

## INTERNATIONAL ENTREPRENEURSHIP: LEVERAGING INTERNAL AND EXTERNAL KNOWLEDGE SOURCES

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*International knowledge is a key intangible resource for international entrepreneurship. Yet, given the liabilities of newness and foreignness, how do new ventures obtain international knowledge? In this study, we draw on the knowledge-based view to investigate both internal and external sources of international knowledge for 206 new ventures. The findings suggest international knowledge may be sourced externally, including from alliance partners, venture capital firms, and firms in close proximity. Interestingly, and contrary to absorptive capacity arguments, new ventures with limited internationally experienced top management teams benefited most from external international knowledge sources. Copyright © 2009 Strategic Management Society.*

### INTRODUCTION

International entrepreneurship involves the ‘discovery, enactment, evaluation, and exploitation of opportunities across national borders to create future goods and services’ (McDougall and Oviatt, 2005: 540). Since first appearing in the academic literature two decades ago, research under the auspices of international entrepreneurship has developed into a rich area of scholarly inquiry. New ventures represent the bulk of international entrepreneurship research (Zahra and George, 2002b), and they are a particularly intriguing area of study given their need to overcome considerable constraints related to newness and smallness in order to internationalize (Knight, Madsen, and Servais, 2004). This study extends this growing body of international entrepreneurship literature by

examining how new ventures can leverage both internal and external international knowledge in achieving greater internationalization.

In order to internationalize, a firm must possess a competitive advantage that enables it to overcome the additional costs of cross-border operations and be competitive in foreign markets (Dunning, 2000; Rugman, 1981). This requires resources. Although firms have traditionally leveraged tangible resources in foreign markets, the intangible resources represent a more sustainable source of competitive advantage due to the difficulties competitors face in replicating them (Kotha, Rindova, and Rothaermel, 2001; Knight and Cavusgil, 2004). For new ventures in particular, international knowledge (e.g., information, beliefs, and skills that organizations can apply to their international activities) has been demonstrated as a key intangible resource leading to internationalization (Bloodgood, Sapienza, and Almeida, 1996; Carpenter, Pollock, and Leary, 2003; Reuber and Fischer, 1997).

To date, international entrepreneurship scholars have focused on the prior international experiences of a new venture’s top management team (TMT) as the

Keywords: new ventures; internationalization; alliances; venture capital; location

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primary source of international knowledge. Such an approach is consistent with Hambrick and Mason's (1984) upper echelon theory, which suggested managers are influenced by their backgrounds and ultimately develop biases, attitudes, values, aspirations, and behaviors based on their life experiences. As prior knowledge leads to the identification of opportunities (Shane, 2000; Wiklund and Shepherd, 2003), new ventures with greater stocks of international knowledge attained through their TMTs' prior experiences are believed to identify more international opportunities. Thus, they pursue a higher level of internationalization. New ventures can also leverage the international experience of their TMTs to form alliances in the international arena (Reuber and Fischer, 1997) that can help them gain credibility in foreign markets (Lu and Beamish, 2001; Shrader, 2001). Furthermore, new ventures with internationally experienced TMTs appear to internationalize sooner (Reuber and Fischer, 1997). Earlier internationalization enables organizational routines and structures to be better integrated with international considerations, resulting in greater efficiency (Oviatt and McDougall, 1995), faster international growth (Autio, Sapienza, and Almeida, 2000), and more foreign sales as a percentage of total sales (Reuber and Fischer, 1997).

Although this focus on the international knowledge sourced internally through TMT prior experiences has increased our understanding of new venture internationalization, there has been little investigation into international knowledge sourced outside a new venture's organizational boundaries. This is rather surprising given the noted importance of the external environment to new venture internationalization (e.g., Coviello, 2006; Johanson and Vahlne, 2003). External sources of international knowledge are likely important to overcome liabilities of newness and foreignness. New ventures tend to rely on external knowledge sources to verify that they are on the right path to improve their chances of success (McGrath and MacMillan, 1995). This is also likely for internationalizing ventures, as external sources of international knowledge may shape and improve their transition into foreign markets. Although internationalizing new ventures can rely on the prior international experiences of their TMTs, the international environment is continuously changing (Hitt, Keats, and DeMarie, 1998), and it is expected that the value of these experiences will decrease with time (Anand, Glick, and Manz, 2002). In this study, we develop a knowledge-based model of internationalization to investigate the role of

external sources of international knowledge for a sample of 206 new ventures. In doing so, we further examine the potential complexity involved in leveraging external knowledge sources by considering whether or not the existing level of internal knowledge matters to this process. Competing hypotheses are put forth and tested.

The significance of this research is fourfold. First, the impact of knowledge on action is fundamental to theories of management, strategy, and internationalization (McEvily and Chakravarthy, 2002; Wiklund and Shepherd, 2003). A major contribution of this study is to distinguish among sources of new ventures' international knowledge and to specify the relationship between these sources and internationalization. Second, absorptive capacity is recognized as an organizational mechanism for integrating internal and external sources of knowledge (Cohen and Levinthal, 1990; Zahra and George, 2002a). This study puts forth an alternative framework for understanding this knowledge integration process and demonstrates instead that new ventures with low levels of internal knowledge were found to benefit more from the knowledge vicariously exploited through alliance partners and venture capital firms. Third, network and economic-geography theories have found technical knowledge can spill over and be a source of knowledge for firms other than the originators of that knowledge (Audretsch and Feldman, 1996; Feinberg and Gupta, 2004). We extend these mechanisms to the transfer of another type of knowledge—international knowledge. This opens the possibility that many other types of knowledge can also be spilled over. Finally, our research addresses a noted gap in the international entrepreneurship literature pertaining to the factors influencing a new venture to internationalize (Zahra and George, 2002b), thereby contributing to the growing body of entrepreneurship literature on new venture internationalization. We find that new ventures do not necessarily internationalize alone, but rather through the exploitation of external knowledge sources. These findings offer key insights to managers of new ventures that desire to internationalize.

## THEORY AND HYPOTHESES

### International knowledge and new venture internationalization

The knowledge-based perspective is essentially an outgrowth of the resource-based view, in which

knowledge is viewed as the most strategically important of the firm's resources (Grant, 1996). Much of the research in this area considers the competitive implications of the knowledge created by the firm, such as market or technological knowledge (McEvily and Chakravarty, 2002; Wiklund and Shepherd, 2003). However, research on international entrepreneurship has frequently highlighted the critical role of international knowledge when entering the foreign marketplace. Organizational knowledge refers to 'any information, belief, or skill that the organization can apply to its activities' (Anand *et al.*, 2002: 88). Building on this definition, we define *international knowledge* as the information, beliefs, and skills that organizations can apply to their internationalization activities.

The primary source of a firm's international knowledge lies within the prior international experiences of its management team (Grant, 1996). Hambrick and Mason's (1984) upper echelon theory suggests managers are influenced by their backgrounds and ultimately develop biases, attitudes, values, aspirations and behaviors based on their life experiences. Individuals who have spent significant amounts of time abroad, whether related to work, education, or pleasure, will develop greater familiarity and understanding of the respective international market. When these individuals serve as members of a firm's management team, this experience translates into a stock of international knowledge. Such individuals are similar to those who have been termed *returnee entrepreneurs*, as they first accumulate international experience and then start a new venture (Filatotchev *et al.*, 2009). It is likely that new ventures with greater stocks of international knowledge will ultimately pursue higher levels of internationalization. More prior knowledge leads to the identification of a greater number of opportunities and more radical opportunities (Shepherd and DeTienne, 2005; Wiklund and Shepherd, 2003). Individuals are more alert to opportunities that exist in areas in which they have experience (Ardichvili, Cardozo, and Ray, 2003; Shane, 2000). Likewise, new ventures' management teams with more extensive international experience are more likely to identify more potential international opportunities for their ventures. As the decisions made by a new venture are essentially a reflection of its management team (Hambrick and Mason, 1984), the end result is a higher level of internationalization (Bloodgood *et al.*, 1996). Empirical evidence largely supports the linkage between the international

knowledge held by the management team and firm internationalization in studies of both existing firms (Sambharya, 1996) and smaller, entrepreneurial ventures (Bloodgood *et al.*, 1996; Reuber and Fischer, 1997).

Thus, while the top management team serves as a likely internal source of international knowledge for new ventures, it is also possible that external sources of international knowledge play an important role. The international environment is continuously changing and creating competitive pressures (Hitt *et al.*, 1998). The international knowledge attained through the prior experiences of a new venture's TMT is beneficial, but may lose value over time because it becomes outdated or less relevant to the current situation (Anand *et al.*, 2002). Unlike existing multinationals, new ventures have not yet had the chance to build up an operating history from which to learn. Nor do new ventures typically have the ability to devote a significant amount of time or resources to researching international markets. These challenges are believed to be overcome partly through relationships with other organizations that are facilitated either through formal partnerships or informal social contact. For example, Anand *et al.* (2002) pointed out that an organization's strategic partners can provide capital, technology, and/or other firm-specific assets (such as tacit knowledge). Likewise, informal relationships are seen as especially valuable for new ventures to acquire knowledge (Birley, 1985), and informal relationships between organizations are believed to be developed by being located in a close geographic proximity (Audretsch and Feldman, 1996). In the next section, we further discuss the potential impact of three external sources of international knowledge—alliance partners, venture capital firms, and proximal firms—on new venture internationalization.

