Investigating social capital in technology-based firms to fit research purposes

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INTRODUCTION

The study of technology entrepreneurship has become an important research area. **Technology entrepreneurship** is the ability to respond to a set of technological opportunities and create new technologies (Almeida, Dokko, & Rosenkopf, 2003). Several issues related to the environmental conditions that affect the creation of new technology firms have been examined (Di Gregorio & Shane, 2003; Stuart & Sorenson, 2003) including the relationship between institutional change and entrepreneurial opportunity (Sine & David, 2003) and the role of firm size for explaining different access to external knowledge opportunities (Almeida, et al., 2003). This chapter focuses on the influence of the senior management team for fostering innovation in technology based firms. **Top management team** theory suggests that senior managers influence firm performance (Hambrick & Mason, 1984) based on their tenure (Herrmann & Datta, 2005), experience (Kor, 2003), age (Datta & Rajagopalan, 1998; Tihanyi, Ellstrand, Daily, & Dalton, 2000), and education (Jensen & Zajac, 2004). This research theme draws on the social capital literature and points to the importance of the social capital of top management for understanding the innovation processes of **technology-based firms**. In this chapter I adopt an approach to measuring social capital (the position generator technique) and discuss the effects of the senior management team's social capital on technology-based firms' innovation. I try to shed more light on this aspect by highlighting the link between top management team theory and the social

capital literature. This is a unique approach and contributes to the development of social capital and technology entrepreneurship theory.

BACKGROUND

To improve their **innovation** capacity, technology-based firms search constantly for new ideas and unexploited opportunities. The innovation literature argues that firms can benefit from the knowledge possessed by external actors such as users, suppliers, universities, and competitors (Arora, Fosfuri, & Gambardella, 2001; Rosenkopf & Nerkar, 2001; Shan, Walker, & Kogut, 1994; von Hippel, 1988).

This chapter adopts a social capital perspective to explore the interactions among the actors involved in the innovation process, to analyze the assets that inform those interactions such as trust, social norms, obligations, and shared communication codes. Following Lin (1999), I build on the concept of **individual social capital** defined as the product of individual investment in a network of relationships which allows access to heterogeneous knowledge domains. Lin (1999:9) adopts a private-good view of social capital, and highlights that social capital is the 'investment in social relations by individuals through which they gain access to embedded resources to enhance expected returns of instrumental or expressive actions'. **Individual social capital** therefore, is a resource linked to social networks and group membership. More specifically, as suggested by Bourdieu (1986: 249) 'the volume of social capital possessed by a given agent depends on the size of the network of connections that he can effectively mobilize'. Bourdieu (1980) claims that the relationships one individual has with others represent a specific form of capital: the social resources inherent in these relationships may be used by the individual to pursue economic ends. Nahapiet and Ghoshal (1998) identify three dimensions of social capital: the structural dimension, i.e. the social ties and connections between actors; the relational dimension, i.e. the nature and the quality of these connections (social interactions); and the cognitive dimension, i.e. the representations, interpretations, and systems that actors share and which result in durable connections.

It is argued in the literature that social capital affects firm performance by promoting firms' acquisition of external resources and knowledge. Knowledge and resource sharing can be more effective if the individuals know, trust, and understand one another. Several studies illustrate how firms can benefit from social capital. Uzzi (1997) shows that firms capitalize on social ties to obtain bank loans, Shane and Cable (2002) relate social ties to private equity, Aldrich et al. (1996) emphasize the importance of founders' social ties in the setting up of new ventures. Laursen et al. (2012) provide evidence that geographically localized social capital influences the firm's ability to introduce new products, is complementary to the firm's investment in internal

research and development (R&D), and positively moderates the effectiveness of externally acquired R&D on product innovation. They show that social capital increases firms' awareness of international business opportunities and consequently their involvement in foreign markets (K. Laursen, F. Masciarelli, & A. Prencipe, 2012).

The entrepreneurship literature includes many important contributions that investigate individual investments in social relations: entrepreneurs generally consult within their own networks of relations to obtain resources and knowledge (Larson & Starr, 1993; Stuart & Sorenson, 2003). This literature strand investigates the role of social capital focusing on the benefits that the firm derives from the entrepreneur's investment in a network of relationships (Larson & Starr, 1993; Stuart & Sorenson, 2003). The present chapter complements this literature by clarifying the contribution of the top management team's social capital to innovation in technology-based firms.

