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Digital entrepreneurship and field conditions for institutional change— Investigating the enabling role of cities

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ABSTRACT

Digital entrepreneurship may result in institutional turbulence and new initiatives are frequently blocked by vested interest groups who posit superior financial and relational resources. In this paper, we explore the role of cities in facilitating digital entrepreneurship and overcoming institutional resistance to innovation. Drawing upon two historical case studies of digital entrepreneurship in the city of Stockholm along with an extensive material on the sharing economy in Sweden, our results suggest that cities offer an environment that is critical for digital entrepreneurship. The economic and technological diversity of a city may provide the field conditions required for institutional change to take place and to avoid regulatory capture.

1. Introduction

Research in the field of entrepreneurship increasingly acknowledges the importance of digital entrepreneurship (Del Giudice and Straub, 2011). Digital entrepreneurship facilitates the exchange, transfer and acquisition of knowledge while also initiating new ways of doing business. As web-based platforms enable peer-to-peer transactions and allow novel and unique combinations of resources that generate new products and service offerings (Amit and Zott, 2001), digital entrepreneurship becomes increasingly prevalent in many sectors of the economy, giving rise to institutional conflicts as new initiatives are frequently incompatible with formal and informal laws and regulations governing established industries.

The platform revolution (Parker et al., 2016) and the rise of the sharing economy constitute prominent examples of ways in which unused resources become utilized (Acquier et al., 2017) which create unparalleled scalability. Apart from some notable exceptions (e.g. Florida et al., 2016; Isenberg, 2011), little is known concerning how digital entrepreneurship relates to its nearest geographical proximity. Therefore, much remains in assessing the interplay between ecosystems

of digital entrepreneurship and specific spatial settings such as cities, especially concerning the role of institutions and institutional change. Institutional change is usually associated with considerable resistance among vested interest groups who frequently posit superior financial and relational resources, putting them in a position where they can captivate regulatory processes and block changes of a more divergent nature (Epstein, 1980; Moky, 2003). How is it possible for digital entrepreneurs to enact institutional change when facing resistance from resourceful interest groups?

In this paper, we study how digital start-ups and scale-ups grow in a city, in our case Stockholm and Sweden. Specifically, we explore how and why digital entrepreneurship takes place in cities and how digital entrepreneurs can overcome resistance. We do so by employing a mixed methods approach, drawing upon both archival data concerning historical cases and more contemporary material such as entries in social media. While two of our cases concern the early phases of digitalization (the 1980s) with entrant and incumbent firms in telecommunications and financial exchanges, we combine this material with an analysis of how the sharing economy is currently gaining momentum in Sweden. This is done by drawing upon approximately 5000 user-generated

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content in social media concerning the Swedish sharing economy.

We conclude that cities present a potent ground for the creation of new formal and informal institutions. The combined process of technological and institutional change that has often been invoked by digital entrepreneurship seems to be more likely to occur in cities, i.e. agglomerations where transaction costs are lowered, a diverse collection of actors are present, policymakers are more accessible and markets are more diverse. Our primary contribution therefore lies in highlighting that cities play a critical role in overcoming institutional barriers to digital entrepreneurship. Institutions frequently need to be altered in order to enable the continued expansion of digital scale-ups and cities tend to provide the field conditions required for accomplishing institutional change. With regards to platforms, that depend on network effects for their growth and success, the relative density of cities seem to offer opportunities to create and expand sharing economy offers to new areas of society.

The remainder of the paper is organized as follows. In the next section, we review literature on digital entrepreneurship and cities. We then turn to our method and cases used this paper. Subsequently, results are presented and analyzed. Eventually, a discussion and a concluding remark are provided.

2. Literature on digital entrepreneurship and platforms

We begin this section by providing an expanded description of digital entrepreneurship, with a particular emphasis on platforms. The following sub-section delves deeper into the role of institutions and overcoming resistance from vested interests. We then turn to economic geography and the role of cities while the last sub-section synthesizes and situates our research problem in further detail.

In the information based economy, industries are to a greater extent subject to increasing returns to adoption rather than diminishing returns. As knowledge can be re-used and businesses are subject to network effects by applying a platform logic, significant economies of scale are an integral part of digital entrepreneurship (Arthur, 1996), resulting in associated exponential changes across several sectors of society.

The emergence of digital technology and associated entrepreneurship has not only sparked economic growth, but also competitive turbulence and creative destruction (Christensen, 1997; Tripsas, 1997) along with institutional change (Ernkqvist, 2015; Gurses and Ozcan, 2015). Here, institutions can be defined as “the humanly devised constraints that structure human interaction” (North, 1991: 3) that conventionally are divided into formal (laws and regulations) and informal institutions (culture, norms and practices).