## External sources of international knowledge

### *Alliance partners*

Defined as cooperative interfirm agreements that aim to achieve competitive advantages for each partner (Das and Teng, 2000), strategic alliances exemplify a key formal relationship that can help a new venture access the necessary resources to grow (Baum, Calabrese, and Silverman, 2000; Sarkar, Echambadi, and Harrison, 2001). Although the resources being formally exchanged through

interfirm agreements likely contribute to growth, new ventures are believed to also learn from the information or knowledge gained through these relationships (Johannisson, 2000). For example, new ventures may acquire business intelligence or information on new business opportunities through interacting with their alliance partners. Hite (2005: 113) argued that the partners of a new venture provide the 'conduits, bridges, and pathways through which the firm can find and access external opportunities and resources.' Furthermore, strategic alliances are deemed to be the most important source for innovation and new ideas (Dyer and Singh, 1998), as well as a critical source for attaining tacit market knowledge (Anand *et al.*, 2002)—both of which are valuable for a new venture that is trying to grow and survive.

Strategic alliances, therefore, serve as key external sources of knowledge for new ventures. Accordingly, the extent to which an alliance partner operates in, or interacts with, international markets likely influences how international are the resulting opportunities and knowledge resources for the new venture. Existing theoretical work has proposed a positive link between alliance usage and new venture internationalization (Coviello and Munro, 1995). Although it has not yet been empirically tested, we suggest that the transfer of international knowledge partly contributes to this relationship (Johanson and Vahlne, 2003) and that more international knowledge by alliance partners will be associated with greater impact on the new ventures' international efforts. Multiple studies support this assertion. In a survey of small entrepreneurial firms, Coviello and Munro (1995) reported that 64 percent of the firms indicated their initial foreign market entered and entry mode used were triggered by opportunities presented by alliance partners, rather than by their own proactive identification process. Chen and Chen (1998) similarly argued that alliance networks drive and facilitate more foreign direct investment. They also observed that smaller firms tend to rely more heavily on networks than larger firms when internationalizing. This is likely because smaller firms have fewer options and less information with which to make decisions than larger firms. New ventures are typically smaller firms (Hanks *et al.*, 1993). Entering into alliances with partners that have more international experience and/or foreign presence can further contribute to new venture internationalization through increased local market knowledge (Lu and Beamish, 2001). Thus:

*Hypothesis 1 (H1): The higher the international knowledge of a new venture's alliance partners, the greater the new venture's internationalization.*

#### *Venture capital firms*

Another important relationship for new ventures to access new information and develop knowledge is with venture capital firms. Existing research suggests venture capital firms may provide more than just financial assistance to new ventures (Sapienza, 1992). For example, it appears that venture capital firms add value to new ventures through the provision of management expertise (Baum and Silverman, 2004; Ruhnka, Feldman, and Dean, 1992), reputational benefits (Chang, 2004), employee recruitment (MacMillan, Kulow, and Khoylian, 1988), and strategy formulation (Fried, Bruton, and Hisrich, 1998; MacMillan *et al.*, 1988). We believe that an additional way in which venture capital firms can add value to new ventures is through the sharing of knowledge pertaining to internationalization, as this sharing is likely a result of venture capital firms' managerial influence over the new ventures in their portfolio.

Venture capital firms tend to play active roles in the new ventures in which they invest (Baum and Silverman, 2004; Ruhnka *et al.*, 1992) and have even been considered to be part of a venture's human resources (Florin, Lubatkin, and Schulze, 2003). This is largely due to the high level of risk associated with venture capital financing and the fact that these venture capital firms want to not only protect their investment but do whatever it takes to ensure high returns (Fried *et al.*, 1998). In some cases, the investment by a venture capital firm can spur the replacement of certain management positions within the new venture (sometimes even the actual founder), a membership on the board of directors, or ongoing forms of performance monitoring (Carpenter *et al.*, 2003; Fried *et al.*, 1998). Venture capital firms have even been known to relocate ventures in order to gain certain location-specific advantages (Cumming, Fleming, and Schwienbacher, forthcoming). In other words, due to their equity stake and provision of scarce financial resources, venture capital firms have many opportunities to influence the strategic direction of their portfolio ventures. This influence can be seen as coercive, in that the pressures to conform to the demands of the venture capital firm are met with relatively high pressure, given the resource dependency of the new venture (Mäkelä and Maula, 2005).



A selective review of the venture capital literature provides evidence that venture capital has become an international phenomenon and that venture capital firms are making extensive investments outside of their domestic markets (Cumming *et al.*, forthcoming; Cumming and Walz, forthcoming; Wright, Pruthi, and Lockett, 2005). If a particular venture capital firm has greater international expertise or knowledge, the new venture is more likely to be encouraged to internationalize; and after initial internationalization, the venture capital firm may lend its international knowledge to support the venture in increasing its international position. As demonstrated by De Prijcker *et al.* (2009), venture capital firms are able to exploit their networking and human resources across geographic boundaries in order to benefit their portfolio investments. These venture capital firms can leverage their reputational resources to help increase acceptance of foreign ventures in their home market, as well as offer key international knowledge relating to areas such as recruiting, identifying customers, introducing the venture to key business partners, and providing insight regarding the foreign legal requirements as well as connections to local financiers (Mäkelä and Maula, 2005). Prior research has explored how greater ownership by external investors leads to a greater level of firm internationalization (George, Wiklund, and Zahra, 2005). We add to these findings by signifying how venture capital firms can facilitate new venture internationalization—through the transfer of international knowledge. We also acknowledge that venture capital firms differ in their impact, depending upon the extent to which they are internationally experienced. Thus,

*Hypothesis 2 (H2): The higher the international knowledge of a new venture's venture capital firm, the greater the new venture's internationalization.*

#### *Proximal firms*

The concept of knowledge spillovers suggests firms benefit from the knowledge of other firms through informal interactions and emphasizes the importance of being located in the same geographic proximity for the knowledge transfer to take place (Adams and Jaffe, 1996; Audretsch and Feldman, 1996). Saxenian (1990: 97) explains how people 'meet at trade shows, industry conferences, and the scores of seminars, talks, and social activities organized by local business organizations and trade associations.

In these forums, relationships are easily formed and maintained, technical and market information is exchanged, business contacts are established, and new enterprises are conceived.' The value of knowledge spillovers is perhaps best illustrated in high R&D-intensive industries where MNCs have been found to base their R&D lab location decision on the potential for knowledge spillovers (Feinberg and Gupta, 2004). The extent to which knowledge can be spilled over is determined in part by the extent to which the relevant industry has a presence in the particular geographic area. In the example of the software industry, Silicon Valley is the most well-known region for software development. However, other leading software areas in the U.S., such as Boston, San Francisco, or Austin can also be places where knowledge spillovers benefit software new ventures. While generally applied to more technological knowledge, we believe knowledge spillovers are also relevant to international knowledge. If more firms within a new venture's headquartered location are international, there is greater opportunity for the international knowledge of these firms to spillover and influence the knowledge of new ventures nearby (Fernhaber, Gilbert, and McDougall, 2008). Thus:

*Hypothesis 3 (H3): The higher the international knowledge of proximal firms in a new venture's headquartered location, the greater the new venture's internationalization.*

#### **Internal and external sources of international knowledge: complements or substitutes?**

As discussed earlier, alliance partners, venture capital firms, and proximal firms serve as viable sources for new ventures to attain knowledge for internationalization. The international knowledge is not necessarily part of a formal resource exchange, but rather believed to be an indirect benefit exploited by the new venture through this relationship. Although it is posited that these external sources of international knowledge will have a direct effect on new venture internationalization, it is likely that the international knowledge of a new venture's TMT will influence the extent to which the new venture taps into and benefits from these external knowledge sources. Yet, the literature suggests two different schools of thought as to whether it is the new ventures with greater or lesser internationally knowledgeable TMTs that would benefit more from these external knowledge sources. On one hand, new

ventures with greater internationally experienced TMTs may be better able to recognize the value of the international knowledge in their networks and also better able to apply the knowledge when internationalizing. On the other hand, new venture TMTs with limited or a lack of international knowledge may be more motivated to overcome their shortcoming and pay closer attention to the knowledge of their external network partners. Thus, it is not clear whether internal and external sources of international knowledge would serve as complements or substitutes for new venture internationalization. In the following paragraphs, we draw upon the absorptive literature to develop a set of hypotheses reflecting the view that new ventures with greater internationally experienced TMTs will benefit more from the knowledge of their external network partners. Then we develop a competing set of hypotheses reflecting the second view.

The absorptive capacity literature stresses that firms differ in their ability to ‘recognize the value of new information, assimilate it, and apply it to commercial ends’ (Cohen and Levinthal, 1990: 128). This absorptive capacity is typically developed based on firms’ prior experiences and relevant knowledge bases (Zahra and George, 2002a). A complementary link between internal and external sources of knowledge is supported by multiple studies (Kumar and Nti, 1998; Nielsen, 2005) that found existing knowledge capabilities of a firm—such as the ability to assimilate knowledge—greatly improve the performance outcomes of an alliance through the creation of new knowledge. In the case of alliances formed abroad, research also demonstrates that a firm’s absorptive capacity influences the ability to acquire knowledge from the foreign parent (Lane, Salk, and Lyles, 2001).

