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International exposure through network relationships: Implications for new venture internationalization

Stephanie A. Fernhaber

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Abstract:

Drawing on the network literature and attention-based view, we examine the extent to which international exposure from key informal (geographically proximate firms) and formal (alliance partners) network relationships impacts new venture internationalization. Our findings are three-fold. First, international exposure from both types of network relationships positively influence new venture internationalization, and serve as substitutes for each other. Second, the effects differ based on the age of the venture. While older ventures benefit more from international exposure from alliance partners, younger ventures are more influenced by international exposure from geographically proximate firms. Third, our analysis confirms a three-way interactive effect of age and international exposure from informal and formal relationships on new venture internationalization.

Keywords: New venture, Internationalization, Knowledge, Age

1. Executive summary

The importance of networking in the international context continues to escalate due to the increasing interdependencies between firms, countries and markets (Dunning, 1995). For new ventures that battle liabilities of foreignness and newness concurrently, the relevancy of networks is magnified even further (Johanson and Vahlne, 2009). Despite the growing literature stream on networks, there are three relatively ignored aspects of network relationships that could have significant implications for internationalizing ventures. First, although pioneering research on entrepreneurial networks has long recognized the differential benefits of informal versus formal networks (Birley, 1985), the implications of network relationship formality for internationalization remain understudied. Second, limited research has been conducted that moves beyond the extent of network relationships to alternatively consider the ability of those relationships to expose a venture to internationalization. International exposure is broadly defined as the extent to which a venture's management team comes into contact with international knowledge through prior experiences or network relationships. Third, it is unclear how the reliance on various network relationships potentially differs among younger and older ventures, despite the fact that the management literature frequently recognizes the evolutionary nature of ventures (e.g., Katz and Kahn, 1978, Lippitt and Schmidt, 1967, Quinn and Cameron, 1983 and Scott, 1971).

The purpose of this paper is to respond to these gaps in the literature. We explore if international exposure through informal and formal network relationships positively impacts the internationalization of new ventures, and if so, whether or not the relationship differs according to the age of the venture. The theoretical foundation for our research is the network literature supplemented by the attention-based view.

Our analyses of 448 U.S.-based, high-growth ventures in high-technology industries offer a series of findings. First, international exposures from both formal (alliance partners) and informal (geographically proximate firms) network relationships positively influence new venture internationalization. Interestingly, these relationships also serve as substitutes for each other. Second, the effects vary based on the age of the venture. While international exposure from alliance partners impacted older ventures more in terms of internationalization, younger ventures were more influenced by international exposure from geographically proximate firms. Third, our analysis confirms the existence of a three-way interactive effect of the international exposure from geographically proximate firms, international exposure from alliance partners, and age on new venture internationalization. The effects on internationalization were observed even after controlling for ventures' own international experience whose effects on venture internationalization were suggested in prior research.

The significance of our research is multifaceted. First, in response to multiple calls (Coviello and Munro, 1997 and Fernhaber et al., 2009), this research extends the international entrepreneurship literature by investigating the varying effects of international exposure from network relationships at different ages to explain new venture internationalization. While our findings are consistent with prior studies on internationalization via networks (Alvarez and Barney, 2005, Gulati, 1999, Johanson and Vahlne, 2006 and Johanson and Vahlne, 2009), results on the differential degrees of reliance on networks for venture internationalization are intriguing. Second, our research sheds light on the general international business literature by recognizing key networking antecedents of internationalization. By examining the impact of firm age on the relationship between international exposure from network relationships and internationalization, we highlight how new ventures may potentially differ from existing firms in their internationalization efforts. Third, our study contributes to the strategy literature by broadening the application of the attention-based view to new ventures. Finally, in terms of implications for managers, our research shows that ventures aiming to internationalize can and should take advantage of their networking resources from both geographically approximate firms and alliance partners. Ventures should strategically

locate in more internationalized community and build relationships with more internationalized partners in order to enhance their exposure to international businesses.

2. Introduction

The importance of networking in the international context continues to escalate due to the increasing interdependencies among firms, countries and markets (Dunning, 1995). Emphasizing the role of networks in providing valuable international exposure for firms, Johanson and Vahlne (2009: 1411) wrote that “markets are networks of relationships in which firms are linked to each other in various, complex and, to a considerable extent, invisible patterns.” For new ventures pursuing internationalization, the relevancy of networks is magnified even further as these ventures battle the liabilities of foreignness and newness concurrently. Network relationships help new ventures offset the lack of a proven track record and the limited legitimacy associated with being new (Shane and Cable, 2002). At the same time, network relationships can aid in new venture internationalization by providing connections and opportunities in foreign markets (Coviello and Munro, 1995, Coviello and Munro, 1997, Ellis, 2011 and Johanson and Vahlne, 2003), the access to needed resources to internationalize (Zahra et al., 2000), and key information necessary to enter and compete abroad (Sharma and Blomstermo, 2003). The criticality of networks for new venture internationalization is further evidenced by the growing research stream and calls for research devoted to this topic (e.g. Coviello and Munro, 1997, Hara and Kanai, 1994 and Sharma and Blomstermo, 2003).

Despite the insight being offered by this rapidly growing research stream, there are three relatively ignored aspects of network relationships that could have significant implications for internationalizing new ventures. First, although pioneering research on entrepreneurial networks has long recognized the differential benefits of informal versus formal networks (Birley, 1985), the implications of network relationship formality for internationalization have not yet been explored. This is rather surprising as learning has been found to be largely dependent upon the informal versus formal mechanisms that exist (Almeida et al., 2003 and Anand et al., 2002).

Second, only a limited number of studies consider the ability of existing network relationships to expose a new venture to internationalization. For the purposes of this research, international exposure is broadly defined as the extent to which a venture's management team comes into contact with international knowledge through prior experiences or network relationships. Such a definition builds upon the recognition by Lee and Park (2008) that international exposure captures executives' *prior* experiences, knowledge and relational capital associated with international environments, but also takes into account the role of *on-going* international exposure through network relationships (Bruneel et al., 2010). Numerous studies have linked the international exposure gained through the top management team's prior foreign work experience and/or education to a greater propensity of the new venture to internationalize (e.g., Bloodgood et al., 1996, Carpenter et al., 2003, Reuber and Fischer, 1997 and Sapienza et al., 2006). Yet, the impact of the on-going international exposure through network relationships tends to be overlooked. Given that the international environment is constantly changing and much of the knowledge gleaned prior to the start of the venture may become outdated over time, a need exists to examine the impact of international exposure via network relationships.

Third, the management literature frequently recognizes the evolutionary nature of new ventures given the amount of change and growth that can occur in the early years of an organization (e.g., Katz and Kahn, 1978, Lippitt and Schmidt, 1967, Quinn and Cameron, 1983 and Scott, 1971). This is one of the differentiating factors between international new ventures and multinational corporations. Yet it is unclear how the reliance on various network relationships potentially varies between younger and older ventures.

To fill these research gaps, we examine *if international exposure from informal and formal networks positively impacts the internationalization of new ventures, and if so, whether or not the relationships differ according to the age of the venture*. The theoretical foundation for our research is the network literature supplemented by the attention-based view. The network literature identifies for our study not only the types of network relationships (formal vs. informal) but the benefits and challenges associated with each. The attention-based view, which focuses on understanding where managers devote their limited attention (Ocasio, 1997, Ocasio, 2011 and Simon, 1947), is useful for shedding additional insight as to what type of exposure venture managers will attend to and act upon when deciding on internationalization. Although our study does not empirically capture managerial attention, we argue that it is a useful framework that adds to our understanding and linking of international exposure from network relationships to new venture internationalization.

We begin by examining how international exposure from key informal and formal network relationships affects venture internationalization and the substitutive relationship between these two sources of international exposure. The reference value and impacts of international exposure from informal and formal network relationships at differing ages are then considered. Our hypotheses are tested on a sample of 448 U.S.-based, publicly held ventures in high-technology industries, using an archival data set. As these firms are typically high-growth ventures and represent only a portion of the population, caution should be made when generalizing the findings. The paper closes with a discussion of implications for research and practice, limitations, and suggestions for future research.

