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WHAT TYPE OF FIRM FORGES CLOSER INNOVATION LINKAGES WITH PORTUGUESE UNIVERSITIES?

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THE EVOLUTIONARY MODEL OF ENTREPRENEURIAL FIRMS' DEPENDENCE ON NETWORKS: GOING BEYOND THE START-UP STAGE

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INNOVATION-BY-AGREEMENT: ACTIVATING THE LISBON AGENDA



## The evolutionary model of entrepreneurial firms' dependence on networks: going beyond the start-up stage

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resumo

résumé / abstract

Neste artigo propomos um modelo dinâmico da dependência das empresas empreendedoras nas suas redes relacionais. Primeiro, argumentamos que cinco características das empresas empreendedoras induzem a sua elevada dependência nas redes. Estas características incluem a orientação empreendedora, o papel central do empreendedor, limitações nos recursos, procura de flexibilidade e enfoque num nicho de mercado. Em seguida, examinamos como o crescimento das empresas empreendedoras é acompanhado pela evolução destas cinco características conduzindo a uma alteração da forma como estas constroem e usam as suas redes. Em particular, examinamos a composição e a estabilidade das redes relacionais das empresas empreendedoras. Este artigo contribui para a construção de uma teoria mais integrativa de empreendedorismo.

Dans cet article on propose un modèle

dynamique de la dépendance des entreprises entrepreneurantes dans leurs réseaux relationnels. Premièrement nous faisons valoir que cinq caractéristiques des entreprises entrepreneurantes induisent à leur élevée dépendance dans les réseaux. Ces caractéristiques incluent l'orientation entrepreneurante, le rôle central de l'entrepreneur, les limitations dans les ressources, la recherche de flexibilité et l'approchement dans un créneau de marché. Ensuite, on examine comment est-ce que la croissance de la société entrepreneurante est accompagnée par l'évolution dans les cinq caractéristiques, en conduisant à une modification de la forme suivie par les entreprises entrepreneurantes pour construire et utiliser leurs réseaux. En particulier, on examine la composition et la stabilité des réseaux relationnels des entreprises entrepreneurantes. Cet article contribue à une construction plus intégrative d'une théorie de l'esprit entrepreneurant.

In this paper, we propose a dynamic model of entrepreneurial firms' dependence on networks. First we argue that five characteristics of entrepreneurial firms result in their high dependence on networks; these five characteristics include entrepreneurial orientation, central role of the entrepreneur, resource constraints, pursuit of flexibility, and niche market focus. We then examine how entrepreneurial firms' growth is accompanied by the evolution of these five characteristics leading to a shift in the mode through which entrepreneurial firms construct and deploy their networks. In particular, we examine the composition and the stability of entrepreneurial firms' networks. This paper contributes to building a more integrative theory of entrepreneurship.

JEL Codes: M13; M14

## 1. Introduction\*



It has been widely accepted in the entrepreneurship research that networks of relationships play a crucial role in the entrepreneurial processes (Birley, 1985; Aldrich and Zimmer, 1986; Jarillo, 1988; Dubini and Aldrich, 1991; Larson, 1992; Jack and Anderson, 2002). Departing from the notion that the dependence on networks is intrinsic to entrepreneurial firms (Low and MacMillan, 1988; Minguzzi and Passaro, 2000), prior studies have documented how entrepreneurial firms employ family ties, friendships, strategic alliances, and other types of social connections (Birley, 1985; Ramschandran and Ramnarayan, 1993; Coviello and Munro, 1995; Hite and Hesterly, 2001) to obtain resources (Lipparini and Sobrero, 1994), gain legitimacy (Stuart *et al.*, 1999; Human and Provan, 2000), enhance organizational learning (Minguzzi and Passaro, 2000), and collaborate on new product development (Deeds and Hill, 1996). Because entrepreneurial firms experience more and faster changes than established mature firms, it is likely that the composition of their networks has to reflect these changes. However, few studies have theorized or documented empirically how network dependence evolves over the firms' life cycle and particularly from the start-up to the maturity stage.

Despite the rich evidence of the importance of network ties, existing entrepreneurship research focused on either describing these ties or on examining the functions of the ties and has less often focused on two other important and related issues. First, a systematic examination of the antecedents of entrepreneurial firms' dependence on networks. It is often taken for granted that the dependence on networks is an intrinsic response of entrepreneurial firms (Jack and Anderson, 2002) to overcome resource dependencies, and thus the search of antecedents has seldom moved beyond resource constraints (Stinchcomb, 1965). However, it is likely that entrepreneurial firms' dependence on networks is not limited to resource dependence arguments and may be complemented with the examination of other firm attributes (e.g., organizational structure, strategy, and market focus). In particular, based on extant research we identify five fundamental characteristics of entrepreneurial firms: entrepreneurial orientation, central role of entrepreneurs, small size, pursuit of flexibility, and niche market focus, that explain their dependence on networks. As entrepreneurial firms grow the relative and absolute importance of these characteristics changes, which requires adjustments in the entrepreneurial firms' network - as different components of organizational systems should be aligned with each other (Tushman and Romanelli, 1985). Thus, to address this issue, an integration of these attributes is formulated in the first part of the paper.

Second, the understanding of the dynamics of entrepreneurial firms' networks has also been overlooked. This is partially because the lack of a comprehensive understanding of the antecedents of entrepreneurial firms' dependence on networks has somewhat limited scholars' exploration of the dynamism of entrepreneurial firms' networks (Human and Provan, 2000). Notwithstanding, entrepreneurial firms' networks are strategically constructed and employed, and the network ties may have different roles along the firms' life cycle, as argued by Baum, Clabrese and Silverman (2000) and Hite and Hesterly (2001). In this regard, Minguzzi and Passaro (2000: 182) argued that «the learning processes that induce the growth and retention of entrepreneurial and managerial culture in the firm and changes in entrepreneurial behavior can deeply influence the networks of external relations of the firm». These aspects were brought to the fore also by Hite and Hesterly's (2001) conceptual investigation of the evolution of firms network from emergence to early growth, and by Larson's (1992) examination of the dynamics of dyadic strategic alliances between entrepreneurial firms over the span of several years. Extant research

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permits only a partial understanding of the evolutionary pattern(s) of entrepreneurial firms' networks, the evolution of entrepreneurial firms network composition (i.e., the types of ties that the firm carries), the structural positions occupied, and the stability of the network (Aldrich and Whetten, 1981). The second part of this paper permits a better understanding of the varied requirements in terms of composition and stability of the focal firms' networks over the firms' life cycles (i.e., as the firms grow).

