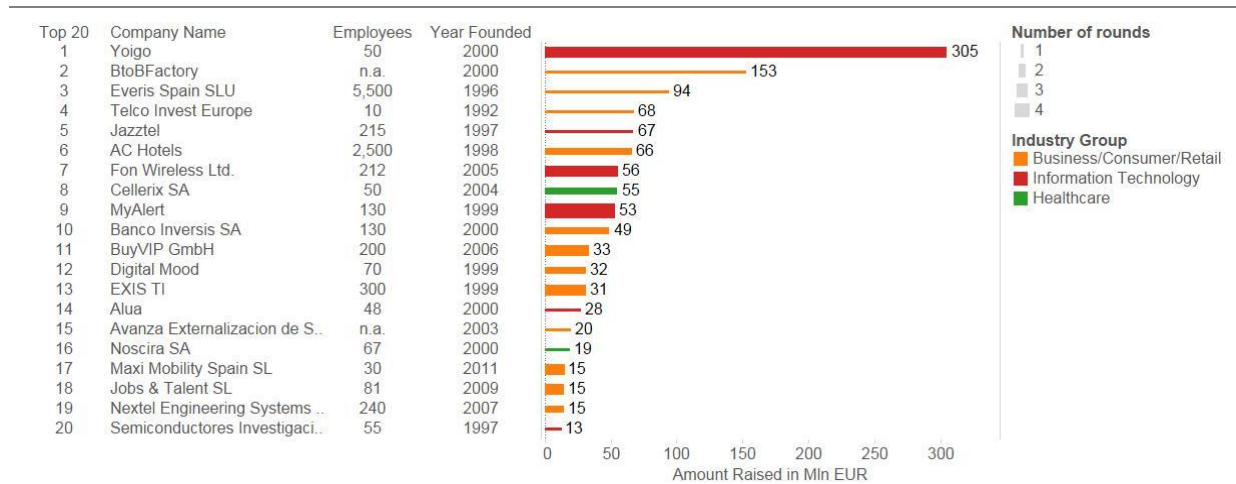
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 52: Top 20 VC-backed companies based in Madrid by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

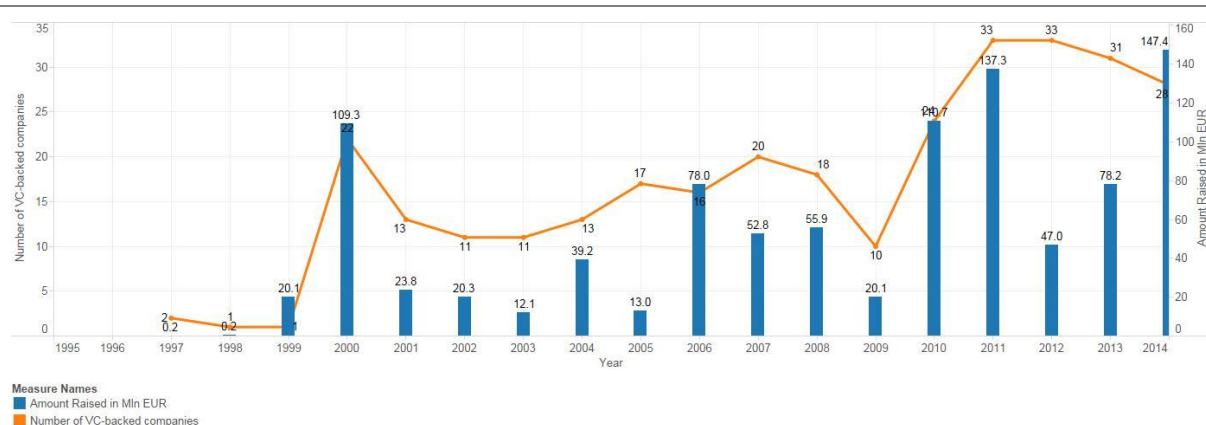
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.10 Barcelona

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Barcelona represent 2.9% of all VC-backed companies based in the European start-up hotspots or 1.4% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Barcelona account for 1.8% of the money received by all firms based in the European start-up hotspots, or for 1.1% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in IT and Business, Consumer Services and Retail.</p> <p>Technological disadvantage in Healthcare and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Barcelona is 1.0 Million Euro.</p> <p>Average number of rounds per start-up based in Barcelona is 1.5</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Barcelona is 20.5 employees.</p> <p>Median age of VC-backed start-up based in Barcelona is 2 years.</p>

**Figure 53: Amount raised and number of VC-backed companies in Barcelona**

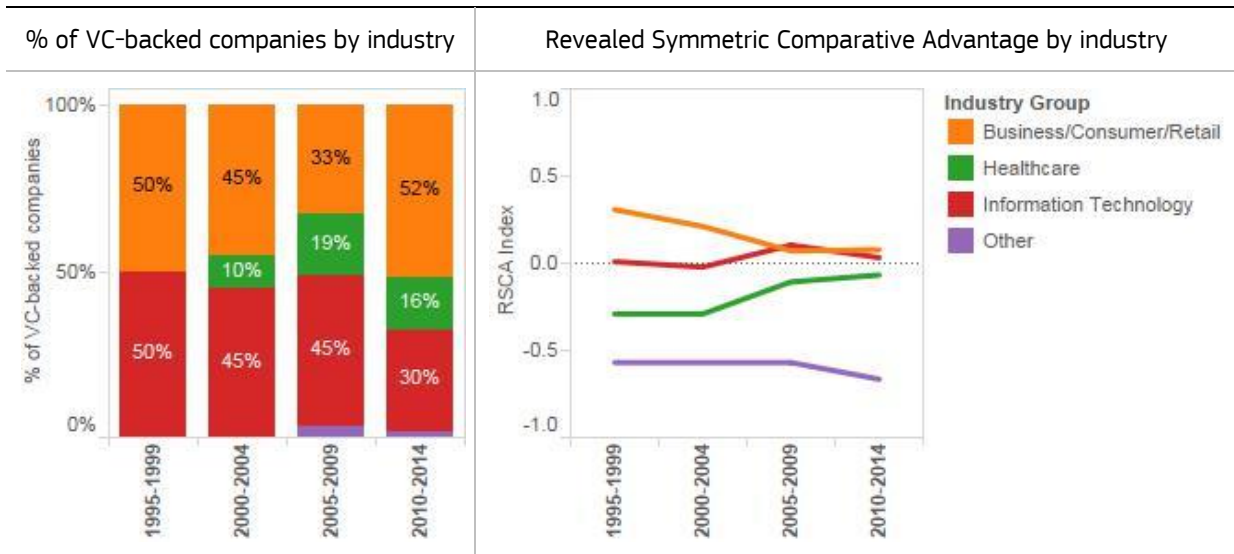


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 54: Technological specialisation of VC-backed companies based in Barcelona**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

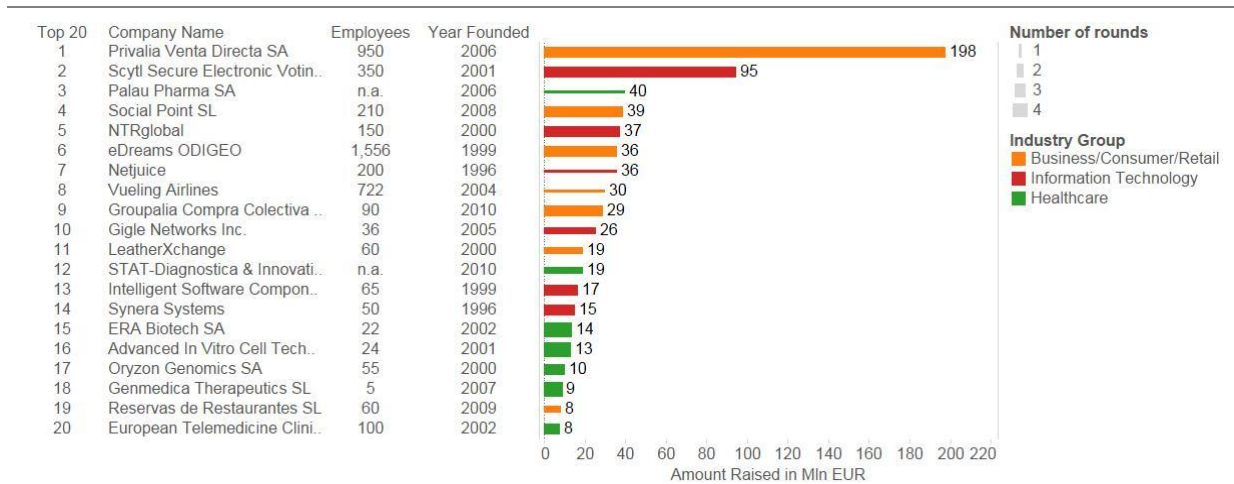
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 55: Top 20 VC-backed companies based in Barcelona by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

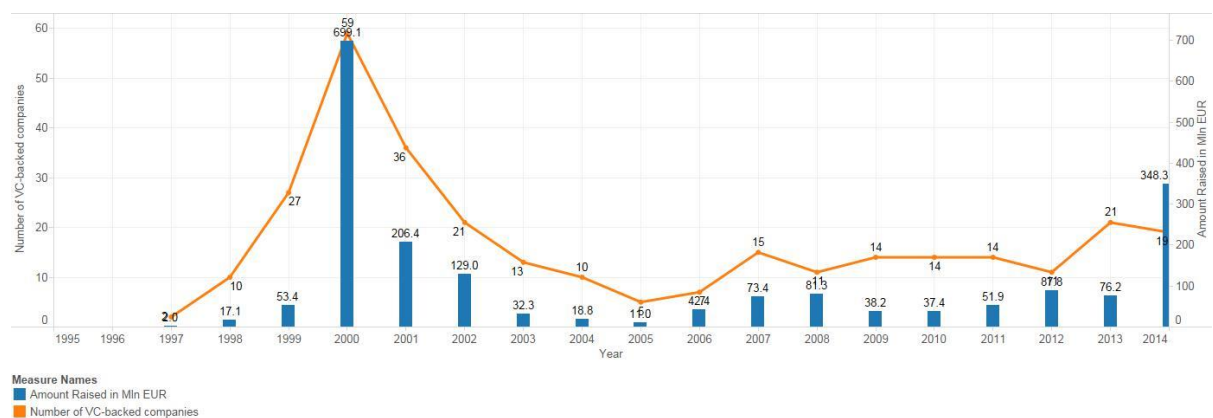
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.11 Amsterdam

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Amsterdam represent 2.7% of all VC-backed companies based in the European start-up hotspots or 1.3% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Amsterdam account for 3.8% of the money received by all firms based in the European start-up hotspots, or for 2.2% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Business, Consumer Services and Retail.</p> <p>Technological disadvantage in IT, Healthcare and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Amsterdam is 2.0 Million Euro.</p> <p>Average number of rounds per start-up based in Amsterdam is 1.7</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Amsterdam is 25 employees.</p> <p>Median age of VC-backed start-up based in Amsterdam is 2 years.</p>

