Chasing the Tale of the Unicorn
- A study of Sweden's misty meadows

Albin Skog
Mats Lewan
Michael Karlström
Sergey Morgulis-Yakushev
Yixin Lu
Robin Teigland

STOCKHOLM SCHOOL OF ECONOMICS

CENTER FOR STRATEGY AND COMPETITIVENESS

iiS

Chasing the Tale of the Unicorn
- A study of Sweden's misty meadows

Albin Skog
Mats Lewan
Michael Karlström
Sergey Morgulis-Yakushev
Yixin Lu
Robin Teigland

Table of contents

Part III

Appendices

Foreword

This is the first report from the three-year project, *The Innovative Internet,* which is funded by the Internet Foundation in Sweden (IIS - Internetstiftelsen i Sverige) and for which we are very grateful. In this project our primary objective is to examine how the Internet and digitalization have influenced entrepreneurship and innovation in Sweden.

Since this is the first report in a larger project, we would like to point out that the results we show here should not be seen as final but rather as the starting point of a more extensive study of a highly dynamic phenomenon. In the future, more is most definitely to come. Indeed, what you will find here is more descriptive material as our next step will be to continue with our analysis, for example by extending our research net from Stockholm to other cities within Sweden, such as Gothenburg, Linköping, Malmö, Umeå, Uppsala, and Västerås, as we move our focus from unicorns to a broader set of high technology startups.

We welcome feedback on the report of any kind as we believe that transparency and cooperation outside our research team are key to ensuring that our research is as thorough as possible. Furthermore, if you think you could help us in anyway, please do not hesitate to contact us so we could discuss a possible cooperation. If you like the report, we would be more than happy if you could help us to spread it so that as many as possible can access the results if they are interested.

We hope you will find the report interesting and that you will enjoy the read!

Executive summary

Sweden, and in particular its capital city of Stockholm, is remarkably competitive in the IT-sector. This is especially true when looking at the amount of highly valued startups that Stockholm has produced during the last few years. When counting the number of "unicorns", i.e., high-tech startup companies that achieve a valuation of at least USD 1 billion within 10 years, Stockholm stands out as the city with the most unicorns per capita in the world and as a region second only to Silicon Valley. This is one reason why Stockholm in the international press has been called the "unicorn capital of the world".

How did Sweden arrive at this position? Indeed if one were to look at Sweden in the early 1990s, quite a different story would be painted. At this time, the country experienced a deep banking crisis, in which the GDP dropped by a total of 6% between the summers of 1990 and 1993 and unemployment quadrupled from 3 to 12% of the labor force while the public sector deficit worsened to as much as 12% of GDP. There were numerous bankruptcies, and the words startup, entrepreneur, and venture capital were rarely used in the vocabulary of Stockholm's business circles and in the media.

This report explores the roots of this success and takes us on an initial journey through the technological developments from the 1980s to today and through the first and second waves of IT startups in the country. While the Swedish ecosystem is quite fertile, providing access to valuable resources such as venture capital, human capital, and technology, Sweden does not stand out, however, in any of these aspects. Instead we propose that it is the convergence of a number of different factors over time that has created Sweden's exceptionally fertile breeding ground. These include factors such as an enabling business climate fueled by the highly connected informal and formal social networks among entrepreneurs, experienced business people, politicians,

and university researchers, especially in Stockholm, that has its base in a long history of multinational, engineering-based firms and in the 1990s IT boom and bust as well as longsighted public initiatives and supportive government policies, such as the highly developed and continuously maintained technical infrastructure that enabled the early adoption, development and spread of information technology (IT) in Sweden. In this initial report, we take a closer look at these factors.

First, we present a section that describes in detail the development of IT and the Internet in Sweden from the 1980s until today. Among the things the report emphasizes within this section is the state subsidy for home computers, the "hem-pc-reformen", and Stockholm city's investment in dark-fiber under the name of Stokab. We further focus on how various private and public actors promoted a competitive environment by restraining potential monopoly positions.

Second, we discuss what happened in the late 1990s and early 2000s in what has been the called the IT boom and bust and how this first wave of startups have been of importance for today's situation. It is common to discuss the IT boom primarily in terms of the bubble and the following bust in which it was suggested that the 31 most notable IT-related companies listed on the Stockholm stock exchange lost over SEK 300 billion in value during the crash. However, this report shows that there is a strong connection between the IT boom and bust and the current situation. Thus while even if a lot of the companies of that time did not succeed in the long run, the experience and resources that the people gained and the networks that were created should not be underestimated in terms of their influence on today's competitiveness of Sweden's high technology sector.

Continuing on this angle of networks, we turned to the entrepreneurship literature, which has found that successful startups in fast-paced environments are those that are able to leverage their formal and informal networks to gain access to necessary resources. Startups face two challenges to success: 1) the liability of newness and 2) the liability of smallness. These liabilities occur as startups lack the necessary financial capital and knowledge as well as the legitimacy of older firms, that make it difficult for the startups to search for and acquire further resources or to develop business relationships with suppliers, customers, partners, and other actors in their ecosystem.

Thus, we initiated an investigation of the business networks of a set of fifteen startups divided into two groups: 1) four startups that have reached unicorn status: Avito, Klarna, Mojang and Spotify, and 2) eleven startups that are considered by some to have the potential to reach unicorn status:

FishBrain, FootWay, Fyndiq, iZettle, KnCMiner[1], LeoVegas, MAG Interactive, ShapeUp, Tictail, TrueSoftware and Zound. For this research, we gathered data on 17,377 individuals holding 84,568 board and leadership positions at 4,414 companies, which included our group of 15 startups and all companies connected to them through interlocking directorates and top management positions, during the period January 2007 to January 2016. An interlocking directorate occurs between two companies when the same person sits on the board of directors of these two companies, and they are of interest as an interlocking directorate indicates a formal network connection between two companies. *(It should be noted that while we have extensive data on individuals, we are primarily interested in the aggregated data at the company level and not individual data.)*

In our analysis we find that there is no one "recipe for success" in terms of the composition of the individuals holding leading positions at these 15 firms and that they become more diverse over time in terms of age and international diversity. Furthermore, we find very few direct connections between these startups, indicating a broad set of individuals involved in these companies within the startup ecosystem. However, when we expanded our investigation to include the indirect connections created by board members and top management individuals sitting together on a third company's board, we do find a more connected network with seven startups interlinked.

In addition, we examined to what degree approximately 100 influential individuals from the first wave of IT boom companies were active in this second wave. We found some direct and indirect connections indicating how a few actors can provide the necessary resources such as capital, experience, and know-how within a startup network.

Finally, we discuss some of the direct and indirect effects of Sweden's government policies in terms of encouraging an entrepreneurial and innovative climate as well as take a deeper look into the startup ecosystem of Stockholm. In Stockholm alone there are more than 22,000 technology companies, and approximately 18% of the city's workforce is employed in technology-related roles, with the most popular job being a programmer. Furthermore, 21,000 of the 43,000 employment positions in the ICT & Digital sector have been created since 2008 with a heavy concentration of companies all within a distance of around 6 km within central Stockholm.[2] This heavy concentration of companies interspersed with universities, incubators and accelerators,

---

1. After the writing of this report had been finalized, it was announced on May 27, 2016 that KnCMiner had filed for bankruptcy.

2. Sölvell, Örjan, Fohlin, Carl & Protsiv, Sergiy. *Ekosystemet ICT & Digital: kartläggning av styrkeområden i Stockholmsregionen*, Länsstyrelsen i Stockholms län, Stockholm, 2015.

venture capitalists and co-working spaces within the same area does much to facilitate informal networking within the city. One aspect highlighted by many is Stockholm's trusting, "pay-it-forward" culture characterized by serial entrepreneurs sharing their expertise and reinvesting in new firms as well as by knowledge sharing among entrepreneurs, students, foreigners, and others in informal settings or at a variety of networking events. Thus, while Stockholm is large enough to find the right multi-disciplinary skill set, it is still small enough to accommodate a highly open culture and trusting relationships that allow for deep levels of knowledge sharing and collaboration, even among competitors.

We then conclude the report with a discussion and summary of the factors we identified as leading to Sweden's "unicorn" success followed by our next steps. As mentioned, this report is the first in an ongoing study and we plan to extend our investigation beyond the 15 startups to other companies in Stockholm as well as in other cities. If you are interested in contributing or joining our project in some form or fashion, please drop us an email. And if there is anything you think we have misrepresented or failed to cover, please let us know.

Introduction

Some say we live in the age of the unicorns.

During the last few years an impressive number of Swedish companies have risen to extreme success in a short time.[3] Companies, such as Spotify, King, Mojang, Skype, and Klarna, have reached the status of a unicorn, meaning that they are technology-driven startups that within a few years of existence attain a valuation of one billion US dollars or more[4], while other startups such as Tictail, Footway, Fyndiq and iZettle are considered to have the potential to reach unicorn status. Indeed, Stockholm, the capital of Sweden, has more billion dollar-valued companies per capita than any other city in the world and as a region is second in the world only to Silicon Valley.

Figure 1. Nordic exits and exit value per country 2000-2014.
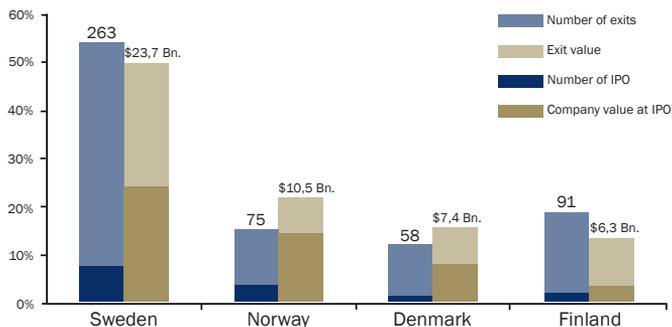
Source: Blomqvist, Daniel. 2015. Nordic tech is on fire – almost 10% of global BUSD exits over past 10 years. *Creandum.* March 16.

_____

3. How Stockholm Became a "Unicorn factory". 2015. *Knowledge@Wharton. Wharton University of Pennsylvania.* November 9. http://knowledge.wharton.upenn.edu/article/how-stockholm-became-a-unicorn-factory/ (Accessed 2016-03-30).

4. Unicorn is a buzzword and as such the definition varies with whom you ask. Our definition is the following: "A technology-based startup that attains a valuation of at least one billion USD within 10 years of founding and that has not been acquired by another company."

Furthermore, Sweden, with fewer than 10 million inhabitants, had 263 exits at a total value of $23.7 billion from 2000 to 2014 (figure 1).[5]

Additionally, Sweden represents more than 50% of all exits and exit value in the Nordics during the past 10 years. On a global scale, 10% of all USD billion tech exits worldwide from 2004 to 2014 were from the Nordics, trailing behind only the USA and China - quite remarkable considering that the Nordics account for only 2% of global GDP.[6] Indeed, the Nordics have the highest ratio of exit value to GDP – 4.5%, compared to that 3.0% in the USA or 0.3% in the Rest of EU as indicated in figure 2.[7]

Figure 2. Nordic exits and exit value per region 2000-2014.
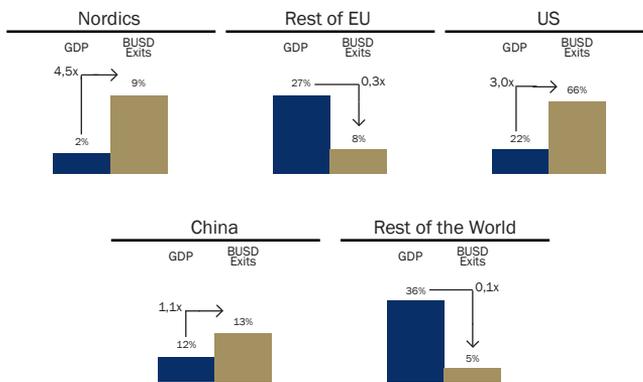
Source: Blomqvist, Daniel. 2015. Nordic tech is on fire – almost 10% of global BUSD exits over past 10 years. *Creandum*. March 16.

The flow of capital into the region has not abated in 2014 and 2015 as Swedish companies received USD 788 million of venture and growth capital, excluding private equity deals, in 2014[8], and nearly USD 960 million were invested in Sweden's tech sector during the first nine months of 2015.[9] Looking forward it will be interesting to see whether this high level of investment activity can be sustained. In the final quarter of 2015, there was already some indication that global VC investments were slowing down as the num-

5. Blomqvist, Daniel. 2015. Nordic tech is on fire – almost 10% of global BUSD exits over past 10 years. *Creandum*. March 16. http://www.creandum.com/nordic-tech-is-on-fire-almost-10-of-all-busd-exits-last-10-years (Accessed 1016-03-30).

6. Ibid.

7. Ibid.

8. How Stockholm Became a "Unicorn factory". 2015. *Knowledge@Wharton. Wharton University of Pennsylvania.*. November 9. http://knowledge.wharton.upenn.edu/article/how-stockholm-became-a-unicorn-factory/ (Accessed 2016-03-30).

9. Lundell, Stefan. 2015. 2015 sees record breaking venture capital rain on Swedish tech companies. *Swedish Startup Space*. October 8. http://swedishstartupspace.com/2015/10/08/vcs-make-it-rain-on-swedish-tech-companies-records-will-be-broken-this-year/ (Accessed 2016-03-30).

ber of deals fell to a quarterly level not seen since the beginning of 2013.[10]

Within the Nordics, the majority of the startup activity occurs in Stockholm, and a study by GP Bullhound found that six of a total of 40 European Unicorns founded 2000 or later were from Stockholm (Avito, Skype, King, Klarna, Mojang, and Spotify) while the other capital cities of Helsinki and Copenhagen each had one (Supercell and Zendesk, respectively) and Oslo produced none.[11] Atomico suggested that Stockholm is the second most prolific tech hub globally after Silicon Valley on a per capita basis - with 6.3 billion-dollar companies per million people compared to Silicon Valley with 8.1.[12] Furthermore, Stockholm tends to command 15% of the total foreign direct investment in the European technology sector.[13]

One of the areas that attracts considerable attention and investment in Stockholm is FinTech. From 2010 to 2014, Stockholm was the number two city in the EU, second only to London, when it comes to FinTech investments.[14] From 2011 to 2015, Stockholm attracted approximately USD 659 million in investments with fifteen FinTech deals attracting USD 266 million in investments in 2014 only, accounting for 18% of the total USD 1.5 billion FinTech investments across Europe[15] as well as 32% of Sweden's total USD 826 million[16] in investments in private companies.

It is no wonder that Sweden and its capital city of Stockholm as a fertile breeding ground have been the subject of numerous media reports of late. How did Sweden arrive at this position? Indeed if one were to look at Sweden in the early 1990s, quite a different story would be painted. At this time, the country experienced a deep banking crisis, in which GDP dropped by a total of 6% between the summers of 1990 and 1993 and unemployment quadrupled from 3 to 12% of the labor force while the public sector deficit

---

10. RIP Good Times? Venture Capital Funding, Unicorn Births, And Mega-Deals Plummet in Q4'15. 2016. *CB Insights – Blog*. January 7. https://www.cbinsights.com/blog/venture-capital-fall/ (Accessed 2016-03-30).

11. GP. Bullhound. Independent technology research- European billion dollar companies 2015: European unicorns: Do They Have Legs? 2015. http://www.gpbullhound.com/wp-content/uploads/2015/06/GP-Bullhound-Research-Billion-Dollar-Companies-2015.pdf (Accessed 1016-03-30).

12. Atomico. Billion dollar+ software companies founded since 2003. Year n.a. http://www.atomico.com/explore-d3 (Accessed 1016-03-30).

13. How Stockholm Became a "Unicorn factory". 2015. *Knowledge@Wharton. Wharton University of Pennsylvania..* November 9. http://knowledge.wharton.upenn.edu/article/how-stockholm-became-a-unicorn-factory/ (Accessed 2016-03-30).

14. Wesley-James, N., Ingram, C., Källstrand, C., & Teigland, R., Stockholm as a FinTech Hub, Stockholm Business Region, June 2015.

15. Skan et al. 2015, The Future of FinTech and Banking: Digitally Disrupted or Reimagined?, *Accenture Report*,

16. RIP Good Times? Venture Capital Funding, Unicorn Births, And Mega-Deals Plummet in Q4'15. 2016. *CB Insights – Blog*. January 7. https://www.cbinsights.com/blog/venture-capital-fall/ (Accessed 2016-03-30).

worsened to as much as 12% of GDP.[17] There were numerous bankruptcies, and the words entrepreneur, startup, and venture capital were rarely used in the vocabulary of Stockholm's business circles or in the media. Here, in the introduction, we will present the background that is important to understand before moving further in the report.

A long history of multinational, engineering-based firms

Sweden boasts a long history of numerous multinational success stories. On the one hand, Sweden was home to Alfred Nobel who established the Nobel Prizes - perhaps the world's most prestigious awards inspiring innovation, while on the other hand Sweden has produced multinational companies in a wide variety of industries from mining, steel, pulp & paper, and industrial machinery to consumer products such as clothing and home appliances. Multinationals such as Ericsson and Atlas Copco date as far back as the 1870s and more recent success stories include IKEA and H&M that were founded in the 1940s. Regardless of the industry, the tendency for Swedish multinationals has been to pursue global strategies in order to exploit technologies developed at home.[18] These multinationals have invested significantly in in-house R&D as well as at universities through the years, and together with funding from the Swedish government and other sources have led Sweden to be a global leader in terms of R&D investment. Indeed Sweden today invests around 3.4% of its GDP in R&D, compared with the EU-wide target of 3% in 2020, and the country has one of the highest expenditures in R&D per capita in the world, with around 17% of research funding coming from private funds, nonprofits, and companies, which is comparable to the US and higher than that of many EU countries.[19] [20]

What were the reasons for the innovative success of Sweden's first multinationals? A study in the late 1980s by Professors Örjan Sölvell and Ivo Zander proposed that Sweden's industrial environment was characterized by strong industry clusters of firms that located their core activities in a supportive home base while tapping into additional resources outside the coun-

17. Bäckström, Urban. What lessons Can Be Learned from Recent Financial Crises? The Swedish Experience. Remarks by Mr. Urban Bäckström, Governor of Sveriges Riksbank, at the Federal Reserve Symposium "Maintaining Financial Stability in a Global Economy", Jackson Hole, Wyoming, USA August 29, 1997. http://www.riksbank.se/pagefolders/1722/970829e.pdf (Accessed 2016-03-30).

18. Sölvell, Örjan, Zander, Ivo & Porter, Michael E., Advantage Sweden, Norstedt, Stockholm, 1991.

19. Vetenskapsrådet. The Swedish system of research funding. 2015. http://www.vr.se/inenglish/researchfunding/applyforgrants/theswedishsystemofresearchfunding.4.aad30e310ab cb9735780007228.html (Accessed 2016-03-30).

20. Mitzner, Dennis. 2016. Sweden Is A Tech Superstar From The North. 26 January. *Tech Crunch. Crunch Network.*. http://techcrunch.com/2016/01/26/sweden-is-a-tech-superstar-from-the-north/ (Accessed 2016-03-30).

try through their global operations.[21] First, the home base facilitated innovation as it provided the necessary specialized inputs such as highly skilled labor, specialized machinery and a research infrastructure and sophisticated demand while encouraging knowledge spill-overs due to advanced suppliers and related industries along with a high level of domestic rivalry not only in price competition but also in terms of quality and service. Furthermore, within these clusters, dense formal and informal networks between firms and their buyers, suppliers, other firms in related industries and even their competitors enabled knowledge flows and promoted innovation and continuous upgrading.[22]

A strong engineering background encouraged a focus on problem solving through collaboration, a collaboration that was supported through informal networks as many knew each other from university, having studied together at universities such as the Royal Institute of Technology. Finally, global operations in which products and services developed in Sweden were sold through the multinational's foreign operations and at times modified for local conditions led to international sales often accounting for the vast majority of the multinational's total sales. These operations enabled not only access to additional resources but also the development of an international orientation among managers across the organization as well as skills in orchestrating a variety of foreign activities and the ability to manage risks due to shifting geopolitical and market conditions.

Moving forward, this same study by Sölvell and Zander questioned the degree to which Sweden would be capable of making the transition from raw-material intensive industries and "mature" industries to newer technologies as well as continuing to encourage innovation at home. The authors countered the first point by arguing that Swedish firms were committed to their industries, preferring not to "escape" industry crises through diversification, such as in the USA, but to remain committed to their industry and to survive through upgrading their products by innovating around difficulties, investing in automation and mechanization, and seeking new product niches. In this manner, they argued, Swedish firms would develop new methods, products, systems and even new industries by building on existing strengths as opposed to shifting resources to new and unrelated industries for which they had no competence.

However, a more troubling issue at the time was the second point related to encouraging innovation at home. Up to the 1990s there had been a cartelization of Swedish industry in which large firms acquired domestic

---

21. Sölvell, Örjan, Zander, Ivo & Porter, Michael E., *Advantage Sweden*, Norstedt, Stockholm, 1991.
22. Sölvell, Örjan, Zander, Ivo & Porter, Michael E., *Advantage Sweden*, Norstedt, Stockholm, 1991.

rivals and their spinoffs with the government supporting the development of economies of scale through large domestic markets and reduced competition, thereby suppressing innovation. Indeed in the late 1980s, the Swedish institutional environment stifled entrepreneurship due to employment laws restricting small firm growth, personal and corporate taxes favoring larger firms, and limited access to startup capital due to a lack of venture capital markets, a business angel culture, and government programs and soft loans.

Thus, while Sweden's history of successful multinationals has led to some factors that can explain today's unicorn boom, such as an underlying climate that encourages continuous innovation and a driving interest in improvement, a guiding principle that a product or service is not to be developed for the home market of Sweden but for the global marketplace, and an international orientation and skill set among Swedish managers and even trade unions, the same home environment that produced these multinationals did little to promote the level of entrepreneurship the country experienced in the first wave of Internet startups and that we continue to see growing today. We examine this below.

From engineering multinationals to high technology startups

In this report, we explore Sweden's story from the first early steps or wave of Internet-related activity in the country in the 1990s, through its popularization and the IT boom and bust in the late 1990s and early 2000s, up until the recent developments of today or what could be seen as the second wave of Sweden's Internet boom. While the main focus in this report is the unicorn-boom we are experiencing today, as we move forward with our study we will continue to develop a broader approach to explore how the Internet and digitalization relate to entrepreneurship and innovation as a whole in Sweden.

Throughout our story, we have taken a special interest in social networks by highlighting the individuals who have played an instrumental role in some way in either the development of the technology or of a startup as well as the networks of these individuals and their startups. We have chosen to take such a social network perspective as there is considerable evidence that one of the critical success factors for startups is the degree to which the startup leverages its external networks, and in particular those networks that are within its region.[23] Today's highly competitive environment is characterized by a rapidly increasing pace of innovation and shrinking product lifecycles,

---

23. Lechner, Christian, and Michael Dowling, 'Firm Networks: External Relationships as Sources for the Growth and Competitiveness of Entrepreneurial Firms', *Entrepreneurship & Regional Development*, 15 (2003), 1–26.

the need for integration across a high diversity of exponential technologies, and rising levels of competition from a stream of new competitors crossing not only geographical but industrial borders as well, further fueled by falling barriers to entry due to factors such as the cloud and falling IT startup costs.

Startups face considerable challenges to success in this fast-paced environment due to two primary factors: 1) the liability of newness[24] and 2) the liability of smallness[25]. These liabilities occur as startups lack the necessary resources such as financial capital and knowledge as well as the legitimacy of older firms that make it difficult for the startups to search for and acquire resources or to develop business relationships with suppliers, customers, partners, and other actors in their ecosystem. Research shows that those startups that are able to leverage their external networks, especially those within their region, tend to achieve greater growth rates, as measured by revenues.

In our story below, we present three parts that we find important to highlight in our quest to understand Sweden's unicorn success. First, we begin by describing how the *Technology* developed and penetrated Sweden's society. In particular, we are interested in the technological advancements and innovations and how they constructed the bases for and/or are a result of innovativeness and entrepreneurial practices. This relates to both the hardware and software advancements and innovations.

We then discuss in more detail the first wave of Internet startups in the 1990s. Here we turn to a discussion of *Money and Influence*, by taking a look at the money that was invested and earned in IT startups during the first wave of the Internet boom and which individuals were influential during this time and who benefited from these investments and their subsequent role, if any, in the second wave. In the final thread of *Networks,* we analyze the social networks of 15 unicorn and potential unicorn startups today by mapping the networks of the individuals in the leading positions of these startup. In addition to analyzing these more formal networks, we also begin our investigation of the informal networks in the Stockholm region.

In this report we take these three parts and their intertwining as a basis for understanding the recent unicorn phenomenon in Sweden. Although the threads are single entities, they are also heavily interconnected with, and heavily influenced by, each other. We hope to shine a light on the story from different angles with the help of these three perspectives. And hopefully our results will be more accessible and understandable.

If you are interested in the methodology we have used, you will find the

---

24. Stinchcombe, Arthur L. "Organizations and social structure." *Handbook of organizations* 44.2 (1965): 142-193.
25. Baum, Joel AC, and Helaine J. Korn. "Competitive dynamics of interfirm rivalry." *Academy of Management journal* 39.2 (1996): 255-291.

methodology section in the end of the report. One final note, as noted above, is that this report is only the first step in our study so we welcome any feedback or comments you may have.

Part I

1. The first steps

The Internet reached Sweden in the early 1980s. In April 1983, computer engineer Björn Eriksen employed at Enea Data received what is sometimes referred to as the first email sent to Sweden via the Internet. In 1986, Eriksen also registered the Swedish top domain, .se, that he managed personally for over ten years.

The first direct Internet connection was established in 1988 when the Swedish University Computer Network, SUNET, was connected to Princeton University via the Nordic University Network, Nordunet. The connection supported a total bitrate of 56 kilobit/s. As a reference, today a fiber-based household broadband connection has more than a thousand times higher bitrate than this first connection, and Nordunet's total connectivity to the Internet has almost half a million times higher bitrate than in 1988.

The choice of the Internet protocol, IP, for communication in Nordunet, was not evident at this time since other established protocols were competing. Early Internet applications were mainly e-mail, FTP (file transfer protocol) and discussion groups or newsgroups—Usenet. It was first in 1990 that Tim Berners-Lee and his team at CERN developed the tools necessary for the World Wide Web, www—the application protocol http, the markup language html, the first web server and the first web browser. In December Berners-Lee published the world's first web page.

According to the Swedish Internet pioneer, Patrik Fältström, those who primarily took advantage of communication via the Internet were physicists who needed the connection to send large datasets to computer centers for processing for example from the space observatory in Onsala, Sweden. [26]

Commercial activities were not initially allowed on SUNET, but in 1991, Swedish companies obtained access to the Internet through the first Swedish

---

26. Fältström, Patrik; Head of Research and Development at Netnod. Interview 2016-02-04

commercial Internet service provider Swipnet, a subsidiary of Comvik Skyport, later Tele2. This initiative was driven by the association Swedish Network Users' Society (SNUS), which had initially approached the Swedish telecommunications agency Televerket. Televerket, however, had declined to build an IP-based network. Later the same year, Televerket launched its own competing network, Tipnet.

Patrik Fältström considers the choice of IP as a protocol, in Nordunet, SUNET and other networks, to be of fundamental importance since it made it possible to run virtually any kind of application over the network. He argues that when the cost of communication was detached from distance, worldwide exchange of information was transformed and started involving culture, values, norms and new business models, independently of whether you had money or not.[27]

Bengt Nordström, founder and CEO of the Sweden-based international mobile network consultancy firm, Northstream, raises another perspective. He recalls that the ISDN technology, which made it possible to integrate voice and data communication over the copper-based telecom network, was developed and aggressively marketed by Ericsson and other telecom vendors in the beginning of the 1980s. Yet, no one had a good explanation at that time as to what ISDN should be used for.

Nordström points out that the answer came only with the Internet and the www in the 1990s, but that ISDN fairly quickly then turned out to have a capacity that was too poor for a good quality experience of using the www and other Internet applications.

He believes that from an innovation point of view, the fundamental shift that the introduction of the Internet brought was that network-based innovation was moved away from telecom operators and vendors to a free market, building products and services based on creativity and on a wide variety of business cases.

Nordström argues that we should be extremely grateful for this shift, and makes a point of noting that incumbent telecom operators made various efforts to maintain their monopoly position, e.g., by prohibiting phones not sold by themselves to be connected to the telephone network until the late 1990s, claiming technical reasons for such a restriction.[28]

A first step in breaking up the old telecom monopolies was the deregulation of the telecom markets. In Sweden, Televerket was divided into several parts in 1993. The regulatory role was moved to the governmental authority *Telestyrelsen*, later the Swedish Post and Telecom Authority, PTS; the broad-

27. Fältström, Patrik; Head of Research and Development at Netnod. Interview 2016-02-04
28. Nordström, Bengt; CEO and co-founder of Northstream. Interview 2016-01-27

cast networks were transferred to the state-owned company Teracom while both telecom networks and services remained tied to each other in another state-owned company, Telia.

During the late 1980s and beginning of 1990s, several propositions from political parties (e.g., Moderaterna, Folkpartiet), agencies and other organizations had highlighted the importance of separating services and networks for increased competition, but Televerket strongly opposed this model and obtained support from the Social Democrats. On two occasions, 1991 and 1992, the parliament voted against such a division of Televerket.

In a master thesis from 1999, Bertil Andersson at the Royal Institute of Technology (KTH), in Stockholm analyzes the discussions and investigations on this topic. He compares it with the analogue separation of the Swedish railway system and of the Swedish electric power system, and he concludes that the consequences of the decisions regarding Televerket were poorly examined, while there was also an important inertia in the telecommunication system due to a homogeneous system culture.

He also notes that the strong financial crisis at the time for the decisions in 1991 and 1992 reasonably made policymakers less prone to making risky decisions, particularly since Televerket provided important revenues to the state.[29]

According to Bengt G Mölleryd, Ph.D. and Senior Analyst at PTS, what seems to be politically-initiated processes often depend less on actions by policymakers and more on events that happen for other reasons. For example, he sees the poor network quality of British Telecom and a weak financial situation for the British State as important reasons for bringing private capital into the British telecom sector.

He also believes that entrepreneurs play an important role in market development through introducing new products and services and also influencing the market, e.g., Jan Stenbeck who through his company Kinnevik put significant pressure on the incumbent operator Telia to keep up with competition and to comply with regulations, e.g., regarding access to its infrastructure.[30] In the following years, the Internet then reached a wider audience.

29. Andersson, Bertil. Varför avskiljdes inte Telias nätverksamhet? Dissertation, KTH 1999, ISSN 1103-5277.
30. Mölleryd, Bengt G; Ph. D. and Senior Analyst at PTS. Interview 2016-01-26.

2. The beginning of the Internet as we know it

The first Swedish website was published by the computer association Lysator at the University of Linköping in 1993. In 1994 the Swedish Prime Minister Carl Bildt sent an email to President Bill Clinton, and the same year the Swedish tabloid *Aftonbladet* launched its website that still is one of Sweden's most visited.

Partly as a reaction to Telia's ownership of both networks and services, and partly to avoid a difficult situation in large cities such as London where some streets were constantly excavated to lay down fiber networks, the city of Stockholm founded the municipal fiber infrastructure company Stokab in 1994. That is how Anders Broberg, Chief Communications Officer at Stokab describes the background of the company, indicating Carl Cederschiöld, Mayor of Stockholm, at the time, and Mats Hulth, leader of the opposition and Mayor of Stockholm before and after Cederschiöld, as the main proponents. [31]

Following a model almost unique in the world, Stokab started building a network in Stockholm based on dark fiber, i.e., optic fibers, without any communication or laser equipment attached, inviting anyone to install equipment for activating the fibers, and investing all resulting profits in further expansion of the network. Early customers were banks that wanted controlled connections between their branches, the county healthcare administration *Landstinget*, and the city of Stockholm itself.

In the following 19 years, Stokab would invest SEK 5.4 billion in the network, resulting in benefits for the municipality, the county, businesses and end users at a value of SEK 16 billion, according to a report by the Swedish consultancy firm Acreo.[32]

31. Broberg, Anders; Chief Communications Officer at Stokab. Interview 2016-01-27.
32. M. Forzati, C. Mattsson. *Stokab, a socio-economic study*, Acreo report acr055698, Stockholm: Acreo, 2013.

In 1994 the results from the Swedish general elections were also distributed to media via e-mail for the first time. According to Patrik Fältström, who was involved in this project, this meant that all Swedish newspapers, TV and radio networks had to obtain access to email, which in turn made them invite their readers and audience to contact them via email, giving ordinary people a reason to obtain Internet access.[33]

That same year, consumers were offered Internet access through telephone modems by Swedish Algonet, which launched in 1994. Contributing to user friendliness on the Internet was the release of the first Netscape web browser in 1994, introducing on-the-fly display of text and graphics on web pages while they loaded which made the web experience more tolerable on slow dial-up connections. Developed mainly by Marc Andreessen, Netscape was now freely available for non-commercial use.

