



## **The Strategic Networks And Performance Of Entrepreneurial Firms: Impact Of Pre-Founding Ties**

*This dissertation studies the impact of founders' background on alliances and firm performance. First essay examines the role of founders' prior employer (parent) in shaping the alliance network of firms founded by employees (spinouts). I find that the spinouts that differ from their parent, partner with firms that have direct/indirect parent ties. While spinouts that are similar find partners with no parent ties. Second essay examines the effect of heterogeneity in the founders' backgrounds on the start-up's alliance, innovation, and performance. I find that founders' background has no impact on start-up's performance; instead, it shapes the resources within the firm.*

**Category:** Strategy, Entrepreneurship, Organization Theory

**Keywords:** Founders' Background, New Venture Alliances, Firm Performance

# **The Strategic Networks and Performance of Entrepreneurial Firms:**

## **Impact of Pre-Founding Ties**

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### **EXECUTIVE SUMMARY**

My dissertation explores the influence a founder's background has on the alliance network, innovation, and performance of their new ventures. I examine two types of founder backgrounds— employee and academic entrepreneurs. Both employee and academic entrepreneurship are prevalent phenomena in the high-technology industry. However, there has been little research on how these new ventures' establish alliances due to limited data on alliances forged by new ventures. I overcome this challenge by creating a unique database, digitizing Medical Marketplace guides and merging this data with seven other databases. This data allows me to track the founders' history, along with alliances, patent, and firm-level data of new ventures in the pharmaceutical and medical-device industries from 1986 to 2012. In the first essay, I examine the role the founders' backgrounds play in the alliances forged by employee startups. In the second essay, I compare employee and academic startups to understand how founders' background shapes the alliance, innovation, and performance of these new ventures. Below, I summarize the research question, data, and findings for each of the two essays.

## *Essay 1: Casting Shadows—Effect of Parent-Spinout Knowledge Distance on New Venture Alliances*

The success of firms founded by employee entrepreneurs has been attributed to the knowledge inherited from the prior employers of the founders, called *parent firms* (Agarwal et. al, 2004; Chatterji, 2009). However, new firms face competition in the high-technology industry and find product commercialization especially challenging (Gans & Stern, 2003). These firms cope with this competition by forming alliance ties with other firms. Alliance ties allow the new firms to access complementary resources from their partner firms (Podolny et. al., 1996). As a result, new firms that form alliance ties are relatively more successful in the high-technology industry. I bridge the gap between employee entrepreneurship and new venture alliance literature by examining how spinouts leverage knowledge from their parent firms to establish alliance ties with other firms.

*Spinouts* are firms founded by employee entrepreneurs, and parent firms are prior employers of these entrepreneurs. Through their experience in the parent firms, employee entrepreneurs gain knowledge that spills over into the new ventures they create. The knowledge and social capital accumulated by these new ventures through their founders, shape their opportunities to find alliance partners. To capture the impact of the parent firm on the spinout's alliance network, I classify partner firms into those with direct, indirect, or no ties to the parent.

A new venture's success in a high-technology industry hinges on its knowledge and access to resources. Hence, spinouts that gain knowledge from their parents and establish strategic ties with other firms are likely to be successful. I capture two types of knowledge: technological and product market. The Euclidean distance between the parent and spinout's

technology or product markets is used to measure both these knowledge. *Technological distance* uses data on patents to measure a spinout's technical knowledge relative to its parent firm's technology. Firms could choose to apply this knowledge in different products and this could result in different resource needs. Hence, product market distance is important to understanding the formation of alliance ties. *Market distance* captures the difference between the spinouts' and the parent's product markets. I further categorized these two distance measures as either high or low based on the median technological and product distance, to yield four spinout categories.

New firm would have limited resources and need to gain access to complementary resources for their survival. A firm forms inter-organizational alliance ties to fulfill its need for complementary resources. When two firms can fulfill their mutual need for resources or capabilities through collaboration, they are likely to establish an alliance tie. However, forming ties to gain access to complementary resources is not without its pitfalls. One potential risk for a new venture forming alliance ties is the potential partner's behavior. An alliance partner could behave opportunistically by misappropriating crucial resources from the new firm. In addition, the partner could choose to hold back its efforts and not contribute to the alliance. An incumbent relies on its prior alliance ties to search for potential alliance partners (Gulati & Garguilo, 1999). On the other hand, a new venture does not have prior alliance ties. Instead, it relies on the founder's prior affiliations to gain access to information about potential partners.