In the venture capital process, firms with greater absorptive capacities were found to be more likely to invest in new ventures due to their increased ability to tap into the knowledge being generated by the venture (Dushnitsky and Lenox, 2005). Keil (2004) similarly examined how investing firms develop learning capabilities to more successfully create and develop new ventures. In the same way, the absorptive capacity of a new venture likely defines how much knowledge can be taken away and integrated from the investing partner.

For proximal firms, the literature again concurs that greater experience in a particular area shapes and facilitates firms’ abilities to absorb knowledge spillovers (Macher and Boerner, 2006). This is

corroborated by Negassi (2004), whose findings highlighted the necessity of firms to have sufficient absorptive capacity to either attract partners in collaborative arrangements or benefit fully from externally sourced knowledge. Rothaermel and Thursby (2005) similarly examined how knowledge flowed from the university to incubator firms and concluded that the absorptive capacity of the incubator firms impacted their ability to transform university knowledge into competitive advantages.

Thus, it appears that firms with more experience and/or larger related knowledge bases are able to take greater advantage of the knowledge being spilled over into their environments. In the context of international knowledge, this suggests that a new venture with a more internationally experienced TMT has a greater absorptive capacity to recognize the value of new information about foreign opportunities sourced from external relationships (alliance partners, venture capital firms, and proximal firms) and assimilate it with current knowledge for the purposes of internationalizing. Even if new venture TMTs with lesser international knowledge come across similar international opportunities, they may not be able to as effectively evaluate the potential value of these opportunities and are, therefore, less likely to draw on the knowledge to internationalize. Thus:

*Hypothesis 4a (H4a): The positive relationship between the international knowledge of a new venture’s alliance partner and new venture internationalization will be **more** positive for TMTs with greater international knowledge than for TMTs with lesser international knowledge.*

*Hypothesis 5a (H5a): The positive relationship between the international knowledge of a new venture’s venture capital firms and new venture internationalization will be **more** positive for TMTs with greater international knowledge than for TMTs with lesser international knowledge.*

*Hypothesis 6a (H6a): The positive relationship between the international knowledge of proximal firms in a new venture’s headquarter location and new venture internationalization is **more** positive for TMTs with greater international knowledge than for TMTs with lesser international knowledge.*

However, as previously mentioned, an alternative set of hypotheses is plausible. New venture TMTs

that have limited international knowledge could be more motivated to look to their external network for strategic direction. A new venture is generally characterized as having a 'high ratio of assumption to knowledge' (McGrath and MacMillan, 1995: 4), leading it to frequently look to external sources to verify that it is on the right path and improve its chance of success. External knowledge sources are important, as they make up for (or substitute for) a limited set of internal knowledge resources. Indeed, one of the core components of the liability of newness put forth by Stinchcombe (1965) is that new ventures must rely heavily on social relationships for survival. In the context of international knowledge, this implies that if a new venture has limited internal international knowledge, it must more heavily rely on external sources of international knowledge to guide its strategic decisions. In other words, new ventures with little international knowledge develop a greater motivation to search for and vicariously exploit international knowledge in their external environments. In contrast, new ventures with more internationally knowledgeable TMTs will still benefit from external knowledge sources, but there will be less reliance on, and motivation to exploit, the external source knowledge.

This is corroborated by neoinstitutional theory, which demonstrates that in times of uncertainty, firms are more likely to look to visible and comparable firms in their environments in order to interpret their own situations and act accordingly (Haunschild and Miner, 1997). Uncertainty can be linked to newness and/or a lack of experience (Shepherd, Douglas, and Shanley, 2000). In a study of Japanese firms' entry mode choices, Lu (2002) found experience to moderate the relationship between isomorphic behavior and foreign entry mode choice. Firms with less foreign entry experience tended to rely more on other firms' past entry mode choices in deciding how they would enter a country. In the same vein, new ventures with less international experience are likely to be facing greater uncertainty and, therefore, rely more on other firms' international knowledge.

New venture TMTs with lesser experience are also likely to benefit more from external sources of international knowledge because they have more knowledge gaps needing to be filled. It is important to point out that the external knowledge exploitation can occur deliberately when a new venture decides to pursue an international strategy while recognizing its own internal knowledge shortfall. However, it

can also occur unintentionally. In some instances, a new venture can be pulled into international markets by its partners or by opportunities that are presented to them. Whether the initial decision to internationalize is deliberate or unintentional, there are still sizable knowledge gaps for new ventures with lesser internationally experienced TMTs. In addition, a lack of international experience also makes new ventures more aware and open to tapping into external sources.

Thus, it appears that firms with less experience and/or related knowledge base could be more motivated to take advantage of, and benefit from, the knowledge being spilled over into their environments. This implies that new ventures with less internationally experienced TMTs would play closer attention to the foreign opportunities identified through external relationships (alliance partners, venture capital firms, and proximal firms) and assimilate them for the purposes of internationalizing. Thus:

*Hypothesis 4b (H4b): The positive relationship between the international knowledge of a new venture's alliance partner and new venture internationalization will be less positive for TMTs with greater international knowledge than for TMTs with lesser international knowledge.*

*Hypothesis 5b (H5b): The positive relationship between the international knowledge of a new venture's venture capital firms and new venture internationalization will be less positive for TMTs with greater international knowledge than for TMTs with lesser international knowledge.*

*Hypothesis 6b (H6b): The positive relationship between the international knowledge of proximal firms in a new venture's headquartered location and new venture internationalization is less positive for TMTs with greater international knowledge than for TMTs with lesser international knowledge.*

## METHODOLOGY

### Sample and data

Data were collected for U.S. high-technology new ventures that issued initial public offerings (IPOs) from 1996 to 2000. Consistent with other new venture studies (Robinson, 1999), a firm was deemed to be a new venture if it was six years old or less at

the time of IPO. The first six years are regarded by the U.S. Small Business Administration as a crucial period in which survival is determined for a majority of companies. Sampling over multiple years provided an adequate sample size and helped avoid potential biases introduced by sampling from only one year. IPO firms were sampled, as they were likely to be growth oriented and, thus, more likely to consider foreign markets in their early years. High-technology industries were selected because these industries are expected to have greater variance in new venture internationalization (Kotha *et al.*, 2001; Zahra, Ireland, and Hitt, 2000). Prior research also suggests technological knowledge is a principal means of gaining global market share and cross-border integration (Kobrin, 1991). Firms were deemed to be high-technology if they were so classified by SDC's Global New Issues database, which included subcategories of communications, computer equipment, and electronics. All corporately held ventures (subsidiaries) and spinoffs were eliminated from the sample. Also, only firms that exhibited sales revenue in the year following IPO were retained in the sample in order to have a one-year lag time between independent and dependent variables.

Based on the above criteria, 227 high-technology new ventures that underwent an IPO between 1996 and 2000 were identified through the Securities Data Corp (SDC) Global New Issues database. The sample size was then reduced to 206, as only firms that exhibited sales revenue in the year following IPO were retained in the sample (in order to have a one-year lag time between independent and dependent variables). Unless otherwise stated, all independent variables were gathered at the end of the fiscal year in which the new venture underwent the IPO. All dependent variables were gathered as of the end of the fiscal year following the IPO year. This resulting sample represented new ventures in three high-technology industries and 37 different metropolitan statistical areas (MSA) throughout the United States. In terms of size, the average new venture achieved \$185.47 million in assets and \$53.72 million in sales at the time of IPO.

### Dependent variables

New venture internationalization refers to the seeking of 'significant competitive advantage from the use of resources and sale of outputs in multiple countries' by firms from, or near, inception (Oviatt

and McDougall, 1994: 49). In this study, multiple measures—including international sales intensity, international asset intensity, and international scope—were used to conceptualize new venture internationalization. These measures are consistent with Sullivan's (1994) theoretical dimensions of internationalization. The data were obtained from Compustat North America.

#### *International sales intensity*

The international sales intensity of a new venture represents the performance dimension and is defined as the venture's degree of international involvement based on sales. It was operationalized as foreign sales as a percentage of total sales (Carpenter *et al.*, 2003; Preece, Miles, and Baetz, 1998) in the year following its IPO.

#### *International asset intensity*

To assess the structural dimension of internationalization, we draw on the international asset intensity, which assesses the venture's degree of international involvement, taking into account the location of the venture's assets as of the year following its IPO. The variable was operationalized as foreign assets as a percentage of total assets (Daily, Certo, and Dalton, 2000; Sambharya, 1996).

#### *International scope*

The international scope variable considers the attitudinal dimension and examines the extent to which a new venture enters foreign markets outside its home region (Preece *et al.*, 1998). This variable was operationalized using a count of the number of continents a venture had sales in as of the year following the venture's IPO (Preece *et al.*, 1998). As firms are argued to internationalize to nearby countries (intraregion) more so than to distant countries (extraregion) (Rugman and Verbeke, 2004), this operationalization was deemed to be an appropriate indicator of the extent to which the venture sold beyond adjacent international markets.

An index of new venture internationalization was also calculated based on a factor analysis of the international sales intensity, international asset intensity, and international scope variables (e.g., Fernhaber *et al.*, 2008). The Cronbach alpha for the composite measure was 0.86 and produced similar results in the regression analyses, offering additional support for our findings. We present the results based on the individual measures.