As technological change may induce changes both in the marketplace and in the institutional set-up (Fuenfschilling and Truffer, 2016; Kwon and Motohashi, 2017), digital entrepreneurship can be regarded as a process of strategic maneuvering in both the commercial and the institutional domain, i.e. the non-market domain. The commercial domain can be thought of as the marketplace where offers compete for customers. Non-market strategy can be defined as a firm's attempts to compete by influencing the institutional and societal context in which it engages in market strategies of economic competition (Baron, 1995; Lux et al., 2011), also frequently referred to as institutional entrepreneurship (Battilana et al., 2009). Therefore, digital start-ups and scale-ups not only face the challenge of attracting resources such as capital and employees while developing a competitive offer. They also face an institutional set-up which at times require proactive transformation in order to better fit the entrepreneur's business (Berglund and Sandström, 2017). The outcome of such processes of interrelated technological and institutional change is highly uncertain and subject to extensive negotiations as actors strive to create legitimacy and influence the institutional set-up to their favor (Binz et al., 2016; Kooijman et al., 2017).

In recent years, a particular form of digital entrepreneurship has emerged which is often referred to as the sharing economy, defined as

“ICT-enabled platforms for exchanges of goods and services drawing on non-market logics such as sharing, lending, gifting and swapping as well as market logics such as renting and selling” (Laurell and Sandström, 2017, p. 63). While this topic has gained extensive attention recently, there is ample evidence that platform-based models of competition have been around for several decades. Mobile communications and stock exchanges constitute two early industries where digital technology emerged by introducing a platform logic, thereby creating technological and institutional turbulence (Ernkqvist, 2015; Sandström et al., 2016).

The sharing economy, also frequently referred to as “collaborative economy”, “gig economy” and “platform economy” (Mair and Reischauer, 2017) can generally speaking be regarded as a form of vertical disintegration where buyers and sellers meet over an ICT-mediated platform which lowers transaction costs. In doing so, this platform model has enabled usage of underutilized assets, and in doing so, creating unprecedented scalability (Acquier et al., 2017).

Initially, sharing economy business models and practices were found in the information-based economy (Belk, 2014), but has in their contemporary manifestations grown and entered industries concerned with physical goods and services. Examples of the sharing economy include Uber in personal transportation and Airbnb in accommodation, but it is clear that this business logic is presently spreading to several other sectors of society as well. Estimations suggest that different sectors of the sharing economy can jointly amount to 335 BUSD of revenue in 2025 (PwC, 2014).

The platform revolution (Parker et al., 2016) and the rise of the sharing economy, although not new, still constitute important megatrends that may alter our economy dramatically in the coming decades. Recent contributions have shown that the sharing economy may not only be disruptive in the technological sense, but may also distort the institutions that govern certain industries (Laurell and Sandström, 2016; Laurell and Sandström, 2017; Mair and Reischauer, 2017) and similar results can be identified concerning fintech firms (Bogusz et al., 2018).

2.1. Digital entrepreneurship and institutional change

Recent contributions have also highlighted that the sharing economy is presently characterized by conflict and tension (Murillo et al., 2017), e.g. between market and non-market logics (Laurell and Sandström, 2017). Sharing economy firms may therefore be characterized as institutional entrepreneurs in the sense that they proactively seek to transform the rules and practices governing a certain industry, while also possibly redefining the meaning of work and the labor market in a broader sense (Friedman, 2014; Sundararajan, 2016).

While there are several studies concerning the interplay between firm strategies and institutional change (Ahuja and Yayavaram, 2011), many use high-level aggregated data such as campaign contributions (e.g. Epstein, 1980). There are recent papers regarding the non-market strategies of firms under conditions of technological change (Gurses and Ozcan, 2015; Funk and Hirschman, 2014; Ernkqvist, 2015). The micro and meso-levels of digital entrepreneurship and institutional change remain understudied and partly as a consequence, we are left with little knowledge regarding how institutional place actually happens (Peng, 2003). Specifically, more research is needed concerning how digital entrepreneurs can accomplish institutional change when facing resistance from vested interest groups.

Economic literature tends to argue that changes in formal institutions such as the regulatory set-up tend to be influenced by rent seeking actors such as incumbent monopolists who manage to shape institutions to their benefit as they control more financial and relational resources (Buchanan, 1980; DiMaggio, 1988). In institutional theory, this dilemma is usually referred to as the paradox of embedded agency: if actors are constrained by institutions, how does institutional change come about (Seo and Creed, 2002)?

