



LUND UNIVERSITY

School of Economics and Management

**Master program in Economic Growth,
Innovation and Spatial Dynamics**

**Bridging rural constraints - do rural
entrepreneurs exploit online social capital
differently than urbanized entrepreneurs?**

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Abstract: Social capital can be a vital resource for entrepreneurs but so far research has not addressed how it is accessed through online communication channels. This paper presents a new way of sourcing network information about Swedish entrepreneurs and consequently explores whether rural entrepreneurs utilize online social capital as much as entrepreneurs from urban or metropolitan areas do. Theory implies rural entrepreneurs are constrained in working on the size and structure of their network (bridging) and also are less affine to use new social media sites, although social media facilitates enlarging the network size. Multivariate regressions with data from LinkedIn show that rural entrepreneurs use online bridging as much as their urbanized counterparts after all but are still limited by the size of their offline network. The results contribute to both the entrepreneurship as well as the social capital literature and the paper is one of the firsts that gives insights of the online network behaviour of entrepreneurs.

Key words: Entrepreneurship, Social Capital, Bridging, LinkedIn, Network

EKHM52

Master thesis, second year (15 credits ECTS)

June 2017

Supervisor: Jing Xiao

Examiner: Mikhail Martynovich

Word Count: 16.112

Acknowledgments

This thesis concludes my two-year master of science program at Lund University School of Economics and Management. I will always look back at these two years as an incredibly valuable time of my life. Lund University is a place where people from all backgrounds come together to improve society, promote science and simply enjoy life. It is moreover a place which shows that progress and collaboration are in no way limited by ethnical origin, religion or appearance and I am positive that the rest of the world can learn a lot from the spirit in Lund. Thus, I want to thank the University and the Swedish state for giving me the privilege of living and learning here. My gratitude also goes to Jing Xiao who has been a very propulsive and promoting supervisor for this thesis. Naturally, I also thank my parents who have always supported me in my decisions and given me the freedom to pursue my own career ambitions, although it is maybe not the one they wished for. Furthermore, I want to give my regards to all the wonderful people who made my stay here in Lund so enjoyable, namely Petar, Christian, Christina, Virginia, Elin, Lennart and the amazing LEBT 2016 committee and my team mates from Lunds VK. Eventually, my largest gratefulness goes to Ronja for each past moment and for each moment we will spend together in the future.

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III. Abbreviations

e.g.	Exempli gratia (for example)
END	Number of received endorsements
etc.	Et cetera
et al.	Et alii (further authors)
H₀	Null Hypothesis
km	Kilometre
NET	Number of followed networks
OLS	Ordinary least square
Q3	Third quarter of the year
REC	Number of received and given recommendations
SEK	Swedish Krona
SME	Small and medium sized enterprise
SNS	Social Network Sites
Tkr	Thousand Swedish Kronas
VIF	Variance Inflation Factor

1. Introduction

Entrepreneurs and small businesses have been the subject of a myriad of studies and research papers which suggest their importance for science and the society. At least since Schumpeter's elaborations on entrepreneurship the foundation of a new business has been associated with the occurrence of innovations, which are vital for the progress of mankind. Moreover, new ventures and small businesses are ascribed to several further benefits for society, for example employment growth and lower prices for consumers, due to their competition with incumbent firms (*Memili et al. 2015, Storey & Greene 2010, Storey & Johnson 1986*). Factors for new venture growth can be categorized roughly in either endogenous (education, personal traits, experience), or structural (firm's age and size, local externalities, business cycles) or exogenous (competition and governmental institutions) (*Capasso, Gallucci & Rossi 2015, Ejeremo & Xiao 2014, Fischer 2016, Klepper 2002, Klepper & Thompson 2006, Nielsen 2015, Pe'er & Keil 2013 and Roberts, Klepper & Hayward 2011*).

In the author's opinion, this past research has revealed a variety of important findings regarding determinants of SME-growth and survival, however, most of these research directions focus a lot on a firm level although it is the entrepreneur himself¹ who should be accounted for the corporate growth, particularly in the beginning. Specifically, the author perceives a severe void in studies investigating how entrepreneurs exploit resources in their private network, meaning how they can use their social contacts in order to make their business grow. Shane and Venkataraman (*2000, p.223*) already postulated that to show how social ties facilitate "the probability of opportunity exploitation" is going to become a necessary subject in entrepreneurship research. Henceforth, considerable effort on this path has been conducted. The spectrum starts with how the network influences the tendency to start a business in the first place (*Westlund & Bolton 2003, Westlund, Larsson & Olsson 2014*). Liao and Welsch (*2003, 2005*) wrote two very insightful papers about the differences in network usage of different classes of entrepreneurs (e.g. nascent, technological, men, women etc.). Empirical attempts suggest the presence of a U-shaped relationship between network usage of the entrepreneur and his business' survival rate as well as innovation performance (*Watson 2007, Yu 2013*). Different dimensions of network exploitation are also positively associated with increased innovation output (*Corry et al. 2015*). The named studies give useful insights into the network exploitation of entrepreneurs, nevertheless, the author argues that all of them and other existing research on this topic share two major flaws.

The first is the lack of reliable quantified data. When it comes to collecting data about social interactions of entrepreneurs, inquirers rely either on survey or interview data

¹ When speaking about "entrepreneurs" the paper includes of course both male and female entrepreneurs; due to the quality of reading flow though, the masculine form is used.

(e.g. *Liao & Welsh 2005, Oliviera 2013, Watson 2007 or Williams 2006*). Of course, this primary data can be useful, however, interrogating humans face to face or per question sheet cannot guarantee unbiased and accurate answers, since persons sometimes tend to answer what they consider as the correct answer (*Richard et al. 2014, Wiseman 1972*). With that being said, a method to collect unbiased but yet quantifiable data is needed.

Secondly, research on the entrepreneurs' social networks mostly neglects new ways of communication, specifically professional and social online networks. This is a grave lacuna. Social media is constantly changing the world and as *Wiklund et al. (2011)* propose entrepreneurship scholars should follow issues concerning the development of the world. So far one only knows that social media can be an effective tool to promote entrepreneurship and to convince the entrepreneur to start his business (*Ajjan et al. 2015, Fischer & Reuber 2011*). Very recent research of *Mack, Marie-Pierre and Redican (2017)* and *Wang, Mack and Maciejewski (2017)* shows that entrepreneurial experience strongly influence social media usage and entrepreneurs actively use social media to connect with other entrepreneurs.

Nonetheless, one does not know yet how entrepreneurs use their network in an online world to gain potential benefits for their business. Especially, it is not known which exogenous factors influence the networking behaviour. One of those factors being discussed for the offline environment is the urbanization or population density, respectively, of the entrepreneur's location. Existing literature gives evidence that entrepreneurs have problems of accessing social capital in sparsely populated regions and or that the kind of exploited social capital varies between rural and urbanized areas (*Haase Svendsen, Kjeldsen & Noe 2010, Moyes, Whittam & Ferri 2012, Swinney 2008*). So, location does matter for the entrepreneurial network, but how the role of the location has changed due to the appearance of online networks is barely discussed. This is surprising because the internet has made locations and distances less determining and thus one would expect that it changes the way how entrepreneurs can access social capital.

Therefore, this paper intends to be one of the firsts to give a clearer understanding of regional differences in online network usage of entrepreneurs and also to provide a new way of collecting individual data on entrepreneurs. The paper builds on the social capital theory which is a well-established framework describing how economic benefits can be reaped from the individual network. By discussing this framework, it will be pointed out that having a lot of weak connections (bridging) is economically more useful than having few strong ties (bonding). Furthermore, the paper will discuss how bridging and bonding activities differ among rural and urbanized areas. It will also be shown that through online networks the feasibility of bridging and bonding has changed a lot. Eventually, it will also be demonstrated how the social networks sites are generally used among rural and urbanized inhabitants. This theoretical discussion will lead to a hypothesis towards the following research question:

“How does the online bridging behaviour of rural entrepreneurs differ from the online bridging behaviour of urban or metropolitan entrepreneurs?”

By answering this question, the paper not only follows Wiklund's et al. (2011) call but also Smith, Smith and Shaw (2016) and Yang (2015) who recently addressed the gap on how entrepreneurs can embrace social capital in a digital world. Moreover, they claim that social capital theory and entrepreneurship research become more and more distant from actual contemporary entrepreneurial practices; an issue which needs papers like the one at hand.

In addition, there are three important contributions expected from the paper. First, the differences of bridging between rural and urbanized entrepreneurs are investigated in an online context. By using a contemporary social network, the second of the abovementioned flaws is resolved. Second, the paper will use a completely novel method of collecting individual data and evaluate whether it is a functioning way to empirically analyse networks. Such a new data source is greatly needed in social capital research due to the mentioned bias of existing methods and resolves the first flaw (Lamine et al. 2015). And third, the findings could give policy makers new insight on how to support entrepreneurial activity in areas with different population densities as well as on how digitalisation affects new venture foundation.

The structure is as follows. The second chapter will depict the social capital theory and how entrepreneurs exploit it differently online and depending on their location. Thirdly, the data and the used variables are presented. Fourth, the methodology is outlined. Fifth, the results are shown and interpreted. The paper ends with a conclusion and recommendation for further research.

2. Theoretical Framework: Social Capital

This research is interested in geographical differences of the online social capital exploitation of entrepreneurs. On that account, it is important to understand the theoretical motivation behind this question. More precisely, this chapter will clarify the definition of social capital and demonstrate why it is important for entrepreneurs. The dimensions of social capital are explained and the role of bridging is highlighted. Subsequently, it will be shown why the research question concentrates on the online bridging behaviour of entrepreneurs. And eventually, since the research question expects geographical differences of this behaviour, theoretical reasons for this assumption are shown as well.

2.1. Definitions and benefits of social capital

'Social capital' in an economic context originates from the resource-based view on companies which describes how and why businesses grow and achieve competitive advantage (*Storey & Green 2010, Teece, Pisano & Shuen 1997*). Originally, tangible capital has been considered as the reason for such a competitive advantage, namely land, labour or other physical capital (financial assets, technology etc.). In the beginning of the 1960s a new intangible sort of valuable asset was scientifically introduced: human capital (*Schultz 1961, Woolcock 2001*). Through this concept, cognitive capacities and education of human beings were firstly introduced as being necessary for companies or even whole countries to develop. Yet, human capital theory only described how an individual's characteristics create value. What was missing was the link how this human capital of a single person was increased, or decreased, by the relationship of this person with other individuals. According to Woolcock (*2001*), while human capital deals with the individual, social capital concerns relationships and naturally the two concepts are complementary.

Due to the close connection to the resource-based view and human capital theory, the author considers social capital as highly relevant for research on entrepreneurship and new venture growth. Before evaluating further on this matter, it is important to clearly define the meaning of social capital. Until today, a very large variety of studies has used the social capital concept and tried to establish an own definition. In general, there is an agreement that social capital, if used in the correct way, is beneficial for the individual, group or business, however the details differ quite a lot. In order to find the most suitable definition for the following essay, some claimed characteristics of social capital are reviewed briefly.

The paper starts with Boxman, De Graaf, and Flap (*1991, p.52*) who suggest that social capital reflects "*the number of people who can be expected to provide support and the resources those people have at their disposal*". This definition considers how value can be gained from other people but it is too basic since it leaves out two important considerations: First, social capital does not reflect a market place. The "support" and "resources" obtained are not based on a contractual framework and cannot be bought as other capital goods or services. They are rather a favour that does not (at least immediately) require a compensation. Second and subsequently, social capital should not be uni-directional meaning that if "support" or "resources" are provided, the receiver is most likely expected to grant a comparable favour to the donor in the future (*compare with Putnam 2001 "mutual obligations"*).

Social capital has also been applied in purely organizational research. Leana and Van Buren (*1999, p.538*) defined social capital as a "*resource reflecting the character of social relations within the organization, realized through members' levels of collective goal orientation and shared trust*" and added organizational social capital is a gain that can be beneficial for both the members of the organization as well as for the organization itself. Again, the author sees weaknesses in this definition, especially in

the organizational approach. Particularly in corporate organizations, favours or other beneficial deeds between people can be eventually enforced through supervisors or written corporate rules and thus cannot be considered social in the sense of gratuitously given anymore. It is reasonable to assume a good relationship between the actors can facilitate the inter- or extra organizational exchange of social capital. Still, in the author's opinion, once any form of contractual relationship (e.g. employer vs- employee or supplier vs. buyer) comes into play, a vital assumption of social capital is violated, which is the value, no matter of the form, is transferred without having the legal right of compensation.

On these grounds, the paper turns to the definition of Adler and Kwon (2002):

“Social capital is the goodwill available to individuals or groups. Its source lies in the structure and content of the actor's social relations.” (Adler & Kwon 2002, p.23)

Although this definition does not explicitly expound that social capital is bi-directional, it has two important characters for the present research. First, “goodwill” indicates that it is about non-contractual services or deeds between actors. Second, one sees that this goodwill originates in the “structure” and the “content” of the relationship, which signifies the importance to look at precisely these structures and contents of individuals' relationships. Before focussing more on this matter, it is also crucial to clarify why social capital is actually capital and can lead to a competitive advantage as suggested by the original resource-based view. In case the reader is still interested in more definitions of social capital, the author recommends to read Adler and Kwon (2002) for a list of definitions.

With that being said, is the exploitation of the goodwill within relations actually a form of capital, meaning it would be comparable to other intangible capital like a company brand? Intangible capital needs to be both difficult or impossible to imitate and trade (Teece 2010). Furthermore, capital in general should be long-living, convertible and complementary to other goods (capital) (Adler & Kwon 2002). These characteristics are correct for social capital. Still, critics claim that social capital does not fulfil these requirements and additionally it should not be considered capital because it cannot be (financially) measured, is at most a repackaging of existing theories and cannot be assigned a private property right (Adler & Kwon 2002, Schneider & Diaz 2015, Storey & Green 2010, Woolcock 2001).

Therefore, it is useful to outline how social capital can be converted into value for the actor. In their pathbreaking paper for the social capital literature, Nahapiet and Ghoshal (1998) suggest that social capital is necessary to obtain “intellectual capital” or in a simpler term: knowledge. Especially experience-based, non-codified, knowledge is much easier accessible through a good relationship to its owner. Social capital strongly facilitates this condition being necessary for knowledge transfer and combination of new information (Nahapiet & Ghoshal 1998). Furthermore, a very close

network helps the individual to reduce observation costs and access help from his friends and family, which is especially important for younger people (*Coleman 1998*). Social capital can also be used to fill “structural holes” in the individual’s field of knowledge. This concept introduced by Burt (*1997, 2000*) suggests that social capital can overcome knowledge constraints or more precise, knowledge in the individual’s network can complement the individual’s set of knowledge. Regardless of the possible benefits and comparable to other forms of capital, social capital has its costs, usually time and effort to maintain the relationship but also that at some point a return favour might be expected (*Hoang & Antoncic 2003, van Oorschot, Arts & Gelissen 2006*). The author wants to give some supplemental examples of how social capital can be converted into a competitive advantage in order to show that social capital is not only a form of capital but also specifically vital for entrepreneurship research.

Example 1: A young business founder writes his first contract for the first employee of his new business. Instead of hiring a lawyer to validate the contract for eligibility, he asks a friend who happens to be a last year law student. The friend gives a more or less equally good judgement about the contract without asking for monetary return.

Example 2: A graduating student applies for jobs. Her grades are rather average but she knows that one of her former volleyball team mates now has a managing position at a prestigious firm. She calls her and asks for a recommendation. Because the manager has good memories about their common sport time she says “Of course, I will give your application directly to the HR department and you should pass the screening and jump directly to the interview stage”.