Combining these two issues, we propose an evolutionary model of entrepreneurial firms' dependence on networks. The mode in which entrepreneurial firms construct and utilize their business networks changes along the firms' growth (Hite and Hesterly, 2001), although the dependence on networks may not necessarily decrease. On one hand, their networks might need to be more stable to provide a foundation for a quickly changing firm. On the other hand, if the firms are changing quickly, then the network might be changing just as quickly. In alternative, entrepreneurial firms may seek to develop more diverse and perhaps fluid networks that permit adaptations to these changes. In this case it is reasonable, for example, that some of the old network ties may be discarded and other are moved to a latent stage, to possibly be recovered later on when, and if, needed.

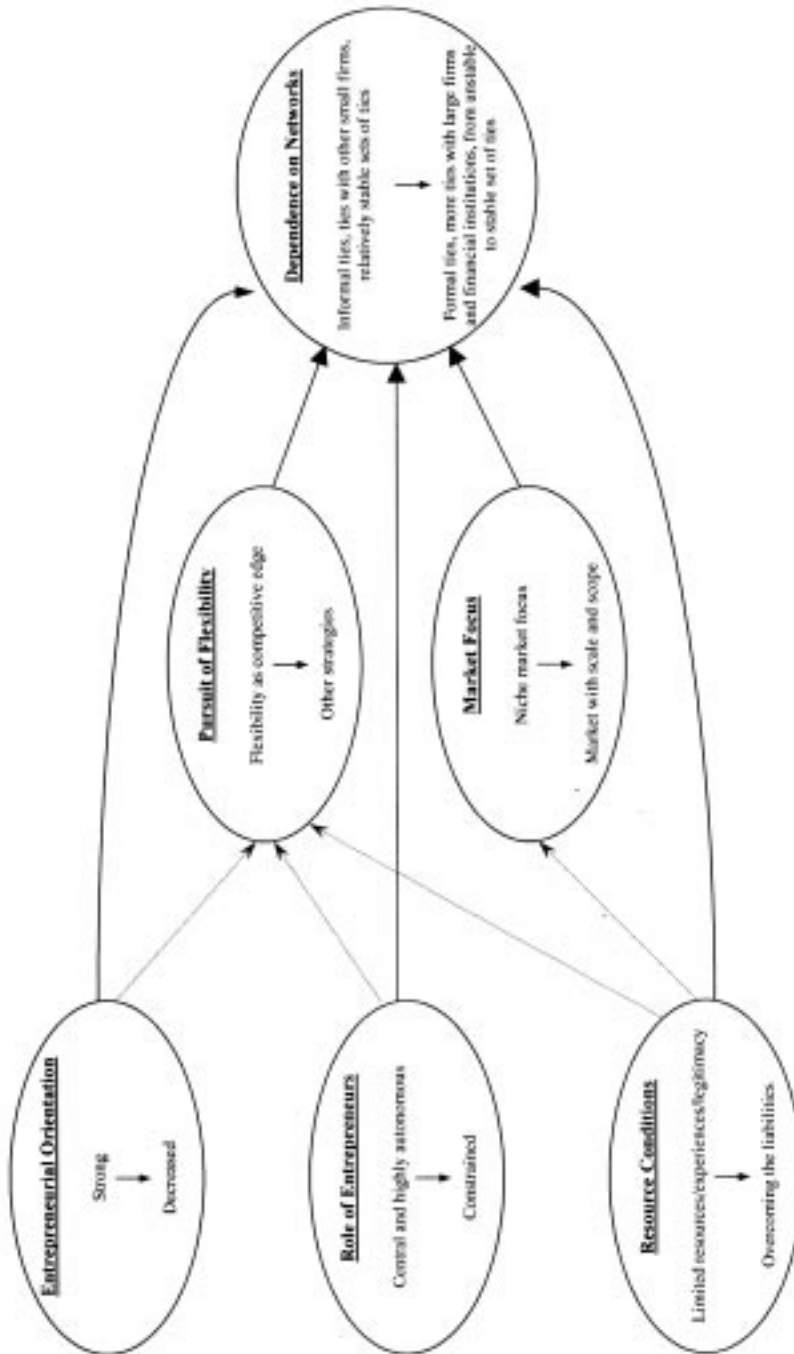
In this paper, we focus on the entrepreneurial firms' ego network and analyze the dynamism of the network from an evolutionary perspective. An ego network is composed of actors that directly connect with the focal entrepreneurial firm (Wasserman and Faust, 1994). Building upon Hite and Hesterly (2001), who examined characteristics of ties (i.e., embedded vs. arm-length ties, path-dependent vs. intentionally managed ties) to propose a change in the proportion of embedded ties, we concentrate on the configurational characteristics of firms networks and advance a change in the proportion of both formal and informal ties. Specifically, we investigate the dynamism of entrepreneurial firms' networks by comparing network *composition* and *stability* between the start-up and the established stage. Hence, we also contribute for a better understanding of how firms' networks are configured and reconfigured to respond to changes internal to the firms.

In the remainder of this paper we first identify five antecedents of entrepreneurial firms' dependence on social networks dependence from prior entrepreneurial studies and explain why they are related to firms' dependence on social networks. In the second part, we examine how firms' growth causes an alteration in these antecedents, resulting in the evolution of the entrepreneurial firms' network. At closing, we discuss our theoretical contributions and implications for future research.

#### **Antecedents of entrepreneurial firms' dependence on social networks**

The conceptual model, shown in Figure 1, conveys two main ideas that preside over this paper. First, we discuss how five main characteristics of entrepreneurial firms determine entrepreneurial firms' dependence on social networks. These characteristics are: entrepreneurial orientation, central role of entrepreneur, resource constraints, pursuit of flexibility, and niche market focus. Second, we discuss how as entrepreneurial firms evolve from the start-up to the established stage, their business networks evolve in response to changed internal, but possibly also external, conditions namely changes in the five characteristics mentioned above. Below, we explain how these five factors are antecedents of entrepreneurial firms' dependence on social networks. However, it is important to explain at the outset that the entrepreneur is embedded in a social network that plays a critical role in the entrepreneurial process (Aldrich and Zimmer, 1986). Social networks are broadly defined by a set of actors (individuals or organizations) and a set of linkages between the actors (Brass, 1992). For the entrepreneurs, these linkages, or relationships, to others provide various types of resources (Larson, 1991).

