

The relational embeddedness of startup entrepreneurs: Exploring the role of spatially fragmented work practices

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Abstract

Through high levels of trust, relationally embedded network ties allow entrepreneurs to access specialized resources below market price. As proximity can facilitate trust building without the need for permanent co-location, the ways entrepreneurs organize their work in space could matter for their relational embeddedness. Using time logs and interview data, this paper explores the extent to which spatially fragmented working practices are related to the relationally embedded networks of startup entrepreneurs. The paper shows how entrepreneurs who organize their work in more spatially fragmented ways have more relationally embedded ties, embedded to a higher degree and spread over a larger area, than the entrepreneurs whose work is less fragmented. These results increase our understanding of the ways in which the spatial organization of work is related to relational embeddedness. Hence, they could have implications for the facilitation of entrepreneurship in general, and the resource acquisition of startups in particular.

1. Introduction

Economic activity is said to be embedded with personal relations (Granovetter, 1985). In other words, the social relationships between people affect how firms do business. When there is evidence that a social relationship influences the economic actions of a firm, the relationship can be said to be relationally embedded (Granovetter, 1985; Uzzi, 1996; Hite, 2003; 2005). Through networks of relationally embedded ties, entrepreneurs can access specialized resources at a price lower than the market value (Anderson et al., 2005; Newbert and Tornikoski, 2013). This is because of the relatively high levels of trust in embedded relations, something rarely found in regular business relationships (Uzzi, 1997).

Thus, since “short geographical distances favour social interaction and trust building” (Boschma, 2005, p. 67), the ability for entrepreneurs to work in geographical proximity to potential resource holders should not only matter for the levels of trust in their networks, but also their relational embeddedness. It has however been argued that the benefits of proximity would not necessarily require permanent co-location, as people instead could be brought together by travelling (Boschma, 2005). Hence, by organizing their work in spatially fragmented ways (Couclelis, 2000; 2004) entrepreneurs could potentially facilitate the development of trust, which could have important consequences for their ability to access resources through relationally embedded networks.

This paper examines this association, by studying the ways in which the spatial work patterns of startup entrepreneurs are related to their relationally embedded networks – expecting more spatially fragmented working practices to be associated with higher degrees of relational embeddedness. It does so using time log data and semi-structured interviews with startup entrepreneurs in Toronto, Canada – globally known as one of the best cities to establish a company in (Business Insider, 2015). Resource acquisition through relationally embedded networks is believed to be particularly important for startups, who are usually internally resource poor, with no history of former economic exchange to build upon (Hite and Hesterly, 2001).

As networks of entrepreneurs are dynamic, there is a general need to understand how network ties develop over time (Lamine et al., 2015). Even though it is outside the scope of this research to study networks over time – this paper acknowledges the need to distinguish between different types of ties. To fully capture the different ways spatial work organization are associated with relational embeddedness, this study follows Hite’s (2003) multidimensional conceptualization of embedded relations, as being built up by three bases of trust – personal relationship, dyadic economic interaction and social capital. This view “considers how variation in the quality of the relationship and bases of trust may lead to different types of embeddedness” (Hoang and Yi, 2015, p. 14). Previously, it has been employed to study the resource acquisition of non-profit organizations (Eng et al., 2012), ego-centric network structures (David et al., 2016) and differentiated embedding among migrants (Ryan, 2018). In this paper, the multidimensional view is especially useful, as a more nuanced conceptualization can help show important differences in how relational embeddedness benefits or constrains entrepreneurs.

The research is guided by the following questions:

1. How do the properties of relationally embedded networks of startup entrepreneurs differ with respect to (a) number, (b) type and (c) location of relationally embedded ties?
2. To what extent is the spatial organization of work related to the relational embeddedness of startup entrepreneurs?

The analysis shows that relationally embedded ties provide the entrepreneurs with valuable resources, but that there are big differences in the extent to which the entrepreneurs are embedded. Most importantly, it shows that entrepreneurs who organize their work in a more fragmented way have more relationally embedded ties, embedded to a higher degree and located on a greater geographical area, than entrepreneurs who organize their work in a less spatially fragmented way. Most certainly, the results of this study are vital when developing strategies aimed at facilitating the resource acquisition of startups. Nevertheless, it should be noted that even though these findings suggest a correlation between spatially fragmented working practices and relational embeddedness, causality can not be implied.

The paper is structured accordingly: Section 2 begins with introduction to the concept of relational embeddedness. Thereafter, Hite’s (2003) multidimensional view of relational embeddedness and the main factor of interest, spatial fragmentation of working activities, are introduced. The section ends with a summary of the factors of interest in a conceptual model. Section 3 discusses methods and data, primarily focusing on the mapping of relationally embedded networks, and the measuring of spatial fragmentation. In Section 4,

the results of the network analysis are presented. Thereafter, in Section 5, the variations in relationally embedded networks are related to spatial fragmentation. In Section 6, other variables affecting relationally embedded networks are presented. Section 7 discusses the differences in embeddedness and spatial fragmentation. Finally, the main results of the paper are summarized, and the limitations of the study are discussed.

2. Theory

2.1 Relational embeddedness

Entrepreneurs have been shown to mobilize social ties in order to seize economic opportunities (Anderson et al., 2007; Ozgen and Baron, 2007), and there has long been a broad consensus that social networks are important for the economic performance of firms (Arrow, 2000). For entrepreneurs, social networks provide access to capital, financing, information and key talent, but also immaterial resources such as emotional support and advice (Hoang and Antoncic, 2003; Schutjens and Stam, 2003; Hoang and Yi, 2015). These external resources supplement a firm's internal capabilities, making network relations crucial in the establishment and development of firms (Jack, 2005).

When there is evidence that a social relationship influences the economic actions of a firm, the relationship between two dyadic partners can be said to be relationally embedded (Granovetter, 1985; Uzzi, 1996; Hite, 2003; 2005). Relationally embedded ties differ from traditional business relationships, so-called arm's-length ties, mainly because of their different governing mechanisms. In arm's-length relationships, the focus lies on economic exchange governed through legal and market mechanisms (Newbert and Tornikoski, 2013). Relationally embedded ties, on the other hand, govern exchanges with trust (Uzzi, 1997). Uzzi (1997, p. 37) describes relationally embedded networks as "distinctive for their 'thick' information exchange of tacit and proprietary know-how", which promotes knowledge transfer and learning (see also Hoang and Antoncic, 2003). Moreover, relationally embedded ties can provide access to very specific resources, whereas arm's length ties offer more ubiquitous resources (Newbert and Tornikoski, 2013). Anderson et al. (2005), further show how embedded ties not only provide low cost resources, but timely access to them.

Accessing high quality information and specific, low-cost resources is, without a doubt, important for all businesses. But because of the critical nature of the startup phase and the general resource weakness characterizing startups, the resources associated with relationally embedded ties can be assumed to be even more important for young companies than for mature enterprises (Hite and Hesterly, 2001). This, since there is no history of transactions for the new company to fall back on, making the trust in embedded relations crucial in determining the costs of resources (Hoang and Antoncic, 2003). Moreover, relational embeddedness has been shown to reduce vulnerability for entrepreneurs who depend heavily on few ties, which is oftentimes the case for startup entrepreneurs (Newbert and Tornikoski, 2013).

The degree to which an entrepreneur is embedded has important implications for the cost to which resources can be acquired. Nevertheless, embedded ties may also constrain firms, as conflicts might occur between economic actions and social obligations (Hoang and Yi, 2015). For example, the role expectations of family or close friends might impede business relationships (Kim and Aldrich, 2005). In other words, entrepreneurs might feel obliged to maintain business relationships with relationally embedded ties even though the resources

provided are insufficient, which might limit the growth of their firms (Jack, 2005; see also Gargiulo and Benassi, 1999).