**Figure 56: Amount raised and number of VC-backed companies in Amsterdam**

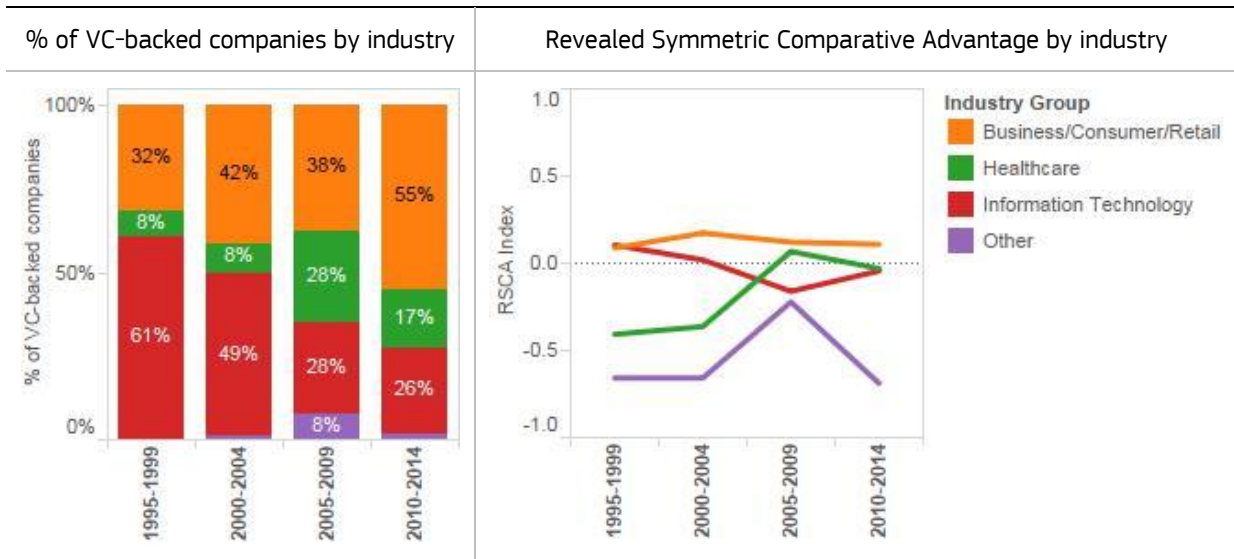


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 57: Technological specialisation of VC-backed companies based in Amsterdam**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

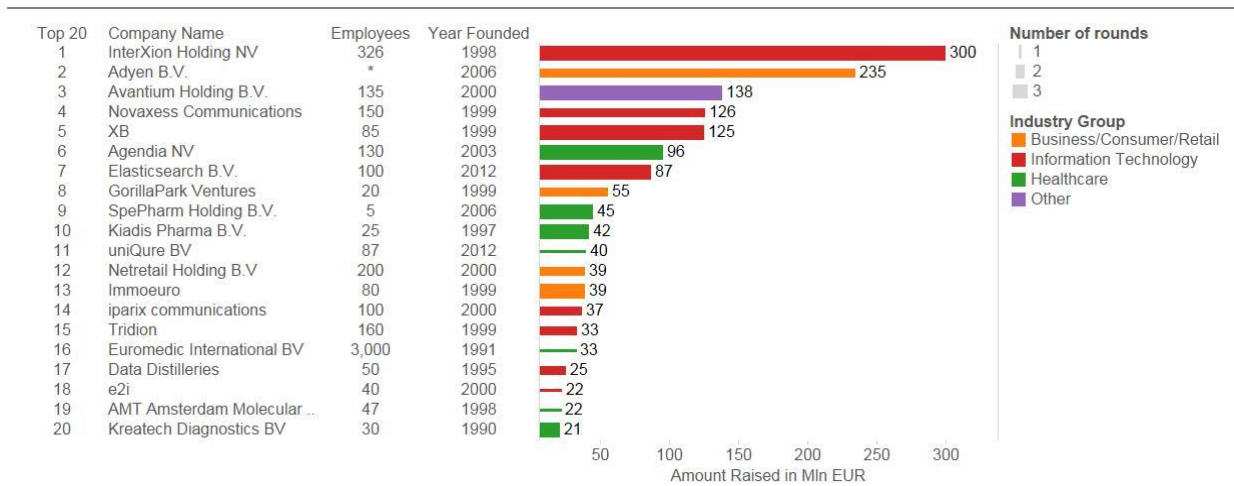
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 58: Top 20 VC-backed companies based in Amsterdam by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

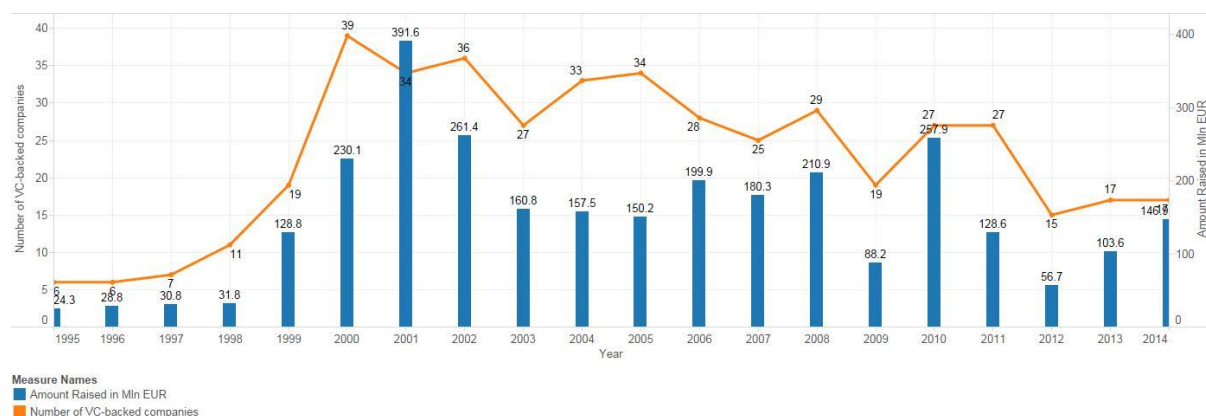


## 4.12 Cambridge

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Cambridge represent 2.6% of all VC-backed companies based in the European start-up hotspots or 1.3% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Cambridge account for 5.6% of the money received by all firms based in the European start-up hotspots, or for 3.2% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in IT, Healthcare and Other sectors.</p> <p>Technological disadvantage in Business, Consumer Services and Retail.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Cambridge is 3.8 Million Euro.</p> <p>Average number of rounds per start-up based in Cambridge is 2.6</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Cambridge is 30.5 employees.</p> <p>Median age of VC-backed start-up based in Cambridge is 3 years.</p>

**Figure 59: Amount raised and number of VC-backed companies in Cambridge**

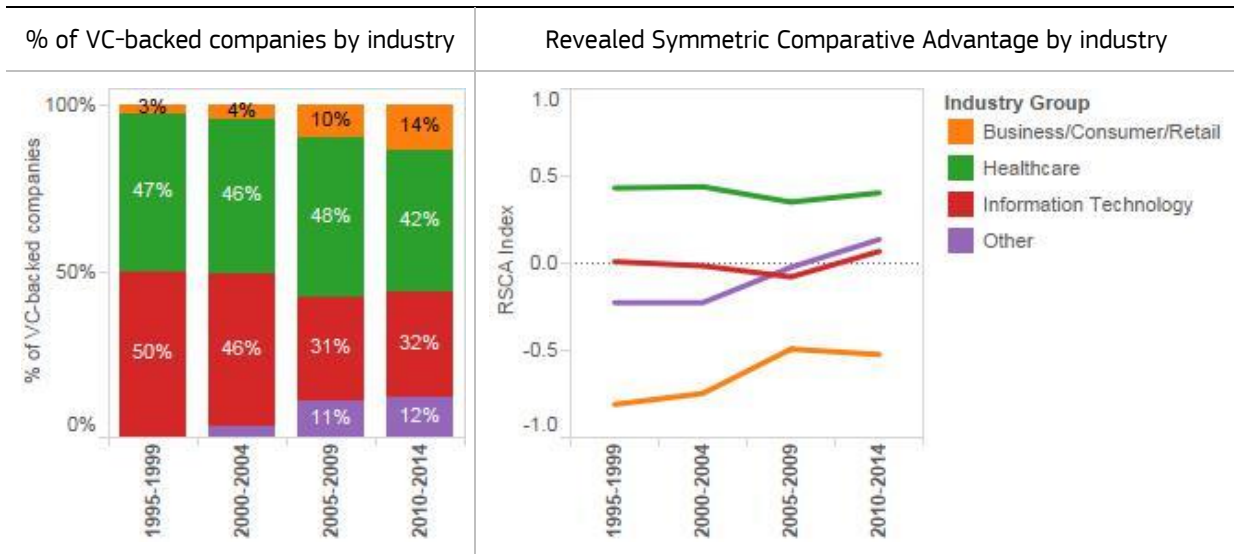


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 60: Technological specialisation of VC-backed companies based in Cambridge**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

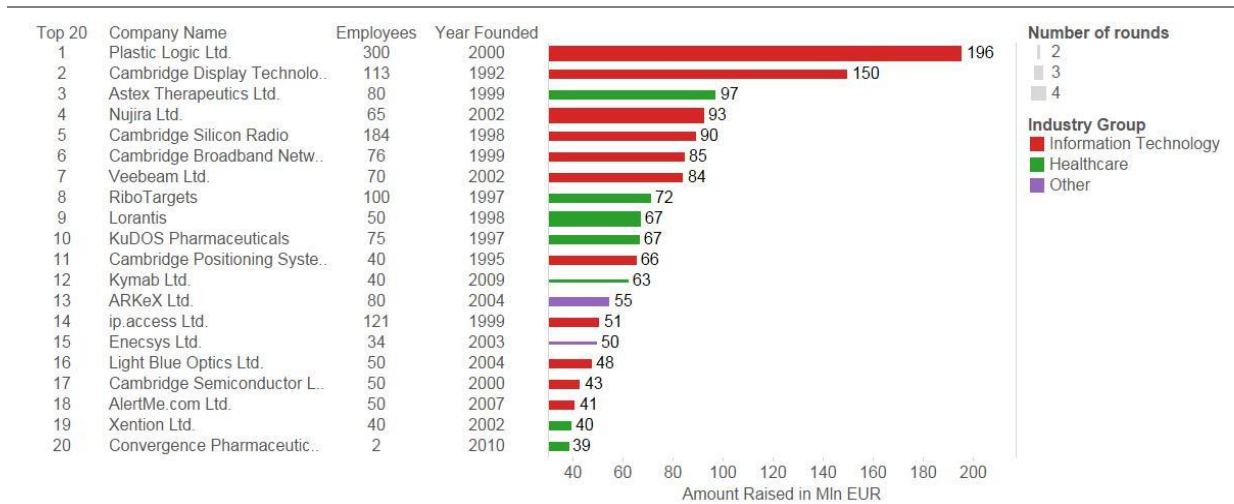
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 61: Top 20 VC-backed companies based in Cambridge by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

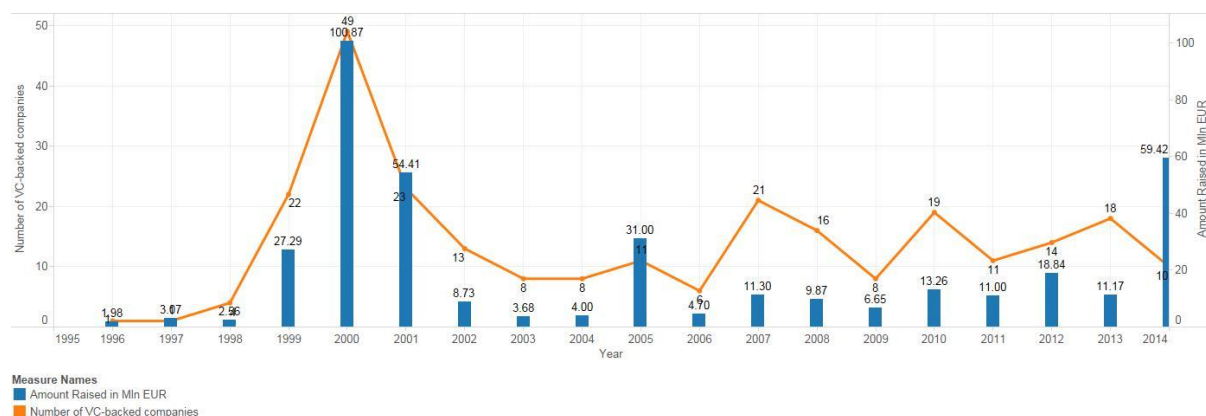
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.13 Hamburg

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Hamburg represent 2.5% of all VC-backed companies based in the European start-up hotspots or 1.2% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Hamburg account for 0.7% of the money received by all firms based in the European start-up hotspots, or for 0.4% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Business, Consumer Services and Retail.</p> <p>Technological disadvantage in IT, Healthcare and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Hamburg is 1.5 Million Euro.</p> <p>Average number of rounds per start-up based in Hamburg is 1.6</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Hamburg is 25 employees.</p> <p>Median age of VC-backed start-up based in Hamburg is 1 years.</p>

