



## Bridging ties and the role of research and start-up experience on the early growth of Dutch academic spin-offs



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### ABSTRACT

Bridging ties are important for obtaining new information. However, when entrepreneurs try to bridge between two networks, they may face problems due to the variety of knowledge among individuals in both networks. In this paper, we argue that specific human capital is essential for interpreting new information and coordinating action when bridging between networks. In a sample of 70 Dutch academic spin-offs, our findings show that specific human capital increases the relative impact of bridging ties on early spin-off growth. This paper sheds light on the value of bridging ties for entrepreneurs and provides implications for practitioners.

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### 1. Introduction

The network structure of the firm has become one of the main topics of interest in entrepreneurship literature. The entrepreneur's network is considered strategically significant to the firm because it serves as a conduit for resources, new information, guidance, and endorsement (Aldrich and Zimmer, 1986; Steier and Greenwood, 2000; Shane and Stuart, 2002; Huang et al., 2012). Academic spin-offs benefit from their contacts in the university networks and the related supporting agencies as they provide them with advice, financial help, and further contacts (Hughes et al., 2007; Clarysse et al., 2011). At the same time, network contacts in industry are particularly important to academic spin-offs (Nicolaou and Birley, 2003; Corolleur et al., 2004; Van Geenhuizen and Soetanto, 2009) as they face the key challenge to move away from their familiar academic environment towards a business environment (Vohora et al., 2004).

Research on firm network contacts has focused on identifying the most beneficial network connections. Some scholars argue that networks with many bonding ties among network contacts

are more beneficial because they are trusted contacts allowing for the efficient transfer complex knowledge (Coleman, 1990; Ahuja, 2000; Steier and Greenwood, 2000). Others claim that networks with many bridging ties provide access to a wider range of information and referrals, and offer structural opportunities for generating new ideas (Granovetter, 1985; Burt, 1992; McEvily and Zaheer, 1999; Zaheer and Bell, 2005; Vissa and Chacar, 2009). Relevant to this debate is to understand what the role of bridging ties is when academic spin-offs reach out to the business environment.

Previous research has investigated whether the potential beneficial effects of bridging ties on firm performance is influenced by contingency factors. The effects of bridging ties could be moderated by entrepreneurial team characteristics (Vissa and Chacar, 2009), the interactions with firm-level capabilities (Inkpen and Tsang, 2005; Zaheer and Bell, 2005; Walter et al., 2006), and the firm's human capital (Castanias and Helfat, 2001; Blyler and Coff, 2003; Sirmon et al., 2007; Huang et al., 2012). However, these studies have not examined the role of specific human capital, such as prior experience, while Reed et al. (2006) and Huang et al. (2012) show the importance of taking the role of specific human capital into account. Obstfeld (2005) addresses the action problem and argues that while bridging ties provide opportunities for the new combination and recombination of ideas, they pose a problem when it comes to acting on such ideas. We explicitly address the action problem by investigating the role of human capital when

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bridging between disconnected networks. As [Obstfeld \(2005, p. 101\)](#) puts it “*the action problem may often overwhelm whatever information advantage structural holes afford*”. In other words, the benefit of bridging ties may only materialize if the actor bridging two disconnected networks understands and knows how to act on the information circulating in both networks. By investigating how academic spin-off’s bridging ties and specific human capital interact we address the challenge posed by a number of researchers (i.e. [Mosey and Wright, 2007](#); [Wright et al., 2007](#); [D’Este et al., 2012](#)) to examine how networks of entrepreneurs and their human capital complement each other.

In this study, we take into account the beneficial effects of specific human capital of the entrepreneurs who bridge disconnected networks. We propose that entrepreneurs who have domain-specific human capital are better able to understand the knowledge and beliefs of people in disconnected networks and can therefore better evaluate and find relevant information. Accordingly, we examine the following research question: To what extent does human capital (i.e., prior experience and knowledge) leverage the effect of bridging ties on the early growth of academic spin-offs?

The paper is organized as follows: We begin by discussing existing literature on network ties and human capital in relation to the performance of entrepreneurial firms. Secondly, we develop hypotheses for each of the main effects of bridging ties and human capital, and for their interaction effects on the early growth of spin-offs. Thirdly, we describe the methodology used in this study after which we present the major findings from a survey among 70 academic spin-offs in the Netherlands. Finally, we discuss the findings and how they contribute to our knowledge on the early growth of academic spin-offs.