## International knowledge variables

### *International knowledge of alliance partners*

Alliance partners of a new venture were initially identified through the Joint Venture/Strategic Alliance database of Securities Data Corp (SDC). We considered any alliance partnership that had been formed up until the initial public offering of the new venture. The alliance partners of a new venture were deemed to have international knowledge if they were (1) headquartered outside the U.S. or (2) headquartered in the U.S. and had at least 10 percent of sales outside the U.S. A 10 percent 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 Web search was made to determine how to classify the alliance partner. For each new venture, the number of alliance partners that met either criterion was then summed (Kotha *et al.*, 2001). Thus, if a new venture had five alliance partners, but only three had international sales, a three would be entered for this variable. We felt a sum was felt more appropriate than taking the average or percentile, as each additional partner brings its knowledge into the alliance relationship and impacts the new venture.

### *International knowledge of venture capital firms*

We identified venture capital firms for each new venture through the Venture Economics Database of the SDC (e.g., Chang, 2004) and considered all venture capital firms that had invested in the new venture up until the initial public offering. For each venture capital investor, it was first assessed as to whether or not any international investments in their current and past funds had been made. This information was provided by SDC's Venture Economics Database. For each new venture, we then calculated the count of venture capital firms with prior international investments. If a venture capital investor with prior international investments was involved in multiple rounds of funding for the new venture, it was counted for each of these rounds. Due to a lack of linearity, the variable was transformed by taking its natural logarithm (Cohen *et al.*, 2003).

### *International knowledge of proximal firms in headquartered location*

Based on Compustat data, we calculated the percentage of public firms that had reported international

sales within the respective headquartered location of the new venture. Similar to other studies examining colocation issues, we used the metropolitan statistical area (MSA) as the geographic unit of analysis (e.g., Fernhaber *et al.*, 2008; Marquis, 2003).

### *International knowledge of TMT*

The TMT is defined as the top executives of the venture and does not include external board members (consistent with other TMT research, including Hambrick and Mason, 1984; Sambharya, 1996; Shrader, Oviatt, and McDougall, 2000). The international experience of the new ventures' TMT was assessed by examining the IPO prospectus for each venture. The prospectus includes a list and brief biography of all members of the TMT. Consistent with previous scholars (Bloodgood *et al.*, 1996; Carpenter *et al.*, 2003), we used the biographies listed in the prospectus to determine if each member of the TMT had international work experience. Members were considered to have had foreign work experience if their biography indicated they had held a position overseeing the international component for a previous employer or had worked in a foreign company or for the foreign subsidiary of a U.S. company. Individuals that have spent a significant amount of time abroad will develop a greater familiarity and understanding of the respective international market. When these individuals serve as members of a firm's management team, this experience translates into a stock of international knowledge. TMT members were coded as to whether they had international work experience (1 = Yes; 0 = No). To create the value for the TMT international knowledge variable, the data was summed for each new venture. We chose not to adjust the variable for TMT size, as we felt each additional TMT member could contribute toward having an impact on the strategic direction of the new venture.

## Control variables

### *Age*

It is possible that *age* might influence a new venture's propensity to internationalize, as older firms typically have more resources and a greater number of network relationships on which to rely (Zahra *et al.*, 2000). Following prior research (e.g., Burgel and Murray, 2000; Zahra *et al.*, 2000), age was incorporated as a control variable. 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.

#### *Size*

The *size* of the new venture was considered, due to larger firms having more resource availability that might influence its ability to internationalize (Bloodgood *et al.*, 1996; Zahra *et al.*, 2000). Size was operationalized through a venture's total assets in its IPO year.

#### *Delaware incorporation*

A dichotomous variable was created that distinguished whether or not the new venture was incorporated in the state of Delaware, given the potential advantages associated with incorporating in Delaware (Cumming and MacIntosh, 2002).

#### *Industry group*

Following existing research (e.g., Westhead, Wright, and Ucbasaran, 2001), dummy variables were utilized to control for the *high-technology industry group* that the venture belongs. This information was obtained from the SDC's Global New Issues database and included the following industry groups: communications, computer equipment, and electronics.

#### *IPO size*

It is possible that the amount of funds raised through a firm's IPO could influence the resources available to internationalize. Thus, we controlled for the size of IPO by measuring the total dollar amount raised in the initial offering of stock (Pollock and Rindova, 2003).

#### *VC backing and alliance partner*

As not all of the ventures in the sample had venture capital or alliance partners, it was necessary to include a dichotomous variable indicating the presence of either relationship. This was done to test the hypotheses relating to the international knowledge of the venture's venture capital firm and/or alliance partner within the entire sample (George *et al.*, 2005). These dichotomous variables were assessed as of the IPO year and called *venture capital backing* and *alliance partners*, respectively.

#### *R&D intensity*

The development of unique products has been advanced as an important component of new venture internationalization (Autio *et al.*, 2000; Oviatt and

McDougall, 1994). To control for this possibility, the *R&D intensity* (sales divided by R&D expenditures) of the venture was included in the model.

#### *IPO year*

Dummy variables were also created to control for the *IPO year*, as the ventures identified in the sample had completed an IPO at various times from 1996 to 2000.

## RESULTS

### **Descriptive statistics**

In Table 1, we provide the descriptive statistics of the sample and an intercorrelation matrix. The mean age of the new ventures was 3.64 years and ranged from one to six years. Nearly half (48%) of the new ventures in the sample had alliance partners, while approximately 79 percent of the ventures had venture capital backing. On average, the new ventures had 1.19 TMT members with international experience. This ranged from zero to eight TMT members. Of the 206 ventures, 106 reported international sales. The international sales intensity of the sample ranged from zero to 100 percent, with a mean of 16.3 percent. In terms of international asset intensity, the sample ranged from zero to 89.8 percent, with a mean of 10.2 percent. The international scope variable ranged from one to six, with a mean of 1.99 continents entered.

Among the intercorrelations, two deserve additional discussion. The venture capital backing variable, a dummy variable based on whether or not a new venture has venture capital financing, is significantly correlated with the venture capital firms with international knowledge variable, at 0.85 ( $p < 0.001$ ). Also, alliance partner, which serves as a dummy variable based on whether or not a new venture has an alliance partner(s), is significantly correlated with the alliance partners with international knowledge variable, at 0.53 ( $p < 0.001$ ). These highly significant correlations are attributed to the necessary inclusion of dummy variables for both the presence of venture capital firms or alliance partners in order to include all new ventures in the full sample (Carpenter *et al.*, 2003). All variance inflation factors (VIFs) reported were less than 10 for each of the regressions, which is consistent with the rule of thumb recommended by Hair *et al.* (1998) and suggests that multicollinearity is unlikely to have confounded the results.

Table 1. Descriptive statistics and correlations ( $n = 206$ )

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Mean	3.64	\$185.47	0.78	0.43	0.09	\$68.21	0.78	0.48	\$0.79	0.15	0.15	0.34	0.25	1.19	1.01	7.49	0.33	0.16	0.10	1.99
s.d.	1.43	\$391.41	0.41	0.50	0.28	\$76.84	0.41	0.50	3.53	0.36	0.35	0.47	0.43	1.35	1.99	9.01	0.13	0.23	0.17	1.16
1. Age	1.00																			
2. Assets	-0.11	1.00																		
3. Delaware incorporation	-0.01	0.13	1.00																	
4. Computer equip industry	0.01	-0.12	0.08	1.00																
5. Electronics industry	0.19	-0.01	0.00	-0.27	1.00															
6. IPO size	-0.13	0.54	0.12	-0.11	-0.01	1.00														
7. VC backing	0.11	0.09	0.09	-0.09	0.04	1.00														
8. Alliance partner	-0.01	0.01	-0.03	0.03	-0.06	-0.07	1.00													
9. R&D intensity	0.14	-0.10	0.09	0.05	0.03	0.00	0.24	1.00												
10. IPO year 1997	-0.13	-0.11	-0.07	0.10	0.01	-0.19	-0.14	-0.13	1.00											
11. IPO year 1998	-0.08	0.02	0.05	-0.02	-0.13	-0.06	-0.05	-0.07	-0.22	1.00										
12. IPO year 1999	0.05	0.06	-0.02	0.06	-0.08	0.02	0.11	0.15	0.08	-0.30	1.00									
13. IPO year 2000	0.14	0.08	-0.02	-0.13	0.14	0.29	0.22	0.01	0.19	-0.24	-0.24	1.00								
14. TMT int'l knowledge	0.25	0.02	0.04	-0.02	0.10	0.01	0.15	0.06	0.10	-0.13	-0.11	0.09	1.00							
15. Alliance partner int'l knowledge	-0.03	0.25	0.07	0.08	-0.09	-0.03	0.24	0.53	0.16	-0.04	0.02	0.08	-0.07	1.00						
16. VC int'l knowledge	0.11	0.15	0.10	-0.06	-0.01	0.21	0.85	0.33	0.31	-0.12	-0.07	0.06	0.22	0.12	1.00					
17. Proximal firm int'l knowledge	0.20	-0.07	-0.02	0.03	0.19	0.01	0.25	0.06	0.31	-0.23	-0.15	0.16	0.30	0.06	-0.01	1.00				
18. International sales intensity	0.21	-0.05	-0.06	-0.03	0.52	-0.07	0.08	-0.06	0.07	0.00	-0.06	-0.06	0.06	0.26	0.05	0.12	1.00			
19. International asset intensity	0.16	-0.10	-0.11	-0.09	0.44	-0.13	-0.02	-0.05	-0.11	0.05	-0.04	-0.15	-0.01	0.22	0.02	0.01	0.02	1.00		
20. International scope	0.24	-0.10	-0.07	0.06	0.26	-0.10	0.13	0.04	0.12	0.07	-0.06	-0.07	-0.01	0.28	0.12	0.18	0.12	0.71	0.64	1.00

Note: Correlations with the absolute value greater than 0.14 are statistically significant at the  $p < 0.05$  level.