Example 3: A business owner needs a new contractor for the internal IT systems. Instead of researching through the internet, she posts a question on her social media page asking about whether some of her business contacts know a reliable service firm for this matter. Within one hour she got four replies with recommendations, names and contact details for such firms.

The examples show two important characteristics about social capital. First, it can be converted into different benefits, for example information, reduced time or even business opportunities. The second characteristic is that in each example both the communication channel and the closeness of the actors vary. While in the first example the two actors are friends, the third example shows that the recipients might be only perfunctory acquaintances.

Anyway, the explained characteristics of social capital should also show why this topic is so relevant for entrepreneurship. Social capital can render the entrepreneur financial benefits, time and sometimes even gives access to opportunities or information which would not have been accessible through usual market mechanisms (*Putnam 1993, Smith, Smith & Shaw 2016, Storey & Green 2010, Watson 2007,*). Moreover, it is

capital that can be acquired without having financial assets. Naturally, several researches also indicate a negative impact of social capital on new venture performance (*Li et al. 2013, Mačerinskienė & Vasiliauskaitė 2007, Westlund & Bolton 2003*). The critics, however, coincide more or less that drawbacks occur if the social capital originates in too tight relationships as these produce irrational decisions. On account of this and in order to answer the research question, it is mandatory to understand how social capital is constructed in the first place, how it nowadays work in an online world and how people embrace social capital depending on their location.

2.2. Dimensions of social capital and the importance of bridging

The research question is specifically concerned with the bridging behaviour of entrepreneurs. Hence, one needs an understanding of what bridging is and which weight it has in the social capital dimensions.

Although there are some disputes about the validity of the social capital theory itself and its usefulness for people and businesses, there is a relative strong consent about the ingredients of social capital. As social capital originates in relationships between persons, each form is probably unique but nevertheless the characteristics of a relationship can be broken down into smaller pieces in order to better understand social capital. The framework that has found a strong recognition among social capital researchers was postulated in the already mentioned paper of Nahapiet and Ghoshal (1998). They claim social capital has three mutually exclusive dimensions: structural, cognitive and relational, which in total have nine sub-dimensions (see Figure 1). These nine sub-dimensions give platforms on which intellectual capital can be accessed, anticipated, exchanged and also they constitute the capabilities of the relationship for these purposes. Eventually, through this combination and exchange, new intellectual capital is created, which in turn alters the existing social capital.

This framework has been used the basis of very many research on social capital (*e.g. Liao & Welsch 2005, Smith, Smith & Shaw 2016, Tandardini & Kroll 2016, Yu 2013, Zahra 2010*). Other researchers claim to have developed their own framework but basically just renamed the dimensions of Nahapiet and Ghoshal (*Adler & Kwon 2002, Hoang & Antoncic 2003*). The author is also convinced of the framework's logic and elaborateness and thus uses it for the further analysis.

Figure 1 shows a visualization of Nahapiet's and Ghoshal's framework. The structural dimension contains the size of the actor's network (ties), its composition (configuration) and the purpose of the network(s) (appropriable organization). The cognitive dimension focusses on whether two actors share the same language and intellectual capacity which is necessary to transfer knowledge. Finally, the relational dimension describes the closeness of two actors based on their institutional background: how much do they trust each other, do they share the same inner rules (norms), do they have obligations between each other and can they identify with each

other's purposes? Consequently, each of these sub-dimensions has a different impact on the combination and exchange of knowledge (intellectual capital).

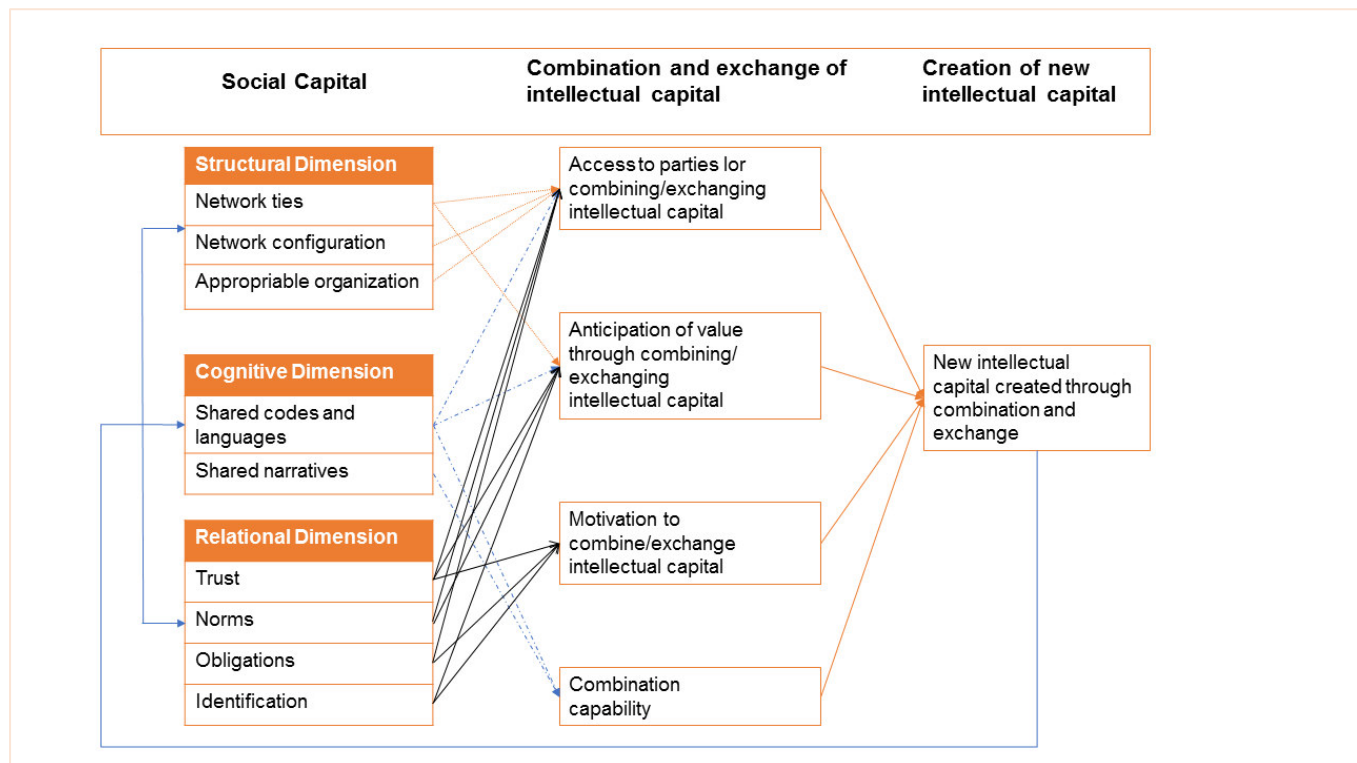


Figure 1: Social Capital in the Creation of Intellectual Capital, own visualization (Nahapiet & Ghoshal 1998, p.251)

Despite the avail of the framework the author perceives two major shortcomings of the framework. First, although Nahapiet and Ghoshal apply their model to organizational advantage, they limit the conversion potential of social capital to knowledge only. The author has already shown that there are more possible benefits from social capital conversion (e.g. time, money and opportunities). Second, the framework is rather a description of how social capital looks like and that it can be converted into access, anticipation, motivation and capabilities of knowledge exchange, yet they refrain from showing how social capital is created in the first place.

Since this question is crucial for this paper, it demands some focus which implies the cognitive dimension is of inferior importance here. The reason is that by definition the cognitive dimension reflects the mental capabilities as well as the concrete knowledge of the actor, for example the academic background, the mastery of languages or work experience. Hence, the recommendation to improve this dimension would be to acquire new types of knowledge or visit education facilities. But still then, the actor can hardly influence the cognitive level of his counterpart beforehand. Therefore, the cognitive dimension here is considered as a given characteristic between people and it comes back to the structural and relational dimension to find the people with the right cognitive dimension.

With that being said, the paper focusses on the structural and relational dimension to answer the research question. Enlarging the magnitude and configuration of the network as well as the closeness of the relationship are vital for creating social capital and as shown in figure one mandatory for accessing and anticipating intellectual capital (Nahapiet & Ghoshal 1998, Storey & Green 2010). Both practices can be defined as 'bridging' and 'bonding', respectively, and these definitions are characterized by several works of Putnam (1993, 1995, 2000). Bridging is the progress of making new acquaintances and creating more external ties to the network (Adler & Kwon 2002, Putnam 1995, Woolcock 2001). Putnam emphasizes that bridging is a necessary progress to increase "external assets and information diffusion" (Putnam 2000, p.22). Accessorily, it can be considered as the horizontal increase of social capital (Woolcock 2001). This implies not only looking for like-minded people by searching for certain interest groups but also making oneself seen more easily by others. Bonding, in comparison, refers to the interaction with individuals of the same background being already in the community of the actor (Harrison, Montgomery & Bliss 2016). It happens a lot between families and friends and is characterized by trust as well as norms which is needed to keep communities together (Ring, Peredo & Chrisman 2010, Williams 2006, Woolcock 2001). In very simple terms, bridging is working on the quantity of the network while bonding can be considered as working on the quality of networks or rather the single ties.

The nomenclature has grown on Granovetter's definition of strong and weak ties. In his sociological approach, he classified strong ties as a connection with a high emotional intensity and the expectation of reciprocal services (Granovetter 1973). Putnam's concept of bridging and bonding is strongly associated with Granovetter's idea as bridging can transform absent ties into weak ties and subsequently bonding would transform weak ties into strong ties. In practice, one can assume that bridging could imply speaking to foreign people or visit new sport clubs. Bonding, on the other hand, would be the repetitive communication with existing contacts and the elevation on more intimate conversation topics.

Bridging and bonding and the corresponding weak and strong ties are part of constructing social capital according to Nahapiet and Ghoshal. However, as mentioned above, not each form of social capital is necessarily beneficial. Furthermore, there is support that bridging and bonding are not equally important in an entrepreneurial context. Nahapiet and Ghoshal themselves already avow the structural dimension, and not the relational one, a primary role in developing intellectual capital (1998). Reasons were already explained before the existence of the framework. Granovetter strongly favours weak ties over strong ties in order to receive information; he even claims "*it is remarkable that people receive crucial information from individuals whose very existence they have forgotten*" (Granovetter 1973, p.1372). Basically, what this, maybe slightly exaggerated, quote implies is that people are very willing to help and share information with an actor once they have only the slightest (weak) connection to this actor. Burt endorses the superior role of weak ties

by showing that social capital is exploited when contacts (brokers) are used to fill gaps in the individual's knowledge (structural holes) (*Burt 1997, 2000*). Feldman and Zoller (*2012*), for example, agree by showing that it is more important for entrepreneurs to know "dealmakers", or brokers, than the actual investors in order to raise firm investment. Generally, one can agree that founding and managing a business is a complex endeavour which should exceed the cognitive capacities of one single person. Due to the variety of expertise that is needed to run a business it seems more useful for the entrepreneur to have a diversified and large network at hand than less but more intense relationships.

But not only are bridging and weak ties more beneficial but also can too much bonding have negative outcomes. A probable reason is shown in Granovetter's following work in which he claims that relying on strong ties can lead to a cognitive embeddedness portending a lack to apply new ways of thinking (*Granovetter 1985*). Other critical research basically relies on this core issue and also Putnam suggests that bonding is rather a measure to 'get by' while bridging is needed to 'get ahead' (*Putnam 2000*). Naturally, bonding can have expedient effects as well (*see e.g. Coleman 1988*), yet it seems to need a very careful balance while more bridging, if not taken to an extreme, is always helpful for an individual especially when he is an entrepreneur (*Burt 1992, Storey & Green 2010, Williams 2006*).

Summing up, social capital abstractly consists of three dimensions of which the structural dimension and the corresponding bridging of networks are considered as the most relevant part; not only for the purpose of this research but also frankly for entrepreneurship in general. As delineated in the introduction, considerable effort has been done to explore networking (bridging) behaviour of entrepreneurs, yet, this research body is limited mostly to the offline world. Also, Nahapiet and Ghoshal, Burt, Putnam and Granovetter have established their theories in a time where day-to-day communication on an online platform was either not invented or not common. Therefore, before compiling continuing to the empirical analysis, it is mandatory to briefly depict the differences between the offline and online dimensions of social capital.

2.3. Social capital in social network sites

It was shown that bridging is economically more useful for entrepreneurs, however the research question touches bridging over online media. Hence it has to be shown why bridging and not bonding is the more relevant social capital dimension online.

Online networks or social network sites (SNS) are social media websites which have to be distinguished from other social media services such as blogs, content communities or virtual game worlds (*Smith, Smith & Shaw 2016*). The distinguishing

characteristics are a (semi-) public profile of the user within the system of the website, a search function for digital content, functions to show and suggest relational ties of the user and transparency about other users' profiles; all of which are fully integrated in the users daily live and therefore used regularly (Boyd & Ellison 2007, Kane et al. 2014, Olmstead, Lampe & Ellison 2006, Smith, Smith & Shaw 2016). The largest SNS in the beginning of 2017 are Facebook (1871 million users), QQ (877), WeChat (846), QZone (632) and Instagram (600) (Statista 2017a).

Since most of these networks only started sky-rocketing after 2010 research synthesizing their functions with social capital is rather thin. Nevertheless, the first attempts give evidence that SNS are much more used for bridging than for bonding social capital (Wallace 2012, Williams 2006, Yang 2015). Ellison, Steinfield and Lampe (2011) compiled a study about the user behaviour on Facebook, concluding that only 20% of their study population use Facebook to bond with existing ties while the majority uses Facebook to initiate new ties and to seek social information about weak ties. A main assumption behind these bearings is that an actor meets the people behind strong ties regularly face-to-face and thus does all his bonding behaviour in real life and not online. Yet, studies have revealed crucial characteristics about SNS showing why they not only facilitate bridging but also make bridging online almost more powerful, in terms of accessing social capital, than the offline version:

- **Low entry barriers:** In the offline world, making a new contact can give some people difficulties and needs surmounting. In online networks, however, a new tie or the access to a whole community can be created by a simple click on the right button (Williams 2006).
- **Content access mechanisms:** If one makes a new contact offline one usually does not know the background of the person. This uncertainty can be somewhat reduced if you meet people on symposiums but still then details like former universities or employers are unknowns. On SNS this uncertainty can be turned around. Search filters give the possibility to search persons with a specific (combination of) background(s). Hence, especially in a business context new ties can be made, for example, to fill information gaps (Burt 2000, Kane et al. 2014).
- **Transparency and social lubricant:** In line with the previous point, users' profiles, which are supposed to reflect the offline character and résumé, can usually be viewed publicly, especially on career networks like LinkedIn. This not only supports the search function but also facilitates the creation of a new tie and access to possible social capital. For example, if a user is contacted by an unknown person he can be of course sceptical in the first moment. But, if the person's profile for example shows that he went to the same university, there

will be a common ground and therefore knowledge exchange could be facilitated (*Ellison, Steinfield & Lampe 2011, Kane & Alavi 2008*).

- **One to many communication:** Unless when speaking on a public convention or comparative occasions, it is hard in the offline world to address a crowd of people with a question or request. As shown in the example above, on SNS this is an easy task and enables a user to crowd-source social capital from weak ties. A question can be written quickly, published with one click and then appears in the contacts' new feeds (*Ellison & Boyd 2013, Wallace 2012*).
- **The friend list:** A SNS profile usually contains a list of "friends" or "connections" that can be seen by viewers. Different from a human mind, the SNS does not forget these friends once the connection has been made. Therefore, not only is a tie never lost online but also is it always a way to communicate instantly, even after years of no contact. Furthermore, a friend list also serves as a validation for new contacts. As explained in the transparency point, common friends can facilitate communication between two formally unknown people. In the offline world, unknown people do not have a sign showing whether they know someone you know; this uncertainty is mostly taken away online (*Ellison & Boyd 2013*).

