Evolution of Entrepreneurial Social Networks:

A Preliminary Analytical Model

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ABSTRACT

We study the role the entrepreneurs can actively play in the evolution process of their social networks. Building on structural holes and embeddedness literatures, we develop a preliminary analytical model of the benefit an entrepreneur obtains from his/her social network. Using the model, we discuss conditions under which connecting two of his/her unconnected alters and adding a new connection is more beneficial to the entrepreneur than keeping them separate and adding a new connection. Our analytical model opens up novel avenues for scholars to study how entrepreneurial social networks may evolve and how the entrepreneurs take charge of the evolution process.

INTRODUCTION

Entrepreneurs are individuals who discover or create new opportunities and organize the efforts required to explore and exploit them. In order to build a business that can capitalize on these opportunities, entrepreneurs need many resources. They, however, rarely possess the resources they need (Garnsey, 1998) and securing access to such resources is a particular challenge for them (Baker & Nelson, 2005; Elfring & Hulsink, 2007). Some resources are unavailable via market transactions, while many others are priced above the entrepreneurs’ meager means (Starr & Macmillan, 1990; Witt, 2004). Thus, the entrepreneur’s social network looms large as a crucial source of valuable resources for the entrepreneur (see review by Hoang & Antoncic, 2003).

Although the literature has examined how different social networks may help the entrepreneur during the entrepreneurial process, this discussion mostly treated these social networks as static and focused on their static benefits. More importantly, the literature, for the most part, assumed these networks as given, rather than examined how these networks came into place in the first part.

In this study, we propose a preliminary analytical model that investigates evolution of the personal social network of the entrepreneur. Our analytical model distinguishes and fleshes out two interdependent yet distinct dimensions that entrepreneurs must pay careful attention to in order to benefit from their networks. One dimension is identifying those who own or have ready access to more valuable resources. The other dimension is convincing the owner(s) of those resources to share their resources (Aldrich & Martinez, 2001). These dimensions together form the core of how entrepreneurs can actively think about their social networks.

We specifically focus on and ask under what conditions can it be more beneficial for the entrepreneur to bring together two of his/her connections that are unconnected to each other and seek
a new connection to another individual compared to keeping the current social network as it is, i.e. keeping the two unconnected connections separate and adding a new connection. Our preliminary analytical model helps us evaluate the relative benefits of the social networks that result due to such a simple but quintessential network evolution decision of the entrepreneur, i.e. forming new connection.

In what follows, we first present a brief overview of the importance of social networks for the entrepreneurs and highlight the two dimensions that generate this benefit. In the second section, we build the preliminary analytical model and present results of our analytical model and discuss the results. The last section concludes and lays the ground for future work.

**THEORY**

The importance of social networks for entrepreneurs and the entrepreneurial process has received significant interest in the recent decade. Focusing especially on the static structures of these personal social networks, researchers have shown how particular network structures enable the entrepreneur to identify opportunities (Elfring & Hulsink, 2003; Hills et al., 1997), gain access to venture capitalists and obtain financial capital (Batjargal & Liu, 2004; Fafchamps, 2000), overcome liabilities of newness and smallness (Stuart et al., 1999), gain access to potential customers (Liao & Welsch, 2003), help the firm grow (Hansen, 1995; Hite & Hesterly, 2001), and ensure the survival of the venture (Bruderl & Preisendorfer, 1998; Huggins, 2000).

In this study, by social network of the entrepreneur (his/her ego-network), we mean the web of connections between the entrepreneur and others that the entrepreneur is directly connected to (the alters). These others may include suppliers, professional service providers, investors, and customers. Any of these others may also very well be entrepreneurs themselves. The entrepreneur’s aim is to use his/her social network as a source of resources such as financial capital, manufacturing facilities, marketing and distribution capabilities, employees, advice and feedback, ideas, and information on potential customers, suppliers, and investors, etc. For the entrepreneur to obtain resources from his/her social network a number of conditions must be met (Cross & Parker, 2004; Zhong & Ozdemir, 2010). First, the entrepreneur’s alter should have certain resources, i.e. a particular resource should be available, ready for transfer or share. Second, there needs to be a demand for the resource from the entrepreneur, i.e. the resource should be valuable to the entrepreneur. Third, the alter needs to be
willing to transfer the relevant resources to, or share them with, the entrepreneur. The entrepreneur then uses the resources obtained throughout the entrepreneurial process.