3. Theoretical background and hypotheses

3.1. Theoretical background

3.1.1. International exposure through network relationships

International exposure, which is defined as the extent to which a venture's management team comes into contact with international knowledge through prior experiences or network relationships, is an essential ingredient for new ventures that aspire to enter foreign markets. Although international exposure through the *prior* work experiences of venture managerial teams has been found in numerous studies to positively affect venture internationalization (Bloodgood et al., 1996, Carpenter et al., 2003, Reuber and Fischer, 1997 and Sapienza et al., 2006), the knowledge gleaned from prior work experiences can also become outdated and less relevant in a fast-paced world of change. For this reason, the current or *on-going* networks to which a venture is internationally exposed is likewise important (Bruneel et al., 2010). Although the Uppsala model of internationalization initially assumed that the knowledge required to internationalize was largely acquired through operations abroad (Johanson and Vahlne, 1977 and Johanson and Vahlne, 1990), the model has more recently been modified to recognize the criticality of international exposure through network relationships, even going as far as to suggest that new venture lacking sufficient networks suffer from the so-called liability of outsidership (Johanson and Vahlne, 2009). This radical reliance on networking in the international context is largely attributed to the increasing interdependencies among firms, countries and markets (Dunning, 1995).

There are three main benefits that international exposure through network relationships can offer to new ventures. First, through networking connections, many entrepreneurs recognize the international opportunities that exist and act upon these opportunities to expand internationally (Coviello and Munro, 1995, Coviello and Munro, 1997, Johanson and Vahlne, 2003 and Johanson and Vahlne, 2006). Established network relationships contribute to a firm's knowledge base; this in turn lays the foundation for being able to recognize and value international opportunities (Casillas et al., 2009). In a survey of small, entrepreneurial firms, Coviello and Munro (1995) reported that 64% of the firms indicated that their initial

foreign market entered and entry mode used were triggered by opportunities presented by network contacts, rather than by their own proactive identification process. Similar benefits have been reported in Chen and Chen (1998), Johanson and Vahlne (2006) and Ellis (2011), although the industry contexts vary. In essence, the reliance on networks can enhance new venture growth in international markets by providing opportunities and, in doing so, help offset costs or risks related to market unfamiliarity and a lack of legitimacy.

Second, networks can lead to the formation of exchange relationships, which have been suggested to be a vital component to new venture internationalization as they can provide both resources and legitimacy (Oviatt and McDougall, 1994). New venture pursuing internationalization have been noted to rely on an aggressive and sometimes large-scale strategy in entering foreign markets (McDougall, 1989 and McDougall et al., 2003), which implies the necessity of resources. Through the use of networks and associated credibility, new ventures can more easily enter into exchange relationships to obtain these resources, which can subsequently lead to higher levels of growth and performance internationally. The positive relationship between alliances, which are one common type of exchange relationship, and new venture growth in international markets has been reported in several studies (Kotha et al., 2001 and Lu and Beamish, 2001).

Lastly, networks can provide new ventures with key information about international markets (Sharma and Blomstermo, 2003). As noted by the work of Eriksson et al., 1997 and Eriksson et al., 2000, such knowledge can be based on business (i.e. customers and competitor base in foreign country), institution (i.e. government, rules, norms) or internationalization (i.e. capability to enter foreign market, resources needed). These informational benefits are important as they can enable the new venture to compete both with local firms, who do not have to overcome the liabilities of foreignness, as well as larger multinationals.

Interestingly, network relationships are anything but homogenous. Of particular interest to internationalizing new ventures is the relative formality of their network relationships. In a foundational study on network relationships, Birley (1985) concluded that informal and formal network relationships offer varied benefits. It has also been posited that learning is dependent upon the informal versus formal mechanisms that exist (Almeida et al., 2003). Anand et al. (2002) further argue that exposure leveraged from informal and formal sources differs in its content and accessibility and that firms need to “continuously monitor the quality of knowledge derived” from different sources (p. 87). Given that both informal and formal network relationships are likely to attract venture managers' attention, albeit in different ways, it is solely through the joint examination that we can fully understand the implications for internationalization.

3.1.2. Managerial attention

To provide additional theoretical insight, we suggest it beneficial to consider why and where venture managers focus their attention in order to lay the groundwork for understanding how international exposure through key network relationships affects new venture internationalization. As noted by the attention-based view (Ocasio, 1997), and also by upper echelons theory (Hambrick and Mason, 1984), managers have bounded rationality. In other words, there are cognitive limitations as to how much information an individual manager or management team can take in, process, and subsequently, make decisions based on. Indeed, prior work on information processing by LaBerge (1995) and attention processing by Simon (1947) and Weick (1979) has recognized that managers have limited cognitive capability to process the typical information overflow. Thus, it is simply not possible for managers to take advantage of every piece of information exposed to through network relationships.

The overarching premise of the attention-based view (Ocasio, 1997) is that decisions made by managers are based on where they focus their attention. Ocasio (1997: 189) defines attention as the “noticing,

encoding, interpreting and focusing of time and effort by organizational decision-makers” on both *issues* (i.e., problems, concerns, threats, and opportunities) and *answers* (i.e., solutions, routines, proposals, and projects). This model explains, by three premises, how unlimited stimuli surrounding managers are noticed, encoded and then transformed into a limited number of organizational activities. (1) “What decision-makers do depends on the issues and answers they focus their attention on” (*focus of attention*),² (2) What issues and answers decision-makers attend to and act on “depends on the particular context or situation they find themselves in” (*situated attention*), and (3) “[W]hat particular context or situation decision-makers find themselves in, and how they attend to it,” depends on how the firm “regulate[s] and control[s] the distribution and allocation of issues, answers, and decision-makers into specific activities, communications and procedures” (*structural distribution of attention*) (Ocasio, 1997: 188).

The extent to which venture managers are exposed to international opportunities, resource exchanges or foreign market information through directed attention to network relationships can impact the internationalization of the new ventures. First, venture managers frequently look to the external environment for confirmation that they are on the right path and to ensure survivability (McGrath and McMillan, 1995). Considering the nature of globalization and the frequent need for firms to internationalize to remain competitive, venture managers may purposely search for solutions and opportunities that pertain to expanding abroad. Second, although multiple sources of international exposure may be present within the external environment, bounded rationality prevents venture managers from capturing all international-business related information from the exposure and from allocating the same amount of attention to international exposure from different network relationships. That is, exposure from certain sources may catch more venture managers' attention than exposure from other sources. Different information sources are likely competing for the limited attentional capability (Ocasio, 1997 and Ocasio, 2011) by venture managers.

3.2. International exposure through network relationships and new venture internationalization

3.2.1. Informal network relationships

Given that new ventures are heavily reliant on their local environment (Stuart and Sorenson, 2003), geographically proximate firms represent key informal network relationships that are likely to receive the attention of venture managers. The attention-based view posits that managerial attention allocation is contextual or *situated* (Ocasio, 1997). A typical situation that new ventures find themselves in is the liabilities of newness and often smallness; the lack of resources, knowledge, information and legitimacy imposes a constant threat to the ventures' survival and growth (Freeman et al., 1983). As described by Stinchcombe (1965), managers in the situation of new organizations have not yet learned their roles and tasks, nor have they established stable links to key stakeholders such as customers, suppliers and supporters, and interaction with management team members and decision-making process are typically general and informal. Such a situation, on one hand, pushes managers to attend to information and knowledge located external to their own ventures and, on the other, encourages the incorporation of a broad range of information from external environment into decision-making. As noted by Birley (1985), informal network relationships were seen to be especially useful in assembling the resources to start up a venture. In addition to the resources, information or knowledge can also be easily extracted through informal relationships (Haati et al., 2005).

International exposure from geographically proximate firms can catch venture managers' attention through multiple channels. Geographically proximate firms are able to leverage information exchanged informally through local trade shows, conferences, seminars, communication with personnel from nearby research institutes, organized social activities, or from employees switching companies (Aldieri and Cincera, 2009,

Lemarié et al., 2001, McKelvey et al., 2003 and Saxenian, 1990). Much of the information or knowledge being exchanged is tacit in nature (Audretsch, 1998). Many times, opportunities can develop from informal network relationships as shown by the many new innovations that are started by firms located nearby universities (MacPherson, 1998). Interestingly, research by Shaver and Flyer (2000) concluded that it is the weaker firms that have more to gain from being in a cluster location. Likewise, McCann and Folta (2011) empirically demonstrated that younger firms benefit more from such agglomeration activities largely due to their reliance on proximate resources. This implies that new ventures, typically featured by the situation of being weaker and more fragile than existing firms, are likely to be more attentive to and benefit more from informal network relationships.