Scholarly work in business administration and sociology has pointed out field preconditions that increase the likelihood of institutional change to come about (Battilana et al., 2009), including exogenous shocks like new technology and social upheaval (Fligstein, 1997), perceived crises or problems within the field (Phillips et al., 2000), the degree of heterogeneity within the field, for instance the presence of multiple institutional orders or alternatives (Clemens and Cook, 1999). Heterogeneity may trigger institutional conflicts and instabilities, thus creating opportunities for institutional change (Blackburn, 1994). The presence of potential allies that can be mobilized is another condition enabling institutional change (Fligstein, 1997). These field conditions will be revisited in the analysis and discussion parts of the paper.

2.2. Literature on cities and agglomerations

Apart from some notable exceptions (e.g. Florida et al., 2016; Isenberg, 2011), little research has been devoted to how the digital shift affects the environment in which digital entrepreneurship takes place. More specifically, much remains in assessing the interplay between ecosystems of digital entrepreneurship and specific spatial settings such as cities, especially regarding the role of institutions.

A large and growing body of literature has concerned itself with agglomerations, i.e. geographical concentrations of economic activity (Fujita et al., 1999). Early works in this area highlighted the role of knowledge externalities, also referred to as knowledge spillovers (Carlino et al., 2001; Jacobs, 1969; Marshall, 1927).

Generally speaking, cities can be regarded as large and concentrated markets, which in turn give rise to increased division of labor, i.e. higher degrees of diversity and also improved quality of matches among firms and workers (e.g. Helsley and Strange, 2004; Wheeler, 2001). Hence, resources may be more efficiently allocated and reshuffled at lower transaction costs in dense agglomerations (Porter, 1990; Sölvell et al., 2008). As a result, there is ample evidence that geographical concentration tends to positively affect productivity by offering access to a wider variety of supply and demand (Ciccone and Hall, 1996). Previous research has also shown that employment grows more rapidly in metropolitan areas with higher degrees of industrial diversity (Glaeser et al., 1992).

Regarding innovation and renewal, it is clear that inventors are more inclined to cite patents created in their geographical proximity (Jaffe, 1989) and several authors have shown that patent activity increases with metropolitan size (Feldman and Audretsch, 1999). Higher population density has also been linked to higher degrees of inventive output (Carlino et al., 2007). Case studies also suggest that geographic concentration tends to facilitate diffusion of tacit knowledge (Saxenian, 1994).

The case of digital entrepreneurship has been shown to be geographically concentrated in several regards (Saxenian, 1991). Early internet start-ups were often located in regions where there was more venture capital available (Zook, 2002). Several other geographical aspects of digital entrepreneurship have been explored, e.g. the critical importance of access to skilled labor (Demir et al., 2017) and the role of interpersonal and interfirm networks (Birley, 1985). While there are some studies stating that different institutional logics may emerge in different cities (Lounsbury, 2007), geographical aspects of institutional change and digital entrepreneurship remain understudied.

There are several publications concerning the specific geographical setting of Stockholm which explore how the city has become home to one of the most vibrant IT clusters globally. The city is per capita the second densest city around the world in terms of number of unicorns, i.e. start-ups with a market cap over 1 BUSD. The emergence of Stockholm as a highly competitive IT cluster can be tracked back many decades to such industries as telecommunications and broadband investments (Sölvell et al., 2015). Previous literature has documented several factors contributing to this success story, including policies to support diffusion of personal computers at an early stage, early

investments in broadband networks, along with access to skilled labor and business incubators in the Stockholm area (Skog et al., 2016), but the role of institutions and institutional change has not been addressed in greater detail.

2.3. Synthesis and research problem

As stated previously, more research is needed concerning the interrelationship between digital entrepreneurship and economic agglomerations. While literature on cities and agglomerations would suggest that cities play an important role in the emergence and diffusion of platform solutions and digital entrepreneurship (Florida et al., 2016; Isenberg, 2011), this question needs to be further addressed.

This paper therefore sets out to explore the role of cities in the emergence of digital entrepreneurship to explain how and why digital start-ups and scale-ups grow in cities. Specifically, we are interested in the interplay between digital entrepreneurship and institutional change, and why such changes may come about in cities. Before turning to the results and analysis, we next describe our method and procedures for data collection and analysis in further detail.

3. Method

To study the emergence of digital entrepreneurship and institutional change in a city, an empirical context with plenty of successful cases over a sustained time period is required. Sweden, and in particular, the capital city of Stockholm, offers a potent ground for undertaking such research. Stockholm has developed into one of Europe's most dynamic start-up cities (Davidson, 2015) which places second in the world in terms of hosting billion-dollar start-ups (Temperton, 2017). One potential reason for why this has become the case is Stockholm's long history of success concerning digital entrepreneurship (Ernkqvist, 2015).