The primary starting point for our analytical model is the following two observations: Not all valuable resources that are available within the entrepreneur’s social network are instantly acquirable, nor that all acquirable resources are valuable to the entrepreneur. Of all the resources available in the entrepreneur’s social network, only a subset is actually both valuable and acquirable. And, entrepreneurs face considerable activity capacity constraints during the entrepreneurial process. They have only limited time and energy to expend on nurturing their social network.

The entrepreneur needs to ensure that each available resource within his/her social network is valuable to him/her for the entrepreneurial process. The literature has elaborated on what makes the resources within the ego-network valuable for the entrepreneur, such as relevance, usefulness, accuracy and reliability, exclusivity, and non-redundancy (Bruderl & Preisendorfer, 1998; Casson & Della Giusta, 2007). Along this line of reasoning brokerage ego-networks has gained traction as a beneficial network structure for the entrepreneur. Brokerage ego-networks enable the entrepreneur tap into different segments of the overall network more efficiently (Burt, 2005; Ibarra, 1995), and hence enable the entrepreneurs to have the potential to obtain different, unique, and diverse resources from each of their non-interconnected alters increasing the value of those resources to the entrepreneur. For example, Sing et al. (1999) find that, within a 12-month period, entrepreneurs with brokerage ego-networks identified more opportunities than those with more cohesive ego-networks. Figure 1 presents a hypothetical network of an entrepreneur and two of his alters. In this figure, the entrepreneur (Don) is connected to two alters: John and Lisa, who in turn are not connected to each other, and hence Don has a brokerage ego-network. Since brokerage ego-networks increases the number of valuable resources within the social network, one immediate suggestion to the entrepreneur would be to evolve his/her ego network by adding new ties that are unconnected with his/her current ties, and maintain its brokerage characteristic.

[INSERT FIGURE 1 ABOUT HERE]

However, brokerage ego-networks significantly underplay the potential resource acquisition problem that entrepreneurs face. The acquisition of resources, however, is a very important problem
for entrepreneurs: a problem that can simply determine the success or failure of the entrepreneurial process. The fact that an alter has some valuable resource for the entrepreneur is not enough to ensure that the resource will flow to the entrepreneur. The acquisition of resources is not immediately guaranteed. As a result, our entrepreneur, Don, cannot just continue adding more connections to his social network and hope that he will acquire these resources necessary for the entrepreneurial process.

In order to bring the issue of resource acquisition into the brokerage literature that has largely overlooked its importance, we draw on the embeddedness literature. We focus on two alternative types of embeddedness: relational embeddedness and structural embeddedness. Relational embeddedness refers to the extent to which the dyadic relationship between two parties is strong (Marsden & Campbell, 1984; Uzzi, 1997). Strength of the tie between two parties is posited to be a function of the level, frequency, and emotional intensity of interactions between them (Granovetter, 1973). Consequently, relationally embedded ties require significant expenditure of time and energy (Bourdieu, 2002) and therefore are more likely to be limited by any activity capacity constraint the entrepreneur has. Structural embeddedness, on the other hand, is less demanding. It is the extent to which the entrepreneur and the alter share ties to the same others (Feld, 1997; Granovetter, 1992; Moody & White, 2003). The higher the number of mutual acquaintances they share, the more structurally embedded the entrepreneur and the alter are.