Given the attention new venture managers are apt to give to their informal network of geographically proximate firms, any subsequent international knowledge that is made available in the process (i.e. via international exposure) is likely to be influential. As evidenced by Greenaway and colleagues' study of domestic UK firms (2004) and Aitken et al.'s research on Mexican manufacturing firms exposed to foreign multinationals (1997), firms exposed to internationalizing activities within their network of geographic proximate firms are more likely to launch their own internationalization. Geographically proximate firms can indeed be a source of international opportunities and knowledge, as a study by Birkinshaw and Hood (2000) demonstrated that foreign subsidiaries purposely move to key geographical locations in a foreign country in order to take advantage of the knowledge available from being co-located with other firms. Information, opportunities and the potential for resource exchange pertaining to foreign markets and international operation diffuses through venture managers' frequent interaction with their proximately located counterparts. That is, venture managers make an effort to attend to and act upon the exposure from geographically proximate firms. Consequently, we expect that ventures exposed to geographically proximate firms of higher degree of internationalization are more likely to engage internationalization.

Hypothesis 1.

The degree of international exposure from geographically proximate firms is positively related to new venture internationalization.

3.2.2. Formal network relationships

Within the external environment, the other influential component that venture managers situate their attention allocation upon is the venture's formal network relationships. Alliance partners represent a key formal network relationship that new venture managers interact with on a regular basis. The situated attention to alliance partners can be particularly relevant, in-depth, and sometimes convenient.

In alliances, firms pool their resources and capabilities to accomplish tasks that (1) they cannot accomplish on their own, or (2) they can complete on their own but likely at a much higher cost/with more risks. The close collaboration and frequent contact allow firms to closely observe their alliance partners' business operation (Li et al., 2008), including the international business operation. Thus, alliance partners can make available to new ventures a repertoire of demonstrations of internationalization benefits including, for example, economies of scale and scope and richer resource endowments (Keeble et al., 1998). Alliance partners can possibly be utilized by new ventures as a window to observe the process of launching and managing internationalization. When international knowledge is made available in this way, typically through a venture's management team, it is a form of international exposure. Venture managers can attend to and possibly act upon these demonstrations displayed by the alliance partners when deciding on their own venture's internationalization.

Alliance partnerships can help new ventures access the necessary resources to grow (Baum et al., 2000, Nohria and Garcia-Pont, 1991 and Sarkar et al., 2001) and pursue foreign markets. Alliances can also be a way to help overcome the liabilities of foreignness associated with international expansion (Lu and Beamish, 2001). Johannisson (2000) posited that new ventures gain unintended information through alliance relationship by interacting with their alliance partners. Such information exchanged through alliances is typically tacit in nature (Anand et al., 2002), and thus of great value to the overall competitiveness of an emerging new venture. Alliance relationships also serve as a reliable source for information (Larson, 1991). Venture managers attend to and likely act upon the information and resources from alliance partners for such information and resources to be relevant and useful for the venture's survival and growth. Subsequently, management may pay close attention to these relationships for steering the direction of the venture, especially in international expansion.

Hypothesis 2.

The degree of international exposure from alliance partners is positively related to new venture internationalization.

3.2.3. Informal and formal network relationships: substitutes?

We have discussed the situation of a new organization requires and encourages venture managers to attend to and act upon international exposure from informal and formal network relationship. Interestingly, the presence of international exposure from these two network sources *per se* contributes to the situation that venture managers find themselves in. Thus, we discuss below how venture managers' attention might be situated by the existence of international exposure from network relationships and how such a situation can affect the hypotheses presented above.

Although we argue that the degree of international exposure from geographically proximate firms positively affects new venture internationalization, the impact may depend upon other factors. For instance, there has been a stream of research questioning the value of co-location or geographically proximate firms for firms' external learning. There has been research reporting no effect of geographic proximity on firm innovation (e.g., Ganesan et al., 2005 and Tallman and Phene, 2007); there have also been studies suggesting that, although geographically proximate firms might be a useful group to turn to for knowledge acquisition, such value is not always fundamental and depends on contextual (e.g., Davenport, 2005, Lemarié et al., 2001 and McKelvey et al., 2003) and firm (e.g., McCann and Folta, 2009 and Whittington et al., 2009) factors. We argue that one critical situational factor is the venture's international exposure from alliance partners.

As posited by Ocasio (1997), the attentional capability of humans is limited and it is challenging, many times even impossible, to capture the scope of available alternatives. Venture managers have a limited capacity for focusing their attention. Thus, multiple sources of international exposure can compete for venture managers' attention or substitute for each other. This is supported by Fernhaber et al. (2009) who found that high technology ventures with greater internationally experienced top management teams depended upon and benefited less from external sources than lesser internationally experienced top management teams. That is, venture managers' attention allocation and action upon the attention is situated on the internal and external contexts. We argue that not all network relationships are equal and the existence and reliance upon one network relationship will limit the reliance upon others. Although all new ventures will likely benefit from the international exposure from geographically proximate firms, the new ventures that also have internationally experienced alliance partners will likely have less to gain due to their diverted attention. Formal relationships such as alliance partners require substantial focus, given the additional resources being exchanged as part of their formal contract or agreement. Thus, we argue:

Hypothesis 3.

The degree of international exposure from geographically proximate firms is positively related to new venture internationalization, but to a lesser extent for those new ventures with a greater degree of international exposure from alliance partners.

3.3. International exposure through network relationships, venture age and new venture internationalization

The attention-based view argues that what issues and answers decision-makers attend to and act on depends on the particular situation they find themselves in, and that what particular situation decision-makers find themselves in depends on the firm's structural distribution of attention. Ventures, particularly over their first transformational years after foundation, learn what information/knowledge they need for survival and growth and become more structured and decision-making more formalized (Stinchcombe, 1965). Thus, applying the logic of the attention-based view, we posit that new ventures attribute different amounts of attention to geographically proximate firms and alliance partners at different ages, and that where venture managers devote their limited attention has important implications for the ventures' strategic decisions of internationalization. Specifically, we argue that new ventures' attention to geographically proximate firms (informal relationship) decays over time and will therefore be more heavily relied upon by younger ventures. On the other hand, attention to alliance partners (formal relationship) increases over time, and thus is going to be more prevalent among older ventures.

First, the type of information or resources needed at different ages of a venture affects where managers devote their attention and, in turn, how international exposure from different network relationships affects venture internationalization. New ventures at emergence typically attend to a broad range of information from their external environments and acquire general knowledge to ensure that they are on the right path for survival and success (McGrath and McMillan, 1995). Older ventures, however, develop a greater reliance on and devote more attention to specific information sources to become more competitive (Autio et al., 2004). We argue that international exposure from geographically proximate firms tends to be more general than international exposure from the new ventures' alliance partners because the alliance activities are closely related to the ventures' businesses. International exposure from alliance partners enables new ventures to access key knowledge or opportunities that are often difficult to obtain and replicate by their competitors if no alliances exist between venture competitors and venture alliance partners. This is consistent with Anand et al. (2002) who posited that explicit knowledge such as market size or foreign market regulations can be gleaned through informal social contacts. On the other hand, tacit knowledge such as how to produce and market products in a foreign country is best learned through alliances. Thus, for older new ventures, their attention will likely be “*situated*” towards alliance partners.