Bearing these characteristics and the purpose above in mind, Sweden and Stockholm were chosen as the empirical setting for the study at hand. As processes of digital entrepreneurship, the creation of start-ups, scale-ups and unicorns take considerable time, we chose to combine contemporary data with historical cases of digital entrepreneurship dating back to the 1980s and 1990s. Cases of successful digital entrepreneurship with regard to accomplishing institutional change had to be chosen. Both Comvik and the Stockholm Stock Exchange are such examples as both organizations managed to accomplish divergent change without being captivated by vested interests. Moreover, the contemporary sharing economy illustrates how digital entrepreneurship seems to concentrate to Stockholm, thereby offering further illustrations of how digital entrepreneurship grows in cities and how new practices are diffused across sectors. In the following sub-sections, we describe in further detail the methods employed in these respective cases.

3.1. Historical case studies: Comvik and the Stockholm stock exchange

Comvik was an entrant firm in mobile communications which not only introduced new technology but also worked actively to shape the institutional set-up as the entire telecommunications sector was subjected to an evolutionary process of technological and regulatory change in the 1980s. Most of Comvik's strategic maneuvering took place in the city of Stockholm where regulators, politicians and suppliers were present. The same is true for the second case study concerning the Stockholm Stock Exchange (SSE), an incumbent actor which introduced digital technology while also proactively shaping the institutional landscape.

Large amounts of primary and secondary archival data were collected and structured in a relational database (Murmman, 2003; Padgett, 2010) using Filemaker as software. The strategy of incident coding (Van de Ven and Poole, 1990) on multiple levels (Hekkert and Negro, 2009) was used to further analyze the data while oral history

interviews (Misa, 2009) were used to further the understanding of the coded events. In total, 20 oral history interviews were conducted with former decision makers. This data was combined with extensive archival material from both Swedish National Archives and firm specific archives. The material was photographed, converted into PDF-format and filed in digital form, also processing the material using OCR, meaning that one can search for words and sentences. The software thus enabled us to put together all documents in a chronological order for both cases. Almost 8000 archival documents including board minutes, management minutes, PMs, annual reports from the 1970s, 1980s and 1990s have been subjected to this procedure within the scope of a larger research project. All material concerning the specific firms (Comvik and the Stockholm Stock Exchange) were searched for in the digital archive and subsequently extracted. These were reviewed based on which case descriptions emerged from a combination of this secondary data and data from oral history interviews, thus enabling triangulation.

3.2. The sharing economy

In the third case study, the Swedish social media landscape was utilized to map sharing economy actors, associated sectors of the economy as well as their spatial scope by applying Social Media Analytics (SMA). SMA is an interdisciplinary approach for analysis of social media data (Stieglitz et al., 2014, cf. Jung et al., 2017) that draws upon big data analytics (cf. Chen et al., 2012; Gandomi and Haider, 2015). SMA is currently being utilized in several research disciplines out of which innovation research represents one field where research opportunities increasingly are explored (e.g. Akter et al., 2016; Brandt et al., 2017; Geissinger et al., 2018; Laurell and Sandström, 2016; Laurell and Sandström, 2017).

A dataset of 4829 social media posts including the keyword "Delningsekonomi" (the direct translation of "The sharing economy" in Swedish) collected between 1 April 2016 up until 31 March 2017 within the frame of a wider research project (e.g. Geissinger et al., 2018) functioned as the empirical scope of the third case study. The dataset only contains user-generated contents written in Swedish or user-generated contents posted by Swedish users among text based social media applications as this delimitation enabled a structured approach vis-à-vis the empirical setting chosen. Table 1 presents the distribution of social media data per social media platform.

Qualitative content analysis (Silverman, 2006) was applied by reviewing the ways in which sharing economy actors were referred to in the material. After having categorized actors as start-ups or scale-ups, the associated sectors of these sharing economy actors were reviewed and thereafter, their spatial scope was determined by mapping the associated cities which individual actors have their HQ or local HQ as well as the individual actors main target markets. In total, 121 sharing economy actors were present in the material out of which 90 actors' HQ or local HQ were possible to identify along with 97 sharing economy actors' main target market. These analyses were followed by quantitative content analysis by analyzing the frequency and percentage of specific actors, sectors and their spatial scope as well as their interrelation.

Table 1

Collected and publicly posted user-generated contents per social media platform (cf. Geissinger et al., 2018).

Social media	Frequency	Percent
Blog	177	3.7%
Facebook	403	8.3%
Forum	16	0.3%
Instagram	486	10.1%
Twitter	3747	77.6%
Total	4829	100.0%

4. Results

Below, the three cases of digital entrepreneurship covered in this paper are described in further detail. We start with Comvik's entry into mobile telephony and its associated institutional strategies which unfolded in the 1980s. The Stockholm Stock Exchange (SSE) is then covered and subsequently we turn to contemporary digital entrepreneurship in the setting of the Swedish sharing economy.