Figure 1 – The Evolutionary Model of Entrepreneurial Firms' Dependency on Social Networks



Note: The arrows inside the ovals denote the change of entrepreneurial firm's characteristics from the 'start-up' to the 'established' stage





### **Entrepreneurial orientation**

Entrepreneurial firms generally have a strong entrepreneurial orientation (Lumpkin and Dess, 1996), which manifests itself in three dimensions: innovation, risk-taking, and proactiveness (Miller, 1983). *Innovativeness* refers to an entrepreneurial firm's tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may lead to new products, services, processes or technologies (Lumpkin and Dess, 1996). To be innovative entrepreneurial firms depend on their networks to (1) access information about customer demand, market conditions, technology, and potential collaborators to discover and explore innovative opportunities (Pineda *et al.*, 1998), and (2) to access needed financing and identify human talents to carry out innovative ideas (Lipparini and Sobrero, 1994; Jack and Anderson, 2002). The network ties assist entrepreneurial firms identify possible sources of know-how and information and obtain physical and financial resources (Jarillo, 1988; Ramachandran and Ramnarayan, 1993) that will help them being more active than large firms in developing new products (Carrier, 1994; Deeds and Hill, 1996).

*Risk taking* is another dimension of entrepreneurial orientation. Risk taking refers to the extent to which entrepreneurs are willing to make risky resource commitments (Miller and Friesen, 1978). For instance, Brockhaus (1980) found that entrepreneurs are keen on exploiting emerging opportunities despite being attentive to the risks involved in these opportunities. Entrepreneurial firms are particularly subject to the costs and risks of new market entry and new product development (Lu and Beamish, 2001). Entrepreneurial firms depend on the network to govern, limit and share with partners potential risks (Kogut, 1988), and rely on their ties to obtain accurate information on potential risks (Birley, 1985).

Finally, *proactiveness* emphasizes that entrepreneurial firms take initiative in pursuing new opportunities and entering emerging markets (Miller and Friensen, 1978). To be more proactive, and hence be capable of taking stock of emerging opportunities, entrepreneurial firms may strategically construct networks of relations to firms that permit broader search opportunities in- and out-side their market and technological landscape. The fabrics of entrepreneurial firms' informal and formal relationships nurture proactiveness through information advantages (Dubini and Aldrich, 1991; Ostaard and Birley, 1994). The entrepreneurs learn through their social contacts (Carpenter and Westphal, 2000), or from what Powell (1990) designated as «networks of learning».

### **Central role of the entrepreneur**

The entrepreneur plays a fundamental role in entrepreneurial new ventures. Since Schumpeter (1934) that the entrepreneurship literature has been emphasizing the central role of the entrepreneurs in entrepreneurial firms (Palmer, 1971; Low and MacMillan, 1988). At the start-up stage, entrepreneurs are the primary sources of ideas, innovation and technological expertise (Birley, 1985). Entrepreneurs have enormous discretionary power and autonomy (Lumpkin and Dess, 1996) in the absence of formalized internal structures and external stakeholders, and consequently they have great freedom in conducting business. A reasonable explanation for different management practices between large and entrepreneurial firms is that entrepreneurs enjoy much more power and discretion than their counterparts in large established firms. Moreover, at the start-up stage, entrepreneurial firms lack formalized internal control systems and their internal structure is overseen by the entrepreneurs' direct control and by loose hierarchical constraints (Mintzberg, 1979).

The central role of entrepreneurs contributes to the entrepreneurial firms' dependence on the social networks and particularly the network of the entrepreneur her/himself. Ostgaard and Birley (1994), for instance, noted a strong correlation between the characteristics of the entrepreneurs' personal network and the firms' strategy. The owner-managers of entrepreneurial firms tend to rely on their memberships in various associations (Aldrich and Zimmer, 1986). Oviatt and McDougall (1995) described how the network of the International Investment Group (IIG), an Atlanta-based business consulting venture, is composed of personal, as opposed to business,

relationships among highly successful individuals. IIG conducts most of its business with other members of the network.



### ***Resource constraints***

The entrepreneurial firms' dependence on the network for resources seems to be an intrinsic response to overcome a limited resource endowment and enhance the likelihood of success (Birley, 1985; Lorenzoni and Ornati, 1988; Jack and Anderson, 2002). Entrepreneurial firms depend on the social and business networks to complement their activities or compensate for deficiencies (e.g., use local intermediaries or develop ties with larger firms) (Fontes and Coombs, 1997), to access information and other resources (Holmlund and Kock, 1998), to identify export opportunities (Ellis, 2000), and to identify appropriate entry modes and marketing strategies into foreign markets (Coviello and Munro, 1995, 1997). In sum, the dependence of entrepreneurial firms on networks is an outcome of their attempt to overcome resource constraints (Jarillo, 1989).

Entrepreneurial firms are usually conceptualized as being small, and new, and as having a limited pool of resources (e.g., managerial, financial, informational, human) (Stinchcombe, 1965; Beamish, 1999) that limit their operations and increase their likelihood of failure - being subject to a 'liability of smallness' (Aldrich and Auster 1986; Stinchcombe 1965). This liability refers to the hazards, stereotypically based on internal resource limitations, that small firms incur, but that may be overcome, at least partly, by establishing resource-rich ties to other firms (Gulati, 1998).

### ***Pursuit of flexibility***

To achieve flexibility in design, manufacturing, workforce size, employee skills, and cost structure, entrepreneurial firms benefit from joining networks of firms. As Jarillo (1989: 133) noted «one of the most efficient weapons used by entrepreneurial firms to gain market share from larger, more powerful corporations is their flexibility». Teece *et al.* (1997: 520) referred to highly flexible firms as those with a capability to «scan the environment, evaluate markets and competitors, and to quickly accomplish reconfiguration and transformation ahead of competition». If entrepreneurial firms had to 'do it alone' (Baum *et al.*, 2000) the financial investments incurred and the commitment of physical and human resources would reduce their ability to explore novel opportunities due to switching costs, asset specific commitments, and/or other resource limitations. The membership in a network with other firms also facilitates entrepreneurial activities because partners provide easier and more abundant access to information (Dyer and Singh, 1998), reduce the need to carry out investments in fixed assets specific to a certain activity, and ease a possible shift to an emerging business.