Both types of embeddedness facilitate acquisition of resources through two mechanisms: i) generating a mutual understanding via interpersonal understanding (Krackhardt, 1992; Uzzi, 1997) or shared group identity (Cook, et. al., 1983; Rowley, 1997; Reagans and McEvily, 2008), and ii) generating trust, either via trusting the alter (in the case of relational embeddedness) (Granovetter, 1992; Krackhardt, 1990; McEvily, Perrone, Zaheer, 2003) or trusting the web of relations in which their relationship is embedded (in the case of structural embeddedness) (Gulati and Gargiulo, 1999; Tullock, 1985; Greif, 1989; Burt, 2005:95). There are, however, two crucial differences that influence whether the entrepreneur prefers relational or structural embeddedness to facilitate the acquisition of resources from a particular alter. First, the resources made accessible by structurally embedded connections are likely to be more similar to the resources of those other alters with whom the alter and the entrepreneur are mutually connected. Structurally embedded ties, therefore, have resources that
carry lower potential value for the entrepreneur. Using structurally embedded ties inevitably results in cohesive ego-networks for the entrepreneur, whereas in brokerage ego-networks one finds few, if any, structurally embedded ties. Second, the presence of mutual acquaintances can facilitate the flow of resources between two casually connected individuals. That is, structurally embedded connections facilitate resource flow, on average, with less “time and energy” expended on the connection than relational embedded connections require.

Bringing benefits of brokerage on value of resources together with benefits of relational or structural embeddedness on acquisition of resources, we make the following observations regarding entrepreneurial social networks. If the entrepreneur exclusively uses relational embeddedness to embed his connections, he would obtain a brokerage-ego network. However, given the time and energy requirements that relational embeddedness imposes to acquire resources, the entrepreneur would only have a small brokerage ego-network. This means, the entrepreneur would risk not having some of the necessary resources within his network or risk acquiring them if he cannot relationally embed all his connections. At the same time, if the entrepreneur uses structural embeddedness exclusively to embed her connections, she would obtain a cohesive ego-network. Although she would acquire the resources within the network with more ease and hence can sustain larger networks compared to relational embeddedness alone can, those resources may not be valuable for the entrepreneurial process. Therefore, the primary question for the entrepreneur is how to use relational or structural embeddedness together in his/her social network and how to decide to emphasize one more than the other for a particular connection. Considering these two observations together forms the kernel of our preliminary analytical model of evolution of entrepreneurial social networks.

PRELIMINARY ANALYTICAL MODEL

In the light of foregoing discussion, we start developing the preliminary analytical model by arguing that a particular connection’s benefit to the entrepreneur should be modeled as a combination of whether the resource available from the alter is valuable to the entrepreneur and whether the entrepreneur can acquire it. Given the discussion above, a valuable resource that is available but not acquired or an acquired resource that is not valuable would not help the entrepreneur during the entrepreneurial process. In simple mathematical form, \( \text{likelihood that the alter has a Resource} \)
Valuable for the entrepreneur multiplied by the likelihood that the entrepreneur can Acquire the Resource from that alter. That is \( \Delta SC_{Ei} = val\left(z_{Ei}\right) \times acq\left(v_{Ei}, z_{Ei}\right) \). In the model, we denote the strength of the tie between the entrepreneur \( E \) and the alter \( i \) by \( v_{Ei} \geq 0 \), and the number of mutual acquaintances between the two by \( z_{Ei} \in \{0, 1, ..., N-2\} \), where \( N \) is the number of individuals in the network (including the entrepreneur). We use two tractable functional forms that mimic the curves argued by the literature:

\[
val_{Ei}(z_{Ei}) = \frac{1}{1 + \beta z_{Ei}} \quad \text{and} \quad acq_{Ei}(v_{Ei}, z_{Ei}) = 1 - \exp\left(-\tau_1 v_{Ei} - \tau_2 v_{Ei} z_{Ei}\right).
\]

The functional form for the value of a resource has its maximum when there are no mutual acquaintances (i.e. \( z_{Ei} = 0 \)) and decreases as the number of mutual contacts increase, for positive values of \( \beta \). The parameter \( \beta \) allows us to specify how strongly the number of mutual contacts affects (decreases) the value of a resource. If \( \beta = 0 \), increasing the number of mutual contacts does not decrease value at all, therefore, only resource flow matters to generate benefits. As \( \beta \) increases, however, the presence of mutual acquaintances results in a lower value resource from that tie.