This list of differences is probably not exhaustive; nonetheless it evinces how social networks sites can facilitate bridging networks. In an entrepreneurial context, the possibility to search for people with specific skills or experiences can be extremely valuable as well. With that being said, it is shown again that the research gap spotted in the introduction needs to be tackled. The discussed features will be used for the methodology as well. Eventually, to have a complete theoretical foundation of the concerns of the research question, the paper needs to discuss geographical differences in the usage of social capital as well.

2.4. Geographical patterns of social capital

The research question is concerned with the regional differences of online social capital exploitation of entrepreneurs. This subchapter will clarify the terms rural, urban and metropolitan and also develop a theoretical hypothesis for answering the research question.

The terminologies 'rural' and 'urban' have been used in social capital literature before and relish usually a common definition. Rural areas distinguish themselves from urban areas through a low population density, usually measured inhabitants per square kilometre, and or through a non-commutable distance to a metropolitan area (*Gilbert, Karahalios & Sandvig 2010, Stern & Adams 2010, Westlund, Olsson & Larsson 2011*).

While these parameters are usually the same, the dimensions vary from source to source; for example, Westlund, Larsson and Olsson (2013) use a definition for metropolitan areas in which the area is defined by a 30km radius around the core city. Eurostat describes areas as urban centres when “[...] at least 1 500 inhabitants per km² and a minimum population of 50 000[...]” live in the area (Eurostat 2017). In addition to the density dimension, metropolitan areas can also be distinguished from regular urban area by the total population amount and the economic importance for the country (Dijkstra & Poelman 2017).

So far, papers investigating the social capital differences between low and high density areas have not found an agreement. One camp argues that individuals and firms in rural areas either do not exploit the possibilities of networking (Moyes, Whittam & Ferri 2012, Stern & Adams 2010, Sørensen 2016, Townsend et al. 2016) or simply do not have the circumstances to do so because of missing agglomeration advantages (Freire-Gibb & Nielsen 2014, Wennberg & Lindquist 2010). Consequently, other studies suggest the opposite, namely that social capital is much richer in rural areas and can moreover be easier exploited by entrepreneurs (Dahl & Sorenson 2012, Hofferth & Iceland 1998, Purdue 2001, Westlund, Larsson & Olsson 2013, Ziersch et al. 2009). Nevertheless, all these authors also unitedly acknowledge that rural areas are more prone to bonding while urban areas let people apply more bridging.

Since one group argues for the superiority of rural areas, it seems to be contradictory to the delineated assumption that bridging, generally speaking, is economically more beneficial than bonding. Hence, the author argues that bonding in rural areas is not the better way to exploit social capital but the only feasible way. Due to the lack of people, rural areas simply do not offer much room for bridging. In addition, one has to consider other factors influencing social capital exploitation as well. Van Oorschot, Arts and Gelissen (2006) conducted a cross-national comparison of social capital embracement and concluded that bridging and bonding are less a question of population density but rather of human capital. Subsequently, they conclude that more education and work experience are positively correlated with bridging and since these factors are higher in agglomeration areas one tends to find more bridging there as well. This claim is also supported by Sørensen (2016) who also adds that bridging rather than bonding is used by urban population because they expect more economic benefits. Moreover, bonding might also be more spread in rural areas because tight relationships can substitute for missing institutions (e.g. capital markets) in these areas (Andersson & Larsson 2016, Westlund, Larsson & Olsson 2013).

On these grounds, one can assume that bonding is applied because the capabilities for bridging are not consistently given. Regarding the research question, this argumentation leads indeed to the expectation of a lower bridging behaviour of rural entrepreneurs. Admittedly, the question asks for the online bridging behaviour and the previous subchapter showed that bridging is highly facilitated through SNS. Therefore, one could also guess that rural inhabitants, especially entrepreneurs, have a way to bypass their constraints and embrace the benefits of bridging social capital. But do

rural inhabitants see and make use of this possibility? The answer is tendentially no. Studies give evidence that social network usage is not only higher in high-density areas but also urban inhabitants tend to have more weak ties and communicate less intensively with their ties online (*Gilbert, Karahalios & Sandvig 2010, Haight, Quan-Baase & Corbett 2014*). Although there could be technical reasons, like limited internet access in rural areas, studies concerning industrialized countries tend to explain this phenomenon by demographic reasons (education, experience and age) as well (*Baeza-Yates, Middleton & Castillo 2009, Lengsfeld 2011*). Unlike the paper on hand, these studies are not specialized on entrepreneurs, anyhow there is not enough evidence that entrepreneurs use the internet substantially more than 'regular' people. There is another mechanism that influences the research question. Entrepreneurs are not obliged to create their business where they are born, hence one has to account for a self-selection process. In order to maximize economic benefit for the business, entrepreneurs tend to move to places where they find promotional factors (*Kolympiris, Kalaitzandonakes & Miller 2015, Kulchina 2016*). For that reason, one can surmise that entrepreneurs which consider social capital and bridging as valuable move to or stay in urban or metropolitan regions, because there are more people to connect with. With that being said, theory suggests three mechanisms that have to be considered when answering the research question:

- Bridging possibilities are generally lower in rural areas.
- SNS usage is tendentially lower in rural areas (among people in general).
- Entrepreneurs, which are prone to bridging, might have moved away from rural areas.

By implication, the author hypothesizes that the online bridging behaviour of entrepreneurs in rural regions is indeed different from the one of entrepreneurs in more urbanized regions. More precisely, the theoretical deduction is that online bridging activity is considerably lower for rural entrepreneurs. The following analysis will test this hypothesis.

Summing up the theoretical framework, it has been demonstrated that the research question asks whether entrepreneurs in rural areas access the goodwill embedded in the relationship between actors which can be converted into concrete value by an actor. This social capital is a flexible and financially costless form of capital and it can be especially useful for entrepreneurs. Social capital consists of three dimension, structural, cognitive and relational, of which however the cognitive dimension can only be unilaterally influenced by an actor. Moreover, evidence shows that working on the structural dimension (bridging) promises more economic benefits than working on the relational dimension (bonding), mainly because it gives more access to missing forms of knowledge. It was subsequently shown that bridging is strongly facilitated by the use of social network sites. In a geographical context, offline bridging is more utilized

in urban areas than in rural areas which is presumptively the result of demographical and institutional constraints in the latter. Also, regular social media usage is more spread in urban areas. Eventually, this leads to the hypothesis that rural entrepreneurs, compared to urban or metropolitan ones, are constrained in their utilization of online bridging.

In the following chapter, it will be exhibited how this hypothesis is empirically tested by presenting how microlevel data on entrepreneurs and their social network usage, respectively, is gathered.

3. Data

Measuring social capital is a difficult proposition, especially when quantitative analyses should be applied. The standard procedure is to do surveys or conduct interviews (*e.g. Achtenhagen & Bogren 2013, Burt 2000, Haase Svendsen, Kjeldsen & Noe 2010, Liao & Welsch 2005, Oliviera 2013, Van Oorschot, Arts & Gelissen 2006, Williams 2006*). But as mentioned above these sourcing methods can suffer from heavy bias and human mistakes. For example, if people are asked how many weak ties they have, they could hardly come up with an accurate number. Hence, a new approach to obtain objective and accurate micro-level data is applied, in order to test the just established hypothesis. This chapter is going to present the database, how the data is collected and how social capital is reflected by this data.

3.1. Exploiting LinkedIn

The study on hand will use individual network data of entrepreneurs from the social network site LinkedIn. With 467 million registered users worldwide (Q3 2017), it is the largest network, which is specialized on business interactions (*Statista 2017b*). More than 45% of these users claim to use LinkedIn at least 3 hours a week (*Statista 2017c*). It was founded in 2003 and focusses on connecting working professionals all over the world ever since (*LinkedIn 2017*). This focus on working professionals makes LinkedIn a very suitable database for entrepreneur data for two reasons. First of all, in comparison to papers analysing private social networks like Facebook (*Ellison, Steinfield & Lampe 2011*) or Twitter (*Wang, Mack & Maciejewski 2017*), this paper is based on the assumption that networking on LinkedIn is done for economic reasons, for example boosting the own career or finding relevant information. Second, a LinkedIn member is supposed to show since when and if he still does a certain job, hence, based on the assumption that the members are honest, one can doubtlessly identify entrepreneurs. Consequently, entrepreneurs can be found easily and all their

activities on LinkedIn are more or less done for economic reasons. LinkedIn is free for users. Nevertheless, certain premium functions can be acquired for a monthly fee. The digital profile is constructed in rectangular fields. The top field on the profile consists of the user's picture, name of one employer and education facility, number of connections and a space for a brief profile summary. As a visitor one also sees a button for connecting and messaging the user. The next field summarizes the user's activities, for example recent publications or comments on other users' posts. The proximate and most prominent field of the profile demonstrates the user's work experience, education and volunteer experience in this successive order. Naturally, the user has to manage the contents by himself and does not have to fill out everything in detail. The positions are by default structured chronologically. If an employer or university is linked to a public business page one sees this organization's profile picture as well and can reach the page through a hyperlink in the listed name. After the experience field, one usually finds a field for 'Featured Skills & Endorsements'. A skill has to be added by the user himself, for example 'Leadership'. Connections of the user can then click on a skill on the user's profile and give his "endorsement". It simply shows to a third party that the connection approves that the user has this skill. Under the endorsement field, the next field is usually "Recommendations" with received and given recommendations. A recommendation is an individual text a user can write to give a more detailed praise for another user. Recommendations are also publicly seen by other users. Received recommendations are chronologically listed on the profile with the author, make-up date and relation between the author and user mentioned as well. Given recommendations are shown in the same way with the recipient shown instead of the author. Each written recommendation has to be approved by the recipient before it is shown on the profile.

The subsequent field shows "Accomplishments" of the user. These accomplishments can be language level (e.g. Swedish "full working proficiency") or test scores. The last field reflects the user's "Interests". Interest in the sense of LinkedIn are certain groups around a topic, public persons or company pages that the user follows. Following implies that the user receives status updates or activities of the page's owner on his timeline. For example, in the group 'Banking & Finance' professional articles about the finance world are published. Each of the mentioned fields only exists if the user adds at least one item, however the top field as well as the field about experience are mandatory since the user has to add at least one work position. The fields can also be manually arranged by the user, yet the order as explained is the default order and seldom changed by users.

Manually writing down the data for each entrepreneur and the corresponding company is a strenuous procedure. Nonetheless, this rich amount of information, voluntarily given by the users, offers completely new possibilities for entrepreneurial research. The data is given unobserved, meaning that the entrepreneurs shared the information without being influenced by any survey or interview environment. Furthermore, the profile collects quantitative data on networking behaviour and ties accurately, which is

hardly possibly when working with qualitative methods. Which activities exactly are measured and how they represent bridging behaviour is shown in the subsequent chapter.

The data is taken from Swedish entrepreneurs, meaning from people who have founded a business in Sweden. The country is chosen for different reasons. Van Oorschot, Arts and Gelissen (2006) concluded that Sweden is a country being very rich in social capital due to its high human capital level, which promises the potential of finding interesting results in this study. Swedes are also a very internet affine people as 90% have access to internet for an average weekly use of 24 hours (Nordicom 2017), indicating that one can expect networking indeed to take place on sites like LinkedIn as well. In terms of entrepreneurship, Sweden has a fairly low percentage of people intending to start a business. However, the businesses being actually started are launched because the founder sees an opportunity and does not act due to an economic necessity, although policy support is rather moderate (GEM 2017). Finding opportunities is an important value potential of social capital so one can suspect that entrepreneurs in Sweden are able to use their social capital. Sweden is also a very large country in size with a consequent low population density. Yet, one finds several urban areas as well as one metropolitan area (Stockholm) which offers a good basis for the rural/ urban comparison intention of the research question. Finally, since there is evidence for a connection between firm growth and entrepreneur network (Watson 2007, Yu 2013), firm data for the company is needed. Sweden's penchant for data collection is very useful for this plan. The public database Retriever represents a reliable source for employment growth, revenue, industry or registration dates for the companies. In addition, it enables to verify whether the claimed firms mentioned on LinkedIn are still active. Retriever was accessed through the Lund University access.

The author of this paper acquired a LinkedIn Premium membership. The search function has been used with the search items "Sweden" for location, "Founder" for title and "3rd+" for degree of connections. This search offered 21.019 results. The author visited each of the offered profiles in the order given by the search algorithm. Entrepreneurs were added to the dataset when the following conditions were met:

- **Single founder:** The author only wants to include entrepreneurs who are the only founder of their business and subsequently to measure their online network behaviour. If two or more people founded a business, their networking capabilities would, to a certain extent, go together and possibly create synergies. These effects exceed the limits of this paper and would need an own research agenda.
- **Registered and active business:** The founder has to claim on LinkedIn that he still is the owner of the business. Additionally, the business has to be

registered on Retriever and marked as active. This control ensures that the entrepreneur is managing a legitimate business.

- **Reported Revenues and Employee number:** Firm performance data should be included in the analyses as well. Hence, the business has to exist long enough that first accounting data on Retriever is given as well.

In case the entrepreneur has more than one active company, the one featured in the top field of the user profile is taken. Using these conditions 300 observations were made. Up to the 250th observation, data given in the order of the search algorithm were taken by going through the result pages. This procedure showed a majority of observations from Stockholm, which would make the calculations less valid. Since no time should be wasted by going through more result pages, the author decided to add specific locations to the search function for the last 50 observations. These 50 observations would have appeared sometime through the original search filter, anyway, but it would have taken more time. After all, data is anonymized and names of entrepreneurs and companies are not shared in this research. The data from LinkedIn and Retriever was collected between March 27th and April 17th 2017.

This sourcing is limited in the sense that one cannot observe the whole extent of the LinkedIn usage. Especially daily activities such as messaging, searching or posting cannot be measured from viewing the profiles. Regardless, the variables presented in the following chapter will show how the available data represents the entrepreneur's attitude to access the social capital of online networks.

3.2. Bridging, location and control variables

The LinkedIn profiles of the entrepreneurs together with the firm-level data from Retriever offer variables for reflecting the bridging aptitude and for controlling the company effects. There are three outcome variables which represent the online bridging behaviour. Each variable shall present different aspects of bridging:

Variable Name	Description	Unit	Source
Endorsements	Received endorsements for all skills from other users	Count (#) ²	LinkedIn Profile
Recommendations	Given and received recommendations to and from other users.	Number (#)	LinkedIn Profile
Followed Networks	Networks that are followed by the user	Count (#)	LinkedIn Profile

Table 1: Outcome variables representing bridging behaviour²

² Unit: "count" implies that the number had to be counted manually while "number" means the number was given on the profile

Endorsements represent how many people confirm that a profile user possesses a certain skill. Endorsements are given through a simple click on a skill the recipient has mentioned on his page and thus demand fairly little engagement. Once an endorsement is given, the donator is also seen on the recipient's profile but not visibly shown like a recommendation. If an observer clicks on a skill he sees a list of whom endorsed this specific skill, but this list of people cannot be seen by simply scrolling over the profile. From his own LinkedIn experience, the author knows that endorsements are usually given with the expectation to receive endorsements from the recipient as well. This also usually happens immediately when the new tie is made on LinkedIn. In comparison to recommendations, an endorsement can be given without showing that there has ever been a working relationship between the two people, hence users can be much more generous with endorsements and consequently receive far more endorsements than recommendations. A user ideally tries to receive endorsements from every of his contacts. Subsequently, it can be assumed that there exists a very strong correlation between network size and number of endorsements. The number of visible connections is capped at 500. This means that the moment a user has more than 500 connections it is shown as '500+' on the profile. Therefore, endorsements for this paper serve as a proxy for network size as well. Moreover, due to the reciprocity of endorsements, their number shows with how many connections the user has actually interacted. Summing up, endorsements show how bridging is used to increase the size of the network.