**Figure 62: Amount raised and number of VC-backed companies in Hamburg**

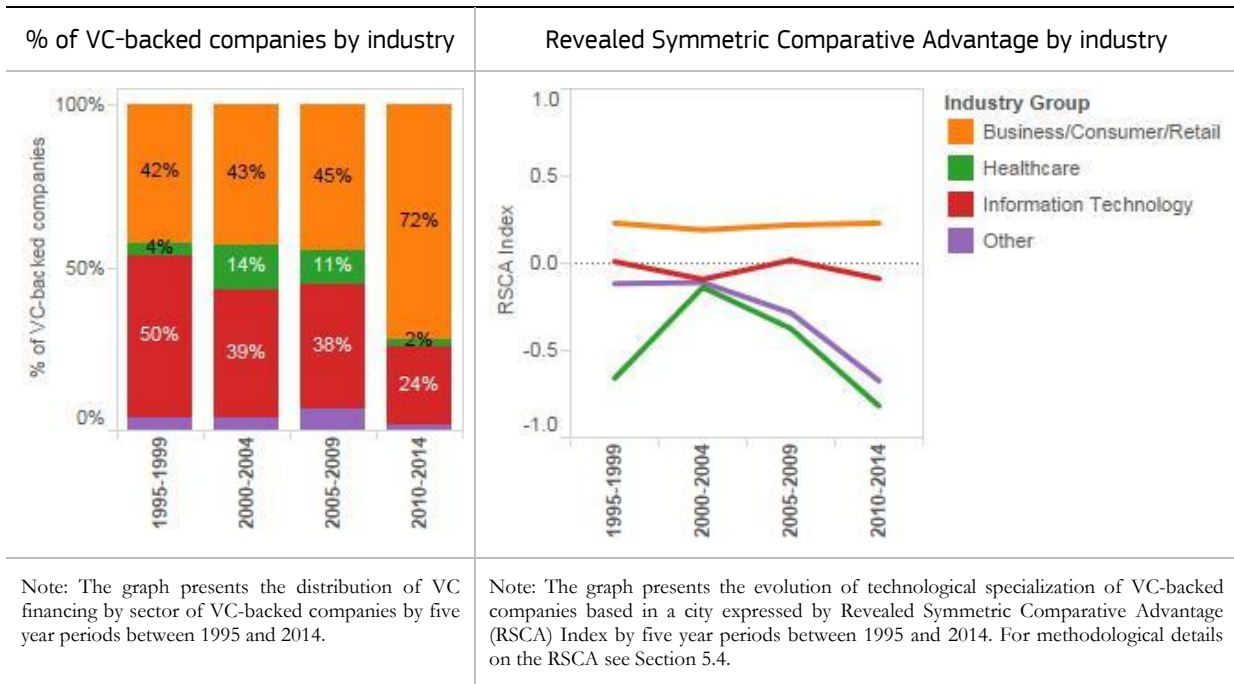


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 63: Technological specialisation of VC-backed companies based in Hamburg**

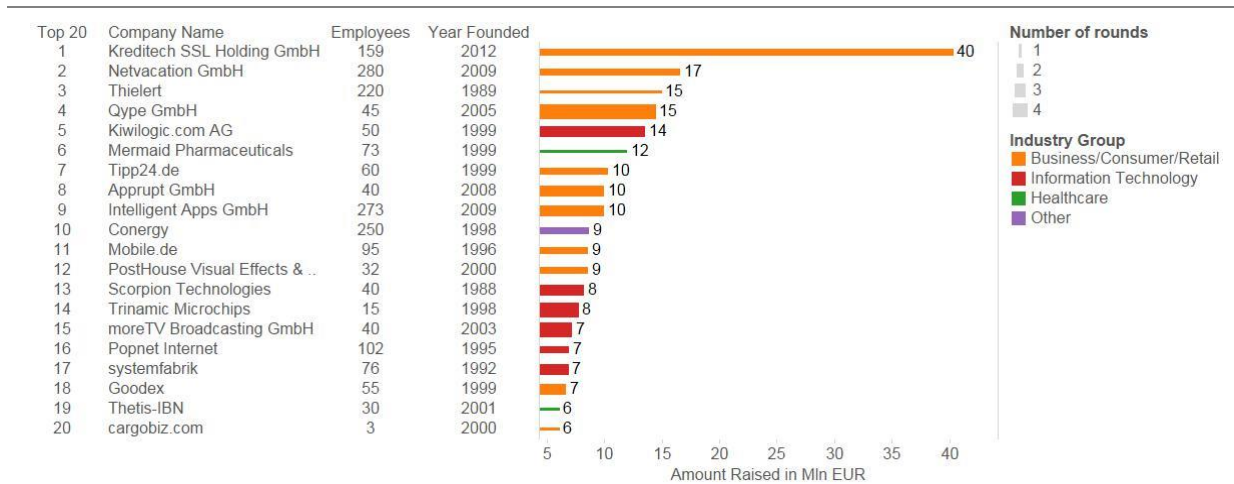


A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 64: Top 20 VC-backed companies based in Hamburg by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

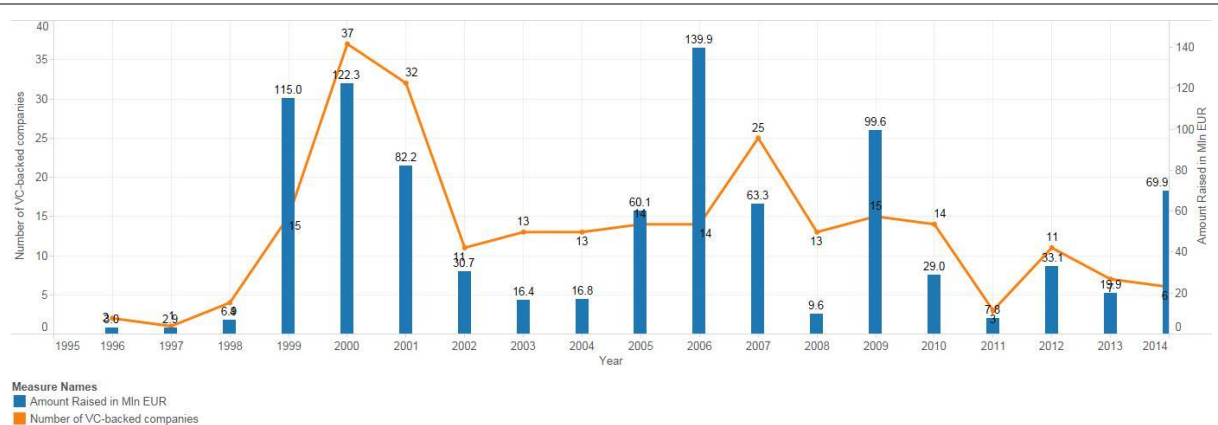
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.14 Oslo

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Oslo represent 2.1% of all VC-backed companies based in the European start-up hotspots or 1.0% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Oslo account for 1.8% of the money received by all firms based in the European start-up hotspots, or for 1.0% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in IT and Healthcare Business.</p> <p>Technological disadvantage in Consumer Services and Retail and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Oslo is 2.2 Million Euro.</p> <p>Average number of rounds per start-up based in Oslo is 1.8</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Oslo is 25 employees.</p> <p>Median age of VC-backed start-up based in Oslo is 4 years.</p>

**Figure 65: Amount raised and number of VC-backed companies in Oslo**

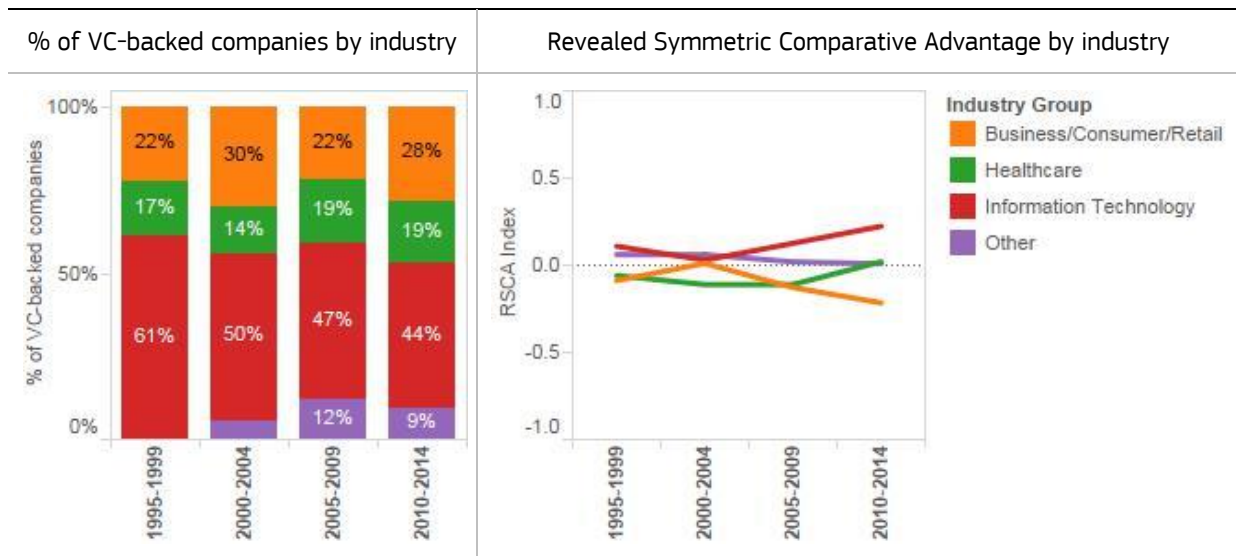


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 66: Technological specialisation of VC-backed companies based in Oslo**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

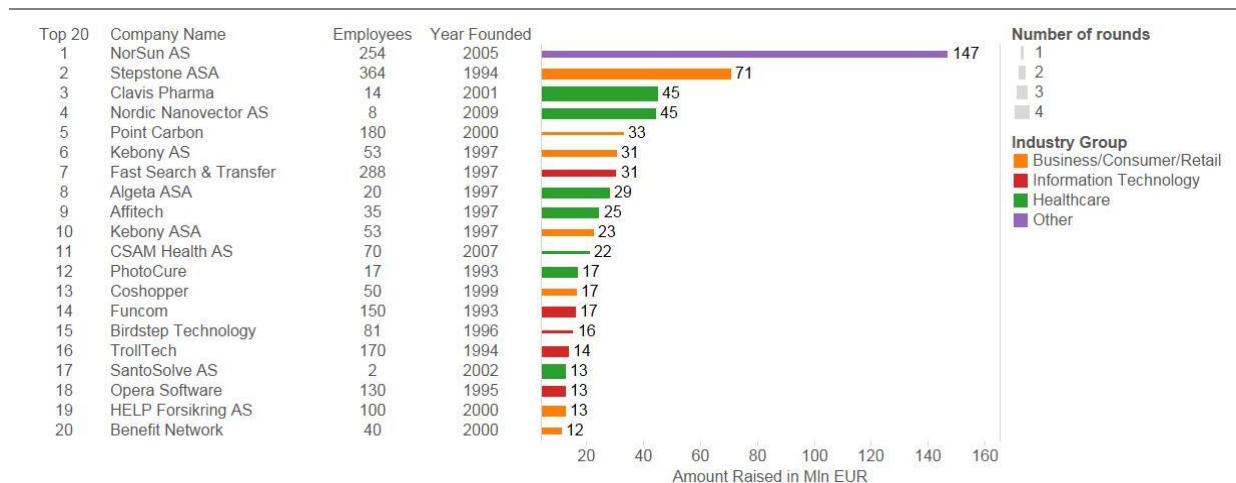
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 67: Top 20 VC-backed companies based in Oslo by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