4.1. Comvik and mobile telephony

Since the 1950s, a Swedish private company called "Företagstelefon" had been granted permission to operate a small network of mobile telephony next to the government monopoly Televerket. Företagstelefon had been granted this unusual permission from Televerket who was not only operating the landline network but also regulating entry into the market.

Företagstelefon changed its name to Comvik after having been acquired by Swedish entrepreneur and capitalist Jan Stenbeck. In the 1980s, the telecommunications sector became subject to an interrelated process of technological and institutional change where e.g. the emergence of mobile telephony sparked conflicts between Televerket and Comvik. Both firms were located in the city of Stockholm, where other key actors such as the supplier Ericsson could be found, along with media, politicians and various regulatory bodies.

Both Televerket and Comvik foresaw a future growth in demand for mobile telephony. Televerket developed NMT, Nordic Mobile Telephony-system, together with Ericsson. Comvik instead bought a system from Canada. During the time for the launching of these mobile systems on the market several technological advancements occurred. Automatic switches were now available and these were more effective than the old manual switches. The latter demanded a person to connect the calls and the former did this automatically. This detail had an initial role in the first institutional non-market battle between Televerket and Comvik in the early 1980s. Having developed and introduced automatic switches, Televerket wanted to avoid competition and thus forbade Comvik to use their technology.

Comvik responded with several proactive non-market activities directed towards media and public authorities. The process included holding Televerket accountable towards competition authorities. They were also subject for a newspaper article where the CEO of Comvik said that Televerket misused their role as a regulator. In the same article, the expression "David against Goliath" was mentioned where David symbolized Comvik and Goliath symbolized Televerket. Comvik worked on several frontiers during this time including formal law through NO and the communication authority, public opinion through media and directly to Televerket's permission unit and to Televerket's board of directors. Eventually, the department of communications ruled in favor of Comvik, highlighting the importance of increased competition in the market as the primary reason.

In the next conflict, Comvik tried to obtain more frequencies from Televerket in order to expand their business. Comvik wanted frequencies for their mobile telephone system, particularly for their Skyport system for telecommunication to the USA. But Televerket as the authority with the power over frequencies denied them that by referring to technical difficulties that would occur and make the whole telephone network insecure. However, Televerket let the government decide on the issue since they considered themselves biased in this issue and that international telecommunication did require deals with foreign countries. This did not stop Televerket from making a recommendation to the government to deny Comvik's request. The reason for this recommendation was according to Televerket that one operator/system used the limited amount of frequencies. Comvik questioned this claim and initiated several activities to alter things to their favor by approaching NO, Televerket and the department of communications while making sure to obtain extensive publicity in media

outlets. Finally, Comvik was granted 14 more frequencies, going from 36 to 50, (they wanted 60) through a government decision in June of 1987.

In the third round, Comvik complained to the government regarding Ericsson's refusal to sell AIX-switches to Comvik for their GSM system. Developed by Ericsson and Televerket, the AXE system was one of the best at that time. While there were some suppliers on the market, Comvik wanted to buy from Ericsson for practical reasons as Ericsson was located in Sweden. Comvik found it strange that a private company like Ericsson did not want to sell to them. Ericsson referred to it being practically impossible to say yes to every buyer out there and that they wanted to focus on Televerket for the Swedish market. Comvik again suspected Televerket, this time for pressuring Ericsson not to sell to Televerket's competitor. Comvik was very open with this suspicion, communicating it both publicly, to Televerket and politicians. NO suggested that the department for competition should approve Comvik's demands. In 1990, Marknadsdomstolen decided that Ericsson was obligated to sell AIX to Comvik and thus Comvik won the third round as well.

In sum, Comvik used the emergence of new technology to initiate a process of deregulation, thereby creating the market it would also compete in. The emergence of GSM in the early 1990s implied a restructuring of the industry where suppliers of equipment such as Ericsson sold to operators who were in turn regulated by a separate independent government agency. In this case, Televerket had to compete on equal terms with other players such as Comvik and Tele2. It is therefore clear that Comvik had an important role in shaping the new institutional order under which mobile telephony would be governed in Sweden in the coming decades.

4.2. The Stockholm stock exchange

A recent publication in *Technological Forecasting and Social Change* documents the combined technological and institutional strategies of OM, an entrant firm offering a fully electronic stock exchange for trading options (Ernkvist, 2015). Building on this contribution, we describe below how the Stockholm Stock Exchange (SSE) became the first stock exchange to fully implement a digital stock trading system which included order execution. Later the SSE became the first stock exchange in the world to change its structure from a cooperative form to a for-profit company with open ownership, a development that made other stock exchanges follow in the coming years (Zanotti, 2012). Also, the SSE was one of the first actors to introduce a fully digital trading system in 1989. OM acquired the SSE in 1998 and it is thus clear that these two firms were part of the same process of technological and institutional change in financial exchanges. Ernkvist (2015) described the case of OM, we acknowledge and build upon this contribution by covering the case of the incumbent SSE below.