Second, we argue that managers of younger ventures pay more attention to geographically proximate firms while managers of older ventures pay more attention to alliance partners, due to the change of the *structure* of distributed attention as new ventures age. Simon (1947) stresses that the firm's economic and social structures distribute decision-makers' attention into discrete processes and organizational actions. In comparison with younger ventures, older ventures have accumulated more attention processing in their structures; and competition for decision-makers' limited attention becomes inevitable. Similarly, Barkema and Vermeulen (1998) argued that firms must unlearn routines before new routines can be learned. Certain knowledge/information will be “locked out” if firms do not acquire it early on (Cohen and Levinthal, 1990). When competition for attention to international exposure from different sources exists (Acs et al., 1994 and Henderson and Clark, 1990), alliance partners eventually “win.” This is largely attributed to the different degrees of attention paid to informal networks vs. formal networks as the new venture ages. As

explained by Hite and Hesterly (2001), when new ventures first emerge, there is a high reliance on identity-based or informal networks that have developed from preexisting relationships in their surrounding environment. Such relationships are likely to result from being in a close geographic proximity. These informal networks are beneficial in providing needed resources early on that more distant ties are unwilling to provide. However, among older ventures, there is a conscious change of attention towards more formal networks, such as alliances, that have the advantage of providing greater resources and reducing environmental uncertainty. We therefore hypothesize:

Hypothesis 4.

The degree of international exposure from geographically proximate firms increases new venture internationalization, but to a lesser extent for older ventures than younger ventures.

Hypothesis 5.

The degree of international exposure from alliance partners increases new venture internationalization, but to a greater extent for older ventures than younger ventures.

From a configuration perspective (Miller, 1996 and Wiklund and Shepherd, 2005), we examine the three-way interaction of the three constructs of new venture age and international exposure from informal and formal network relationships. Hypothesis 4 and Hypothesis 5 above suggest moderating roles of venture age on the effect of the degree of geographically proximate firms' internationalization (H4) and alliance partners' international business (H5) on a new venture's internationalization. That is, the effects of international exposure from geographically proximate firms and alliance partners are stronger for younger ventures than older ventures. Hypothesis 3 addresses the negative moderating role of international exposure from alliance partners, arguing that the impact of international exposure from geographically proximate firms is stronger for ventures with a low degree of international exposure from alliance partners. Putting these together, we argue that the degree of international exposure from alliance partners increases new venture internationalization the *most* for older new ventures with a low degree of international exposure from geographically proximate firms. On the one hand, the attention of managers of younger ventures has not been structured (Ocasio, 1997 and Ocasio, 2011) to focus on formal relationships such as alliances; on the other, the limited international exposure by partners does not consist of a significant source of internationalization. However, for managers of older new ventures with a low degree of international exposure from geographically proximate firms, the degree of international exposure from alliance partners increases new venture internationalization the *most*. Not only has the attention of managers of these ventures been structured to emphasize more formal relationships (Ocasio, 1997 and Sapienza et al., 2005) such as alliances, but the rich international exposure residing in alliance partners per se attracts most of the limited managerial attention. Therefore, we hypothesize the following three-way interaction of new venture age and international exposure from informal and formal network relationships.

Hypothesis 6.

There is a three-way interaction effect of venture age and international exposures from informal and formal relationships on new venture internationalization such that:

(a) The degree of international exposure from alliance partners increases new venture internationalization the most when older new ventures have a low degree of international exposure from geographically proximate firms (i.e., the steepest slope).

(b) The degree of international exposure from alliance partners increases new venture internationalization the least when younger new ventures have a high degree of international exposure from geographically proximate firms (i.e., the flattest slope).

4. Methodology

4.1. Sample

This study utilizes a sample of 448 high-technology, U.S.-based new ventures that completed an IPO between 1995 and 2005. The Securities Data Corporation's (SDC's) Global New Issues database was used to identify firms that potentially could be included in the sample. To be included, firms had to first be located in the U.S. and to have conducted an IPO between 1995 and 2005. Public firms were chosen in order to have a consistent data source against which to measure both the independent and dependent variables. Within the entrepreneurship literature, using new ventures that have undergone an IPO is relatively common given the access to data it provides (see for example Bloodgood et al., 1996, Chang, 2004, Carpenter et al., 2003 and Robinson and McDougall, 2001). Similarly, U.S. firms were chosen for data availability as well as to have a way to eliminate the influence of other environmental variables that differ among countries. Including firms that conducted an IPO between 1995 and 2005 provided a larger sample size for testing the hypotheses.

Second, to be included in the sample, a firm had to be ten years old or less as of the IPO year. Within the entrepreneurship literature, a firm has been considered to be a new venture through either six (e.g. Robinson, 1999), eight (e.g. Biggadike, 1976) or ten years of age (e.g. Carpenter et al., 2003). In this study, we have followed the latter definition in order to allow time to fully examine the effect of new venture age on their subsequent reliance on external knowledge sources.

Third, high-technology industries were selected because of the high number of recent IPOs by new ventures, resulting in a greater sample size, and because internationalization has been observed to be pursued by high-tech new ventures in previous studies (Burgel and Murray, 2000, Coviello and Munro, 1997 and Zahra et al., 2000). New ventures were included in the sample only if their primary industry was classified as high-technology by the *Securities Data Corp (SDC) Global New Issues* database (Ranft and Lord, 2000).

Lastly, all ventures that were corporately held or that resulted from a corporate spin-off were eliminated from the sample (e.g., Carpenter et al., 2003, Florin et al., 2003 and Robinson and McDougall, 2001), leaving only those new ventures that were independently owned and operated.

4.2. Measures

The purpose of our study is to examine the impact of international exposure from network relationships on new venture internationalization. As the impact of international exposure can take time to materialize, it is important to have a time lag between the two sets of variables. Given that our sample firms have all undergone an IPO, we gathered our variables keeping in mind this major event. Thus, the independent variables were gathered during the time leading up to and as of the IPO year. The alliance partner international exposure considers all alliance partners of the venture prior to IPO. Although the geographically proximate firm international exposure is gathered as of the IPO year, the data do not change dramatically year after year, and are representative of the potential exposure in the subsequent years leading up to the IPO. Our dependent variable, new venture internationalization, has been gathered as of the first full year post-IPO in order to make sure the variable is being consistently, and comparatively, measured.³

4.2.1. New venture internationalization

There are many different ways to operationalize internationalization in the literature. We chose to use the measure of the venture's degree of international involvement based on foreign sales as of the year following its initial public offering for two reasons. First, foreign sales as a measure of internationalization has been widely used in the international entrepreneurship literature (e.g., Carpenter et al., 2003, Fernhaber and McDougall, 2009 and Leiblein and Reuer, 2004), offering a credible way of comparing and interpreting the results in light of other studies. Second, as the operationalization of international exposure from geographically proximate firms and alliance partners (our independent variables) in this study are based on the internationalization of the respective firms' sales, it made sense to examine the subsequent impact on the international sales of the new venture. New venture internationalization is therefore operationalized as foreign sales as a percentage of total sales and sourced from the segment data of Compustat North America.

4.2.2. International exposure from geographically proximate firms

The geographically proximate firms' international exposure variable considers the level of international sales by firms within the new venture's headquartered location as of the year of the new venture's initial public offering. This variable was operationalized by taking the percentage of public firms that had reported international sales within the respective location. The geographic unit of analysis was the metropolitan statistical area (MSA) of the new venture. Data for the computation of this variable were obtained from Compustat.

4.2.3. International exposure from alliance partners

To assess the international exposure of the alliance partners of a new venture, we first identified all alliance partners through the Joint Venture/Strategic Alliance Database of the SDC. Following Fernhaber et al. (2009), we then determined the number of alliance partners that were (1) headquartered outside the U.S., or (2) headquartered in the U.S. and had at least 10% of sales outside the U.S. A 10% threshold was used as the U.S. Securities and Exchange Commission (SEC) requires that public firms report their international sales data only if this threshold is met. This information was obtained via Compustat North America if the firm was public. Otherwise, a telephone inquiry and/or web search was made to determine how to classify the alliance partner. The resulting variable thus represented a count of the alliance partners that met either of the above criteria.

4.2.4. New venture age

Age might influence a new venture's propensity to internationalize as older firms typically have more resources (Autio et al., 2000, Kotha et al., 2001, Reuber and Fischer, 2002 and Zahra et al., 2000). The age of the new venture at IPO was determined from the founding date listed in the SDC's Global New Issues database and cross-validated within the new venture's prospectus.