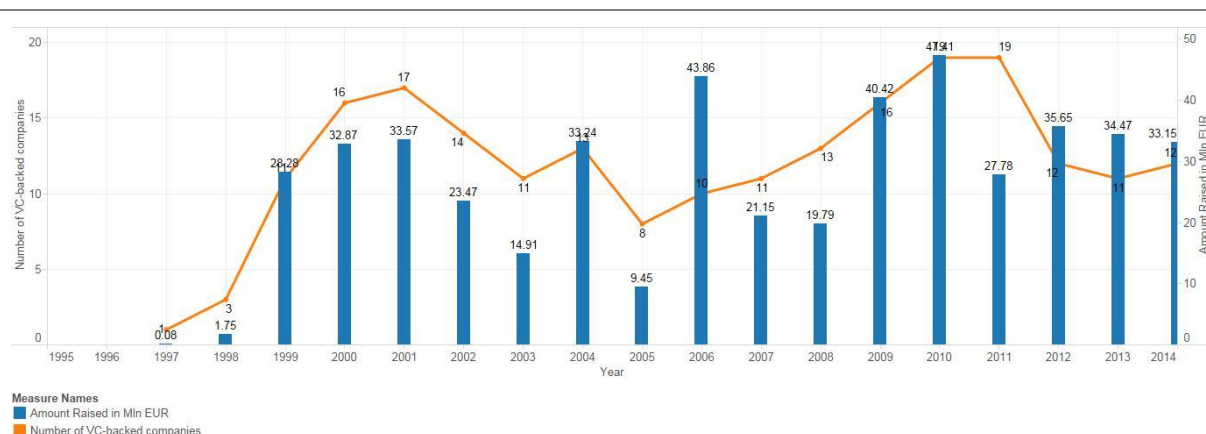
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.15 Lyon

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Lyon represent 1.9% of all VC-backed companies based in the European start-up hotspots or 0.9% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Lyon account for 0.9% of the money received by all firms based in the European start-up hotspots, or for 0.5% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Healthcare and Business, Consumer Services and Retail.</p> <p>Technological disadvantage in IT and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Lyon is 1.2 Million Euro.</p> <p>Average number of rounds per start-up based in Lyon is 1.7</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Lyon is 24 employees.</p> <p>Median age of VC-backed start-up based in Lyon is 3 years.</p>

**Figure 68: Amount raised and number of VC-backed companies in Lyon**

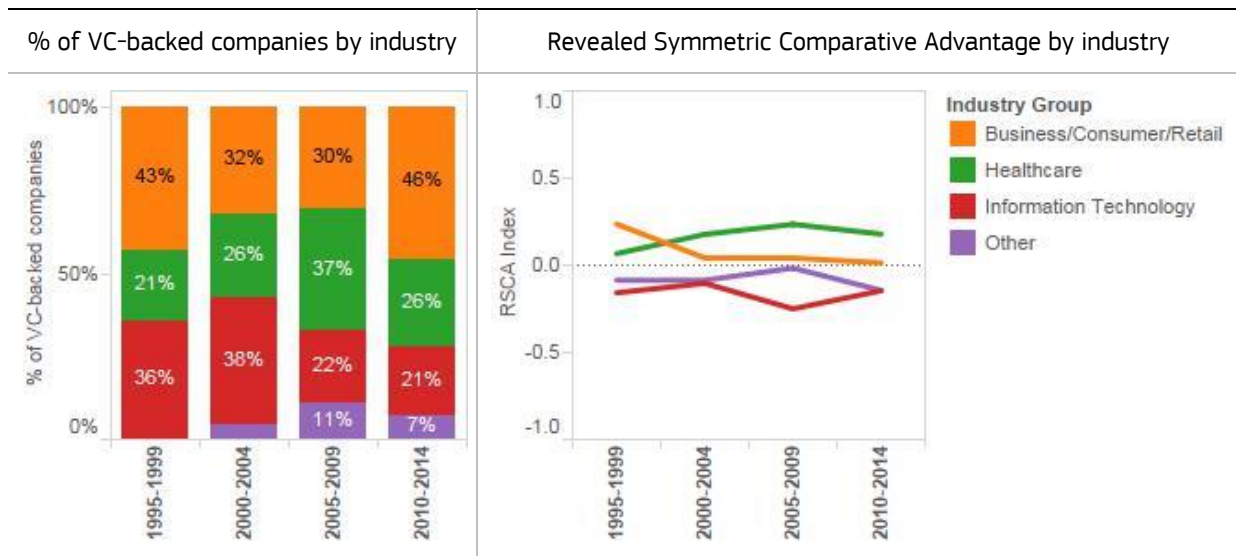


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 69: Technological specialisation of VC-backed companies based in Lyon**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

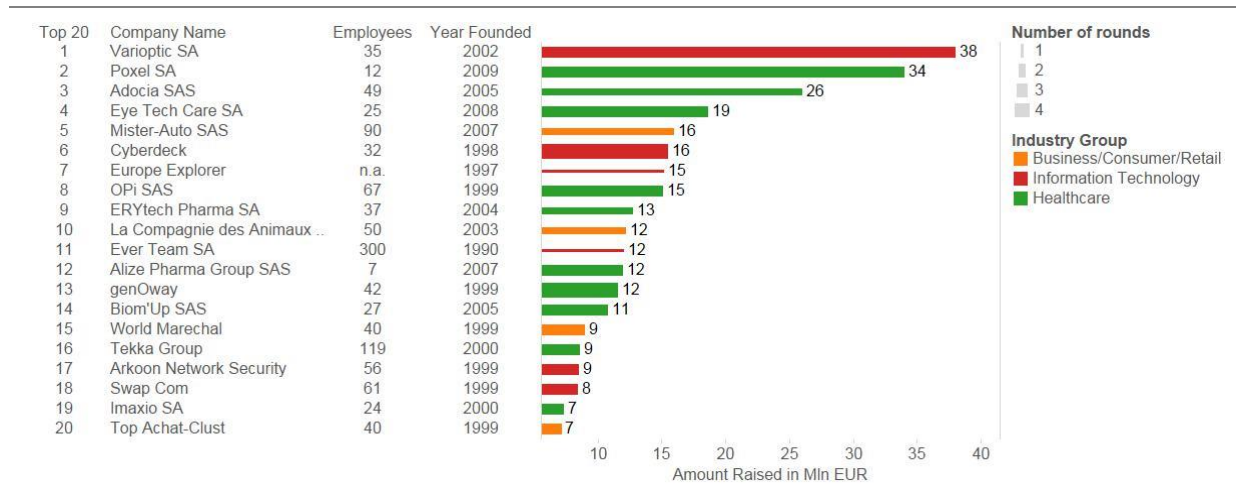
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 70: Top 20 VC-backed companies based in Lyon by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

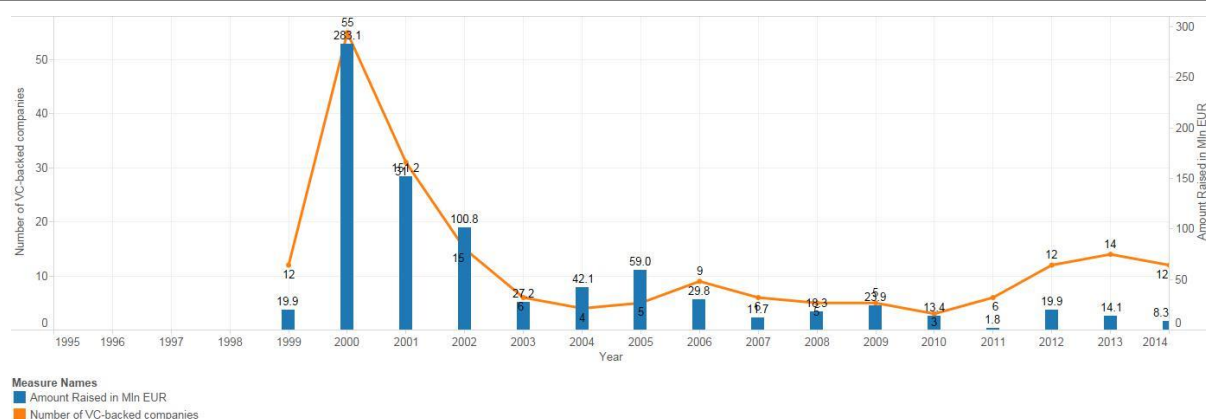


## 4.16 Milano

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Milano represent 1.9% of all VC-backed companies based in the European start-up hotspots or 0.9% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Milano account for 1.6% of the money received by all firms based in the European start-up hotspots, or for 0.9% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Business, Consumer Services and Retail.</p> <p>Technological disadvantage in IT, Healthcare and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Milano is 2.0 Million Euro.</p> <p>Average number of rounds per start-up based in Milano is 1.6</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Milano is 20 employees.</p> <p>Median age of VC-backed start-up based in Milano is 1 year.</p>

**Figure 71: Amount raised and number of VC-backed companies in Milano**

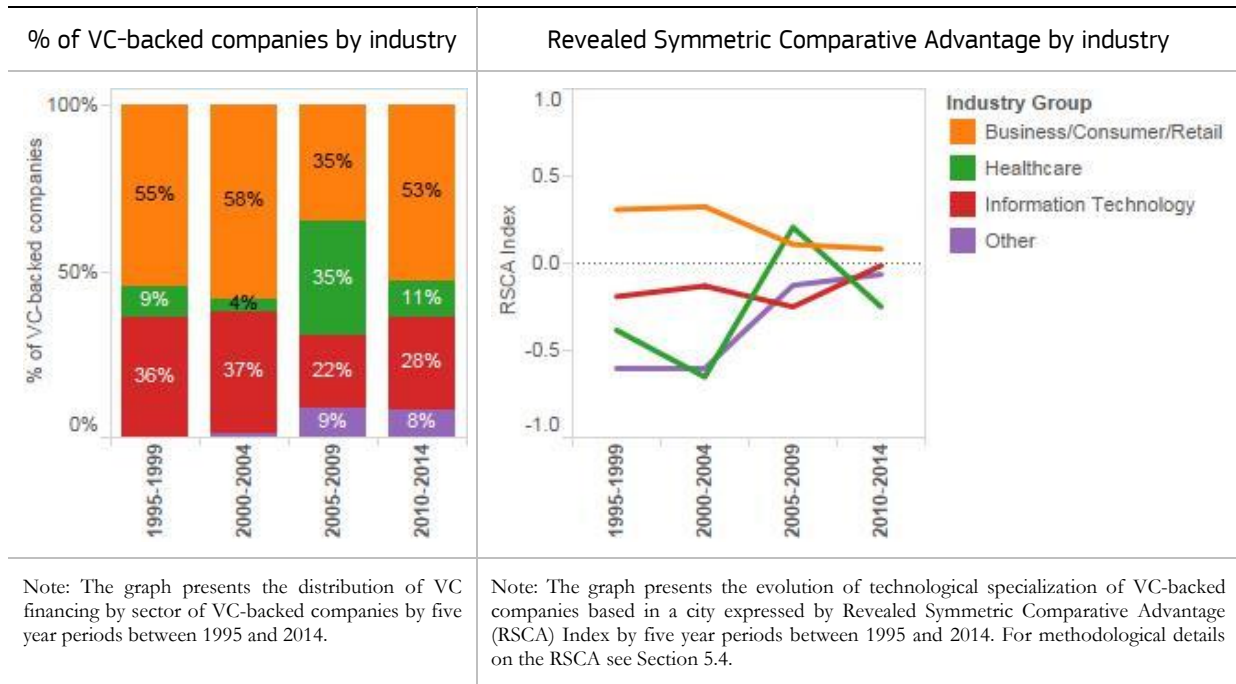


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 72: Technological specialisation of VC-backed companies based in Milano**