2.2 A multidimensional view of relational embeddedness

Not all relationally embedded ties are the same, and their characteristics can influence “the extent to which opportunities and resources can be identified, accessed, mobilized and exploited” (Hite, 2005, p. 113). Therefore, Hite (2003) proposes a multidimensional view, where relationally embedded ties are conceptualized as being made up by a combination of three bases of trust – *personal relationship*, *dyadic economic interaction* and *social capital*.

Consistent with earlier findings (e.g. Uzzi, 1996), Hite (2003), finds that a *personal relationship* is an important element of embedded network ties. A friendly relation to a resource holder can give entrepreneurs competitive advantages because of goodwill and personal trust. As the actors do not want to ruin their social relationship, the risk of economic malfeasance is reduced. The second component is the *dyadic economic interaction*. By having done business before, a trust in each others competency is built. The fear of loosing a good business relationship is what controls the relationship – decreasing the risk of malfeasance. Lastly, in a network relationship with high levels of structural embeddedness, *social capital* trust evolves. Here, mutual ties stand as guarantees that the tie is reliable and trustworthy. Malfeasant actions are avoided, as they would ruin the reputation of the actors.

The presence of one, two or three bases of trust, and the different combinations of them, results in seven possible types of embeddedness, as illustrated in Figure 1:

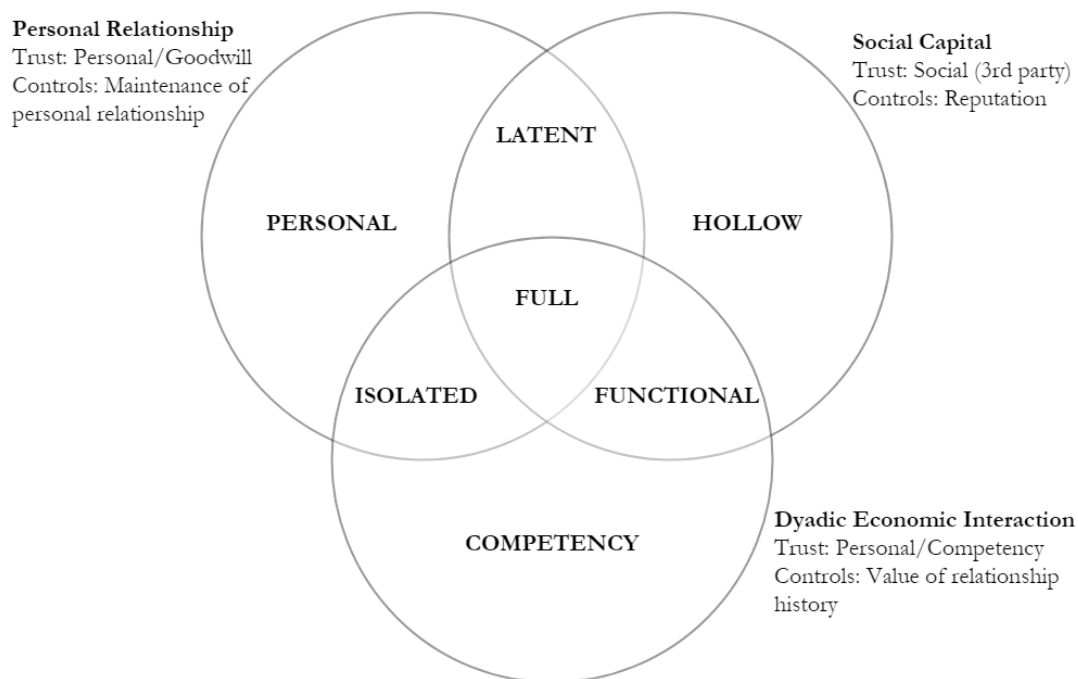


Figure 1. Seven types of embeddedness (Hite, 2003)

Personal embeddedness is characterized by high levels of personal goodwill trust and low levels of social- and personal/competency trust. Upholding the social relationship might therefore become the primary target of the business relationship, leading to inefficient strategies. Ties characterized by *competency* embeddedness are built on a history of successful

economic exchange. However, without the influence of social- and personal trust, it might be hard to sustain the relational contracting which is so essential in the creation of competitive advantages. Embedded relationships built solely on a common, third party recommendation are labeled as *hollow*. Here, social pressure could give advantages, but might lead to inefficient economic decisions.

Functional embeddedness lacks the personal relationship, but nevertheless functions very well as embedded business ties (Hite, 2003). Hite (2003) finds that *isolated* embeddedness is the least common form of embeddedness, making up only five percent of the total ties studied. However, this does not come as a surprise given that strong dyads eventually create links to others, forming networks (Granovetter, 1973). Ties categorized as *latent*, often family or close friends, consist of high degrees of personal relationship and social capital, but lacks quality in the economic interaction. *Fully* embedded ties demonstrate high degrees of all three bases of trust. The quality of these ties is thus controlled by both the wish to maintain a successful personal- and economic relationship, as well as a good reputation.

2.3 Factors affecting entrepreneurial networks

Before discussing the context-, firm- and individual factors affecting entrepreneurial networks, I introduce the main factor of interest for this paper, namely the spatial fragmentation of working activities.

2.3.1 Spatial fragmentation of working activities

Geographical proximity affects network formation (Glückler, 2007). One reason is that firms located in relative proximity to each other have more face-to-face contacts, which builds trust leading to more personal and embedded relationships (Harrison, 1992). Trade relations have also been shown to become more embedded in personal relations the greater the social, cultural and geographical proximity between the actors (Granovetter, 1993).

However, it is argued that geographical proximity does not necessarily require permanent co-location (Boschma, 2005). Instead, people can be brought together by travelling. Halford (2005) shows how employees changed both how they worked, communicated and socialized when introduced to a flexible workplace policy. The multilocal work allowed the employees to find “additional resources with which to maintain and *extend* private communication spaces, for both organizational and personal relationships” (Halford, 2005, p. 29). Sometimes, mobile professionals even create what Maskell et al. (2004) call *temporary clusters*. These resemble permanent clusters, in the sense that they are “hotspots of intensive and dedicated exchange of knowledge, network building and generation of new ideas” (Maskell et al., 2004, p. 2).

Time geography (Hägerstrand, 1970) offers a conceptual starting point when studying how start-up entrepreneurs organize their operations with regards to mobility and space. By relaxing space-time constraints, i.e. factors that limit participation in certain activities, technology has the potential to increase the space-time flexibility (here measured as spatial fragmentation), both in general, and for entrepreneurs (Schwanen and Kwan, 2008; Mokhtarian, 2009). As technology allows growing numbers of people to work outside their regular office (Wynarczyk, 2005), spatially fragmented forms of organizing company operations evolve. Activities can now be split up and performed at different places, at different times. In the literature, this is referred to as the *spatio-temporal fragmentation* of activities (Couclelis, 2000; 2004; Alexander et al., 2011).

Spatial fragmentation has the potential to increase geographical proximity between actors – allowing entrepreneurs to be “on the spot”, facilitating the exchange of resources and information that could be crucial for their growth and survival. In other words, by organizing their work in a spatially fragmented way, geographical proximity is enabled – which could be crucial for the ability to develop trust and relational embeddedness.

2.3.2 Individual-, firm- and contextual factors affecting relational embeddedness

Several contextual, firm- and individual factors could also influence the number, type and location of relationally embedded ties.