THE ROLE OF SOCIAL CAPITAL

It is suggested that individual social capital impacts on firm innovation. The idea is that individual social capital fosters innovation by providing conduits for knowledge sharing (Nahapiet & Ghoshal, 1998; Nonaka, 1994). I would suggest that, in technology-based firms, social capital assumes a central role in the innovation process by facilitating the acquisition of external knowledge and the recognition of external opportunities (Keck, 1997; Knight et al., 1999; Pitcher & Smith, 2001). Through their social ties top managers can gain access to a set of actual and potential resources, external knowledge, and new ideas (Adler & Kwon, 2002). Social capital encourages knowledge sharing and guarantees access to expertise and to knowledge domains that otherwise would be unavailable. I suggest that higher levels of social capital allow top management access to a wider range of knowledge sources, and argue that there is a positive association between higher levels of social capital and the firm's better technological performance. Therefore, it is likely that, for technology-based firms, high levels of social capital may facilitate the definition of technological opportunities, and speed up the creation of innovation and new technologies.

The role of social capital is particularly important during the first years of a firm's life when high levels of social capital can define the interplay between technology-based ventures and established firms and institutions (i.e. competitors, clients, suppliers, universities). Social capital can provide access to heterogeneous sources of information and avoid myopic searching for new knowledge. This benefit reduces the liability of newness and can increase the firm's probability of survival.

Solutions and Recommendations

There is a need for a deeper investigation of the social capital of the top management team because of the latter's essential role in shaping technology-based firms' innovation (Kimberly & Miles, 1980; Mintzberg & Waters, 1982). However, the measurement of senior management's social capital is challenging. The difficulties derive mostly from the complex and multidimensional nature of social capital (Masciarelli, 2011). In suggesting a valid procedure to measure the social capital of the top management team in a technology-based firm, this chapter helps to clarify and operationalize the concept of social capital.

In line with Masciarelli (2011), it is proposed that measuring the role of social capital requires information on the different knowledge domains that senior managers can access by virtue of their social ties. The social capital of an individual can be described in terms of his or her social network, and refers to the network's intrinsic resources (Bourdieu, 1980; Coleman, 1988). Various methods can be used to measure social networks, including whole network, and egocentric approaches. The first considers the structural properties of the network – i.e. centrality, group, cliques - but requires identification of the network boundaries, and in the case of most networks, it is impossible to identify precise boundaries. The second approach, the egocentric approach, considers the ego – i.e. the central actor – and all the actors with whom the ego has relations. In the case of the present study, the ego is the senior manager who describes the relationships with alters that have access to valuable knowledge (Ronald S. Burt, 1997; Rytina & Morgan, 1982).

The social capital literature considers two main techniques that can be used to identify an egocentric network: name generator and position generator (Lin, Cook, & Burt, 2001). The **name generator technique** proposed by Laumann (1966), asks about the ego's contacts. The respondent lists the names that come instantly to mind. The questions posed generate a list of ranked contacts. However, Lin (2001) suggests that there are several problems associated with the use of this technique to measure social capital: (i) it tends to elicit stronger rather than weaker ties because the first names to come to mind have been shown to be those of the strongest contacts/ties; (ii) it identifies actors rather than social positions whereas in several studies the focus is on social position. Given these shortcomings, Lin and Dumin (1986) proposed **the position generator technique**. This method captures social capital by measuring the individual's access to a list of positions, each of which provides access to a specific knowledge domain. Using the position generator technique to measure entrepreneurs' social capital requires identification of a list of positions that could be useful for the introduction of new products or processes.

The technique is implemented in two steps. The first consists of identifying those positions most

likely to provide access to knowledge domains useful for the innovation processes. Access to varied sources of knowledge is one of the most incisive benefits provided by social capital (Lane & Lubatkin, 1998; Yli-Renko, Autio, & Sapienza, 2001; Zahra, Ireland, & Hitt, 2000). In line with Batjargal (2003) and Chiesi (2007), I propose that the following positions are important for such an investigation: strategic suppliers, strategic clients, competitors, advisers, experts in technological innovations, university researchers and professors, policymakers, finance providers/funders, members of public administrations, and presidents of public or private industry associations and employment agencies. The second step consists of a survey inquiring about whether the senior manager knows someone occupying the positions listed. The **position generator technique** allows measurement of different aspects of individual social capital. It would be interesting to measure social capital in terms of network diversity using the number of direct ties of senior managers have individuals in different positions, and thus belonging to different knowledge domain.