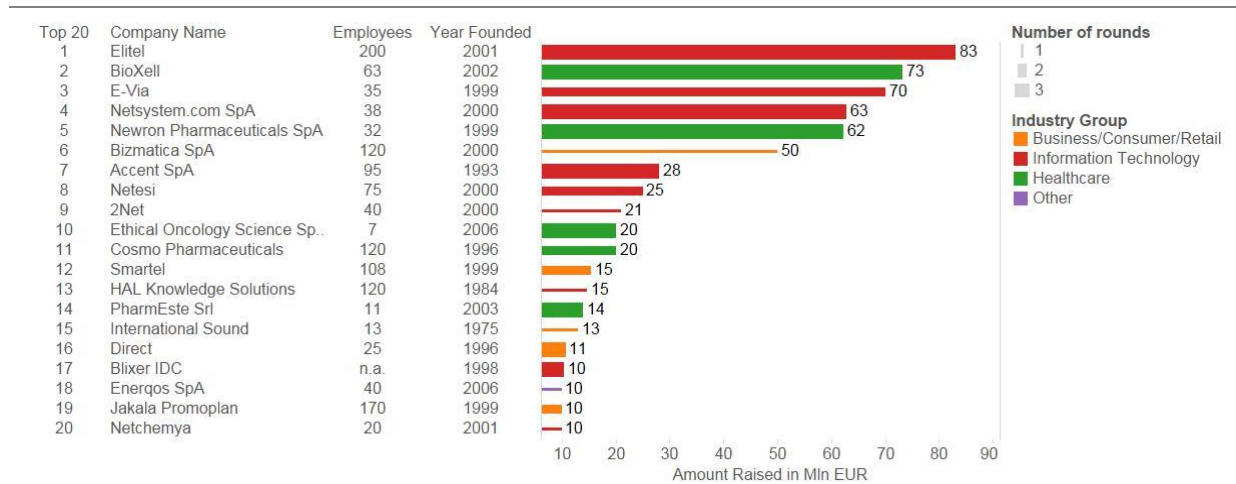


A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 73: Top 20 VC-backed companies based in Milano by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

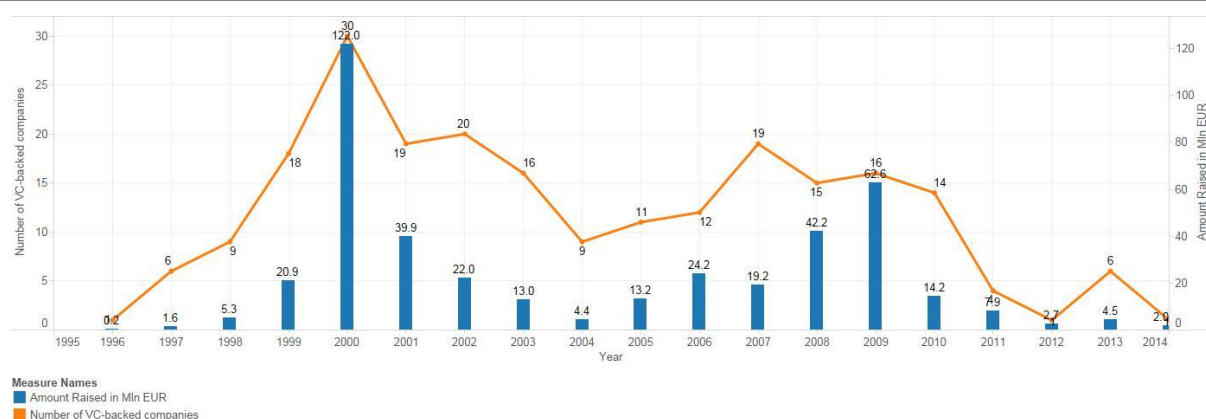
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.17 Göteborg

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Göteborg represent 1.7% of all VC-backed companies based in the European start-up hotspots or 0.8% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Göteborg account for 0.8% of the money received by all firms based in the European start-up hotspots, or for 0.5% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in IT and Other sectors.</p> <p>Technological disadvantage in Business, Consumer Services and Retail and Healthcare.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Göteborg is 0.8 Million Euro.</p> <p>Average number of rounds per start-up based in Göteborg is 2.0</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Göteborg is 10 employees.</p> <p>Median age of VC-backed start-up based in Göteborg is 3 years.</p>

**Figure 74: Amount raised and number of VC-backed companies in Göteborg**

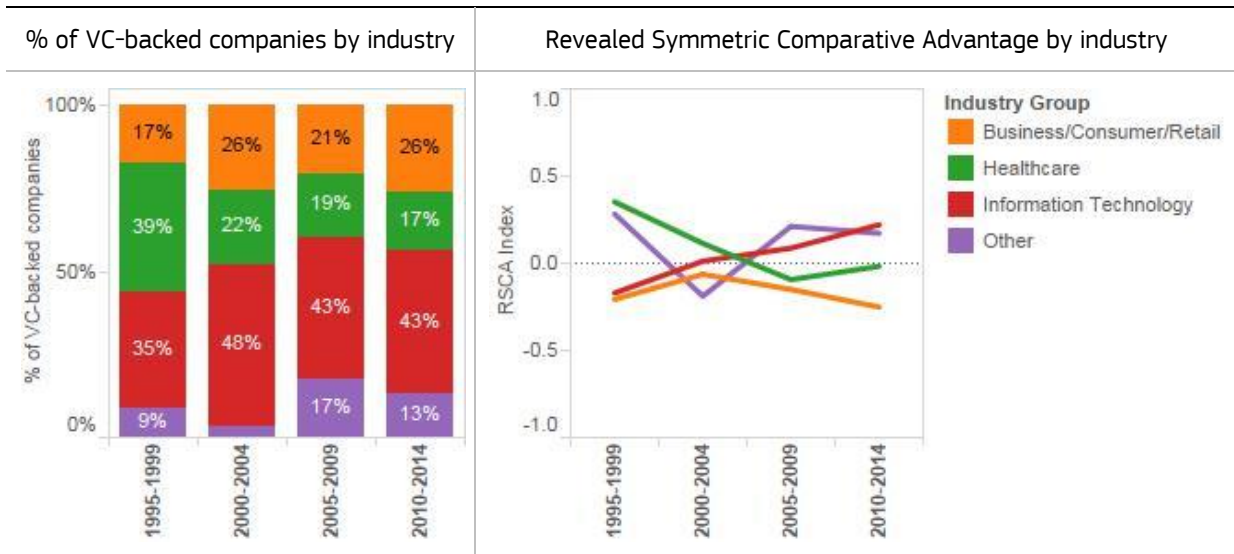


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 75: Technological specialisation of VC-backed companies based in Göteborg**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

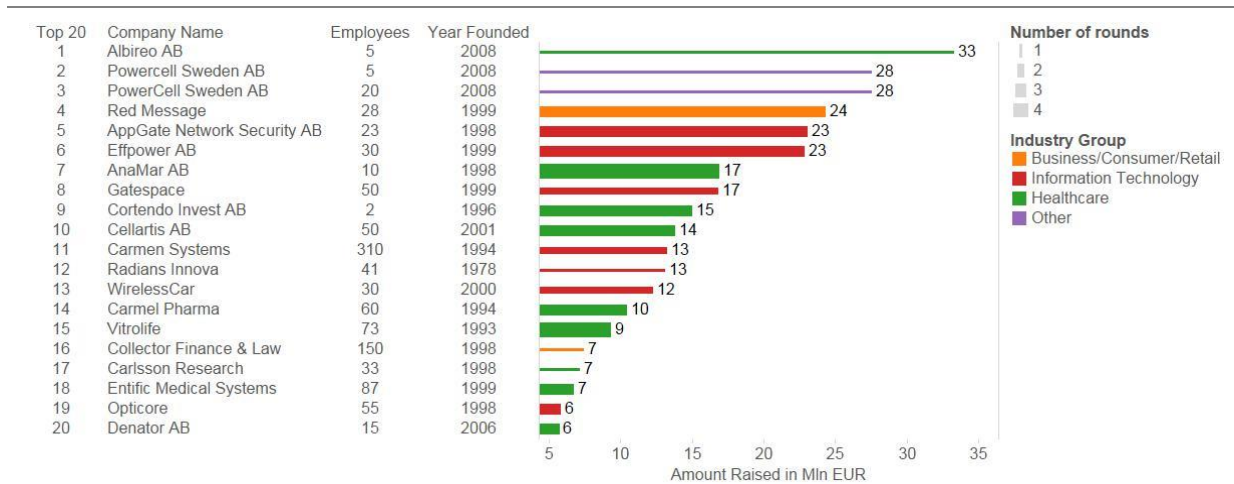
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 76: Top 20 VC-backed companies based in Göteborg by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

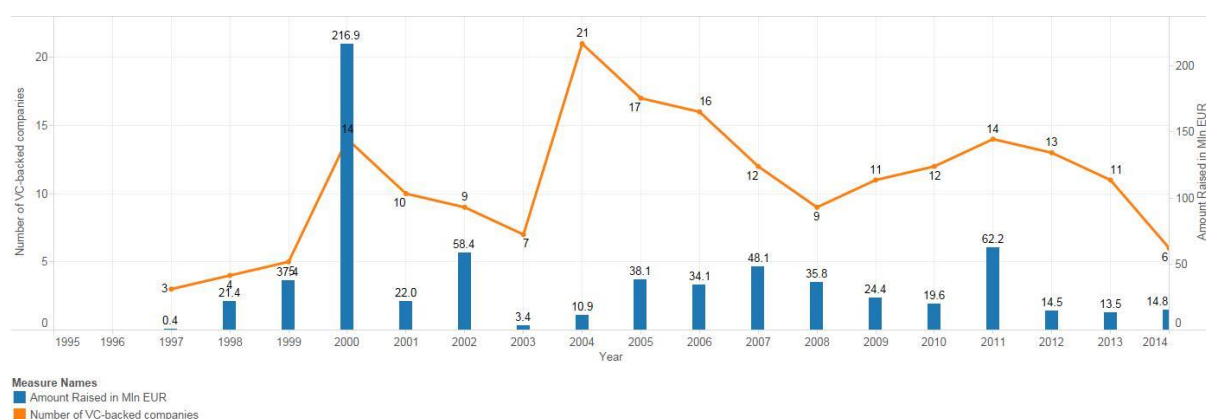
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.18 Manchester

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Manchester represent 1.7% of all VC-backed companies based in the European start-up hotspots or 0.8% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Manchester account for 1.3% of the money received by all firms based in the European start-up hotspots, or for 0.7% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Healthcare.</p> <p>Technological disadvantage in IT, Business, Consumer Services and Retail and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Manchester is 0.9 Million Euro.</p> <p>Average number of rounds per start-up based in Manchester is 1.7</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Manchester is 15 employees.</p> <p>Median age of VC-backed start-up based in Manchester is 2 years.</p>

**Figure 77: Amount raised and number of VC-backed companies in Manchester**

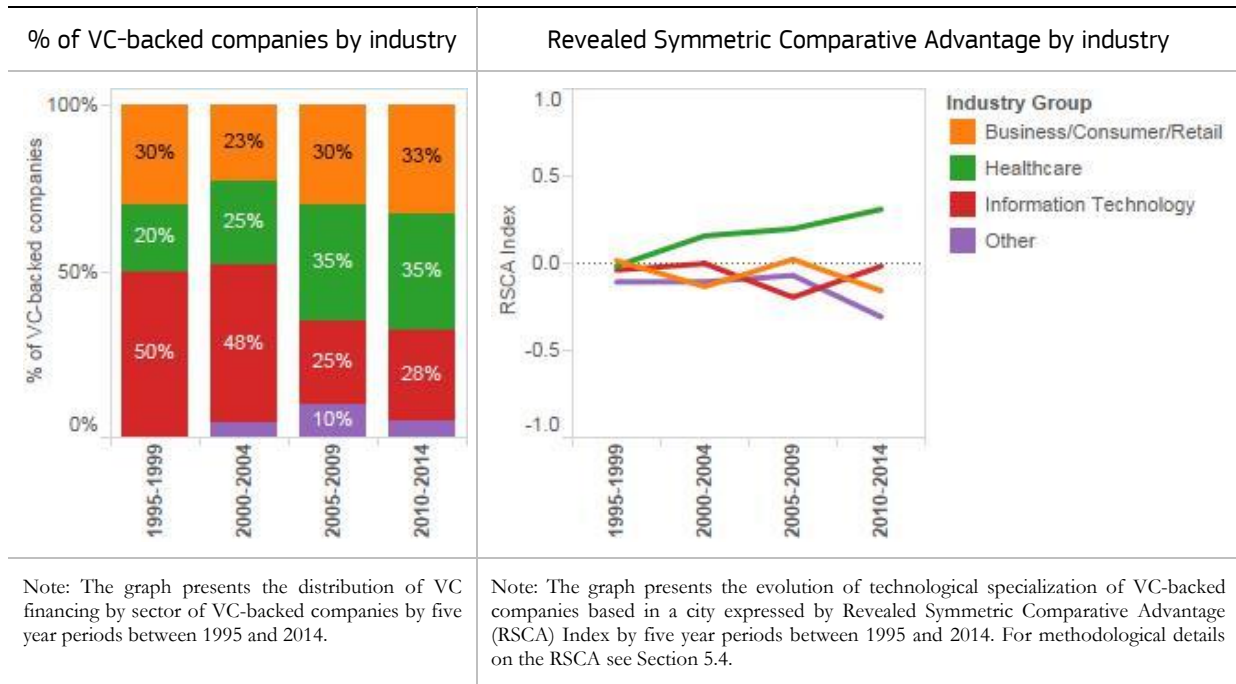


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 78: Technological specialisation of VC-backed companies based in Manchester**