The year after, in 1995, the major Swedish discussion forum Flashback opened its website as well as the web portal Spray Network, and in 1996, Swedish *Posten* launched its web portal Torget.se and the Internet consultancy firm Icon MediaLab was founded. Maybe not incidentally, in 1996, the Swedish Trade Federation-owned consultancy firm HUI Research, declared the Christmas Gift of the Year to be an Internet connection kit.[34]

In 1997, Telia's dominant position was discussed again politically, this time with a focus on the copper-based access network—the last mile—which was proposed to be put in a separate company or at least subject to transparent and separate economic reports. The parliament chose the latter. In his thesis, Bertil Andersson concludes that while the telecom system culture was less homogeneous at this point, a political interest to strengthen Telia before an upcoming IPO and also an idea of promoting the Swedish telecom market by supporting one strong player might have influenced the decision.[35]

Also in 1997, The Internet Foundation in Sweden (IIS), which was previously called .SE, was founded through a cooperation between the Royal Institute of Technology and the aforementioned Internet pioneer, Björn Eriksen, as a non-profit organization with two major objectives. The first objective was to take over the management of the Swedish top domain .se from Björn Eriksen, initially through the subsidiary NIC-SE. The second was to support the development of Internet infrastructure in Sweden[36] through activities such as its own research and providing in-depth statistics on every aspect of Swedish Internet and computer usage. IIS also funds external re-

33. Fältström, Patrik; Head of Research and Development at Netnod. Interview 2016-02-04

34. HUI Research. Årets julklapp. http://www.hui.se/arets-julklapp (Accessed 2016-02-08).

35. Andersson, Bertil. Varför avskiljdes inte Telias nätverksamhet? Dissertation, KTH 1999, ISSN 1103-5277.

36. IIS. Historik. https://www.iis.se/om/historik/ (Accessed 2016.04.10).

search connected to its field of interest, such as this report.

Arguably, one of the most important events in 1997 from an Internet point of view was the political decision on the Home PC reform. The reform, which became effective 1998, made it possible for employees to rent a personal computer at favorable conditions, paying for the rent with a deduction on the salary before tax. After an agreed period, often three years, the computer could be bought at a second-hand market rate.

3. The Internet becoming accessible for a wider public

Between January 1998 and December 2001, 850,000 Home PCs were delivered. Of these, 100,000 replaced earlier Home PCs, while 375,000 went to households already owning a personal computer. Thus 375,000 households received their first computer through the reform. Counting all households, maybe one million individuals obtained their first computer, or around 11% of the Swedish population at that time.

The cost of the Home PC reform during these years turned out to be higher than expected—about SEK 3.9 billion in lost tax revenues. It also favored people with high income rather than those with a low income, employed rather than retired, and those with good health rather than sick people, meaning that those who were already largely excluded from the new opportunities that Internet technology brought were not helped by the reform.

On the other hand, it could be argued that the money required to implement the reform should not be seen as a cost but as an investment, just as any investment in computer technology made by private companies and other organizations.[37]

The advantageous conditions of the Home PC reform were reduced in 2007 through benefit taxation. Until then 2.2 million Home PCs had been delivered, but at that point the reform was not considered to contribute effectively to increasing computer penetration in Sweden any longer, and was mostly requested by companies making a profit on selling the Home PCs through different agreements. Overall, however, it is probable that the reform increased IT maturity in Sweden since Sweden later was top ranked as an IT country, together with countries such as Denmark and Norway that

---

37. 4 miljarder notan för hem-pc-reformen. *Computer Sweden, IDG*. 2002-08-02. http://computersweden.idg.se/2.2683/1.40813/4-miljarder-notan-for-hem-pc-reformen (Accessed 2016-02-08).

also had implemented similar programs.[38]

In 1998, Google was founded and soon outpaced the search engine Altavista, established in 1995, which in turn had outpaced search engines and portals such as Lycos, Infoseek, Webcrawler, and to some extent Yahoo. Google's innovation was to add information on links to the indexing/retrieval algorithms, which made them significantly more effective.

An important event from a digitization and Internet perspective was the launch of the file sharing system Napster in June 1999. File sharing was not new—it was a natural part of people's interest to exchange information, originally using removable media.

Napster, however, is considered to be the first peer-to-peer file sharing system, meaning that users could announce what files they had on their computers and share files with people whom they did not know, without storing the files on an intermediate location.

Maybe P2P file sharing, more than anything else before, made evident the fact that the marginal cost of copying digital content was almost zero, thereby disrupting earlier prospering business models, the music industry being the first to be affected.

Copying and sharing music files without the consent of the rights holder was and still is illegal, but this did not change the innovative impact that the digital technology would have on business models.

Napster faced litigation, and this might have encouraged technical innovation—Napster required a central server for file indexing and peer discovery. Later file sharing systems, such as Gnutella, eDonkey2000, Freenet and Limewire released in 2000, and Kazaa, Poisoned and Bittorrent in 2001, were distributed, meaning that no central server was required. Some of them also included anonymity and encryption.

Early uptake of music file sharing seems to have been stronger in Sweden than globally, concluding from the decline in revenue from sales of registered music. Globally, the revenue decreased by about 20% from 1999 to 2004[39], while the corresponding value in Sweden was about 35%.[40]

Possibly an early uptake of file sharing combined with early computer and Internet penetration in Sweden laid the foundation for innovation of ser-

38. Ilijason , Robert. Hem-pc:n på väg ut – så klarar du dig. *Computer Sweden, IDG*. 2007-08-21. www.idg.se/2.1085/1.98978 (Accessed 2016-02-08).

39. McDuling, John. Meet Charles Caldas, the Aussie who took on Apple with Taylor Swift. *The Sydney Morning Herald*. 2015-10-23. http://www.smh.com.au/business/media-and-marketing/the-aussie-who-stared-down-apple-and-won-20151020-gkeb23.html (Accessed 2016-02-08).

40. Larsson, Markus. Förhållandet mellan CD-försäljning, digital musikförsäljning, framföranderättigheter, privatkopieringsersättning och konsertintäkter. Dissertation, KTH, 2009.

https://www.nada.kth.se/utbildning/grukth/exjobb/rapportlistor/2009/rapporter09/larsson_markus_09065.pdf

vices such as Spotify, as is sometimes claimed.

Blogging was another Internet application that increased significantly at the end of the 1990s, with the term 'weblog' coined in 1997. It started many years earlier, but tools making it easy to update the blog without html editing—e.g., Blogger, Pitas—were launched in 1999, strengthening the uptake.

Much attention to Internet services in the late 1990s was focused on 'dot-com' companies, trying to figure out the new business models that digital technology both required and made possible.

Many of them failed after the 'dot-com bubble' bust in 2000, one of the most well-known being Swedish online commerce company Boo.com. From a technological point of view, many of the tools for creating an attractive web shop online were already available. The problem, specifically in the case of Boo.com, was that such features made the websites much too heavy to load for most customers who normally still relied on dial-up Internet connections.

Another Swedish dot-com company was Bredbandsbolaget, founded in 1998, offering fixed broadband connections. In 1999, co-founder Jonas Birgersson obtained a framework agreement with the cooperative housing association HSB, involving 350,000 households. Telia immediately announced plans to invest SEK 1.4 billion in broadband access networks.[41]

Bredbandsbolaget was among those dot-com companies that survived and were fairly successful after the bust, suggesting that modern digital infrastructure offered an early viable business case. Another company that went well was the auction site Tradera, maybe indicating industries where the conditions to develop successful digital business models were already present.

41. Ericsson, AnnCharlotte. Nu blir det strid om nätsurfarna. *Aftonbladet*. 1999-08-27. http://wwwc. aftonbladet.se/nyheter/9908/27/bredband.html (Accessed 2016-02-08).

4. The inception of the IT-bubble

The IT boom or dot-com bubble as it is also called, started to expand aggressively around 1997, before it reached its peak in 2000. "The New Economy" became a widespread term used to describe the new economic conditions, which were considered to have arisen in the wake of Internet penetration.[42] In "The New Economy", rapid growth and global expansion was the name of the game, and profitability was considered less important.

The IPO of Netscape in August 1995 is often considered the starting point for the bubble.[43] The share price had been set to be offered at US$14, but a last-minute decision doubled the initial offering to US$28 per share. During the first day of trading, Netscape's stock value soared to US$75.[44] At the end of the day Netscape was worth two billion US dollars in the stock market, although most of the users never had paid for the company's only product - the Navigator browser.[45] The Swedish journalist and author Björn Elmbrant, remembers how exaggerated expectations of future profits became the driving force of company valuations during the heydays of the IT boom.[46] To exemplify this, Elmbrant refers to an article written in 1999 by Björn Wilke who estimated that the seven biggest IT-consulting companies in Sweden needed to hire 42,000 new employees to defend their valuations.

In the radio documentary "IT-bubblan" (in English "the IT bubble"),

42. Den Nya Ekonomin. *Wikipedia*. 2013. https://sv.wikipedia.org/wiki/Den_nya_ekonomin (Accessed 2016-02-05).

43. Dotcombubblan. *IDG.se IT-ord*. nd. http://it-ord.idg.se/ord/dotcombubblan/ (Accessed 2016-02-24); IT-bubblan. *Internetmuseum.se*. nd. http://www.internetmuseum.se/tidslinjen/it-bubblan/ (Accessed 2016-02-24); Berg, Anton. *P3 Dokumentär - IT-bubblan* [Radio]. Stockholm: Sveriges Radio. 2007. http://sverigesradio.se/sida/avsnitt/93814?programid=2519. 35-39 min.

44. Netscape. Wikipedia. 2016. https://en.wikipedia.org/wiki/Netscape (Accessed 2016-02-24)

45. Dotcombubblan. *IDG.se IT-ord*. nd. http://it-ord.idg.se/ord/dotcombubblan/ (Accessed 2016-02-24).

46. Berg, Anton. *P3 Dokumentär - IT-bubblan* [Radio]. Stockholm: Sveriges Radio. 2007. http://sverigesradio.se/sida/avsnitt/93814?programid=2519. 35-39 min.

Elmbrant mentions Icon Medialab, an IT-consulting company that was valued at SEK 4.9 billion, while making a loss of SEK 299 million. Together with Framfab, Icon Medialab is often used as a Swedish example of how the valuations were founded on expectations rather than substance, and how the valuations plummeted when the bubble bust. These IT-consulting companies and their founders, Johan Staël von Holstein (Icon Medialab) and Jonas Birgersson (Framfab) became symbols of this time. Staël von Holstein and Birgersson were not the sole founders, but they were the front figures, frequently talking in the media about how the Internet would change the world. Birgersson was often referred to as "Broadband Jesus" by journalists, to name just one example of how these icons were presented by the media.[47]

Spray, Cell Networks, Wineasy and HiQ are other noteworthy IT-consulting companies that were founded during the inception of the IT boom. Spray was founded in 1995 by Jonas Svensson, Johan Ihrfelt, Sebastian Knutsson, Michael Daun, Gunnar Lindberg Årneby and Patrik Stymne. Spray started several Internet ventures in parallel with the company's consulting business. These included the search engine Punkt.se and e-mail service Kurir.net, which later became Spray Mail. The Spray.se portal was launched in 1999, around the same time Spray sold its consulting business to Razorfish.[48]

Christer Sturmark founded Cell in 1996, which later became Cell Networks after the company merged with Mandator.[49, 50] Cell Networks was one of the world's largest IT-consulting companies around the millennium with more than 2000 employees. Micael Dahlén, professor at the Stockholm School of Economics, mentioned Sturmark's frequent appearances in the media as a contributing factor to the soaring valuation of the company in an interview with journalisten.se.[51] Sturmark managed to receive a lot of press, which created credibility for the company. This was essential during the new economy according to Dahlén, as the valuations primarily were based on projections with high degrees of uncertainty.

The story behind Wineasy is quite remarkable and a good example of how the new economy had opened up possibilities for aspiring entrepreneurs. Johannes Bertorp was only 17 years old when he founded Wineasy in the attic of his parents' house in the Swedish suburb, Lidingö. He offered Internet ac-

47. Nilsson, Elisabeth. Jonas Birgersson – från rollspelare till Bredbandsjesus. IIS. 2015-10-02. https://www.iis.se/blogg/jonas-birgersson-fran-rollspelare-till-bredbandsjesus/ (Accessed 2016-02-05).

48. Spray.se. *Wikipedia*. 2015. https://sv.wikipedia.org/wiki/Spray.se (Accessed 2016-02-05).

49. Rönn, Cina. *Cell och Mandator går ihop?*. Aftonbladet. 2000-02-07. http://wwwc.aftonbladet.se/nyheter/0002/07/itjatte.html (Accessed 2016-02-05).

50. Christer Sturmark. Wikipedia. 2015. https://sv.wikipedia.org/wiki/Christer_Sturmark (Accessed 2016-02-05).

51. Nilsson, Julia. *Press är guld värd för företagen*. Journalisten.se. 2000-11-22. http://www.journalisten.se/nyheter/press-ar-guld-vard-foretagen (Accessed 2016-02-05).

cess to companies and consumers for a lower price than the competition, and his business grew quickly despite the lack of a marketing budget. Later at 22 years old, Bertorp sold the company to a telecom operator and made about SEK 100 million in the deal.[52]

HiQ was founded in 1995 by Hans Karlsson, Rolf Andersson, Ken Gerhardsen and Ragnar ter Vehn,[53] and is one of the few IT-consulting companies that focused primarily on organic growth instead of acquisitions.[54] Today, the company has managed to recover from the crash and reached a revenue of SEK 1.5 billion in 2015.[55]

The opto-boom is a term used to describe the massive influx of capital directed towards companies developing fiber-optic communication technology. Altitun, founded in 1997 by five researchers at the Royal Institute of Technology in Stockholm, is one of the more famous examples. Altitun developed a tunable laser, i.e., a laser that can be set to different wavelengths. The idea was that it would become a key component of the fiber-optic broadband networks. The value of Altitun went from zero to SEK 8 billion in less than three years, making it one of the companies from the new economy with the highest valuation.[56]

Boss Media was founded by Joel Wikell in 1996 and is one of the few companies during this era that was profitable.[57] The company launched Gold Club Casino in 1997, and soon thereafter Casino.com, a casino news portal. After some time, the focus shifted towards licensing their software as a white label solution for other online casinos.[58]

Another company that qualifies for this exclusive group of profitable Internet companies from the mid-1990s is Blocket. Blocket is a platform for online classifieds founded in 1996 by Henrik Nordström and Pierre Siri.[59] Today, Blocket is owned by the Norwegian company Schibsted and has been launched in more than 40 other countries. The Swedish site is familiar to

52. Cantwell, Oisin. ”Mina pengar tar inte slut”. Aftonbladet. 2000-02-28. http://wwwc.aftonbladet.se/nyheter/0002/28/wineasy.html (Accessed 2016-02-05).

53. Lindroth, Jan. Börsbubblans största vinnare. Affärsvärlden. 2002-10-30. http://www.affarsvarlden.se/hem/nyheter/article2538053.ece (Accessed 2016-02-05).

54. HiQ. Annual Report 1999. http://feed.ne.cision.com/wpyfs/00/00/00/00/00/00/4C/C7/wkr0006.pdf (Accessed 2016-02-05), p 38.

55. HiQ. Quarterly Report 2015 (Q4). http://www.hiq.se/Global/Reports_sv/Q4%20Rapport%202015.pdf (Accessed 2016-02-05)

56. Agerman, Per., & Pineus, Isaac. ”Världen snurrade för Altituns grundare”. Affärsvärlden. 2003-10-22. http://www.nyteknik.se/nyheter/it_telekom/allmant/article232971.ece (Accessed 2016-02-05).

57. Sjöshult, Fredrik. Wikell jagas av skattmasen. Dagens Industri. 2004-01-09. http://www.di.se/artiklar/2004/1/9/wikell-jagas-av-skattmasen/ (Accessed 2016-02-05).

58. Boss Media. Wikipedia. 2015. https://en.wikipedia.org/wiki/Boss_Media (Accessed 2016-02-05).

59. Blocket.se. Wikipedia. 2016. https://sv.wikipedia.org/wiki/Blocket.se (Accessed 2016-02-05).

99% of the Swedish population and receives 5 million visitors per week.[60]

In addition to all the Internet and technology-related companies that came to life during these years, the Swedish market also experienced a large number of new venture capital (VC) firms entering the market. From 1998 to 2000, a total of 24 new Swedish VC funds were founded. This was three times more than during the substantially longer period 1983 to 1997.[61] A number of different factors could explain this trend. The Swedish government changed strategy from actively investing to facilitating growth of the Swedish VC industry. Institutions like Industrifonden and the Swedish National Pension Funds were allowed to invest in small, unlisted companies. Furthermore, the Swedish technology development also played its part as did the soaring stock market. Thus, the combination of capital and interesting projects led to a thriving Swedish VC industry.[62]

60. Blocket AB. *Om Blocket*. n.d. http://www.blocket.se/omblocket.htm (Accessed 2016-02-05).

61. Söderblom, Anna. The current state of the Venture Capital industry. In *Näringspolitiskt Forum* (2012).

62. Karlén, Åse. Affärsänglarna flockas i storstäder. *Esbri.se*. 2007-01-15. http://www.esbri.se/referat_utskrift_popup.asp?id=67 (Accessed 2016-03-09).

5. The peak and the burst of the IT-bubble

During the end of 1999 and the beginning of 2000, there was an unprecedented rise in the stock market. The valuations of IT companies skyrocketed, driven by unrealistic expectations of future growth. This period lasted until March 2001 and was then followed by a sharp and prolonged downturn that left many private investors in economic distress. If one accounts for indirect investments in the stock market (e.g., through funds), 80% of the Swedish population was exposed to the stock market during these times. Never before had so many been affected by a financial bubble.[63] Many of the most hyped companies collapsed and belong in the history books today as warning examples of how greed and speculation can turn people blind.

The Swedish financial magazine, *Affärsvärlden*, concluded that the 31 most notable IT-related companies listed on the Stockholm stock exchange lost over SEK 300 billion in value during the crash.[64] However, not everybody was hurt economically. A few individuals managed to make a fortune. One strategy that proved successful was selling the whole company to another organization. Altitun and Qeyton, both part of the "opto-boom", executed this strategy with impressive outcomes. Altitun was acquired by ADC for SEK 8 billion in 2000[65] and Qeyton was acquired by Cisco for SEK 7.3 billion in 2000. Egnell, the biggest shareholder at the time, personally made SEK 1.2 billion in the deal.[66] AU-systems (acquired by Schroeder Ventures

63. Berg, Anton. *P3 Dokumentär - IT-bubblan* [Radio]. Stockholm: Sveriges Radio. 2007. http://sverigesradio.se/sida/avsnitt/93814?programid=2519. 35-39 min.

64. Agerman, Per. 300 miljarder blev luft när IT-bubblan sprack. Affärsvärlden. 2000-10-17. http://www.affarsvarlden.se/hem/nyheter/article2565046.ece (Accessed 2016-02-24).

65. Agerman, Per., & Pineus, Isaac. "Världen snurrade för Altituns grundare". Affärsvärlden. 2003-10-22. http://www.nyteknik.se/nyheter/it_telekom/allmant/article232971.ece (Accessed 2016-02-05).

66. Karlberg, Lars Anders. *Cisco lägger ned svenska Qeyton*. Ny Teknik. 2002-10-29. http://www.nyteknik.se/nyheter/it_telekom/allmant/article227080.ece (Accessed 2016-02-24).

in 1999, who in turn sold two spin-offs from AU to Sonera in 2000)[67], Blue-tail (acquired by Alteon WebSystem for SEK 1.4 billion in 2000)[68], Sendit (acquired by Microsoft for SEK 1.1 billion in 1999)[69], E*Trade (acquired by the US E*Trade in 1999)[70], WinEasy (acquired by Tele1 Europe for SEK 150 million in 1999)[71], and Jobline (acquired by Monster for SEK 1.2 billion in 2001)[72] are a few other successful examples.

Another recipe for success was selling before the crash, or at least while the company still had a substantial value in the stock market. Several entrepreneurs became billionaires in a very short time but managed to get away with "only" a couple of tens or hundreds of million Swedish crowns. The founders of Framfab and Icon Medialab belong in this category. Birgersson, one of the founders of Framfab, had a personal wealth of SEK 2.4 billion in September 2000, according to the Swedish journalist Andreas Cervenka.[73] Bear in mind that this is about half a year after the stock market reached its peak. However, Birgersson did not sell his shares until his bank made him sell due to being overleveraged, and he is estimated to have made about SEK 76 million in the sale.[74] The Vik brothers, founders of Xcelera, had better timing with their divestment. The company's share price rose by 54,000% in a single year, making it perhaps the biggest dot-com bubble stock of the era. In March 2000, Xcelera was valued at $11.7 billion and Alexander and Gustav Vik are rumored to have made about SEK 10 billion from selling their shares.[75][76]

Others, like Jonas Svensson, one of the founders of Spray, were not as successful. Svensson, whose holdings were valued at SEK 1.3 billion during the peak, ended up with SEK 15 million in debts. According to Svensson, he

67. AU-systems. *Wikipedia*. 2013. https://sv.wikipedia.org/wiki/AU-System (Accessed 2016-02-24).

68. Blomén, Anna. "Affärsängeln bakom Klarna". Privata Affärer. 2012-08-24. http://www.privataaffarer.se/nyaaffarer/na-nyheter/affarsangeln-bakom-klarna-438925 (Accessed 2016-02-24).

69. Granlund, Fredrik. "Microsoft lägger ned Sendit". Ny Teknik. 2002-06-03. http://www.nyteknik.se/nyheter/it_telekom/allmant/article224584.ece (Accessed 2016-02-24).

70. Lindroth, Jan. *Börsbubblans största vinnare*. Affärsvärlden. 2002-10-30. http://www.affarsvarlden.se/hem/nyheter/article2538053.ece (Accessed 2016-02-05).

71. Cantwell, Oisin. "Mina pengar tar inte slut". *Aftonbladet*. 2000-02-28. http://wwwc.aftonbladet.se/nyheter/0002/28/wineasy.html (Accessed 2016-02-05).

72. "Guldregn över grundaren när Jobline blir USA-ägt". Dagens Industri. 2001-05-25. http://www.di.se/artiklar/2001/5/25/guldregn-over-grundaren-nar-jobline-blir-usa-agt/ (Accessed 2016-02-24).

73. Cervenka, Andreas. Jonas Birgersson rikare än någonsin. Affärsvärlden. 2000-09-18. http://www.affarsvarlden.se/hem/nyheter/article2564454.ece (Accessed 2016-02-24).

74. Cervenka, Andreas. De blev rika på Framfab. Affärsvärlden. 2001-05-07. http://www.affarsvarlden.se/hem/nyheter/article2534190.ece (Accessed 2016-02-24).

75. Vardi, Nathan. Alexander Vik Is The Most Interesting Man In The World (As Long As He Doesn't Owe You Money). Forbes. 2014-03-05. http://www.forbes.com/sites/nathanvardi/2014/03/05/the-riddle-of-alexander-vik/#4df667ae17e0 (Accessed 2016-02-24)

76. Lindroth, Jan. *Börsbubblans största vinnare*. Affärsvärlden. 2002-10-30. http://www.affarsvarlden.se/hem/nyheter/article2538053.ece (Accessed 2016-02-05).

was prepared for a decline in the range of 97-98%, not 99.5%.[77] The term "burn rate", which is a measure for how fast a company uses up its shareholder capital, became widespread during this era.[78] A high burn rate was a sign of high ambitions and aggressive growth, something that was promoted by investors. A low burn rate, on the other hand, was not in line with the "get big, fast" mantra that prevailed during these times. When the market started crumbling and investors demanded results, this strategy backfired as many companies burned through their bank accounts without being able to raise additional capital. However, the ones that managed to stay liquid during the crash, for example by adopting a more conservative expansion strategy or by managing to raise capital despite the tough market conditions, could fight through the hard times. Some, like Tradera, Blocket and Bredbandsbolaget came out on the other side as winners. Both Tradera (acquired by eBay in 2006)[79] and Blocket (acquired by Schibsted in 2003)[80] are two of the biggest online marketplaces in Sweden today, and Bredbandsbolaget (acquired by Telenor in 2005) is the third most popular broadband supplier in Sweden[81].

It is hard to say what caused the crash. It does not seem to be one single event but rather several drops that finally made the glass overflow. At one point, reality caught up with investors. According to Jonas Birgersson, the fundamental belief that the Internet would be important to businesses, was correct. However, to value a consulting company with 3000 employees at SEK 42 billion was unrealistic.[82] One event that signifies the end of the boom is the bankruptcy of the fashion ecommerce site Boo.com in May 2000, named "The Ultimate Dotcom Disaster" by BBC's Evan Davis[83]. Boo.com was founded by Ernst Malmsten, Kajsa Leander and Patrik Hedelin in 1998, who raised around SEK 1.4 billion in capital to execute their ambitious expansion plans.[84] The company had hundreds of employees, offices in several countries and a burn rate of $10 million per month before it filed for

77. Edling, Lotta. Spray-grundaren ångrar ingenting. Affärsvärlden. 2001-11-22. http://www.affarsvarlden.se/hem/nyheter/article2535239.ece (Accessed 2016-02-24).

78. Burn rate. *Wikipedia*. 2014. https://en.wikipedia.org/wiki/Burn_rate (Accessed 2016-02-25).

79. Tradera. *Wikipedia*. 2015. https://sv.wikipedia.org/wiki/Tradera (Accessed 2016-02-25).

80. Larsson, Johan. Ebay köper Tradera för 365 miljoner kronor. 2006-04-24. http://internetworld.idg.se/2.1006/1.54357/ebay-koper-tradera-for-365-miljoner-kronor (Accessed 2016-02-24).

81. Bredbandsbolaget. *Wikipedia*. 2015. https://sv.wikipedia.org/wiki/Bredbandsbolaget (Accessed 2016-02-25).

82. Nilsson, Elisabeth. Jonas Birgersson – från rollspelare till Bredbandsjesus. IIS. 2015-10-02. https://www.iis.se/blogg/jonas-birgersson-fran-rollspelare-till-bredbandsjesus/ (Accessed 2016-02-05).

83. Davis, Evan. *Business Nightmares: Disastrous Decisions* [Television]. London: BBC. 2011. https://www.youtube.com/watch?v=n9kgZqbCJiM (Accessed 2016-02-24).

84. Roos Svensson, Moa. *Tillbaka – som pomolog*. Dagens Industri. 2015-06-23. http://www.di.se/di/artiklar/2015/6/24/tillbaka--som-pomolog/ (Accessed 2016-02-24).

bankruptcy only six months after launch.[85] After the crash, Leander operated a small café at the train station in Malmö for some time. Now, she has retrained as a pomologist and started an apple orchard in southern Sweden.[86] This time, Leander proclaims that she will focus on organic growth.[87]

The VC industry also took a severe hit in the crash. The number of venture capital firms operating on the Swedish market was reduced by 65% from 2002 to 2000.[88] However, compared to the US market, the venture capital downturn in Sweden was rather gentle[89] and despite the crash, the VC industry was considerably bigger after the dotcom era than before.[90]

85. Davis, Evan. *Business Nightmares: Disastrous Decisions* [Television]. London: BBC. 2011. https://www.youtube.com/watch?v=n9kgZqbCJiM (Accessed 2016-02-24).

86. Roos Svensson, Moa. *Tillbaka – som pomolog*. Dagens Industri. 2015-06-23. http://www.di.se/di/artiklar/2015/6/24/tillbaka--som-pomolog/ (Accessed 2016-02-24).

87. "Då: Brände 1,4 miljarder i riskkapital Nu: Är pomolog och säljer äppeldrycker". *VA.se*. 2015-06-26 http://www.va.se/nyheter/2015/06/26/da-brande-14-miljarder-pa-boo.com.-nu-ar-pomolog-och-driver-eko-musteri/ (Accessed 2016-02-24).

88. Söderblom, Anna. The current state of the Venture Capital industry. In *Näringspolitiskt Forum* (2012).

89. Karlén, Åse. Affärsänglarna flockas i storstäder. Esbri.se. 2007-01-15. http://www.esbri.se/referat_utskrift_popup.asp?id=67 (Accessed 2016-03-09).

90. Söderblom, Anna. The current state of the Venture Capital industry. In *Näringspolitiskt Forum* (2012).

6. The early stages of broadband and mobile Internet

The collapse of the dot-com bubble in 2000 was seen by many as a failure or an end to the visions of completely new and innovative business models based on the possibilities that Internet technology provided. But in retrospect we can observe that what companies, such as Swedish Boo.com, failed to make profitable at that time was implemented with great success about a decade later by giants such as Amazon or Alibaba and by many smaller companies.

As mentioned before, the problems encountered by Boo.com depended partly on offerings directed towards an online market that did not yet exist, presented on web sites with advanced design and programming which required high speed Internet connections that were not yet widespread among consumers.

And ironically, the roll-out of high speed Internet, the focus on Internet as an important infrastructure, and the growth of the number of consumers using Internet, started for real around 2000 and accelerated in the following years.

On March 28, 2000, the Swedish government submitted the bill *An Information Society For All* (Ett informationssamhälle för alla)[91]. This was only 18 days after the peak at Nasdaq with the following decline that lasted until October 2002, with 78% of the stock value being erased.

The bill stated that IT was a priority and that Sweden, being already at the forefront within information technologies, should become the first country where the information society was accessible for everyone.

The government proposed that SEK 5.8 billion should be available for sup-

---

91. The Swedish Goverment. Ett informationssamhälle för alla. Proposition 1999/2000:86. Stockholm, 2000.

porting the deployment of an IT infrastructure, mainly through tax credits and through state aids where the market was not capable of offering Internet access at reasonable prices, e.g., in rural areas. It also proposed an investigation of how to prevent broadband providers to monopolize access networks in apartment buildings.

In connection with the bill, the government also proposed an IPO of the Swedish state-owned telecom operator, Telia.

In December the same year, 'packed switched' data communication—GPRS—was introduced by the mobile network operator Europolitan in Sweden. GPRS was a technology closely related to the way data were transferred on the Internet, and communication fees were based on the amount of data transferred. Until then, mobile data communication had only been possible through dial-up connections, meaning that a call fee was paid continuously per minute, independently of when data were sent or received.

In theory, GPRS could lower the cost for sporadic data transfer during long sessions. However, the fees were initially high—from about SEK 30 SEK to almost SEK 200 per megabyte, which corresponds to opening only the first page of an ordinary news website. Furthermore, the maximum data rates were about 30 kilobit/s, which was slower than the fastest mobile dial-up connections at that time (HSCSD).

Yet, the introduction of GPRS should be seen as an important technologic move since it was the first step towards the always-connected smart phones that people have in their pockets today.

Other Swedish mobile operators delayed their launch of GPRS to 2001 since very few handsets supporting the technology were available initially.

Also in 2000, an Internet technology that would have greater importance, ADSL, was launched in 25 Swedish cities by Telia[92]. As a parallel to GPRS in mobile networks, ADSL (the first variant of the technology family xDSL) was an alternative to dial-up connections in the fixed telephone network. More specifically, ADSL made it possible to establish an always-on connection over the copper based 'local loop' that arrived in basically every home and office, although the connection speed depended on the distance to the nearest telephone exchange (the last mile).

The speed was initially up to 0,5 megabit/s—about 30 times faster than GPRS in the mobile network—and the cost was about SEK 700 per month plus SEK 0.50 per megabyte, thus about a hundred times less per transferred amount of data compared to mobile data communication.[93]

92. IIS. Internetmuseum.se. 2000 Telia erbjuder ADSL. http://www.internetmuseum.se (Accessed 2016-02-22)

93. Casselbrant, Roland. ADSL – bredband för alla. *PC Plus.* May 1999.

Another important way of connecting to the Internet at this time was through cable TV networks that were being upgraded to support two-way data communication.

But the massive presence of fixed telephone connections made xDSL an important opportunity for the mass-market, which also meant a risk that Telia would build a dominant position, having the ownership of the copper-based access network. This would become a heated area for conflicts, discussions and regulator initiatives in the coming years.

The most important regulation on the copper-based access networks became effective the next year in January 2001. It was the European regulation No 2887/2000 on Local Loop Unbundling, also called LLUB, from December 2000.[94]

The regulation forced incumbent operators, such as Telia, to offer possibilities to competing operators to install their own xDSL-equipment in local telephone exchanges, and then using Telia's existing copper lines—the local loop—to access customers and offer them Internet connection.

Despite the LLUB regulation, Telia quickly built a dominant position on the Internet access market.

As can be seen in figure 3, from 2000 through 2003, xDSL grew to represent a clear majority of high-speed Internet connections in Sweden, with access through cable TV networks and through other fixed connections over time dividing a minor part of the market.