4.2.5. Control variables

Multiple control variables were included in our model. The *international experience* of the new venture executives was controlled for, because it is a key source of prior knowledge (Casillas et al., 2009) that has been found to lead to new venture internationalization (Bloodgood et al., 1996, Carpenter et al., 2003, Reuber and Fischer, 1997 and Sapienza et al., 2006). New venture international experience was operationalized as the count of top management team members and board of directors who had worked in a foreign company or for the foreign subsidiary of a U.S. based company (Sambharya, 1996). If a top management team member was also on the board of directors, this person was counted only once. The data for the international experience variable were obtained through the new venture's IPO prospectus which contains a biographical sketch for each top management team and board member.

The size of the new venture was considered, because large firms have more resources available, which might influence their ability to internationalize (Bloodgood et al., 1996, Burgel and Murray, 2000 and Zahra et al., 2000). *New venture size* was operationalized through the new venture's total assets in its IPO year. Because all financial data are taken as of the fiscal year end following the new venture's IPO, the proceeds of the IPO are included in the assets figure. The logged format of this variable is included in the regressions.

New ventures may internationalize in order to leverage the research and development (R&D) costs associated with creating innovative products across a greater market volume or to generate extra profits to sustain their large-scale R&D operations (Oviatt and McDougall, 1995 and Qian and Li, 2003). To control for this possibility, the *R&D intensity* (sales divided by R&D expenditures) of the new venture was included in the model as sourced via Compustat North America. This variable was logged prior to inclusion in the analysis.

Although a primary interest in this study was the international exposure of a new venture's alliance partners, it was necessary to control for other benefits achieved through the alliance partner. Thus, we used a dichotomous variable to control for the presence of *alliance experience* by the new venture as of the IPO year. As not all of the new ventures in the sample have alliance experience, the inclusion of this variable enabled us to more accurately test the hypotheses relating to the international exposure from the new venture's alliance partners.

Although all new ventures included in the sample are considered to be high-technology, it is possible that differences exist by *industry*. For instance, ventures in the industry of computer equipment might be more prone to international exposure than those in the biotechnology industry. Thus, dummy variables were utilized to control for the high-technology industry group that the new venture belongs to. This information was obtained from the SDC's Global New Issues database and included the following industry groups: biotechnology, communications, computer equipment, and electronics. The comparison baseline is the industry of computer equipment.

We also control for the extent to which the industry may attract managerial attention when deciding on internationalization. All firms that belonged to the primary SIC code of each new venture were first identified in Compustat North America. Within each SIC code, the average foreign sales to total sales ratio of all firms was then calculated for the year prior to the new venture's IPO to control for the *industry internationalization*.

Similarly, a control variable was put into place for the extent of *industry agglomeration* in a new venture's headquartered location. Following previous researchers (e.g. Boasson et al., 2005 and Fernhaber et al., 2008), we used the cluster location quotient provided by the Cluster Mapping Project, an initiative of the Institute for Strategy and Competitiveness at Harvard Business School. The cluster location quotient is an index which indicates the degree to which a given metropolitan area has a higher, lower, or equivalent representation of cluster employment than what exists in the U.S. at large. Metropolitan areas with a cluster location quotient greater than 1 have a higher concentration of cluster employment than that which exists in the U.S., although those with a cluster location quotient less than 1 would be less concentrated than the U.S. as a whole.

Dummy variables were created to control for the year of *IPO*, because the new ventures identified in the sample had completed an IPO between 1995 and 2005 and each year could have had other unobservable effects (Carpenter et al., 2003).

4.3. Analysis

The new venture internationalization variable was continuous, but also left censored. Slightly more than half of the new ventures in the sample did not have any international sales, resulting in a zero being input for these variables. Accordingly, to account for this censoring as well as the continuous nature of the variables, an interval regression was used within Stata. Interval regression is a generalization of tobit regression in Stata that allows for more complex calculations and adjustments to the standard errors in an analysis, such as the robust cluster option described below.

The geographically proximate firms' internationalization variable is based upon the geographic location of the new venture. As the resulting database is thus comprised of new ventures that are nested within geographic locations, this initially led to the consideration of hierarchical linear modeling for analysis. However, the limited number of distinct locations and consequently limited sample size at the higher-order level was too small to generate adequate power to test cross-level interactions (Hofmann, 1997). Consequently, we applied the value for the location data to the lower-level unit of the new venture. One of the disadvantages of such an approach is that the observations are no longer independent (Bryk and Raudenbush, 1992), which could lead to biased results from correlated standard errors. To address this concern, we ran the interval regression analysis using the robust cluster option within Stata. The cluster option employs a classing feature, in this case based on the new venture's MSA location, which adjusts the standard errors based on intragroup correlations.

Before tests of the hypotheses were performed, all variables were analyzed for normal distributions and the presence of outliers. Because of the lack of linearity, the assets and R&D intensity variables were transformed by taking the natural logarithm (e.g., Preece et al., 1998). The alliance partners' internationalization variable was determined to have several extremely high count observations. Accordingly, the top 1% (four observations) were determined to be outliers and omitted from the analysis. We also ran regression with this variable winsorized to preserve the outlier observations and at the same time mitigate the skewed distribution (Shao et al., 2010 and Southam and Sapp, 2010); similar results were observed. To test for the hypothesized interaction effects, the new venture age, geographically proximate firms' and alliance partners' internationalization variables were multiplied together to create the respective 2-way and 3-way interaction variables. Before the interaction terms were created, each variable was mean-centered to facilitate the interpretation of the interaction coefficients (Cohen et al., 2010 and Jaccard and Turrissi, 2003).

5. Results

Correlations, means and standard deviations of the variables are presented in Table 1. The average age of the new ventures was 4.75 years, with the average size being \$148.25 million in assets. Of the 448 ventures, a total of 213 reported international sales.

Table 1
Means, standard deviations and correlations.

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. New venture internationalization	0.20	0.31	1.00									
2. New venture international experience	1.53	1.63	0.24	1.00								
3. New venture size	148.25	339.22	0.17	0.11	1.00							
4. R&D intensity	4.52	25.67	0.09	0.04	-0.28	1.00						
5. Alliance experience	0.40	0.49	0.03	0.04	0.02	0.18	1.00					
6. Industry (communications)	0.11	0.32	-0.09	-0.02	0.30	-0.34	-0.14	1.00				
7. Industry (biotechnology)	0.31	0.46	-0.10	0.05	-0.24	0.41	0.00	-0.24	1.00			
8. Industry (electronics)	0.04	0.20	0.13	0.00	0.25	-0.16	-0.05	-0.07	-0.14	1.00		
9. Industry internationalization	0.33	0.12	0.11	0.09	-0.19	0.32	0.11	-0.59	0.13	-0.01	1.00	
10. Industry agglomeration	3.65	6.32	0.12	0.03	0.05	0.04	0.08	-0.10	-0.24	0.12	0.04	1.00
11. IPO year (1996)	0.19	0.39	-0.23	-0.11	-0.27	0.14	-0.02	-0.05	0.19	-0.07	-0.02	0.00
12. IPO year (1997)	0.10	0.30	-0.11	-0.04	-0.20	0.00	-0.09	-0.05	0.03	-0.03	0.01	0.01
13. IPO year (1998)	0.06	0.23	-0.01	0.00	0.02	-0.09	0.02	0.07	-0.12	0.05	-0.16	0.00
14. IPO year (1999)	0.22	0.42	0.05	0.03	0.17	-0.13	-0.05	0.01	-0.34	0.00	0.08	0.06
15. IPO year (2000)	0.16	0.36	0.27	0.15	0.24	0.00	0.01	0.06	-0.07	0.16	-0.03	-0.04
16. IPO year (2001)	0.03	0.16	0.09	0.12	0.04	0.06	0.03	-0.02	0.01	-0.03	0.03	0.04
17. IPO year (2002)	0.02	0.13	0.02	0.03	-0.01	0.02	0.03	-0.05	0.06	-0.03	-0.03	-0.03
18. IPO year (2003)	0.02	0.15	0.11	0.04	0.09	-0.13	-0.04	-0.01	-0.01	0.04	0.02	-0.05
19. IPO year (2004)	0.08	0.27	0.02	0.07	0.12	0.03	0.07	0.00	0.26	-0.06	0.06	-0.05
20. IPO year (2005)	0.05	0.23	-0.05	0.01	0.01	0.05	0.05	0.04	0.19	-0.05	0.05	-0.09
21. Int'l exposure from geo. proximate firms	0.29	0.13	0.13	-0.08	-0.13	0.13	0.03	-0.10	-0.13	0.06	-0.01	0.42
22. Int'l exposure from alliance partners	0.52	1.01	0.15	0.01	0.11	0.14	0.63	-0.12	-0.03	-0.07	0.10	0.11
23. New venture age	4.75	2.03	0.08	0.03	-0.08	0.13	0.13	-0.11	0.18	0.01	0.07	-0.03

Note: Correlations with the absolute value greater than 0.09 are statistically significant at the p<0.05 level (n=448).