The technological and market knowledge that a spinout inherits from its parent firm shapes its resource needs as well as its collaboration risk. A spinout that is too close to the parent's technical knowledge and product market directly competes with the parent firm for resources. This competition could increase the spinouts risk of collaborating with the parent and its direct or indirect partners. While, a spinout that is different from its parent with respect to

technology, product markets, or both does not face direct competition from the parent firm. However, the founder's prior affiliation with the parent firm creates path dependencies in the spinout's search for partners and this search for resources is limited by the firm's social capital (Eisenhardt & Schoonhoven, 1996). A spinout relies on its parent's alliance network to seek partners. A spinout will face competition from its parent firm. This competition increases the collaboration risk associated with forming alliance ties with firms that have either direct or indirect ties to the parent firms. Firms with either direct or indirect parent ties could provide resources that the spinout needs, but would differ in their level of risk associated with collaboration.

I examine the impact of founders' prior affiliations in the formation of spinouts' alliance ties using data of firms in the pharmaceutical and medical-device industries from 1986 to 2012.<sup>1</sup> These spinouts avoid forming direct ties with their parents and less than three percent of spinouts have ties to their parent firms. I use exponential random graph models to estimate the tie formation among spinouts and other firms. Using an exponential random graph model allows me to account for the underlying network and characteristics of all firms to predict tie forged by these spinouts.

The partners either have direct, indirect, or no ties to the parent firm. The four categories of spinouts can be simplified into two groups. One group of spinouts is similar to their parent and have low technological as well as product-market distance from their parent. The second group has spinouts that have different technology, product markets, or both with respect to their

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<sup>1</sup> I collected this data by digitizing annual additions of Medical Market Place Guides from 1986 to 2003 and merged it with COMPUSTAT, VentureXpert, LexisNexis, Corporate Affiliations, SEC Filings, Delphion, and Thompson One to make the data current. The resulting panel data contains firm- and individual-level data, along with rich network data, from 1986 to 2012.

parents. Spinouts that are similar to their parents are more likely to form manufacturing, marketing, or funding ties with firms that have no ties to the parent firms. Whereas, spinouts that are different are more likely to seek commercialization ties with firms that are direct or indirect partners with their parents. This suggests that spinouts that are different from their parents are able to leverage their uniqueness to negotiate alliance ties with firms that have some sort of tie to the parent firms.

Spinouts that have similar technology and product markets as their parent firms are in direct competition with the parents. The parent firms have crucial resources that these spinouts need. Also, spinouts rely on their founders' backgrounds to search for partners, creating a path dependency toward finding partners within their parents' alliance networks. But, parent firms pose a higher risk of misappropriating resources within these spinouts and may not prove to be good partners. The same risk extends to firms that have direct or indirect ties to their parents. Therefore, spinouts that are similar avoid forming alliance ties with these firms.

Conversely, firms with no parent ties pose lower collaboration risk. If the spinouts were driven purely by the need for resources and do not face any collaboration risk, then the spinouts would form ties with firms that have direct or indirect ties to the parent firm. However, there is a risk of collaborating with these firms. Hence, these spinouts form ties with firms that have no ties to their parent.

A spinout that is different from its parent firm is not in direct competition with the parent. Furthermore, a spinout relies on its founder's prior affiliation to seek partners and gain information about their potential partners. As a result, this spinout gravitates toward filling its resource needs by forming alliance ties with direct or indirect partners of their parent. But being different from its parent reduces the risk of collaboration. Hence, these spinouts fulfill their

resource needs by forming ties with firms that have direct or indirect ties to their parent. If the collaboration risk continues to be a problem due to parent-spinout dynamics, then the spinout seeks partners that have indirect ties to the parent to reduce this risk. In the absence of a high collaboration risk, these spinouts form ties with direct partners of the parent firm.