First and foremost, a financial exchange is a marketplace, i.e. a place where buyers and sellers of financial securities or other instruments - "brokers" - meet to trade. Lee (1998, p. 26) state that the functions of a financial exchange is the "listing, trading, information dissemination, and various post-trade services, including clearing and settlement". In the case of SSE, as the de facto and de jure monopoly, it was the sole provider of the financial infrastructure necessary for equity trading with the exception of the clearing and settlement that was made by a third party. This meant that of the different steps in making a "trade", the primary function of SSE was to match the orders of the buyers and sellers at the exchange floor: "Traditionally, stock exchanges were organized as not-for-profit organizations, founded and owned by brokers and dealers who managed "their" stock exchange like an exclusive club, with high barriers for new entrants and a regional or even national monopoly, comparable to a medieval guild." (Fleckner, 2005, p. 3–4).

Given the strong influence of interest groups in the financial sector and retrospective accounts of how brokers successfully resisted implementing automated trading systems at other exchanges (Gorham and

Singh, 2009; Melamed, 2009; Pardo-Guerra, 2010) the SSE's efforts to complete the process of implementing this system is of particular interest.

In Sweden, financial reform took place in several areas between 1978 and 1990 (Englund, 1990). For the functioning of the SSE, the financial transaction tax and the gradual ability to trade shares across international borders had a key influence.

In the first step, the old SSE was moving to new facilities in 1978, which opened up an opportunity to replace electro-mechanical systems with modern equipment, which, in turn, meant hiring people that would develop and support the new systems. The IT department of the SSE grew substantially, even when the total number of employees declined in 1984 and 1987.

During this phase, the possibility to use computers and external pressures coming from an increasing volume were the main drivers for change. The CEO of the SSE, Bengt Rydén, was well connected politically, particularly within the Social Democrat Party. Large parts of the SSE board were appointed politically and most of these politicians or political appointees had little knowledge of the operations of a stock exchange.

Rydén argued in a strategic report from 1985 that the SSE 'is to a great degree a mirror of the static and relatively calm environment that persisted in Sweden before 1980'. He moreover provided an expanded definition of stakeholders of the exchange, shifting attention from brokers to other actors such as emitting companies and stockowners, something that bothered many of the floor brokers.

One of the members of the board stated in a newspaper interview that an automated trading system was good because it "moved the competence from the legs to the brain". The digital exchange was opened in 1989 and when the floor closed for good in 1990 there were several accounts of how working as a broker became "dull" and how many brokers, who excelled at the old skills relevant for floor trading, were made redundant. Nonetheless, as the system became stable the growing pains declined and the critique stopped.

When implementing the system and subsequently turning the SSE into the world's first privately owned stock exchange, the CEO Bengt Rydén used many different strategies. He pointed out the efficiency gains to be obtained from using new technology, while also building alliances with various interest groups such as bankers, regulators and politicians. Being firmly rooted in the social democratic movement also turned out to be a vital asset in implementing these changes. When OM acquired the SSE in 1998, they kept the successor of the SSE system as it was highly successful. They also sold it to other stock exchanges around the world in subsequent years.

4.3. The sharing economy in Stockholm and Sweden

In terms of how the Swedish sharing economy has evolved, the initial dominance of global players such as Airbnb and Uber was quickly followed by initiatives from local actors drawn from Sweden's vibrant startup scene (Felländer et al. (2015)). When taken together, the contemporary sharing economy in Sweden today is therefore characterized by a multitude of sharing economy platforms even though orientations differ substantially (Laurell and Sandström, 2017).

Fig. 1 presents the interconnection between start-up and scale-up sharing economy actors, their associated sectors as well as their spatial scope in terms of the associated cities which individual actors have their HQ or local HQ as well as the individual actors main target market. As the figure illustrate, a total of 23 sharing economy actors representing scale-ups and 66 sharing economy actors representing start-ups were identified. Despite the higher amount of sharing economy start-ups, the ways in which the two categories of sharing economy actors create engagement among users in social media is evenly distributed as start-ups amounted to 59.6% of the total engagement while scale-ups totaled 40.4%. With regards to individual actors, the ways in which they engage in social media differs quite

Table 2
Headquarter location of start-up and scale-up sharing economy actors.