The pursuit of flexibility is likely contingent upon the three characteristics examined above: entrepreneurial orientation, role of the entrepreneur, and resource constraints. First, an entrepreneurial oriented culture requires entrepreneurial firms to be flexible to explore emerging, related and unrelated business opportunities (Birch, 1987). Second, the salience of the entrepreneur, and corresponding firms' power and decision making structure, facilitates the pursuit of flexibility because autonomous entrepreneurs can make strategic decisions and respond swiftly to the opportunities identified (Palmer, 1971; Lumpkin and Dess, 1996). Third, flexibility can also compensate for the disadvantages of limited resources. Hence, flexibility is not only a possibly intrinsic characteristic but more importantly it is likely a planned strategic choice of entrepreneurial firms.

### ***Niche market focus***

Besides maintaining flexibility, focusing on market niches is another strategic choice for entrepreneurial firms given resource constraints (Ensley, Pearson and Amason, 2002). Chaganti and Mahajan (1989) found that, because of the lack of economies of scale, new entrepreneurial





firms have more difficulties in competing on price against large established firms. In addition, despite entrepreneurial firms' relative competitive disadvantage, large firms still seek to raise entry barriers (of different forms) to edge against new entries (Porter, 1980). Thus, to preempt direct confrontation with large firms, entrepreneurial firms may tend to seek market segments with unique characteristics (Davis and Austerberry, 1999).

A niche market strategy requires entrepreneurial firms' dependence on networks. A market niche is narrowly circumscribed in terms of customers, services, and funding sources (Hannan and Freeman, 1977). As a result, information about niche markets is usually hideous, tacit, and hard to obtain (Schwart *et al.*, 2000). Acquiring information about niche markets requires information channels closer to customers, and therefore, networking with customers, suppliers, families, and friends are essential «bridges» to new markets (Sharma and Johanson, 1987). In addition, entrepreneurial firms have to learn how to explore niche opportunities despite the lack of prior experience from which to draw (Ensley *et al.*, 2002). Instead of learning by their own, entrepreneurs often rely on vicarious learning through external contacts for advice and necessary information. Therefore, ties to other firms facilitate entrepreneurial firms' learning (Minguzzi and Passaro, 2000) and access to market niches.

In summary, the preceding discussion illustrates that entrepreneurial firms' dependence on networks is the strategic manifestation of their own characteristics and also of strategic choices. Such dependence is causal rather than coincidental.

**Proposition 1:** *Entrepreneurial orientation, central role of entrepreneur, resource constraints, pursuance of flexibility, and niche-market focus jointly induce entrepreneurial firms' high dependence on networks for survival and growth.*

### The evolution of entrepreneurial firms' networks

Entrepreneurial firms' dependence on networks is not static, rather, the evolution of these firms alters the mode in which they construct and utilize their networks. However, the changing patterns of entrepreneurial firms' networks have received limited attention in entrepreneurship literature in spite of its acknowledged importance (Human and Provan, 2000; Hite and Hesterly, 2001). As suggested previously, as firms evolve through their life cycles so do their networks (Hite and Hesterly, 2001). In this section, we focus on the changes of the entrepreneurial firms' networks along their life cycles in terms of composition (e.g., Baum *et al.*, 2000; Gulati *et al.*, 2002) and stability (e.g., Aldrich and Whetten, 1981).

#### Network composition

The network composition may be examined in terms of the types of ties – formal and informal – and the types of firms that compose the network at any given moment.

*Type of ties.* The distinction between formal and informal ties has been frequently used to reflect different governance mechanisms. The *informal ties*, which have also been referred to as personal or non-contractual relationships (Macaulay, 1963), include family ties, friendship ties, affiliation ties, community ties, and so forth (Galaskiewicz, 1979; Grannovetter, 1985; Larson, 1992). The *formal ties*, in contrast, are frequently bound by a contract or other governance forms such as strategic alliances and interlocking directorates (Gulati, 1995).

Entrepreneurial firms are likely to depend on informal ties for economic transactions at an early stage but gradually adopt more formal ties as they become more established in the market (Hite and Hesterly, 2001). In other words, the networks of entrepreneurial firms are likely to be dominantly composed of the entrepreneurs' personal and informal ties (Hite and Hesterly, 2001), which provide access to information, resources, and local markets and bring benefits of reputation, advice and serve as referrals (Dubini and Aldrich, 1991; Ramachandran and Ramnarayan, 1993; Ostgaard and Birdly, 1994). As the entrepreneurial firms grow from the start-up to the established stage they often require additional resources. The existing informal ties





may not suffice for added tangible and intangible resource and strategic requirements, and thus need to be gradually replaced by formal ties. For instance, entrepreneurial firms will seek other external agents such as financial institutions that have the capacity to meet the added resource requirements. Alternatively, the firm may go public (Aggarwal and Rivol, 1991), with the corresponding implications of the change in ownership structure, and the added monitoring of external institutional investors, and financial regulation institutions (e.g. SEC). Under the pressure of external monitoring, entrepreneurs need to justify their decisions to other parties (Ross and Staw, 1993), and are likely to avoid making decisions on the basis of «intuition» or prior experiences, which are not easily justifiable. Therefore, driven by increasing resource needs, entrepreneurs may seek to develop formal and easily justifiable external relationships with other partners (DiMaggio and Powell, 1983), such as contracts and strategic alliances. Consequently, entrepreneurs' power and autonomy decrease with their firms' growth and their risk-taking and innovative behaviors are likely to be considerably constrained. Notwithstanding, we suggest that informal ties are likely to persist, even if they become relatively less predominant, due to the complementarity between formal and informal relationships, especially between firms with recurrent transactions (Gulati, 1995).

In addition to the change in entrepreneurial orientation and organizational structure necessary to develop these formal relationships, the change in entrepreneurial firms' resource endowment facilitates the establishment of these formal ties. New entrepreneurial firms are generally perceived riskier than established firms (Baum and Oliver, 1991), and are stereotypically characterized by their lack of a broad base of influence and endorsement, perception of quality, reliability, reputation, and low legitimacy (Larson, 1992). Hence, other organizations may hesitate to develop formal relationships with entrepreneurial firms (Stuart *et al.*, 1999). However, as the entrepreneurial firm demonstrates it is viable<sup>1</sup> and establishes a track record of success (Bantel, 1998; Stuart *et al.*, 1999) - that is, as they become established firms - it becomes progressively easier to develop formal alliances with other established firms. Moreover, it seems reasonable to suggest that this is a positively self-reinforcing process because established formal ties with large and prestigious firms further heightens the likelihood of forming additional formal ties in the future (Gulati, 1995).

We may thus reach a similar proposition to that of Hite and Hesterly (2001) whereby we advance that at the start-up stage firms' networks are socially embedded (identity-based), and evolve to ties based on a calculation of economic costs and benefits, as firms become more established.