The functional form for the likelihood of resource acquisition from an alter has its minimum (= 0) when the relationship doesn’t exist (i.e. \( v_{Ei} = 0 \)), and increases (up to a maximum of 1) as either the strength of the connection, the number of mutual acquaintances, or both increase. The parameters \( \tau_1 \) and \( \tau_2 \) allow us to specify the relative impact of strength of the tie (relational embeddedness) and the number of mutual acquaintances (structural embeddedness) in facilitating resource acquisition of resources from the alter. Furthermore, the ratio of \( \tau_1 \) and \( \tau_2 \) allows us to adjust whether relational or structural embeddedness is more conducive to enabling the entrepreneur to acquire resources from the alter.

Following the approach in Burt (1992), we extend the analytical model from the individual connections level to the entire ego-network of the entrepreneur. Equation 1 presents the analytical model of the optimization problem that the entrepreneur face in thinking about the choice between adding a new connection through pure relational embeddedness vs. adding a new connection through using relational and structural embeddedness together.
\[
    \text{max} \ SC_E = \sum_i \left[ \left( \frac{1}{1 + \beta z_{Ei}} \right) \times \left( 1 - \exp \left( -\tau_1 v_{Ei} - \tau_2 v_{Ei} z_{Ei} \right) \right) \right]
\]

Eqn. 1

\[
st \sum_i v_{Ei} \leq C_E
\]

The pursuit of entrepreneurial opportunities involves countless activities, many of which only the entrepreneurs can attend to. They therefore face considerable activity and capacity constraints in allocating their limited time and energy for networking purposes (Greve & Salaff, 2003). Therefore, as the Equation 1 states, the decision the entrepreneurs are facing is how to construct an ego-network that uses relational, structural, or both forms of embeddedness to ensure both the availability of valuable resources and their successful acquisition from the alters, while observing the activity capacity constraint, \( C_E \), they have in terms of time and energy.

RESULTS AND DISCUSSION

Going back to Figure 1, instead of exploring the static benefits for Don from the current ego-network structure at this given time, we focus on the dynamic aspect. Although Don exclusively uses relational embeddedness in his current ego-network, if he wants to add a new connection to his social network, how should he go about it? Should he add a new alter into the network, keep all 3 of them separated and continue trying to exclusively use relational embeddedness, as depicted in Figure 2? Or, should he introduce Mark and Lisa to each other to structurally embed his relationship with them, and add a new alter, Steve, to his network, who is unconnected to Mark and Lisa, i.e. should Don start using both relational and structural embeddedness together, as depicted in Figure 3?

With Equation 1, we obtain the optimization problem for the two ego-networks in Figure 2 and Figure 3, for the parameters \( \beta, \tau_1, \) and \( \tau_2 \) which are to be specified empirically. Figure 2 represents a potential evolution of Figure 1, where the entrepreneur is using only relational embeddedness to ensure acquisition of resources. Figure 3 represents another potential evolution of Figure 1, where the entrepreneur is using structural embeddedness to facilitate resource flow from two of his alters (John and Lisa), and relational embeddedness to facilitate flow from the newly connected third alter (Steve). Therefore, Figures 2 and 3 represent the quintessential evolution process for an entrepreneur: adding a new connection to and changing the structure of his/her current ego-network.
When an entrepreneur decides to add a new connection to his/her ego-network, he/she needs to calculate whether the total benefit from the network in Figure 3 is greater than the total benefit he/she receives from the ego-network in Figure 2, or vice versa.