There is a minor limitation with endorsements though. Once a skill receives more than 99 endorsements, the number is shown as '99+'. In the very few cases this applied, the number of endorsements for this skill was counted as 100.

Recommendations are the bridging activity on LinkedIn that demands the most involvement of the user. Moreover, it can be seen as the result of previous offline bonding. Writing a recommendation on LinkedIn usually assumes that the two persons have somehow worked with each other before. The recommendation is a public appreciation. For the recipient, a recommendation shows to other users that he can work well with others and, depending on the contents of the recommendation, maybe has specific skills. The writer of a recommendation not only creates the possibility of a reciprocal favour but also puts his name permanently on another person's profile. Hence, received and given recommendations mirror a bridging behaviour that serves to increase the user's visibility which increases the chance of other people connecting with the user. It also deems the horizontal enlargement of social capital and also mirrors its bi-directional character. Because recommendations are individual and need active writing, not every user of the data sample has created or received any, yet, and also correlation with the total number of connections is very low. Therefore, in the author's opinion, recommendations are used by entrepreneurs who see the bridging value of this LinkedIn function. In addition, it is the visible LinkedIn function that is

closest to bonding with existing ties and also serves to openly show qualitative relationships to other users.

Followed Networks is the bridging variable that exceeds the existing connections of the user. Furthermore, it is also the least interactive way to use LinkedIn. A user follows some networks automatically e.g. the business pages of his employers or education facilities (if existent). Followed networks are divided into influencers, who are pages of celebrities in the business world like Richard Branson, companies, which are official business pages, groups which are communities revolving around one specific topic like mobile payment and lastly schools which are the official pages of education facilities. To follow such a group, the user only has to visit the group page and click on a follow button. Subsequently, he will see new posts in these networks on the starting page. From the profiles only, one cannot see if and how often a user posts or reads in these networks, but still the number of followed networks gives interesting insights in the bridging behaviour. Networks can be used to source recent information about relevant topics, find job opportunities and ask for help for business problems. Besides, networks are an easy way to find new connections which share at least one common point of interest. As a result, following networks are vital to bridge and increase the horizon of the user's social capital. In comparison to endorsements, it is independent from the current network (online or offline) and rather depicts the user's aptitude to increase the network's magnitude.

These three variables show different ways to use LinkedIn and bridging online. Endorsements not only reflect the network size but also show how intensively LinkedIn connections have been made so far. Recommendations are a way to increase the profile's visibility and also can create reciprocal favours. Eventually, the count of followed networks shows how strongly the user wants to source information and possibly enlarge his network

The research question intends to examine the differences of the usage of these LinkedIn functions among rural, urban and metropolitan entrepreneurs. The creation for this categorical variable for each entrepreneur is done as follows. First, the company, which the entrepreneur founded and still manages, has been identified on Retriever. Second, the physical address ("Besöksadress") was noted. This address was chosen because the entrepreneurs not always mentioned the company's location on LinkedIn. Third, the address and city was found on the statistical atlas (Eurostat 2017). For this map, the population grid 2011 (Type of clusters), which shows the population density per square-kilometre, was chosen. Fourth, if a city falls into the category 'urban cluster' or 'rural grid cells' (marked as orange and green areas on the statistical atlas) it was coded as "0" = rural area. This implies that companies are in locations with less than 300 inhabitants per square kilometre. Companies in urban centres (red areas, at least 1500 inhabitants per km²), were coded as "1" = urban areas. Lastly, the author decided to have a third category "2" = metropolitan whenever

the company is in Stockholm or the surrounding suburbs. This was done for two reasons. First, the sheer number of observations from Stockholm justified an own category. Second, Stockholm's size and importance for the Swedish economy gives reason to call it as a metropolitan area, as defined above. The population of this metropolitan area almost encompasses one third of the country's population.

To control whether variations are due to location differences, several control variables were created:

Variable Name	Description	Unit	Source
Employees	Number of registered employees in the company	Number (#)	Retriever
Revenue	Registered revenue of the company	Thousand SEK	Retriever
Gender	Gender of the founder. 0 = male, 1 = female	Dummy	LinkedIn Profile
Entrepreneur Experience	Number of months since the foundation of the company	Months	LinkedIn Profile
Number of Foundations	Number of other businesses founded by the entrepreneur	Count (#)	LinkedIn Profile
Workplaces	Number of other given workplaces minus the foundations	Count (#)	LinkedIn Profile
Education	Number of visited higher education facilities (excluding high-schools and primary schools)	Count (#)	LinkedIn Profile

Table 2: List of control variables

The control variables were chosen for the following reasons:

- **Revenue and Employees:** As discussed above, studies give evidence that the firm size (measured by employees and or revenue) is correlated in different ways (*Oliviera 2013, Tandardini & Kroll 2016, Watson 2007*). In connection with the LinkedIn usage, the author assumes that the larger the company, the more clients and contractors the entrepreneur might have, which he adds to and possibly interacts with on LinkedIn.
- **Gender:** Gender is included as a control variable because the majority of studies investigating gender differences of entrepreneurial networking in fact agree on a considerable difference. Female entrepreneurs are supposed to have far less weak ties and deploy less bridging than men (*Achtenhagen & Bogren 2013, Jayawarn & Marlow 2015, Katz & Williams 1997*).
- **Entrepreneur experience:** The longer the entrepreneur is managing his business, the more people he possibly meets and can consequently add them to the online network. Moreover, in order to make the business survive longer, the entrepreneur possibly uses more bridging including information seeking.

These assumptions are empirically supported by Mack, Marie-Pierre and Redican (2017)

- Number of other foundations: Assuming that an entrepreneur is aware of the value of bridging for economic purposes it is obvious that each founded business adds new ties to a network. Also, especially when the new ventures belong to different industries, the entrepreneur could be following more different networks.
- Workplaces and Education: Each new work place or visited university reveals the actor to new people and gives the chance to enlarge the network structure. Since these structures can be reflected in the online world one would expect positive impacts of these two variables.

Some of the control variables also need more clarification regarding the measurement. Employees and revenue were given on a specific reporting month, which is inconsistent for all companies. The dates range from 06-2015 until 12-2016. Since these numbers should only reflect the size of a company in two dimensions as a control variable, this inconsistency is accepted. Entrepreneur experience is the difference between the claimed starting date of the active company on LinkedIn and today, measured in months. The months between the given date and the 1st of April were taken. In few cases, the entrepreneur only gave the year of foundation; in these cases, June was chosen as the founding month, since it is the middle month of a year. Months as a unit was chosen because the majority of companies is younger than 5 years and thus years would have given to little variations.

For the number of other business foundations, the author counted for how many other companies the entrepreneur claimed to be a founder (or co-founder) on his LinkedIn page. Co-foundations were included here because this variable only intends to reflect previous entrepreneurial experience. For the number of workplaces only single employers were chosen; meaning if the entrepreneur had three different jobs at one company it was still counted as one workplace. Moreover, only education facilities for a higher education are counted regardless of the length of the stay, so a semester abroad has the same value as a three-year bachelor. The reason is that education here mirrors places where the entrepreneur could make new (weak) ties for his LinkedIn profile and hence the length of the stay is of minor importance.

Comprising, the paper will use three different variables to depict online bridging behaviour on LinkedIn. It will be evaluated whether bridging behaviour follows geographical differences using a categorical location variable for rural, urban or metropolitan areas. A variety of control variables is available to test the robustness of the models describing these differences. In order to have a first idea of how bridging behaviour discerns between locations, the next chapter will show the descriptive statistics of the data.

3.3. Descriptive statistics

This chapter will first show the mean, standard deviation, minimum and maximum of each variable to get an overview of the distribution of the data. Furthermore, one will evaluate how the outcome variables are distributed depending on the location coding.

Variable	Mean	Standard Deviation	Minimum	Maximum
Recommendations	4,59	9,69	0	110
Endorsements	315,73	307,71	0	2237
Followed Networks	33,6	42,43	1	423
Workplaces	6,38	4,33	1	31
Education	1,68	1,2	0	7
Other Foundations	1,14	1,47	0	9
Entrepreneur Experience	86,4	67,38	2	400
Gender	0,25	0,435	0	1
Revenue (in Tkr)	52228,1	366891,3	0	6075551
Employees	21,04	91,47	0	1258

Table 3: Descriptive statistics for all variables

Looking at the distribution of the data one can see that almost each variable is heavily right skewed. The mean is mostly much smaller than the maximum value and the standard deviation is beyond the minimum value. This assumption is confirmed by the visualizations of the outcome variable in a histogram (*Appendix, p.XII*) This shows first of all that there could be a certain threshold of how extensively most users exploit LinkedIn and only a smaller group exceeds it in terms of endorsements, recommendations and followed networks. Second, this skewness will most likely give challenges to fulfil homoscedasticity demands of the residuals in an OLS-estimator (*Feinstein & Thomas 2002, Gujarati & Porter 2009*). Therefore, a data transformation with logarithms and or roots will probably be necessary. Table 3 also shows the distribution of the dummy variables. Only 25% of the entrepreneurs are women. The company data (Revenue and Employees) seems to be extremely right skewed with few heavy maximum outliers. This is in line with the general assumption that most start-ups stay relatively small and few chosen ones become so called gazelles, high growth companies (*Delmar, Davidsson & Gartner 2003, Storey & Green 2010*). Eventually, it is noticeable that on average each entrepreneur has been involved in at least one other business foundation (mean = 1,14). Since this variable is also right skewed one can further conclude that there are several entrepreneurs with at least two other foundation involvements. With that being said, it is possible to receive an

interesting side observation of the analyses, namely whether serial entrepreneurship determines the online networking behaviour.

Beholding the location codes one can see the following distinctions in the bridging variables:

Endorsements					
Location	Mean	Standard Deviation	Minimum	Maximum	n
Rural	258,22	281,86	0	1216	83
Urban	287,64	263,07	0	1179	68
Metropolitan	360,6	334,22	0	2237	149
Recommendations					
Location	Mean	Standard Deviation	Minimum	Maximum	n
Rural	3,98	6,68	0	26	83
Urban	4,5	7,23	0	37	68
Metropolitan	4,97	11,87	0	110	149
Followed Network					
Location	Mean	Standard Deviation	Minimum	Maximum	n
Rural	32,89	44,3	1	302	83
Urban	36,35	57,39	2	423	68
Metropolitan	32,74	32,48	1	190	149

Table 4: Distribution of outcome variables depending on location

Table 4 gives a first insight in the regional differences of online bridging of entrepreneurs. One also sees the predominance of the metropolitan area as an entrepreneurship hub as half of the observations are attributed to this area.

Regarding the endorsements, the mean increases a lot with increasing population density. An entrepreneur in the metropolitan area of Stockholm on average has 100 more endorsements than a rural entrepreneur. The maximum number endorsements in the metro area also almost exceeds the others by twice their value. Also, recommendations seem to increase with population density, not only on average but also in terms of standard deviation. Yet, the mean difference between rural and metropolitan is only one recommendation. Endorsements and recommendations naturally have different dimensions but still the distance between rural and metropolitan seems smaller here. Besides, the much higher maximum value in the metro area is remarkable. When it comes to the number of followed networks one perceives a totally different pattern. The mean, standard deviation and also the

maximum value is the lowest in the Stockholm area, while all those values are the highest in regular urban areas.

These key indicators show a first interesting picture of the bridging differences between rural, urban and metropolitan areas. Assuming that endorsements correlate also with the number of LinkedIn connections, one sees that metropolitan entrepreneurs have far more connections and seem to value the endorsements function much more. In terms of recommendations, the gap is smaller but some metropolitan entrepreneurs apply the recommendations function quite heavy. What stands out is the almost equal extend of the number of networks an entrepreneur follows in each location. Only urban areas have somewhat higher values. This could indicate that rural entrepreneurs have recognized the value of this bridging function. These observations are only partly in line with the hypothesis. It seems like the constraints for bridging in rural areas affect the online networks as well but the mechanisms of general internet affinity and self-selection have no effect. This would imply for the research question that the difference between online bridging behaviour is not as large as the theory for offline bridging would suggest. However, more sophisticated analyses are needed to confirm this observation.

4. Methodology

In order to confirm or reject the hypotheses of this paper and to answer the research question multivariate ordinary least squares (OLS) regressions will be applied. This chapter conduces to present the models being used to estimate the economic statistical significance of the location variables. For the following calculations the program STATA IC 14.2 was used.

There are three variables indicating the online bridging behaviour on LinkedIn: number of received endorsements, number of given and received recommendations and the number of followed networks. The paper intends to find an overall significance of location effects on this bridging of entrepreneurs, therefore one valid model for all outcome variables is needed. This model will, besides the location dummies, consist of most of the covariates described in the previous chapter. Furthermore, due to described skewness of the outcome variables, data transformations with square roots, cubic roots and logarithms are deployed. Along with an ocular inspection of residual plots the following formal tests were applied to examine whether the underlying assumption of linear regression models are not violated:

Test Name	Test Subject	Test hypothesis
F-Test	Overall significance of the model	H ₀ : All coefficients of the slopes are zero
Skewtest	Normal distribution of residuals	H ₀ : Residuals of regression are normally distributed
Jarque-Bera	Normal distribution of residuals	H ₀ : Residuals of regression are normally distributed
Breusch-Pagan-Godfrey	Heteroskedasticity of residuals	H ₀ : Residuals of regression are homoscedastic
White's General Heteroscedasticity	Heteroskedasticity of residuals	H ₀ : Residuals of regression are homoscedastic
Variance Inflation Factor (VIF)	Multicollinearity of variables	No imperfect multicollinearity between the variables

Table 5: List of formal tests for OLS models

As shown in table 5, two tests for each normality and heteroskedasticity are chosen to validate the results. While these four tests assay a null hypothesis, the VIF is an absolute value which is used here to describe the mean degree of multicollinearity within the model. Hence, the tests for normality and heteroskedasticity of the residuals will use test statistics to keep or reject their null hypotheses while for multicollinearity the VIF should be at least below ten to assume no high collinearity (*Gujarati & Porter 2009*). The F-test is used to access the overall significance of the model.

After testing several models and specifications, the following model has been chosen:

$$Y = \beta_1^Y * U + \beta_2^Y * M + \beta_3^Y * Rev + \beta_4^Y * Emp + \beta_5^Y * G + \beta_6^Y * Ex + \beta_7^Y * Num + \beta_8^Y * W + \beta_9^Y * Ed + \beta_{10}^Y * \lambda + \beta_{11}^Y * \lambda^2 + \beta_{12}^Y * \delta + \beta_{13}^Y * \delta^2 + \theta^Y + u_i$$

With β being the coefficient for the respective variable, θ the constant and u_i a random error term. U and M are dummy variables for urban and metropolitan areas, respectively, meaning that their coefficient will show the difference to rural areas. Rev and Emp represent revenue and employment number of the company. G is the gender dummy, Ex the entrepreneurial experience in months, Num the number of additionally founded businesses of entrepreneur, W and Ed are the number of workplaces and visited higher education facilities, respectively.