## Regression results

For the international sales intensity and international asset intensity dependent variables, we used interval regressions to test the hypotheses. Interval regression takes into account the left censoring of the variables, as slightly less than half the new ventures in the sample did not have any international sales or assets. It is a robust form of Tobit regression and the results are comparable to using a two-step Heckman regression (Breen, 1996). Given that the international scope dependent variable was a count variable with values ranging from one to six, we used a zero-truncated Poisson regression for this dependent variable.

The *international knowledge of proximal firms in headquartered location* variable is based on the geographic location of the new venture. As the resulting database is comprised of new ventures that are nested within geographic locations, 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 and Poisson regression analyses using the cluster option within Stata. The cluster option employs a classing feature—in this case based on the new venture's geographic location—which adjusts the standard errors based on intra-group correlations.

For each internationalization dependent variable, we tested two regression equations. The first contained the control variables and international knowledge variables. The interaction terms were then introduced in the second model. Each variable was mean centered prior to entering each regression. The mean-centered variables were also used to create the interaction terms. We present the results of these tests in Table 2.

### International sales intensity

The results of the interval regression analysis for international sales intensity is found in columns 1 and 2 of Table 2. Hypothesis 1—which proposed that the higher the international knowledge of alliance partners, the greater the venture's international sales intensity—was supported ( $\beta = 0.027$ ,  $p < 0.01$ ). We also hypothesized (H2) that the higher the international knowledge of venture capital firms, the greater the new venture's international sales intensity. Our findings provide support for this hypothesis ( $\beta = 0.032$ ,  $p < 0.001$ ). The international knowledge of other firms in a new venture's headquartered

Table 2. Regression results by dependent variable

	International sales intensity				International asset intensity				International scope			
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
<b>Control variables</b>												
Age	0.018	(0.015)	0.015	(0.013)	0.015	(0.010)	0.011	(0.009)	0.098**	(0.038)	0.088*	(0.036)
Assets	0.000	(0.000)	0.000	(0.000)	0.000*	(0.000)	0.000*	(0.000)	0.000	(0.000)	0.000	(0.000)
Delaware incorporation	-0.105**	(0.039)	-0.104**	(0.034)	-0.089*	(0.037)	-0.086*	(0.034)	-0.245	(0.188)	-0.256	(0.185)
Computer equip industry	0.072	(0.054)	0.082	(0.052)	0.022	(0.038)	0.032	(0.034)	0.241*	(0.113)	0.277**	(0.104)
Electronics industry	0.525***	(0.067)	0.531***	(0.068)	0.329***	(0.042)	0.333***	(0.044)	0.667***	(0.111)	0.710***	(0.099)
IPO size	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)	0.000 <sup>†</sup>	(0.000)	0.000	(0.001)	0.000	(0.001)
VC backing	-0.145	(0.102)	-0.229*	(0.109)	-0.103	(0.077)	-0.185*	(0.084)	-0.277	(0.329)	-0.423	(0.301)
Alliance partner	-0.114*	(0.049)	-0.132*	(0.052)	-0.055 <sup>†</sup>	(0.032)	-0.072*	(0.031)	-0.099	(0.111)	-0.119	(0.113)
R&D intensity	-0.002	(0.009)	0.001	(0.007)	-0.014 <sup>†</sup>	(0.008)	-0.012*	(0.006)	0.017	(0.024)	0.030	(0.023)
IPO year 1997	-0.049	(0.094)	0.006	(0.094)	-0.089	(0.079)	-0.045	(0.072)	-0.154	(0.265)	-0.016	(0.266)
IPO year 1998	-0.068	(0.097)	-0.012	(0.092)	-0.130 <sup>†</sup>	(0.078)	-0.087	(0.068)	-0.316	(0.312)	-0.151	(0.324)
IPO year 1999	-0.128	(0.095)	-0.087	(0.094)	-0.171*	(0.080)	-0.135 <sup>†</sup>	(0.076)	-0.572 <sup>†</sup>	(0.314)	-0.435	(0.322)
IPO year 2000	-0.172*	(0.079)	-0.113	(0.078)	-0.180**	(0.064)	-0.125 <sup>†</sup>	(0.065)	-0.711**	(0.274)	-0.542 <sup>†</sup>	(0.288)
TMT int'l knowledge	0.056*	(0.022)	0.059**	(0.020)	0.038*	(0.017)	0.040**	(0.015)	0.144***	(0.032)	0.156***	(0.029)
<b>Independent variables</b>												
Alliance partner int'l knowledge	0.027**	(0.009)	0.042***	(0.011)	0.018*	(0.007)	0.031***	(0.009)	0.038*	(0.017)	0.069**	(0.025)
VC int'l knowledge	0.032***	(0.009)	0.038***	(0.011)	0.022***	(0.006)	0.028***	(0.008)	0.077**	(0.030)	0.092**	(0.031)
Proximal firm int'l knowledge	0.458***	(0.129)	0.467***	(0.129)	0.215 <sup>†</sup>	(0.123)	0.215 <sup>†</sup>	(0.122)	0.714*	(0.307)	0.803**	(0.312)
<b>Moderating variables</b>												
TMT int'l knowledge × Alliance partner int'l knowledge			-0.016*	(0.006)			-0.013**	(0.005)			-0.029 <sup>†</sup>	(0.015)
TMT int'l knowledge × VC int'l knowledge			-0.009 <sup>†</sup>	(0.005)			-0.010**	(0.004)			-0.017*	(0.008)
TMT int'l knowledge × Proximal firm int'l knowledge			-0.116	(0.108)			-0.068	(0.079)			-0.304 <sup>†</sup>	(0.175)
Constant	0.270*	(0.124)	0.331**	(0.114)	0.228*	(0.100)	0.298**	(0.095)	0.758*	(0.337)	0.831*	(0.327)
Log pseudolikelihood	-78.110		-72.173		-44.820		-35.544		-252.509		-249.261	
Wald $\chi^2$	330.730***		540.360***		385.450***		424.860***		201.700***		290.980***	
Change ( $\chi^2$ ) from base model			19.210***				18.770***				14.250**	

<sup>†</sup> $p < 0.10$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$  ( $n = 213$ ). Unstandardized estimates are reported. Standard errors are in parentheses.



location was also found to be positively related to new venture international sales intensity ( $\beta = 0.458$ ,  $p < 0.001$ ). This finding provides support for Hypothesis 3.

Hypotheses 4, 5, and 6 proposed that the international knowledge of the new venture TMT moderates the relationship between the external sources of international knowledge and the new venture's sales intensity, and offered competing hypotheses as to whether the moderating effect would be positive or negative. The coefficient for the TMT-alliance partner international knowledge interaction term was significant and negative ( $\beta = -0.016$ ,  $p < 0.05$ ). To determine the nature of the relationship, we plotted high and low levels of TMT international knowledge on a y-axis of international sales intensity and an x-axis of the number of alliance partners with international knowledge. As we illustrate in Figure 1, a new venture's international sales intensity increases with the number of alliance partners with international knowledge, but increases at a faster rate for those new venture TMTs with low international knowledge than those with high international knowledge. Thus, Hypothesis 4b is supported.

The TMT-venture capital international knowledge interaction term was negative and also significant ( $\beta = -0.009$ ;  $p < 0.10$ ). This relationship is plotted in Figure 2. The VC international knowledge variable was back transformed prior to plotting the

graph. The new venture's international sales intensity increases with the number of internationally knowledgeable venture capital firms and increases at a faster rate for those new venture TMTs with low international knowledge than those with high international knowledge. Thus, support is achieved for Hypothesis 5b.

The TMT-proximal firm international knowledge interaction term was negative, but not significant ( $\beta = -0.116$ ;  $p > 0.10$ ). Thus, neither Hypothesis 6a nor 6b is supported for the international sales intensity dependent variable.