Equation 2 presents the solution of the optimization problem the entrepreneurs face when they are in charge of the evolution of their social network. The expected benefit that the entrepreneur obtains from the ego-network is dependent upon the number of alters $N$ in the ego-network, the time and energy $C_E$ that the entrepreneur has, the number of mutual connections shared with the alters, as well as the parameter values $\beta$, $\tau_1$, and $\tau_2$. In our comparison of the benefits the entrepreneur obtains from ego-networks in Figure 2 and 3, we keep the time and energy $C_E$ of the entrepreneur constant.

$$SC_E = \sum_{i=1}^{N} \left( \frac{1}{1 + \beta z_{Ei}} \right) - \sum_{i=1}^{N} \exp \left( -C_E \sum_{j=1}^{N} \frac{1}{\tau_1 + \tau_2 z_{Ej}} \right) \times \exp \left( \sum_{j=1}^{N} \ln \left( \frac{\tau_1 + \tau_2 z_{Ej}}{1 + \beta z_{Ej}} \right) / \sum_{j=1}^{N} \tau_1 + \tau_2 z_{Ej} \right) \times \frac{1}{\tau_1 + \tau_2 z_{Ei}} \right)$$ Eq. 2

The ego-network in Figure 2 has the following values: $N=3$ (i.e. there are three alters of Don the entrepreneur and $z_{Don,j} = 0, \forall i = \{Mark, Lisa, Steve\}$ (i.e. Don does not share any mutual acquaintances with Mark, Lisa, or Steve). These simplify the Equation 2 into Equation 3 for the benefit the entrepreneur gets from Figure 1. The resultant benefit is a function of the time and energy $C_E$ the entrepreneur has and the importance of tie strength in inducing resource flow (i.e. the parameter $\tau_1$). If we assume that resources are acquired no matter how weak or strong the connection is ($\tau_1 \uparrow \infty$), as it is implicitly assumed in the brokerage literature, then we would reach at

$$\lim_{\tau_1\to\infty} SC_{Figure2} = 3$$ for Figure 2. That is the entrepreneur gains 3 units of benefits, for example three units of unique information, by connecting to two unconnected alters.

$$SC_{Figure2} = 3 \times \left( 1 - \exp \left( -\frac{\tau_1 C_E}{3} \right) \right)$$ Eq. 3
The ego-network in Figure 3 has the following corresponding values: \( N = 3 \) (i.e. there are three alters of Don), \( z_{Don-Mark} = z_{Don-Lisa} = 1 \) and \( z_{Don-Steve} = 0 \). These simplify the Equation 2 into the following Equation 4.

\[
SC_B = \frac{3 + \beta}{1 + \beta} - \exp \left[ \frac{2 \tau_1 \ln \left( \frac{\tau_1 + \tau_2}{1 + \beta} \right) + \left( \tau_1 + \tau_2 \right) \ln \left( \tau_1 \right) - E \tau_1 \left( \tau_1 + \tau_2 \right)}{3 \tau_1 + \tau_2} \right] \times \frac{3 \tau_1 + \tau_2}{\tau_1 \left( \tau_1 + \tau_2 \right)} \tag{Eq. 4}
\]

For Figure 3, the benefit is a function of the time and energy \( C_E \) the entrepreneur has, the importance of mutual acquaintances in decreasing the value of the resource the alter has (i.e. the parameter \( \beta \)), the importance of tie strength in inducing resource flow (i.e. the parameter \( \tau_1 \)), and the importance of mutual acquaintances in inducing resource flow (i.e. the parameter \( \tau_2 \)). Once again, if use parameter values that are implicitly assumed in the brokerage literature inside Equation 4, i.e. \( \beta = 1, \tau_1 \to \infty, \) and \( \tau_2 = 0 \) (or unimportant), we find that Equation 4 further simplifies to

\[
\lim_{\tau_1 \to \infty, \beta = 1} SC_B = 2.
\]

That is, as anticipated from the brokerage literature, if resources flows freely, the entrepreneur with an ego-network such as Figure 3 generates only 2 units of benefits, which is suboptimal compared to Figure 2, which generated more benefits.