Eventually, it is crucial to control for the general tendency of the entrepreneur to use LinkedIn. Since there is no such indicator given, the model shall include the variables λ and δ , which represent the two bridging variables which are not used as the outcome variable in the equation. Furthermore, the specification of the model divulged that there is a quadratic relationship between each of the outcome variable. This seems plausible: A heavy LinkedIn user would have high values for each of the three variables. However, if a user, for example, only uses LinkedIn to receive recent professional news, he will follow a large number of networks but will neglect the

endorsements and recommendations. Hence, a single, uncommonly high bridging variable can be associated with low number of the other two variables. Thus, using the outcome variables as control variables on each other make sure that the results for the location variables are robust.

With that being said, the model for each outcome variables looks as follows:

$$\begin{aligned}\sqrt{End} = & \beta_1^{End} * U + \beta_2^{End} * M + \beta_3^{End} * Rev + \beta_4^{End} * Emp + \beta_5^{End} * G + \beta_6^{End} * Ex \\ & + \beta_7^{End} * Num + \beta_8^{End} * W + \beta_9^{End} * Ed + \beta_{10}^{End} * Rec + \beta_{11}^{End} * Rec^2 \\ & + \beta_{12}^{End} * Net + \beta_{13}^{End} * Net^2 + \theta^{End} + u_i\end{aligned}$$

$$\begin{aligned}\sqrt[3]{Rec} = & \beta_1^{Rec} * U + \beta_2^{Rec} * M + \beta_3^{Rec} * Rev + \beta_4^{Rec} * Emp + \beta_5^{Rec} * G + \beta_6^{Rec} * Ex + \beta_7^{Rec} \\ & * Num + \beta_8^{Rec} * W + \beta_9^{Rec} * Ed + \beta_{10}^{Rec} * End + \beta_{11}^{Rec} * End^2 + \beta_{12}^{Rec} * Net \\ & + \beta_{13}^{Rec} * Net^2 + \theta^{Rec} + u_i\end{aligned}$$

$$\begin{aligned}\ln(Net) = & \beta_1^{Net} * U + \beta_2^{Net} * M + \beta_3^{Net} * Rev + \beta_4^{Net} * Emp + \beta_5^{Net} * G + \beta_6^{Net} * Ex \\ & + \beta_7^{Net} * Num + \beta_8^{Net} * W + \beta_9^{Net} * Ed + \beta_{10}^{Net} * End + \beta_{11}^{Net} * End^2 + \beta_{12}^{Net} \\ & * Rec + \beta_{13}^{Net} * Rec^2 + \theta^{Net} + u_i\end{aligned}$$

With *End* representing the number of received endorsements, *Rec* the number of received and given observations and *Net* the number of followed networks. As expected, each variable is transformed due to the strong right skewness. A general transformation with natural logarithms is not possible because there are too many zero observations for endorsements and recommendations. Also, the author decided to use different transformations in order to maximize statistical validity for each model specification, instead of applying the same transformation for each model. This procedure might appear odd but is necessary to fix the strong skewness of the outcome variables.

To estimate the effect of the location factors U and M on the outcome variables, the coefficients β will be analysed with the help of graphical visualizations. Moreover, it is crucial to evaluate the statistical significance of the variables as well. If for example there was no such significance, there would be no geographical differences in the online bridging behaviour of entrepreneurs.

5. Results

This chapter is divided into three parts. In the first, the output table of the regression is shown and the yield with a focus on the statistical significance is shown. Since sophisticated data transformations are applied, the interpretation of the economic

significance will be done with the help of visualizations in the second part. Thirdly, all results will be analysed.

5.1. Regression results

The results of the regression for all outcome variable are exhibited in table 6. Most important, the location effect is only statistically significant for endorsements and only for the difference between rural and metropolitan entrepreneurs. All outcome variables have a statistically significant effect on each other, both in linear and quadratic form. Other than that, there are several differences. The number of workplaces and education facilities is statistically significant for the number of endorsements and networks but not for recommendations. On the other hand, the entrepreneurial experience is significant for endorsements and recommendation but not for the number of networks. However, this is only true for the number of months since the foundation and not for the number of other foundations which is not statistically significant for any variable. Gender only has an effect on recommendations. It seems also very surprising that neither of the two firm size dimensions (revenue and number of employees) has an impact on any outcome variable. R-Square values are sufficiently high for all equations, showing that variations of the outcome variables can partly be explained by the input variables.

The econometric tests are shown in table 7 (*Appendix p.XII*). F-tests are highly statistically significant for all models, indicating that the slope coefficients are not simultaneously zero. There are no problems with multicollinearity despite the use of linear and quadric versions of the same variable. Heteroskedasticity is also avoided; albeit, for the recommendation model only by using robust standard errors. According to the formal tests, the null-hypothesis of normally distributed residuals is rejected for the endorsements equation at the 10% level. The histogram and scatterplot of the residuals (*Figures 10 and 13*), in the opinion of the author, indeed show a normal distribution and the formal denial is probably due to one single but strong outlier. Hence, the model is accepted anyway.

The regression results show that several control variables do not have a statistical impact on the online bridging behaviour although there are theories advocating a relationship. In terms of the location effect the results are in line with what has been seen in descriptive statistic. There is a difference between rural and metropolitan entrepreneurs considering the number of endorsements, however not when it comes to recommendations and followed networks. Still, the extend of this difference as well as the impact of some of the statistically significant variables has to be analysed, too.

	$\sqrt{\text{End}}$	$\sqrt[3]{\text{Rec}}$	$\ln(\text{Net})$
Urban	0.401 (1.133)	-0.017 (0.141)	0.219 (0.156)
Metropolitan	2.925*** (0.95)	-0.169 (0.114)	0.076 (0.132)
Revenue	2.52e-06 (2.25e-06)	-2.25e-07 (2.77e-07)	-3.80e-07 (3.09e-07)
Employees	-0.001 (0.009)	0.001 (0.001)	0.001 (0.001)
Gender	-0.864 (0.985)	-2.242** (0.126)	0.187 (0.135)
Experience	0.02*** (0.006)	-0.002** (0.001)	-0.001 (0.001)
Number of other Foundations	-0.064 (0.286)	-0.051 (0.035)	0.062 (0.039)
Workplaces	0.215** (0.099)	0.018 (0.015)	0.023* (0.014)
Education	0.6* (0.354)	0.071 (0.05)	0.148*** (0.048)
Endorsements	- -	0.003*** (3.7e-04)	0.002*** (0.001)
Endorsements^2	- -	-9.55e-07*** (2.36e-07)	-7.63e-07*** (2.71e-07)
Recommendations	0.591*** (0.082)	- -	0.031** (0.012)
Recommendations^2	-0.005*** (0.001)	- -	-2.91e-04** (0)
Networks	0.0706*** (0.02)	0.009*** (0.002)	- -
Networks^2	-0.0002** (6.49e-05)	-1.87e-05** (7.98e-06)	- -
constant	6.004*** (1.332)	0.130 (0.16)	1.867*** (0.182)
R-Square	0.382	0.397	0.254

Table 6: Regression results for all outcome variables. *Note: Standard errors are given in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $N=300$ for all regressions. Robust standard errors have been used for the equation with the cubic root of recommendations as the outcome variable.*

5.2. Visualization of regression models

The regression results show that there is one statistically significant relationship between the entrepreneur's location and one of the bridging variables. Yet, due to the data transformations the coefficient of this relationship as well as of the other location effects are hard to embrace. For this reason, the author decided to put the regression equation into a graphic format to show the economic impacts of each variable. The graphs show how the outcome variable is impacted by one control variable as well as the location dummies while everything else is held constant. For figure 2, for example, the formula for the metropolitan graph would be $END = (2.925 + 0.591 * Rec - 0.005 * Rec^2 + 6.004)^2$. The visualizations are made with Windows Excel.

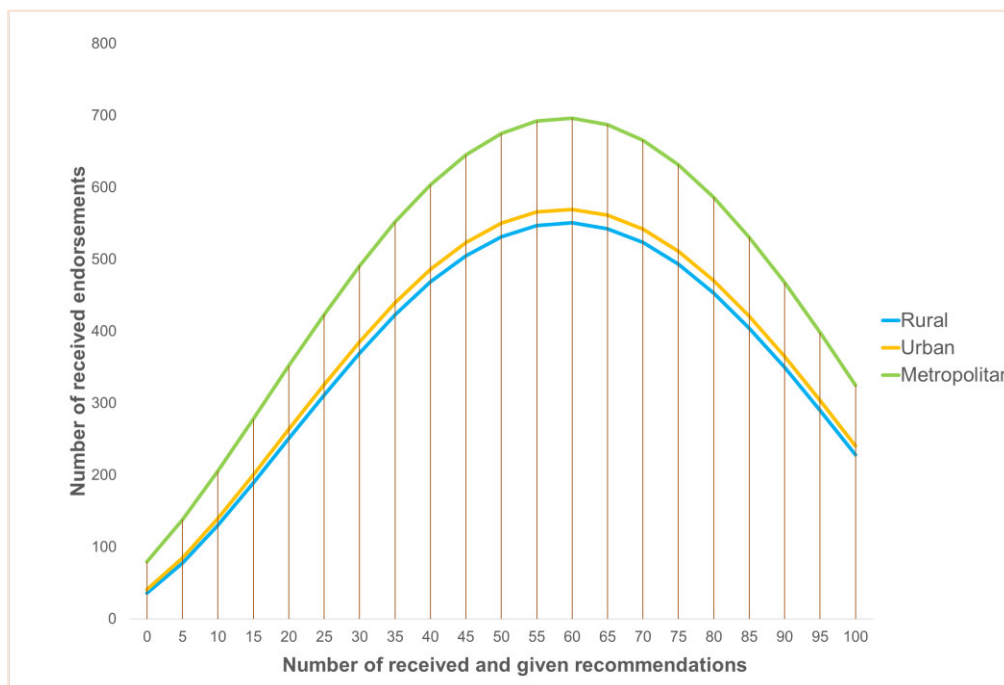


Figure 2: Relationship between endorsements and recommendations

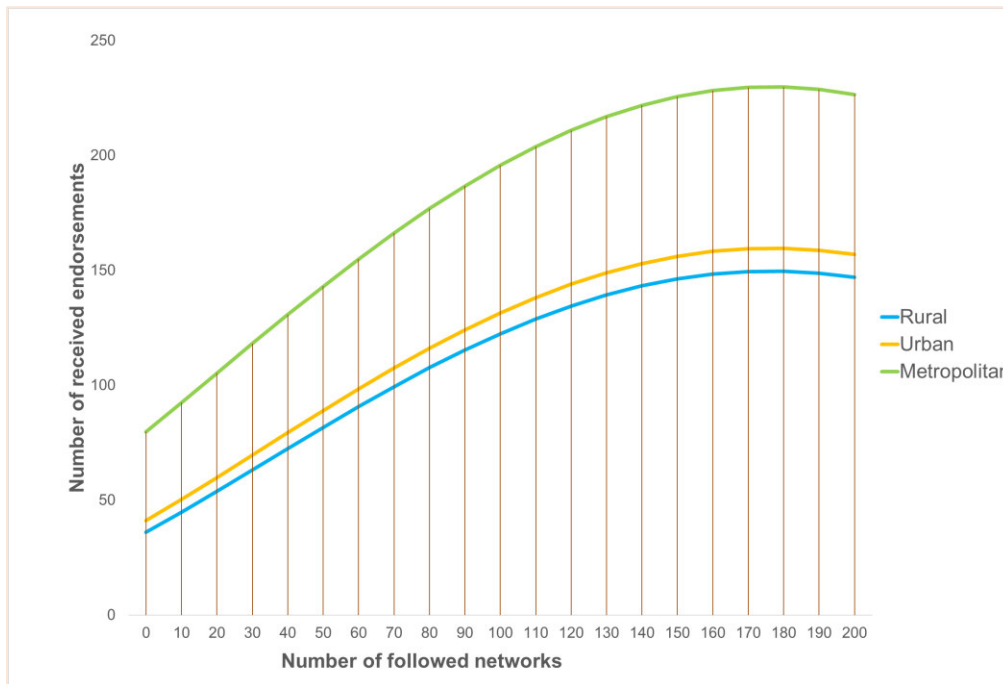


Figure 3: Relationship between endorsements and followed networks

Figure 2 and 3 demonstrate how the number of endorsements is associated with the other two bridging variables as well as the location effect. As the descriptive statistics have already suggested, there is a considerable difference between metropolitan entrepreneurs and urban and rural ones, but not between the latter two. For example, an entrepreneur with 60 given and received recommendations, holding everything else equal, would have 700 endorsements living in Stockholm but only 550 in less densely populated areas. Since one assumes number of endorsements is closely connected to network size, the two figures show that enlarging the network is easier in Stockholm. Figure 2 also shows how the number of endorsements decreases once a LinkedIn user pursues to collect and give away a lot of recommendations. The economic significance of the location effect is also shown in figure 3. A hypothetical entrepreneur following 200 networks on LinkedIn is associated with 225 endorsements in Stockholm while a similar entrepreneur would only have 155 endorsements in regular urban or rural areas. Also, the graph indicates that more information seeking would be associated with fewer endorsements and a smaller network, respectively. The impact of living in a metropolitan area is also independent of other statistically significant control variables. For example, when the business foundation was 240 months ago, holding everything else equal, the entrepreneur is expected to have 185 endorsements in Stockholm and only 115 in the other two areas (*Figure 15, p.XVI*).

The relationship between recommendations and the location is not statistically significant and the graphs reveal there is also hardly any economic significance as well.

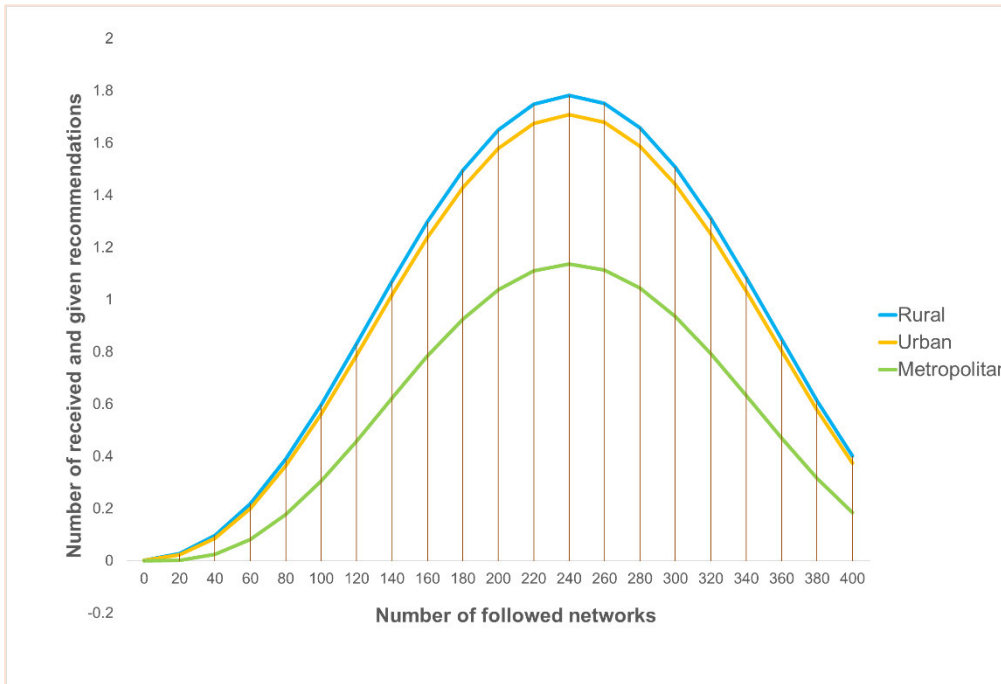


Figure 4: Relationship between recommendations and followed networks

Figure 4 shows that in general the impact of the number of followed networks also has a reversed U-shaped relationship with received and given recommendations, however, the economic significance is very low; a high number of followed networks is not even associated with two more recommendations. Also, the location disparities are not even one recommendation. Nevertheless, here a hypothetical metropolitan entrepreneur is linked to less recommendations than the rural and urban counterparts.