City	HQ or local HQ	
	Percent	Frequency
Stockholm	60.9%	728
Malmö	21.5%	257
Gothenburg	10.3%	123
Several cities	2.5%	30
Strängnäs	2.2%	26
Sala	1.2%	14
Umeå	0.7%	8
Helsingborg	0.3%	3
Linköping	0.3%	3
Asperö	0.1%	1
Karlstad	0.1%	1
Uppsala	0.1%	1
Total	100.0%	1195

substantially in both categories, as Uber and Swopshop dominate their two respective categories while the remaining sharing economy actors attract a more evenly distributed engagement throughout the analyzed time period covering 12-months.

In terms of the associated sectors, scale-up sharing economy actors only dominate in the mobility and leisure sector in terms of the engagement they generate while the remaining sectors are dominated by start-up sharing economy actors. In relation to the actors and associated sectors spatial features, a considerable concentration of HQ and local HQ among both scale-ups and start-ups is found to the capital Stockholm as illustrated in Table 2. With regard to the other cities which also were identified, start-ups dominate and scale-ups are relatively uncommon except in Gothenburg, the second largest city in Sweden. In close relation, the target market for both scale-ups and start-ups is predominantly Sweden even though sharing economy actors targeting specific cities, Europe or having a global ambition also were identified as illustrated in Table 3.

5. Analysis and discussion

The empirical section illustrates several aspects of the interplay between digital entrepreneurship and the functioning of cities. One central aspect concerns the efficiency of cities as locations for economic renewal and another aspect is related to institutional renewal. The case descriptions show that cities form a fertile ground for institutional changes to take place, including changes in both formal and informal institutions. In the coming sub-sections, we revisit the field conditions that are likely to contribute to institutional change and highlight how and why cities such as Stockholm fulfill these criteria and thus offer factor conditions that contribute to institutional change and successful digital entrepreneurship. The field conditions identified by previous research include exogenous shocks such as technological change (Fligstein, 1997), perceived crises or problems (Phillips et al., 2000),

Table 3
Main target market of start-up and scale-up sharing economy actors.

Region	Main target market	
	Percent	Frequency
Sweden	64.9%	775
Malmö	20.3%	242
Stockholm	5.2%	62
Sweden	3.9%	47
Sweden (municipality based)	2.5%	30
Gothenburg	2.0%	24
Global	1.0%	12
Europe	0.3%	3
Total	100.0%	1195

the degree of heterogeneity, i.e. the presence of multiple institutional orders or alternatives (1994) and the presence of potential allies (Fligstein, 1997).

5.1. Exogenous shocks and new technology

As can be seen in the empirical data, both Comvik and the SSE were enacting their combinations of technological and institutional entrepreneurship in the city of Stockholm. Fig. 1, Table 2 and Table 3 concerning the sharing economy show how sharing economy firms in Sweden are predominantly concentrated to the Stockholm area, while some firms also operate in Malmö and in Gothenburg, also larger cities in Sweden. These firms are introducing new practices in established industries in the form of e.g. car sharing, accommodation and cloth swapping. Hence, the introduction of sharing economy practices can be regarded as a combination of technological and institutional change (Laurell and Sandström, 2016, 2018) where new practices are introduced in established sectors.

In all our cases, the emergence of new technology created a form of exogenous shock, imposing a need for change within the studied fields. Also, the induced shock came in a city prior to gaining a foothold in other parts of the country. Technology is more likely to be developed or introduced in a denser and more knowledge intense geographical area such as a city (Carlino et al., 2007; Jaffe, 1989).

5.2. The perception of a crisis

Both the SSE and the Comvik case exhibit tendencies of a growing perception of crises. External pressures from internationalization, the possibility to use computers and the simultaneous demand for handling increasing volumes put the SSE in a position where members of the field gradually started to perceive the established order of things as dysfunctional. The CEO, Bengt Rydén, argued that the previous, limited use of computers and the prevailing institutional logic were products of the past and that a restructuration was necessary.

The telecommunications sector was subject to a similar perception of a crisis in the early 1980s. The government monopoly Televerket was subject to extensive criticism for being inefficient, lacking service-mindedness and for misusing its position as a monopoly regulating itself. Discontent with Televerket was widespread in these years and Comvik made sure to capitalize upon these opinions, arguing that competition and free markets were part of the solution.

The relative density of people and diversity of actors present in a city, are factors that contribute to the diffusion of a crisis sentiment. The presence of media outlets, corporate headquarters and political authorities seems to have formed preconditions where a joint perception of crisis could prevail, and where it is possible for institutional entrepreneurs to build an alternative vision.

5.3. Degree of institutional heterogeneity

One enabling condition for institutional change is the co-existence of multiple institutional settings. A more economically diverse area such as a larger city is arguably more likely to contain a sufficient degree of variety where it is possible for new practices to be diffused. Our data indeed suggests that this is the case as sharing economy firms are primarily found in cities.