11	12	13	14	15	16	17	18	19	20	21	22	23
1.00												
-0.16	1.00											
-0.12	-0.08	1.00										
-0.26	-0.18	-0.13	1.00									
-0.21	-0.14	-0.10	-0.23	1.00								
-0.08	-0.05	-0.04	-0.09	-0.07	1.00							
-0.06	-0.04	-0.03	-0.07	-0.06	-0.02	1.00						
-0.08	-0.05	-0.04	-0.09	-0.07	-0.03	-0.02	1.00					
-0.14	-0.10	-0.07	-0.16	-0.13	-0.05	-0.04	-0.05	1.00				
-0.11	-0.08	-0.06	-0.13	-0.10	-0.04	-0.03	-0.04	-0.07	1.00			
0.20	0.03	0.08	-0.11	0.03	0.10	-0.08	-0.12	-0.23	-0.20	1.00		
-0.08	-0.06	0.07	0.02	-0.01	0.00	0.00	-0.02	0.05	0.04	0.10	1.00	
-0.01	-0.02	-0.06	-0.24	-0.07	0.07	0.05	0.05	0.22	0.15	0.04	0.10	1.00

To determine whether a problem of multicollinearity existed, the approach recommended by Neter et al. (1996) was followed and variance inflation factors (VIFs) were computed when all variables were included in each model. The VIFs ranged from 0.12 to 3.832, with a mean of 1.85 for the full model. The maximum VIF in each case is less than the VIF value of 10 noted by Neter et al. (1996) to indicate a major problem with multicollinearity.

The results of the interval regression on new venture internationalization are presented in Table 2. In Model 1, the control variables were entered. In Model 2, the impact of geographically proximate firms' internationalization and alliance partners' internationalization on new venture internationalization were examined. The two-way and three-way interaction variables were then entered in Model 3.

Table 2
Interval regression results (N= 448).

	Model 1		Model 2		Model 3	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
<i>Control variables</i>						
New venture international experience	0.029**	(0.01)	0.030**	(0.01)	0.031**	(0.01)
New venture size (log)	0.017	(0.01)	0.012	(0.01)	0.011	(0.01)
R&D intensity (log)	0.015*	(0.01)	0.012†	(0.01)	0.012†	(0.01)
Alliance experience	0.018	(0.04)	-0.043	(0.05)	-0.069	(0.05)
Industry (communications)	-0.149†	(0.08)	-0.119	(0.08)	-0.117	(0.08)
Industry (biotechnology)	-0.094*	(0.04)	-0.083†	(0.04)	-0.084†	(0.05)
Industry (electronics)	0.034	(0.09)	0.042	(0.08)	0.057	(0.08)
Industry internationalization	0.016	(0.18)	0.031	(0.16)	0.000	(0.17)
Industry agglomeration	0.005**	(0.00)	0.002	(0.00)	0.002	(0.00)
IPO year (1996)	-0.114**	(0.04)	-0.079†	(0.05)	-0.066	(0.05)
IPO year (1997)	-0.035	(0.05)	0.012	(0.05)	0.023	(0.05)
IPO year (1998)	0.042	(0.07)	0.069	(0.08)	0.096	(0.08)
IPO year (1999)	0.075	(0.07)	0.153†	(0.08)	0.171†	(0.09)
IPO year (2000)	0.329***	(0.08)	0.382***	(0.07)	0.389***	(0.08)
IPO year (2001)	0.221†	(0.13)	0.244*	(0.11)	0.248*	(0.11)
IPO year (2002)	0.305**	(0.11)	0.382***	(0.10)	0.386***	(0.10)
IPO year (2003)	0.364**	(0.13)	0.434**	(0.14)	0.440**	(0.14)
IPO year (2004)	0.203**	(0.06)	0.261***	(0.07)	0.262***	(0.08)
IPO year (2005)	0.265***	(0.08)	0.327***	(0.09)	0.331***	(0.09)
<i>Independent variables</i>						
Int'l exposure from geo. proximate firms			0.424*	(0.19)	0.381†	(0.21)
Int'l exposure from alliance partners			0.048†	(0.03)	0.077**	(0.03)
New venture age			0.018*	(0.01)	0.022**	(0.01)
<i>Interaction variables</i>						
Int'l exposure from geo. proximate firms×Int'l exposure from alliance partners					-0.241*	(0.10)
New venture age×Int'l exposure from geo. proximate firms					0.014	(0.07)
New venture age×Int'l exposure from alliance partners					0.023***	(0.01)
Int'l exposure from geo. proximate firms×Int'l exposure from alliance partners×New venture age					-0.079*	(0.04)
<i>Intercept</i>						
	0.143	(0.098)	0.133	(0.10)	0.147	(0.10)
<hr/>						
Log Pseudolikelihood	-273.190		-262.250		-257.610	
Wald χ^2	369.590***		475.490***		716.720***	
Incremental change (χ^2)			18.920***		36.350***	

† p<0.10.

* p<0.05.

** p<0.01.

*** p<0.001 (n= 448).

Hypothesis 1 argues that the degree of international exposure from geographically proximate firms is positively associated with new venture internationalization. There is support for this hypothesis ($\beta = 0.424$, $p < 0.05$), as shown in Model 2. Hypothesis 2 considers the possibility that international exposure from alliance partners is associated with greater new venture internationalization. As evidenced by Model 2, moderate support is found for this hypothesis, as indicated by the positive and statistically significant coefficient ($\beta = 0.048$, $p < 0.10$). There is a significant improvement in the Chi Square from Model 1 to Model 2 ($\Delta\chi^2 = 18.920$, $p < 0.001$), offering further support.

Hypothesis 3 posits an interaction between the geographically proximate firms' and alliance partners' international exposure for new venture internationalization. This was tested in Model 3 and was supported as shown by a negative and statistically significant coefficient ($\beta = -0.241, p < 0.05$). In order to better interpret the findings, we graphed the relationship in Fig. 1. Although the relationship between international exposure from geographically proximate firms and new venture internationalization is positive overall, it is to a lesser extent for new ventures with a greater degree of international exposure from alliance partners.

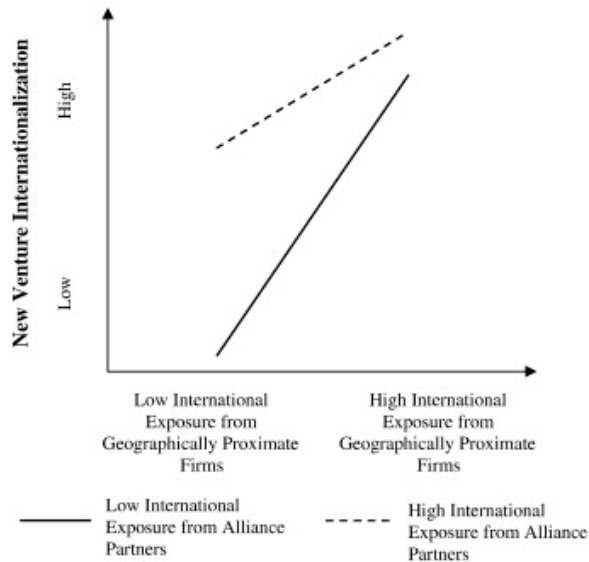


Fig. 1.

The moderating role of international exposure from geographically proximate firms on the effects of international exposure from alliance partners on new venture internationalization.

The next set of hypotheses recognizes the complexity of the network formality and new venture internationalization relationship and proposes that it is the interactive effect of age with the international exposure from formal and informal network relationships that affects new venture internationalization. Specifically, it is proposed in Hypothesis 4 that the international exposure from geographically proximate firms has a more positive effect on new venture internationalization when the new venture is younger. This interaction is tested in Model 3. As the regression coefficient for the two-way interaction term is not significant, Hypothesis 4 does not receive support.