Number

Although the use of social media is increasing among seniors (Perrin, 2015), studies (e.g. Pfeil et al., 2008; Skeels and Grudin, 2009) show how older people are less likely to make use of networking apps, for private and work purposes. Nevertheless, age and entrepreneurial experience have been found to have a positive impact on the size of entrepreneurial networks, suggesting that developmental effects might be in place (Roberts et al., 2008). Thus, age can be expected to have a positive influence on the number of relationally embedded ties.

The type of industry could also be of importance. Entrepreneurs in firms that are based around the trade of “qualified formal knowledge” (so-called knowledge-based firms) spend more time and energy on networking than firms that are not (Johannisson, 1998, p. 299). This could lead to a higher number of relationally embedded ties.

Innovative firms are expected to engage in collaborations more often than firms that rarely innovate (Schutjens and Stam, 2003), which could result in a larger number of relationally embedded ties. Furthermore, business service firms are shown to have more social relations than manufacturing firms (Schutjens and Stam, 2003). As ties become relationally embedded when social relationships affect the economic actions of firms, business service firms can be expected to have more relationally embedded ties.

Lastly, there are context variables that can have an influence on the number of relationally embedded ties. With concentration in cities comes agglomeration advantages (Porter, 2000), and an increase of resources that entrepreneurs can draw from. Moreover, cosmopolitan values found in urban regions are also assumed to allow a more flexible management of personal networks (Johannisson, 1996 in Schutjens and Stam, 2003). Hence, urban environments can be expected to facilitate the development of relationally embedded ties.

Type

Knowledge-based, often high-tech entrepreneurs, more often lack a personal relation to their network partners, compared to traditional entrepreneurs (Johannisson, 1998). This should have consequences for the type of their relationally embedded ties. Moreover, gender could be important for the embeddedness type, as female entrepreneurs are argued to make more use of close personal ties, such as family and close friends, than their male counterparts (Klyver and Terjesen, 2007; Watson, 2012), who instead make more frequent use of banks, solicitors, industry associations and business consultants (Watson, 2012).

Business service firms have more social relations than manufacturing firms (Schutjens and Stam, 2003), which might result in a higher proportion of personal trust, thus affecting the type of embeddedness.

Location

Highly educated entrepreneurs have been shown to have networks extending over larger geographical scales than entrepreneurs with low education level (Donckels and Lambrecht, 1995).

On the firm level, as larger firms are more often dealing with export, as their ties are to a greater extent international (Gorton, 1999). Business service firms are sometimes expected to be more dependent on local markets, compared to manufacturing firms (Schutjens and Stam, 2003), which likely results in more ties located in close proximity to the entrepreneur. The innovation levels of firms can also affect the location of network ties, since collaborations around innovation often take place on a national or international level (Wever and Stam, 1999).

2.4 Conceptual model

An overview of the different factors expected to be associated with relational embeddedness are presented in the model below.

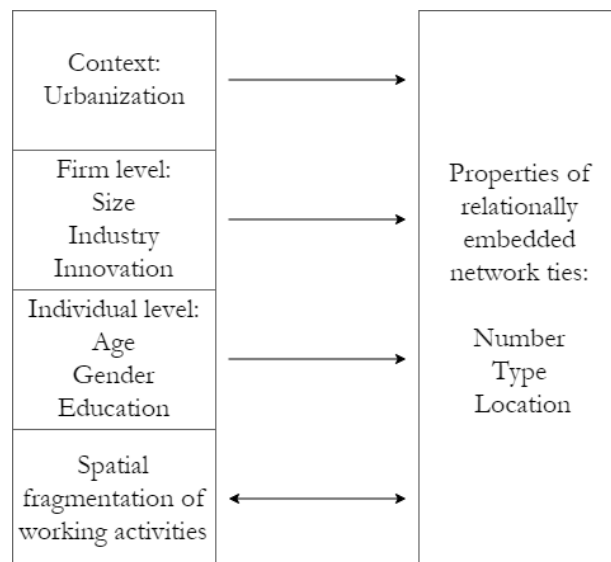


Figure 2. Conceptual model

3. Data and Methods

Toronto is globally known as a successful city when it comes to fostering startups (Business Insider, 2015). To reinforce this reputation, the City of Toronto (2015) adopted a new strategy, identifying initiatives in which the City can support the startup ecosystem. The availability of entrepreneurs and the efforts made by the City make Toronto suitable for a case study. Toronto was also considered large enough to find a sufficient number of participants whose technology use allowed them to organize their work in a relative multilocal fashion (Wynarczyk, 2005).

Because Toronto is such a prominent startup city, providing opportunities to find resources through a wide variety of channels, the importance, number, type and location of relationally embedded ties might differ from other cities. However, how the developed infrastructure for startups might influence the results is difficult to say, as it could both facilitate the development of, or act as a substitute for, relationally embedded networks. To what extent the focus on technology companies might influence the results is also hard to estimate, but

as technology relaxes spatio-temporal constraints (Schwanen and Kwan, 2008; Mokhtarian, 2009), entrepreneurs who incorporate technology in their business might be more spatially fragmented than others.

The participants were recruited at different events for startups, trade shows, through e-mails and Facebook advertisements. As the study demanded significant effort and time from the participants, a substantial number of entrepreneurs declined participation, or did not respond. It is likely that entrepreneurs with a special interest in networking were more inclined in participating than others. However, entrepreneurs who are interested in networking are not necessarily better at networking than others. One might be interested in finding out more about their own network because one experiences a lack of network ties. Thus, the impact this bias has on the result is hard to estimate. Furthermore, being a younger, white male engaged in higher education, I may also have biased the results, as entrepreneurs identifying with these characteristics might have been more inclined to participate.

The study strives to follow the core ethical principles of qualitative research – respect of persons, beneficence and justice (Hennink, Hutter and Bailey, 2011), by attempting to maximize the benefits for the wider community, while minimizing the risks for the participants, and conducting the research in a respectful and just manner. The entrepreneurs were introduced to the themes of the study and asked for their consent (see Appendix 1). All data have been kept confidential at all times, and because of the potentially sensitive nature of the topic, all names of individuals and firms presented in the paper are fictitious. Information regarding smaller cities and towns has also been anonymized, out of concern for the privacy of the entrepreneurs.

In total, 10 startup entrepreneurs took part in the study (see Table 1). All companies were based in the city of Toronto, but one, which is based in a smaller city outside Toronto, in the so-called Greater Golden Horse Shoe region (Hess et al., 2007). The entrepreneurs own companies founded in 2015 or 2016, providing a variety of services based on technology. Data collection took place during November and December 2017 and was divided in two parts. First, participants kept a time log during a work week, keeping track of their work activities. Thereafter, they participated in a longer interview with the purpose of mapping their relationally embedded network ties. Three data bases were constructed in order to answer the research questions – one contains basic information about 10 entrepreneurs and their firms, the second contains information about the ties these entrepreneurs rely on when doing business, and the third the time logs of 9 of these entrepreneurs. Below, I will describe how this data was collected and used.