Figure 3. Number of high-speed Internet connections in Sweden.
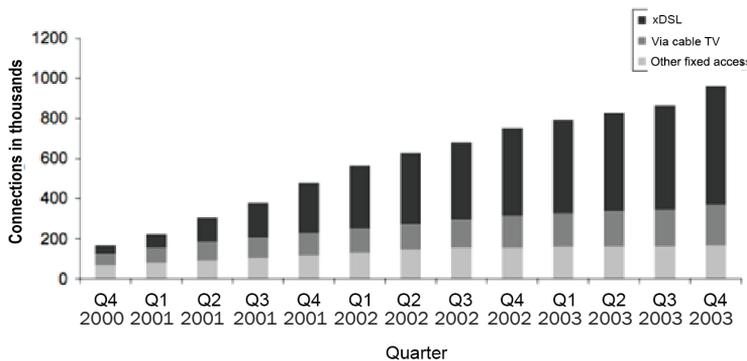
Source: PTS. Konkurrensen i accessnätet. Tredje rapporten 2004. PTS-ER-2004:34.

---

94. EU. EUR-Lex. Regulation (EC) No 2887/2000 of the European Parliament and of the Council of 18 December 2000 on unbundled access to the local loop. http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32000R2887&from=SV (Accessed 16-02-22).

Figure 4. Growth of number of xDSL connections.
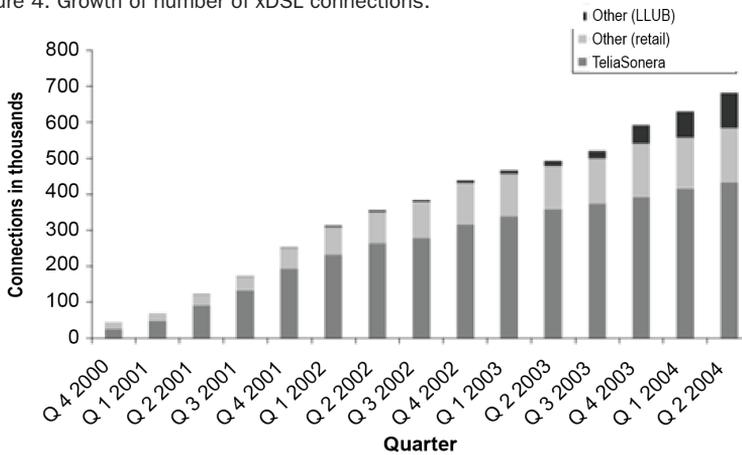
Source: PTS. Konkurrensen i accessnätet. Tredje rapporten 2004. PTS-ER-2004:34.

And as shown in figure 4, Telia (which in December 2002 merged with Finnish Sonera and became Telia Sonera) controlled an overwhelming majority of all xDSL connections from 2000 through 2003, predominantly through direct sales to customers and to a lesser extent through wholesale of xDSL connections to other operators that in turn sold them to their customers.

Soon LLUB was not considered to be enough from a regulation point of view. Only in larger cities could it be made profitable for other operators, buying access from Telia Sonera. In smaller cities and rural areas, the wholesale product, which was not regulated, was the only profitable alternative. The problem was that other operators could not differentiate their offering based on the wholesale xDSL product that was completely controlled by Telia Sonera.

An additional in-between opportunity called *bitstream access* was requested by competitors and regulators in many countries. Bitstream access meant that incumbents had to offer reselling of xDSL-connections, including the exchange equipment but with opportunities for other operators to tune the technical details, making it possible to offer differentiated offerings.

In Sweden, the regulator PTS introduced bitstream access in 2004, but it was not until 2007 that the regulation became effective, after years of appeals in court. During those years, the debate was heated. Competitors to Telia Sonera such as Tele2, raised the alarm on Telia Sonera's building a monopoly[95]; the Swedish Competition Authority ruled that Telia Sonera favored its

---

95. Lewan, Mats. Tele2 slår larm om Telias bredbandsmonopol. *Ny Teknik, Talentum*. 2006-04-27. http://www.nyteknik.se/nyheter/it_telekom/allmant/article256476.ece (Accessed 2016-02-23).

own resale of xDSL over competing operators buying wholesale products[96]; and PTS conducted a whole report on the difficulties in creating competition on the market for high speed Internet, pointing to Telia Sonera's behavior as an important reason for the problems. In the report, PTS concluded the following:

> One factor that renders this situation, if possible, even more serious is that the retail markets are currently in a phase of dynamic growth and it is usually during times of strong growth that suppliers can attract customers. There is consequently a risk that the market shares that are established during the growth phase will endure for a long time into the future, for which reason protracted proceedings potentially restrain competition for an equally long period. The limitations for the development of competition during the growth phase therefore risk creating serious consequences for end-users and society, also in the long-term.[97]

The Swedish government commissioned a report in 2006 to investigate what could be done. The report proposed that both consumers and operators could claim damages if an operator with significant market power "intentionally or negligently" breached its obligations and also that the possibilities for an operator to appeal decisions by PTS should be limited.[98]

Meanwhile, the xDSL technology evolved quickly, with maximum download rates increasing from ADSL's starting point at 0,5 megabit/s to 12 and finally 24 megabit/s for ADSL2 and ADSL2+, and 52 and 100 megabit/s for VDSL and VDSL2, which was approved as a standard in 2006. Upload rates were lower for ADSL, whereas VDSL provided equal rates for download and upload.

The number of xDSL connections would peak in 2008, giving way for connections via direct optical fiber or fiber combined with LAN (local area network).

According to Patrik Fältström, the combination of LLUB and bitstream access, from a regulation point of view, was of fundamental importance for the xDSL market, and he also points out that these regulations are missing on the market for high speed Internet via optical fiber.[99] This will be discussed later.

---

96. Kleja, Monica. Konkurrensverket ger sig på Telia om adsl. *Ny Teknik, Talentum*. 2003-05-06. http://www.nyteknik.se/nyheter/it_telekom/allmant/article230529.ece (Accessed 2016-02-23).

97. PTS. Förutsättningar för hållbar konkurrens på bredbandsområdet. PTS-ER-2005:39. Stockholm 2005-12-08.

98. Kleja, Monica. Skadestånd ska skrämma telebolag till lydnad. *Ny Teknik, Talentum*. 2006-10-23. http://www.nyteknik.se/nyheter/it_telekom/allmant/article249616.ece (Accessed 2016-02-23).

99. Fältström, Patrik; Head of Research and Development at Netnod. Interview 2016-02-04.

7. New technology, new possibilities

During the early years of expansion of high-speed Internet, content on the Internet started to evolve quickly. One notable example is the free-access, free-content Internet encyclopedia Wikipedia, which was launched in 2001. The same year, Sweden was one of the first countries to get its own local Wikipedia version.

Wikipedia could be seen as a child of the idea of peer-to-peer collaboration and file sharing on the Internet—activities that were made possible by the Internet on a global scale, independently of distances, in a way that had never been possible before.

Illegal file sharing continued to be a part of this phenomenon, and the worries of rights holders increased. In Sweden, a lobby group representing companies and organizations within the Swedish film and computer game industry was formed in 2001 under the name Svenska Antipiratbyrån.

Some notable websites that were launched in Sweden in 2001 were the ironic site Spermaharen.se, and the Wikipedia-like Susning.nu, which was closed a few years later due to content vandalism.[100]

In 2002, the online payment service PayPal, founded in the late 1990s, had its IPO, and later the same year it became a wholly owned subsidiary of eBay. Also in 2002, the Swedish University Computer Network, SUNET, was upgraded from 622 megabit/s to 10 gigabit/s, which offered university students and academics a world class Internet infrastructure. This year, 56% of Swedish people had access to Internet at home, which grew to 65% in 2003.[101]

In 2003, the voice and text chat service Skype, developed by Swedish Niklas Zennström and Danish Janus Friis, was launched, hinting at a develop-

---

100. IIS. Internetmuseum.se. http://www.internetmuseum.se (Accessed 2016-02-22)

101. IIS. Internetmuseum.se. http://www.internetmuseum.se (Accessed 2016-02-22)

ment where the telecom industry's high margins on voice calls and text messages would be severely challenged. Skype built on technology from the file sharing system Kazaa, partly also developed by Zennström and Friis, and it used the fact that voice and text could be transferred as data at an extremely low cost over the Internet, combined with technology for connecting users directly to each other—peer-to-peer.

Skype was acquired by eBay in September 2005 for $2.6 billion and, passing through an investor group, it was eventually bought by Microsoft in May 2011 for $8.5 billion.

Also in 2003, the Swedish think tank Piratbyrån was formed, choosing its name in contrast to Antipiratbyrån. The think tank focused on the debate regarding file sharing and on evolution of legislation on intellectual property and copyright in the light of new conditions posed by the Internet.

The same year, the file-sharing site 'The Pirate Bay' was established by Piratbyrån. Technically, The Pirate Bay was a so-called *tracker* for the file sharing technology Bittorrent. Bittorrent makes it possible to divide a file in small pieces that can reside on a large number of different computers, and the tracker keeps track of where these files are and of when they are available, making it possible to re-compose the file for any user connected to the tracker.

In this way, it was difficult to legally claim that a tracker like The Pirate Bay was violating right holders' copyright since no copies of the files were stored or produced on the website.

The Pirate Bay would become one of the most well known websites for finding and sharing illegal copies of music, movies and computer games, and it became a target for the music and the movie industry.

On May 31, 2006, Swedish Police made a raid against The Pirate Bay, shut down the website and confiscated its servers. However, three days later the website was up and running again, and it is still available as of today. In 2009, the four founders of The Pirate Bay were found guilty of assistance to copyright infringement in a much-acclaimed trial.

8. Mobile Internet growing mature

An important event in 2003 was the launch of 3G, based on the WCDMA technology, in Swedish mobile networks, increasing the data speed initially to 384 kilobit/s, and a few years later reaching several megabit/s.

Regulators over the world had chosen different methods for handing out licenses for 3G, most of them opting for auctions bringing significant amounts of money to the governments. In Sweden, PTS instead chose a 'beauty contest' where participants had to make promises of coverage and network rollout. It resulted in four winning operators in December 2000, promising to cover 8,860,000 inhabitants, or 99.98% of the population as of December 2004. Somewhat surprising, the dominating mobile operator Telia, did not receive a license. Telia later solved this situation by forming a joint venture with one of the licensees, Tele2, building a shared network.

The licensees had some difficulties fulfilling their promises on time and were criticized at the time, but this massive 3G coverage is often considered to have been important for the following high usage of mobile Internet and connected activities in Sweden.

Bengt Nordström, founder and CEO of the Sweden-based international mobile network consultancy firm Northstream, believes that the choice of a beauty contest was important. Firstly, you avoided transferring large amounts of money from the private to the public sector. "If it's true that the Internet contributes to economic growth, then it's not very smart to tax those who build it," Nordström says, noting that basically the only advantage with auctions is that you avoid having the regulator being sued for handing out licenses to the wrong operator.

Secondly, according to Nordström, when the winning operators realized what they had promised, they were forced into network sharing for economic reasons, which has developed into a standard model 15 years later. He says

that the most important aspect of the 3G rollout was not the 3G technology but the massive deployment of towers and transmission networks. That constituted an investment which later made it easier to rollout the following mobile data technology 4G, and which will also make it possible to do a quick rollout of the next technology, 5G, in Sweden within the next four to five years.[102]

Bengt G Mölleryd, Ph.D. and Senior Analyst at PTS, adds that the Swedish 3G operators were pushed further by the fact that Hong Kong based Hutchison Whampoa was one of the winning operators, establishing the trademark '3' for its 3G networks in Sweden and in several other countries.[103] In Sweden, Hutchison was the first operator to launch its 3G-network in May 2003.

However, Nordström points out that from a technological point of view, 3G was a failure. He explains that when the telecom industry started with data communication, it had virtually no competence in that field at all, and so the technology that was delivered during 2001 to 2003 was completely deficient for data communication. Nordström says that 3G was based on the observation that the Internet was growing and that mobile phones consequently needed to be connected too.

But according to Nordström, the business case for the operators was a disaster, and he says that the mistake was—apart from the poor technology—the belief that who would become rich from 3G-offerings were the operators. The plan was that ARPU, Average Revenue Per User, would increase from about 40 euros in 2000 to about 70 euros, with new revenues coming from services such as mobile gaming and banking, offered through the operators. He notes that the idea of an ecosystem, independent of the mobile operators, was not even considered.

"With poor technology, expensive licenses and collapsed business cases, it was a complete disaster for the industry. Among operators and network vendors, 500,000 people lost their jobs. The expectations were huge and impossible to fulfill," Nordström says.

He adds that a lot of technological improvements were made in the following years, and that the 3G networks eventually delivered what was initially promised but only in about 2007. And at that point, the launch of the iPhone would change the industry.[104]

The improvements consisted of technologies such as HSPA—high-speed packet access—increasing the data rate to about 7 megabit/s in 2007 and

102. Nordström, Bengt; CEO and co-founder of Northstream. Interview 2016-01-27
103. Mölleryd, Bengt G; Ph. D. and Senior Analyst at PTS. Interview 2016-01-26.
104. Nordström, Bengt; CEO and co-founder of Northstream. Interview 2016-01-27

eventually to tens of megabit/s. HSPA was launched first by Hutchison's 3 in 2006, followed by the other operators, and in 2007, unlimited mobile high speed data plans were offered at about SEK 100 per month.

Lowered prices and increased data rates contributed to a strong uptake in the usage of high speed mobile Internet. According to Berg Insight, the total European market had a value of Euro 1.1 billion in 2006, and 3.2 million 3G-modems were sold. Five million users were expected to connect their computers to the Internet via high-speed 3G connections in 2007.[105]

The dramatic uptake of mobile high-speed Internet subscriptions and the increase of mobile data traffic on the Swedish market from 2006 to 2007 is shown in figure 5.

During these years, the content on the Internet continued to develop, with

Figure 5. Mobile data traffic and number of mobile connections. with active users of packet-switched mobile data communication via pc-card or usb-stick
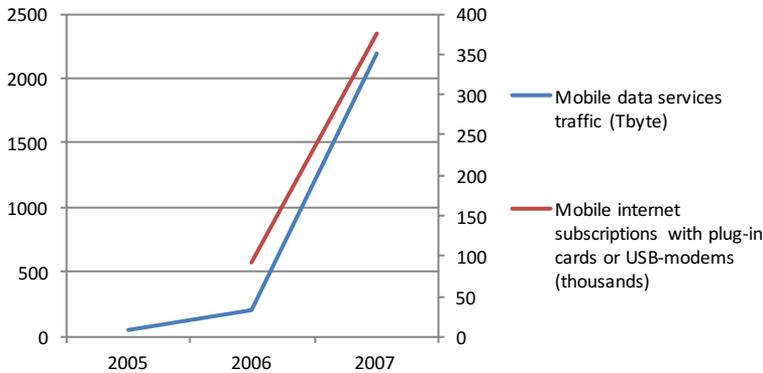
several important websites being created. In 2005, the video website You-Tube was launched by three former PayPal employees. YouTube gained traction by making it easy to upload and view video content on any computer. In November 2006, YouTube was acquired by Google for USD1.65 billion. Today Swedish Felix Kjellberg, known as Pewdiepie, has the most visited channel on YouTube with about 30 million subscribers.

In 2006, Facebook, which was initially launched in 2004 at Harvard Collage by Mark Zuckerberg and four fellow students, opened to the public. As of 2015, Facebook has almost 1.5 billion active users. Also in 2006, the short form 'micro blog' service Twitter was created and launched. In 2016, Twitter

---

105. Edenholm, Yvonne. Mobilt bredband växer med turbofart. *Ny Teknik, Talentum.* 2007-06-29. http://www.nyteknik.se/nyheter/it_telekom/mobiltele/article254281.ece (Accessed 2016-02-22).

had over 300 million active users.

In Sweden the same year, the music streaming service Spotify was founded and created by Daniel Ek, former CTO of the community game Stardoll, and Martin Lorentzon, co-founder of the digital marketing company Trade-Doubler. The music service was launched in 2008.

Ek stated that it was obvious that something was wrong when illegal alternatives defeated legal ones. And eventually, Spotify offered what the music industry had failed to do—an alternative to illegal file sharing that was comprehensive and user friendly enough to be more attractive. It could be argued that this happened in Sweden since illegal file sharing was relatively widespread with a high penetration of computers and high-speed Internet connections.[106]

As the Internet continued to penetrate society through usage by people of all ages, issues of data privacy and security began to arise. In 2005 IIS together with several other organizations, government agencies and other prominent actors within the IT sector launched a campaign called "Surfa lugnt" (Surf easy) to raise awareness about security issues online and to educate the public in how to deal with these.[107]

So far, the Internet had essentially been accessed from computers. However, all this changed with Apple's launch of the iPhone in 2007.

106. Lewan, Mats. How piracy paved the way in Sweden. CBS Cnet News. 2009-02-17. http://www.cnet.com/news/how-piracy-paved-the-way-in-sweden/ (Accessed 2016-02-22).

107. Svensk jättekampanjs ska sälja internet. *Computer Sweden*. 2005.03.15.

9. The first smartphones

In 2007, the first iPhone was launched by Apple, which started a fundamental change of the telecom and Internet ecosystem. Smartphones had existed before—for several years, Nokia and Ericsson had been producing advanced mobile phones with the operating system Symbian, making it possible to install applications just like on a computer. There were also other vendors and operating systems, such as Windows Phone and RIM, but in 2006, Symbian had a staggering market share of 73% of the smartphone market.[108]

However, Symbian was not a very modern operating system, the smartphones required expertise to use and it was fairly difficult to find and install applications. Furthermore, the dominating vendor, Nokia, apparently misjudged the importance of touchscreens. From user surveys, Nokia knew that users wanted to be able to use their phones with only one hand. And since touchscreens at that time required a stylus, this was impossible. Nokia's conclusion was that users wanted a traditional keypad.[109]

Most certainly, the surveys were right, but the conclusion was wrong, based on old touch screen technology. Anyone using modern smartphones knows that they can be used with one hand since today's touchscreens are both very responsive and sensitive to fingers. Apple was one of the pioneers in introducing this kind of so-called *capacitive* touch screen technology when launching the iPhone.

The sensitive touchscreen and the user-friendly user interface were important aspects of the iPhone, which would contribute to Apple's disruptive

---

108. Litchfield, Steve. Symbian market share analysis from ABI. *All About Symbian.* 2007-03-20. http://www.allaboutsymbian.com/news/item/5059_Symbian_market_share_analysis_.php (Accessed 2016-03-07).

109. Lewan, Mats. Nokia tänkte rätt men gjorde fel. *Ny Teknik.* 2010-04-29. http://it-bloggen. nyteknik.se/2010/04/29/nokia-tankte-ratt-men-gjorde-fel/ (Accessed 2016-03-07).

success on the mobile phone market. Yet, established vendors were not impressed at the beginning.

Before the launch, Swedish telecom vendor Ericsson received a demo version of the iPhone and had a team of engineers trying it out. The verdict was merciless. The team concluded that Apple's phone had a series of flaws and that it did not comply with one single technical specification. This verdict spread throughout Ericsson's organization and would set the expectations on the phone. And the day after the launch of the iPhone, in the fall 2007, the Multimedia business unit at Ericsson had a meeting where someone suggested that they should have a look at the iPhone since it could be considered a piece of industrial history. But everyone else at the meeting said no since it was known to be a 'lousy phone' and that 'no-one would buy it'.[110]

Obviously, Ericsson misjudged the strengths of the iPhone. From an engineering perspective it was true that it was not the best of breed, but these flaws were compensated by innovative design and software. The biggest change, however, came in 2008 with a new ecosystem—the possibility for users to download and install apps from Apple's App Store, and for third party program developers to produce apps and distribute them through the App Store. The same year, iPhone started to sell in Sweden.

At launch, the App Store had about 500 available apps[111], and seven years later, in 2015, there were over 1.4 million apps, with users having downloaded over 100 billion apps since the start.[112] Meanwhile, Symbian's market share of the smartphone market shrunk to about 30% in 2010, only to reach zero in 2014.[113]

Bengt Nordström, founder and CEO of the Sweden based international mobile network consultancy firm Northstream, believes that if we had not had the open interface for app developers, we would not need the high data speed we have in mobile networks today. He also believes that the mobile industry would have stagnated.

Nordström describes mobile operators at that time as gatekeepers with a well-developed almost criminal arrogance, proposing 50 page agreements with hopeless conditions to third party developers—offering payments to

110. Ahlbom, Helen. Ericsson-ingenjörerna tyckte Iphone var "en skittelefon". *Ny Teknik*. 2015-10-15. http://www.nyteknik.se/nyheter/it_telekom/article3938961.ece (Accessed 2016-03-07).

111. Apple. Apple Press Info. iPhone 3G on Sale Tomorrow. 2008-07-10. http://www.apple.com/pr/library/2008/07/10iPhone-3G-on-Sale-Tomorrow.html (Accessed 2016-03-07).

112. Ingraham, Nathan. Apple's App Store has passed 100 billion app downloads. *The Verge*. 2015-06-08. http://www.theverge.com/2015/6/8/8739611/apple-wwdc-2015-stats-update (Accessed 2016-03-07).

113. Statista. Global market share held by the leading smartphone operating systems in sales to end users from 1st quarter 2009 to 4th quarter 2015. 2016. http://www.statista.com/statistics/266136/global-market-share-held-by-smartphone-operating-systems/ (Accessed 2016-03-07).

the developers only if the product was launched and if it produced revenue for the operator. Nordström concludes that operators had zero understanding for the entrepreneur.[114]

But the change was probably inevitable. Already in 2003, the development of the Android operating system, which would later be directed towards smartphones and tablets, started. It was acquired by Google in 2005, and officially announced in 2007, together with the Open Handset Alliance—a group of Google and 33 other companies including handset vendors, mobile carriers and chipset makers.[115]

The first Android-based smartphone was launched in 2008, which was the start of Android's quick growth, arriving at a market share of about 80% in 2015, with Apple's iOS in second position at about 18% market share.[116]

The open platform model of Android, iOS and other smartphone OS:s was one important key to the fast growth of smart phone penetration. Another key was a set of advanced sensors embedded in most phones—3-axis accelerometers, gyroscopes, GPS receivers, magnetometers, proximity sensors and light sensors— mentioning only the most common. Together, these sensors made it possible for app developers to make apps that substituted for a large number of other stand-alone devices and also to integrate their different functions within one single device.

Some Swedish app developers had early success, such as Illusion Labs with the game Labyrinth—a smartphone version of the classic wooden labyrinth toy controlled by two knobs. In 2009, Illusion Labs made revenues of SEK 30 million, with a net gain of SEK 18 million.[117]

114. Nordström, Bengt; CEO and co-founder of Northstream. Interview 2016-01-27

115. Open Handset Allience. Industry Leaders Announce Open Platform for Mobile Devices. 2007-11-05. http://www.openhandsetalliance.com/press_110507.html (Accessed 2016-03-07).

116. Statista. Global market share held by the leading smartphone operating systems in sales to end users from 1st quarter 2009 to 4th quarter 2015. 2016. http://www.statista.com/statistics/266136/global-market-share-held-by-smartphone-operating-systems/ (Accessed 2016-03-07).

117. Billner, Amanda. Svenskar långt framme på app-fronten. *DN*. 2010-05-08. http://www.dn.se/ekonomi/svenskar-langt-framme-pa-app-fronten/ (Accessed 2016-03-07).

10. Continuing development of mobile and fiber technology

Over time, the iPhone and other smartphones evolved with more powerful processors, significantly higher data speed and better screens. And apart from shaping the new app-based ecosystem, they contributed to extending the Internet from desktop and laptop computers into people's pockets, always available and always-on, bringing a fundamental change in how people could access and share information and communicate with each other.

Meanwhile in these years, fixed infrastructure continued to be rolled out and to create new opportunities. In 2008, the dark fiber network of Stockholm's city owned company Stokab, was used for broadcasting TV images from the Stockholm Marathon in a new, innovative way. Instead of positioning trucks with equipment and production staff, connected via satellite or radio link at strategic points along the running track, a very lightweight solution was implemented by Stokab in collaboration with High Definition Resources AB, with TV4 as the customer.

Stokab provided access points for dark fiber, directly through manhole covers in the street, at desired positions. A small, portable communication unit was connected to the dark fiber, lighting it up, and a handheld television camera was in turn connected to the communication unit. In this way, live video editing and production could remain at the central TV4 headquarters, having only camera staff and reporters located in the field.[118] This method, called Distance Outside Broadcast, DOB, was later standardized, for example at Sveriges Television, and commercialized by the Swedish company, Twentyfourseven.

An intense public and political debate developed in 2008 regarding a bill

---

118. Mynewsdesk. Stokab och HDR förser sändningar av Stockholm Marathon samt EM-fest med senaste tekniken. 2008-05-30. http://www.mynewsdesk.com/se/pressreleases/stokab-och-hdr-foerser-saendningar-av-stockholm-marathon-samt-em-fest-med-senaste-tekniken-219294 (Accessed 2016-03-07).

called the FRA-law, FRA being the Swedish National Defence Radio Establishment. The bill proposed a series of law changes, making it possible for FRA to intercept not only radio signals, as before, but also cable bound signals crossing the Swedish border. The reason for this was that an increasing share of communication was being transferred from radio networks to fixed networks as the capacity and penetration of fixed data networks increased. The bill passed in 2008 and went into effect in 2009.

The same year, another debate regarded the IPRED-law, based on an EU-directive with the same name—Intellectual Property Rights Enforcement Directive—aiming at making it easier for rights holders to demand user data from Internet service providers when there was suspicion of copyright infringement through digital piracy. The law passed in February 2009 and went into effect on April 1, 2009.

The same day, the total traffic through Sweden's five main Internet connection points run by Netnode suddenly decreased by about 50%.[119] No detailed data on what kind of traffic was reduced were available, but with the hypothesis that the decrease depended mainly on people stopping illegal file sharing for fear of being identified, the dramatic change in traffic gives a hint of how wide spread illegal file sharing was. It is worth noting that the traffic slowly increased again and roughly reached previous levels about half a year later.[120]

In 2009, another event regarding illegal file sharing was the sentence in the high-profile trial towards four individuals involved with the Swedish file sharing *tracker* site Pirate Bay mentioned above. The four were sentenced to one-year imprisonment and a total of SEK 30 million in damages for assisting in copyright infringement.

Also in 2009, the world's first 4G mobile networks were launched by Swedish Telia Sonera in Oslo and in Stockholm simultaneously, offering higher data speeds and lower latency than in the 3G networks. Five years later in 2014, there were 14.4 million mobile connections in Sweden, and of them more than four million had used services in the 4G networks.[121]

Much less noted in 2009 was the introduction of the digital cryptocurrency Bitcoin, by the yet unknown individual or group called Satoshi Nakamoto. Bitcoin offers a peer-to-peer based global payment transaction system, not controlled by any central entity. The price of one bitcoin reached over

119. Lewan, Mats. Internettrafiken halverades i går. *Ny Teknik*. 2009-04-02. http://www.nyteknik.se/nyheter/it_telekom/internet/article260684.ece (Accessed 2016-03-07).

120. Svensson, Måns. Är fildelningen tillbaka på samma nivåer som före Ipredlagen?. *Cybernormer.se*. 2009-10-02. http://cybernormer.se/ar-fildelningen-tillbaka-pa-samma-nivaer-som-fore-ipredlagen/ (Accessed 2016-03-07).

121. PTS. Svensk telemarknad 2014. PTS-ER 2015:19. Stockholm 2015-05-25.

1,000 USD in the beginning of 2014, and it has lately moved between 200 and 460 USD. The underlying technology called the block chain is sometimes considered to be more important, with various possible applications, than bitcoin itself. Indeed, Andreas Antonopolous, a leading expert on Bitcoin and the block chain, has stated, "Saying that Bitcoin is a currency is like saying that the Internet is email. Currency is just the first app!"[122]

In 2010, the image based social network Instagram was released and started to grow quickly. Instagram was acquired by Facebook in 2012 for about 1 billion USD.

Optic fiber alone or in combination with LAN (local area network) continued to grow in the 2010s and represented the largest growth in the number of fixed Internet connections in Sweden (figure 6).

Figure 6. Number of fixed Internet connections (thousands)
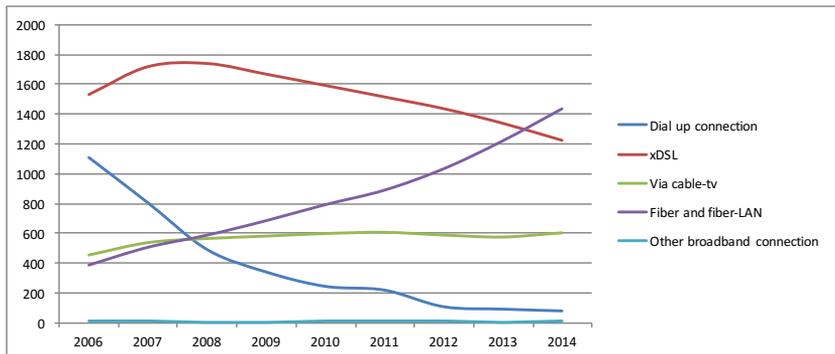
Source: PTS. Svensk telemarknad 2014. PTS-ER 2015:19. Stockholm 2015-05-25.

Just from 2013 to 2014 the number of fiber based connections increased with 17% or 214,000 to reach a total of 1.4 million.

According to a study by Acreo Swedish ICT AB, the rollout of a fiber network has had important effects on society. The study presents a strong correlation between fiber and both employment levels and business activities. It suggests that an increase in fiber penetration of 10% yields a 3% higher employment level in highly urbanized municipalities and 1% in those that are less urbanized.

Overall in the region Västra Mälardalen, with its total of 433,000 inhabitants, a 10% increase in fiber penetration was calculated to result in 10,000 new jobs, corresponding to SEK 2.4 billion of increased GDP, generating SEK 784 million of increased tax revenues, 35 new businesses, and 74 mil-

---

122. Start using Bitcoin. What is Bitcoin? http://startusingbitcoin.com/blog/1-what-is-bitcoin/ (Accessed 2016-05-01)

lion fewer kilometers of car driving, corresponding to a decrease of 14,000 tons of CO_2 emissions.[123]

Crister Mattsson, Senior Advisor at Acreo and one of the authors of the study, argues that infrastructure is essential for supporting innovation and development of society, but that you cannot expect to cover the investments with sales revenues only, just as it would have been impossible to build national railway networks based only on revenues from ticket sales.

According to Mattsson, the increase in fiber networks therefore depends largely on city-owned metropolitan area networks, actively built in Sweden. He also points out that in 2011, a 100 megabit/s business connection cost SEK 5,000 a month in Stockholm, while the corresponding price was 10,000 in Helsinki, 9,000 in Oslo and 6,000 in Copenhagen.[124]

Anders Broberg, Chief Communications Officer at Stokab, states that in many large cities around the world, a choice of four broadband providers is a high number, whereas there are 130 in Stockholm, of which 30 are all-round providers targeting all kinds of customers.[125]

The present regulation model for fiber networks in Sweden, however, is challenged by Swedish Internet pioneer Patrik Fältström, who underlines that the fiber market, as opposed to the copper-based local loop, is still unregulated, with rules lacking for letting other Internet providers obtain access to both dark and lit fiber from network owners. Such rules would enable increased competition and choice for the customer. He concludes that there is a strong ongoing expansion of fiber networks by entities that want to reach as strong a position as possible before any regulation limits their growth possibilities.[126]

Yet it is likely that Stockholm, with its particularly open dark fiber network owned by Stokab, offers a market for broadband Internet connections that helps making it an attractive location and fertile ground for the unicorns of today.

123. M. Forzati, C. Mattsson, *Samhällsekonomisk inverkan av fiber nät i Västra Mälardalen*, Acreo Rapport acr059369, Stockholm, April 2015.

124. Mattson, Crister; Senior Advisor, Acreo Swedish ICT AB. Interview 2016-01-26.

125. Broberg, Anders; Chief Communications Officer at Stokab. Interview 2016-01-27.

126. Fältström, Patrik; Head of Research and Development at Netnod. Interview 2016-02-04.

Part II

1. Back from the boom

Since the dotcom crash, Sweden has seen a revival of Internet-related businesses. Stockholm has been described as a "Unicorn Factory"[127], and been compared to Silicon Valley in terms of being the birthplace for the world's most successful Internet companies.[128] Also, Sweden has been named the startup capital of Europe by numerous media organizations, such as the *Telegraph, the Financial Times,* and *Forbes*.[129] The question is, has this happened thanks to, or despite of, the dotcom era.

Many of the most famous companies from the late 1990s mentioned previously here are today only known as "dotcom companies" that went from billion dollar valuations to bankruptcy or were acquired for a fraction of their former value. For example, Framfab and Icon Medialab merged in 2006[130], changed their names to LBI International and eventually were acquired by Obtineo in 2010.[131] Spray has been the subject of a series of acquisitions and is today an Internet portal, not an IT consultancy, owned by Keynote Media Group.[132] Also several of the big acquisitions that made headlines during the boom have proved to be unfortunate for the buyers. ADC discontinued Al-

127. How Stockholm Became a "Unicorn factory". 2015. *Knowledge@Wharton. Wharton University of Pennsylvania.* November 9. http://knowledge.wharton.upenn.edu/article/how-stockholm-became-a-unicorn-factory/ (Accessed 2016-03-30).