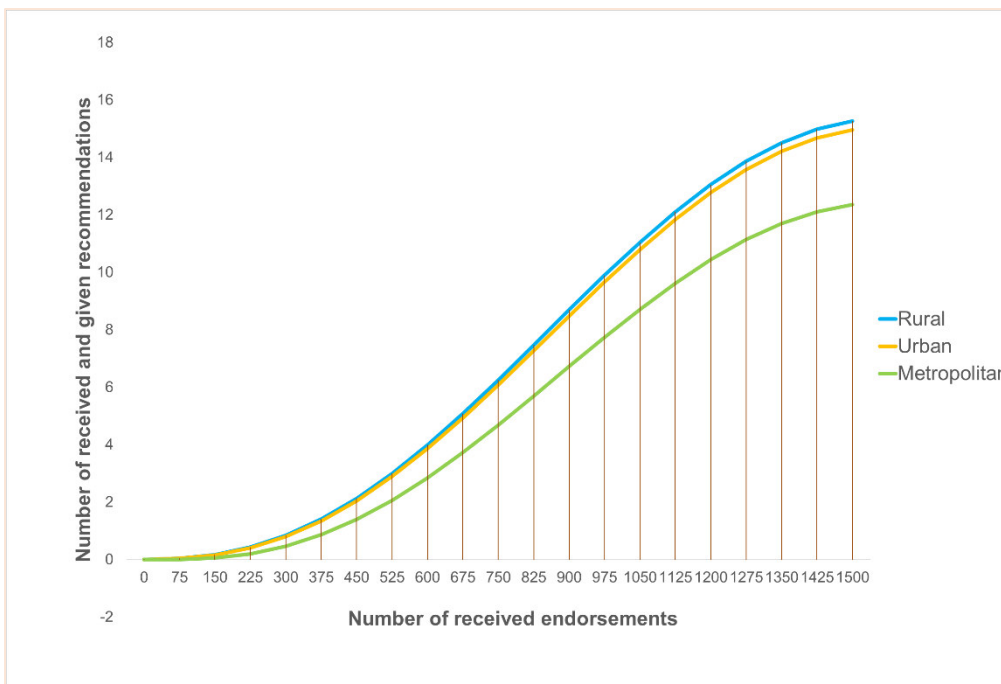


Figure 5: Relationship between recommendations and endorsements

Figure 5 shows that endorsements have a more noticeable impact on recommendations than the number of followed networks. Nonetheless, a location effects is still barely measurable: Only with a relatively high number of received endorsements (1500) rural entrepreneurs are expected to have three more received or given recommendations than metropolitan entrepreneurs. In comparison, when adding the gender dummy variable to the equation, the impact is much more severe with women theoretically having no recommendations on LinkedIn at all (see figure 16, p.XVI).

Lastly, the relationship between followed networks and the location of the entrepreneur, even if statistically significant, would be fairly weak.

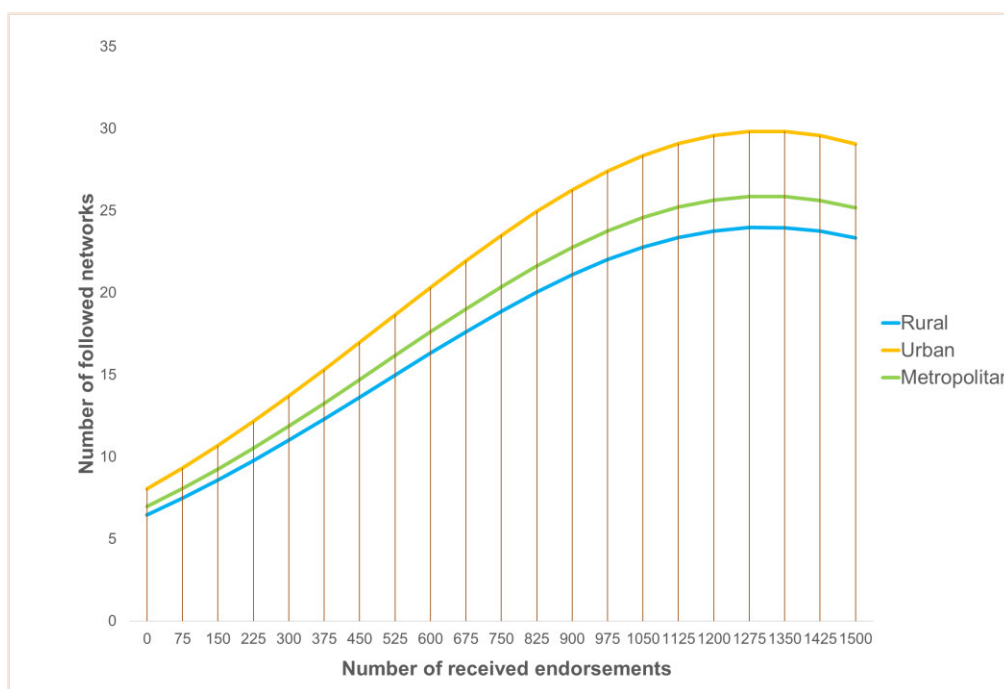


Figure 6: Relationship between followed networks and endorsements

As it was the case in the descriptive statistics, urban entrepreneurs are associated with the highest number of followed networks. Yet the difference is little. An entrepreneur with 1350 endorsements having the business in an urban area is supposed to follow 30 LinkedIn networks, while a rural entrepreneur only follows 24 networks. As shown in figure 7, the difference is still low when using recommendations as an input variable. In total, one can see that both endorsements and recommendations are only moderately associated with variations in the number of followed networks. Additionally, the relationship is also a reversed U-curve, but a decreasing number of followed networks is only reached at extraordinarily high values for recommendations and endorsements.

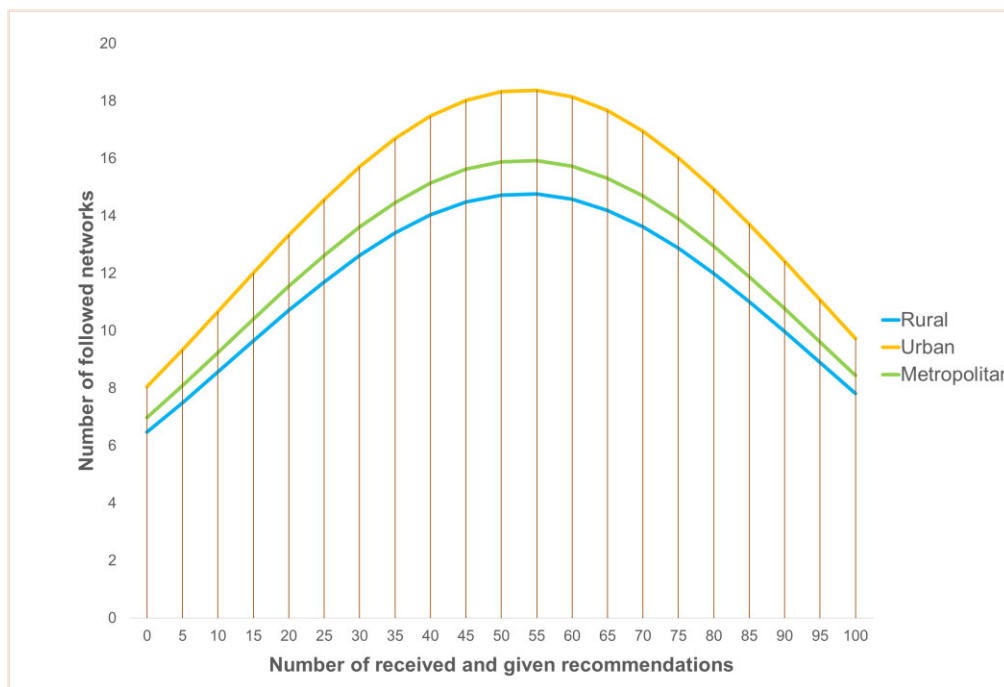


Figure 7: Relationship between followed networks and recommendations

All in all, the only statistically significant impact of a location effect on online bridging of entrepreneurs also has the only economically significant impact as well. Metropolitan entrepreneurs are foretold to have considerably more endorsements and thus most likely more online connections than entrepreneurs in urban and rural areas. Yet, according to the models, there are no such differences for the number of recommendations or followed networks.

These are interesting findings that shall now be discussed more thoroughly. Also, the significance of some of the control variable give reason to discuss online bridging patterns of entrepreneurs.

5.3. Discussion: geographical differences of entrepreneurial online bridging

So far, the paper has discussed why social capital is important for entrepreneurs, how it is applied on social networks sites and that it is expected that entrepreneurs in metropolitan areas engage much more bridging online than their counterparts from less dense areas. After using aggregated data from LinkedIn in regression models with location variables one can say that this expectation is only partly fulfilled. It depends de facto on how online social capital is measured.

Using the number of received endorsements as the outcome variable confirms the hypothesis. Entrepreneurs having their business in the metropolitan area of Stockholm have significantly more endorsements than rural business founders. Assuming that endorsements show the size of the online network, rural entrepreneurs do not seem

capable of using SNS to fill the lack of weak ties they are supposed to have offline. There are two possible explanations for this result. First, as explained in the theoretical framework, rural inhabitants are generally less internet affine and subsequently just do not want to use SNS to network online. This claim would support for example Moyes, Whittam and Ferri (2012), Townsend et al. (2016) or Stern and Adams (2010) as it shows that even facilitated bridging possibilities through online networks do not fill the void of offline contacts. However, the second explanation goes into a different direction. Rural entrepreneurs have less endorsements not because they do not want to use LinkedIn or connect online but because they have fewer offline contacts as well. Although, it is theoretically possible to connect with every member of a SNS, an online network is rather an augmented version of the offline network and new ties are built with offline acquaintances rather than with complete strangers (Ellison, Steinfield & Lampe 2011, Wallace 2012). This theory is supported by the results showing the number of endorsements is also influenced by the number of workplaces, visited universities and entrepreneurial experience. All of these variables indicate time and possibilities to meet offline contacts. Moreover, there is only a difference between the metropolitan and the rural areas but not between the urban and rural ones. The metropolitan area in this research is Stockholm, which has by far more inhabitants than the biggest urban area Gothenburg (2,018 Mio inhabitants vs. 0,898 Mio inhabitants, OECD 2016). The smallest considered urban area (Borås), only has 100.000 inhabitants. Consequently, there is a much wider gap in terms of inhabitants between metropolitan and urban areas in this research than between urban and rural ones. Hence, compared to rural ones, observations from metropolitan areas are naturally exposed to more possible contacts than are urban ones. With that being said, the results do not give clear evidence that entrepreneurs from less densely populated areas are less willing to develop their network online, but that the lack of human capital, once reaching a certain level, is a constraint that so far cannot be overcome by the possibilities of SNS. This interpretation supports Sørensen (2016) and Van Oorschot, Arts and Gelissen (2006). In addition, Stockholm might be a very attractive place for bridging affine entrepreneurs and so creates a strong self-selection of the metropolitan area.

When using other indicators for bridging the results give more insights on this matter. Neither the number of given and received recommendations nor the number of followed networks has a statistically significant association with the location of the entrepreneur. This finding suggests that rural entrepreneurs indeed can and do use the potential of SNS in terms of finding information and demonstrating ties on their profile. Recommendations, in this research, are only influenced by the general activity of the user on LinkedIn (described by the other two outcome variables) and the gender. While the latter is interesting and demands an own research agenda, the first shows indeed that there are no geographical differences regarding the LinkedIn activity among the entrepreneurs. Actually, if the results were statistically significant one would even see that rural and urban entrepreneurs use recommendations a little bit more

than metropolitan entrepreneurs. As explained, writing a recommendation is an activity on LinkedIn that requires some personal effort of the creator. Therefore, it is a bridging activity that has some bonding characteristics as well and since there is evidence for increased bonding in less populated areas the economic significance of the location variables is even in line with the theory about offline networking (*Dahl & Sorenson 2012, Hofferth & Iceland 1998, Westlund, Larsson & Olsson 2013*). Yet, the vital observation here is still that entrepreneurs use recommendations independent of the location of their venture.

Like the number of received endorsements, followed networks have a connection to the number of workplaces and visited universities of the user. This seems quite logical: changing jobs and environment require and or give input for new groups or information. The insignificance of the location variable suggests that the propensity to follow networks is independent from the number of offline contacts. Furthermore, the model for followed networks has the lowest R-square of all models. This gives reason to assume that other leverage than career or company factors of the entrepreneur determine this propensity, supposedly psychological characteristics. Anyway, the results show that it is not important where the entrepreneur lives. To use LinkedIn as an information source and to expose oneself to a larger interest group is not swayed by the urbanization around the entrepreneur's business.

Besides, the paper has demonstrated that online bridging, no matter the form, is not dependent on the size or success of the company, neither in terms of revenue nor employees. As researchers claim that this connection exists for the offline network, the results show that in the online world, or at least on LinkedIn, there is a controversy (*Corry et al. 2015, Oliviera 2013, Slotte-Kock & Coviello 2010, Watson 2007*). There are two possible interpretations of this controversy. The first is the online network offers simply less beneficial effects than the offline network and thus the impact on venture growth is meagre. This would contradict not only the majority of social capital scholars but also the mentioned theory that SNS mirror an augmented offline network of the user. Hence, the second explanation might be more feasible. While working on the own network offline can be part of the daily work of an entrepreneur, e.g. through conventions, fairs or trade shows. Being online on a SNS can be considered more like a free time activity. Under the assumption that firm growth implies more busy times for the entrepreneur, the time spend on SNS and thus the time spend on caring about the LinkedIn network might decrease or at least not grow alongside the company. Yet, this is hypothetical and needs an own research agenda as well. In addition, the upshot of the regression suggests that founding more businesses does not increase the online social capital (on LinkedIn). This is interesting because logically one would assume that a new business means new employees, customers and clients which could all influence the LinkedIn profile of the founder. Perhaps, the entrepreneurs do not leave their former industry and client base with a new business which prompts a lack of innovative progress. Or, considering the previous observation, serial entrepreneurship is too consuming to properly mirror the networking activity on LinkedIn.

The discussion has surely raised more questions than answers but also points in one direction: the online bridging tendency of entrepreneurs is not dependent on the location of their business. This finding gives evidence that entrepreneurs generally use bridging differently than regular people and thus supports the finding of Liao and Welsh (2002, 2005) and Mack, Marie-Pierre and Redican (2017)

Accordingly, the research question can be answered by claiming that rural entrepreneurs do less online bridging when online bridging is measured by a variable that is connected to the number of online contacts. Only, the number of endorsements which is supposed to be strongly connected with the number of LinkedIn connections is significantly higher in metropolitan areas. However, from the theories evaluated one can assume this is the result of the entrepreneurs not knowing enough people in less densely populated areas, and not the result of entrepreneurs not wanting to connect online. In comparison, searching for new information sources as well as contacts (followed networks) and increasing the visibility of the profile (recommendations) is independent of the location. This implies that other expected mechanisms, like the self-selection bias or the rural idleness of using SNS, have a weaker influence than the constraints of offline contacts in rural areas. Rural entrepreneurs want to exploit online social capital by bridging, and they do so as much as urbanized entrepreneurs do until they are limited by the number of people they know in real life.