Table 1. Characteristics of entrepreneurs and firms

	Brian	Alex	Petter	Anna	Bob	Sarah	Michael	Kevin	Ryan	Chris
Contextual										
Urbanization	2 730 000	2 730 000	2 730 000	2 730 000	150 000	2 730 000	2 730 000	2 730 000	2 730 000	2 730 000
City size ¹										
Industry ²	8000 - Services: Health Services	7994 - Services: Video Game Arcades	7371 - Services: Computer Programming Services	7370 - Services: Computer Programming, Data Processing, Etc.	7385 - Services: Telephone Interconnect Systems	7370 - Services: Computer Programming, Data Processing, Etc.	7371 - Services: Computer Programming Services	7370 - Services: Computer Programming, Data Processing, Etc.	7310 - Services: Advertising	6199 - Finance services
Firm level										
Company name	HomeDoc	Driver's inn	GestureTech	DatMed	MultiPhone	CosmetiScan	AIX	VisaGuide	GoBlock	WireMe
Operation	Remote physicians	Driving simulator	Gesture recognition	Medical data	Telecom	Skin tone determination	AI Consultant	Travel technology	Advertisement technology	Money transfers
Customer base	B2C	B2C	B2B	B2B	B2B/B2C	B2B/B2C	B2B	B2B/B2C	B2B	B2B
Company founded	2015	2016	2015	2016	2015	2016	2016	2015	2015	2015
Full/part time	Full	Full	Full	Part	Part (retired)	Full	Full	Full	Full	Full
Nr. of employees	ca. 25	3	6	0	0	0	0	3	6	0
Nr. of founders	3	1	2	2	2	2	1	2	2	1
Innovation level	Medium	Low	High	Medium	Medium	High	High	High	High	Medium
Individual level										
Age	37	37	24	43	61	24	26	28	32	30
Gender	Male	Male	Male	Female	Male	Female	Male	Male	Male	Male
Educational level	University	Vocational college	University	University	University	University	University	University	University	University
Educational background	Information Science	IT/Marketing	Computer Science	IT/Finance/Misc.	MBA	Industrial Eng.	Commerce	Statistics	Language	Electrical eng./Business
Labor market experience	Medium-High	Medium-High	Low	Medium-High	High	None	Medium	Medium	Medium	Low
Entrepreneurial experience	Low-Medium	Medium	None	High	Low-Medium	None	Medium	Low	High	None

¹ Statistics Canada, 2016. City population (single tier).

² U.S SEC, 2018. Standard industrial classification (SIC) code list.

3.1 Mapping entrepreneurial networks

The research question *How do the properties of relationally embedded networks of startup entrepreneurs differ with respect to (a) number, (b) type and (c) location of relationally embedded ties?* is answered by analyzing data stemming from verbatim transcripts of interviews with entrepreneurs.

The first part of the interview consisted of a thorough screening of the firm, building on Porter's value chain (1985, see Appendix 2). This was deemed appropriate as this paper sees embedded ties as a way to access resources, in turn creating value and competitive advantages. Porter's value chain divides firm activities in two categories, primary and support activities (see figure 3). These consists of five respectively four activity types, wherein value can be created. For every type of activity, the entrepreneur was asked how the firm structured the activity, and if there were anyone in particular they relied on.

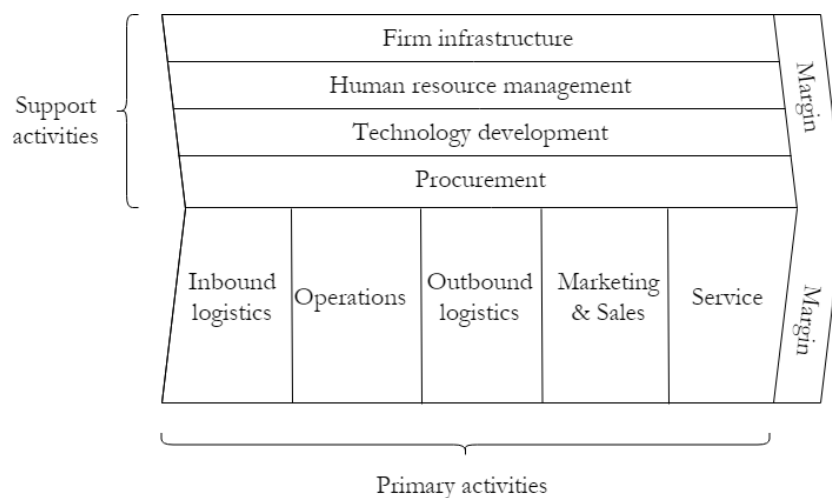


Figure 3: Porter's Value Chain (Porter, 1985)

The resources relevant for this study are not only the material, economic ones, but also immaterial resources such as emotional support, mentoring and advice. To ensure that my approach did not bias the results in favor of ties with an economic base of trust, I underlined my interest in both material and immaterial resources – for example both ties providing actual HR-services and ties giving advice on HR-related issues.

A second interview guide (see Appendix 3) was initiated when a potential tie was mentioned. This guide contains a series of questions designed to establish the type of tie. The questions build on Hite's (2003) three bases of trusts and their attributes:

1. Personal relationship, demonstrated with (i) personal knowledge, (ii) affect and (iii) sociality.
2. Dyadic economic interaction, containing four attributes: (iv) extent, (v) effort, (vi) ease and (vii) quality.
3. Social capital, comprised of (viii) obligations, (ix) resource accessibility, (x) brokering, and (xi) structural embeddedness

When analyzing the interview data, ties were first identified as either embedded or not based on meeting the definition presented in the introduction. This information is sufficient to determine the number of relationally embedded ties (research question 1a).

A coding scheme following Hite (2003, see Appendix 4) was used to analyze the verbatim transcripts in order to establish the type of embeddedness, answering question 1b. Using this coding scheme, it is possible to investigate to which degree (high, medium or low) each base of trust demonstrated within the informant’s description of a tie. For example, for a tie to be considered having a personal base of trust, the interviewee should demonstrate high overall levels of the attributes personal knowledge, affect and sociality. These, in turn, are composed of different elements.

The attribute sociality, for instance, is constituted in part by the element *Participation in social activities*. Answering “once or twice a month” to the question “How often do you spend time together, doing social activities?”, would suggest high levels of this element, whereas “once or twice a year” would suggest low levels. Together with the demonstration of the element *Knowing about the partners personal life and family*, the overall level of the attribute sociality can be decided. Together with the degrees of the other attributes, it can be decided if there is a personal base of trust or not. Ties demonstrating high degrees of one, two or all three bases of trust are categorized accordingly into one of the seven types of embeddedness.

To answer research question 1c, the main location of the tie was identified.

In this part of the interview I also asked the interviewees to describe the background of their relationships, and their motivations to maintain each of them, providing information to answer the research question: *To what extent is the spatial organization of work related to the relational embeddedness of startup entrepreneurs?*

3.2 Measuring spatial fragmentation

To further study how start-up entrepreneurs organize their operations with regards to spatial fragmentation, I collected time log data with information about performed work tasks, location and times. According to Alexander et al. (2011), working activities can be divided into episodes. The level of spatial activity fragmentation is constituted by three different dimensions of fragmentation – the number, distribution and configuration of episodes. By selecting one index for each dimension (see Table 2) the spatial fragmentation of working activities can be decided.

Table 2. Measures of spatial fragmentation (Alexander et al., 2011)

Dimension	Symbol	Description	Values	Interpretation
Number of fragments	L	Number of locations: count of the total number of activity locations	$L \geq 1$	Higher number indicates more spatial fragmentation
Distribution of fragment sizes	S-index	Spatial index: the way in which the time spent on a certain activity type on a given day is fragmented across different locations	$0 \leq \text{S-index} \leq 1$	0 indicates that the activity is not fragmented spatially, 1 that the activity is spatially fragmented completely
Configuration of fragments	A	Area index: the global clustering/dispersion of activity locations	$A \geq 0$	Higher values indicate more spatial fragmentation
General level of fragmentation	Overall	Measure of how fragmented each entrepreneur is relative to the rest of the group overall.	$3 \leq \text{Overall} \leq 27$	Higher numbers indicate more spatial fragmentation.

L is calculated in the following way:

$$L = \sum_{j=1}^n l_j$$

where L is the total number of work locations and l_j is the j th work location.