**Proposition 2a:** *An entrepreneurial firm's growth from the 'start-up' stage to the 'established' stage is likely to be accompanied by an increase in the proportion of formal ties relative to informal ties in its network.*

*Type of organizations.* As suggested by institutional theory (DiMaggio and Powell, 1983), resource dependence theory (Pfeffer and Salancik, 1978), and social networks literature (Galaskiewicz, 1979), different firms have different institutional power, resources, positions, and relationships in a network. These are important because the organizations to which the entrepreneurial firms are tied matter in determining the access to additional resources, social status, and markets (Stuart *et al.*, 1999). According to prior studies, two types of organizations, namely financial firms and large firms, are of particular importance to entrepreneurial firms (Stevenson *et al.*, 1985).

As entrepreneurial firms grow they become more likely to have ties to financial providers. At the start-up stage entrepreneurial firms will have difficulty accessing financial resources from external sources due to entrepreneurial firms perceived high risks and the high costs involved in public offerings (Aggarwal and Rivol, 1991). As entrepreneurial firms mature, accumulate experience, build a track record of successes, construct their internal structure, build transparent internal decision-making processes, and established legitimacy, the credit ratings improve and boost

1 A new venture is usually considered viable after surviving a start-up period of high mortality (Brush, 1995).



financial providers' expectations. Financial firms are more likely to get involved with large established firms. Therefore, expanding entrepreneurial firms are likely to intentionally establish ties to co-opt financial institutions, and alleviate financial resources dependence (Pfeffer, 1983).

As entrepreneurial firms grow they are also more likely to have ties to established *large firms* that can provide a range of benefits, such as legitimacy, novel knowledge and social endorsement (Stuart et al. 1999). However, at the start-up stage, entrepreneurial firms are perceived risky and thus large firms may not foresee the benefits of cooperating. Stuart et al. (1999: 316) suggested that this could be due to potential hazards «because young and small companies encounter so many potential hazards and because they have short track records by which outsiders can evaluate their quality, there is considerable uncertainty about the value of new ventures». Changes along firms' growth such as increased internal formalization of decision-making enhance large firms' confidence on partnering with these firms. Indeed, extant empirical findings suggest that established large firms tend to network with multiple entrepreneurial firms to gain access to path-breaking technologies, state-of-the-art engineering talents, or seize the control of potential markets (Alvarez and Barney, 2001). These entrepreneurial firms are likely to be more advanced in their life cycle and have already developed a track record of performance and may be relatively more 'established' entrepreneurial firms. Thus, established entrepreneurial firms are more capable of having ties with large firms than when they are at the 'start-up' stage.

**Proposition 2b:** *An entrepreneurial firm's growth from the 'start-up' stage to the relatively 'established' stage is likely to be accompanied by an increasing proportion of ties to large firms and financial institutions in its network.*

It is worth pointing out that our proposition 2b above does not invalidate that many new firms (especially high-tech firms) start out with close ties to very large firms, as lead investors and customers (Venkatraman, Van de Ven, Buckeye and Hudson, 1990; Baum et al., 2000). However, this is not likely to be a general case given the already noted hazards associated to entrepreneurial firms that increase the perceived risks of investing or partnering with these firms.

### **Network stability**

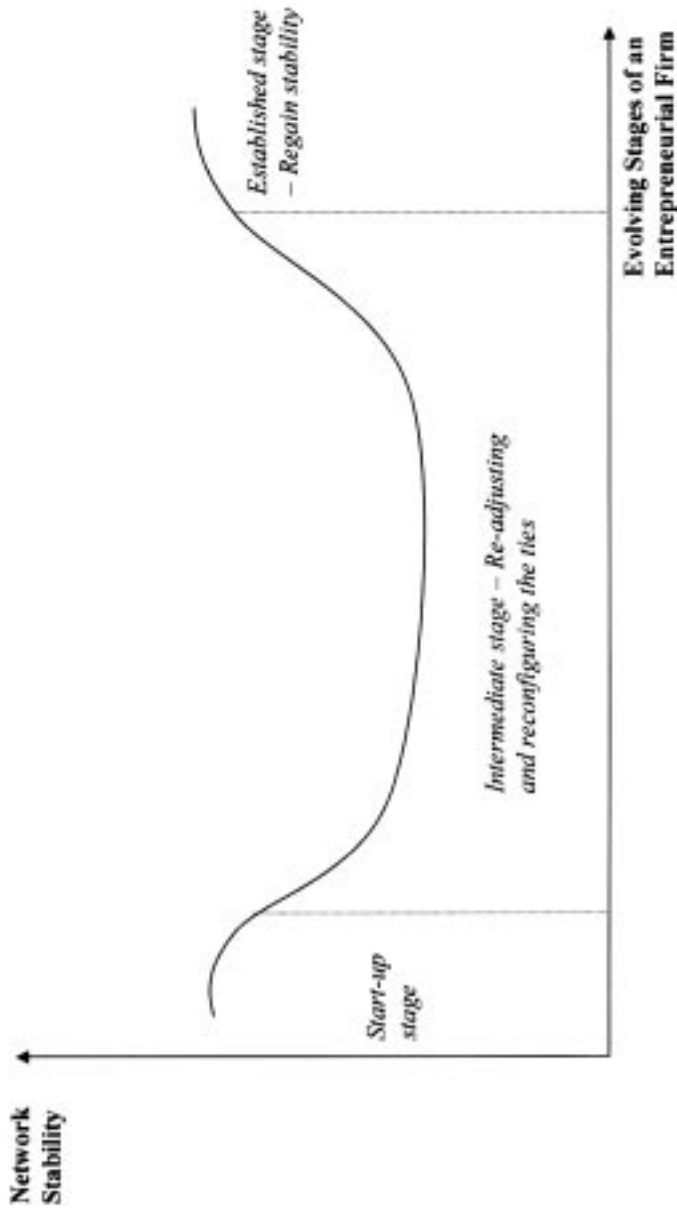
Network stability was defined by Aldrich and Whetten (1981: 391) as «a situation in which relations between organizations within a bounded population remain the same over time.» Aldrich and Whetten (1981) further suggested that the structural characteristics of the network, the behaviors of dominant organizations, the dependence relations, and the environmental dynamics jointly influence the stability of the network. Therefore, the stability of entrepreneurial firms' network is likely to reflect the status quo of their resources, legitimacy, and strategy (Human and Provan, 2000) and stability is likely to change as these conditions change. In other words, entrepreneurial firms' growth is accompanied by changes in resources, reputation, strategies, and legitimacy that both require and induce modifications in the network. The period of instability accrues from the need to reconfigure a network that changes from cohesive to calculative-based ties (Hite and Hesterly, 2001).