## 2. Social network structure and human capital

It has long been noted by scholars and researchers in strategy and organization that networks play an important role in the performance of organizations. The network contacts of the firm are important for providing opportunities for learning ([Gulati, 1999](#); [Kale et al., 2000](#)) and for developing new capabilities ([Rosenkopf and Almeida, 2003](#); [Inkpen and Tsang, 2005](#)). The sources of innovation do not lie exclusively within the firm, but are commonly found at the intersection with actors outside the firm, such as competing firms, universities, and business contacts ([Hargadon and Sutton, 1997](#)). Similarly, for entrepreneurial firms, relationships with external actors are important when it comes to identifying new information, gaining access to resources such as capital, expertise, and advice, and obtaining guidance and endorsement ([Batjargal, 2003](#); [Ardichvili et al., 2003](#)). Networks play an important role in the early growth of new firms by helping them overcome the liabilities of newness and smallness ([Baum et al., 2000](#); [Shane and Stuart, 2002](#)). [Burt \(1992\)](#) suggests that firms that have bridging ties, i.e., disconnected parts of a network, have access to a broader scope and more novel information and therefore perform better than those that do not. These bridging ties between disconnected networks may be particularly important to academic spin-offs when they try to commercialize scientific findings in a business environment and aspire to early growth.

However, if start-ups do not understand the novel information they acquire in the networks they bridge, they may fail to take appropriate actions to innovate and capitalize on that information. As a result, they may become paralyzed by the vast amount of information and may face an action problem ([Obstfeld, 2005](#)). Start-ups may be able to mitigate this problem by relying on

specific prior experience, which can help them to organize and structure the information they receive when bridging between networks, and to select the most appropriate information. Specific prior experience is a part of human capital that reflects domain-specific experiences and capabilities that are embodied in individuals and are considered an important asset of a firm ([Pfeffer, 1994](#)). It is the organization’s knowledge that influences the outcome of a firm ([Pennings et al., 1998](#); [Hatch and Dyer, 2004](#)). More specifically, domain-specific experience is often embedded in skills and uncoded routines that cannot be transferred easily ([Liebeskind, 1996](#); [Agrawal, 2006](#)). Human capital is then difficult to imitate, and when integrated with firm specific resources, it can become valuable to the firm to compete and grow ([Hitt et al., 2001](#); [Hatch and Dyer, 2004](#)). The human capital of new entrepreneurial firms in the high-technology sector is considered an important resource since these firms are often founded with little more than the experience and skills of the start-up team ([Brüderl et al., 1992](#); [Dyke et al., 1992](#)). In particular, academic spin-offs can benefit from domain-specific knowledge and skills embedded in their research experience ([Ensley and Hmieleski, 2005](#); [Wright et al., 2007](#); [D’Este et al., 2012](#)), which is important when commercializing scientific findings ([Feldman et al., 2002](#); [Agrawal, 2006](#)). Research experience is important for the effectiveness of technology transfer ([Agrawal, 2006](#)) and opportunity discovery and exploitation ([D’Este et al., 2012](#)). Furthermore, the value of entrepreneurial experience has been extensively documented in the literature ([Franklin et al., 2001](#); [Clarysse and Moray, 2004](#); [Steen et al., 2010](#)). [Stuart and Abetti \(1990\)](#) indicate that entrepreneurial experience, in terms of number of previous new venture involvements and entrepreneurial attitude, is by far the most significant factor to explain early performance of new technical ventures. Similarly, it is considered important for understanding the growth process of new ventures ([Kalleberg and Leicht, 1991](#); [Vohora et al., 2004](#); [Wales et al., 2012](#)) and technological business development ([Clarysse and Moray, 2004](#)).

While both network ties and human capital are considered to have an important effect on the early growth of start-ups, most empirical studies have investigated their individual role and only a few have addressed the role of human capital in leveraging the value that exists in social networks ([Blyler and Coff, 2003](#); [Zahra et al., 2006](#); [Huang et al., 2012](#)), in particular when it comes to academic spin-offs ([Wright et al., 2007](#)). These firms typically originate within a non-commercial environment ([Siegel et al., 2003](#)) and often lack prior professional business experience ([Chiesa and Piccaluga, 2000](#); [Van Geenhuizen and Soetanto, 2009](#)). As they move from an academic environment to a business environment, the scope of their network increases. They bridge between private and academic sectors, which makes their network more diverse and complex. In such complex arenas, the entrepreneurial team needs certain competencies for the start-up to grow ([Rasmussen et al., 2011](#)). The human capital, e.g., their entrepreneurial and research experience, plays a central role in the evaluation of entrepreneurial opportunities ([Shane, 2000](#); [Wright et al., 2007](#)). Involving scientists in the commercialization process contributes to a more sophisticated understanding of how the scientific invention can be combined and recombined with the information these firms receive when bridging between in private and academic environments ([Agrawal, 2006](#)). Hence, the human capital of the entrepreneurial team determines a firm’s knowledge endowment at its foundation, and has a positive effect on the effectiveness of actions necessary when operating within more complex and dynamic environments. In particular, when entrepreneurs establish a bridge between disconnected networks, specific types of human capital are essential in organizing, structuring and combining the new information they receive.

Following this logic, and consistent with earlier studies, we first

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