The S-index is defined like this, and can be obtained in three steps:

$$\left. \begin{aligned} & \left[1 - \sum_{j=1}^L \left(\frac{t_{ij}}{T} \right)^2 \right] / \left(1 - \frac{1}{L} \right), \quad \text{if } L > 1, \\ & 0, \quad \text{if } L = 1. \end{aligned} \right\}$$

First, the duration of each episode is divided by the total time spent on work on a given week. Then take the square of each fraction and sum these across episodes. Second, that sum is subtracted from 1 so that greater values are indicative of more fragmentation. Finally, the differences in the number of episodes are controlled for by dividing the intermediate outcome by: $1 - (1/L)$ if $L > 1$.

The area index (A) is closely connected with the standard deviational ellipse (SDE), which is used to describe the spatial configuration of a set of locations. The SDE is centered on the mean center of the activity locations. The long axis of the ellipse represents the maximum dispersion of activity locations. The short axis is perpendicular to the long axis at the mean center and shows the minimum dispersion of the activity locations. The standard deviations along the long- and short axes give the SDE³. The area index (A) is then calculated as:

$$A = \pi ab$$

where A is the area index, a is the semimajor axis of the SDE and b is the semiminor axis of the SDE.

To illustrate the overall level of fragmentation, I created an aggregate ranking measure. The overall level of fragmentation is calculated by assigning a score of 1-9 for each of the three dimensions, corresponding to how fragmented each entrepreneur is relative to the rest of the group. The most fragmented entrepreneur is assigned a 9, the least fragmented a 1. The sum of the three scores illustrates the general level of fragmentation, measured on an ordinal scale.

4. Characteristics of relationally embedded networks

4.1 Number of ties

During the interviews with the 10 entrepreneurs, 138 ties were mentioned in total, of which 70 were considered potentially embedded (i.e. having a social relationship that could potentially affect the economic activity of the entrepreneur). 45 of these ties were in the end categorized as embedded, demonstrating sufficient levels of at least one dimension of relational embeddedness.

³ For a more detailed description on how to calculate the SDE, see Alexander et al. (2011)

Table 3. Number and type of relationally embedded ties

	Brian	Alex	Petter	Anna	Bob	Sarah	Michael	Kevin	Ryan	Chris	Total
Number of ties	0	1	2	2	3	3	4	8	10	12	45
Weighted embeddedness ⁴	0	2	4	5	4	5	6	20	20	21	
Type											
Full	0	0	1	1	0	0	0	5	4	3	14
Functional	0	0	0	1	0	0	2	2	2	3	10
Isolated	0	1	0	0	1	2	0	0	0	0	4
Latent	0	0	0	0	0	0	0	0	0	0	0
Competency	0	0	1	0	1	0	0	0	0	1	3
Personal	0	0	0	0	0	1	2	0	3	3	9
Hollow	0	0	0	0	1	0	0	1	1	2	5

4.2 Type of ties

In line with Hite's (2003) findings, fully embedded ties were over all the most common among all embedded ties. As described in Section 2.2, being embedded on more dimensions is beneficial, as it decreases the risks associated with embeddedness. In this respect Kevin stands out, with 5 out of 8 ties being fully embedded. Surprisingly, no latent ties, which Hite (2003) found as a common form of embeddedness, were identified. In Hite's study, latent ties often consisted of family or close friends helping out in the business. Among the entrepreneurs in this study, ties with such a relationship were either personally, isolated or fully embedded.

The ties that could develop into latent embeddedness are the hollowly and personally embedded ties. The personally embedded ties have a personal, but not social capital base of trust. A further analysis shows that these ties often are peers. They share quite a few mutual ties, but are less able to act as brokers, providing the entrepreneurs with introductions and other resources through their professional networks. Their rather balanced power relations might also explain why the feelings of obligation are rather low. The absence of brokering and feelings of obligation, together with low resource accessibility results in a form of embeddedness without a social capital trust base.

Conversely, the hollow ties are characterized by high levels of social capital trust, but lower levels of personal and economic embeddedness. These are often based far away from the entrepreneurs, in global cities such as New York, San Francisco, or Vancouver. In these cases, a lack of geographical proximity often seems to explain why there is no evident personal base of trust. This matter will be further elaborated in Section 5.1.

4.3 Location of ties

A majority (33/45) of all ties are to be characterized as local, with both dyads located in the same city. Six ties can be categorized as regional (Ontario), while the remaining six are global (based outside Ontario). The global ties are divided between four entrepreneurs, with three connections belonging to Ryan, and one to Bob, Kevin and Chris respectively. Of the six regional ties, five belong to Chris, whereas the remaining tie is Michael's.

Table 4. Location of relationally embedded ties

	Brian	Alex	Petter	Anna	Bob	Sarah	Michael	Kevin	Ryan	Chris	Total
Global	0	0	0	0	1	0	0	1	3	1	6
Regional	0	0	0	0	0	0	1	0	0	5	6
Local	0	1	2	2	2	3	3	7	7	6	33

⁴ I constructed the weighted embeddedness in order to take the degree of embeddedness into account. Fully embedded contacts are thus assigned a value of three, bidimensional contacts a value of two, and unidimensional contacts a value of one. These values correspond to how many bases of trust they demonstrate.

5. Spatial organization of work

Since it is argued that the benefits of geographical proximity can be accessed through travelling (Boschma, 2005), this paper sees spatial fragmented working practices as an alternative to permanent co-location. Consequently, when seeking to understand how spatial fragmentation is related to relational embeddedness, we first need to understand the importance of geographical proximity for relational embeddedness.

5.1 Geographical proximity and relational embeddedness

As shown above, an overwhelming majority of all relationally embedded ties are local. Of the 12 extra-local ties, 9 had previously been located in the same city as the entrepreneur – leaving only 3 embedded ties who had never been co-located with the entrepreneur. When summing up his views on the importance of geographical proximity with regards to relationship building, Ryan describes it in the following way:

I mean the fact to the matter is that the closer I am geographically to somebody, the closer my relationship's gonna be. And the same goes for the guys that are in San Francisco. When I spent seven weeks in San Francisco, my relationship got stronger with them. [...] even at a more granular level, like Andren's a great example, he's in the same office as me. And when we weren't in the same office, our relationship wasn't as close. We got in to the same office – our relationship got a lot closer.

As Ryan points out, proximity can be an important factor on all levels – globally, regionally and locally. This is confirmed by Alex, who tells the story of a previously embedded tie, whom he lost contact with after he moved of just 15 minutes away. It seems as though small changes in proximity could have a significant impact on the intensity of relations, hence on relational embeddedness.

As mentioned, being embedded on more dimensions is beneficial, as each dimension represents a base of trust. The local ties examined are generally embedded on more dimensions than other ties, on average demonstrating 2,1 bases of trust, compared to regional ties (1,5) and global ties (1,3). However, proximity seems to affect the three bases of trust in different ways, which has consequences for the type of embeddedness. Table 5 shows the number of local, regional and global ties that demonstrate the three different bases of trust⁵.

Table 5. The number of relationally embedded ties per location type demonstrating the different bases of trust

	Number	Personal trust	Economic trust	Social capital trust
Local ties	33	21	27	22
Regional ties	6	4	3	2
Global ties	6	2	1	5
Total	45	27	31	29

For example, 27 out of 33 of the local ties demonstrate an economic base of trust, having a relationship characterized by either full, functional or competency embeddedness. This can be compared to the presence of economic trust among global ties, which is only found in 1 out of 6. In Table 6, the *share* of local, regional and global ties demonstrating personal, economic and social capital bases of trust is presented.

⁵ Keep in mind that a relationally embedded tie can demonstrate one, two or three bases of trust.

Table 6. Share of local, regional and global ties demonstrating personal, economic and social capital bases of trust.