Now that we have established that our analytical model can replicate the results expected in the brokerage literature with specific parameter combinations, as assumed in that literature, we start analyzing the what if resource flow is not automatic question. For this purpose, we set the parameter \( \tau_1 \) to be \( 0 < \tau_1 << \infty \). By comparing the resultant benefits calculated from Equations 3 and 4 under different parameter values, we can identify the conditions for which the ego-network in Figure 3 is more or less beneficial than the ego-network in Figure 2 for the entrepreneur.

Figure 4 presents the 3-dimensional surface for the difference between the benefits generated through Figure 3 and through Figure 2, when \( \beta = 1 \) (as assumed in the brokerage literature), while resource flow is automatic assumption is relaxed (i.e. \( 0 < \tau_1, \tau_2 << \infty \)). The two dimensions of the figure are the \( \tau_1 \) and \( \tau_2 \) parameters, while the third dimension is the difference in benefits generated.
The gray surface represents when the difference in benefit generated from Figure 3 and Figure 2 is zero, and therefore both ego-networks are equally beneficial for the entrepreneur (the horizontal surface for benefit = 0 line on the y-axis). If the colored surface is higher than the gray surface, evolving the network through bringing together two unconnected others, keeping connection to both, and forming a new tie to another alter (as depicted in Figure 3) is more beneficial to the entrepreneur than introducing a new connection to the network while keeping all alters separate (as portrayed in Figure 2). On the other hand, if the colored surface is lower than the gray surface, the entrepreneur should prefer to evolve his/her ego-network as in Figure 2 compared to the one in Figure 3. For $\beta = 1$ parameter condition, we observe that the entrepreneur prefers ego-network in Figure 3 when $\tau_1 < \tau_2$, and prefers the ego-network in Figure 2 when $\tau_1 > \tau_2$.

[INSERT FIGURE 4 and 5 ABOUT HERE]

Figure 5 presents a similar 3-dimensional surface, but this time for $\beta = 0.75$ parameter value. Compared to the $\beta = 1$ parameter value used for generating Figure 4, $\beta = 0.75$ means that each alter has something unique to them, albeit miniscule, that only they can transfer to the entrepreneur, and the entrepreneur cannot receive this miniscule amount of resource through another party. That is, even if Mark and Lisa are connected to each other, there is a very small benefit in being connected to both of them since they still hold a miniscule amount of unique resource, in addition to possessing a shared resource together with the other. However, of course this miniscule benefit should still be weighted against spending the time and energy for connecting to another unconnected actor who would give a unique resource. In Figure 5, we observe that a larger percentage of the $\tau_1, \tau_2$ parameter combinations result in the ego-network in Figure 3 being better than the ego-network in Figure 2. This suggests that when $\beta = 0.75$, the entrepreneur should actively bring together his two alters and seek a third connection for more combinations of $\tau_1$ and $\tau_2$ parameters than when $\beta = 1$.

Although the brokerage literature implicitly assumes that $\beta = 1$, once again we don’t have a sound bases for empirically specifying this parameter value, just as we did not have for the $\tau_1$ and $\tau_2$ parameter values. While for some types of resources such as information or data the $\beta = 1$
specification might be suitable, for other kinds of resources that can be obtained from the ego-network such as support or identity (Podolny and Baron, 1997), or financial resources, such a parameter specification is probably misleading and a lower $\beta$ parameter value is much more suitable. Therefore, more empirical work is needed for us to comprehend how easily different types of resources flow between ties ($\tau_1$ and $\tau_2$ parameters), the kind of embeddedness and the relative importance of each type of embeddedness that is needed to ensure the flow of different kinds of resources in different contexts, as well as the effect of mutual acquaintances on the redundancy of the resource obtained from the alter ($\beta$ parameter). For example, although the parameter values for $\tau_1$ and $\tau_2$ would be constant for a particular type of resource within a specific context (geographical or institutional context), they and their ratio may change from one type of resource to a different resource or from one context to a different context.