A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 79: Top 20 VC-backed companies based in Manchester by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

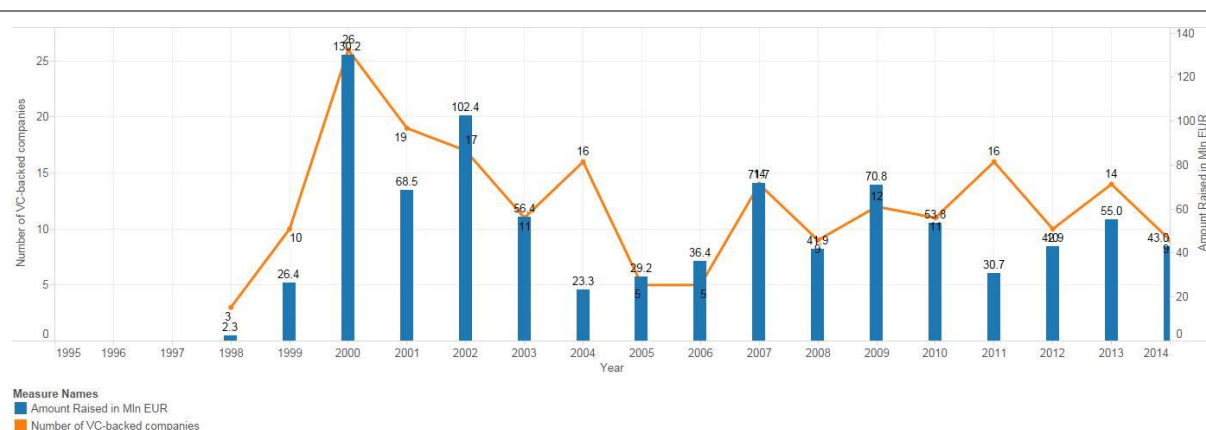
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.19 Zürich

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Zürich represent 1.6% of all VC-backed companies based in the European start-up hotspots or 0.8% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Zürich account for 1.7% of the money received by all firms based in the European start-up hotspots, or for 1.0% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Healthcare.</p> <p>Technological disadvantage in IT, Business, Consumer Services and Retail and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Zürich is 2.0 Million Euro.</p> <p>Average number of rounds per start-up based in Zürich is 1.9</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Zürich is 20 employees.</p> <p>Median age of VC-backed start-up based in Zürich is 3 years.</p>

**Figure 80: Amount raised and number of VC-backed companies in Zürich**

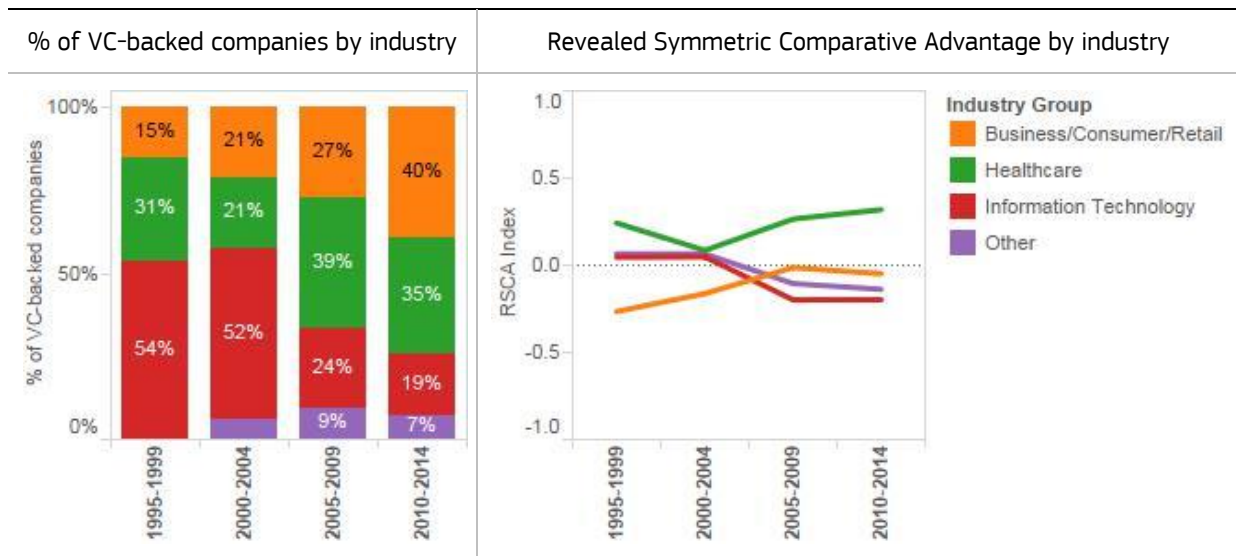


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 81: Technological specialisation of VC-backed companies based in Zürich**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

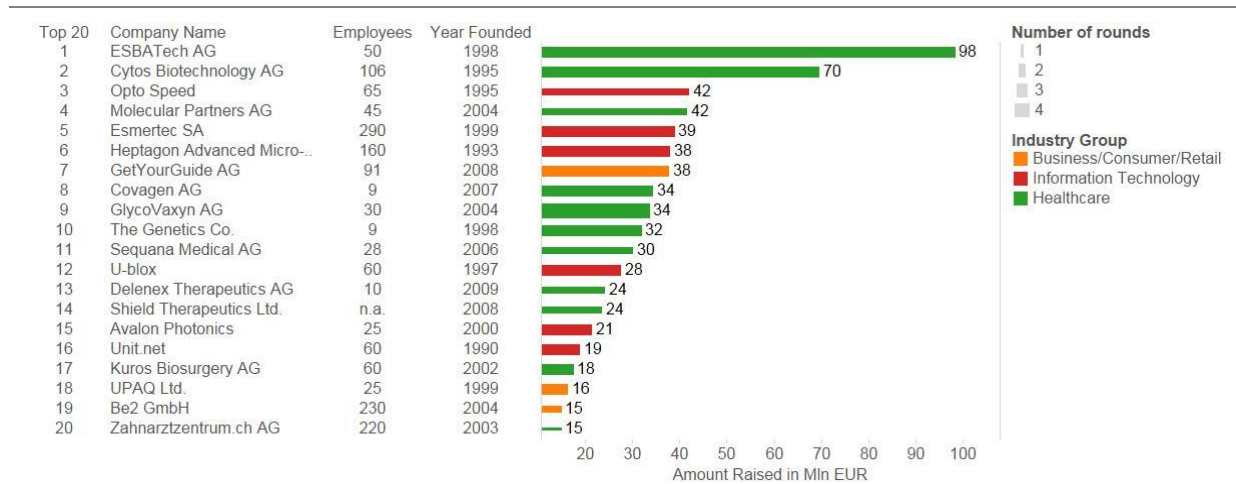
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 82: Top 20 VC-backed companies based in Zürich by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

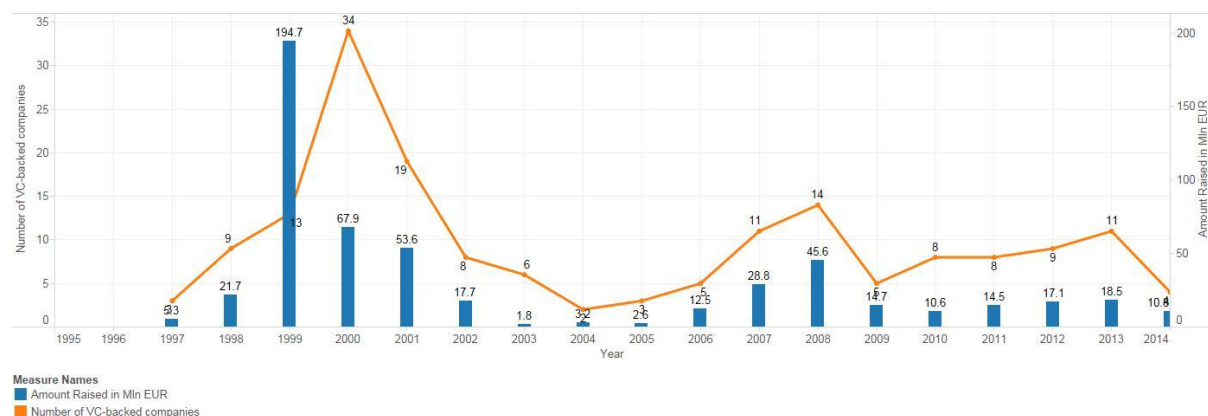


## 4.20 Köln

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Köln represent 1.6% of all VC-backed companies based in the European start-up hotspots or 0.8% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Köln account for 1.0% of the money received by all firms based in the European start-up hotspots, or for 0.6% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Business, Consumer Services and Retail and Healthcare.</p> <p>Technological disadvantage in IT, and Other sectors.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Köln is 1.7 Million Euro.</p> <p>Average number of rounds per start-up based in Köln is 1.6</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Köln is 29 employees.</p> <p>Median age of VC-backed start-up based in Köln is 2 years.</p>

**Figure 83: Amount raised and number of VC-backed companies in Köln**

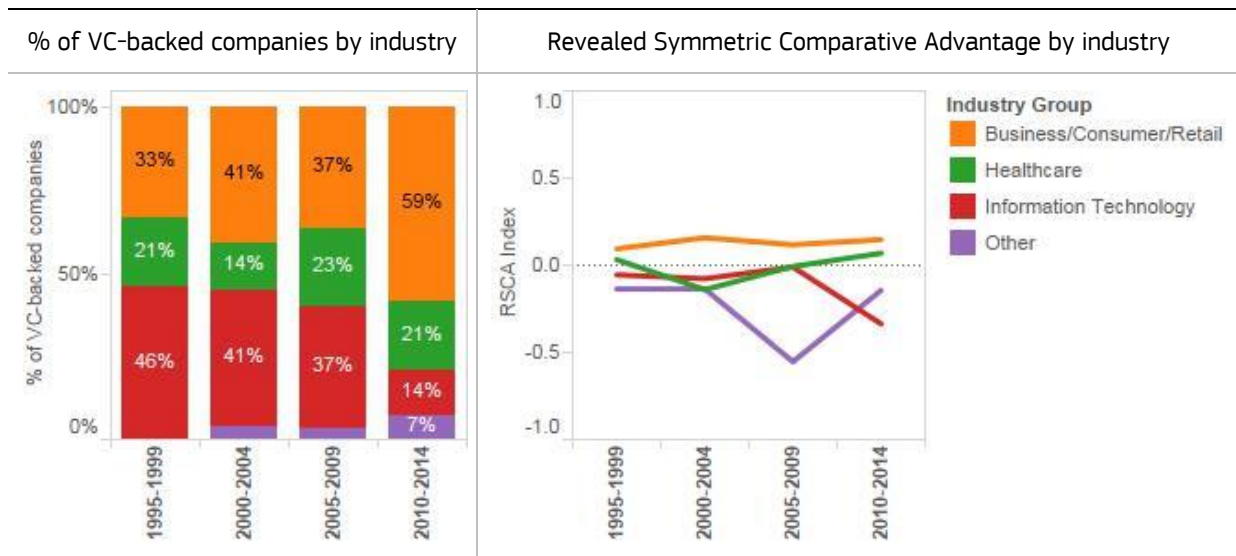


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 84: Technological specialisation of VC-backed companies based in Köln**



Note: The graph presents the distribution of VC financing by sector of VC-backed companies by five year periods between 1995 and 2014.