As entrepreneurial firms develop from 'start-up' to 'established', their networks may first experience high instability and then progressively re-gain stability. From the 'start-up' to the 'established' stage, the stability of entrepreneurial firms' networks seems to follow a curvilinear general pattern as indicated in Figure 2. At the 'start-up' stage we expect the entrepreneurial firms' network to be relatively stable. The perceived risk and uncertainty of entrepreneurial firms are a barrier to the development of collaborations (Stuart et al., 1999), and hence the network of ties at this stage is likely to be based on informal, cohesive and personal ties of the entrepreneur, as predicted by Hite and Hesterly (2001). In addition, networking with other firms is not cost-free, and it is sometimes prohibitive for entrepreneurial firms with very limited resources because it requires large investments, continuous maintenance, and carries the risks associated to potential opportunistic behaviors of partners or even absorption (Williamson, 1985; Alvarez and Barney, 2001). That is, the entrepreneurial firm network is stable because the addition of new ties is not

possible. Hence, entrepreneurial firms tend to rely on path-dependent or existing ties, and these ties are essentially the entrepreneurs' ties. Ferreira (2002), for example, suggested a motherhood model whereby new entrepreneurial firms exploit existing ties of an umbilical nature instead of exploring new ties with firms outside the parental network of relationships.



Figure 2 – Evolution of Entrepreneurial Firms and Network Stability





During the maturation stage, as entrepreneurial firms gradually build up reliability, legitimacy and an observable track record of performance they become more likely to define new relationships. During this phase, entrepreneurial firms maintain a strong entrepreneurial orientation (Schumpeter, 1934; Miller, 1952) and are still active in exploring new opportunities while seeking to remain flexible. The combination of higher attractiveness to potential business partners, stronger capabilities, richer experiences of managing relationships, and strong entrepreneur orientation will probably lead to very high levels of instability in the entrepreneurial firms' network.

The entrepreneurial firms' network seems to regain stability as formal ties and ties to large firms and financial institutions are consolidated. As firms expand, they settle down on some opportunities with long-term prospects, instead of continuously taking risks or exploring the landscape (Jarillo, 1989; March, 1991). Moreover, with large resource and experience accumulated, expanding firms thrive for scale and scope economies, shifting away from appropriating profits and maintaining competitive advantages through strategic flexibility. This process may represent what Stevenson and Jarillo (1986) called the loss of entrepreneurial flair. This may signify the affiliation with established large firms that provide endorsement, enhance the likelihood of developing future ties with other organizations that rely on the observation of entrepreneurial firms' performance and reputation, and provide stable access to more demanding resource needs. In addition, the ties to large firms and financial institutions may tend to induce some inertia against the development of new ties (Larson and Starr, 1993; Baum and Singh, 1994) because of the benefits accruing from these relationships, and potentially high switching costs involved. Furthermore, the volume and the recurrence of transactions between partners increase as the entrepreneurial firms expand and with the longevity of relationship, resulting in increased stability of the relationships (Gulati, 1995a). We may thus advance the following proposition:

**Proposition 3:** *The stability of the entrepreneurial firm's network is likely to display a curvilinear relationship as it grows from the 'start-up' to the 'established' stage. Specifically, an entrepreneurial firm's network is likely to remain stable at the very initial stage of its life cycle; in the transition from the initial to the established stages, its network is likely to experience high instability; the network regains stability when the entrepreneurial firm becomes well established.*

### Discussion and conclusion

This paper contributes to the entrepreneurship and small business literature by addressing why and how entrepreneurial firms rely on networks for survival and growth. We specified some network dynamics that accompany entrepreneurial firms' growth. We integrated existing research to explain why entrepreneurial firms are highly dependent on networks. From a strategy standpoint, for entrepreneurial firms, networking is almost the only, or often the best, organizing form to conduct economic transactions and explore market opportunities in conditions of resource, capability, and informational constraints. In stark contrast, networking with other organizations is not the only possible option for large established firms because they possess abundant resources, large manufacturing capacity, and intelligence systems (Ensley *et al.*, 2002). Furthermore, we examined the impact of changes in the entrepreneurial firms' characteristics on the evolution of entrepreneurial firms' networks. The dynamism of entrepreneurial firms' networks can be predicted examining changes in firms' organizational attributes. Hence, this paper contributes to a better understanding of entrepreneurial firms' networks by directing our attention to the underlying forces that cause alterations in the network.

This paper integrates the study of entrepreneurial firms' networks with approaches that examine entrepreneurs' traits (Low and McMillan, 1988), entrepreneurial orientations (Lumpkin and Dess, 1996), entrepreneurial firms' environments (Lorenzoni and Ornat, 1988), and entrepreneurial firms' growth (Churchill and Lewis, 1983; Hite and Hesterly, 2001). Our theorizing indicates that networking activities of entrepreneurial firms, along with other five characteristics, should be considered as building blocks in building a comprehensive model of entrepreneurship theory.

We highlighted some avenues for theoretical development and empirical testing in future research on entrepreneurship. First, given the focus of this paper, we did not consider the effects of contextual factors on the evolution of entrepreneurial firms' networks. Moreover, although our discussion of entrepreneurial firms' network composition was made at a high level, we may seek to deepen our understanding of the context-specificity that may be involved in firms networks. For instance, our arguments and propositions may, to some extent, be affected by firm-related contingent factors such as whether there is the possibility of venture capital funding, the positioning of the firm, and so forth. A future model may take these issues into account.

Much of our arguments, namely those related to the stability of the entrepreneurial firms' network, seem to suggest that all entrepreneurial firms follow a common pattern in their networking. That is not our contention, and Covin, Slevin and Covin (1990) already found that small firms in high- and low- technology industries emphasize different strategies. Baum *et al.* (2000) found that entrepreneurial firms in biotechnology tend to form partnership with large firms from the start-up stage. Accordingly, it is probable that the dynamic patterns suggested in this study may vary across industries. Future research may seek whether industry characteristics moderate the relationships proposed due to, for example, different requirements (e.g., capital intensity, technology intensity, labor intensity) in varied industries. This avenue may run away from the typical studies on entrepreneurial firms sampling from either high technology or service industries for generalizability.