**CONCLUSION**

Network evolution is a very crucial process to understand for the entrepreneur who is in constant look for easier ways to go through the entrepreneurial process. Given this importance, there has been a recent surge of interest in studying the evolution of networks within the social networks and entrepreneurship literatures (Hite & Hesterly, 2001; Lechner et al., 2006; Steier & Greenwood, 2000). In this study, we have investigated a quintessential network evolution process, the addition of a new connection to the network by the entrepreneur. In order to be able to study the potential role the entrepreneurs can actively play in the evolution of their social networks, we have developed a preliminary analytical model. In our analytical model, we have challenged the primary assumption implicitly made in the brokerage literature: resources flow freely and immediately and therefore benefits derived from an ego-network only depends on the value of resources available within the network. Instead, in our model we have modeled the benefits accrued to the entrepreneur from his/her network as both the value of resources to the entrepreneur as well as the likelihood that the entrepreneur would be able to acquire them.

Our theory informs how the entrepreneur’s network may transition from smaller personal networks to larger and/or more professional networks. Our analysis enabled us to conclude that,
knowing that relational and structural embeddedness are alternative mechanisms for enabling resource flow, each with relative advantages and disadvantages, empowers the entrepreneur to take an active role in introducing two unconnected alters. By structurally embedding a connection with an alter while reducing relational embeddedness with that alter, entrepreneurs are able to keep the flow of resources constant or even enhance it. By varying the mechanisms they use to embed the connection, the entrepreneurs are able to expand their capacity for maintaining ties and can free up time and energy to extend their networks by forming new ties. In this way, entrepreneurs are able to actively manage the evolution of their social networks. Our discussion highlighted the importance of considering activity capacity constraints in designing the entrepreneur’s ego-network and in embedding ties in the process.

Specifically, the framework and the model presented here may help explain how entrepreneurial networks grow and evolve. For example, when an entrepreneur is trying to attract investment, it may be wise to relationally embed a limited number of the most promising investors. After initial funding has been secured, the entrepreneur can begin to substitute this time and energy intensive process of relationally embedding his/her ties with each individual investor in favor of structurally embedding them. In the process, he/she will free up time and energy to refocus on forming and developing ties to others. Furthermore, as the entrepreneur pursues ties to additional investors, he/she can encourage them to invest (resource flow) by introducing (structurally embedding) them to existing investors (Bygrave, 1987; Lockett & Wright, 2001) and thereby avoid any need to relationally embed them, thus further freeing up time to build ties to other stakeholders such as customers and generate more revenue.

Our findings point that the path of evolution to depend on the time and energy endowments of the entrepreneur, current size of the entrepreneur’s ego-network, the external contextual factors, and the type of resources the entrepreneur is aiming to access from his/her ego-network.

The model presented and the results found within this study can form the basis for designing future empirical studies that can both identify these parameter values for different resources and contexts, and for empirically testing how entrepreneurial social networks evolve and how the entrepreneur can be in charge of that evolution process.
REFERENCES


Figure 1: The entrepreneur’s, Don, brokerage social network with separated alters Mark, and Lisa.

Figure 2: The entrepreneur’s, Don, brokerage social network with separated alters Mark, Lisa, and Steve. In this network Don tries to make use of only relational embeddedness.

Figure 3: The entrepreneur’s, Don, social network with Mark, Lisa, and Steve. In this network Don uses both structural and relational embeddedness in his ties.
Figure 4: (τ₁ and τ₂) parameter value space for β = 1. If the colored surface is higher than gray surface, evolving the network through introducing two unconnected others, keeping connection to both, and forming a new tie to another one (as depicted in Figure 3) is more beneficial to the entrepreneur than the ego-network presented in Figure 2.
Figure 5: $(\tau_1$ and $\tau_2$) parameter value space for $\beta = 0.75$. If the colored surface is higher than gray surface, evolving the network through introducing two unconnected others, keeping connection to both, and forming a new tie to another one (as depicted in Figure 3) is more beneficial to the entrepreneur than the ego-network presented in Figure 1.