#### *International asset intensity*

In columns 3 and 4 of Table 2, we present the results of the interval regression analysis of international asset intensity. In terms of external sources of international knowledge, we found a positive relationship between the international knowledge of alliance partners and the new venture's international asset intensity ( $\beta = 0.018$ ,  $p < 0.05$ ). This finding provides support for Hypothesis 1. We also found a positive relationship between the international knowledge of venture capital firms and new venture international asset intensity ( $\beta = 0.022$ ,  $p < 0.001$ ) and a positive relationship between the international knowledge of proximal firms in the new venture's headquartered location and the international asset intensity of the new venture ( $\beta = 0.215$ ,  $p < 0.10$ ). These

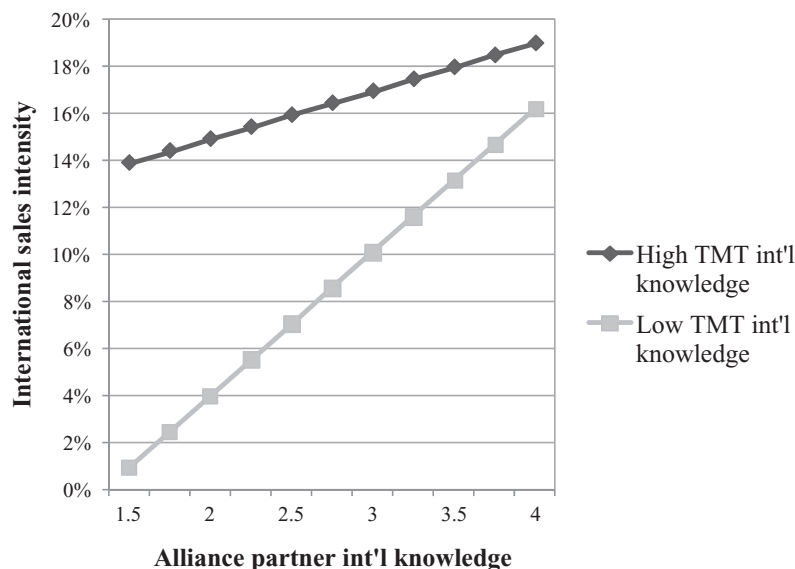


Figure 1. Moderating effect of TMT int'l knowledge on relationship between alliance partner int'l knowledge and int'l sales intensity

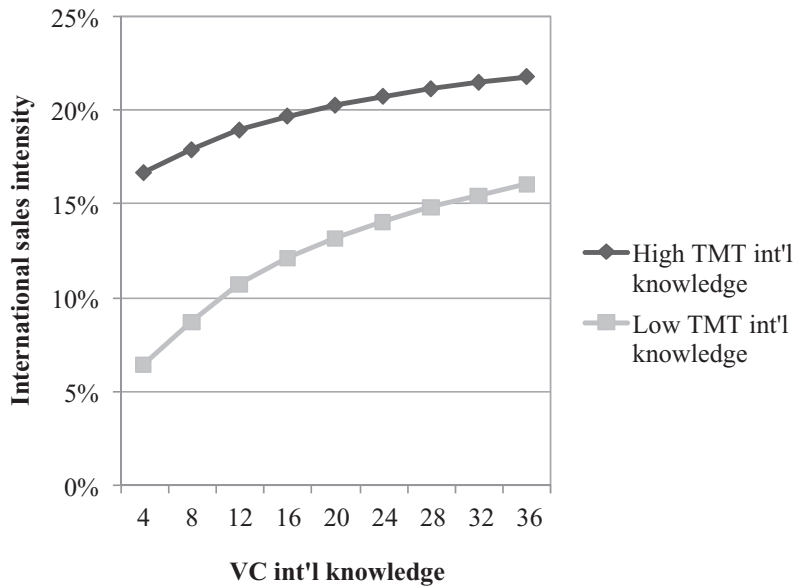


Figure 2. Moderating effect of TMT int'l knowledge on relationship between VC int'l knowledge and int'l sales intensity

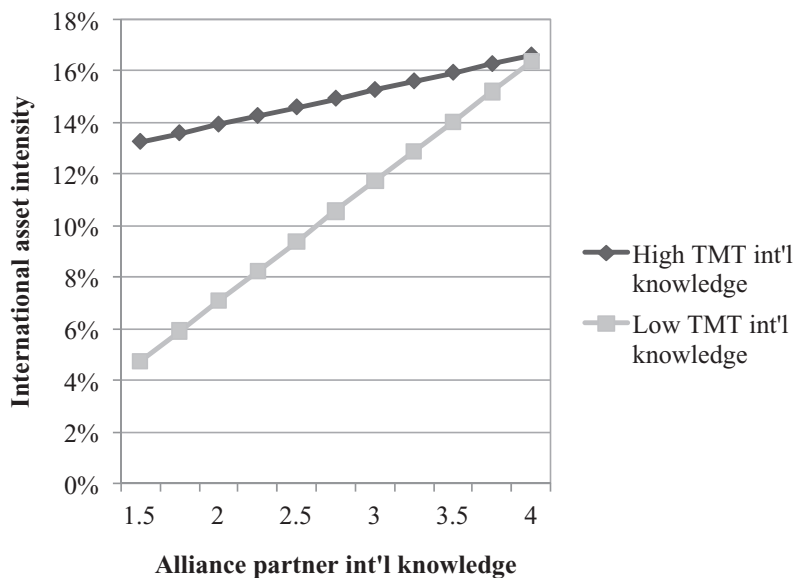


Figure 3. Moderating effect of TMT int'l knowledge on relationship between alliance partner int'l knowledge and int'l asset intensity

findings provide support for Hypotheses 2 and 3, respectively.

Hypotheses 4, 5, and 6 offered the competing hypotheses regarding how the international knowledge of the new venture TMT moderates the relationship between a new venture's external sources of international knowledge and its international asset

intensity. Since the coefficient for the TMT-alliance partner international knowledge interaction term was negative and significant ( $\beta = -0.013$ ,  $p < 0.01$ ), we again used a plot to reveal the relationship. Figure 3 illustrates that a new venture's international asset intensity increases with the number of alliance partners with international knowledge, but increases at

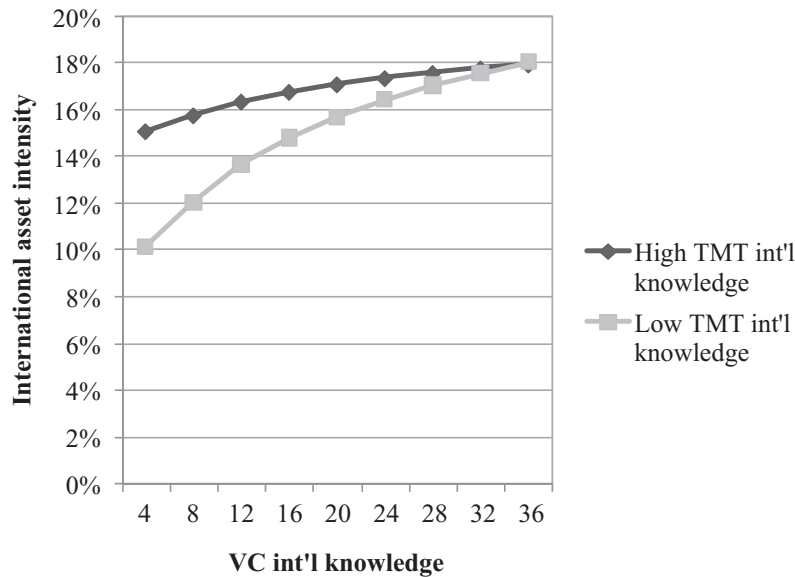


Figure 4. Moderating effect of TMT int'l knowledge on relationship between VC int'l knowledge and int'l asset intensity

a faster rate for those TMTs with low international knowledge than those with high international knowledge. The findings here provide support for Hypothesis 4b.

The coefficient of the TMT-venture capital international knowledge interaction term was negative and significant ( $\beta = -0.010$ ,  $p < 0.01$ ). Again, to better understand the nature of the relationship, we plotted the relationship, but this time with an x-axis of venture capital firms' international knowledge. This variable was back transformed for interpretation purposes. As we illustrate in Figure 4, a new venture's international asset intensity increases with venture capital firms' international knowledge, but increases at a faster rate for those TMTs with low international knowledge than those with high international knowledge. This finding provides support for Hypothesis 5b.

The TMT-proximal firm international knowledge interaction term was negative, but not significant ( $\beta = -0.068$ ,  $p > 0.10$ ) and, thus, did not provide support for either H6a or H6b.

#### International scope

We present the results of the Poisson regression analysis of international scope in columns 5 and 6 of Table 2. We hypothesized (H1) that the higher the international knowledge of a new venture's alliance

partners, the greater the international scope of the new venture. We found that this relationship was significant ( $\beta = 0.038$ ,  $p < 0.05$ ), offering support for H1. We did find a positive relationship between the international knowledge of venture capital firms and the new venture's international scope ( $\beta = 0.077$ ,  $p < 0.01$ ) and a positive relationship between the international knowledge of other firms in a new venture's headquartered location and the new venture's international scope ( $\beta = 0.714$ ,  $p < 0.05$ ). These findings provide support for Hypotheses 2 and 3, respectively.

We also proposed that the new venture TMT's international knowledge moderates the relationship between a new venture's external sources of international knowledge and its international scope. The coefficient for the TMT-alliance partner international knowledge interaction term was negative and significant ( $\beta = -0.029$ ,  $p < 0.10$ ). As Figure 5 illustrates, a new venture's international scope increases with the number of internationally knowledgeable alliance partners, but increases at a faster rate for those new venture TMTs with low international knowledge than those with high international knowledge. This finding provides support for H4b.