	Number of ties	Personal trust	Economic trust	Social capital trust
Local ties	33	64%	82%	67%
Regional ties	6	67%	50%	33%
Global ties	6	33%	17%	83%

While this table supports that being located in close geographical proximity seems to be important for the personal- and dyadic economic bases of trust, social capital trust seems to be less dependent on proximity. On a global level, only 1 and 2 of the 6 ties demonstrate sufficient levels of personal or economic trust, while 5 out of 6 demonstrate a social capital base of trust. A further indication of this is that the only three ties that never, at any point, were co-located with the entrepreneur all were categorized as hollow – only demonstrating sufficient levels of social capital trust.

When it comes to developing a personal base of trust, especially the aspect of sociality (knowing about the partners personal life and family, as well as engaging in social activities) seems to benefit from being located near each other. When describing his personal relationship to hollowly embedded tie Linda, who is based in Colorado, Kevin compares it to fully embedded tie George, based in downtown Toronto.

It's not the same thing as with George where we've gone for beer and stuff like that. If we were based in Colorado we probably would have. But it's not as personal.

In Kevin's case, the lack of geographical proximity to Linda seems to be hindering further developments of personal trust – making him more exposed to the potentially harmful aspects of embeddedness. Vice versa, an increase in geographical proximity can facilitate the development of a personal relationship, making entrepreneurs less vulnerable. Below, Ryan describes how staying in the same city as his now fully embedded tie Jeffrey helped developing the relationship:

I think the last seven weeks we actually have built a personal relationship. Prior to that we met once, and then we spoke on the phone for like nine months.

Geographical proximity does not only impact the personal dimension of embeddedness, but also the dyadic economic dimension. For that dimension of embeddedness, especially *ease* and *extent* are affected by proximity. As an example of how proximity affects the ease of a relationship, Kevin described that when an advisor moved from a suburb to downtown Toronto, they now have “a little bit more access typically during the day”.

When describing his relation with fully embedded tie Andrew, with whom he shares an office, Ryan explains the difference in content between virtual and in person communication, and how it affects the extent of their relationship:

I'd say that when we're in different cities the types of interactions are less social. [...] So it's very, not transactional, but it's very business focused when we're not in the same city. When we run in to each other in the hallways here, we're telling each other stories about what we did over the weekend and stuff like that.

Furthermore, Ryan explains how proximity and the nature of face-to-face communication also can create a more multiplex economic relation. With not purely transactional communication, face-to-face contact helps further embedding the entrepreneur.

I definitely have more of a personal relationship with the people who are in Toronto. So, the natural outcome is that a lot of the advice or topics I discuss with them are not always centered around specific business advice, but also centered around like... The struggle.

Since proximity leads to more personal relationships with his business advisors, the resources they provide become less transactional and more diversified – for example providing both moral support and specific business advice.

5.2 Spatial fragmentation and relational embeddedness

As proximity, according to both the theory and findings of this paper, is important for creating embedded relations, this paper expects that spatially fragmented forms of organizing work can have a positive impact on relational embeddedness, since they should enable geographical proximity and trust building. In Table 7, the spatial fragmentation of the entrepreneurs is presented, with scores above the median presented in bold.

Table 7. Spatial fragmentation

Dimension	Symbol	Brian	Alex	Petter	Anna	Bob	Sarah	Michael	Kevin	Ryan	Median
Number	L (weekly)	5	9	2	4	5	5	10	10	13	5
Distribution	S-index	0,45	0,78	0,35	0,46	0,56	0,52	0,84	0,69	0,81	0,56
Configuration	A ⁶	2,37	5210	1,61E-11	4,98	15704	0,06	2,21	78,1	88,5	4,98
General level	Overall	11	21	3	10	19	11	20	20	24	19

Overall, Ryan can be said to be the most fragmented entrepreneur, scoring highest on number of location (L), second highest on the S-index (measuring how evenly distributed time is between locations) and third highest on the A-index (meaning that his activities are dispersed over a relatively large area). Of the less fragmented entrepreneurs, Petter stands out, having worked four hours outside his office during the week, visiting two unique locations in total.

Entrepreneurs who score above median on the different measures of fragmentation tend to have more embedded ties than the median entrepreneur (see Table 8). They are also embedded on more dimensions. The exception is Alex, who was one of the more fragmented entrepreneurs, but only has one embedded tie. This is can likely be explained by closer examining his working activities. A considerable share (77%) of his working hours were spent either in his home office, or at his main place of business. Of the remaining 7 locations, 5 were places where he had errands, (e.g. the post office). While these are establishments where one could develop relationally embedded ties, it is more likely that the interactions are quick and transactional.

Table 8. Overall fragmentation and number of relationally embedded ties

	Measure	Brian	Alex	Petter	Anna	Bob	Sarah	Michael	Kevin	Ryan	Median
Fragmentation	Overall	11	21	3	10	19	11	20	20	24	19
Embeddedness	Number of ties	0	1	2	2	3	3	4	8	10	3

⁶The average daily A score * 1 000 000

Fragmentation also seems to be related to the location of ties. Again, except for Alex, entrepreneurs who score in line with or higher than the median level of overall fragmentation measure are the only ones who have global or regional ties.

Table 9. Overall fragmentation and location of relationally embedded ties

	Measure	Brian	Alex	Petter	Anna	Bob	Sarah	Michael	Kevin	Ryan	Median
Fragmentation	Overall	11	21	3	10	19	11	20	20	24	19
Embeddedness	Global ties	0	0	0	0	1	0	0	1	3	0
	Regional ties	0	0	0	0	0	0	1	0	0	0
	Local ties	0	1	2	2	2	3	3	7	7	2

The underlying rationale of this paper is that entrepreneurs who are working from more locations (i.e. are more spatially fragmented) should be able to meet more people, which should facilitate trust building and the development of relationally embedded ties. But maintaining remote relationships requires significant amounts of time and effort. Hence, it is not surprising that several of the entrepreneurs state physical distance as an important reason for not meeting their ties in person. Instead, many communicate via phone calls, e-mails and chats.

The time logs show how entrepreneurs (primarily Brian and Petter, but also Sarah) that work from fewer locations but have long face-to-face meetings in their primary workplace – often have them with people who are part of their team. Other entrepreneurs (e.g. Ryan, Kevin) instead do a lot of the internal communication remotely. However, instead of using video calls and chats to communicate with potential clients and advisors abroad, they use those technologies to run the everyday operations, while they themselves travel with the purpose of developing personal relations with potential resource providers.

As the content of communication differs between remote and in person communication, this could have important consequences for their embeddedness. Face-to-face contact seem to more often contain elements of small talk compared to other communication, contributing to increased sociality and general personal knowledge, also in business relationships. This is confirmed by Kevin, who tells about how he makes sure to be mobile, in order to meet his functionally embedded tie Steven:

When he's in Toronto, we'll typically ask to speak in person rather than going on calls. Of course if he's travelling you know, we don't have much of a choice. But we would typically prefer meeting in person to calls. [...] We probably will do more small talk in person than in calls. But we will also have extended interactions. [...] There's a sunk cost of walking out to see him when you go and meet in person, so we typically will talk more. Just generally, and then I guess more on both fronts - more personally and more in detail on what we're doing.

This reasoning shows how the mobility of entrepreneurs (which is demonstrated in their level of spatial fragmentation) impacts their relationship. It also illustrates an important difference of meeting face-to-face contra virtually. Since in person meetings require both more time and effort due to the costs of travelling, some entrepreneurs make the conversations longer. In this way, fragmentation does not only affect the personal relation, but also the economic relation.