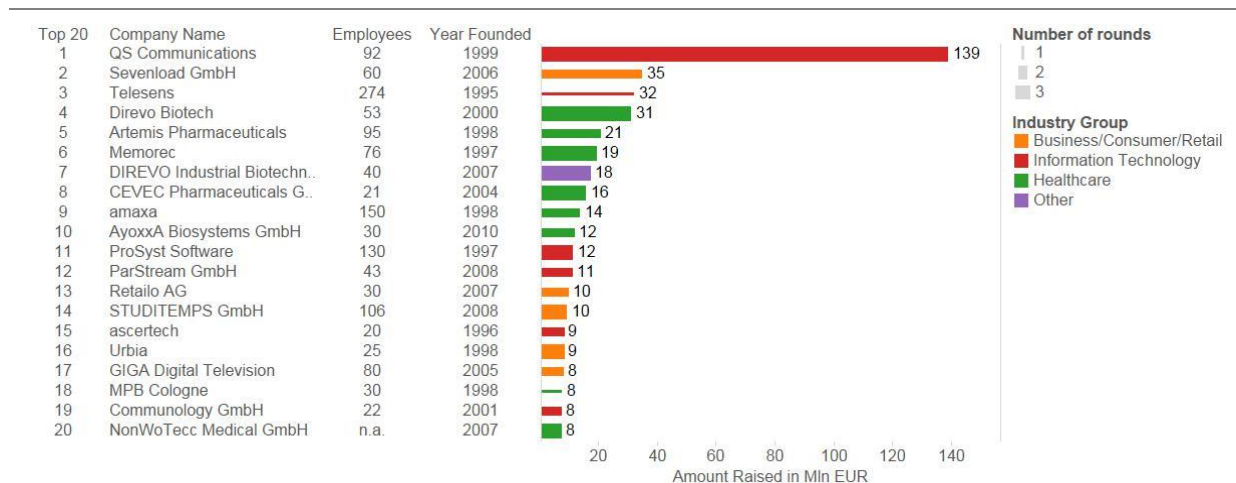
Note: The graph presents the evolution of technological specialization of VC-backed companies based in a city expressed by Revealed Symmetric Comparative Advantage (RSCA) Index by five year periods between 1995 and 2014. For methodological details on the RSCA see Section 5.4.

A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 85: Top 20 VC-backed companies based in Köln by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

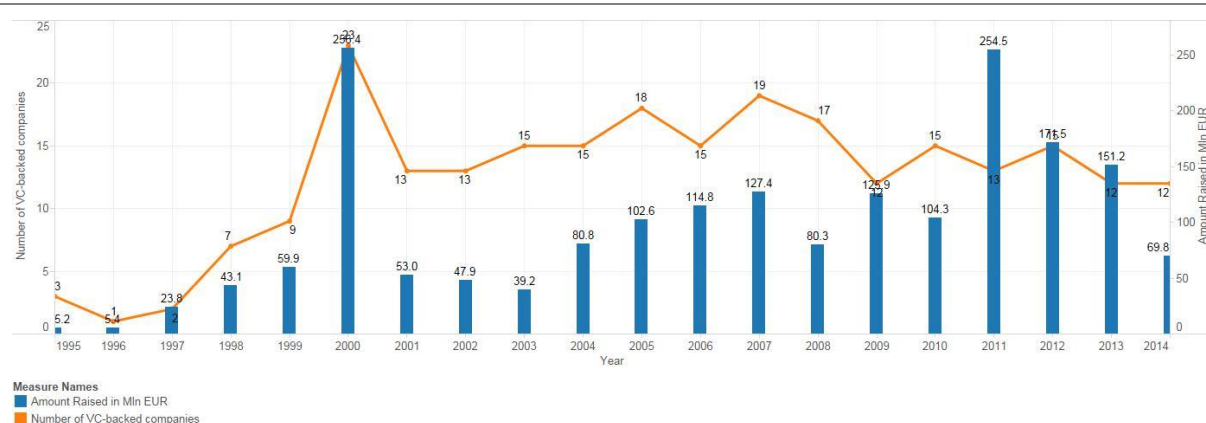
Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 4.21 Oxford

### Key facts

Relative size of a start-up hotspot	<p>VC-backed companies based in Oxford represent 1.6% of all VC-backed companies based in the European start-up hotspots or 0.8% of all European companies backed by VC between 1995 and 2014.</p> <p>VC-backed companies based in Oxford account for 3.6% of the money received by all firms based in the European start-up hotspots, or for 2.1% of the total amount raised by all European companies backed by VC financing between 1995 and 2014.</p>
Technological specialisation of a start-up hotspot	<p>Technological advantage in Healthcare and Other sectors.</p> <p>Technological disadvantage in IT and Business, Consumer Services and Retail.</p>
Amount and continuity of VC financing of start-ups	<p>Median amount of VC financing in one round by companies in Oxford is 3.3 Million Euro.</p> <p>Average number of rounds per start-up based in Oxford is 2.4</p>
Size and age of start-ups	<p>Median size of VC-backed start-up based in Oxford is 30 employees.</p> <p>Median age of VC-backed start-up based in Oxford is 3 years.</p>

**Figure 86: Amount raised and number of VC-backed companies in Oxford**

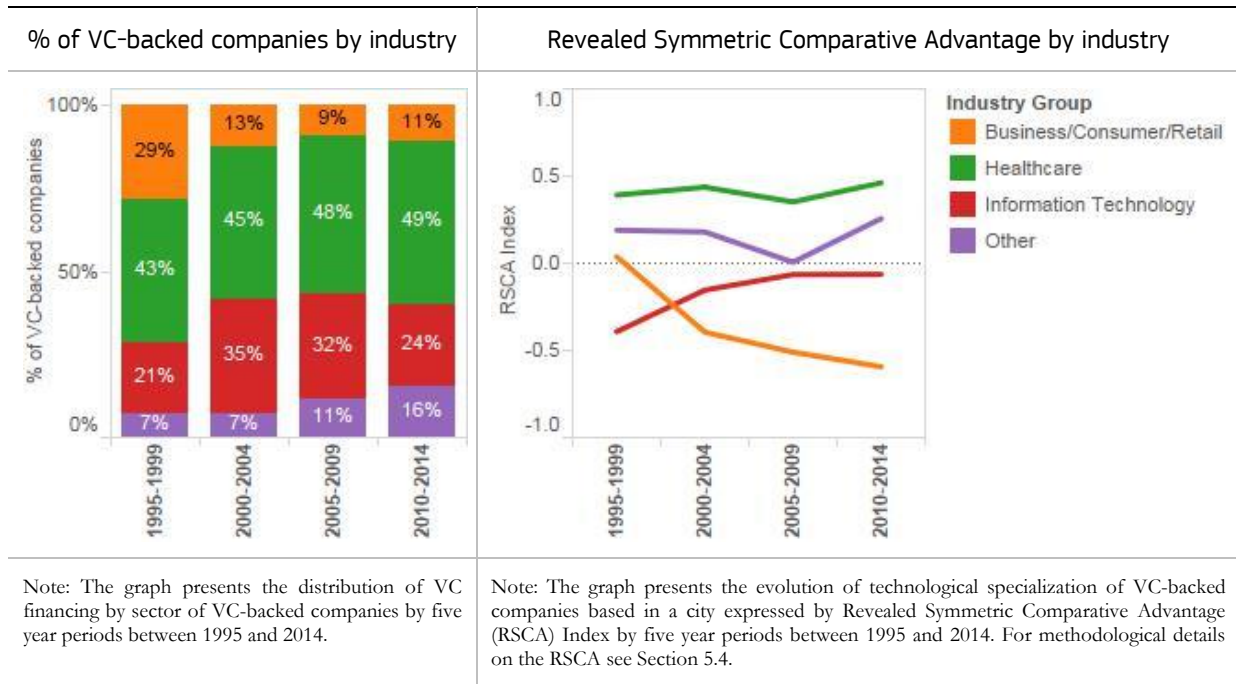


Note: The graph presents the total number of VC-backed companies and the total amount raised in Mln Euro by year over the period between 1995 and 2014 in Paris. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 87: Technological specialisation of VC-backed companies based in Oxford**

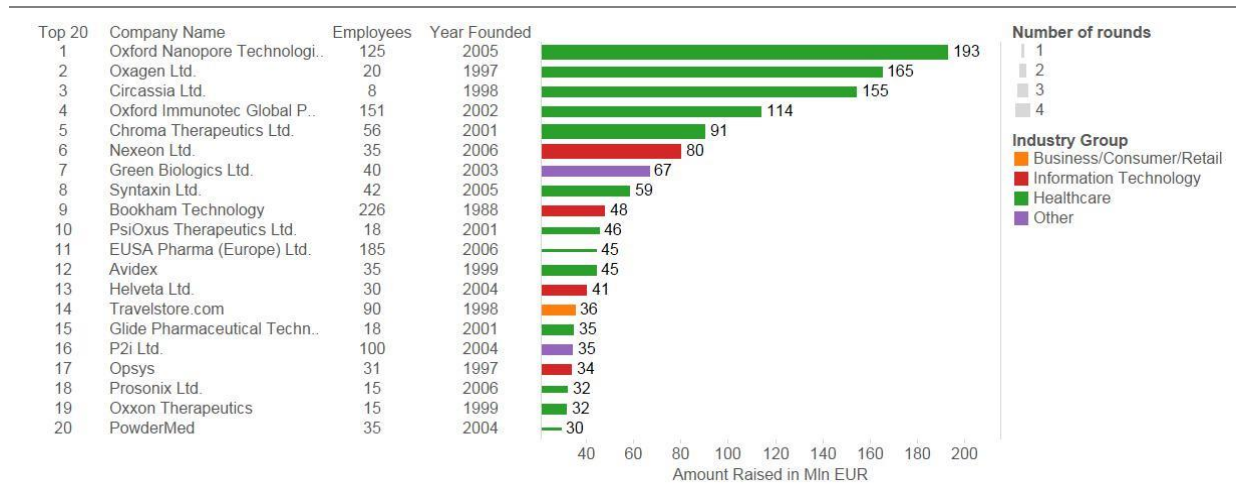


A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

**Figure 88: Top 20 VC-backed companies based in Oxford by amount raised**



Note: The graph presents the list of top 20 VC-based companies based in a city by total amount raised in Mln Euro in the period between 1995 and 2014. The industry sectors are based on [Venture Source](#) industry classification as defined in Section 5.3. A city is defined as a Functional Urban Area as described in Section 5.5.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) for further details please see Section 5.1.

## 5. Annex: Data and Methodology

### 5.1 Data source

This report is based on the [Venture Source](#), i.e. Venture Capital database by Dow Jones. Venture Source provides comprehensive data on venture-backed and private equity-backed companies – including their investors and executives – in every region, industry sector and stage of development throughout the world. This database contains information on venture capital transactions, the financed companies and the financing companies. The data are largely self-reported by VC companies, but several plausibility checks are conducted by the database providers. According to Kaplan et al. (2002), who provide a detailed overview of this database and compare it with an alternative source of information (i.e. Venture Economics), the Venture Source data are generally more reliable, more complete, and less biased than the Venture Economics data.