Consequently, the paper fulfils the contributions claimed at the outset. First, it increases the understanding of how the offline and online bridging behaviour of entrepreneurs differs depending on their location. There is evidence that the gap between rural and metropolitan entrepreneurs in terms of bridging is smaller in the online world than in the offline world. Second, the paper has presented a new usage of a free data source that is not biased by the circumstances of surveys or interviews. Third, the results show that if governments want to support entrepreneurship in rural areas by increasing the social capital, there is not much need to incentivise the usage of SNS. Instead, the constraint for entrepreneurs to meet the right people face to face in places with few inhabitants should be attacked, for example by making it more attractive for industrial conventions to take place in more remote areas or by supporting rural entrepreneurs to take part in such events.

Regarding the questions that have been raised, the last chapter will work up the whole paper and give suggestions on which directions future studies can take on the basis of the present findings.

6. Conclusion

The results were discussed and the research question was answered. This last chapter now summarizes the research and infers further possible research questions. Additionally, the limitations are briefly listed.

6.1. Summary and future research suggestions

This paper showed that it is vital to investigate the online network behaviour of entrepreneurs. So far, research on this matter neither had a good data base nor had sufficiently included the economic potential of social media communication. Therefore, the paper asked whether entrepreneurs from rural areas do less online bridging than entrepreneurs from urban or metropolitan places. This question is based on the social capital framework, which describes how the goodwill within personal relationships can be converted into distinct value for the entrepreneur. Bridging is one important part of social capital as it defines how the individual improves the size and structure of his network. Especially for entrepreneurs bridging is economically more useful than its opposite bonding, which is defined by working on the strength of few ties. It was furthermore demonstrated that bridging, unlike bonding, is facilitated by the usage of social network sites. Further theory discussion of social capital revealed that there are geographical differences of bridging and bonding. While people from urbanized areas, generally speaking, use more bridging, rural inhabitants rely more on bonding, due to the low population density and lack of institution. This and the depicted lower online affinity of rural inhabitants lead to the hypothesis that the research question should be answered with a yes.

In order to support this hypothesis with empirical evidence, the author applied a new way of data collection. The LinkedIn profiles of 300 Swedish entrepreneurs were visited and publicly visible data aggregated. Furthermore, information about the respective entrepreneurs' companies was accessed through Retriever. As a result, a database was created containing company, location, career and bridging information of individual entrepreneurs. The bridging was represented by three outcome variables: endorsements, recommendations and followed network. As the independent variable, three location dummies were used: rural, urban and metropolitan, whereas rural and urban differed by population density and metropolitan contained every observation in the commuting area of Stockholm. Using multivariate regressions unbosomed that only the number of endorsements, which is allegedly dependent on the number of offline connections, is significantly higher in metropolitan areas. Considering the other two outcome variables, bridging does not differ among the locations of the entrepreneurs. Hence, the hypothesis is partly rejected and the research question conditionally answered with a no. Online bridging between rural and urbanized entrepreneurs does not differ in terms of activity but the ladder seems to have an advantage since metropolitan regions offer more offline connections which can be transferred to sites like LinkedIn. These findings are a first light on the until now hardly explored online networking behaviour of entrepreneurs. The research question could be answered however, more questions rise from this paper as well.

First of all, the findings are only valid for Sweden and thus more evidence from other countries is needed to generalize the findings. Stockholm seems to have a very special

role in Sweden due to its size and attractiveness for entrepreneurs. More research should therefore try to find countries where one has more metropolitan areas and larger urban areas. Otherwise one cannot completely measure the effect of population density alone. Second, the used variables to mirror bridging are probably the best publicly available variables but LinkedIn could offer much more input variables for social capital research. For example, data on messages between users (quantitatively), number of connections (not capped at 500) and activity in network groups would heavily increase the quality of measuring bridging. If future researchers could convince the LinkedIn owners to furnish this data for studies, the social capital literature benefited immensely. Analysing how often and what kind of messages are sent or how regularly users post in networks would give even better databases for exploring online bridging and also would give the possibility to evaluate whether LinkedIn is used to bond with contacts.

Third and lastly, the significance of the control variables in this research gives an incentive for further exploration. It was shown that women write and receive far less LinkedIn recommendations than men. If future research, applying this methodology to different countries, finds similar results, this phenomenon should receive an own exploration as well. Moreover, the control variables for company success showed no significance although cited research precisely advocates such a relationship. In order to evaluate whether online social capital is not connected to firm success, the author suggests to collect LinkedIn as well as company data over time. This would follow Lamine et al. (2015) call for longitudinal datasets and enables to investigate causality. Eventually, as the number of founded businesses was insignificant although logic suggests differently, future research should embrace this issue more to see whether serial entrepreneurship has really no connection to online bridging.

With that being said, the author classifies this study as a solid starting point with first crucial findings for further research on social capital of entrepreneurs in online networks. Naturally, more observations and possible improvements of the methodology are necessary shed light on the patterns and potential of social capital for entrepreneurs within new communication platforms.

6.2. Limitations of research

Despite its novelty, the research design has some limitations that are either impossible to overcome or would need more timely resources. Furthermore, the results have to be considered carefully due to the limitations.

As mentioned above, using LinkedIn as a database is a novel and needed way to collect quantifiable data of networking behaviour. It is of course one single website and cannot encompass all online networking behaviour of entrepreneurs. Still, it is the largest business network of the world and due to its global presence can be applied in

almost every country. Thus, it should always be integrated for comparable research agendas but can be complemented by more websites as well if the timely resources are available. This also might help to fill gaps and substantiate the LinkedIn profiles. The research is based on the assumption that the entrepreneurs are both complete and honest with the information shared on their profiles, specifically regarding the work and academic experience. Further research with more resources should consider finding ways to certify these statements.

The usage of LinkedIn unfortunately has two more drawbacks. The first is that the exact same research cannot be done by two different users. The reason is that the search algorithm is also based on the user's network and so if another author would conduct the data collection he would get observations in a different order and so probably would have another sample. Thus, each drawn sample from LinkedIn is somehow biased because the order how the entrepreneurs are presented by the search algorithm is influenced by the researcher's LinkedIn profile.

Secondly, the LinkedIn profiles only show present data. On account of this only cross sectional data can be extracted which implies the findings can only be interpreted as associations and not causalities, which is nonetheless a good springboard for further research. In addition, revenue and employees are only used as a control variable in this research. If future studies want to investigate the connection between firm growth and online networking they will need to synchronize the times of the observation. For example, revenue growth and LinkedIn profiles have to be observed over several years in order to have a reliable basis for causalities.

As explained, any findings of this paper will also be valid for Sweden only and can at most be applied to the other Nordic countries. The reason is that Sweden is a large, thinly populated country with a highly-developed civilization in terms of internet usage. Such underlying guidelines are vital for this methodology and make generalisations of the results difficult. Also, the presence of one, comparably very large, metropolitan area influences the results. Generalisability is thereby strongly limited.

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V. Appendix

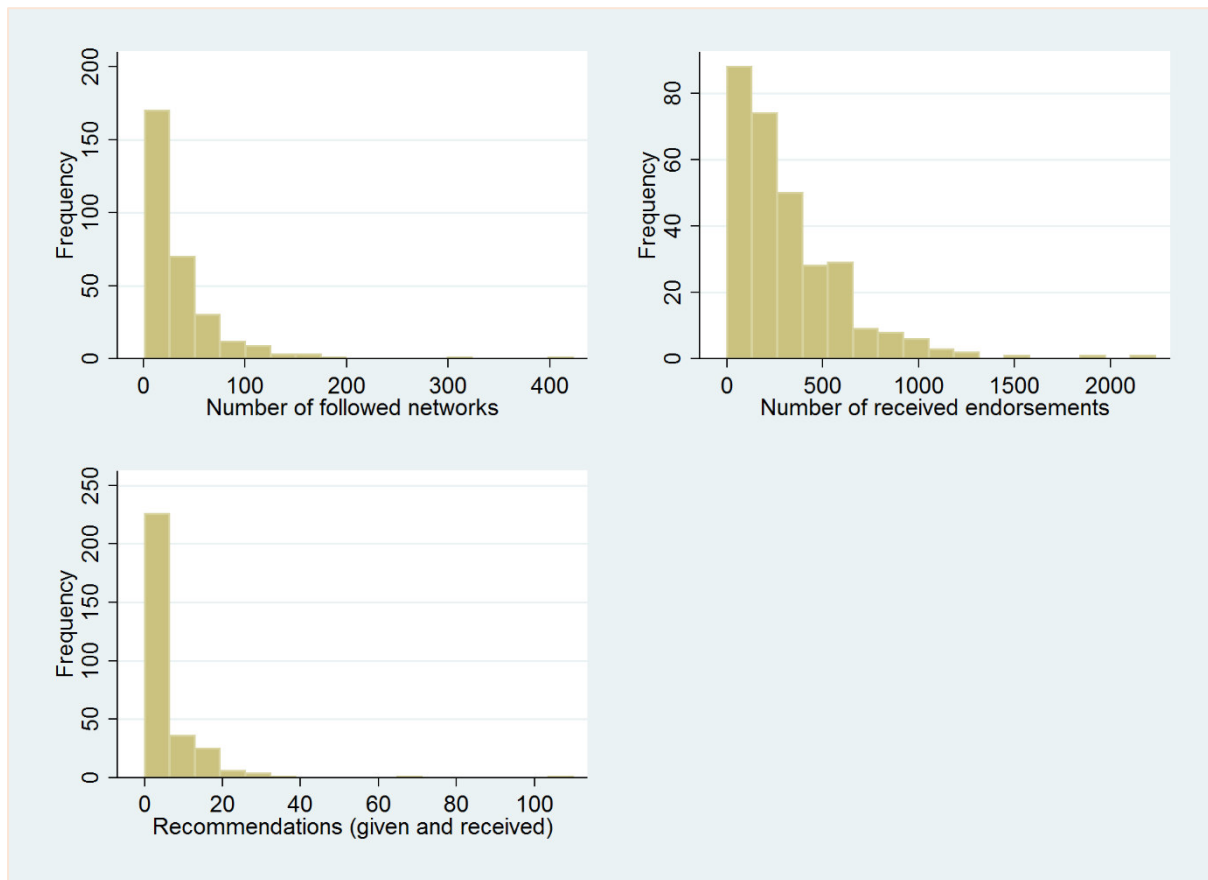


Figure 8: Histograms of outcome variables

	$\sqrt{\text{End}}$	$\sqrt[3]{\text{Rec}}$	$\ln(\text{Net})$
Prob>F	13.57***	14.5***	8.83***
Skewtest	21.69*	1.520	0.000
Jarque-Bera	40.66*	1.424	0.050
Breusch-Pagan-Godfrey	0.460	-	0.000
White's Test	50.590	-	87.390
VIF	2.560	2.770	2.860

Table 7: Econometric tests for regression Models. Note: *** $p < 0.01$. Shown are the test statistics except for the VIF. Heteroskedasticity tests not applied to the recommendations equations because of robust standard errors.

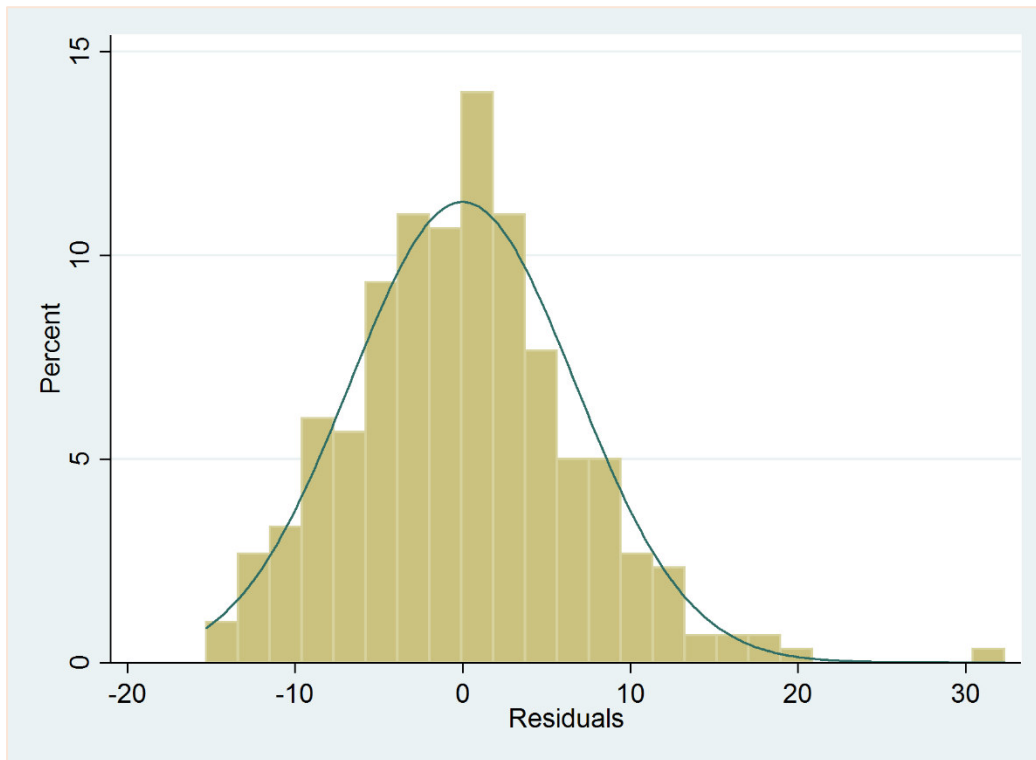


Figure 9: Histogram of residuals Model End^(1/2)

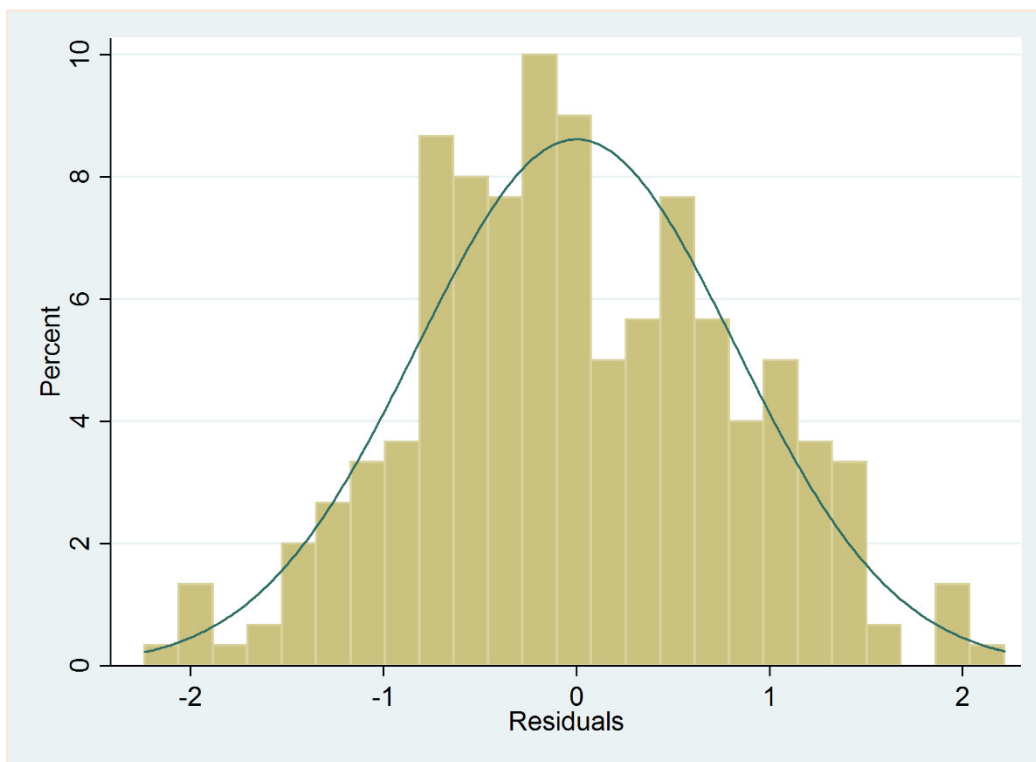


Figure 10: Histogram of residuals Model Rec^(1/3)