128. Tung, Liam. Stockholm is the 'most prolific' billion-dollar startup hub behind Silicon Valley. 2014-11-07. http://www.zdnet.com/article/stockholm-is-the-most-prolific-billion-dollar-startup-hub-behind-silicon-valley/ (Accessed 2016-02-25).

129. Davidson, Lauren. How Sweden became the startup capital of Europe. 2015-06-28. http://www.telegraph.co.uk/finance/newsbysector/mediatechnologyandtelecoms/11689464/How-Sweden-became-the-startup-capital-of-Europe.html (Accessed 2016-02-25).

130. Framfab. Wikipedia. 2015. https://sv.wikipedia.org/wiki/LBI_International_AB (Accessed 2016-02-25).

131. LBI International. Wikipedia. 2015. https://sv.wikipedia.org/wiki/LBI_International_AB (Accessed 2016-02-25).

132. Spray.se. Wikipedia. 2015. https://sv.wikipedia.org/wiki/LBI_International_AB (Accessed 2016-02-25).

titun's operations in 2002, about 1.5 years after the acquisition.[133] Cisco fired all of Qeyton's employees and discontinued its operations two years after the acquisition.[134] Microsoft closed down Sendit, which became their Mobile Internet Business Unit, three years after the acquisition.[135] The list goes on.

On the other hand, there was a big influx of capital during this time. As mentioned previously, research has shown that the dotcom boom spurred the VC industry in Sweden.[136] The informal venture capital market, which consists of individuals commonly referred to as business angels, might have seen a similar development. However, it is difficult to say so with certainty due to the practical difficulties involved in identifying informal investors. Business angels are often anonymous and there are no official listings on which to rely, which explains the scarcity of previous research in this area.[137] In lack of research, there is an abundance of anecdotal evidence that supports the notion that the dotcom boom caused an increase in the informal venture capital market.

The Swedish unicorn, Klarna, is a stellar example of how the development in the late 1990s has positively affected the entrepreneurial environment in Sweden. The three business students, Sebastian Siemiatkowski, Niklas Adalberth and Victor Jacobsson, had an idea for a new kind of online payment service, but they lacked the technical skills to build the platform themselves. Also, they needed capital. Luckily, things took a turn for the better after meeting with the famous angel investor, Jane Walerud. Walerud, who was one of the co-founders of the dotcom success Bluetail and had both capital and connections that would prove profoundly important to the future of Klarna. Bluetail, which was sold for SEK 1.6 billion within 16 months after it was founded, had developed software that made email systems and websites more reliable using the programming language, Erlang. Walerud realized that Erlang could be used in this context as well since reliability would be essential for Klarna's payment service. Three weeks after their initial meeting, Walerud invested €60,000 in seed capital for 10% of the shares and introduced them to five developers (all of them former co-founders of Bluetail), who committed to building the platform in exchange for 37% of

133. Alpman, Marie. Spiken i kistan för Altitun. 2002-11-04. http://www.nyteknik.se/nyheter/it_telekom/allmant/article227154.ece (Accessed 2016-02-25).

134. Karlberg, Lars Anders. *Cisco lägger ned svenska Qeyton*. Ny Teknik. 2002-10-29. http://www.nyteknik.se/nyheter/it_telekom/allmant/article227080.ece (Accessed 2016-02-24).

135. Granlund, Fredrik. "Microsoft lägger ned Sendit". *Ny Teknik*. 2002-06-03. http://www.nyteknik.se/nyheter/it_telekom/allmant/article224584.ece (Accessed 2016-02-24).

136. Söderblom, Anna. The current state of the Venture Capital industry. In *Näringspolitiskt Forum* (2012).

137. Avdeitchikova, Sofia. "On the structure of the informal venture capital market in Sweden: developing investment roles." *Venture Capital* 10.1 (2008): 55-85.

the shares.[138] At this point, the company was called Kreditor and had not even been incorporated.[139] Walerud's involvement in Klarna lasted until 2010 when the venture capital giant Sequoia invested USD 70 million and simultaneously bought out a number of previous owners, including Walerud. However, Klarna is not the only company in which Walerud has been engaged. She has been involved in at least fourteen startups, out of which she has had an operative role in four and served on the board in all the others except two.[140] The Klarna/Walerud example clearly demonstrates how the technology, capital and networks from the dotcom boom have positively impacted the conditions for the next generation startups.

As an interesting side note, it was Mattias Miksche, former co-founder and CEO of E*Trade, who introduced Sequoia and the Klarna founders to each other.[141] Like Walerud, Miksche has also been an active angel investor in Sweden. He has invested in the potential future unicorn Fishbrain as well as Euroflorist, Teamtailor and NaturalCycles, among others.[142]

Walerud and Miksche are not the only ones from the dotcom era who have engaged in the informal venture capital market. Angel investing seems to be one of the more common paths for the entrepreneurs who acquired their wealth during the boom.

There are also several examples of dotcom entrepreneurs who both continue on the entrepreneurial path as well as invest the money they have made. Johan Brenner is a noteworthy example. After co-founding two notable companies, E*Trade and Tradera, during the dotcom boom, he later went on to co-found Payson (acquired by Svea Ekonomi) and Bookatable (acquired by Michelin). He was also an angel investor and chairman of the board of the dotcom company, Jobline (acquired by Monster) as well as of the payment service company DIBS (IPOd in 2007). Brenner later spent four years as a General Partner at the renowned venture capital firm, Balderton Capital, and is now a General Partner at the Swedish venture capital firm, Creandum. At Creandum, Brenner is the partner responsible for the firm's investments in two of the most promising startups in Sweden, iZettle and Tictail.[143]

---

138. Weverbergh, Raf. Interview: from Burger King to boardroom, how Klarna became a payments giant. *Whiteboardmag*. n.d. http://www.whiteboardmag.com/interview-from-burger-king-to-boardroom-how-klarna-became-a-payments-giant/ (Accessed 2016-03-10).

139. Blomén, Anna. "Affärsängeln bakom Klarna". Privata Affärer. 2012-08-24. http://www.privataaffarer.se/nyaaffarer/na-nyheter/affarsangeln-bakom-klarna-438925 (Accessed 2016-02-24).

140. Ibid.

141. Ibid.

142. Mattias Miksche. LinkedIn. https://www.linkedin.com/in/mattiasmiksche (Accessed 2016-03-10).

143. Johan Brenner. Creandum. n.d. http://www.creandum.com/team/johan-brenner/ (Accessed 2016-03-10).

Johan Brenner has also served on the board of two of Hjalmar Winbladh's companies, Rebtel and Wrapp.[144] Winbladh, the former co-founder of Sendit, has also been highly active on the startup scene, both as an entrepreneur and business angel and more recently as a venture capitalist at EQT Partners.[145] One of his more notable investments as an angel investor is iZettle.[146] Two of the Spray founders, Patrik Stymne and Sebastian Knutsson, are also worth mentioning as they went on to found the hugely successful social games company, King, which was acquired by gaming giant, Activision Blizzard, for USD 5.9 billion in 2015.[147] After the acquisition, the founders have launched a venture capital firm called Sweet Capital.[148]

Jonas Nordlander is another prominent Swedish entrepreneur and investor with connections to Johan Brenner. Nordlander was the CEO and part of the original startup team at Tradera, which was founded by Brenner and the Kaplan family. Nordlander led the company during the acquisition by eBay and served as the COO of eBay Sweden for about one year before founding Avito, one of the Swedish unicorns, with Filip Engelbert.[149] The duo Nordlander and Engelbert recently sold a third of their shares in Avito for SEK 1.4 billion to the South African company Naspers and have previously made several business angel investments, for example in the two promising startups, LeoVegas and KnC Miner.[150]

Others have chosen a more strictly entrepreneurial career. During the IT boom, Johan Staël von Holstein founded Icon Medialab, Speed Ventures and Letsbuyit.com and became one of the most iconic figures of the time. Today, about 15 years later, he can be described as the entrepreneur who never gives up. Since the crash, Staël von Holstein has started an incubator (Iqube), founded a digital life management tool for exchanging, sharing and

144. Johan Brenner. LinkedIn. n.d. https://www.linkedin.com/in/johan-brenner-4353509 (Accessed 2016-03-10).

145. EQT. Hjalmar Winbladh Joins EQT Partners. 2015-01-19. http://www.eqt.se/Newsroom/EQT-Updates/2015/Hjalmar-Winbladh-joins-EQT-Partners/ (Accessed 2016-03-10).

146. Ström, Viktor. Den svenska adelns favoritstartup. DI Digital. 2015-09-22. http://digital.di.se/artikel/den-svenska-adelns-favoritstartup (Accessed 2016-03-10).

147. Needleman, Sarah E.. Activision Blizzard to Acquire King Digital for $5.9 Billion. *The Wall Street Journal*. 2015.11.03. http://www.wsj.com/articles/activision-blizzard-agrees-to-acquire-king-digital-entertainment-in-5-9-billion-deal-1446523976 (Accessed 2016-03-10).

148. Lundell, Stefan. King-grundarna startar egen fond - ska investera i svenska startups. Breakit. 2016-01-29. http://www.breakit.se/artikel/2491/king-grundarna-startar-egen-fond-ska-investera-i-svenska-startups (Accessed 2016-03-10).

149. Jonas Nordlander. LinkedIn. https://www.linkedin.com/in/jonas-nordlander-749274 (Accessed 2016-03-14).

150. Lundell, Stefan. Svenska grundarna säljer Avito-aktier för 1,4 miljarder kronor. Breakit. 2015-10-23. http://www.breakit.se/artikel/1676/svenska-grundarna-saljer-avito-aktier-for-1-4-miljarder-kronor (Accessed 2016-03-15).

selling content that interests users (Myqube), and currently has a new startup now called "My name club".[151]

Jonas Birgersson has also stayed in the entrepreneurial track. Birgersson preached "broadband for everybody" during the late 1990s and has stayed true to this vision, fighting for omnipresent Internet through his involvement in Labs2. He refers to himself as "the Rhino from Lund"[152], probably referring to the fact that he is the eternal entrepreneur who never quits. In more recent years, he has been engaged in building Israel's fiber network through the company Via Europa where he is a shareholder.[153]

Not all of the dotcomers are 'die-hard' entrepreneurs like Birgersson and Staël von Holstein. Magdalena Bonde, former co-founder and COO of Cell Networks, is an example of a successful dotcom entrepreneur who has chosen the path as a business executive. After the crash, Bonde has worked as a manager in the telecom industry, a consultant, CEO of the search company Eniro, and now just recently she returned to the entrepreneurial scene, although not as a founder, but as the Chief Commercial Officer of the potential future unicorn, Fyndiq.[154] Bonde is not the only one from Cell Networks involved in Fyndiq. Jan Carlzon, another former co-founder of Cell Networks, is also a Fyndiq investor.[155]

Although there are exceptions, the key individuals from the dotcom era seem to have continued to stay engaged in the Swedish startup scene in one way or another, either through founding, advising or investing in new companies or often a combination of all three. There are also several examples of connections to the new generation of successful entrepreneurs. As described above, there are cases where "dotcomers" previously have been or are engaged in Swedish unicorns and potential unicorns, either as founder (Avito), investor (Klarna, iZettle, Tictail, Fyndiq, Fishbrain, KnC Miner, LeoVegas), or as a part of the top management team (Fyndiq). There is also one individual who stands out as a central connector in the network, namely Johan Brenner who founded several successful startups during and after the dotcom era. Brenner is, with only one degree of separation, connected to seven of the fifteen Swedish unicorns and potential unicorns.

151. Lindh, Sara. Johan Staël von Holsteins nya startup berättar allt om ditt namn. Breakit. 2015-06-15. http://www.breakit.se/artikel/814/johan-stal-von-holsteins-nya-startup-berattar-allt-om-ditt-namn (Accessed 2016-03-10).

152. Zachrison, Olle. Jonas Birgersson: "Vi har straffats mycket hårdare". Svenska Dagbladet. 2010-03-05. http://www.svd.se/jonas-birgersson-vi-har-straffats-mycket-hardare (Accessed 2016-03-10).

153. Zeigerer, Jessica. Jonas Birgersson till Israel. Sydsvenskan. 2013-08-25. http://www.sydsvenskan.se/lund/jonas-birgersson-till-israel/ (Accessed 2016-03-10).

154. Magdalena Bonde. LinkedIn. https://www.linkedin.com/in/magdalenabonde (Accessed 2016-03-15).

155. Fyndiq. (2012). Fyndiq tar in 20 miljoner i nytt kapital - affärsänglar investerar i Ullared på nätet. http://www.mynewsdesk.com/se/fyndiq/pressreleases/fyndiq-tar-in-20-miljoner-i-nytt-kapital-affaersaenglar-investerar-i-ullared-paa-naetet-776527 (Accessed 2016-03-15).

2. Connecting the dots

As we have seen in the previous sections, there have been several individuals who have played influential roles in the history of Sweden's successful startups. In order to investigate in more depth the role that these individuals play, we turned to the academic research that explores how the success of startups is related to the social networks within which they are embedded.

In the introduction chapter, we stated that there are two liabilities that hinder startups from succeeding: the liabilities of smallness and newness. These liabilities make it more difficult for entrepreneurs to obtain the resources they need to enable their startup to grow, such as financing, human capital, advice, knowledge, technology, and market access. In their efforts to obtain these resources, entrepreneurs face considerable challenges such as rejection of their ideas, refusals to their funding requests, difficulties in hiring talent, and a lack of legitimacy.[156] However, entrepreneurs who are able to develop and leverage interfirm networks or interpersonal relationships are more likely to gain access to the resources they need.

An interesting example in Sweden of the influence of social networks on a firm, albeit for established firms and not startups, occurred after a change in Swedish tax policy in the late 1990s. Within a few months in 1997, around 20% of firms that were listed on Stockholm's primary exchange transferred to the secondary exchange. One of the major drivers of this transfer is suggested to be that these firms' strategic decision makers were influenced by those in their social networks.[157] [158]

---

156. Cardon, Melissa S., et al. "The nature and experience of entrepreneurial passion." *Academy of Management Review* 34.3 (2009): 511-532.

157. Social network analysis encompasses a set of methods, which are used for the analysis of social structures, more specifically to investigate the relational aspects of these structures.

158. Edling, Christofer, and Rickard Sandell. "Social Influence and Corporate Behaviour A Case Study of Interdependent Decision-Making in Sweden's Publicly Traded Firms." *European sociological review* 17.4 (2001): 389-399.

Networks can be created in a variety of ways – either through formal ties, such as interfirm contracts, or informal ties, such as friendship or previous work colleagues. Entrepreneurs who are able to select the appropriate partners for their changing needs over time as well as establish and maintain a network of informal relationships providing access to necessary resources are generally more successful.

In 2015 the Center for Strategy and Competitiveness at SSE released a report on the Stockholm ICT cluster, "Ekosystemet ICT & Digital". In this report, the authors explored the social networks of 100 of the most influential people, e.g., founders, investors, directors, connected to a list from *Dagens Industri's Digitalpodd* of startups with unicorn status or were predicted at the time to reach unicorn status. Through data collected on LinkedIn, they found a highly connected network of individuals who had either studied at the same universities or worked at the same companies (figure 7).[159]

Figure 7. Work experience of founder(s), board and investors of 13 unicorns and potential unicorns
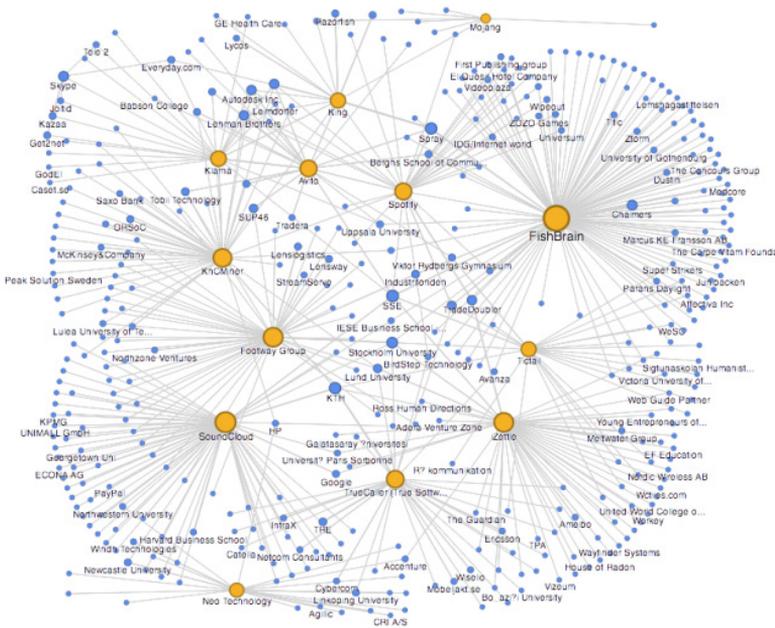
Source: Sölvell, Örjan, Fohlin, Carl & Protsiv, Sergiy, Ekosystemet ICT & Digital: kartläggning av styrkeområden i Stockholmsregionen, Länsstyrelsen i Stockholms län, Stockholm, 2015.

---

159. Sölvell, Örjan, Fohlin, Carl & Protsiv, Sergiy, *Ekosystemet ICT & Digital: kartläggning av styrkeområden i Stockholmsregionen*, Länsstyrelsen i Stockholms län, Stockholm, 2015.

A closer look found that the firm, Everyday.com owned by Kinnevik, and its spinoff, Spray, were at the beginning of a chain of individuals involved in successful startups, such as Skype and King (figure 8). The team behind King hired Marcus Notch Persson, who then created his own company, Mojang, while attracting other talent from King, before being sold to Microsoft for USD 2.5 billion. Today the team behind Mojang has now started Rubberbrain, a new gaming studio. It is worth noting that Persson managed to build a global empire without any external capital.[160]

Figure 8. The network Everyday – Spray – King – Skype - Mojang
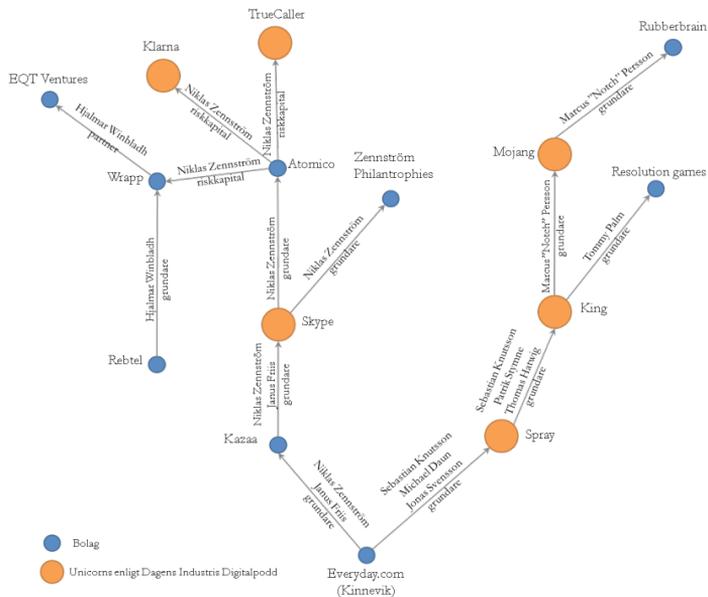
Source: Sölvell, Örjan, Fohlin, Carl & Protsiv, Sergiy, Ekosystemet ICT & Digital: kartläggning av styrkeområden i Stockholmsregionen, Länsstyrelsen i Stockholms län, Stockholm, 2015.

---

160. Sölvell, Örjan, Fohlin, Carl & Protsiv, Sergiy, *Ekosystemet ICT & Digital: kartläggning av styrkeområden i Stockholmsregionen*, Länsstyrelsen i Stockholms län, Stockholm, 2015

3. The second wave

Following this trail of investigation, we decided to explore in more depth the unicorns and potential unicorns of today. However, this task is a challenging one in itself as there is no one definition of what a unicorn is. The most commonly used definition is a startup company valued at USD 1 billion or more, where valuations have been generated due to a bull market and high expectations built on disruptive technologies. *Fortune* magazine published a list of unicorns in January 2016, with companies such as Uber, Xiaomi, Airbnb, and Palantir topping the list.[161] Atomico defined unicorns as Internet and software companies founded within the last decade and that have reached a valuation of over USD 1 billion.[162] However, there is a lack of clarity as to whether a unicorn should be privately-owned or if it loses its status if it is listed on the stock market.

Several lists of unicorns in Sweden have been published, such as by Atomico, CB Insights, and *Dagens Industri*. Some of these lists include companies that are suggested to have the potential to reach unicorn status due to their activities and previous funding rounds. However, as valuations are constantly in flux as are expectations regarding markets and technologies, lists of unicorns and potential unicorns are highly speculative.

According to the most commonly used definition above, Sweden has produced six unicorns since 2000: Avito, King, Klarna, Mojang, Skype and Spotify.[163] Since we are interested in exploring the second wave of high growth technology-based startups in Sweden, we followed Atomico's definition and defined a unicorn as a high technology startup that is valued at USD 1 bil-

---

161. The unicorn list. *Fortune*. 2016. http://fortune.com/unicorns/ (Accessed 1016-03-30).

162. Atomico. Billion dollar+ software companies founded since 2003. Year n.a. http://www.atomico.com/explore-d3 (Accessed 1016-03-30).

163. Which also is in line with what other say. See for example GP. Bullhound.

lion or more while less than 10 years old. Thus, we excluded Skype in this research since it was first sold in 2005. Unfortunately, we were not able to obtain data on King, which means that we have had to exclude them as well. We are therefore left with four unicorns: Avito, Klarna, Mojang and Spotify. Two of them, Avito (autumn 2015) and Mojang (autumn 2014) were acquired by other companies but since these acquisitions happened relatively recently, we still have chosen to include them.

In addition, we have included eleven startups that have the potential to reach unicorn status. Several of these were indicated in our correspondence with the venture capital firm, Creandum, as well as in the media. These companies are the following: FishBrain, FootWay, Fyndiq, iZettle, KnCMiner[164], LeoVegas, MAG Interactive, ShapeUp, Tictail, TrueSoftware and Zound.[165] We have also chosen to eliminate a few, such as Tobii, because they did not fit our definition primarily due to the 10-year timeframe. It should be noted that there is no one definitive list of potential unicorns, and startups can enter and exit this list due to changing expectations related to their market potential and technology development. A summary of the 15 companies with either unicorn status or potential unicorn status is found in table 1 (next two pages).

---

164. After the writing of this report had been finalized, it was announced on May 27, 2016 that KnC-Miner had filed for bankruptcy.

165. For information on how and why we have chosen the unicorns and the potential unicorns, please check the methodology chapter in the end of the report.

Table 1. Unicorns and potential unicorns

Company	Status	Year founded	Description	Notes	Publically traded	Most recent valuation	Most recent valuation date
Avito	Unicorn	2008	Avito.ru is a web platform for free online classified ads in Russia	Acquired by Naspers	No	2.7bn USD	2015-10-01
FishBrain	Potential Unicorn	2010	FishBrain is a social network that allows sport fishers to share their fishing experiences with friends via web and mobile applications	Valuation at most recent funding round not disclosed	No	NA	
Footway Group	Potential Unicorn	2010	Swedish online shoe retailer	Footway Group has preferred shares listed on the First North Exchange but these only represent part of the company	Partially	NA	
Fyndiq	Potential Unicorn	2009	The Swedish Bargain Super-store, connecting merchants with bargain hunters	Valuation at most recent funding round not disclosed	No	NA	
iZettle	Potential Unicorn	2010	Provides mobile integrated Point of Sale solution		No	500m USD	2015-08-01
Klarna	Unicorn	2005	Klarna provides e-commerce payment solutions for merchants and shoppers	Valuation from Secondary Share Sale	No	2.25bn USD	2015-08-01
KnC-Miner	Potential Unicorn	2013	Blockchain mining and related services	Valuation at most recent funding round not disclosed	No	NA	
LeoVegas	Potential Unicorn	2010	LeoVegas AB offers private individuals the opportunity to play casino games and engage in other forms of online gaming using applications and browsers on mobile devices.	Market Cap taken on 18 March 16 from nasdaq.com converted from SEK to USD at a rate of 0.12	Yes	439m USD Market Cap	2016-03-17 IPO

Company	Status	Year founded	Description	Notes	Publically traded	Most recent valuation	Most recent valuation date
MAG	Potential Unicorn	2011	Publishing service allowing content to be easily created for mobiles and tablets	Valuation at most recent funding round not disclosed	No	NA	
Mojang	Unicorn	2009	Mojang is a Swedish game developer creating independent video games such as Minecraft	Acquired by Microsoft	No	2.5bn USD	2014-09-01
ShapeUp	Potential Unicorn	2008	Lifesum is a Swedish digital health startup that helps clients become healthier by using applied psychology and technology	Valuation at most recent funding round not disclosed	No	NA	
Spotify	Unicorn	2006	Music streaming service		No	8.53bn USD	2015-06-01
Tictail	Potential Unicorn	2011	Tictail is a global community that allows you to discover the world's greatest independent brands	Valuation at most recent funding round not disclosed	No	NA	
TrueSoft-ware	Potential Unicorn	2009	Truecaller is a mobile app that let's you see who's calling and block unwanted calls	Valuation is accurate if current $100m raise goes through as advertised	No	1bn USD	Currently underway
Zound	Potential Unicorn	2008	Zound Industries is the home of fuses electronics and design offering a wide arrange of products including a mobile phone	Valuation given as an approximate not explicitly stated	No	~100m EUR	2015-07-01

4. An embedded network

One of the most widely investigated social networks of companies is the network of a firm's board of directors and top management teams. Indeed there is a large body of literature that falls under the heading of interlocking directorates in which direct or indirect relationships between firms are created when one individual sits on the boards of more than one firm. A direct interlock is created when one person is a board director for two or more firms, thereby forming a single path between these firms (figure 9). An indirect interlock exists when a path is created through one or more third firms linking two firms. For example, firms B and C are indirectly interlocked through firm A in figure 10 (next page).

Figure 9. Illustrative diagram of interlocking directorates
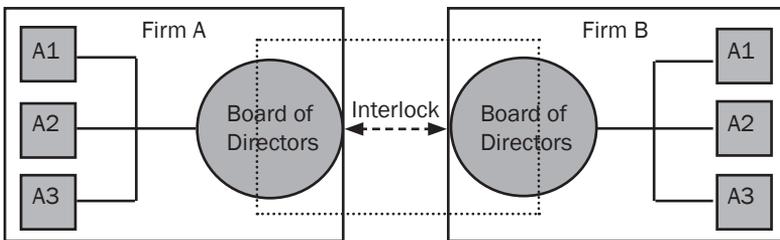
Source: Pennings, J. "Interlocking directorates: Origins and consequences of connections among organizations' Board of Directors." (1980).

Figure 10. . Illustrative diagram of an indirect interlock
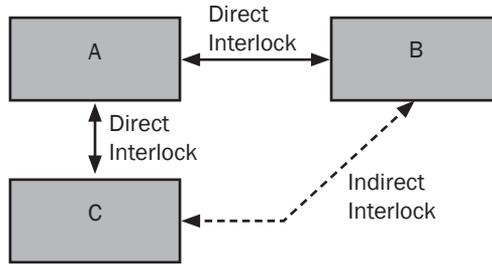
Source: Pennings, J. "Interlocking directorates: Origins and consequences of connections among organizations' Board of Directors." (1980).

Consistent with this research, our next step was to collect data from publically available datasets on each of our 15 startups. More specifically, we created a list of the people holding the following leading positions for each of the 15 startups for each year since the startup's inception, or from January 2007, whichever came later, until January 2016: Bolagsman (Partner) Extern VD (External CEO), Extern vice VD (External vice CEO), Firmatecknare personer (Signatories), Ordförande (Chairman of the board), Prokurist (Authorized officer), Styrelseledamöter (Board members), Styrelsesuppleant (Deputy director), VD (CEO), Vice VD (Vice CEO). For each of these individuals, we then collected further information as listed in table 2.

Table 2. Variables for individuals holding leading positions at startups during the period: January 2007 to January 2016.

Variable	Measure
Demographics	• Birth year • Gender • Residency status: living in Sweden, in EU, or outside EU • Leading position experience – year first held a leading position in any company in Sweden
Startup leading position(s)	• Current leading position at startup and date at which this position was taken • Previous leading position(s) at startup, if any and period of time holding position(s)
Other company leading position(s)	• Current leading position(s) at other companies, if any, and date at which this position was taken • Number of previous leading position(s) at other companies, if any
Demographics of leading position network	• Total number of current links with people in leading positions in other companies • Number of men with Swedish personal number in this network • Number of women with Swedish personal number in this network • Number of people residing outside of Sweden in this network • Average age of people with Swedish personal number in this network

By collecting information on the individuals in the startup leading positions, we were then able to create a list of other companies that are tied to our set of 15 startups. This set of companies thus constitutes the startup's network, or what we have labeled the startup's "cloud". It should be noted that we collected data for the entire time period from the startup's inception or January 2007, whichever came later, for the cloud of other companies tied to the startup. We then collected the following information on each of the individuals holding the leading positions at these other companies in the cloud as shown in table 3.

Table 3. Variables for individuals holding leading positions at cloud companies during the period January 2007 to January 2016

Variable	Measure
Demographics	• Birth year • Gender • Residency status: living in Sweden, in EU, or outside EU • Leading position experience – year first held a leading position in any company in Sweden
Cloud company leading position(s)	• Leading position and date at which this position was taken • Previous leading position(s), if any and period of time holding position(s)
Demographics of leading position network	• Current leading position(s) at other companies, if any, and date at which this position was taken • Number of previous leading position(s) at other companies, if any
Demographics of leading position network	• Total number of current connections with people in leading positions in other companies • Number of men with Swedish personal number in this network • Number of women with Swedish personal number in this network • Number of people residing outside of Sweden in this network • Average age of people in network with Swedish personal number

Through this data collection, we gathered data on 17,377 unique individuals holding 84,568 leading positions at 4,414 companies (startups and their clouds) during the time period January 2007 to January 2016. *It should be noted that while we have extensive data on individuals, we are primarily interested in the aggregated data at the company level and not individual data.*

In the next step, we then created a set of descriptive variables for each startup based upon an aggregation of the data collected for individuals holding leading positions at the startup and the startup's cloud.

To give an example of the data collected, table 4 (next page) shows the variables describing Klarna.

Table 4. Data collected on Klarna Holding AB

#	Company	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	Birth year of the key people	1971	1971	1971	1968	1968	1971	1972	1972	1972	1970
2	Age diversity of the company	10,84	10,84	10,76	15,60	15,53	13,13	13,03	12,70	12,17	12,93
3	Gender diversity of the company	0,10	0,10	0,14	0,13	0,15	0,18	0,15	0,15	0,18	0,25
4	International diversity of the company	0,00	0,00	0,00	0,05	0,10	0,15	0,15	0,15	0,17	0,17
5	In how many companies people are involved	8,30	8,30	8,59	10,41	9,72	8,39	8,20	8,05	7,26	6,67
6	Number of previous positions of the people	6,70	6,70	6,83	7,73	6,83	5,00	4,60	4,49	4,00	4,08
7	Number of direct links	18,00	18,00	19,66	26,94	26,80	22,33	21,89	21,59	20,69	21,36
8	Gender diversity of the network	0,45	0,45	0,46	0,55	0,56	0,50	0,49	0,50	0,51	0,52
9	International diversity of the network	0,30	0,30	0,29	0,26	0,27	0,29	0,28	0,28	0,28	0,26
10	Average age of the network	47,30	47,30	47,10	47,46	47,27	46,92	46,89	46,86	46,92	47,27

In addition, these data enabled us to construct the social network of Klarna for each year since 2007. This social network consists of both direct and indirect links. For example, below is the social network graph for Klarna based on its links to its cloud of other companies as of January 2016 (figure 11).

Figure 11. Klarnas network

5. Measuring the unicorn

We first take a look at the startups as a snapshot of their mean values for each of the descriptive variables over their whole lifespan.[166] When looking at all the variables together, our cluster analysis reveals that the companies do cluster in four different groups, which we have color coded with the color in parentheses:

- Group A (blue): Moderate average age and homogeneity in age. LeoVegas, Footway, FishBrain, Spotify, Mojang, KnCMiner, Avito

- Group B (red): Moderate average age and moderate homogeneity in age. Klarna, Fyndiq, TrueSoftware, MAG

- Group C (green): High average age with moderate to high hetero geneity in age. Zound, iZettle

- Group D (purple): Low average age with homogeneity in age. Tictail, ShapeUp

A closer investigation of the clusters reveals that the two descriptive variables of average birth year and age diversity are those that drive the cluster grouping (figure 12). However, when we take a look at other variables, such as gender diversity and international diversity (figure 13), we find that the companies fall into into three groups, which are not the same as those determined by the cluster analysis.

---

166. Some graphs illustrating the findings we discuss will be included here, and the rest you will find in the appendix at the end of the report.