In contrast, Hypothesis 5 posits that alliance partners' international exposure has a more positive effect on new venture internationalization when the new venture is older. As the regression coefficient in Model 3 for the two-way interaction term is positive and strongly significant ($\beta = 0.023, p < 0.001$), Hypothesis 5 is also supported. As shown in Fig. 2, the relationship between alliance partner international exposure and new venture internationalization is more positive for older ventures than for younger ventures.

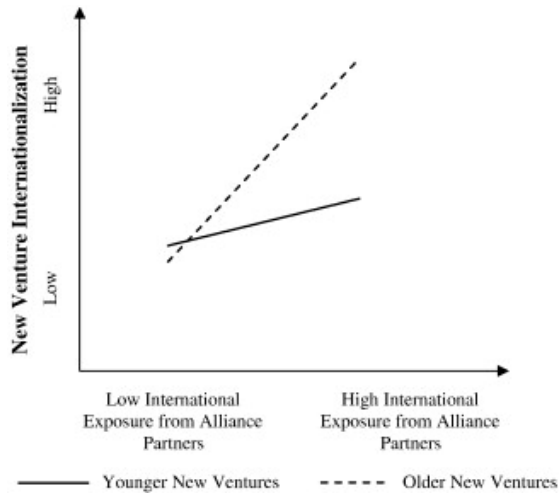


Fig. 2.

The moderating role of new venture age on the effects of alliance partners' international exposure on new venture internationalization.

It is lastly proposed in Hypotheses 6a and 6b that together new venture age, geographically proximate firms' international exposure and alliance partners' international exposure explain new venture internationalization. This three-way interaction was tested in Model 3 and supported ($\beta = -0.079, p < 0.05$). Fig. 3 illustrates the relationship. As shown by the steepest slope, international exposure from alliance partners increases new venture internationalization the *most* when older new ventures have less international exposure from geographically proximate firms. On the other hand, international exposure from alliance partners increases new venture internationalization the *least* when younger new ventures have more international exposure from geographically proximate firms. Thus, both Hypotheses 6a and 6b receive support.

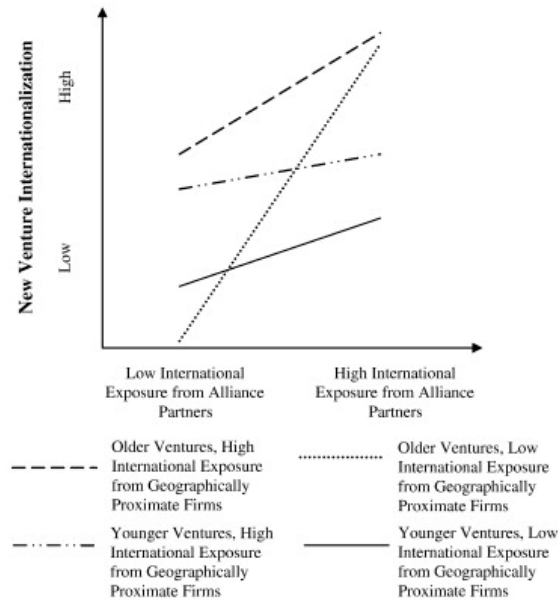


Fig. 3.

The 3-way interaction of new venture age, international exposure from geographically proximate firms, and international exposure from alliance partners on new venture internationalization.

As a robustness check of our analytical tool of the interval analysis, we replicated the tests by adopting two separate analyses with the dependent variable of international propensity (i.e., dummy variable of whether or not a venture internationalizes for the whole sample) and international intensity (i.e., international sales ratio for a subsample of internationalizing ventures), respectively.⁴ The results are largely the same to those reported above, offering further confidence in our findings.

We recognize that a new venture and its alliance partner can be co-located; that is, the alliance partner may be geographically proximate. Although it would be theoretically viable to include the international exposure of co-located alliance partners, we find that such cases are very limited in reality. Out of the 448 sample ventures, only 14 have co-located alliance partners. In the analyses reported, we did not control for the presence of co-located alliances. As a robustness test, we replicated the regression models by excluding the 14 ventures (that is, $n = 434$) and observed similar results as those reported in this article.

6. Discussion

The purpose of this study was to further examine the understudied role of international exposure through network relationships on new venture internationalization. As prior research has shown, informal and formal network relationships can impose varying effects on new ventures. Our study focused on two highly visible examples of informal and formal network relationships to examine how international exposure from these two network sources affects new ventures' internationalization and how these effects differ at different ages of ventures. We find that international exposure from both geographically proximate firms and alliance partners enhances new ventures' internationalization. Further, the positive relationship between international exposure from geographically proximate firms and venture internationalization is lessened when the venture has more international exposure from alliance partners. International exposure from alliance partners is found to be more influential to older ventures than to younger ventures. We also detect a three-way interaction of the two network sources of international exposure and venture age on venture internationalization. These results point to interesting contributions and fruitful areas for future research.

6.1. Contribution

Our research contributes to the international entrepreneurship, international business and strategic management literature. First, this study extends the international entrepreneurship literature by investigating the effects of international exposure through network relationships on new venture internationalization. Although our findings on the general impact of international exposure from network relationships are consistent with prior studies (Alvarez and Barney, 2005, Gulati, 1999, Johanson and Vahlne, 2006 and Johanson and Vahlne, 2009), results on the differential degrees of reliance on networks for venture internationalization are intriguing. The international exposures from informal versus formal network relationships are substitutive in terms of their effects on venture internationalization. As geographic proximate firms represent informal network relationships in our study, our results imply the importance of the surrounding environment in determining the level of internationalization achieved by a new venture. This is consistent with Ghannad and Andersson (2012) who similarly acknowledge the role of the environment on born-globals, albeit with their focus dating back to an entrepreneur's childhood. Yet, the substitutive nature of our findings implies that, while critical, subsequent relationships sought formally with other firms can be pursued in the absence of such an internationally exposed environment.

Further, for new ventures, the first several years after foundation are transformational. Our analysis shows that younger ventures are more subject to exposure from neighboring firms' internationalization and older ventures are more subject to exposure from formal alliance partners' internationalization. Although our study is not longitudinal in nature due to data restriction, the comparison between younger and older ventures seems to be suggesting an evolving role of network ties as a new venture emerges and grows,

which warrants future research. Along with other studies that have suggested age to be a defining factor in the new venture internationalization process (Autio et al., 2000 and Sapienza et al., 2006), our study highlights an additional way in which internationalizing new ventures potentially differ from the larger multinationals typically focused on in the international business literature.

Second, our research sheds light on the general international business literature by recognizing antecedents of firm internationalization beyond the firm boundary. As noted by Dunning (1995) and other international business researchers, the boundaries of a firm are becoming more and more blurred with a reliance on “alliance capitalism” or the interdependencies of a group of firms in the internationalization process. Johanson and Vahlne (2009) also updated their influential work on the gradual process model of internationalization developed in the 1970s to incorporate the increasing role of networks in firms' international expansion. While prior research has recognized the role of network resources, limited research has devoted effort in investigating how various types of network resources and/or network relations may differ in affecting ventures' internationalization. Our research concurs with the increased reliance on a network of firms, and more importantly points to the role of international exposure being *multidimensional*. Specifically, we emphasize that international exposure can be attained through *prior* work and/or educational experiences as well as through *ongoing* network relationships. Furthermore, network relationships can be informal (e.g. alliance) or formal (e.g. geographic proximate firms). New ventures can take advantage of international exposure from external network relationships (or network resources as suggested by Gulati (1999)) and their effects vary across types of network relationships. Our study represents a meaningful first endeavor in understanding the roles of different network resources and the interaction among these network resources for new ventures' internationalization.