By organizing their workday in a spatially fragmented fashion, entrepreneurs can enjoy the benefits of proximity. But naturally, becoming embedded does not automatically happen if you are fragmented enough to spend time in face-to-face meetings – just as geographical proximity does not automatically give you all the benefits associated with agglomeration. Michael, one of the more mobile entrepreneurs, spends a lot of time in face-to-face meetings. He does however avoid social interaction in order to become more efficient. The time and effort needed to develop relations could explain why he has surprisingly few embedded ties:

I'm so focused right now on survival that [...] having meetings purely for friendly purposes with my business contacts is just low on my priority list. I'm so focused on... I got to bring in you know... I gotta close this deal, or I'm not gonna eat next month

When asked if the communication between him and ties Ronald and Farah changed due to their relocations, Michael explains that it did not, since the communication was always virtual, also when they were located in the same city:

No honestly, like Ronald I've always connected with virtually. In fact, I think we've only met for coffee twice. So it is almost entirely virtual this connection.

We've always communicated virtually. I've only met her [Farah] in person twice. Always on the phone.

It is possible that the lack of face-to-face communication in these cases has hindered the development of further embeddedness, as virtual communication rarely contains the same level of social elements that facilitate trust building. Michael's reasoning is strikingly similar to Bob's, when he describes how he communicates with his competency embedded tie John:

[We're in contact] infrequently, because he's got contract out of town. He was in Ottawa for four months, he was in Thunder bay for four months. But I mean, when he was in town it would be just texting or phone.

... and his non-embedded tie Patrick:

[He's based] in the same town, but it was always over the phone. Maybe once in his office. He's home office based too right.

Preferring to remain in their home offices, Bob and Patrick decides not to meet in person – communicating over the phone. The attitudes and priorities of Bob and Michael might certainly have consequences for the embeddedness of their relation, especially the economic and personal dimension, as they are the ones most affected by proximity.

6. Other factors affecting relational embeddedness

The remainder of this section will be discussing how the number, type and location of relationally embedded ties are related to the contextual, firm level, and individual factors presented in Section 2.3.2.

6.1 Number of ties

Individual factors

How age and experience affect relational embeddedness is not certain. Potentially, with age and experience comes an increasing network size, and the entrepreneurs become more knowledgeable about where to find certain resources. However, more experience could also

lead to a situation where certain advisors are no longer necessary, as the knowledge they have might be comparable to that of the entrepreneur himself. The oldest entrepreneur, Bob also describes how he, as an older entrepreneur, is less familiar with networking apps such as LinkedIn or Shapr, which possibly could lead to a different networking behavior (Pfeil et al., 2008; Skeels and Grudin, 2009).

According to Johannisson (1998, p. 299), entrepreneurs who do not possess “qualified formal knowledge” spend less time and energy on networking than those who do. As the educational differences in the sample were fairly small, no real conclusion can be drawn on how education levels affect relational embeddedness.

Firm level factors

Firm size is sometimes believed to have a positive impact on relational embeddedness, since larger firms are said to collaborate more. In line with Schutjens and Stam (2003), I could not find any support for this.

Another factor that is said to affect embeddedness in a positive way is the level of innovation of the firm, since highly innovative firms are more often involved in collaborative relationships (Johannisson, 1996; Fritsch and Lukas, 1999; in Schutjens and Stam, 2003). However, several of the founders of high tech companies describe how their innovativeness potentially hinders the formation of relationally embedded ties. Two main reasons were stated for this. Firstly, the need for highly specific expertise made finding resources difficult. For Sarah and CosmetiScan who are involved in skin tone determination for cosmetics, this is the case:

It's very hard to find people who would have the knowledge that we would need. Because they need to be familiar with programming methodologies, as well as optics and the physics around light. So that's sort of a unique skill set.

Secondly, informal collaborations are, as in Kevin's case, sometimes avoided because entrepreneurs are scared of intellectual property theft:

We do just about all of that in-house between the two of us. All of the actual data base functions and logistics are all proprietary to the business and it's all developed by either myself or [my co-founder...]. Everything proprietary in the business is technology. So we don't use any contractors, we try to keep everything in house. Just to try and protect all of that.

The difficulties in finding specialized resources, while still securing intellectual property, can likely be related to the finding that only 3 out of 45 relationally embedded ties (7%) provide technical expertise in the operational stage, for example by giving advice regarding software development. This finding stands in contrast to Uzzi (1997), who claims that relationally embedded networks are well suited for the transfer of proprietary knowledge.

Business service firms are expected to have more relationally embedded ties than other firms (Schutjens and Stam, 2003). In broad terms, a business service firm can be defined as “a firm which provides any service to another business” (Glancey et al., 1998, p. 249). Although the industries differ slightly, all entrepreneurs in the study own firms that provide services based on technology. Of the 10 interviewed companies, 5 primarily sold their services to other businesses (B2B), 3 catered to both other businesses and consumers (B2B/B2C), and 2 primarily sold their services to consumers (B2C) (see Table 1). On average, B2B-

entrepreneurs had 6 embedded ties, whereas B2B/B2C-entrepreneurs had 5. The two entrepreneurs providing B2C services were the two least embedded entrepreneurs, Alex and Brian. Hence, these findings support that business service firms have more relationally embedded ties than firms providing services for consumers.

Contextual factors

Urban firms can be expected to have more ties due to the influence of cosmopolitan values, resulting in flexible management of personal networks (Johannisson, 1996, in Schutjens and Stam, 2003). The findings of the study are in line with this expectation. Of the interviewed entrepreneurs, Bob is the only one not located in central Toronto. In comparison to the others, Bob stands out, describing himself as conservative and his networking style as old school, avoiding LinkedIn and similar networking tools.

Moreover, agglomeration in cities drives knowledge spillovers (Porter, 2000). Chris, who moved his company from a smaller city in Ontario to Toronto, describes the differences that entailed for his ability to find resources.

... In smaller towns, you just don't have as many big thinkers and hustlers. [...] In [the smaller city], I had to go on Youtube and put in my earbuds and listen to motivational videos. [...] I wasn't willing to listen to anyone around me because they weren't even close to the level that I wanted to achieve. So I could only listen to people on my computer to learn. But then when you go to Toronto, now you actually can meet with somebody that is someone you trade places with. Now you can learn directly from them.

According to Chris, it is now easier to find people with the knowledge he needs. It is however difficult to estimate exactly how this increased pool of resources has affected the relational embeddedness of his network.

6.2 Type of ties

Individual factors

As my sample consists of two female and eight male entrepreneurs, drawing conclusions on how gender impacts the type of embeddedness is difficult. If anything, the findings of this paper are in line with the findings of earlier studies (Klyver and Terjesen, 2007; Watson, 2012) – that women more often make use of personal relationships. Four of the five (80%) embedded relationships belonging to female entrepreneurs had a personal base of trust (personal, isolated or fully embeddedness), whereas the same number for men was 23 out of 40, or 58%.

Firm level factors

The importance of having a personal base of trust to business ties seems to vary depending on what resources entrepreneurs seek. As the resources which entrepreneurs seek likely vary depending on which industry the entrepreneur is in, industry type can have an effect on the type of relationally embedded ties.

Resource holders, especially in uncertain situations, often seek information that facilitates the process of estimating the potential of a business (Hoang and Yi, 2015). Investments in startup companies are usually high risk, and establishing a personal base of trust could be specifically important with regards to finding funding. 83 % of ties dealing with funding have a personal base of trust – being either fully, isolatedly or personally embedded. Personal

trust is also important in building an initial customer base, as startup companies have little or no transactional history to rely on (Newbert and Tornikoski, 2013). Consistent with this, 5 of the 6 clients identified as being relationally embedded demonstrated high levels of personal trust, being either fully or personally embedded.