Figure 12. Average birth year and age diversity
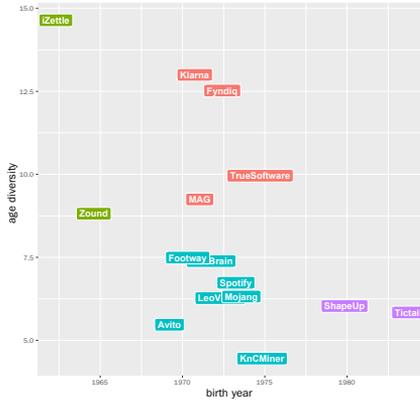
Figure 13. Gender diversity and international diversity
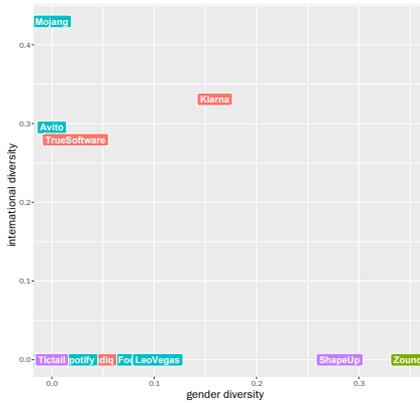
Of the four companies that have a high level of international diversity: Avito, Klarna, Mojang and TrueSoftware, three are already unicorns. Judging from this one could speculate that TrueSoftware in this perspective looks to be a in a good position. If we, however, consider the fourth unicorn in our dataset, Spotify, which has the value zero in international diversity, it makes things more complicated.

Perhaps more interesting is to look at the composition of leading positions over time. Below we see that the general tendency of the startups is to become more diverse over time when it comes to gender and age (figures 14 and 15).

Figure 14. Gender diversity of the company
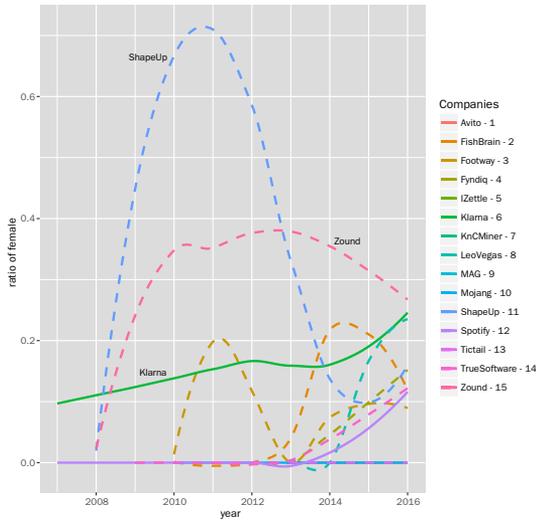
Figure 15. Age diversity of the company
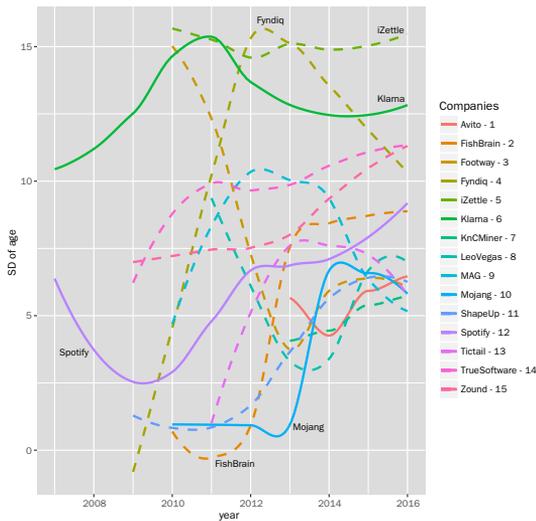
Furthermore, we see that the same four startups as in the first figure either had a relatively higher level of international diversity or became more international over time (figure 16). Looking at the networks of these startups, we find that all have some degree of international diversity in their network (figure 17).

Figure 16. International diversity of company
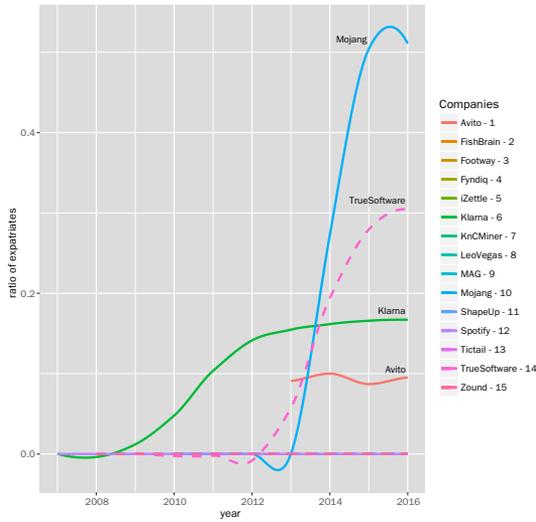
Figure 17. International diversity of network
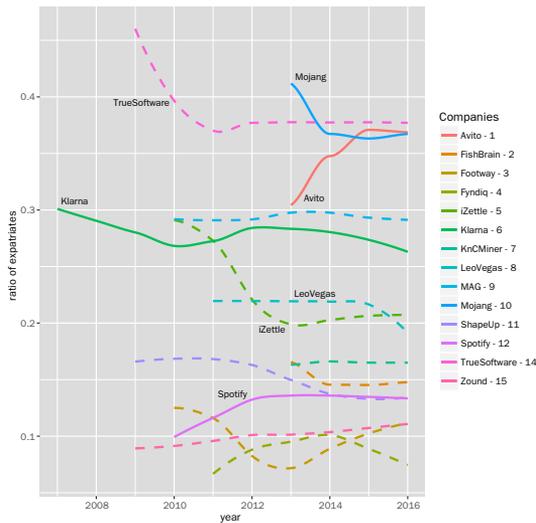
When we examined the networks of the startups as measured by the number of companies the startups are linked to, we find that the startups are quite well connected both directly and indirectly through other individuals in leading positions in Sweden, with a general tendency to increase their network embeddedness over time (figures 18 and 19).

Figure 18. In how many companies people are involved.
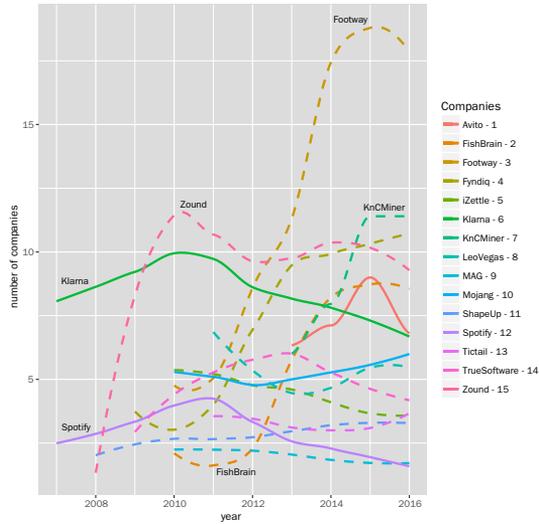
Figure 19. Total number of companies that startups are linked to
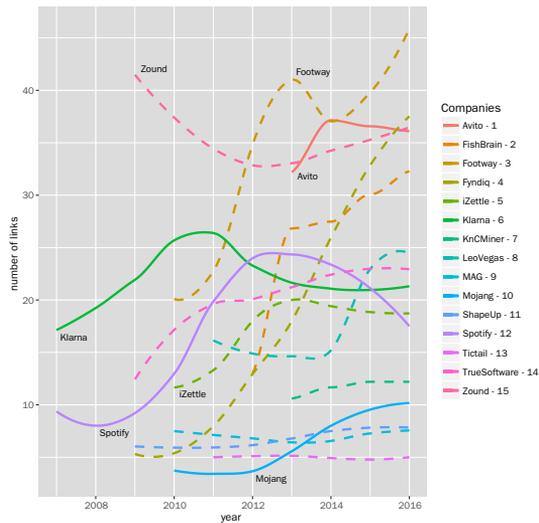
In summary, what can we make of this analysis? When we look at the different variables, we see groupings that are not similar to those that resulted from the cluster analysis. This finding therefore indicates that each of these companies is unique in its composition of leading positions in terms of these descriptives, e.g., age diversity, gender diversity. In other words, there is no "one recipe for success" to becoming a unicorn or potential unicorn when it

comes to the composition of the management team based on these variables. Each company has created its own path to success. However, they may be similar in other dimensions, such as their network position, which we turn to below.

6. Embedded through formal networks

We then conducted an analysis to see to what degree the 15 startups are connected to each other either through direct links or indirect links created by the individuals in leading positions over the years.

Below is the network of the 15 startups if we only take into consideration current direct links among these startups (figure 20). Surprisingly there are very few direct links among these companies, indicating that there is a broad number of highly competent individuals behind these companies.

Figure 20. Startups directly connected to each other currrently.
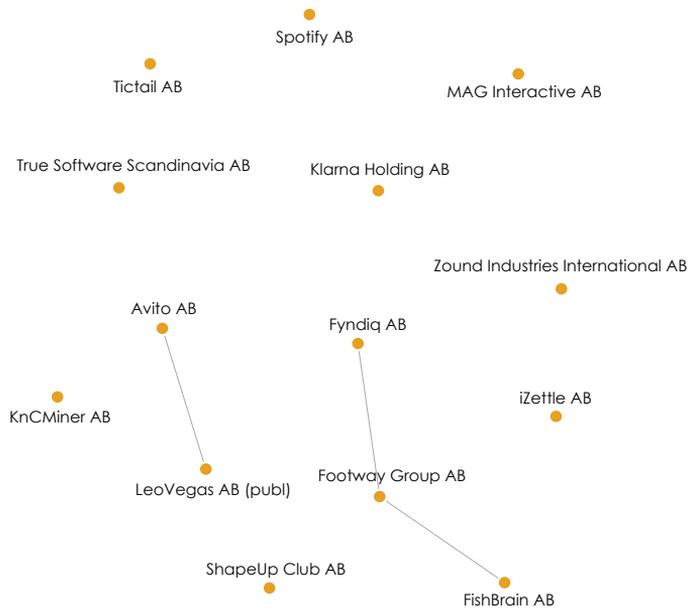
However, when we look at the network of the startups through current direct and indirect links created by the startups' clouds, we see a somewhat more connected network. Eight of the startups have their own separate clouds while the remaining seven are connected through indirect links (figure 21). In the appendix, figures 32 to 41 show these clusters broken out so that the startups are more readily identifiable while figures 51 to 54 provide further detailed analysis.

Figure 21. Social network visualization of startups connected today through their clouds

Figures 22a and 22b shows how this connected network developed. Figure 22a shows the networks of the startups in 2007 – with only three startups present. Figure 22b shows the networks in 2012. More startups had entered the scene; however, they are still quite separated.

Figure 22a. Social network visualization of entire startup and cloud network through time: 2007.
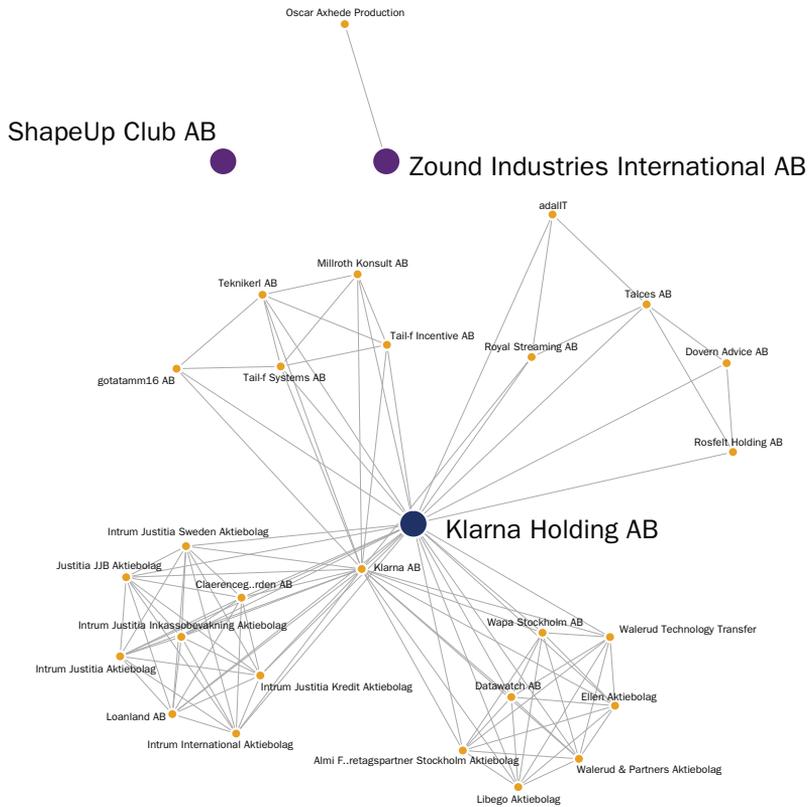
Figure 22b. Social network visualization of entire startup and cloud network through time: 2012
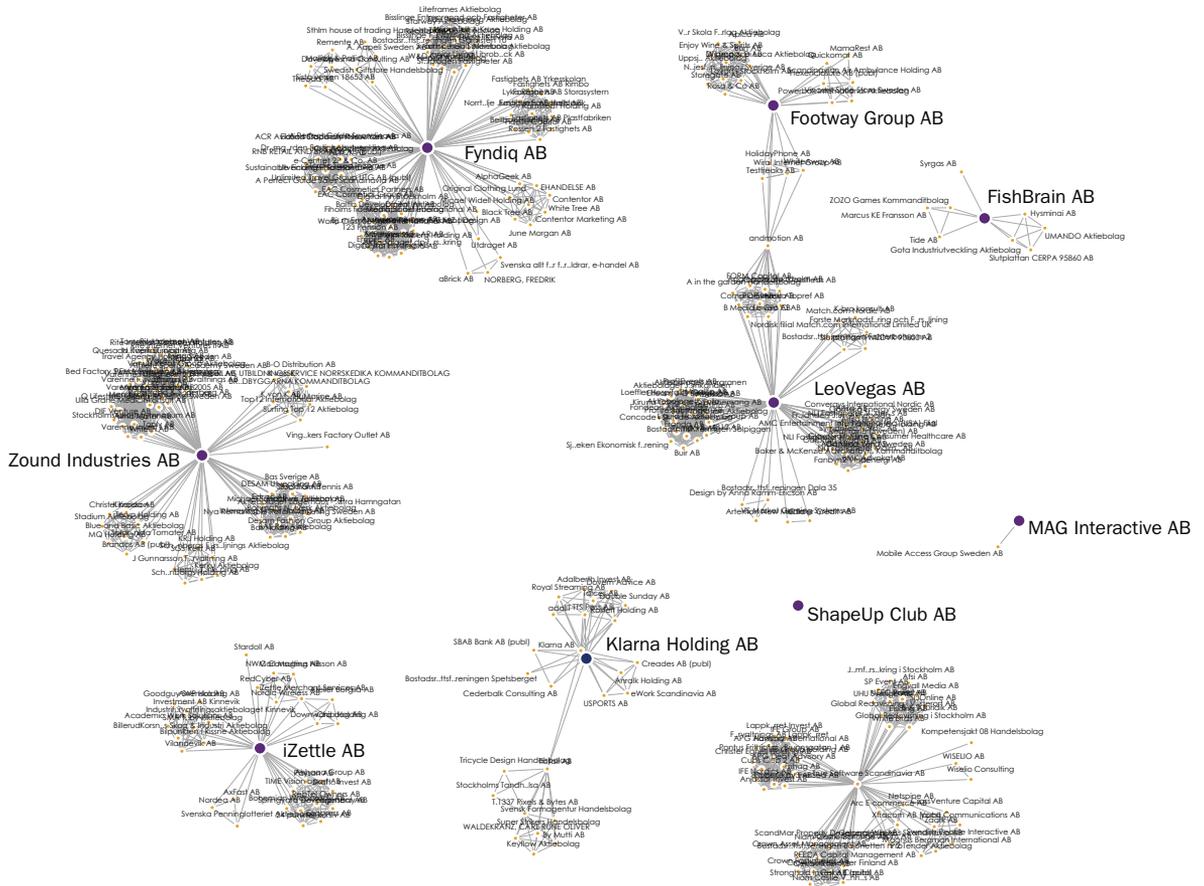
Influence of the Dotcom era

As previously mentioned, we are interested in exploring how individuals who were influential during the dotcom era have played a role in the second wave we are experiencing today. To do so, we identified the most influential individuals as well as their roles in the startups and information about their professional activity after the crash by researching articles in the media, LinkedIn, and other available sources. As "influential individuals", we have included founders, executives, technology experts, board members, and investors, and in this process, we have included not only those individuals who made successful exits but also those who were influential through other means during this time. It is therefore a list of people with resources, be it money, experience, and/or networks, rather than a directory of dotcom millionaires. In this manner, we compiled a list of 60 influential individuals (table 5). In addition, we compiled a list of the 44 most influential people when it comes to the technology, i.e., those who held CTO positions, heads of R&D, senior advisers, etc. (table 6).

Table 5. List of influential companies, institutions and individuals during the IT boom

Company	Individual	Role	Industry	Year company was founded
AdCore	Christer Jacobsson	Co-founder	IT consultancy	2000
Altitun	Björn Broberg	Co-founder	Fiber optical communication	1997
Altitun	Lennart Ramberg	Co-founder	Fiber optical communication	1997
Altitun	Robert Plastow*	Co-founder	Fiber optical communication	1997
Altitun	Stefan Lindgren	Co-founder	Fiber optical communication	1997
AU-Systems	Ulf Jonströmmer	Founder	IT consultancy	1974
Blocket	Henrik Nordström*	Co-founder	Marketplace	1996
Blocket	Pierre Siri	Co-founder	Marketplace	1996
Blue tail	Jane Walerud	Co-founder & CEO	Software	1999
Boo.com	Ernst Malmsten	Co-founder	E-commerce	1998
Boo.com	Kajsa Leander	Co-founder	E-commerce	1998
Boss Media	Joel Wikell	Co-founder	Online casino	1997

Company	Individual	Role	Industry	Year company was founded
Bredbands-bolaget	Jan C. H. Nilsson	Co-founder	Telecom	1998
Bredbands-bolaget	Jan-Erik L. Fiske	Co-founder	Telecom	1998
Bredbands-bolaget	Jonas Birgersson	Co-founder	Telecom	1998
Bredbands-bolaget	Mattias E. G. Söderhielm	Co-founder	Telecom	1998
Bredbands-bolaget	Peter Ekelund	Chairman	Telecom	1998
Cell Network	Christer Sturmark	Co-founder	IT consultancy	1996
Cell Network	Jan Carlzon	Co-founder CoB	IT consultancy	1996
Cell Network	Magdalena Bonde	Co-founder	IT consultancy	1996
Cell Network	Markus Bäcklund	CEO (97-00)	IT consultancy	1996
Cell Network	Niklas Flyborg	CEO (00-03)	IT consultancy	1996
eTrade	Johan Brenner	Co-founder	Fintech	1998
eTrade	Magnus Lindahl	Co-founder	Fintech	1998
eTrade	Mattias Miksche	Co-founder & CEO	Fintech	1998
Framfab	Hans Rausing*	Investor	IT consultancy	1995
Framfab	Johan Wall	CEO	IT consultancy	1995
Framfab	Jonas Birgersson	Co-founder	IT consultancy	1995
Framfab	Ken Ceder	Board member	IT consultancy	1995
HiQ	Hans Karlsson	Co-founder	IT consultancy	1995
HiQ	Ken Gerhardsen	Co-founder	IT consultancy	1995
HiQ	Ragnar ter Vehn	Co-founder	IT consultancy	1995
HiQ	Rolf Andersson*	Co-founder	IT consultancy	1995
Icon Medialab	Erik Wikström	Co-founder	IT consultancy	1996
Icon Medialab	Jesper Jos Olsson	Co-founder	IT consultancy	1996
Icon Medialab	Johan Staël von Holstein	Co-founder	IT consultancy	1996
Icon Medialab	Magnus Lindahl	Co-founder	IT consultancy	1996
Icon Medialab	Ulf Dahlsten*	CEO (99-01)	IT consultancy	1996
Jobline	Johan Brenner	Chairman & investor	Recruiting	1999
Jobline	Lars-Henrik Friis Molin	Founder	Recruiting	1999
Jobline	Magnus Lindahl	Investor	Recruiting	1999
Jobline	Per Sunnemark	CEO (01-02)	Recruiting	1999

Company	Individual	Role	Industry	Year company was founded
Qeyton	Dag Bonnedal	Co-founder	Fiber optical communica-tion	1998
Qeyton	Lars Egnell	Co-founder	Fiber optical communica-tion	1998
Qeyton	Tomas Askinger	Co-founder	Fiber optical communica-tion	1998
Sendit	Hjalmar Winbladh	Founder	Telecom	1994
Skype	Janus Friis*	Co-founder	Software	2003
Skype	Niklas Zennström	Co-founder	Software	2003
Spray	Gunnar Lindberg Årneby	Co-founder	IT consultancy	1995
Spray	Johan Ihrfelt	Co-founder	IT consultancy	1995
Spray	Jonas Svensson*	Co-founder	IT consultancy	1995
Spray	Michael Daun	Co-founder	IT consultancy	1995
Spray	Patrik Stymne	Co-founder	IT consultancy	1995
Spray	Sebastian Knutsson	Co-founder	IT consultancy	1995
Tradera	Daniel Kaplan	Founder	Marketplace	1999
Tradera	Johan Brenner	Co-founder & board member	Marketplace	1999
Tradera	Jonas Nordlander	CEO & origi-nal startup team	Marketplace	1999
Wineasy	Johannes Bertorp	Founder	Telecom	1995
WM-data	Hans Mellström	Co-founder	IT consultancy	1969
Xcelera	Alexander Vik*	Co-founder	Investment company	1999
Xcelera	Gustav Vik	Co-founder	Investment company	1999
Xcelera	Sverker Lindbo	Founder of Mirror Image	Investment company	1999
Xcelera	Tryggwe Karlsten	Investor	Investment company	1999

Table 6. List of influential companies, institutions and individuals during the IT-boom regarding technology

Company	Individual	Role	Industry
AdCore	Hans Grönberg*	CTO	Advertising
AU-System	Ulf Trulson*	CTO	IT consultancy
Bluetail	Jane Walerud	CEO/Founder	Software
Boo.com	Steve Bennett*	CTO	E-Commerce
Boss Media	Pontus Albinzon*	CTO	Software
Cell Network	Krister Nilsson*	CTO	Telecom
Cell Network	Stein Myrseth*	CTO	Telecom
Cell Network	Tore Bjerke*	CTO	Telecom
Cisco, Tele2, Sunet	Peter Löthberg	Advisor	Telecom
CNS Systems	Håkan Lans	Inventor, Co-founder	Maritime
Coding Technologies	Lars Liljeryd	Founder	Telecom
Ericson	Håkan Eriksson*	Head of R&D	Telecom
Ericson	Jan Wäreby	Head of department Multimedia	Telecom
Framfab, Bred-bandsbolaget, Labs2 Group	Jonas Birgersson	Founder, CEO	IT consultancy, Telecom
HiQ	Jacob Gliemann Larsen*	CTO	IT consultancy
IBM Sweden,	Torbjörn Johansson*	CTO, Member	Hardware
Icon Medialab	Björn Schulz	CTO	IT consultancy
Icon Medialab	Eirik Fosse*	CTO	IT consultancy
Icon Medialab	Else-Marie Östling	CTO	IT consultancy
Icon Medialab	Gunnar Östergren*	CTO	IT consultancy
Icon Medialab	Johan Sellström*	CTO	IT consultancy
Icon Medialab	Mathias Korsbäck	CTO	IT consultancy
Internet Architec-ture Board	Patrik Fältström	Member	Internet
Internet Society, IIS	Östen Frånberg*	Member, Chairman	Internet
Jobline	Fredrik Eriksson*	CTO	Recruiting
Jobline	Johan Runnedhal	CTO	Recruiting
Jobline	Sigurdur Stefan Hjal-marsson	CTO	Recruiting
Jobline	Victor Molander	CTO	Recruiting

Company	Individual	Role	Industry
Kazaa, Skype	Niklas Zennström	Co-founder	Internet
KTH	Jens Zander	Professor, Head of research for Wireless communication	Academic
Nanoradio	Pär Bergsten	CEO	Hardware
Northstream	Bengt Nordström	CEO	IT consultancy
Optillion, KTH	Lars Thylén	Co-founder, professor	Academic
Polar Rose	Jan-Erik Solem	Founder	Software
Qliktech	Håkan Wolgé	Founder	Business Intelligence
Sendit	Jonas Lindroth*	CTO	Telecom
Sony Ericson	Mats Lindoff	Head of R&D	Hardware
Spray	Danny Aerts	COO, MD	Web Portal
Spray	Fredrik Fagerberg*	CTO	Web Portal
Spray	Lars Markgren*	CTO	Web Portal
Switchcore, Optillion, Intel, Linköpings universitet	Christer Svensson	Co-founder, member of research counsel, professor	Fiber optical communication
TeliaSonera mobile sector	Östen Mäkitalo	CTO	Telecom
WM-data	Jan Christensen*	CTO	IT consultancy
WM-data	Niko Halonen*	CTO	IT consultancy

*Individuals for which we have no personal number and therefore have been unable to compare with our dataset.

In order to find connections between the dotcom era and today's wave of unicorn activity, we searched for the above individuals in our database of leading positions. We find, however, only a few direct connections (figure 23).

Figure 23. Direct connections between first and second wave

| Blue Tail	→	Jane Walerud	→	Klarna AB
Cell Network	→	Jan Carlzon	→	Fyndiq AB
Tradera	→	Johan Brenner	→	iZettle AB
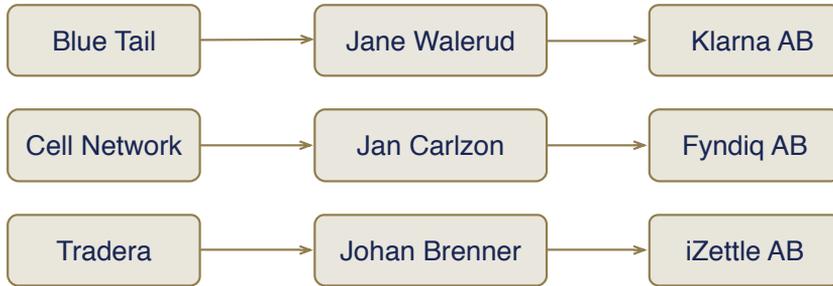
However, when we include indirect links, we do find quite a few more connections (figures 24 and 25).

Figure 24. Indirect connections between first and second waves

First wave company	Individual	Cloud	Second wave startup
Cell Network	Markus Bäcklund		MAG
	Magdalena Bonde		Spotify
eTrade, Tradera	Johan Brenner		iZettle, MAG, Tictail
eTrade	Mattias Miksche		LeoVegas
HiQ	Hans Karlsson		Avito, Klarna, Mojang
	Ken Gerhardsen		Fyndiq
Icon Medialab	Magnus Lindahl	CLOUD	iZettle
	Erik Wikström		FishBrain, ShapeUp, MAG, Tictail
Jobline	Lars-Henrik Friis Molin		FishBrain, MAG, Tictail
	Per Sunnemark		Spotify
Sendit	Hjalmar Winbladh		FishBrain, MAG, Tictail
Spray	Johan Ihrfelt		FishBrain, MAG, Tictail
Tradera	Daniel Kaplan		Klarna

Figure 25. Examples of indirect connections through the cloud between the first wave and unicorns
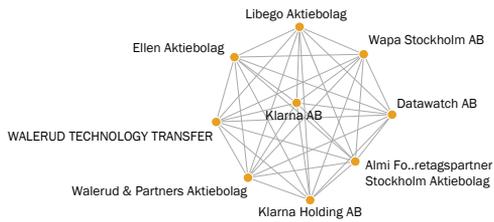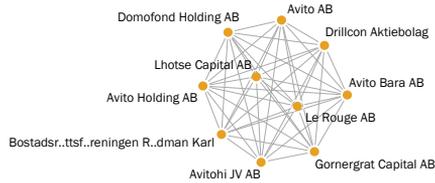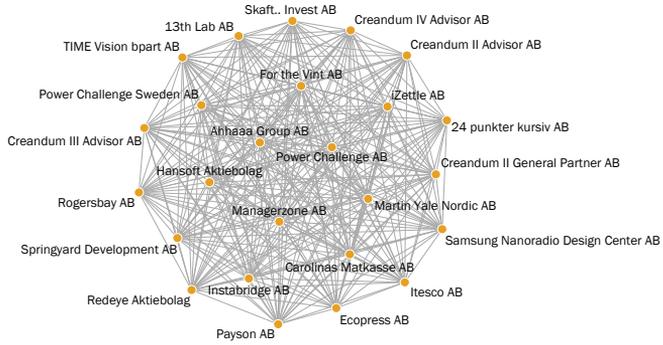
In summary, we do find that there is a clear connection in some respects between the prominent companies of the IT boom and the extremely successful companies of today. This connection is, however, weaker than one maybe might assume. We think it is important to stress that the connection is not a general one, i.e., that it is simply the same people who have continued their careers from the first wave to the second. We find that there are two more or less distinct categories of people who were heavily involved and influential in the IT boom: 1) people who have little or no connection with the successful companies of today as they may have continued their careers outside of Sweden or have new pursuits and 2) people who are very well connected with today's companies.

Clearly, the connection may be higher than what we have found since some of the first wave of individuals may be active in leading positions in companies not in our database of unicorns, potential unicorns, and their clouds or they may also have more informal roles of advisers or angel investors without holding any board or top management positions. Regardless, the fact that we did find some direct connections tells us something very important about how a few actors can provide the necessary resources such as capital, experience, and know-how within a startup network.

Part III

1. Sweden's misty meadows

How to understand the current success story of Sweden and its capital city of Stockholm? The background provided in the introduction chapter gives us as basis for this, and in the following chapter we elaborate with more aspects that we consider of interest.

Let us first take a look at what the Swedish government has done to promote such a high-tech entrepreneurial environment. As discussed above, one area is the direct promotion of the use of computers and the Internet through a variety of measures such as subsidies and tax breaks. Other means include a strong foresight and focus on developing the Internet infrastructure as well as efforts to hinder the development of monopoly positions by major actors within the ecosystem. As a result, the penetration of computers in Swedish households grew from 28% in 1995 to 76% in 2000, thereby creating considerable computer experience among the population.[167] This encouraged the use of computers and the Internet not only by adults, both employed and unemployed, but also by their children, who perhaps preferred to stay inside and play with them as opposed to going outside during the cold and dark winters. Today as a result, almost everyone in the country is computer literate with 91% of the population online, putting Sweden among the countries with the highest penetration in the world.[168] Furthermore, 90% of the population has access to broadband at home and 77% have a smartphone.[169]

Many of those children who benefited from the spread of personal com-

167. Statskontoret. 2000, Internet och datoranvändning i Sverige år 2000. http://www.statskontoret.se/upload/Publikationer/2001/200128.pdf (Accessed 2016-03-15).

168. Internet World Stats. Top 50 countries with the highest internet penetration rates – 2013. http://www.internetworldstats.com/top25.htm (Accessed 2016-03-15).

Findahl, Olle & Davidsson, Pamela, *Svenskarna och internet : 2015 års undersökning av svenska folkets internetvanor*, .SE, Stiftelsen för internetinfrastruktur, 2015

169. Findahl, Olle & Davidsson, Pamela, *Svenskarna och internet : 2015 års undersökning av svenska folkets internetvanor*, .SE, Stiftelsen för internetinfrastruktur, 2015

puters and Internet access around the millennium shift have now entered the workforce and as a result of early use are already leading the way in developing innovations. For example, 33-year-old Sebastian Siemiatkowski, CEO and one of the founders of Klarna, stated in an interview in *The Independent*, "When I was young my family couldn't afford a computer. But because of this subsidy we could, and from the age of 10 I was always playing around with it. [It] was very visionary of the politicians back then."[170]

Government policy has not only led to direct effects of computer and Internet penetration among the general population, but it also has led to indirect effects on the penetration within firms and other organizations. For example, Sweden has a history of labor costs among the highest in the world. In the 1990s, employer costs were almost double the take-home pay of employees due to taxes.[171] In some industries one means for firms to compensate for this high cost of labor was to automate their operations through investments in personal computers and IT systems already dating back to the 1980s. This automation was particularly prevalent in the banking industry. Not only was this industry characterized by rivalry among domestic players, but these IT investments also led to internal rivalry among divisions within the banks, thereby spurring innovation. As the Swedish banks started to integrate IT with their marketing operations more than 30 years ago, internal rivalry was created as the new technology (telephone banking, credit cards, terminals for corporate customers, and then Internet banking in the 1990s) competed with the old technology and organizational structure (branch offices). This internal rivalry helped create a culture that fostered innovation and brought them to the marketplace. In fact, these investments and innovations led to the first wave of FinTech activity in Sweden that began in the 1980s when Optionsmäklarna (OM) was created in 1984. OM was the first options exchange in Sweden, and it also was the first exchange ever to enable remote trading and one of the first electronic exchanges globally.