Starting with the case of the sharing economy, we see how early entrants such as Airbnb and Uber gained initial footholds in larger cities. Our data shows how the platform logic induced by these actors is spreading to other sectors such as fashion and clothing, food and on-demand services. The expanding scope of the sharing economy seems more likely to occur in a city where the population has been subjected to several different institutional logics and where the platform model has already been introduced in several areas previously. Digital entrepreneurship induces new practices that are diffused in cities and

spread to new fields, resulting in new consumer behavior and changes of informal institutions.

Changes of formal institutions also seem more likely to occur in a city. The examples of Comvik and the SSE constitute illustrative examples. The combination of technological and institutional change is subject to high transaction costs as the process is highly uncertain and involves a multitude of actors. The co-location of key actors in a field that is undergoing institutional change seems to be an enabling factor. Negotiations can take place continuously and ambiguities can be handled more effectively when operating in the same geographical area.

The example of Comvik shows how the presence of a wide array of actors facilitated Comvik's political maneuvering. When Televerket rejected Comvik's requests the firm merely chose to target other actors such as various government entities, while also making themselves heard in media, capitalizing upon a public opinion increasingly hostile towards the incumbent monopolist Televerket. These strategies were enacted successfully by both the SSE and Comvik, making it possible to avoid regulatory capture, which is often something that blocks institutional change.

5.4. Presence of potential allies

Previous research has pointed out numerous efficiencies of dense agglomerations such as cities, including increased division of labor and higher degrees of diversity along with improved access to skilled employees (Helsley and Strange, 2004; Wheeler, 2001). In these ways, cities contain the presence of potential allies for those actors who want to accomplish institutional change.

It is clear from both the cases of SSE's digitalization and Comvik's entry into mobile telephony that both firms benefited from having access to a larger labor market where increased needs for competence renewal and recruitment could be satisfied by Stockholm and the surrounding region. For example, in the SSE case, the IT department grew substantially, even when the total number of employees declined. In the SSE case, it is also clear how the CEO Bengt Rydén could avoid being controlled by various interest groups such as brokers, mainly as he had considerable political connections that could be used.

A second aspect of density concerns network effects. All the examples covered above concern various forms of platforms, i.e. two-sided markets which reinforce each other. Comvik launched a system for mobile telephony in competition with Televerket, both depending on network effects and increasing returns for their successful growth. The SSE's electronic system for trading was subject to similar increasing returns to adoption (Arthur, 1996). Sharing economy platforms depend on supply and demand which reinforce each other. Obtaining a critical mass of participants in these platforms is easier in a more geographically dense agglomeration such as a city. Hence, the mobilization of allies seems to be easier to accomplish in a city as cities contain higher degrees of diversity, thus providing further opportunities for institutional change.

6. Concluding remark, limitations and directions for future research

This paper has explored how and why digital entrepreneurship emerges in cities. Drawing upon multiple cases of digital entrepreneurship in the city of Stockholm in Sweden, we show that cities offer a fertile ground for the emergence of digital start-ups and scale-ups.

First, we note that the relative density and diversity of cities constitutes a critical enabling condition for digital entrepreneurship. Access to venture capital and skilled labor makes it possible to build competencies in those settings where skill renewal is critical. Also, as digital platforms are subject to network effects, it seems like these network effects are more easily generated in a dense agglomeration. These mechanisms are clearly illustrated in our empirical data and have also

been highlighted by previous literature.

Our main contribution lies in illustrating and stating that cities contribute to digital entrepreneurship by offering the field conditions required for the accomplishment of changes in both formal and informal institutions. The cases reviewed above illustrate how and why cities contribute to digital entrepreneurship. The relative economic density, diversity and knowledge intensity together form the field conditions (Battilana et al., 2009) usually required for altering both formal and informal institutions. Exogenous shocks in the form of new technology is more likely to be introduced and further diffused in a city and it is easier for a perception of field crisis, especially as cities are more likely to contain a multitude of institutional orders, which in turn also implies the existence of potential allies for those digital entrepreneurs who seek to accomplish institutional change. Also, cities offer a proximity for key actors in a field including suppliers, regulators, politicians and institutional entrepreneurs, making it possible for them to interact continuously, thereby building trust and resolving ambiguities that are related to uncertain processes of interrelated technological and institutional change.

Our contribution therefore lies in highlighting an important reason why cities contribute to the emergence of digital start-ups and scale-ups. Widespread access to broadband, smartphones and other ICT's has caused some scholars to state that location is no longer important. Our findings suggest the opposite, location is important. Joel Mokyr stated that 'what seems to be failures of technology are often the failures of institutions' (Mokyr, 2003, p. 60). We conclude that cities matter for digital entrepreneurship because they seem to offer the field conditions required for accomplishing institutional change and to avoid regulatory capture.

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