**Venture Source vs. Crunchbase:** Before selecting Venture Source data, a comparison with the [Crunchbase](#) was also performed. It included the count of VC-backed companies in the UK, Germany and France, i.e. three largest in terms of VC financing countries in Europe, over the period between 1995 and 2014, as reported by both data sources. As both data providers classify financial deals according to different criteria, the following types of deals were considered: "seed" and "venture" (Crunchbase) "seed", "1<sup>st</sup>", "2<sup>nd</sup>" and "later stage" (Venture Source). Data used in the comparison were extracted in 2014. Figure 89 reports the results of this comparison. It shows that Venture Source contains a significantly higher number of companies in each of the countries and that the information goes further back into the past. Thus, comparing the two data sources showed that Venture Source is a more comprehensive data source that offers longitudinal and standardized information on venture capital deals with all the detailed information concerning the financed and financing entities.

### 5.2 Definition of funding rounds

The report includes only Venture Financing rounds classified by Venture Source as follows:

**Seed Round:** is invested in companies at very early stages of development. It is financing to research, assess and develop an initial concept before a business has reached the start-up phase. Typically, founders and product developers, such as engineers or molecular biologists, are on board, but no complete management team is in place. Most seed rounds do not raise more than \$2.5 million.

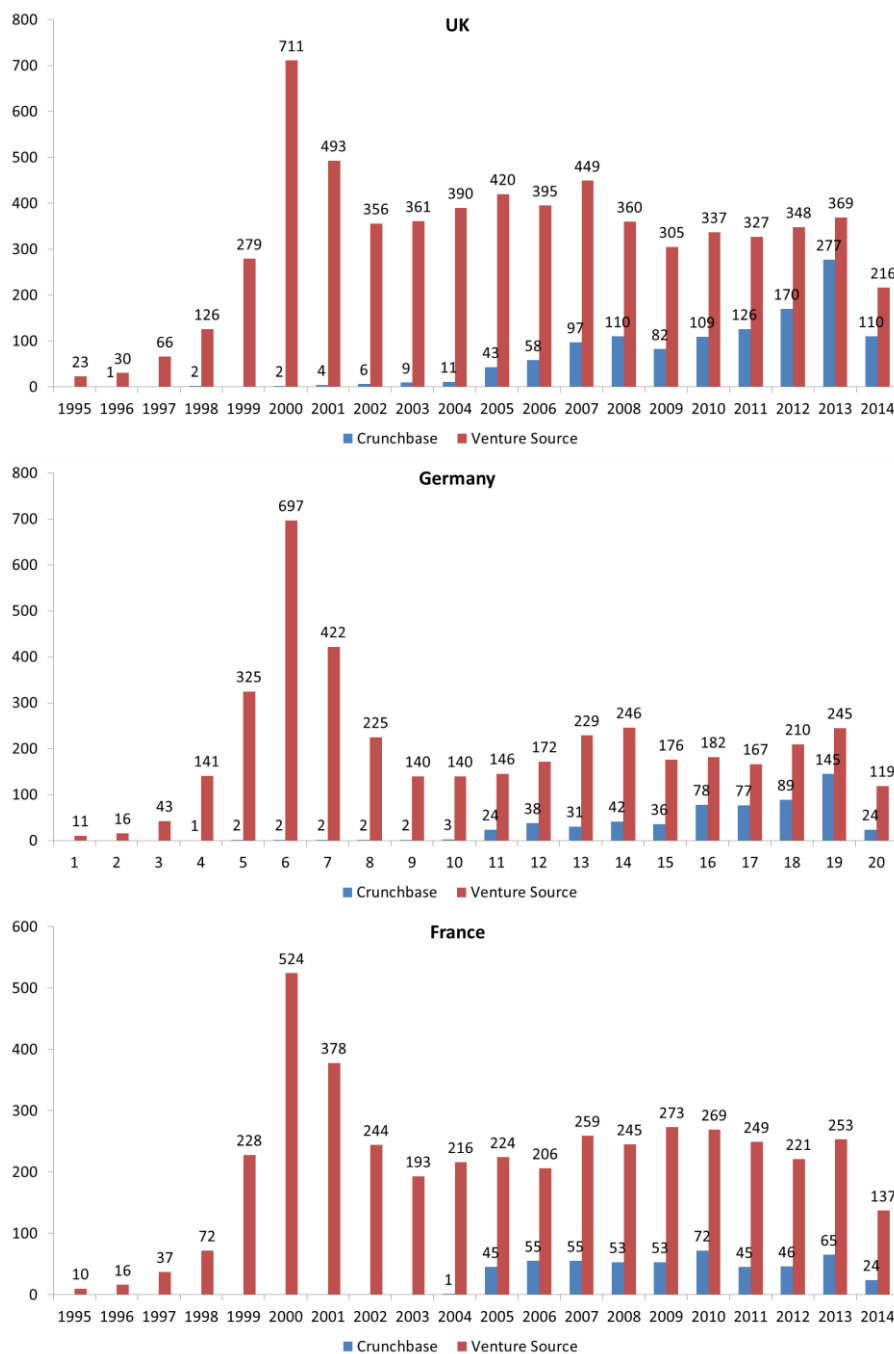
**First Round, Second Round:** This ordinal nomenclature is used to describe most venture rounds. Companies often refer to funding rounds as "first," "second," "third," etc. even though the legal term for the transaction as stated in closing documents and amendments to the documents of incorporation may refer to them as series A preferred, series B common, etc. This type of financing is provided to companies for product development and initial marketing. Companies may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially.

**Later Stage: 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, Later:** Venture Source classifies all equity rounds subsequent to the second round as later rounds. Later stage financing is provided for the expansion of an operating company, which may or may not be breaking even or trading profitably. Later stage venture financing tends to be put into companies that are already backed by VCs, and therefore they would be C or D rounds of financing.

**Restart:** Rest, r1st, r2nd, r3rd, r4th, Recap, rMezz, rSeed, rLater: A restart round requires a judgement by the research team, unless the company itself characterizes the funding round as restart funding. Generally, a restart round is characterized by a significantly reduced valuation causing significant dilution, which serves to "wash out" existing investors who do not participate in the restart round. Often a restart is

accompanied by a change in business direction or a dramatic shift in marketing strategy. The business status of a company that has completed a restart round is also "Restart."

**Figure 89: Comparison of Venture Source, 1995-2014**



Note: The graphs show a comparison between Venture Source and Crunchbase. It includes the count of VC-backed companies the UK, Germany and France over the period between 1995 and 2014, as reported by both data sources. The following types of deals were considered: "seed" and "venture" (Crunchbase) "seed", "1st", "2nd" and "later stage" (Venture Source). Data used in the comparison were extracted in 2014.

Calculations: JRC-IPTS

Data: [Venture Source](#) by [Dow Jones](#) and [Crunchbase](#).

### 5.3 Company's sector of activity

The Dow Jones Venture Source database uses its own sector definition, which does not correspond to, for example, the NACE classification. Based on their activities, companies are assigned to one of four industries. Table 1 describes the details of the Dow Jones Venture Source industry classification.

**Table 1: Industry Definitions by Venture Source**

Industry Code Definitions	Sub-sectors
Information Technology	Communications and Networking Electronics and Computer Hardware Semiconductors Software Information Services Other Information Technology
Business, Consumer and Retail	Retailers Consumer and Business Products Consumer and Business Services Other Retail and Consumer
Healthcare	Healthcare Services Medical Information Systems Biopharmaceuticals Medical Devices and Equipment Other Healthcare
Other	Advanced Specialty Materials and Chemicals Agriculture Energy Environmental Other companies

### 5.4 Technological Specialisation

To characterise the extent of specialisation in a technological field, the current study uses the Revealed Symmetric Comparative Advantage (RSCA) index. The RSCA is derived from the Revealed Comparative Advantage (RCA) index, the Balassa measure of specialisation (Balassa, 1965). Original RCA values are computed for all the European start-up hotspots. RCA represents a city's share of all VC-backed companies in a technological field, relative to its share of all VC-backed companies in all fields. In a formal way, the RCA index can be expressed as:

$$RCA_{ij} = \frac{T_{ij} / \sum_i T_{ij}}{\sum_j T_{ij} / \sum_{ij} T_{ij}}, \quad (1)$$

where  $T_{ij}$  denotes the number of VC-backed companies of a start-up hotspot  $i$  in the technological sector  $j$ .

The original value of the RCA index ranges from 1 to infinity for sectors in which a location reveals comparative advantage, but only from zero to 1 for comparative disadvantage sectors. Hence, in order to facilitate comparisons, the values of the index were normalised on a scale between -1 and 1 to produce the Revealed Symmetric Comparative Advantage (RSCA) (RSCA) index (Laursen, 1998). In a formal way, this can be expressed as:

$$RSCA_{ij} = \frac{RCA_{ij} - 1}{RCA_{ij} + 1}. \quad (2)$$

The interpretation of the RSCA index remains similar to the standard RCA measure except that the critical value is 0 instead of 1 and the lower (-1) and upper (+1) bounds are now symmetric.

## 5.5 Geographical coverage and spatial unit of observation

The data presented in the current report covers the following European countries:

Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, the United Kingdom.

Regarding the level of observation, the original dataset uses "city" as geographical information on the location of R&D centres. However, the term "city" is defined in a number of ways and this type of classification poses analytical problems concerning the comparability between various units of analysis (Matthiessen, Schwarz, & Find, 2002; Nepelski & De Prato, 2015). This is clearly illustrated by, for example, London and Copenhagen, two European capital cities. While the first one has over 13 million inhabitants, the latter has only 1.2 million. Another important point concerning the level of analysis is the fact that by adopting a city perspective, we overlook its spatial context. This again is very visible in the case of Palo Alto, a small city located in the centre of Silicon Valley, the world's hub of ICT activity.

In order to overcome the problem of comparability of distinct territorial units, we aggregate neighbouring cities into Functional Urban Areas (FUA). This is done by using the method of defining FUAs developed at the OECD (OECD, 2013). This methodology is applied to 29 OECD countries and lists 1,179 FUAs of different sizes. If a city is not part of a FUA because, for example, the country in which it is located was not covered by the FUA exercise or there is no match with the list of FUAs, it remains in the database as an independent unit.



## List of abbreviations and definitions

**The European start-up hotspots:** Top 20 European cities by the number of VC-backed companies.

**FUA (Functional Urban Area):** Each city is part of its own commuting zone or a polycentric commuting zone covering multiple cities. These commuting zones are significant, especially for larger cities. The cities and commuting zones together form Functional Urban Areas.

**RCA:** Revealed Comparative Advantage is a measure of technological specialisation. If  $RCA < 1$  or  $RCA > 1$ , the country or the city is said to have a comparative disadvantage or advantage in the industry.

**RSCA:** Revealed Symmetric Comparative Advantage is derived from the RCA index. To facilitate comparisons, the values of the RCA index were normalised on a scale between -1 and 1. If  $-1 < RSCA < 0$  or  $0 < RSCA < 1$ , the country or the city is said to have a comparative disadvantage or advantage in the industry.

### **Venture Capital funding rounds:**

**Seed Round:** Seed rounds are initial rounds invested in companies at very early stages of development. It is financing provided to research, assess and develop an initial concept before a business has reached the start-up phase. Typically the founders and product developers such as engineers or molecular biologists are on board, but without a complete management team in place. Most seed rounds do not exceed \$2.5 million in amount raised.

**First Round, Second Round:** This ordinal nomenclature is used to describe most venture rounds. Companies often refer to funding rounds as "first," "second," "third," etc. even though the legal term for the transaction as stated in closing documents and amendments to the documents of incorporation may refer to them as series A preferred, series B common, etc. This type of financing is provided to companies for product development and initial marketing. Companies may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially.

**Later Stage:** 3rd, 4th, 5th, 6th, 7th, 8th, 9th, Later: Venture Source classifies all equity rounds subsequent to the second round as later rounds. Later stage financing is provided for the expansion of an operating company, which may or may not be breaking even or trading profitably. A later stage venture tends to be financing into companies already backed by VCs, therefore they would be C or D rounds of funding.

**Venture Source:** Venture Capital database by Dow Jones.

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