OM thereby set the stage for a first wave of FinTech companies specializing in software for electronic trading, such as Cinnober and Front.[172]

In addition to encouraging computer and Internet penetration across the country, the Swedish government has also directly and indirectly encouraged the growth of entrepreneurial activities and innovation. Substantial social

---

170. Benwell, Max. Stockholm is rivalling Silicon Valley with a hotbed of technology start-ups. *Independent*. 16.12.17 http://www.independent.co.uk/life-style/gadgets-and-tech/features/stockholm-is-rivalling-silicon-valley-with-a-hotbed-of-technology-start-ups-9931876.html (Accessed 2016-02-25)

171. Jonung, L., Kiander, J., & Vartia, P. (2009). *The Great Financial Crisis in Finland and Sweden,* Edward Elgar Publishing.

172. Wesley-James, Nicholas; Ingram, Claire; Källstrand, Carl ; Teigland, Robin. Stockholm FinTech: An overview of the FinTech sector in the greater Stockholm Region. 2015. Available at http://www.slideshare.net/eteigland/stockholm-49722748

benefits create a social safety net that reduces the risks faced by entrepreneurs and costs for companies. Healthcare is publically funded to a very high degree, leading to relatively inexpensive healthcare for adults and in essence free healthcare for children as well as free dental care for children up to the age of 20. Most parents take parental leave, and they are entitled up to 480 days of parental leave to be taken at any time until the child is eight years old, and the parents are paid a bonus if they split the time equally. Many employers even make up part or all of the difference between the salary paid by the state during parental leave and the salary paid by the employer. Parents receive a monthly, tax-free sum for each child until the child reaches 16 years of age and after that the child is entitled to a study allowance. Education from kindergarten through university is free while daycare and after-school care is heavily subsidized. For example, in 2015 parents paid only around USD 150 per child per month for full-time daycare. Furthermore, if unemployed, individuals who are part of the unemployment insurance fund and have signed an unemployment insurance through a union can receive up to 80% of their salary while those who go on sick leave and are registered with the Swedish Social Insurance Agency generally receive 80% of their normal salary.[173]

Due to this social safety net, individuals may be more likely to take the leap to becoming an entrepreneur, which may lead to a greater number of entrepreneurs per capita than in other countries such as the USA where individuals may endure a higher level of stress due to high healthcare and education costs, unstable income if unemployed or sick, and high student loans to repay. Another indirect effect may be that since university students receive approximately USD 1200 per month from the government (of which 71.5% is a loan to be paid back), students may have more time to devote to entrepreneurial endeavors while still in school since they do not have to take on part-time jobs to pay for expenses such as rent, food, and school supplies.[174] [175]

Students and others who do decide to take the entrepreneurial route can apply for startup loans and grants, funded by state agencies, such as ALMI with offices across Sweden, Tillväxtverket, and Vinnova – Sweden's Innovation Agency, as well as not-for-profit, non-state agencies, such as the Internet Infrastructure Foundation, and university incubators and cluster organizations. In addition to funding, entrepreneurs can receive considerable help along their journey from incubators and other foundations funded by

173. Work in Sweden. Social benefits. http://work.sweden.se/living-in-sweden/social-benefits/ (Accessed 2016-03-15).

174. Kramer, Ariel. 2015. If You're Looking for Your Next Unicorn, Head to Sweden *Huffpost Business. The blog.* December 4. http://www.huffingtonpost.com/ariel-kramer/if-youre-looking-for-your_b_8719426.html (Accessed 2016-03-25).

175. Centrala studiestödsnämnden. Hur mycket pengar får jag. 2015. http://www.csn.se/blivande-studerande/fragor-svar/studiemedel-sverige/1.2463 (Accessed 2016-03-25).

private and public actors. For example, STING - Stockholm Innovation & Growth is a non-profit organization financed by public funds from the Electrum Foundation and partner organizations of Vinnova, KTH - The Royal Institute of Technology, and EIT ICT Labs as well as by private funding and self-funding. STING provides both an incubator and accelerator program and has its head office in Kista, just outside the city center. However, its business coaches tend to sit where the startups are located in Stockholm, such as at SUP46 – a co-working space for digital startups, and at THINGS – a co-working space for hardware startups.

Both SUP46[176] and THINGS[177] are the result of STING's vision of enabling entrepreneurship and innovation in the Stockholm region with STING being a co-founder of SUP46 and a co-owner of THINGS. SUP46 is home to many of Sweden's digital startups and was described by Sebastian Fuchs, Co-founder of SUP 46, in the following way, "SUP46 serves as a middle man to connect businesses with investors and contacts that will help their business grow. Our inspiration comes from the leading incubators, accelerators, networking groups and investors around the world. Over the course of 2015 our members drew in $31M of venture capital. We can't wait to see what 2016 has in store."

Another interesting initiative is Openlab, a creative center that was founded by Karolinska Institutet, the Royal Institute of Technology, Södertörn University, Stockholm University, Stockholm County, and the City of Stockholm, that creates proposals for innovative solutions for the Stockholm region. Openlab offers master's courses, competitions, professional education, workshops, seminars, exhibitions, bookable rooms, flexible work spaces and the prototype studio Make. For example, Openlab is running courses in which master's students work on challenges for Stockholm City, such as shared biking and the future of transportation.

In addition to funding and coaching, access to talented individuals is key for entrepreneurs in high technology companies. Just within the greater Stockholm area there are a number of leading universities providing a high level of technical and managerial competence, such as Karolinska, Uppsala University, the Royal Institute of Technology, the Stockholm School of Economics (SSE), and Stockholm University. Additionally, SSES - the Stockholm School of Entrepreneurship is a non-profit association built with five universities in the area: the Royal Institute of Technology, Stockholm School of Economics, Karolinska Institutet, Stockholm University, and Konstfack – University College of Arts, Crafts, and Design. SSES offers education, train-

---

176. sup46. Start-up people of Sweden. http://www.sup46.com/(Accessed 2016-03-25).
177. THINGS by STING http://www.thingstockholm.com/(Accessed 2016-03-25).

ing, competitions, and outreach activities in the areas of entrepreneurship and innovation. Meanwhile the Stockholm School of Economics runs the SSE Business Lab, which offers accelerator activities free of charge to startup teams that include at least one SSE student or alum, and boasts the fact that the unicorn Klarna started within its walls in 2005.

It is important to note that not only do university students come from across Sweden, but Sweden is able to attract considerable talent from abroad due to its highly ranked master's and doctoral programs combined with relatively low tuition fees. Until the autumn semester 2011, university tuition was free for all students regardless of residency and nationality. Today it remains free for those students from the EU/EEA area while those from outside are required to pay relatively low annual tuition fees from around EUR 9,700 for social science programs to around EUR 15,000 for natural science programs.[178] Many of these students from abroad decide to stay in Sweden upon graduation while others return home. In both cases, these international students considerably strengthen the networks of Sweden's firms.

Furthermore, when talent cannot be found at home, the Swedish government has facilitated the immigration of skilled professionals, notably computer professionals. In 2000 a law was passed that made Sweden more attractive for foreign professionals. Under this law, experts and researchers who are difficult to recruit from within Sweden receive a 25% reduction in his/her income tax and deductions for relocation and the education of his/her children for the first three years of residence in Sweden.[179] In 2008 the labor immigrations laws were eased, making a job offer the single criteria for a work permit.[180]

178. STUDYinEUROPE.eu. Study in Sweden. Tution fees at university in Sweden. 2016. http://www.studyineurope.eu/study-in-sweden/tuition-fees (Accessed 2016-03-25).

179. SFS 2000:1161.

180. SFS 2008:884.

2. Stockholm as a high technology hub

While Sweden is often discussed on the greater scale, much of the country's innovation and entrepreneurship come from the capital city of Stockholm. Founded in 1252, the city is now one of Europe's fastest growing with a current municipal population of around 900,000 and a greater population of around 2.1 million inhabitants. In addition to being a very connected city, Stockholm boasts such labels as the first European Green Capital in 2010 and one of the most reputable cities in the world181, and the Stockholm region is seen as number one on many Nordic indices and in the top ten on numerous global indices: entrepreneurship, innovation, ICT, technology readiness, sustainability, and livability.

Stockholm is also a high technology city. The study in 2014 noted above reported that in Stockholm alone there are more than 22,000 technology companies and that 18% of the city's workforce is employed in technology-related roles182 with the most popular job being a programmer.183 In the report previously mentioned by CSC on the ICT & Digital sector in Stockholm, it was found that of the 43,000 employment positions in this sector, 21,000 have been created since 2008.184

Taking a look at where new companies within the ICT & Digital sector establish themselves, we find a very heavy concentration of companies within four areas of central Stockholm: City, Vasastan, Östermalm and Södermalm,

181. City of Stockholm. Welcome to the Capital of Scandinavia. http://international.stockholm.se/ (Accessed 2016-03-25).

182. Mitzner, Dennis. 2016. Sweden Is A Tech Superstar From The North. 26 January. *Tech Crunch. Crunch Network.*. http://techcrunch.com/2016/01/26/sweden-is-a-tech-superstar-from-the-north/ (Accessed 2016-03-30).

183. How Stockholm Became a "Unicorn factory". 2015. *Knowledge@Wharton. Wharton University of Pennsylvania.*. November 9. http://knowledge.wharton.upenn.edu/article/how-stockholm-became-a-unicorn-factory/ (Accessed 2016-03-30).

184. Sölvell, Örjan, Fohlin, Carl & Protsiv, Sergiy, *Ekosystemet ICT & Digital: kartläggning av styrkeområden i Stockholmsregionen*, Länsstyrelsen i Stockholms län, Stockholm, 2015.

all within a distance of around 6 km from the most northern point of Vasastan to the most southern point in Södermalm (figure 26).

Figure 26. ICT & Digital Startups in Stockholm founded 2008 or later, four shades show employment density
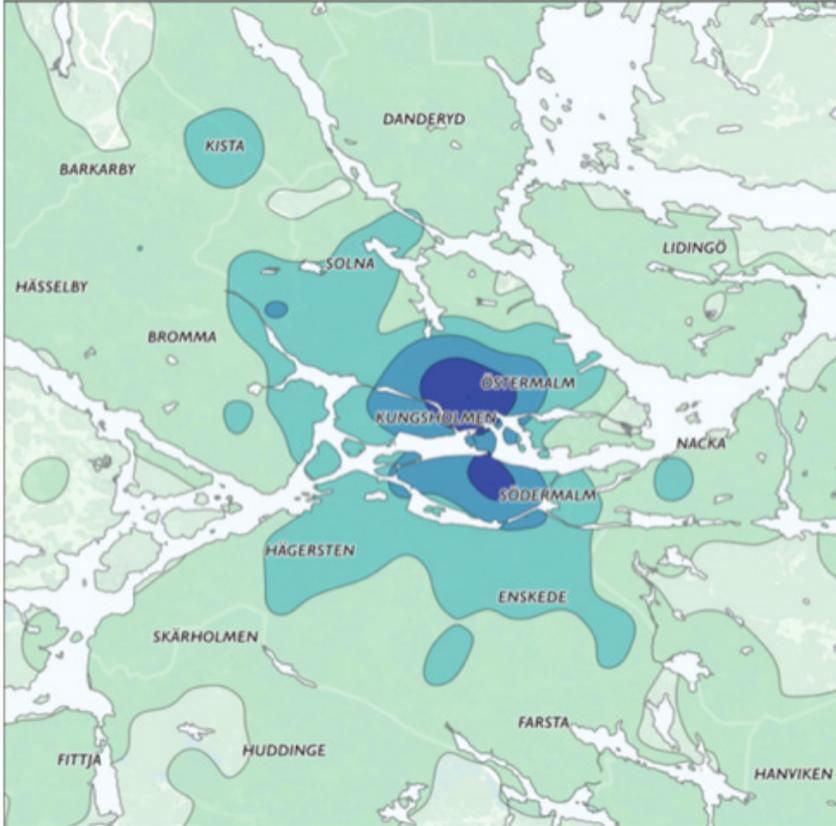
Source: Sölvell, Örjan, Fohlin, Carl & Protsiv, Sergiy, Ekosystemet ICT & Digital: kartläggning av styrkeområden i Stockholmsregionen, Länsstyrelsen i Stockholms län, Stockholm, 2015.

This heavy concentration of companies interspersed with universities, incubators, and co-working spaces within the same area does much to facilitate informal networking within the city. Thus in addition to being linked through formal relationships such as board memberships, entrepreneurs and their startups are also highly embedded in informal networks of relationships among individuals who have met through studying, working, or playing sports together or through friendship or family ties. Physical location is one factor that facilitates the creation and maintenance of such informal relationships as individuals can easily meet one another for business related activities or for more social activities such as lunches or AWs (after work). To

give an idea of this proximity, we mapped our list of 15 startups onto a Google map of Stockholm to see how closely located they are. Indeed they are in very close proximity to one another, with the farthest distance between any two points of approximately only 5 kilometers with the exception of only one company in Kista (figure 27).

Figure 27. Map of unicorn and potential unicorns location in Stockholm

Eleven of the 15 companies are located within less than 2 km from each other in the Norrmalm area in the very center of Stockholm (figure 28).

Figure 28. Map of unicorn and potential unicorns location in Stockholm closeup of Norrmalm (numbering is the same as in the previous figure).
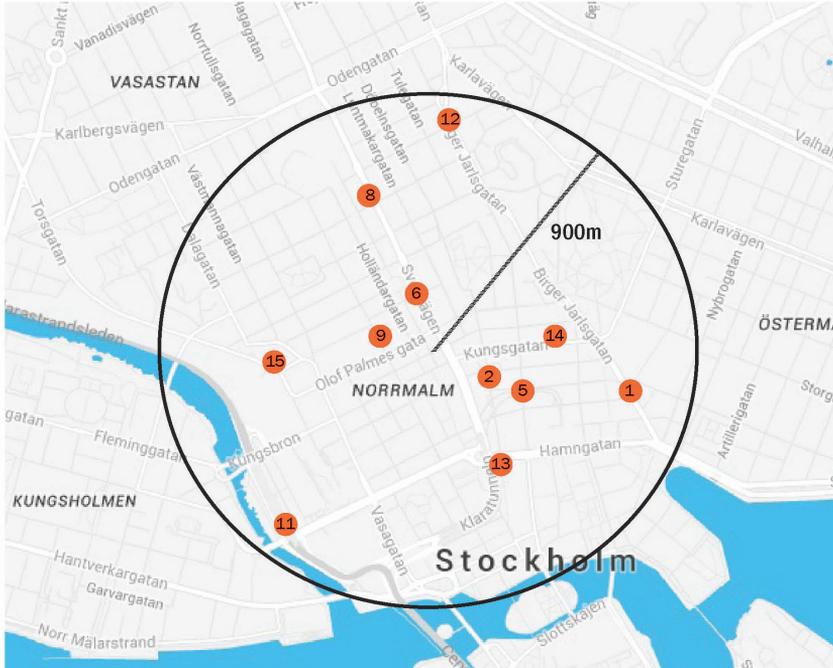
It is not only the relatively small size of Stockholm that enables networking, there is also a strong formal and informal networking culture engrained in the city. Entrepreneurs, students and others have numerous networking opportunities at meetups such as the STHLMTECH Meetups[185], events at university innovation labs and accelerators, incubators and co-working spaces, and even student events organized by business newspapers, universities, and other organizations. These events continue to encourage the Stockholm entrepreneurial ecosystem as knowledge and experience are passed from experienced entrepreneurs to interested individuals through informal discussions. Stockholm boasts a high level of accumulated startup and high technology experience.

Due to the Swedish mentality of low prestige and low power distance combined with Stockholm's small size encouraging high trust levels, these entrepreneurs and other leaders and decision makers are easily approachable and open for collaboration. Jakob Armoe, a typical high-tech entrepreneur who moved to Stockholm from central Sweden who is currently sitting at

185. STHLMTECH Meetup. http://www.meetup.com/STHLM-Tech-Meetup/ (Accessed 2016-03-25).

THINGS and has received startup funding from ALMI and coaching from STING for his startup - LUP Technologies, explained his experience in Stockholm in the following way.

> I think that the city of Stockholm really encourages entrepreneurship. The universities have innovation units, the Stockholm City Council is actively engaged and funds entrepreneurship projects, and there are lots of good examples of successful people who are living here. Stockholm has accumulated a high degree of entrepreneurial experience that continues to be fed back into the ecosystem. I meet these angel investors all the time – like around the innovation hubs or the STING network or at events. And you can absolutely talk with these people. Most people are very open-minded. Like I was at a student event organized by the newspaper *Dagens Industri*, and when the entrepreneur left the stage I ran back and asked him if he would like to have lunch, and he said, "Sure!" Now I have people on my board who have experience from running companies, and I have not run a company before. I found these people through my networks that I have built up since my student days when I went to lots of different events organized by different organizations.[186]

Thus, while the city is large enough to find the right multi-disciplinary skill set, it is still small enough to accommodate a highly open culture and trusting relationships that allow for deep levels of knowledge sharing and collaboration, even among competitors. Johan Attby, CEO of FishBrain - a member of SUP46, characterized the Stockholm startup community in this manner, "The Stockholm startup community is super tight-knit and most folks know each other really well. There are many serial entrepreneurs with big networks and there's a great pay-it forward culture. People help each other with intros and share learnings."[187]

This pay-it forward culture demonstrates itself in a variety of ways. There are a number of successful firms that act as role models by setting high standards inspiring current and future entrepreneurs while serial entrepreneurs share their expertise and reinvest in new firms. As noted above, many of the individuals who have been highly successful since the 1990s continue to engage in the community through activities such as mentoring, investing, and active board membership and even just hanging out at one of the many co-working spaces that Stockholm offers, such as SUP46, United Spaces, and the Castle. Of note is that one of the city's most active co-working spaces for

---

186. Jakob Armoe. Entreprenuer. Interview 2016-03-29.

187. Kramer, Ariel. 2015. If You're Looking for Your Next Unicorn, Head to Sweden. *Huffpost Business. The blog.* December 4. http://www.huffingtonpost.com/ariel-kramer/if-youre-looking-for-your_b_8719426.html (Accessed 2016-03-25).

startups, Epicenter[188], was started in January 2015 by Ola Ahlvarsson, who co-founded Boxman, the largest European e-commerce store selling CDs at the time, in 1997 and was nominated as one of the top ten Leading European Internet Entrepreneurs in 1999 by the *Wall Street Journal*.[189] Epicenter is an innovation lab showcasing the latest technologies and has partnerships with Singularity University and *Wired* magazine. Tictail sits at Epicenter as well as numerous other high potential startups, putting them all within walking distance of the other unicorns.

This pay-it forward culture is not only demonstrated by successful entrepreneurs contributing to the next wave of entrepreneurs but also by most other individuals in the ecosystem. Of particular note is that there is quite a high degree of openness and helpfulness for people from outside of Stockholm, be they from Sweden or elsewhere. One example is Leo Heung, an entrepreneur from Hong Kong, who described his experience coming to Stockholm in the following way.

> I am an industrial designer living in Hong Kong with lots of connections to factories making all kinds of products in China. I decided to go abroad to find startup companies that needed help manufacturing their goods. To search for the best city for this anywhere, I basically googled the words "startup, co-working space, hubs, makerspace" and then this enabled me to narrow down my search to the Nordics. I then went through all the websites of the startup hubs and co-working spaces to learn more about them – how many members they have, any success stories, what kinds of companies are members, etc. I found significantly more startups in Stockholm and Helsinki than anywhere else, so I started sending emails to the makerspaces, hubs, and co-working spaces to ask if I could become a member. Ivar Björkman, the Executive Director of Openlab, gave me a very positive response and said I should come to Openlab and discuss the details with Anders Melbratt, the Make Manager. So I moved to Sweden without any contacts other than Ivar and Anders and joined Openlab in October 2015.
>
> Anders and Ivar were so incredibly helpful. For example, Anders helped me find housing, and he sent out dozens of emails in the middle of the night to all his contacts saying, "Hey, you should meet this guy, Leo from Hong Kong. I think you guys have a thing or two to talk about." And then when I am at the lab, Ivar introduces me to people he thinks I might find interesting. One of the people I met through Anders is Martin Willers, a co-founder of PeoplePeople – an industrial design startup nominated by *Wired* magazine

188. Stockholm House of Innovation Epicenter. https://epicenterstockholm.com/en#about (Accessed 2016-03-25).
189. Ola Ahlvarsson. https://en.wikipedia.org/wiki/Ola_Ahlvarsson (Accessed 2016-03-25).

as one of Europe's 100 hottest startups in 2014. After a couple cups of coffee with Martin, I arranged a two-week trip for him to China to visit dozens of factories within my network.

I really think that there is something special here in Stockholm that I have not seen anywhere else in the world. I came here with no networks and had to build them from scratch. Less than six months later, I already have an extensive network within the Stockholm startup community. A lot of people I have met at Meetups, and people are very easy to meet there. I have also met a lot of people through referrals. People are so helpful and I think people in Stockholm have a basic sense as to whether someone is a good guy or a bad guy. Like when I was going to move into the house where I was renting a room, the landlord was out of town and without ever meeting me and only some communication by email, she said I could just move in without her being there. In fact she just told me where to find the hidden key and to let myself in. This would never happen in Hong Kong. Here it seems people think about the greater collective and "know when enough is enough". It's not like in the USA where people are going after bigger houses and bigger cars and show off in front of the neighbors. Here it seems that people say, "I don't need anything more for me so I share and give back to others."[190]

One other special characteristic of Sweden is that the workday includes a number of informal networking activities. Due to the dense concentration of companies and other organizations downtown and the Swedish custom of eating a hot lunch out in one of the numerous restaurants, many individuals meet each other over a relatively inexpensive meal (around USD 10-15 including salad, bread, drink, main dish, and coffee). Back at the workplace, the common "fika" or coffee break provides opportunities for individuals both from within the same workplace as well as from other firms to share knowledge and experiences. In this way, Stockholm is similar to Silicon Valley in one of its reasons for success – that of informal networking outside of work with people from other firms including the competitors during which new ideas and knowledge are shared, job openings are relayed, projects are discussed, and success and failure stories are passed on.

Other potential factors for Stockholm's startup success include a highly international workforce with English as the company language in many organizations, a well-developed crowdfunding industry across all four forms of crowdfunding (donation, reward, equity, and lending) enabling access to alternative forms of financing, and an advanced test market that multinationals often choose for the development of new products as consumers in

---

190. Leo Heung, Entrepreneur from Hong Kong. Interview 2016-03-30.

Stockholm are high-tech early adopters.

As noted above, one of the areas that is the most active in terms of startups and innovation in Stockholm is FinTech. Since 2009 around 100 FinTech startups have been established in the Stockholm area. In 2015, USD 137.7 million in venture capital was raised by Stockholm FinTech companies of which around USD 26 million went to startups focusing on block chain technology. FinTech is also creating jobs and revenues for the city as revenues rose from SEK 7.5 billion to SEK 14 billion and employees climbed from around 2,900 to more than 5,800 from 2010 to 2015. Daniel Blomquist, a partner at the venture capital firm Creandum explains some of the reasons for Stockholm's success in FinTech in the following way:

> Good ideas aren't enough for success. I think what makes Stockholm unique is that we have a high level of execution intelligence here. For example, not only do programmers have a deep level of technical skills, such as how to build high volume transaction systems that scale, but they also understand how to turn technology into a product that creates value in a global market. This combined with our bottom-up Scandinavian management style enables firms to successfully navigate the many uncertainties in today's financial services.

Whether Stockholm will remain a breeding ground remains to be seen. However, a professor from The Wharton School focusing on the digital economy, Kartik Hosanagar, is positive in this respect, as was indicated in a recent article:

> "There will be more and more coming out of Sweden." One important reason, he adds, is that future start-ups will be less about tech and more design conscious. In the last 20 to 30 years, Apple, Microsoft and Google have made enormous strides with technology. Sweden has always had a really strong design sense with iconic brands like IKEA and Volvo. These days, success can be measured by how intuitive and convenient it is to use a particular piece of software. "Small innovations with really good user-friendly designs will be important, and Sweden has a really good leg up in that respect.[191]

---

191. How Stockholm Became a "Unicorn factory". 2015. *Knowledge@Wharton. Wharton University of Pennsylvania.* November 9. http://knowledge.wharton.upenn.edu/article/how-stockholm-became-a-unicorn-factory/ (Accessed 2016-03-30).

3. Conclusions

One purpose of our ongoing study is to explore the roots of the current "unicorn" success of Sweden and its capital city of Stockholm. Our initial journey that we have reported here has taken us through the technological developments from the 1980s to today and through the first and second waves of IT startups with a particular focus on following the flows of resources such as money and experience and a look at some of the formal and informal networks of today's unicorns and potential unicorns.

One finding that becomes quite clear is that there is no one single factor that has led to Sweden's success. Rather we propose that it is the convergence of a number of different factors over time that have created Sweden's exceptional fertile breeding ground. These include factors such as an enabling business climate fueled by the highly connected informal and formal social networks among entrepreneurs, experienced business people, politicians, and university researchers, especially in Stockholm, that has its base in a long history of multinational, engineering-based firms and in the 1990s IT-boom and bust as well as longsighted public initiatives and supportive government policies, such as the highly developed and continuously maintained technical infrastructure that enabled the early adoption, development and spread of information technology (IT) in Sweden.

In particular, Sweden has a remarkably strong network of experienced and skilled entrepreneurs and business people connected with the technology sector. This of course is partly a result as well as a reason behind the early adoption of the technical infrastructure. This in turn has a long and strong tradition in Sweden, going back to the telecommunication companies such as Ericsson dating back to the late 19th century.

We suggest that the reason the network is so strong is that the population of Sweden is sufficiently big to host a differentiated network while at

the same time not *too* big. With such a size, connections tend to be stronger and more multifaceted than in a larger network. Another aspect that is vital for understanding the network's competiveness is the strong international connections and the global approach that is natural. This global approach is paramount for bigger success given the size-limitations of the Swedish domestic market.[192]

Many of the successful companies today, such as those in this report, have in common that they are born-global companies. In other words, from their inception they are designed and destined for the global market. It is also worth noting that this is something that may separate the successful companies of today from most of the companies of the IT boom. While many of the companies of the first IT boom prepared and attempted to execute global expansion, the market was not yet mature for such players in terms of individuals conducting online transactions on the Internet. However, today with smart phones, mobile broadband, and relatively easy online financial transactions combined with a younger generation who has been brought up with the Internet, born globals are able to rapidly launch and achieve a global presence.

Another thing that is worth highlighting about the extremely successful companies of today is that although they are all companies reliant on modern information technology in some way, their business models are not purely based on a specific new technology. Rather what most of the companies have in common is that they use a technology that is already existing and relatively mature. More emphasis is instead focused on aspects such as user-friendliness, all-embracing solutions and content creation than on innovative technology per se.

As we have shown in this report, there is a clear connection in some respects between the prominent companies of the IT boom and the extremely successful companies of today. This connection is, however, weaker than one maybe might assume, yet it still tells us something very important about how a few actors can provide the necessary resources such as capital, experience, and know-how within the social network.

Below we further summarize our findings related to the factors supporting Sweden's fertile breeding ground.

A historically conducive business climate

- An underlying business environment that encourages continuous innovation, a global outlook, and an international skillset

192. Bernström, Andreas. 2014. Sweden's Growing Tech Scene. *The Wall Street Journal The Accelerators Blog.* April 11. http://blogs.wsj.com/accelerators/2014/04/11/andreas-bernstrom-swedens-growing-tech-scene/ (Accessed 2016-03-15).

across organizational levels developed through a long history of numerous multinational success stories, e.g., in engineering such as Ericsson and Atlas Copco founded in the 1870s and in design such as H&M and IKEA founded in the 1940s.

- A bottom-up and flat, non-bureaucratic management style that empowers creativity and innovation and enables high quality product development.

- A strong engineering and R&D culture encouraging a focus on problem-solving through collaboration both in formal R&D relationships between industry and universities and through informal networks developed while studying at universities such as the Royal Institute of Technology and the Stockholm School of Economics.

- A focus on solving user needs in the market over developing the most advanced technical solution due to a long history of combining IT with marketing and engineering with design.

Supportive economic conditions and government policies

- An economic crisis with a high level of unemployment leading to a first wave of IT startups in the 1990s, which then created a solid springboard for the second wave of startups.

- Early efforts in the 1990s by foresighted politicians to encourage computer penetration at home and in companies and other organizations through subsidies, significant infrastructure investments, and efforts to restrain monopoly positions by large market actors.

- A substantial social safety net provided by the government that reduces the risks faced by entrepreneurs and costs for companies, thereby encouraging entrepreneurship.

- Generous funding and numerous coaching programs provided by the government and universities for entrepreneurs and small companies.

- Access to Swedish and international talent through a number of

leading universities across the country as well as a focus on inter-disciplinary programs.

- A highly international workforce with English as a company language in many organizations with talent from abroad due to relaxed immigration policies and relatively cheap higher education.

- A stable government and a strong regulatory framework, which facilitates startup establishment and a solid base for companies looking to expand abroad.

Today's enabling business climate that leverages the experiences and resources acquired during the IT-boom and bust

- A high degree of Internet and computer literacy in the new generation entering the workforce.

- Access to capital and "smart money" through an experienced VC community, business angels, and new forms of funding such as equity crowdfunding and peer-to-peer lending.

- Strong local networks characterized by a pay-it-forward culture through which experienced entrepreneurs and others from the first wave of IT startups share their resources with the second wave of entrepreneurs through founding, investing, and advising startups.

- A high level of knowledge and other resource flows within the startup ecosystem, even among competitors, due to an open and trusting working environment combined with numerous informal networking opportunities such as meetups, lunches, and AWs, particularly in Stockholm due to the density of startups, universities, and other organizations.

- A high level of international networking with major cities such as London and New York due to individuals moving to Sweden and Swedes studying abroad as well as inflows of venture capital.

- A demanding local market as consumers in Sweden are high-tech early adopters, and multinationals often choose Stockholm as a testing market for the development of new products.

4. Moving forward

It is obvious that the climate for fast-growing tech companies in Sweden today is a beneficial one. This does, however, not mean that it always will remain that way or that there is nothing that cannot be done better. Below are some aspects we suggest that public policy makers and government funding bodies should take into account when trying to uphold and develop the climate further.

As we have noted, the early adopted and very well developed technical infrastructure has been of great importance for the success of Swedish technology-based companies.[193] To continue to make sure that the technological infrastructure is at the forefront globally should therefore be a priority, taking into account the importance of regulations and technical solutions that makes sure that the infrastructure remains open to several competing operators and service providers.

Paramount for Sweden to continue to be a leading hub for technology-based entrepreneurship is the ability to attract talented professionals. As many companies, entrepreneurs, and reports have pointed out on several occasions, the housing shortage in the Stockholm region has become a severe problem when trying to recruit talent.[194] This question needs to be solved in order for Stockholm to keep its position and continue to develop.

Furthermore, the relatively generous social security system in Sweden has contributed positively in creating a climate where people feel that they can take some risks, thereby stimulating entrepreneurship. To maintain a level of

---

193. Bernström, Andreas. 2014. Sweden's Growing Tech Scene. *The Wall Street Journal The Accelerators Blog*. April 11. http://blogs.wsj.com/accelerators/2014/04/11/andreas-bernstrom-swedens-growing-tech-scene/ (Accessed 2016-03-15).

194. Ahola, Teresa. Spotify ryter till om bostadsbristen i storstan. *SvD Näringsliv*. 2016-03-04. http://www.svd.se/spotify-ryter-till-om-bostadsbristen (Accessed 2016-03-15).

Tottmar, Mia. Spotify: Stockholm är sämst. *Dagens Nyheter*. 2015-03-03. http://www.dn.se/sthlm/spotify-stockholm-ar-samst/ (Accessed 2016-03-15).

relatively generous social safety net should in this perspective thus be seen as a good investment.

Finally, it is difficult to underestimate the importance of both the formal and the informal networks that support and contribute to the success of a region's competitiveness. Even though some of the most influential networks are created and developed through informal means, there are definitely ways for institutions to support and reinforce them. One important hub for network building is institutions of higher education. Striving to uphold and further develop a high quality within these institutions so that they can attract and educate skilled and dedicated people should be a priority. A second means is to enable and provide the facilities for individuals to gather informally, such as through meetups.

<div align="center">****</div>

For practitioners in business such as business leaders, entrepreneurs and investors looking to found, develop, or invest in the "unicorns" of the future, it is paramount to understand that there is no single attribute that can tell us whether a startup will achieve unicorn status or not - at least not when contemplating the factors we have looked at in this report. This means that an all too simple and/or schematic analysis, which is based on one or just a few factors, of startups should be avoided. Rather we would suggest developing more fine-tuned and multifaceted criteria when trying to analyze the potential for great success.

The findings in this report also open up for a wide array of possible further academic research. What was mentioned above, for example - that the unicorns from our point of view do not seem to be cast in one mold but do differ significantly compared with one another is something that should be also of academic interest.

Furthermore, there is a lot of interesting research that could be done in several disciplines. Finance scholars could investigate how investments are made in technology-based startups/potential unicorns and which criteria are being used by the investors when doing this. Economic geographers could look at the specific economic microenvironment that Stockholm obviously has. Researchers in business administration could look at the management methods used by the unicorns. Economic sociologists could research the specific social network around the Swedish unicorns and how it is constructed while scholars in international business could investigate the drivers behind the early internationalization of the unicorns and how it is done....just to name a few disciplines and research questions.