Appendix table 1 provides an example of the position generator technique.

[Insert table 1 about here]

The position generator has a major advantage over the name-generator technique: it more accurately captures individual access to structurally embedded resources (Lin, et al., 2001). For this reason, it has been applied to the measurement of social capital in a variety of different settings, and to the study of social mobility, income, job prestige, and status (Lin, et al., 2001; Lin & Dumin, 1986; Lin & Erickson, 2008).

FUTURE RESEARCH DIRECTIONS

This chapter makes clear the benefits of using the position generator technique to measure the social capital of top management teams. Future research could apply this technique to conduct an empirical studies to support the idea that senior managers gain from their investments in social relationships (Bourdieu, 1980; R. S. Burt, 1992; Lin, 1999). Also, future studies could use the technique to investigate whether the level of social connections among employees influences innovation in technology-based firms. High levels of employee social capital are likely to increase communications and promote knowledge flows. These social connections could be increased through flexible working environments that foster the development of social relationships (Way, 2002), and through the use of self-managed teams which allow employees to take some decisions usually reserved to their supervisors (Manz & Sims Jr, 1987). These working arrangements increase the opportunities for the formation of social connections (Evans & Davis, 2005; Hansen, 1999; Nonaka, 1994). It is likely that high levels of social connections/ties among employees are beneficial for technology-based firms.

In addition, it would be worthwhile to explore whether the link between social capital and the innovation process is contingent upon other contextual factors. Future analyses could account explicitly for such contextual factors as local culture and institutions through their inclusion as control variables in the econometric models. In relation to culture, it might be useful to rely on Hofstede's (1980:25) definition of culture as 'the collective programming of the mind which distinguishes the members of one human group from another… the interactive aggregate of common characteristics that influences a human group's response to its environment'. These characteristics refer to demographic variables, status variables, affiliations, nationality, ethnicity, language, and religion (Pedersen, 1991), which are likely to affect the relationship between social capital and innovation. In relation to institutions, it might be interesting to examine how the institutional set-up – i.e. socio-economic and political institutions - shapes the productive and technological processes (Borràs, 2004; Lundvall, 1992). Insights into how local contingencies foster knowledge exchange and innovation would increase our understanding of the location choices made by technology-based firms.

CONCLUDING REMARKS

In this chapter I proposed the thesis that individual social capital is one mechanism through which technology-based firms can acquire external knowledge, and suggested the position generator technique to measure the social capital of such firms' top management team. In line with Lin (1999) and Bourdieu (1980), social capital is presented as a private asset that captures individual access to a set of actors that belong to a heterogeneous knowledge domain. The ideas proposed in this chapter constitute a useful step toward a better understanding of the concept of social capital in technology-based firms

This study provides three main contributions. First, by investigating senior managers' social capital and its effects on the acquisition of external knowledge, it integrates elements of top management team theory with the social capital literatures. The social capital literature focuses on actors' social ties and the potential benefits they provide to actors (Lin, 1999). **Top management team theory** typically explores the characteristics of top managers within social systems, and how they affect firm performance (Hambrick & Mason, 1984). Drawing on these two literature streams, this chapter suggests that top managers' social capital represents an important asset which can influence the innovation processes. Second, in recognizing the importance of social connections, this work contributes to the stream of research on social network theory. Specifically, it corroborates the importance of network diversity by providing a further confirmation that the more extensive the networks, the better the social resources that can be accessed (Lin, 1999). Third, by discussing the role of social capital in innovation in

technology based firms, this chapter adds to our understanding of the open innovation paradigm which states that openness encourages innovation (H. Chesbrough, Vanhaverbeke, & West, 2006). The notion of open innovation suggests that the firms can benefit from internal as well as external ideas (H. Chesbrough, 2003) and should find ways to identify and access external sources of knowledge.

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