A key implication of this study is the continued influence of the parent on the spinout's partner choices. A spinout inherits knowledge from its parent firm, but this inheritance comes at a price. Spinouts that have similar technology and products as their parents find partners that have no parent ties, whereas spinouts that have different technology or enter different product markets than their parent firms are more likely to benefit from their parents' direct or indirect partner. However, these spinouts form ties with partners of the parents' partners (i.e., indirect ties), suggesting that they deal with collaboration risk within the parent alliance network by avoiding firms with direct ties to their parents.

This study makes two key contributions to the employee entrepreneurship and new venture alliance literature. First, it addresses how a founder's prior affiliations affect the alliances forged by the spinout and how knowledge within a startup shapes opportunities of new ventures to form alliance ties with other firms. A new venture needs to be conscientious in seeking out partners because it faces a greater risk of collaboration, and even its founder's prior affiliations could be potential source of such a risk. Second, the study extends the literature on spinouts by examining the role of knowledge inheritance in shaping spinouts' alliance networks. The effect of parent-spinout relationships extends past spinout creation and overshadows the alliances these new ventures establish.

## ***Essay 2: Effects of Founders' Background on Research, Alliances, and Performance:***

### ***Employee and Academic Startups***

The second essay focuses on how heterogeneity in founder's background affects alliances, research output and performance of these new ventures. New firms have limited resources and thus benefit from their founders' prior affiliations. The founders' pre-entry experience determines the resources endowed on the start-up and in turn shapes the founding conditions of the new venture. As a result, the heterogeneity in founders' background has an impact on the formation of firms' alliance ties, research output, and performance.

Founders have a strong influence on the resources and capabilities accrued within the firm. An employee entrepreneur has relevant industry experience that aids their firms to navigate the product markets successfully. While, academically founded firms rely on their founders' research experience in prestigious universities to generate innovation and navigate the industry on the merits of their technology. Would the relevant industry experience triumph the research experience of the academic founder? Does this imply that employee startups perform better than academic startups? This study answers these questions by examining how the founders' backgrounds influence the alliance network, research output, and performance of academic and employee start-ups.

An *employee startup* is a firm founded by individuals who has prior experience in the industry, and the parent firm is the prior employer of the employee entrepreneur (startup founder). An *academic startup* is a firm founded to commercialize a technology or idea developed within an academic institution, such as a research laboratory or university.

For this study, I use longitudinal data on new ventures<sup>2</sup> in the pharmaceutical and medical device industry from 1986 to 2013 for this study<sup>3</sup>. Preliminary results suggest that employee startups are more likely than academic startups to form alliance ties with other firms and their alliance networks are larger than those of academic startups. However, employee startups tend to favor ties that allow them to access research and commercialization resources, as compared to academic startups that use their alliance ties to gain access to funding, marketing, and manufacturing resources. Additionally, academic startups are more likely to have a large number of patents. This implies that their founders' research experience has a profound impact on the research output of the academic startups.

These results suggest that a founder's background shapes the new venture's initial choices regarding research output and alliance ties. However, the firm outcome results suggest the founder's influence may be limited to shaping the path the new venture takes and has no effect on the firm's survival, failure, IPO, or acquisition. Therefore, entrepreneurs need to be cognizant about how their knowledge and experience affect resources within their firms. Another implication of this study is for venture capitalists that need to pay close attention to the impact a founder has on the performance of their firm. A key question to answer in this regard is does founders' background determine success of the new venture or merely shapes the resources within the firm. This study addresses this question by examining how different founder background shapes resources within a firm. Furthermore, founder's prior affiliation has no direct impact on the success of these new ventures instead it shapes the resources within these new ventures.

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<sup>2</sup> The data contained 145 employee startups and 173 academic startups tracked from 1986 to 2013

<sup>3</sup> The data was attracted from the same database as essay 1. This data was created by digitizing, annual additions of Medical Marketplace guides (1986 – 2003). The data was updated by merging with other databases: Delphion, ventureXpert, ThompsonOne, Lexis Nexis and COMPUSTAT.