****

In terms of our next steps, we will continue to explore the factors we have identified as leading to Sweden's "unicorn" success and their convergence as well as keeping an open eye for further factors. We plan to extend our social network study to include companies that are linked to the unicorn and potential unicorn cloud through leading positions as well as to collect social network data on leading companies in other cities in Sweden such as Gothenburg, Linköping, Malmö, Umeå, Uppsala, and Västerås. Additionally, we will perform more in-depth social network analyses of these networks. Our intention is also to combine our social network data with company financial data and regional internet usage and other statistics as well to conduct a more in-depth analysis of two industries such as the financial services industry and one other not yet decided industry.

If you are interested in contributing or joining our project in some form or fashion, please drop us an email (robin.teigland@hhs.se). And if there is anything you think we have misrepresented or failed to cover, please let us know.

Appendices

1. Methodology and limitations

In pursuing the research for this report we have used several methodological approaches. The method which is used to pursue the thread in Part I relies heavy on in-depth literature studies with the aim of unveiling a complex history of technological innovation and evolution. To some extent, the description is based on the extensive experience and overview of the primary author of this part, Mats Lewan, who has worked as a technology reporter specialized on the IT and telecom industries since the middle of the 1990s. This is supplemented with interviews with people who have played important roles in the technological development. The aim has been to make a descriptive overview of how Internet technology—infrastructure, products and services—has evolved since the early years in the 1980s until now, how consumers and businesses have taken advantage of this technology and why, and how governmental and regulatory measures have influenced this process. The focus has been on the situation in Sweden, taking into account important international aspects.

<center>****</center>

The research for the first chapters in Part II has been conducted in three steps: 1) a list of prominent companies from the dotcom era was constructed, 2) key individuals from each company were identified, and 3) their connections to the current Swedish unicorns and potential unicorns were established.

The list of companies from the dotcom era was constructed by searching for combinations of keywords related to the era (e.g., "IT boomen", "dotcomboomen", "den nya ekonomin") and to investments (e.g., "värdering", "pengar", "aktiekurs"). Companies that were reported to have received high

valuations during the dotcom boom were included in the list.

In order to find connections to the current Swedish unicorns and potential unicorns, we have investigated potential relations between the dotcom key individuals combined with those individuals appearing as influential in the technology part and those individuals involved in the unicorns and potential unicorns in order to find matches in the founding team, investors and board members as well as more informal connections.

However, it should be noted that there is a chance that some connections have been missed in this report as there are no satisfactory listings of informal investors available nor could we find identify all the individuals. Many business angel investments are not publicly disclosed, which makes research in this area difficult. Also, this report is a part of a continuous research project and we do not claim to have covered all highly valued companies from this time period nor all individuals who have played a role in its development. Rather, this part of the report is to be seen as a first step in investigating how the dotcom boom has facilitated innovation and entrepreneurship in Sweden today.

****

For the research in which we conducted an analysis of the formal network of the unicorns and potential unicorns, we collected data from the database "Retriever Business". We use Selenium with Python to simulate user browsing behavior and automatically retrieve information about the board members who have been involved in the 15 focal companies as well as their first-degree peripheral companies.[195] Figure 29 provides an overview of the data collection process.

Figure 29. Flowchart of data collection

---
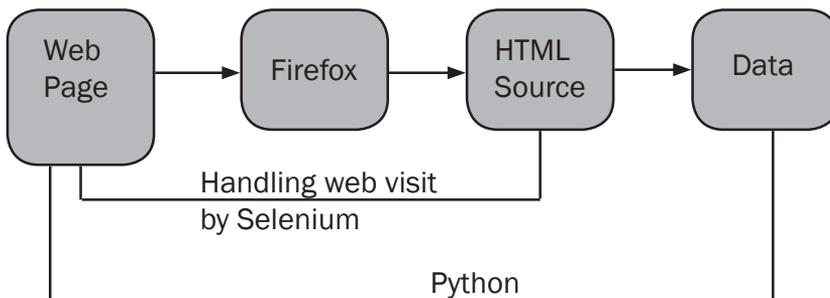
195. We define a company as a first-degree peripheral company of a unicorn/potential unicorn if one of its board members (in the past or present) has served in the board of the unicorn.

Specifically, the process starts by launching a Firefox page, browsing the content of the page, and then automatically extracting data from the page, and saving them into a database. For example, in order to collect the information about the board members at Spotify AB, our script will first load the main page of Retriever and make a query to look for "Spotify". When the general information page of Spotify AB is fully loaded, it will simulate the click of a user on "Befattningshavare" (i.e., Executives) and open the corresponding page (see the screenshot shown in figure 30). All the information about the members in the executive board listed on the page would be extracted and saved automatically. This includes each member's name and his employment history in the company. Next, our webscraping program will go to each board member's personal page, from which all the available information[196] will be extracted and saved.

Figure 30. Screenshot of the executive board at Spotify AB. All the hyperlinks on this page can be "clicked" by our web scraping program.
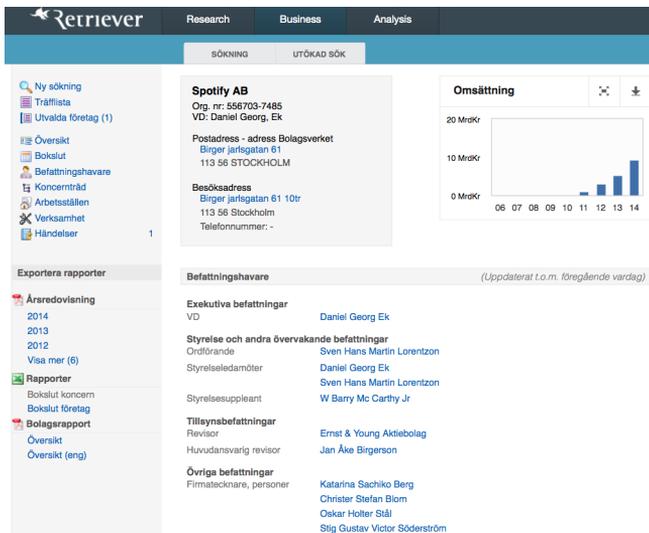
In this process, we have found that ten out of the 15 unicorns and potential unicorns when founded were bought as already registered shelf-companies. This made the data misleading both concerning the founding date and the founding people (and all the data around them). To tackle this issue we have

---

196. Such information might not be directly visible when the personal page loaded. Our script will simulate a user's browsing behavior and click all the hyperlinks on the page to retrieve the data when necessary.

manually checked through the records of each of the unicorns and excluded the people who registered the shelf-companies from our dataset, all in all 26 people.

Another issue that we have had to resolve is the company's sometimes complicated structures. In cases where there were several companies in a company group, we chose to use the parent company as the primary node for data collection, as identified in Retriever (figure 31).[197] Table 7 provides the short names of the startups for which we collected data.

Figure 31. Klarna - company group structure
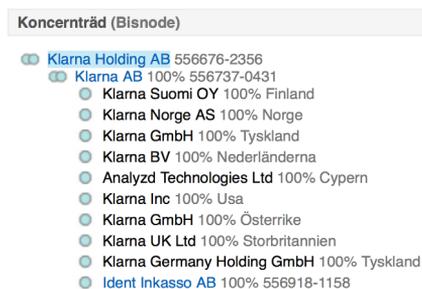
Table 7. Short name of companies and the full name of the company we have looked at

Short name of company	Company choosen in our report
Avito	Avito AB
FishBrain	Fishbrain AB
Footway	Footway Group AB
Fyndiq	Fyndiq AB
iZettle	iZettle AB
Klarna	Klarna Holding AB
KnCMiner	KnC Group AB
LeoVegas	LeoVegas AB
MAG Interactive	MAG Interactive AB
Mojang	Mojang AB
ShapeUp	ShapeUp Club AB
Spotify	Spotify AB
Tictail	Tictail AB
TrueSoftware	TrueSoftware Scandinavia AB
Zound	Zound Industries International AB

197. Tictail AB is a subsidiary to Tictail Inc based in the USA. Since we only have data on companies registered in Sweden we have chosen to study Tictail AB.

As mentioned above, through our data collection, we were able to identify the companies connected to our list of 15 companies. Figures 32 to 48 show the clusters of the 15 startups and their cloud in January 2016 broken out so that companies are more readily identifiable while figures 49 to 52 provide further detailed analysis.

Figure 32
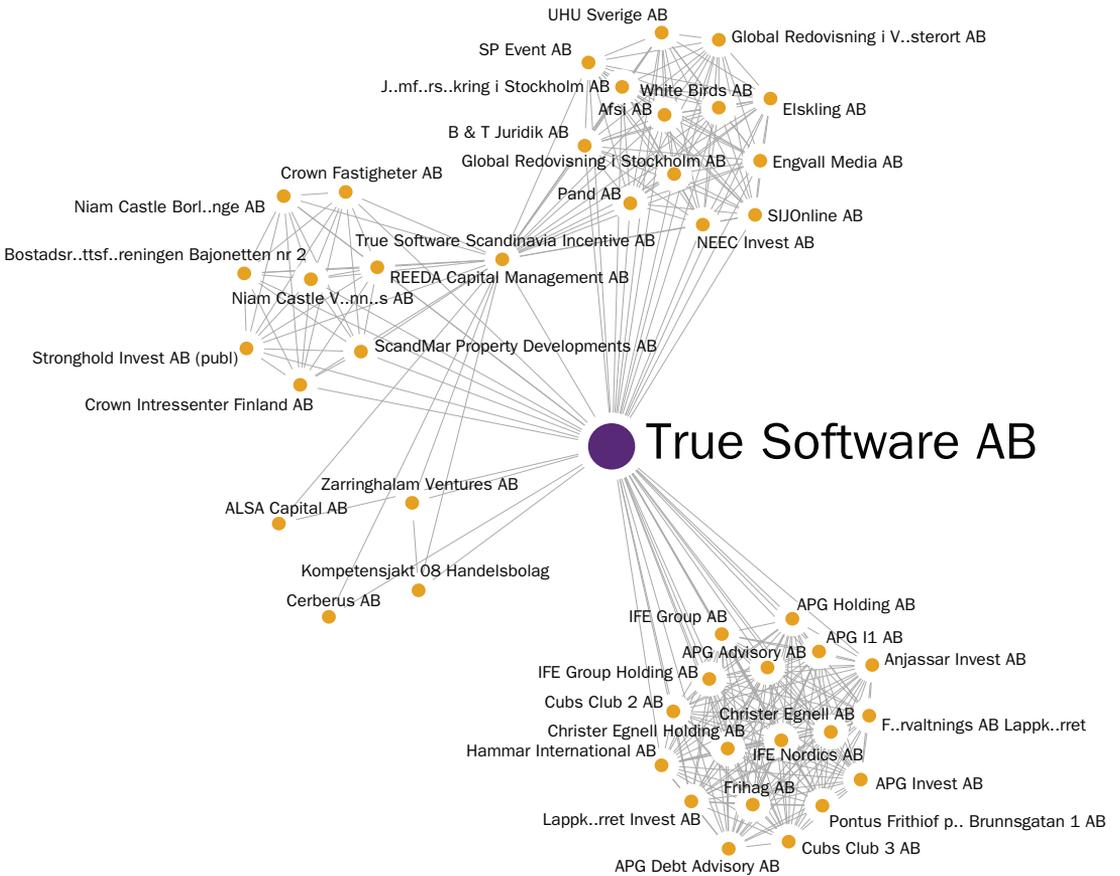
Figure 33
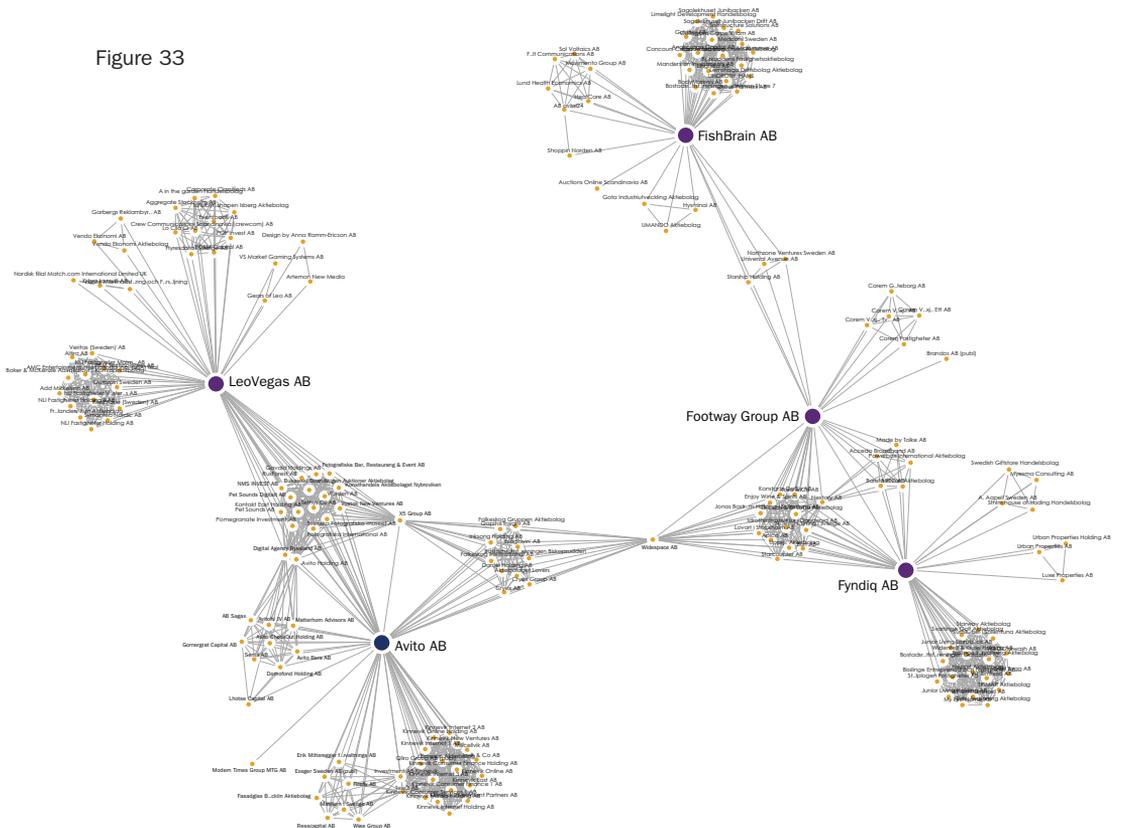
Figure 34
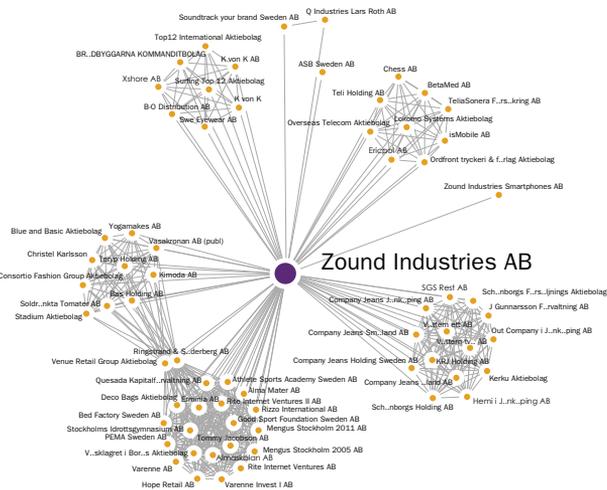
Figure 35
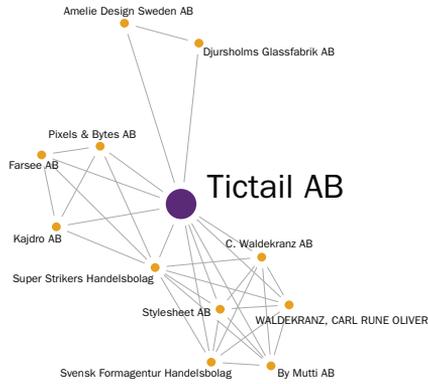
Figure 36
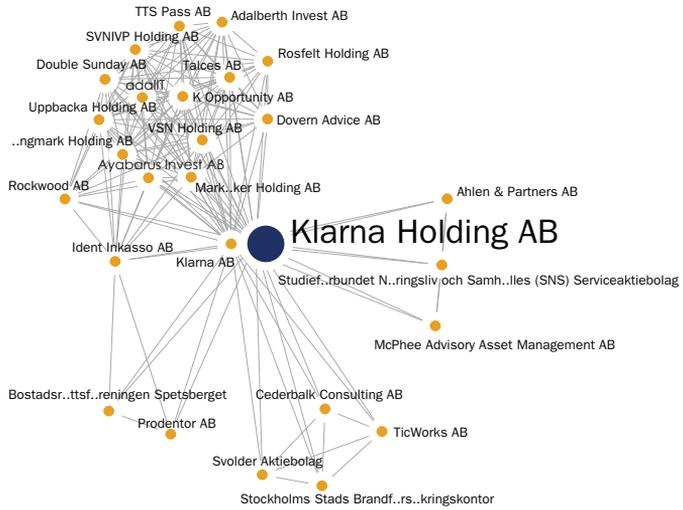
Figure 37
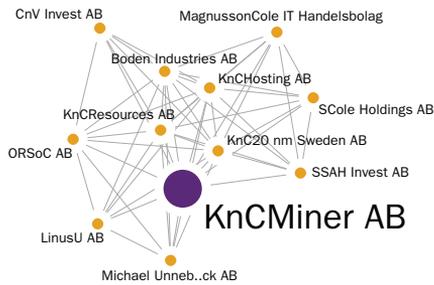
Figure 38
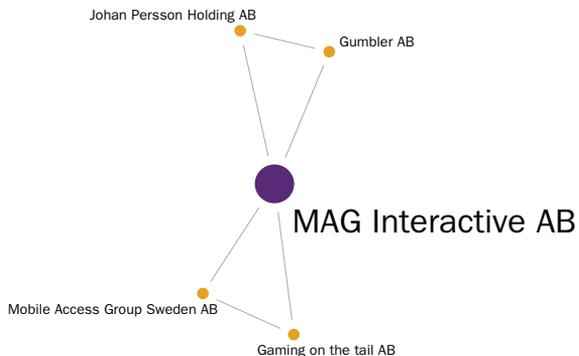

Figure 39
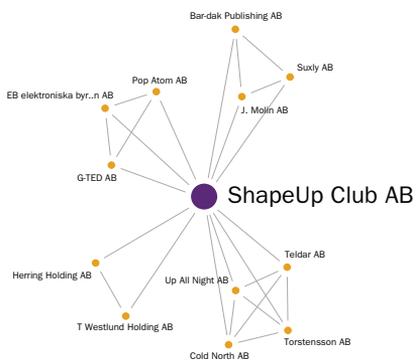
Figure 40
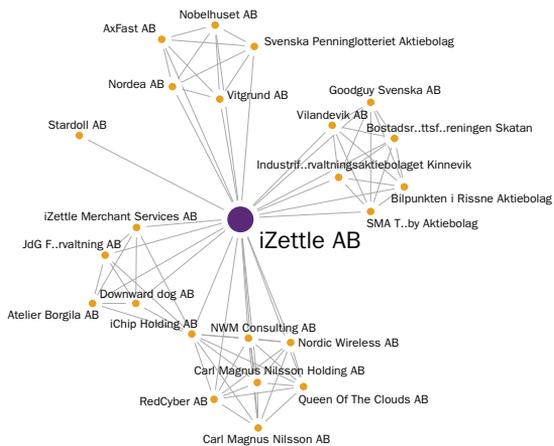
Figure 41
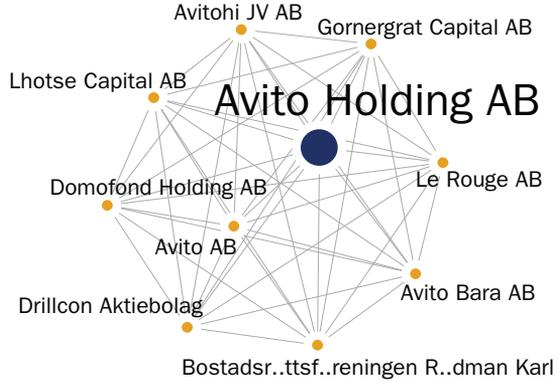
Figure 42
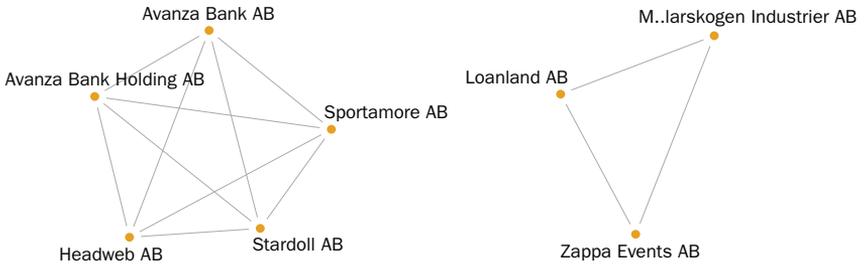
Figure 43
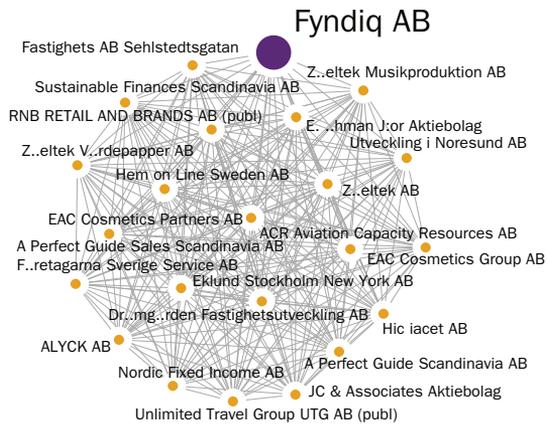
Figure 44
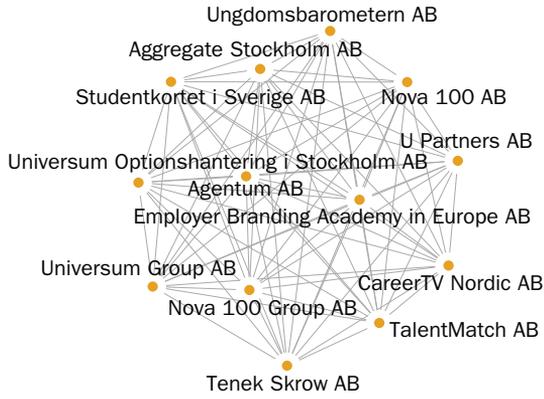
Figure 45
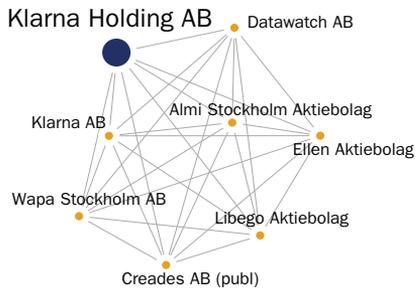
Figure 46
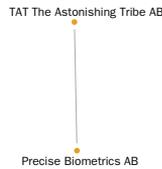
Figure 47
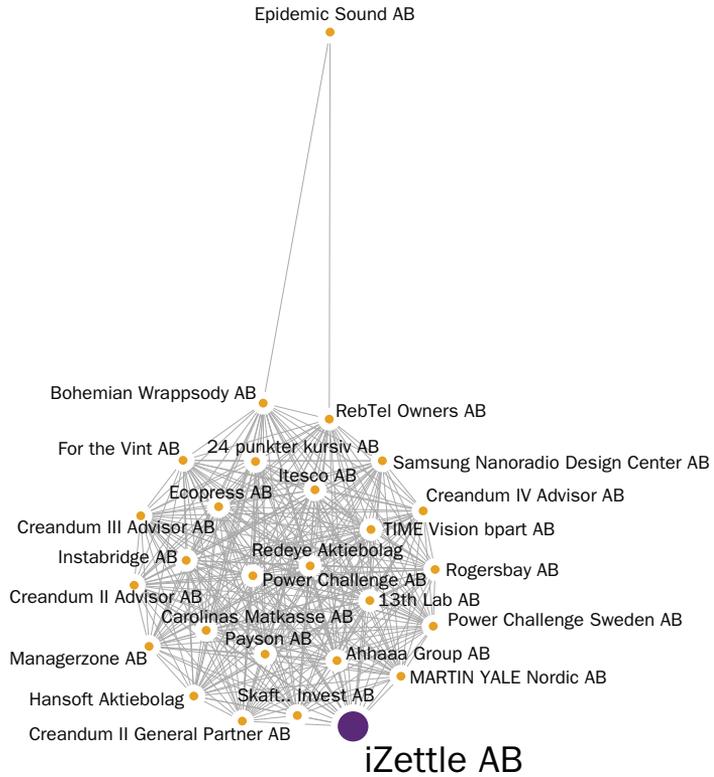
Figure 48

Figure 49
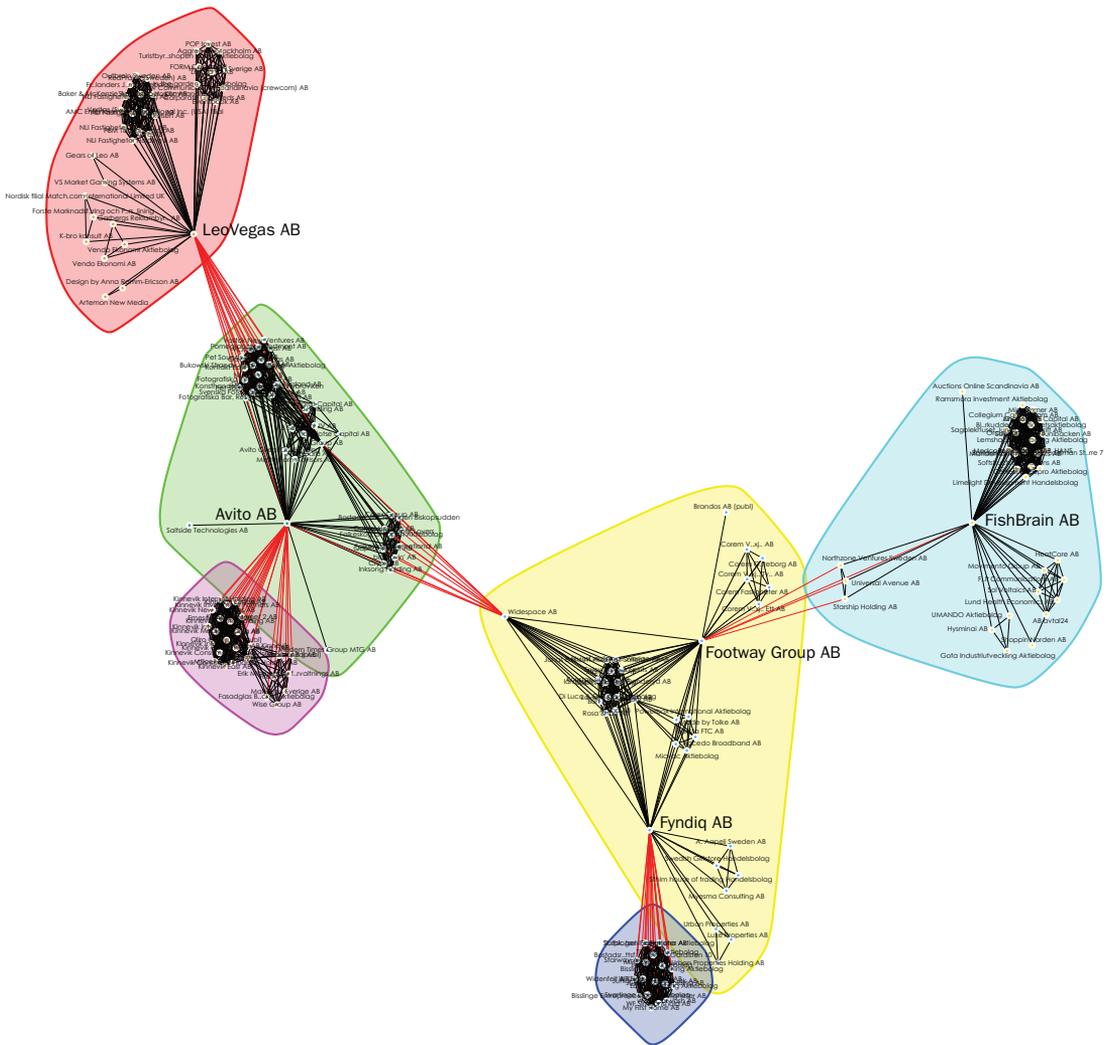
Figure 50

Figure 51
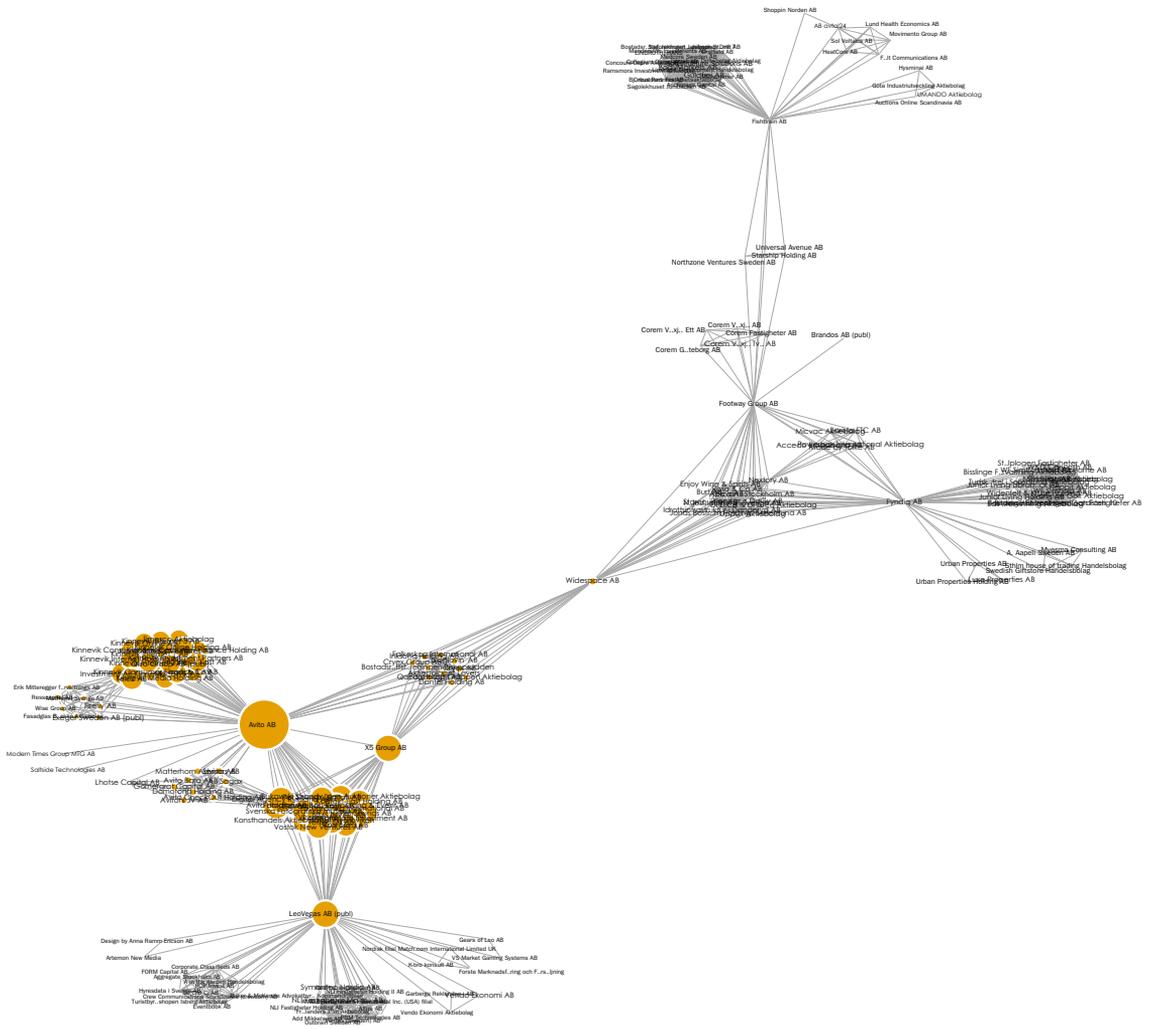
Figure 52
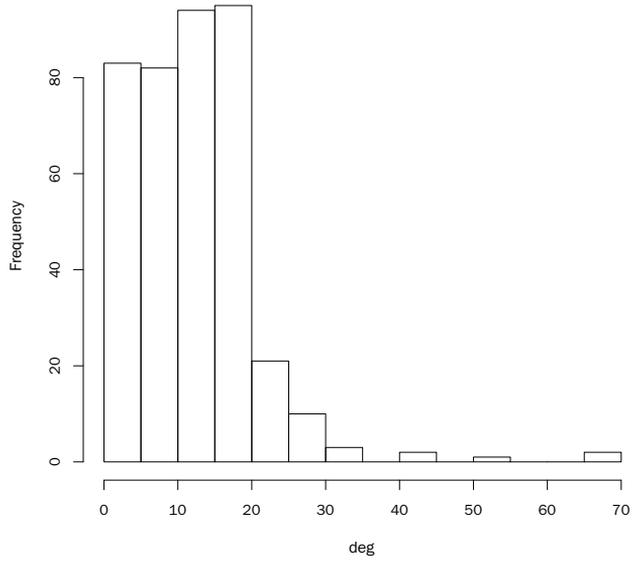
2. Literature

"Då: Brände 1,4 miljarder i riskkapital Nu: Är pomolog och säljer äppeldrycker". *VA.se*. 2015-06-26 http://www.va.se/nyheter/2015/06/26/da-brande-14-miljarder-pa-boo.com.-nu-ar-pomolog-och-driver-eko-musteri/ (Accessed 2016-02-24).