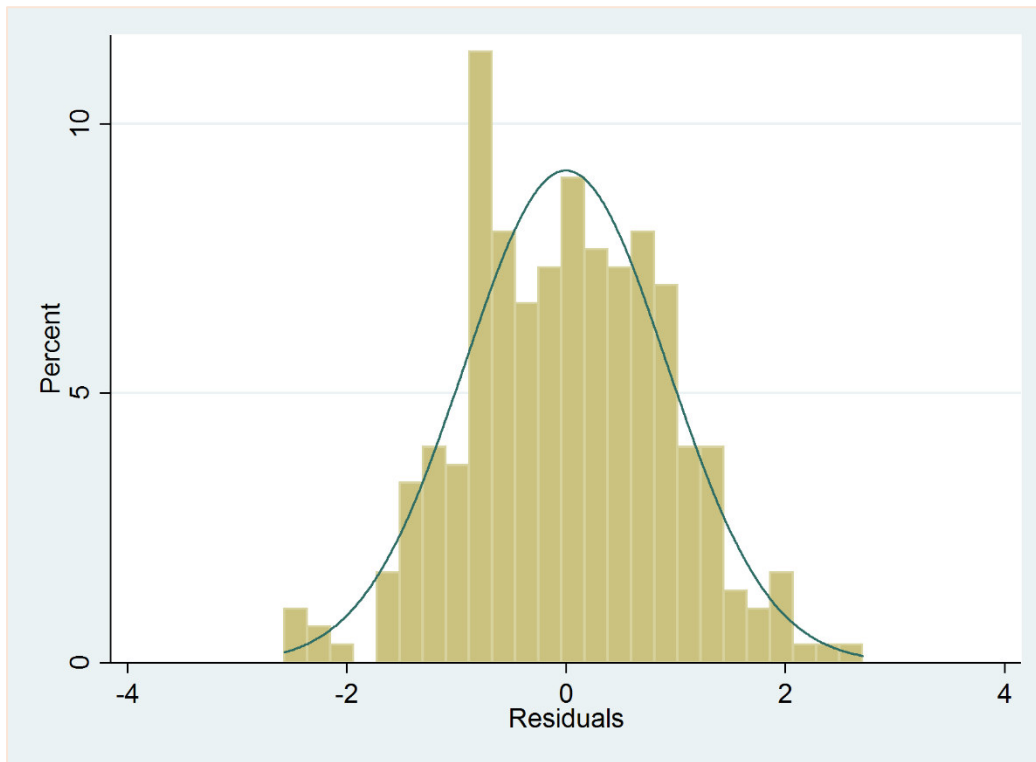


Figure 11: Histogram of residuals Model Ln(Net)

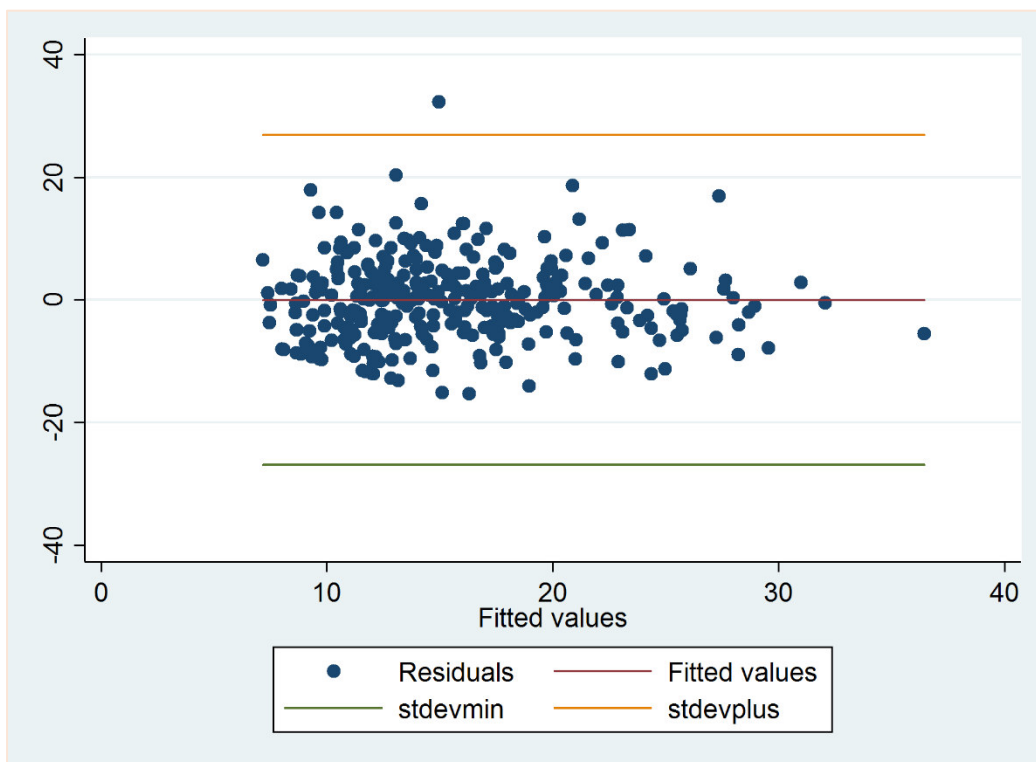


Figure 12: Scatter plot of residuals model $End^{(1/2)}$

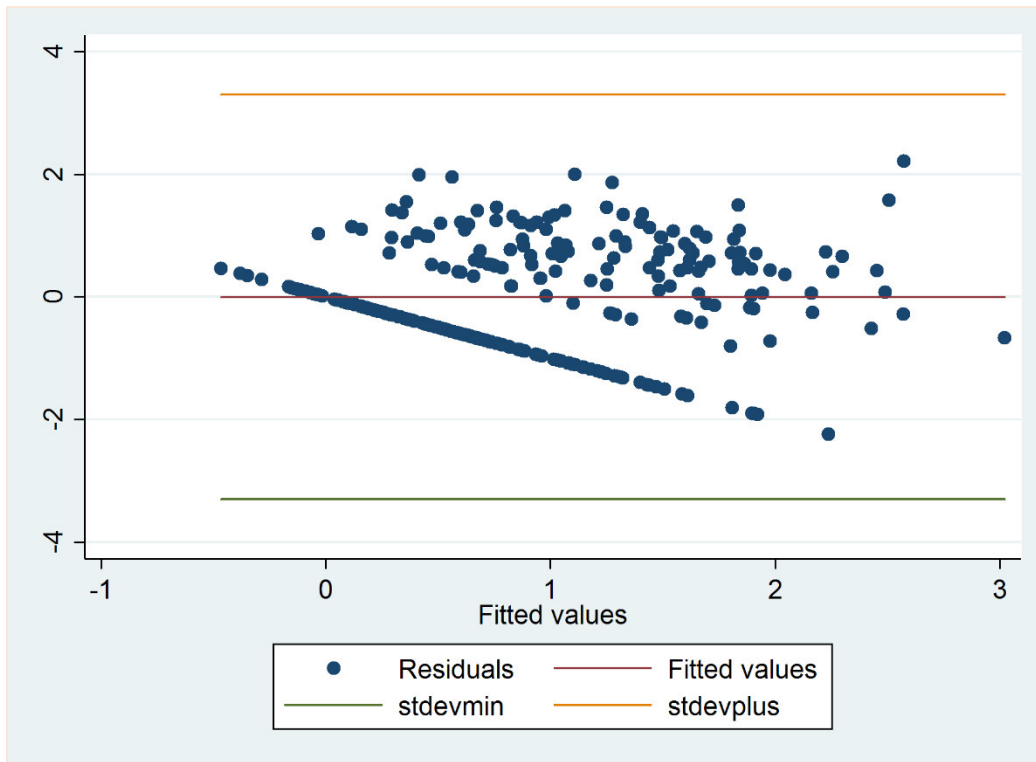


Figure 13: Scatter plot of residuals model $Rec^{(1/3)}$

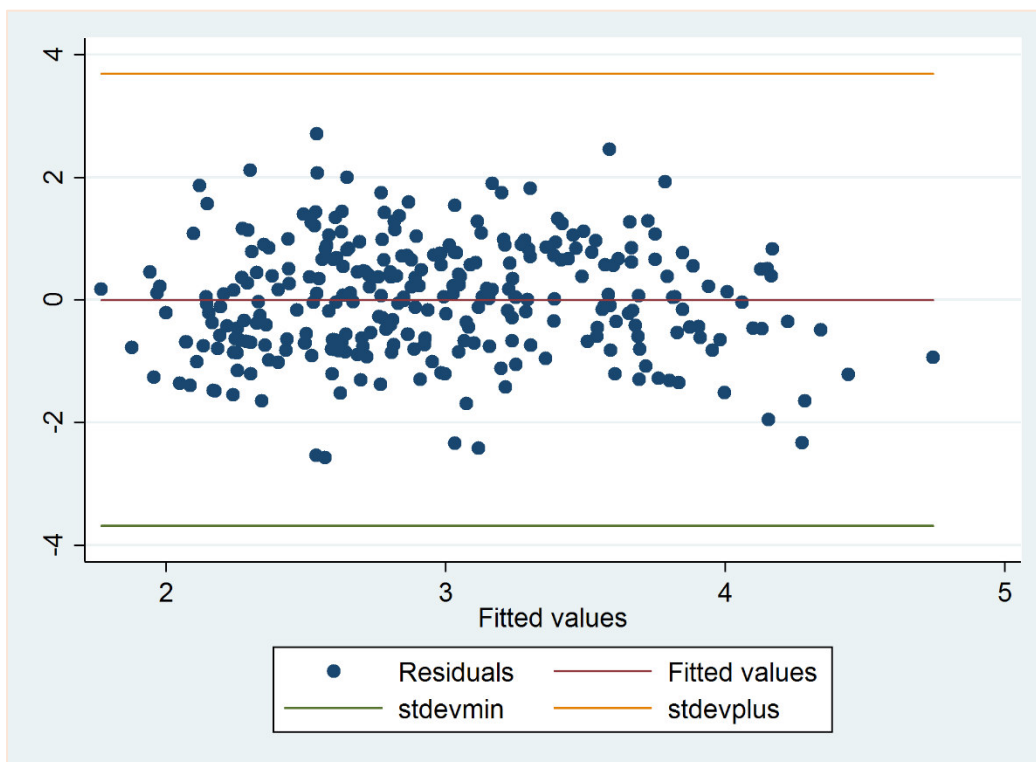


Figure 14: Scatter plot of residuals model $LN(Net)$

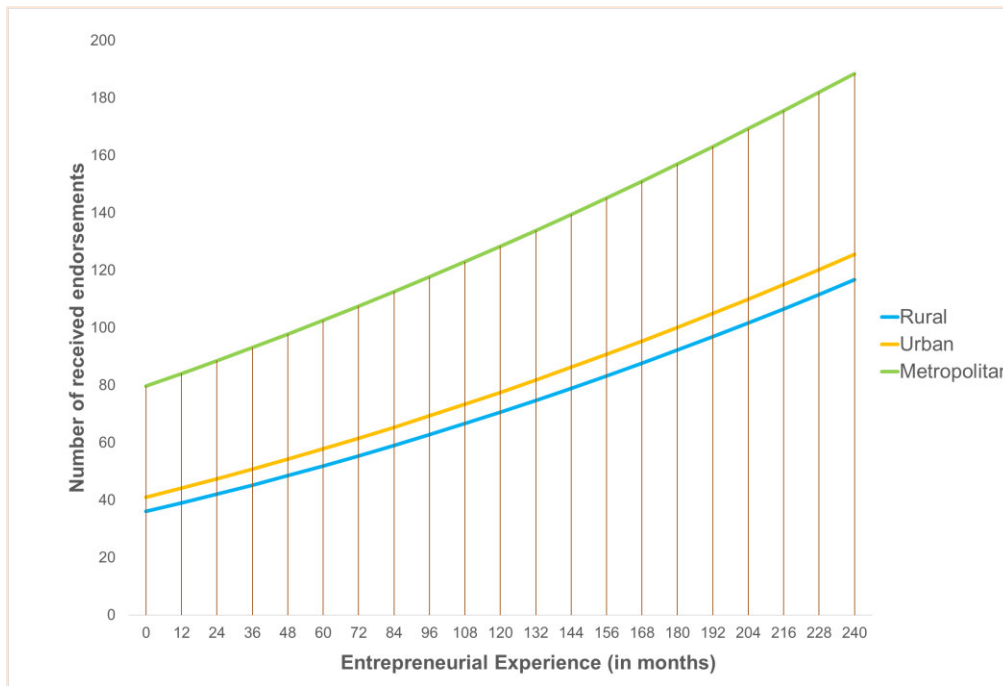


Figure 15: Relationship between endorsements and entrepreneurial experience

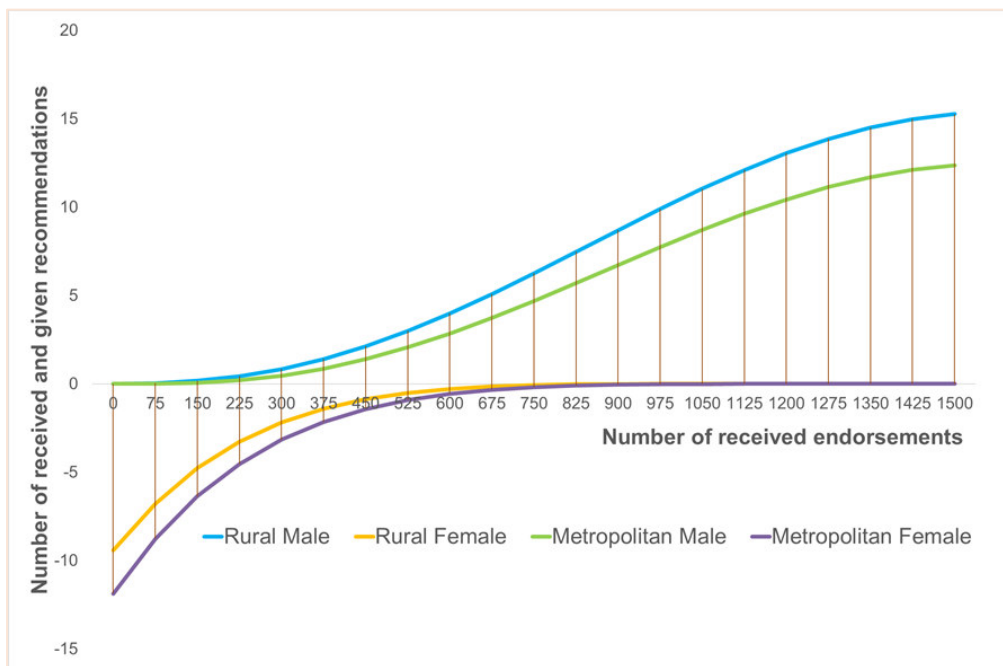


Figure 16: Relationship between recommendations and endorsements with gender differences