We focused on ego networks and hence we explored a limited set of network characteristics. Social network research suggests a number of network characteristics that depict both relationships and structural positions (Wasserman and Faust, 1994) that may have important implications. While examining these characteristics in a complete network may enrich our understanding of entrepreneurial firms' networks, it also imposes challenges on our theory. This is partly because the dynamics of a complete network in which an entrepreneurial firm is located is not only influenced by the focal firm but most important by the collective characteristics of the network.

Future research could be particularly interesting in exploring how culture, and particularly national culture, moderates the effects of international entrepreneurial firms' characteristics on their dependence on and the evolution of networks? For example, in China, family businesses are very popular and different forms of informal ties exist among organizations and play important roles (Peng and Luo, 2000). Similar pattern may be seen in Italy. If culture is a moderator, we may expect international entrepreneurial firms operating in China to have a higher proportion of informal ties in their networks than those in other countries (e.g., in the US) even if they grow to be large established firms. Also, governmental influences, regulatory, legal policies and other institutional factors are possible contextual factors for these firms that warrant empirical and conceptual research.

To conclude, the specific characteristics of entrepreneurial firms largely convey their dependence on social networks. While at the 'start-up' stage of the entrepreneurial firms' life cycle it is likely that their ties are essentially informal, as the firms grow their ties are likely to become increasingly populated by formal relationships and ties to large corporations and financial firms.





## References

- Aggarwal, R.; Rivol, P. (1991) Evaluating the costs of raising capital through an initial public offering, *Journal of Business Venturing*, 6, 351-361.
- Aldrich, H.; Whetten, D. (1981) Organization-sets, action-sets, and networks: Making the most of simplicity, in P.C. Nystrom and W.H. Starbuck (eds.), *Handbook of Organizational Designs*, New York, Oxford Press, 385-408.
- Aldrich, H.; Zimmer, C. (1986) Entrepreneurial through social networks, in Sexton, D.; Smilor, R. (eds.), *The art and science of entrepreneurship*, Cambridge MA, Ballinger Publishing, 91-110.
- Alvarez, S.; Barney, J. (2001) How entrepreneurial firms can benefit from alliances with large partners, *Academy of Management Executive*, 15, 1, 139-148
- Bantel, K. (1998) Technology-based «adolescent» firm configurations: Strategy identification, context, and performance, *Journal of Business Venturing*, 13, 205-230.
- Baum, J.; Oliver, C. (1991) Institutional linkages and organizational mortality, *Administrative Science Quarterly*, 36, 187-218.
- Baum, J.; Clabrese, T.; Silverman, B. (2000) Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology, *Strategic Management Journal*, 21, 267-294.
- Beamish, P. (1999) The role of alliances in international entrepreneurship, in R. Wright (eds.), *Research in Global Strategic Management*, 7, 43-61, JAI Press, Stanford, CT.
- Birley, S. (1985) The role of networks in the entrepreneurial process, *Journal of Business Venturing*, 1, 107-117.
- Brass, D.J. (1984) Being in the right place, a structural analysis of individual influence in an organization, *Administrative Science Quarterly*, 29, 518-539.
- Brockhaus, R. (1980) Risk taking propensity of entrepreneurs, *Academy of Management Journal*, 23, 509-520.
- Brush, C. (1995) *International entrepreneurship: The effects of firm age on motives of internationalization*, New York, Garland.
- Carpenter, M.; Westphal, J. (2000) The strategic context of external network ties: Examining the impact of director appointments on board involvement in strategic decision making, *Academy of Management Journal*, 44, 4.
- Carrier, C. (1994) Intrapreneurship in large firms and SMEs: A comparative study, *International Small Business Journal*, 12, 3, 54-61.
- Porter, M. (1980) *Competitive strategy*, New York, Free Press.
- Chaganti, R.; Mahajan, V. (1989) Profitable small business strategies under different types of competition, *Entrepreneurship, Theory and Practice*, 13, 21-35.
- Churchill, N.; Lewis, V. (1983) The five stages of small business growth, *Harvard Business Review*.
- Coviello, N.; Munro, H. (1995) Growing the entrepreneurial firms: Networking for international market development, *Europe Journal of Marketing*, 29, 7, 49-61.
- Coviello, N.; Munro, H. (1997) Network relationships and the internationalization process of small software firms, *International Business Review*, 6, 2, 1-26.
- Covin, J.; Slevin, D.; Covin, T. (1990) Content and performance of growth-seeking strategies: A comparison of small firms in high- and low- technology industries, *Journal of Business Venturing*, 5, 391-412.

- Davis, B.; Austerberry, T. (1999) Think small win big, *The Mckinsey Quarterly*, November, 29-37.
- Deeds, D.; Hill, C. (1996) Strategic alliances and the rate of new product development: An empirical study of entrepreneurial biotechnology firms, *Journal of Business Venturing*, 11, 41-55.
- DiMaggio, P.; Powell, W. (1983) The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields, *American Sociological Review*, 48, 147-160.
- Dubini, P.; Aldrich, H. (1991) Personal and extended networks are central to the entrepreneurial process, *Journal of Business Venturing*, 6, 305-313.
- Dyer, J.; Singh, H. (1998) The relational view: Cooperative strategy and sources of interorganizational competitive advantage, *Academy of Management Review*, 23, 4, 660-679.
- Ensley, M.; Pearson, A.; Amason, A. (2002) Understanding the dynamics of new venture top management teams cohesion, conflict, and new venture performance, *Journal of Business Venturing*, 17, 365-386.
- Ferreira, M. (2002) *From dyadic ties to networks: A model of surrogate motherhood in the Portuguese plastics molds industry*, Best papers proceedings of the Academy of Management Meeting, Denver CO.
- Fontes, M.; Coombs, R. (1997) The coincidence of technology and market objectives in internationalization of new technology-based firms, *International Small Business Journal*, 15, 4, 14-35.
- Galaskiewicz, J. (1979) *Exchange networks and community politics*, Beverly Hills CA, Sage.
- Gulati, R.; Singh, H. (1998) The Architecture of Cooperation, Managing Coordination Costs and Appropriation Concerns in Strategic Alliances, *Administrative Science Quarterly*, 43, 4, 781-814.
- Gulati, R.; Daldin, D.; Wang, L. (2001) *Organizational network*. Paper presented at the Academy of Management Meeting, Washington D. C., 2000.
- Gulati, R.; Nohria, N.; Zaheer, A. (2000) Alliances and networks, *Strategic Management Journal*, 19, 4, 203-215.
- Gulati, R. (1995) Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances, *Academy of Management Journal*, 3, 1, 85-112.
- Hannan, M.; Freeman, J. (1977) The population ecology of organizations, *American Journal of Sociology*, 82, 929-964.
- Hite, J.; Hesterly, W. (2001) The evolution of firm networks: From emergence to early growth of the firm, *Strategic Management Journal*, 22, 275-286.
- Holmlund, M.; Kock, S. (1998) Relationships and the internationalization of Finnish small and medium-sized companies, *International Small Business Journal*, 16, 4, 46-63.
- Human, S.; Provan, K. (2000) Legitimacy building in the evolution of small-firm multilateral networks: A comparative study of success and demise, *Administrative Science Quarterly*, 45, 327-365.
- Jack, S.; Anderson, A. (2002) The effects of embeddedness on the entrepreneurial process, *Journal of Business Venturing*, 17, 467-487.
- Jarillo, J. (1988) On strategic network, *Strategic Management Journal*, 9, 31-41.
- Jarillo, J. (1989) Entrepreneurship and growth: The strategic use of external resources, *Journal of Business Venturing*, 4, 133-147.
- Kogut, B. (1988) Joint ventures: Theoretical and empirical perspectives, *Strategic Management Journal*, 9, 4, 319-332.
- Larson, A. (1992) Partner network: Leveraging external ties to improve entrepreneurial performance, *Journal of Business Venturing*, 6, 3, 173-188.