"Guldregn över grundaren när Jobline blir USA-ägt". Dagens Industri. 2001-05-25. http://www.di.se/artiklar/2001/5/25/guldregn-over-grundaren-nar-jobline-blir-usa-agt/ (Accessed 2016-02-24).

4 miljarder notan för hem-pc-reformen. *Computer Sweden, IDG*. 2002-08-02. http://computersweden.idg.se/2.2683/1.40813/4-miljarder-notan-for-hem-pc-reformen (Accessed 2016-02-08).

Agerman, Per. 300 miljarder blev luft när IT-bubblan sprack. Affärsvärlden. 2000-10-17. http://www.affarsvarlden.se/hem/nyheter/article2565046.ece (Accessed 2016-02-24).

Agerman, Per., & Pineus, Isaac. "Världen snurrade för Altituns grundare". Affärsvärlden. 2003-10-22. http://www.nyteknik.se/nyheter/it_telekom/allmant/article232971.ece (Accessed 2016-02-05).

Ahlbom, Helen. Ericsson-ingenjörerna tyckte Iphone var "en skittelefon". *Ny Teknik.* 2015-10-15. http://www.nyteknik.se/nyheter/it_telekom/article3938961.ece (Accessed 2016-03-07).

Ahola, Teresa. Spotify ryter till om bostadsbristen i storstan. *SvD Näringsliv*. 2016-03-04. http://www.svd.se/spotify-ryter-till-om-bostadsbristen (Accessed 2016-03-15).

Alpman, Marie. Spiken i kistan för Altitun. 2002-11-04. http://www.nyteknik.se/nyheter/it_telekom/allmant/article227154.ece (Accessed 2016-02-25).

Andersson, Bertil. Varför avskiljdes inte Telias nätverksamhet? Dissertation, KTH 1999, ISSN 1103-5277.

Apple. Apple Press Info. iPhone 3G on Sale Tomorrow. 2008-07-10. http://www.apple.com/pr/library/2008/07/10iPhone-3G-on-Sale-Tomorrow.html (Accessed 2016-03-07).

Atomico. Billion dollar+ software companies founded since 2003. Year n.a. http://www.atomico.com/explore-d3 (Accessed 1016-03-30).

AU-systems. *Wikipedia*. 2013. https://sv.wikipedia.org/wiki/AU-System (Accessed 2016-02-24).

Avdeitchikova, Sofia. "On the structure of the informal venture capital market in Sweden: developing investment roles." *Venture Capital* 10. (2008): 55-85.

Bäckström, Urban. What lessons Can Be Learned from Recent Financial Crises? The Swedish Experience. Remarks by Mr. Urban Bäckström, Governor of Sveriges Riksbank, at the Federal Reserve Symposium "Maintaining Financial Stability in a Global Economy",

Baum, Joel AC, and Helaine J. Korn. "Competitive dynamics of interfirm rivalry." *Academy of Management journal* 39.2 (1996): 255-291.

Benwell, Max. Stockholm is rivalling Silicon Valley with a hotbed of technology start-ups. *Independent*. 16.12.17 http://www.independent.co.uk/life-style/gadgets-and-tech/features/stockholm-is-rivalling-silicon-valley-with-a-hotbed-of-technology-start-ups-9931876.html (Accessed 2016-02-25)

Berg, Anton. *P3 Dokumentär - IT-bubblan* [Radio]. Stockholm: Sveriges Radio. 2007. http://sverigesradio.se/sida/avsnitt/93814?programid=2519. 35-39 min.

Bernström, Andreas. 2014. Sweden's Growing Tech Scene. *The Wall Street Journal The Accelerators Blog*. April 11. http://blogs.wsj.com/accelerators/2014/04/11/andreas-bernstrom-swedens-growing-tech-scene/ (Accessed 2016-03-15).

Billner, Amanda. Svenskar långt framme på app-fronten. *DN*. 2010-05-08. http://www.dn.se/ekonomi/svenskar-langt-framme-pa-app-fronten/ (Accessed 2016-03-07).

Blocket AB. *Om Blocket*. n.d. http://www.blocket.se/omblocket.htm (Accessed 2016-02-05).

Blocket.se. *Wikipedia*. 2016. https://sv.wikipedia.org/wiki/Blocket.se (Accessed 2016-02-05).

Blomén, Anna. "Affärsängeln bakom Klarna". Privata Affärer. 2012-08-24. http://www.privataaffarer.se/nyaaffarer/na-nyheter/affarsangeln-bakom-klarna-438925 (Accessed 2016-02-24).

Blomqvist, Daniel. 2015. Nordic tech is on fire – almost 10% of global BUSD exits over past 10 years. *Creandum*. March 16. http://www.creandum.com/nordic-tech-is-on-fire-almost-10-of-all-busd-exits-last-10-years (Accessed 1016-03-30).

Boss Media. *Wikipedia*. 2015. https://en.wikipedia.org/wiki/Boss_Media (Accessed 2016-02-05).

Bredbandsbolaget. *Wikipedia*. 2015. https://sv.wikipedia.org/wiki/Bredbandsbolaget (Accessed 2016-02-25).

Broberg, Anders; Chief Communications Officer at Stokab. Interview 2016-01-27.

Burn rate. *Wikipedia*. 2014. https://en.wikipedia.org/wiki/Burn_rate (Accessed 2016-02-25).

Cantwell, Oisin. *"Mina pengar tar inte slut"*. Aftonbladet. 2000-02-28. http://wwwc.aftonbladet.se/nyheter/0002/28/wineasy.html (Accessed 2016-02-05).

Cardon, Melissa S., et al. "The nature and experience of entrepreneurial passion." *Academy of Management Review* 34.3 (2009): 511-532.

Casselbrant, Roland. Adsl – bredband för alla. *PC Plus*. May 1999.

Centrala studiestödsnämnden. Hur mycket pengar får jag. 2015. http://www.csn.se/blivande-studerande/fragor-svar/studiemedel-sverige/1.2463 (Accessed 2016-03-25).

Cervenka, Andreas. De blev rika på Framfab. Affärsvärlden. 2001-05-07. http://www.affarsvarlden.se/hem/nyheter/article2534190.ece (Accessed 2016-02-24).

Cervenka, Andreas. Jonas Birgersson rikare än någonsin. Affärsvärlden. 2000-09-18. http://www.affarsvarlden.se/hem/nyheter/article2564454.ece (Accessed 2016-02-24).

Christer Sturmark. Wikipedia. 2015. https://sv.wikipedia.org/wiki/Christer_Sturmark (Accessed 2016-02-05).

City of Stockholm. Welcome to the Capital of Scandinavia. http://international.stockholm.se/ (Accessed 2016-03-25).

Davidson, Lauren. How Sweden became the startup capital of Europe. 2015-06-28. http://www.

telegraph.co.uk/finance/newsbysector/mediatechnologyandtelecoms/11689464/How-Sweden-became-the-startup-capital-of-Europe.html (Accessed 2016-02-25).

Davis, Evan. *Business Nightmares: Disastrous Decisions* [Television]. London: BBC. 2011. https://www.youtube.com/watch?v=n9kgZqbCJiM (Accessed 2016-02-24).

Den Nya Ekonomin. *Wikipedia*. 2013. https://sv.wikipedia.org/wiki/Den_nya_ekonomin (Accessed 2016-02-05).

Dotcombubblan. *IDG.se IT-ord*. nd. http://it-ord.idg.se/ord/dotcombubblan/ (Accessed 2016-02-24)

Edenholm, Yvonne. Mobilt bredband växer med turbofart. *Ny Teknik, Talentum.* 2007-06-29. http://www.nyteknik.se/nyheter/it_telekom/mobiltele/article254281.ece (Accessed 2016-02-22).

Edling, Christofer, and Rickard Sandell. "Social Influence and Corporate Behaviour A Case Study of Interdependent Decision-Making in Sweden's Publicly Traded Firms." *European sociological review* 17.4 (2001): 389-399.

Edling, Lotta. Spray-grundaren ångrar ingenting. Affärsvärlden. 2001-11-22. http://www.affarsvarlden.se/hem/nyheter/article2535239.ece (Accessed 2016-02-24).

EQT. Hjalmar Winbladh Joins EQT Partners. 2015-01-19. http://www.eqt.se/Newsroom/EQT-Updates/2015/Hjalmar-Winbladh-joins-EQT-Partners/ (Accessed 2016-03-10).

Ericsson, AnnCharlotte. Nu blir det strid om nätsurfarna. *Aftonbladet.* 1999-08-27. http://wwwc.aftonbladet.se/nyheter/9908/27/bredband.html (Accessed 2016-02-08).

EU. EUR-Lex. Regulation (EC) No 2887/2000 of the European Parliament and of the Council of 18 December 2000 on unbundled access to the local loop. http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32000R2887&from=SV (Accessed 16-02-22).

Fältström, Patrik; Head of Research and Development at Netnod. Interview 2016-02-04

Findahl, Olle & Davidsson, Pamela, *Svenskarna och internet : 2015 års undersökning av svenska folkets internetvanor*, .SE, Stiftelsen för internetinfrastruktur, 2015

Framfab. Wikipedia. 2015. https://sv.wikipedia.org/wiki/LBI_International_AB (Accessed 2016-02-25).

Fyndiq. (2012). Fyndiq tar in 20 miljoner i nytt kapital - affärsänglar investerar i Ullared på nätet. http://www.mynewsdesk.com/se/fyndiq/pressreleases/fyndiq-tar-in-20-miljoner-i-nytt-kapital-affaersaenglar-investerar-i-ullared-paa-naetet-776527 (Accessed 2016-03-15).

GP. Bullhound. Independent technology research- European billion dollar companies 2015: European unicorns: Do They Have Legs? 2015. http://www.gpbullhound.com/wp-content/uploads/2015/06/GP-Bullhound-Research-Billion-Dollar-Companies-2015.pdf (Accessed 1016-03-30).

Granlund, Fredrik. "Microsoft lägger ned Sendit". Ny Teknik. 2002-06-03. http://www.nyteknik.se/nyheter/it_telekom/allmant/article224584.ece (Accessed 2016-02-24).

HiQ. *Annual Report 1999*. http://feed.ne.cision.com/wpyfs/00/00/00/00/00/00/4C/C7/wkr0006.pdf (Accessed 2016-02-05), p 38.

HiQ. *Quarterly Report 2015 (Q4)*. http://www.hiq.se/Global/Reports_sv/Q4%20Rapport%202015.pdf (Accessed 2016-02-05)

How Stockholm Became a "Unicorn factory". 2015. *Knowledge@Wharton. Wharton University of Pennsylvania.* November 9. http://knowledge.wharton.upenn.edu/article/how-stockholm-became-a-unicorn-factory/ (Accessed 2016-03-30).

https://www.nada.kth.se/utbildning/grukth/exjobb/rapportlistor/2009/rapporter09/larsson_markus_09065.pdf

HUI Research. Årets julklapp. http://www.hui.se/arets-julklapp (Accessed 2016-02-08).

IIS. Internetmuseum.se. 2000 Telia erbjuder ADSL. http://www.internetmuseum.se (Accessed 2016-02-22)

IIS. Internetmuseum.se. http://www.internetmuseum.se (Accessed 2016-02-22)

Ilijason , Robert. Hem-pc:n på väg ut – så klarar du dig. *Computer Sweden, IDG*. 2007-08-21. www.idg.se/2.1085/1.98978 (Accessed 2016-02-08).

Ingraham, Nathan. Apple's App Store has passed 100 billion app downloads. *The Verge.* 2015-06-08. http://www.theverge.com/2015/6/8/8739611/apple-wwdc-2015-stats-update (Accessed 2016-03-07).

Internet World Stats. Top 50 countries with the highest internet penetration rates – 2013. http://www.internetworldstats.com/top25.htm (Accessed 2016-03-15).

Jackson Hole, Wyoming, USA August 29, 1997. http://www.riksbank.se/pagefolders/1722/970829e.pdf (Accessed 2016-03-30).

Jakob Armoe. Entreprenuer. Interview.

Johan Brenner. Creandum. n.d. http://www.creandum.com/team/johan-brenner/ (Accessed 2016-03-10).

Johan Brenner. LinkedIn. n.d. https://www.linkedin.com/in/johan-brenner-4353509 (Accessed 2016-03-10).

Jonas Nordlander. LinkedIn. https://www.linkedin.com/in/jonas-nordlander-749274 (Accessed 2016-03-14).

Jonung, L., Kiander, J., & Vartia, P. (2009). *The Great Financial Crisis in Finland and Sweden,* Edward Elgar Publishing.

Karlberg, Lars Anders. *Cisco lägger ned svenska Qeyton*. Ny Teknik. 2002-10-29. http://www.nyteknik.se/nyheter/it_telekom/allmant/article227080.ece (Accessed 2016-02-24).

Karlberg, Lars Anders. *Cisco lägger ned svenska Qeyton*. Ny Teknik. 2002-10-29. http://www.nyteknik.se/nyheter/it_telekom/allmant/article227080.ece (Accessed 2016-02-24).

Karlén, Åse. Affärsänglarna flockas i storstäder. Esbri.se. 2007-01-15. http://www.esbri.se/referat_utskrift_popup.asp?id=67 (Accessed 2016-03-09).

Kleja, Monica. Konkurrensverket ger sig på Telia om adsl. *Ny Teknik, Talentum.* 2003-05-06. http://www.nyteknik.se/nyheter/it_telekom/allmant/article230529.ece (Accessed 2016-02-23).

Kleja, Monica. Skadestånd ska skrämma telebolag till lydnad. *Ny Teknik, Talentum.* 2006-10-23. http://www.nyteknik.se/nyheter/it_telekom/allmant/article249616.ece (Accessed 2016-02-23).

Kramer, Ariel. 2015. If You're Looking for Your Next Unicorn, Head to Sweden *Huffpost Business. The blog.* December 4. http://www.huffingtonpost.com/ariel-kramer/if-youre-looking-for-your_b_8719426.html (Accessed 2016-03-25).

Larsson, Johan. Ebay köper Tradera för 365 miljoner kronor. 2006-04-24. http://internetworld.idg.se/2.1006/1.54357/ebay-koper-tradera-for-365-miljoner-kronor (Accessed 2016-02-24).

Larsson, Markus. Förhållandet mellan CD-försäljning, digital musikförsäljning, framföranderättigheter, privatkopieringsersättning och konsertintäkter. Dissertation, KTH, 2009.

LBI International. Wikipedia. 2015. https://sv.wikipedia.org/wiki/LBI_International_AB (Accessed 2016-02-25).

Lechner, Christian, and Michael Dowling, 'Firm Networks: External Relationships as Sources for the Growth and Competitiveness of Entrepreneurial Firms', *Entrepreneurship & Regional Development*, 15 (2003), 1–26.

Leo Heung, Entrepreneur from Hong Kong. Interview 2016-03-29.

Lewan, Mats. How piracy paved the way in Sweden. CBS Cnet News. 2009-02-17. http://www.cnet.com/news/how-piracy-paved-the-way-in-sweden/ (Accessed 2016-02-22).

Lewan, Mats. Internettrafiken halverades i går. *Ny Teknik.* 2009-04-02. http://www.nyteknik.se/nyheter/it_telekom/internet/article260684.ece (Accessed 2016-03-07).

Lewan, Mats. Nokia tänkte rätt men gjorde fel. *Ny Teknik.* 2010-04-29. http://it-bloggen.nyteknik.se/2010/04/29/nokia-tankte-ratt-men-gjorde-fel/ (Accessed 2016-03-07).

Lewan, Mats. Tele2 slår larm om Telias bredbandsmonopol. *Ny Teknik, Talentum.* 2006-04-27. http://www.nyteknik.se/nyheter/it_telekom/allmant/article256476.ece (Accessed 2016-02-23).

Lindh, Sara. Johan Staël von Holsteins nya startup berättar allt om ditt namn. Breakit. 2015-06-15. http://www.breakit.se/artikel/814/johan-stal-von-holsteins-nya-startup-berattar-allt-om-ditt-namn (Accessed 2016-03-10).

Lindroth, Jan. *Börsbubblans största vinnare*. Affärsvärlden. 2002-10-30. http://www.affarsvarlden.se/hem/nyheter/article2538053.ece (Accessed 2016-02-05).

Litchfield, Steve. Symbian market share analysis from ABI. *All About Symbian.* 2007-03-20. http://www.allaboutsymbian.com/news/item/5059_Symbian_market_share_analysis_.php (Accessed 2016-03-07).

Lundell, Stefan. 2015. 2015 sees record breaking venture capital rain on Swedish tech companies. *Swedish Startup Space*. October 8. http://swedishstartupspace.com/2015/10/08/vcs-make-it-rain-on-swedish-tech-companies-records-will-be-broken-this-year/ (Accessed 2016-03-30).

Lundell, Stefan. King-grundarna startar egen fond - ska investera i svenska startups. Breakit. 2016-01-29. http://www.breakit.se/artikel/2491/king-grundarna-startar-egen-fond-ska-investera-i-svenska-startups (Accessed 2016-03-10).

Lundell, Stefan. Svenska grundarna säljer Avito-aktier för 1,4 miljarder kronor. Breakit. 2015-10-23. http://www.breakit.se/artikel/1676/svenska-grundarna-saljer-avito-aktier-for-1-4-miljarder-kronor (Accessed 2016-03-15).

M. Forzati, C. Mattsson, *Samhällsekonomisk inverkan av fiber nät i Västra Mälardalen*, Acreo Rapport acr059369, Stockholm, April 2015.

M. Forzati, C. Mattsson. *Stokab, a socio-economic study*, Acreo report acr055698, Stockholm: Acreo, 2013.

Magdalena Bonde. LinkedIn. https://www.linkedin.com/in/magdalenabonde (Accessed 2016-03-15).

Mattias Miksche. LinkedIn. https://www.linkedin.com/in/mattiasmiksche (Accessed 2016-03-10).

Mattson, Crister; Senior Advisor, Acreo Swedish ICT AB. Interview 2016-01-26.

McDuling, John. Meet Charles Caldas, the Aussie who took on Apple with Taylor Swift. *The Sydney Morning Herald*. 2015-10-23. http://www.smh.com.au/business/media-and-marketing/the-aussie-who-stared-down-apple-and-won-20151020-gkeb23.html (Accessed 2016-02-08).

Mitzner, Dennis. 2016. Sweden Is A Tech Superstar From The North. 26 January. *Tech Crunch. Crunch Network.*. http://techcrunch.com/2016/01/26/sweden-is-a-tech-superstar-from-the-north/(Accessed 2016-03-30).

Mitzner, Dennis. 2016. Sweden Is A Tech Superstar From The North. 26 January. *Tech Crunch. Crunch Network.*. http://techcrunch.com/2016/01/26/sweden-is-a-tech-superstar-from-the-north/(Accessed 2016-03-30).

Mölleryd, Bengt G; Ph. D. and Senior Analyst at PTS. Interview 2016-01-26.

Mölleryd, Bengt G; Ph. D. and Senior Analyst at PTS. Interview 2016-01-26.

Mynewsdesk. Stokab och HDR förser sändningar av Stockholm Marathon samt EM-fest med senaste tekniken. 2008-05-30. http://www.mynewsdesk.com/se/pressreleases/stokab-och-hdr-foerser-saendningar-av-stockholm-marathon-samt-em-fest-med-senaste-tekniken-219294 (Accessed 2016-03-07).

Needleman, Sarah E.. Activision Blizzard to Acquire King Digital for $5.9 Billion. *The Wall Street Journal.* 2015.11.03. http://www.wsj.com/articles/activision-blizzard-agrees-to-acquire-king-digital-entertainment-in-5-9-billion-deal-1446523976 (Accessed 2016-03-10).

Netscape. Wikipedia. 2016. https://en.wikipedia.org/wiki/Netscape (Accessed 2016-02-24)

Nilsson, Elisabeth. Jonas Birgersson – från rollspelare till Bredbandsjesus. IIS. 2015-10-02. https://www.iis.se/blogg/jonas-birgersson-fran-rollspelare-till-bredbandsjesus/ (Accessed 2016-02-05).

Nilsson, Elisabeth. Jonas Birgersson – från rollspelare till Bredbandsjesus. IIS. 2015-10-02. https://www.iis.se/blogg/jonas-birgersson-fran-rollspelare-till-bredbandsjesus/ (Accessed 2016-02-05).

Nilsson, Julia. *Press är guld värd för företagen*. Journalisten.se. 2000-11-22. http://www.journalisten.se/nyheter/press-ar-guld-vard-foretagen (Accessed 2016-02-05).

Nordström, Bengt; CEO and co-founder of Northstream. Interview 2016-01-27

Ola Ahlvarsson. https://en.wikipedia.org/wiki/Ola_Ahlvarsson (Accessed 2016-03-25).

Open Handset Alliance. Industry Leaders Announce Open Platform for Mobile Devices. 2007-11-05. http://www.openhandsetalliance.com/press_110507.html (Accessed 2016-03-07).

PTS. Förutsättningar för hållbar konkurrens på bredbandsområdet. PTS-ER-2005:39. Stockholm 2005-12-08.

PTS. Svensk telemarknad 2014. PTS-ER 2015:19. Stockholm 2015-05-25.

RIP Good Times? Venture Capital Funding, Unicorn Births, And Mega-Deals Plummet in Q4'15. 2016. *CB Insights – Blog*. January 7. https://www.cbinsights.com/blog/venture-capital-fall/ (Accessed 2016-03-30).

Rönn, Cina. *Cell och Mandator går ihop?*. Aftonbladet. 2000-02-07. http://wwwc.aftonbladet.se/nyheter/0002/07/itjatte.html (Accessed 2016-02-05).

Roos Svensson, Moa. *Tillbaka – som pomolog*. Dagens Industri. 2015-06-23. http://www.di.se/di/artiklar/2015/6/24/tillbaka--som-pomolog/ (Accessed 2016-02-24).

SFS 2000:1161.

SFS 2008:884.

Sjöshult, Fredrik. *Wikell jagas av skattmasen*. Dagens Industri. 2004-01-09. http://www.di.se/artiklar/2004/1/9/wikell-jagas-av-skattmasen/ (Accessed 2016-02-05).

Skan et al. 2015, The Future of FinTech and Banking: Digitally Disrupted or Reimagined?, *Accenture Report*,

Social network analysis encompasses a set of methods, which are used for the analysis of social structures, more specifically to investigate the relational aspects of these structures..

Spray.se. Wikipedia. 2015. https://sv.wikipedia.org/wiki/LBI_International_AB (Accessed 2016-02-25).

Statista. Global market share held by the leading smartphone operating systems in sales to end users from 1st quarter 2009 to 4th quarter 2015. 2016. http://www.statista.com/statistics/266136/global-market-share-held-by-smartphone-operating-systems/ (Accessed 2016-03-07).

Statskontoret. 2000, Internet och datoranvändning i Sverige år 2000. http://www.statskontoret.se/upload/Publikationer/2001/200128.pdf (Accessed 2016-03-15).

STHLM TECH Meetup. http://www.meetup.com/STHLM-Tech-Meetup/ (Accessed 2016-03-25).

Stinchcombe, Arthur L. "Organizations and social structure." *Handbook of organizations* 44.2 (1965): 142-193.

Stockholm House of Innovation Epicenter. https://epicenterstockholm.com/en#about (Accessed 2016-03-25).

Ström, Viktor. Den svenska adelns favoritstartup. DI Digital. 2015-09-22. http://digital.di.se/artikel/den-svenska-adelns-favoritstartup (Accessed 2016-03-10).

STUDYinEUROPE.eu. Study in Sweden. Tution fees at university in Sweden. 2016. http://www.studyineurope.eu/study-in-sweden/tuition-fees (Accessed 2016-03-25).

Start using Bitcoin. What is Bitcoin? http://startusingbitcoin.com/blog/1-what-is-bitcoin/ (Accessed 2016-05-01)

sup46. Start-up people of Sweden. http://www.sup46.com/(Accessed 2016-03-25).

Svensson, Måns. Är fildelningen tillbaka på samma nivåer som före Ipredlagen?. *Cybernormer.se*. 2009-10-02. http://cybernormer.se/ar-fildelningen-tillbaka-pa-samma-nivaer-som-fore-ipredlagen/ (Accessed 2016-03-07).

Söderblom, Anna. The current state of the Venture Capital industry. In *Näringspolitiskt Forum* (2012).

Sölvell, Örjan, Fohlin, Carl & Protsiv, Sergiy. *Ekosystemet ICT & Digital: kartläggning av styrkeområden i Stockholmsregionen*, Länsstyrelsen i Stockholms län, Stockholm, 2015.

Sölvell, Örjan, Zander, Ivo & Porter, Michael E., *Advantage Sweden*, Norstedt, Stockholm, 1991

Teigland, Robin, et al. Fin Tech and the Future of Finance. Power point presentation. March 2016. http://www.slideshare.net/eteigland?utm_campaign=profiletracking&utm_medium=sssite&utm_source=ssslideview (Accessed 2016-03-30).

The Swedish Goverment. Ett informationssamhälle för alla. Proposition 1999/2000:86. Stockholm, 2000.

The unicorn list. *Fortune*. 2016. http://fortune.com/unicorns/ (Accessed 1016-03-30).

THINGS by STING http://www.thingstockholm.com/(Accessed 2016-03-25).

Tottmar, Mia. Spotify: Stockholm är sämst. *Dagens Nyheter*. 2015-03-03. http://www.dn.se/sthlm/spotify-stockholm-ar-samst/ (Accessed 2016-03-15).

Tradera. *Wikipedia*. 2015. https://sv.wikipedia.org/wiki/Tradera (Accessed 2016-02-25).

Tung, Liam. Stockholm is the 'most prolific' billion-dollar startup hub behind Silicon Valley. 2014-11-07. http://www.zdnet.com/article/stockholm-is-the-most-prolific-billion-dollar-startup-hub-behind-silicon-valley/ (Accessed 2016-02-25).

Vardi, Nathan. Alexander Vik Is The Most Interesting Man In The World (As Long As He Doesn't Owe You Money). Forbes. 2014-03-05. http://www.forbes.com/sites/nathanvardi/2014/03/05/the-riddle-of-alexander-vik/#4df667ae17e0 (Accessed 2016-02-24)

Vetenskapsrådet. The Swedish system of research funding. 2015. http://www.vr.se/inenglish/researchfunding/applyforgrants/theswedishsystemofresearchfunding.4.aad30e310abcb9735780007228.html (Accessed 2016-03-30).

Wesley-James, Nicholas; Ingram, Claire; Källstrand, Carl ; Teigland, Robin. Stockholm FinTech: An overview of the FinTech sector in the greater Stockholm Region. 2015.

Weverbergh, Raf. Interview: from Burger King to boardroom, how Klarna became a payments giant. *Whiteboardmag*. n.d. http://www.whiteboardmag.com/interview-from-burger-king-to-boardroom-how-klarna-became-a-payments-giant/ (Accessed 2016-03-10).

Work in Sweden. Social benefits. http://work.sweden.se/living-in-sweden/social-benefits/(Accessed 2016-03-15).

Zachrison, Olle. Jonas Birgersson: "Vi har straffats mycket hårdare". Svenska Dagbladet. 2010-03-05. http://www.svd.se/jonas-birgersson-vi-har-straffats-mycket-hardare (Accessed 2016-03-10).

Zeigerer, Jessica. Jonas Birgersson till Israel. Sydsvenskan. 2013-08-25. http://www.sydsvenskan.se/lund/jonas-birgersson-till-israel/ (Accessed 2016-03-10).

3. The authors

Albin Skog is a PhD student at the Center for Strategy and Competitiveness at the Stockholm School of Economics. He works on projects about competitiveness, innovation and historical market systems. He holds a Bachelor's and a Master's degree in History of Ideas from Södertörn University, Stockholm and has also studied History and Aesthetics.

Mats Lewan is an author, journalist, speaker and moderator, focusing on the force of change in accelerating technologies and how they will transform our lives and our society forever in the next few decades. As a journalist he has been a staff writer at the Swedish technology weekly *Ny Teknik* for 15 years, and he has also been a reporter at CBS CNET News in San Francisco. In his recent book, *An Impossible Invention,* he tells the remarkable story about the much discussed and potentially disruptive energy source cold fusion. Lewan holds a Master of Science in Engineering Physics from the Royal Institute of Technology in Stockholm, Sweden.

Michael Karlström has a BSc in Business Administration from the Stockholm School of Economics and a BSc in Psychology from Stockholm University. He is currently studying for an MSc in Management of Innovation and Business Development at Copenhagen Business School, which he will graduate from during 2016. Previously, Michael has founded a tech startup in the area of mobile consumer research (Freebee), worked for a multinational FMCG company (Unilever) and been involved with building an online professional network for Nova Global. Personal webpage: http://karlstrom.co/.

Sergey Morgulis-Yakushev is a researcher at the Center for Strategy and Competitiveness at the Stockholm School of Economics. Sergey received his doctoral degree from the Stockholm School of Economics and he also holds a PhD in statistics and Master's degrees in Economics and Mathematics. Sergey's research focuses on international aspects of effectiveness and efficiency of organizations, foreign market entry, knowledge transfer, and strategic innovation. Sergey was born in St Petersburg, Russia and is a Russian citizen.

Yixin Lu is Assistant Professor of Business Analytics and Digital Innovation and a member of the KIN - Knowledge, Information, and Networks research group at VU University Amsterdam. Her research focuses on the economic, behavioral and social impacts of information technology. She received her PhD from the Rotterdam School of Management at Erasmus University and holds a double Master's degree (Cum Laude) in Industrial Mathematics from Eindhoven University of Technology (TU/e), the Netherlands and Technical University of Kaiserslautern, Germany.

Photo: Juliana Wiklund

Robin Teigland is Professor of Business Administration at the Center for Strategy and Competitiveness at the Stockholm School of Economics. She is currently working on several projects such as the Sharing Economy and Sweden's FinTech. In general she is interested in how disruptive technologies, such as the block chain, 3D printing, and virtual worlds are enabling value creation activities across and outside traditional firm boundaries, thereby transforming value creation in society. Robin holds a Bachelor in Economics with Distinction from Stanford University, an MBA from the Wharton School, a Master in International Studies from the University of Pennsylvania, and a PhD from the Stockholm School of Economics. More information can be found through googling her.

4. Center for Strategy and Competitiveness

The Center for Strategy and Competitiveness (CSC) was founded in 2005 and focuses on five research tracks: Strategy and Market Systems, International Business, Knowledge in Networks, Clusters, and Competitiveness Policy.

CSC works in a trans-disciplinary tradition involving theories from Strategy, Management, International Business, Economic Geography, Economic Sociology and Economic History.

CSC is managing the Cluster Observatory and runs a number of data bases related to clusters.

CSC led the three-year Nordic Virtual Worlds Network (NVWN), an international, inter-disciplinary project focused on investigating entrepreneurship and innovation in relation to virtual worlds and the 3D internet. Currently, the Center is running two three year projects: 1) the Innovative Internet and 2) Bringing peer-to-peer to finance: When trust meets information technology.

CSC is an affiliate institute to the Institute for Strategy and Competitiveness (ISC), led by Professor Michael E Porter at HBS.

The Cluster Observatory informs policymakers, cluster practitioners and researchers, throughout the world, about European clusters and cluster policies.

CSC is a research center at SIR, Stockholm School of Economics Institute for Research. SIR is a national research institute for the economic sciences, with a focus on Business Administration in the broadest sense.

5. Acknowledgements

Chasing the tale of the unicorn – A study of Sweden's misty meadows is the first report from the three-year project, *The Innovative Internet*, which is funded by the Internet Foundation in Sweden (IIS - Internetstiftelsen i Sverige). In this project our primary objective is to examine how the Internet and digitalization has influenced entrepreneurship and innovation in Sweden.

In this report we focus on the unicorn-phenomena, by doing an in depth investigation of 4 unicorns and 11 potential unicorns. The report also explores the roots of this success and takes us on an initial journey through the technological developments from the 1980s to today and through the first and second waves of IT startups in the country.

In the future the project will go both deeper into these questions, as well as apply different lenses - as we move our focus from unicorns to a broader set of high-technology startups.