Third, our study contributes to the strategy literature by broadening the application of the attention-based view to international new ventures. The attention-based view of the firm has been used in the strategy literature to explain the merger and acquisition integration process (Yu et al., 2005), real options reasoning (Barnett, 2008) and strategic change (Cho and Hambrick, 2006). A special issue of *Journal of International Business Studies* on managerial intentionality stresses that the “role that managers play in achieving certain internationalizations is...underdeveloped in the [international business] literature” (Hutzschenreuter et al., 2007: 1056). Although a direct measure of attention is challenging and sometimes not possible for firm-level studies, the attention-based view has been valuable in offering insights to research in multiple disciplines and fields. Yet, the application of the attention-based view in the entrepreneurship area, and specifically to internationalizing new ventures, is limited with the exception of Sapienza et al. (2005) on learning effort. Given that new venture managers have many issues vying for their attention and the ventures per se evolve quite dramatically in the start-up years, the attention-based view offers valuable insight in examining venture managers' decision-making process under uncertainties. Meanwhile, the evolving feature of new ventures offers the attention-based view a natural context to apply attention under different situations and attention structures. Our investigation of the substitutive effects between international exposure from informal network sources and that from formal network sources, along with the comparison of the effects of international exposure on new venture internationalization between younger and older ventures supports the importance of considering managerial attention (and associated bounded rationality) when studying venture activities. This is further exemplified with the result of the three way interaction, where international exposure from alliance partners increases new venture internationalization the *most* when older new ventures have less international exposure from geographically proximate firms. Although the age of the venture plays a role, international exposure that is limited to alliance partners seems to enable the venture to better focus and leverage the knowledge attained.

Our research has practical implications as well. For practitioners, we show that valuable resources and knowledge reside both inside and outside of firms. Ventures aiming to internationalize can and should take advantage of their networking resources from both geographically proximate firms and alliance partners.

Ventures should strategically locate in more internationalized communities and build relationships with more internationalized partners to enhance their exposure to international businesses. For policy makers, our study notes the benefits of geographic clusters for internationalization in addition to technology advancement.

6.2. Limitations and future directions

The present study has several limitations and opportunities for future research. The main limitation is that the adoption of archival datasets prevented us from investigating several aspects of ventures' international exposure from networks. We do not empirically assess managerial attention. As categorized by Ocasio (2011), much prior research on attention has “focused, directly or indirectly, on explaining organizational adaptation” (p. 1293). It is the same case with our study. Although the attention-based view is highly useful in enriching our understanding of venture internationalization, it is recommended that future studies attempt a fine-grained measurement of attention through surveys and interviews. Such design and implementation can be costly and challenging. Yet they will offer a channel to directly evaluate the change of managerial attentions rather than relying on outcomes of managerial attention shifts, which can contribute to both the management and neuroscience fields. Research incorporating direct measurement of attention can also contribute to the question of attention distribution between internal and external knowledge. That is, how does already-owned internal international business knowledge affect venture managers' attention to and interpretation of international exposure through network relationships, and vice versa?⁹ In the present study, we compare and contrast manager attention devoted to two network relationships for international exposure; but what if organization inertia prevents ventures from devoting further attention to external sources at all?

The employment of archival datasets also prohibited us from examining venture behavior prior to their IPOs. It is likely that some sample ventures have already been carrying out international activities before IPO. Although an ideal research setting would be following a sample of ventures from inception to an older age (10 years, for instance) and recording their international business activities, we unfortunately do not have access to such data. Instead, we choose to compare ventures of different ages in order to understand venture behavior at different stages. Also, due to the data restriction, we were unable to capture the varying learning capabilities by new ventures. In the face of international exposure, some new ventures are able to capture and take advantage of the “free” knowledge to a greater degree than others. Hence, it should be fruitful in offering both theoretical and practical implications to investigate how ventures' learning capabilities can possibly affect the effect of international knowledge spillover.

There are several limitations other than the reliance on archival data that warrant future research. First, we focus on a relatively narrow sample of ventures that are in high-technology industries, underwent an IPO, and are based in the United States. Our rationale for using such a sample is based on the availability of information to reach a large enough sample in order to test our hypotheses. Such a procedure is relatively common in the entrepreneurship literature. Although our study does represent an initial endeavor in investigating new ventures' international exposure through network relationships and the evolution of the importance of these external sources, the issue of generalizability remains. Further examination of knowledge sources by new ventures in broader contexts—firm (public vs. private), industrial (high-tech vs. non-high-tech), geographic (U.S. vs. non-U.S.) and temporal—is needed.

Second, although our study examines two important types of network relationships, other types of network relationships and therefore international exposure exist; these include universities, venture capitalists, business consultants, executives' personal contacts, competitors, etc. For instance, a very interesting and recent exposure of international business for ventures is the virtual business environment. With the increasing importance of the Internet in business, it is worth investigating how new ventures rely on the virtual business environment for international knowledge needed to internationalize. Further, conflicts

among different sources of international knowledge may arise. Research is warranted in investigating the complementary and supplementary relationships among different international knowledge sources (both internal and external) and their effects on new ventures' internationalization. This could include a more comprehensive examination of the international knowledge *controlled* by new ventures that takes into account the ventures' reliance on a network or group of firms to internationalize.

Third, our measure of the location of international exposure emphasizes the internationalization by public firms in a specific metropolitan statistical area. We did not consider the internationalization by private firms (particularly new private firms) because of the lack of information access to them. Although we believe the public firms and the information release through various channels on their domestic and international businesses make these public firms more visible to new ventures for possible international exposure effects than private firms, a comprehensive measure of the location of international knowledge incorporating both public and private firms will further advance our understanding of the spillover effects.

Fourth, the present study emphasizes the effect of international exposure on new venture internationalization; however, the ultimate question of performance (both survival and short/long-term performance) has not been answered. Although we highlight the international exposure effect on new venture activities, it is necessary to ask whether such activities resulting from/based on network influence are the “right” ones. Thus, we call for research efforts to study the performance implications of international exposure through networks.

Fifth, we considered all alliance partners as if they are of the same importance and of the same degree of trustworthiness. Such assumptions are questionable given the diversity of alliances and alliance partners. Thus, future research on the effects of alliance/alliance partner factors such as intensity of relationship and partner trust on managerial attention allocation and subsequent decision making regarding internationalization is warranted. Similarly, our study does not distinguish among ventures in terms of their embeddedness in the local business community. It is possible that footloose firms are more likely to be influenced by their neighboring firms than those at a relatively more central position of their local communities. Research differentiating types of ventures based on their network features would be worthwhile.

Sixth, although the existing literature and our theoretical arguments distinguish new ventures from their established counterparts in internationalization and our findings confirm the evolutionary feature of ventures, our study does not empirically test whether the evolutionary nature exists or does not exist in established firms. That is, our study does not perform a direct comparison between ventures and established firms regarding the impacts of network relationships on their internationalization. Future research that compares new ventures and established firms at different age ranges would enrich our understanding of firms' life cycles and their internationalizing activities at different stages.

Last but not least, there are at least two endogeneity issues that need to be considered by future research. First, Sapienza et al. (2005) examine how ventures' internationalization may affect their learning effort, domestically and internationally. Their study and ours compose a potentially endogenous learning loop between managerial attention on international knowledge from external sources and new venture internationalization. That is, venture managers' attention on international exposure from various network relationships affects new ventures' internationalization; internationalization by new ventures in turn influences how much attention their managers may pay to information on international businesses. Exploration of the feature of a “benign” loop of international learning and internationalization would be valuable and meaningful. Second, there are two types of dynamisms identified by the existing literature on international entrepreneurship and our study—one of the evolution of new ventures' network relationships, and one of the evolution of venture managers' attention to and action upon these network relationships.

These two dynamisms are not independent from each other and take place simultaneously. Fruitful research on the potential endogeneity between the evolution of networks and the evolution of managers' attention to and action upon the evolving networks is warranted.

7. Conclusions

In conclusion, our study demonstrates that international exposure remains a key catalyst leading to internationalization. For new ventures pursuing internationalization, international exposure can be gleaned and leveraged through both geographically proximate firms and alliance partners. Further, the effects on new venture internationalization of international exposure from informal network relationships (e.g. geographically proximate firms) differ from the effects of international exposure from formal relationships (e.g. alliances). These two sources of international exposure substitute for each other. Moreover, ventures at different ages are subject to the international exposure from these two network sources at varying levels. Thus, our study offers important insights into how new ventures defy the in-house step-by-step international processes outlined by traditional international business theory and rely on network resources to internationalize. Our study shows that this line of inquiry has important implications for the theory and management of new venture internationalization.

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