- Larson, A.; Starr, J. (1993) A network model of organization formation, *Entrepreneurship Theory and Practice*, 17, 2, 5-15.
- Lipparini, A.; Sobrero, M. (1994) The glue and the pieces: Entrepreneurship and innovation in small-firm networks, *Journal of Business Venturing*, 9, 125-140.
- Lorenzoni, G.; Ornati, O. (1988) Constellations of firms and new ventures, *Journal of Business Venturing*, 3, 41-57.
- Low, M.; MacMillan, I. (1988) Entrepreneurship: Past research and future challenges, *Journal of Management*, 14, 2, 139-161.
- Lumpkin, G.; Dess, G. (1996) Clarifying the entrepreneurial orientation construct and linking it to performance, *Academy of Management Journal*, 21, 1, 135-172.
- Macaulay, S. (1963) Non-contractual relations in business: A preliminary study. *American Sociological Review*, 28, 55-67.
- March, J. (1991) Exploration and exploitation in organizational learning, *Organization Science*, 2, 1, 71-87.
- Miller, D.; Friesen, P. (1978) Archetypes of strategy formulation, *Management Science*, 24, 921-933.
- Miller, D. (1983) The correlated of entrepreneurship in three types of firms, *Management Science*, 29, 770-791.
- Minguzzi, A.; Passaro, R. (2000) The influence of the economic environment on the entrepreneurial culture and the competitiveness of small firms, *Journal of Business Venturing*, 16, 181-207.
- Mintzberg, H. (1979) *The structure of organizations*, Prentice-Hall, N. J.
- Ostgaard, T.; Birley, S. (1994) Personal networks and firm competitive strategy – A strategic or coincidental match? *Journal of Business Venturing*, 9, 281-305.
- Oviatt, B.; McDougall, P. (1995) Global startups: Entrepreneurs on a worldwide stage, *Academy of Management Review*, 9, 2, 30-43.
- Palmer, M. (1971) The application of psychological testing to entrepreneurial potential, *California Management Review*, 13, 3, 38.
- Peng, M.; Luo, Y. (2000) Managerial ties and firm performance in a transition economy: The nature of a micro-macro link, *Academy of Management Journal*, 43, 3, 486-501.
- Pfeffer, J.; Salancik, G. (1978) *The external control of organizations: A resource dependence perspective*, New York, Harper and Row.
- Pfeffer, J. (1983) Organizational demography, in L. Cummings and B. Staw (eds.). *Research in Organizational Behavior*, 5, 299-357. Greenwich CT, JAI Press.
- Pineda, R.; Lerner, L.; Miller, M.; Phillips, S. (1998) An investigation of factors affecting the information-search activities of small business managers, *Journal of Small Business Management*, 17, 60-71.
- Ramachandran, K.; Ramnarayan, S. (1993) Entrepreneurial orientation and networking: Some Indian evidence, *Journal of Business Venturing*, 8, 513-524.
- Ross, J.; Stow, B. (1993) Organizational escalation and exit: Lessons from the Shoreham nuclear power plant, *Academy of Management Journal*, 36, 701-732.
- Schumpeter, J. (1934) *The theory of economic development*, Cambridge MA, Harvard University Press.
- Schwartz, R.; McCorkle, D.; Anderson, D. (2000) *Niche marketing*, Texas Agricultural Extension Service, Texas AandM University System.

- Sharma, D.; Johanson, J. (1987) Technical consultancy in internationalization, *International Marketing Review*, Winter, 20-29.
- Singh, J.; Tucker, D.; House, R. (1986) Organizational legitimacy and the liability of newness, *Administrative Science Quarterly*, 31, 2, 171-194.
- Stevenson, H.; Jarillo, J. (1986) Preserving entrepreneurship as companies grow, *Journal of Business Strategy*, 7, 10-23.
- Stevenson, H.; Roberts, M.; Grousebeck, H. (1985) *New business ventures and entrepreneur*, Homewood, Irwin Inc.
- Stinchcombe, A. (1965) Social structure and organizations, in James March (Ed.) *Handbook of Organizations*, Chicago, Rand McNally, 142-193.
- Stuart, T.; Hoang, H.; Hybels, R. (1999) Interorganizational endorsements and the performance of entrepreneurial ventures, *Administrative Quarterly Science*, 44, 315-349.
- Teece, D.; Pisano, G.; Shuen, A. (1997) Dynamic capabilities and strategic management, *Strategic Management Journal*, 18, 509-533.
- Tushman, M.; Romanelli, E. (1985) Organizational evolution: A metamorphosis model of convergence and reorientation, in L. L. Cummings and B. Staw (eds.), *Research in Organizational Behavior*, 7, 171-222.
- Venkatraman, S.; Van de Ven, A.; Buckeye, J.; Hudson, R. (1990) Starting up in a turbulent environment: A process model of failure among firms with high customer dependence, *Journal of Business Venturing*, 5, 5, 277-295.
- Wasserman, S.; Faust, K. (1994) *Social network analysis: Methods and applications*, Cambridge University Press.
- Williamson, O. (1985) *The economic institutions of capitalism*, New York, Free Press.