The coefficient for the TMT-venture capital international knowledge interaction term was significant ( $\beta = -0.017$ ,  $p < 0.05$ ). As Figure 6 illustrates, a new venture's international scope increases

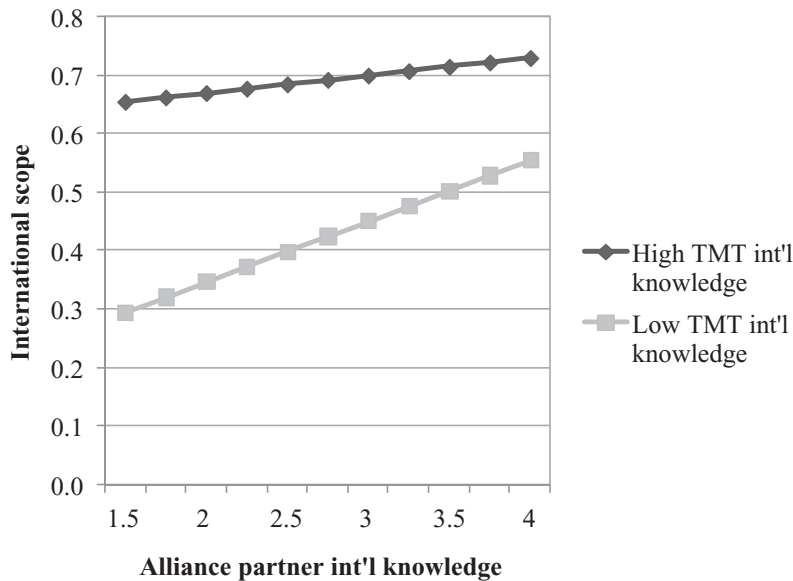


Figure 5. Moderating effect of TMT int'l knowledge on relationship between alliance partner int'l knowledge and int'l scope

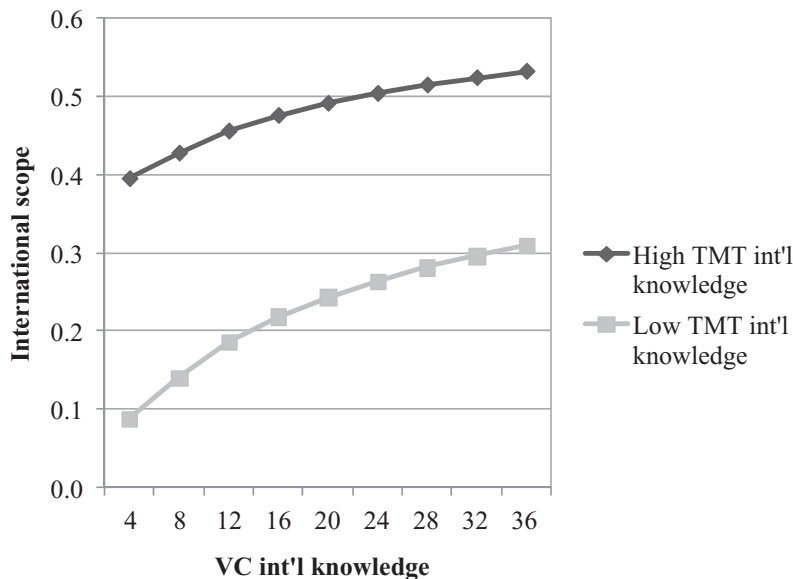


Figure 6. Moderating effect of TMT int'l knowledge on relationship between VC int'l knowledge and int'l scope

with internationally knowledgeable venture capital firms, but increases at a faster rate for those new ventures with TMTs that have low international knowledge than those with high international knowledge. This provides support for H5b.

The coefficient for the TMT-proximal firm international knowledge interaction term was also negative and significant ( $\beta = -0.304$ ,  $p > 0.10$ ).

Figure 7 depicts the relationship. The international knowledge of proximal firms in a new venture's headquartered location is positively associated with international scope. However, the relationship is more positive for new ventures with lesser internationally knowledgeable TMTs than more internationally knowledgeable TMTs. This finding provides support for H6b.



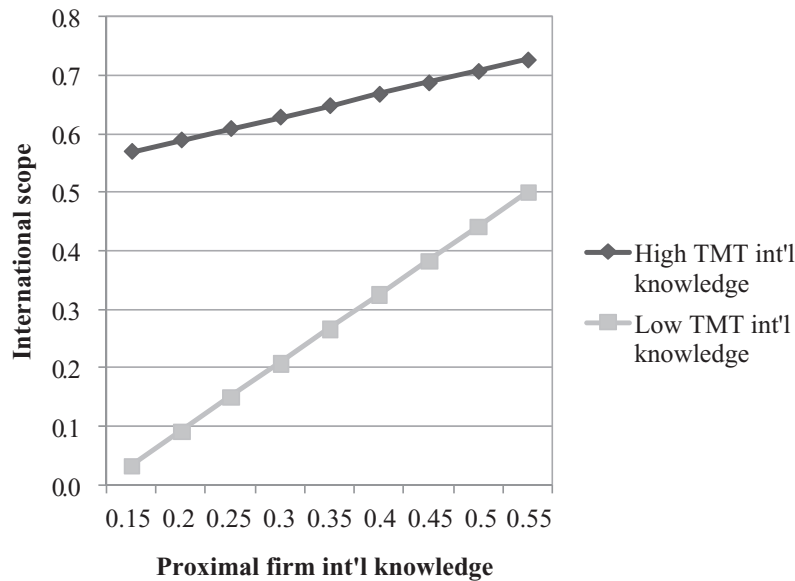


Figure 7. Moderating effect of TMT int'l knowledge on relationship between proximal firm int'l knowledge and int'l scope

It is possible that other latent company characteristics could be driving both the company's external choices as well as its international expansion strategy. For instance, an unobserved company characteristic (e.g., superior technology) could result in greater investment by experienced VCs and at the same time afford opportunities for growth overseas. Likewise, a latent characteristic could attract experienced alliance partners. Or, the decision to colocate among internationally experienced firms could be deliberate or driven by company-specific factors. It is important to explore these possibilities, as endogeneity could be impacting the moderating results.

To determine if endogeneity is a valid concern, additional analyses were conducted following the recommendation of Shaver (1998). This required utilizing the Heckman selection model to first regress multiple firm-level characteristics on the selection of an internationally experienced external partner/location and then second regress the full model taking the first regression into account. In terms of firm-level characteristics, we chose to include age, size (assets), R&D intensity (a rough determinant of superior technology), and top management team international experience. Three separate models were run to determine the impact of each external selection decision (international alliance partner, international venture capital investor, international location). Whether or not an external partner/

location was deemed to be international in the first step of the regression analyses was determined by splitting the sample at the median. (The results are available upon request.) In each model, the rho is negative and the likelihood-ratio test is insignificant, suggesting that self-selection by the firm of their partner/location is unlikely to confound the model's hypothesized relationships. Indeed, we found that the results—including the Heckman correction—are similar to the results reported earlier.

## DISCUSSION

In this research, we investigate both internal and external sources of international knowledge on new venture internationalization, with additional consideration of contingent relationships between these sources of international knowledge. The results largely confirm that the international knowledge of external sources is positively associated with a new venture's level of internationalization. We also found that the nature of external sources of international knowledge with new venture internationalization depended on the international knowledge of the new venture's TMT. Yet, contrary to the arguments put forth by the tenets of absorptive capacity, it was the new ventures with low TMT international knowledge that benefited most from these external sources

of international knowledge. Thus, our results point to several interesting, novel and potentially important findings that advance theory and inform practice while also identifying a number of fruitful areas for future research.

### External sources of international knowledge

This study identified three external sources of international knowledge that new ventures were able to leverage to internationalize. First, the results confirm that new ventures are able to benefit from having more alliance partners with international knowledge. One of the challenges frequently noted in the alliance literature is how to assess alliance outcomes (Gulati, 1998). Various approaches have examined measures such as alliance survival or to what extent each partnering firm achieves its objectives (Das and Teng, 1998). A contribution of this study is the recognition of an additional alliance outcome pertaining to the transfer of internationalization knowledge.

In the case of venture capital firms, a key finding is that new ventures can attain knowledge specific to internationalization over and above the simple exchange of financial resources. The new ventures that were funded by venture capitalists whose portfolios had higher percentages of international investments exhibited greater internationalization, as the ventures appear to have been able to draw from the international knowledge of their venture capital firms. Thus, we add the transfer of international knowledge to the growing list of ways in which venture capital firms influence their portfolio companies (De Clercq and Sapienza, 2005). This conclusion is supported by Carpenter *et al.* (2003), who found that the positive relationship between venture financing and new venture internationalization was stronger when the venture capital investor was represented by a board member with international experience. Our study goes one step further and demonstrates that it is through leveraging the international knowledge gained through their portfolio companies that a venture capital investor is influential.

When new ventures are headquartered in locations where other firms are competing in international markets and, thus, are knowledgeable about such markets, our results suggest that this knowledge is likely to spillover and be exploited by the new ventures located therein. The concept of knowledge spillovers has previously tended to be applied

to more technological knowledge (Audretsch and Feldman, 1996). However, this study makes a contribution to the economic geography literature by pointing to the possibility that other types of knowledge, such as international knowledge, can also spillover within a close geographic proximity and serve to benefit firms located therein.