Personal relationships are however not the key to finding all types of resources. It is common to have an economically embedded, albeit not necessarily personal relationship to people providing services such as accounting and legal advice. For example, of the 12 ties providing accounting or legal resources, 11 demonstrate an economic base of trust, whereas only 5 (4 fully- and 1 personally embedded tie) demonstrate a personal base of trust.

To summarize the relation between industry type and embeddedness type, firms acting in industries where they are dependent on investors and major clients can be expected to have a personal base of trust with such actors, whereas entrepreneurs who are in need of business services are more likely to demonstrate dyadic economic bases of trust. As it is outside the scope of this research to analyze which resources the different entrepreneurs need, it is difficult to estimate how it affected their relational embeddedness.

6.3 Location of ties

The industry in which the entrepreneur is active is also believed to be of relevance for location of ties. All entrepreneurs in this study provide services based on technology, and it is difficult to tell how the differences within the sample affects the location of their ties. However, 10 out of 11 ties primarily providing traditional business services such as legal or accounting resources are based in the same city as the entrepreneur. This is consistent with the expectation that business service firms are dependent on local markets (Schutjens and Stam, 2003). Hence, firms in need of such services should have more local connections. No conclusions could however be drawn regarding how firm size and the education level of the entrepreneurs affect the location of relationally embedded ties, as all firms in the sample can be categorized as small, and all but one entrepreneur attended university.

7. Entrepreneurial responsibilities, spatial fragmentation and relational embeddedness.

A striking pattern, which was not expected from the findings of earlier studies, is the relationship between the division of responsibilities within firms, and the resources entrepreneurs find through relationally embedded network. Overall, entrepreneurs who are primarily responsible for business development have more embedded ties than entrepreneurs who are primarily involved in technology development or entrepreneurs with mixed responsibilities. Business developing entrepreneurs also have ties that are embedded on more dimensions, for example averaging 3 fully embedded ties compared to the 0,33 fully embedded ties of entrepreneurs with technological or mixed responsibilities. When it comes to the location of ties, all but one extra-local tie belong to an entrepreneur primarily responsible for business development.

Table 10. Responsibilities, fragmentation and relational embeddedness

	Brian	Alex	Petter	Anna	Bob	Sarah	Michael	Kevin	Ryan	Chris
Responsibility	Tech	Mixed	Tech	Mixed	Business	Tech	Mixed	Business	Business	Business
Overall fragmentation	11	21	3	10	19	11	20	20	24	-
Number of ties	0	1	2	2	3	3	4	8	10	12

This is likely related to the type of resources found through relationally embedded ties. When investigating where in Porter's value chain (1985) the ties contributed, 18 ties mainly provided primary resources (such as advice on operation or sales), while 25 ties provided resources that could be considered supporting (e.g. accounting or HR)⁷. The most common resources are related to sales and marketing, which is provided by 29 % of all embedded ties. In Porter's value chain, this categorizes as a primary resource. However, it is mainly handled by the business developing founders. The second and third most common resources accessed through relationally embedded networks are funding, or advice regarding funding (28 %) and firm infrastructure, such as accounting and legal advice (24%). These two are also responsibilities of business developing founders.

As described in Section 6.1, the threat of intellectual property theft in combination with the need for highly specific skills hinder the entrepreneurs in this study to use their relationally embedded networks to find resources for technology development. This could explain why the entrepreneurs who have technology development as a main field of responsibility had fewer embedded ties and organized their work in a less spatially fragmented way than entrepreneurs whose main focus was business development. Entrepreneurs in charge of business development often organize their work in a more fragmented way, allowing them to maintain more relationally embedded ties over a greater area, who provide access to resources related to sales, marketing or funding.

These findings have implications for the way strategies for the facilitation of entrepreneurship and resource acquisition are designed. For example, startup entrepreneurs looking for resources in technology development could benefit from formalized programs, with handpicked resource providers and intellectual property agreements. Conversely, entrepreneurs looking for business developing resources would likely benefit more from informal gatherings and events. Since business developing resources are more ubiquitous, bringing together a larger pool of competing resource providers could be beneficial. This would offer the entrepreneurs the opportunity to make connections with resource providers whom they believe could be the right fit both economically and socially – laying the foundation for the development of relational embeddedness.

8. Conclusion

Because of the relatively high levels of personal, economic and social capital trust between economic actors in relationally embedded networks (Hite, 2003), social relationships allow startups to access specialized resources below market value (Anderson et al., 2005; Newbert and Tornikoski, 2013). As it has been argued that geographical proximity can influence trust building without permanent co-location (Boschma, 2005), this paper explored the relationship between the spatial work organization of startups and their relationally embedded networks. It did so by measuring the spatial fragmentation and mapping the relationally embedded networks of startup entrepreneurs in Toronto, Canada.

The findings of this paper suggest that relationally embedded ties provide the entrepreneurs with important resources. However, the number, location and type of relationally embedded ties differs among the entrepreneurs. Contrary to what could be expected, this paper shows how high innovation levels do not necessarily need to have a positive impact on the number

⁷ Two ties (relationally embedded clients) could not be categorized as providing either primary nor supporting resources.

of relationally embedded ties. It also confirms that context and industry are related to the number of relationally embedded ties. Regarding the type of embeddedness, this paper confirms the expectation that female entrepreneurs seem to more often have a personal base of trust than their male counterparts. Lastly, the study indicates that ties involved in business services more often than others are based locally.

Yet, the most important contribution of this paper concerns the relation between spatially fragmented working practices and relational embeddedness. Entrepreneurs who organize their work in a spatially fragmented manner, dividing their work between multiple locations in a larger area, have more relationally embedded ties than entrepreneurs who do not. This strengthens the claim that proximity does not need permanent co-location to facilitate trust building (Boschma, 2005). The relationally embedded ties of spatially fragmented entrepreneurs are also distributed over larger areas and embedded to a higher degree than the ties of less spatially fragmented entrepreneurs. Even though it could also be that entrepreneurs make sure to be in proximity to resource holders which they trust, the geographical proximity that is enabled by a spatially fragmented organization of work primarily seems to help entrepreneurs to build personal and economic trust. Social capital trust seems to be less affected. Hence, spatial fragmentation is also related to the type of embeddedness.

Even though Hite's multidimensional view of relational embeddedness is widely cited and has been applied in differing contexts (Eng et al., 2012; David et al., 2016; Ryan 2018), this is to my knowledge the only paper that applies the framework in the context it was originally intended. Exploring how spatial fragmentation is related to relational embeddedness contributes to our understanding of how new forms of multilocal working practices could affect the resource acquisition of startups. Furthermore, knowledge of which resources that are commonly accessed through relationally embedded networks is essential when developing efficient incubation and acceleration strategies.

Nevertheless, this study has its limitations. First and foremost, with available data and selected methods, causality can not be inferred. The analysis suggests that spatial fragmentation of working activities and the properties of relationally embedded networks are related, but cause and effect can not be implied. Additionally, Porter's value chain was applied in order to ensure that no ties providing the entrepreneurs with resources were left out. However, this might have biased the results of the analysis in favor of tangible, economic resources, at the expense of intangible resources such as moral support. A larger sample of entrepreneurs with highly similar characteristics would also have made these findings stronger.

With the virtues and limitations of this paper in mind, I would like to recommend further research to continue this exploration of the relationship between spatially fragmented working practices and relationally embedded networks. A longitudinal study of a larger sample size would provide insight in to how the networks of entrepreneurs develop over time, along with the spatial organization of their work. With a research design like this, a causal relationship could be found. This would not only be of relevance for scholars in the field, but for everyone interested in facilitating entrepreneurship

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