Although international knowledge is typically not formally contracted for, it may be built into the cost of a relationship, as more knowledgeable partners are likely in greater demand or can require more favorable deal terms. Nevertheless, it is important to note that the international knowledge must be recognized as valuable and be indirectly exploited by the new ventures. This is a way that a new venture can add to its knowledge base without solely relying on the prior knowledge and experiences of its TMT. In other words, new ventures are not necessarily internationalizing alone, but rather via a network they are creating (Coviello and Munro, 1997). Together, these findings imply that although the resource-based view traditionally assesses only the resources located internally to a firm as contributing to their competitive advantage, the resources located externally can be important and valuable as well (at least to the extent of internationalization).

### Internal and external sources of international knowledge: complements or substitutes?

While an examination of the main effects tell an interesting story, the interactive effects raise some interesting questions. We originally put forth a set of competing hypotheses. Based on the concept of absorptive capacity, we argued that new ventures need international knowledge to benefit from external sources of international knowledge. This implied that new ventures with highly internationally knowledgeable TMTs would benefit most in terms of internationalization from external sources of international knowledge because they have the capacity to recognize and exploit the knowledge more effectively. On the other hand, we also argued that new ventures with less internationally knowledgeable TMT would be more motivated to overcome this shortcoming through a greater reliance on external sources of international knowledge. Our results concurred with the later set of hypotheses. Instead of serving as complementary sources of international knowledge that contribute to internationalization by a new venture, it appears as though internal and external sources of international knowledge actually compensate or

substitute for each other. The results were fairly consistent for each of the three internationalization dependent variables. This is a key contribution to the international entrepreneurship literature, as it suggests an important way for new ventures to make up for gaps in their resource bundles.

Prior international entrepreneurship research has already empirically examined the direct relationship between the international knowledge of a new venture's TMT and new venture internationalization (Bloodgood *et al.*, 1996). Within the international business arena, this relationship has likewise been confirmed with more mature, existing firms (Sambharya, 1996). Yet, the existence of a significant moderating relationship found in this study suggests caution must be made when researchers examine the main effects as the sole relationship between sources of international knowledge on firm internationalization. When a new venture lacks access to external sources of international knowledge, the previously confirmed relationship between the TMT's international knowledge and new venture internationalization may be greatly understated. Thus, in situations where the new venture is lacking international knowledge from external sources, the importance of the management team's international knowledge as a conduit to internationalize is magnified. On the other hand, when a new venture is able to access international knowledge externally, the reliance on international knowledge sourced via the venture's managerial team is lessened.

### Managerial and public policy implications

The results provide insight for entrepreneurs considering internationalization as well as for government policy makers. As knowledge is often the most valuable resource a firm can possess, Anand *et al.* (2002: 98) advocate firms need to become 'knowledgeable about knowledge.' In line with this study, the implication for entrepreneurs considering internationalization is the need to understand how critical international knowledge is to their success. International knowledge is valuable to new ventures, as it can increase awareness of new opportunities in foreign markets while decreasing the associated foreign entry costs. New ventures with international aspirations should work to build up their international knowledge base and also become efficient at managing and exploiting this valuable resource.

The most evident source for developing a new venture's international knowledge base lies in the

top management team of the new venture. As entrepreneurs assemble their TMTs, attention to whether or not a manager possesses international knowledge is an important consideration for ventures that desire to compete internationally. However, it is important for managers to also recognize the importance of looking beyond the TMT, as much more knowledge exists outside organizational boundaries than inside. Our results suggest entrepreneurs considering internationalization should also become effective at tapping external sources for international knowledge. Whether a potential alliance partner or venture capital investor possesses international knowledge should be considered in assessing the value of the relationship. For ventures who have alliance partners and/or venture capital firms, their managers should seek to access valuable knowledge from these external sources. Anand *et al.* (2002) offer multiple examples of how firms can improve their ability to tap external sources of knowledge and find ways to motivate external sources to share knowledge.

Our study also highlights the importance of choosing a location for the venture. While many entrepreneurs choose to establish their venture in the location of their current residence, entrepreneurs should recognize the potential importance of the venture's location and may find it beneficial to establish or move a venture to a location that offers greater knowledge spillover benefits.

For new ventures with top management teams that lack international experience, our findings are encouraging, as they suggest this internal resource limitation may not necessarily preclude the new ventures from internationalizing. Internal and external sources of international knowledge were found to serve as substitute, rather than complementary, resources contributing to new venture internationalization. Thus, new ventures with lower levels of international knowledge can tap external sources of international knowledge to compensate for their internal resource gaps.

The results also provide insights for public policy makers. As country boundaries become more blurred and the need to consider international markets increases, policy makers are looking for new ways to encourage internationalization by new and small firms. Within the United States, this is evident by programs funded by the U.S. Small Business Administration (such as U.S. Export Assistant Centers and the International Trade Loans program) as well as state programs that attempt to link local and foreign

firms together. The results suggest policy makers may be able to help facilitate internationalization through recognizing that new ventures may benefit from exposure to external sources of international knowledge. For example, forums could be developed locally bringing together flagship firms and smaller, newer firms with the intent of producing international knowledge spillovers. Likewise, incentives for new firms to establish alliances and other external relationships may be helpful for increasing the firm's ability to pursue strategies such as internationalization.

### LIMITATIONS AND FUTURE RESEARCH

Like all research, limitations of this study have left some questions unanswered, which in turn suggests future research opportunities. Several questions are of particular importance, and we now discuss these in greater detail. First, we sampled only U.S. high-technology new ventures that have undergone an IPO. This was done in order to achieve a greater sample size of new ventures with substantive internationalization variance to test the research model. By focusing on publicly held new ventures in the U.S., we were also able to get over many data hurdles that typically exist when dealing with new ventures. Regardless, the question of whether our findings generalize to ventures operating in industries that are not high technology or to ventures headquartered outside the U.S. remains. Moreover, the use of publicly held firms results in an elite survivor sample, as this sample does not include new ventures that failed or new ventures that did not do an IPO within their first six years. Additional testing using other samples is necessary. As we focused on new ventures, future research could test our model in a sample of new and mature firms and test for differences.

It is possible that the timing of the initial international entry by the new venture could impact the extent to which external sources of international knowledge are relied upon to internationalize. A limitation of our study is that we were not able to include the international entry year as a control variable in our analysis (due to data limitations).

Research opportunities also exist by exploring the impact of location in more depth. We operationalized the international knowledge of proximal firms at the MSA level of analysis. It would be interesting to investigate the influence of proximity using more fine-grained measures.

Although our article examines factors leading to internationalization, we do not examine whether or not internationalization was a good decision and lead to superior performance. That said, the nature of the relationship between internationalization and performance has been the focus of considerable research in the context of new ventures (Bloodgood *et al.*, 1996; McDougall and Oviatt, 1996; Sapienza *et al.*, 2006), SMEs (e.g., Lu and Beamish, 2001), and established firms (e.g., Geringer, Beamish, and daCosta, 1989). This includes its benefits, its costs, and the moderators of this relationship. The purpose of this article is to build on this research by investigating the antecedents to internationalization rather than to offer another study about the performance implications of internationalization. While many others have had internationalization as an independent variable, we have it as a dependent variable. We believe that we make an important contribution by exploring the antecedents of internationalization relating to international knowledge. Nevertheless, future research could more thoroughly examine the implied internationalization-performance relationships in the context of external knowledge transfers.

Future research would also be of benefit if it examined how external sources of knowledge impact a new venture's country location decision, taking into consideration country differences—such as accounting standards, legal conditions, or market size. In addition, although we have examined how external sources of knowledge may impact the internationalization of a new venture's sales, it may also impact the new venture's reliance on importing. This would be interesting to examine further.

We are not able to completely rule out that there is reverse causality, or that the internationally equipped partners or proximal firms are not simply a symptom of the new venture's international activity. Nevertheless, our theoretical arguments imply that the international knowledge of its partners and proximal firms provide knowledge mechanisms that enhance new venture internationalization. We also provide a one-year lag between the independent and dependent variables. An additional analysis of a reduced sample utilizing a two-year lag also provided consistent results, offering further empirical support. Additional research could further tease out these relationships.

Finally, in order to manage the scope of the study, we limited the external sources of international knowledge to a new venture's alliance partners,



venture capital firms, and firms in its headquartered location. Yet, it is likely that other external sources also influence the strategic direction that a new venture takes. For example, it is possible that new ventures also benefit from their suppliers, bankers, and/or customers (Reuber and Fischer, 2005). These alternatives still need to be explored. It would also be beneficial to examine the impact of other attributes of the external partners—such as their reputations (Fombrun, 1996)—on new venture internationalization.

## CONCLUSION

In this article, we investigated both internal and external sources of international knowledge on new venture internationalization. We found that the international knowledge of a new venture's alliance partners, venture capital firms, and firms in the headquarter location were positively associated with the venture's level of internationalization. Contrary to absorptive capacity arguments, these external sources of knowledge compensated for lower internal sources of international knowledge in new ventures' internationalization efforts. These findings have implications for the international business and absorptive capacity literatures as well as for future research on the contingent relationships between internal and external sources of intangible resources necessary for internationalization.

## ACKNOWLEDGEMENTS

A prior version of this article was presented at the SEJ Special Issue Conference in April 2009. The authors wish to thank our discussant and editor, Douglas Cumming, and the other conference attendees for their helpful comments and feedback. This research also greatly benefited from insightful discussions with Alan Rugman and David Audretsch. Financial support was received from the Indiana University CIBER.

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