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# The impact of university-based incubation support on the innovation strategy of academic spin-offs

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## ABSTRACT

This paper develops understanding about how incubation support and innovation strategy can determine the performance of academic spin-offs. Using a sample of spin-offs from the United Kingdom, the Netherlands and Norway, we analyse the potential moderating effect of incubation support (networking and entrepreneurial support) on innovation strategy effectiveness. The empirical results demonstrate: (1) a technology and market exploitation strategy has a stronger and more positive effect on the performance of spin-offs than a technology and market exploration strategy. In relation to an ambidextrous technology and market exploration and exploitation strategy, a market growth strategy (combining technology exploitation and market exploration) has a positive effect on performance while a product development strategy (combining technology exploration and market exploitation) has little effect on performance; (2) incubation support in the form of networking and entrepreneurial support has a positive effect on the performance of spin-offs; (3) networking support moderates the relationship between an exploitation strategy and spin-off performance while entrepreneurial support moderates the relationship between a market growth strategy and spin-off performance. By examining the interactions between types of innovation strategies and incubation support, this study provides a more refined understanding of the strategy selected by spin-offs. In doing so, it offers new insights about the role of incubator support in enhancing the effect of strategy on performance.

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## 1. Introduction

In today's economy, creating academic spin-offs to commercialise university research and knowledge is a fruitful mechanism to fuel the economy, create job growth and innovation (Fini et al., 2011; Gilsing et al., 2010; Bathelt et al., 2010; Mustar et al., 2008; Phan et al., 2005). In using technology developed from a university, academic spin-offs respond to market needs by offering innovative products or services. However, primarily due to lack of resources, uncertainty in technological development, market acceptance and limited entrepreneurial knowledge and skills, it is well known that academic spin-offs especially face a number of obstacles when pursuing their economic objectives (Gredel et al., 2012; van Geenhuizen and Soetanto, 2009). A prevalent means often used by universities to overcome these obstacles is to establish or draw on the facilities of an incubator; a centralised facility that provides access to university support and policies (Bergek and Norrman, 2008; Löfsten and Lindelöf, 2005).

At a general level, the environment incubators are perceived to offer tends to be seen as one which nurtures commercial ideas in a

way which makes them more likely to become marketable products (Nosella and Grimaldi, 2009; Hannon, 2005). As a consequence, incubators are linked to helping to overcome the failure rate too often associated with newly established firms. Faced by various challenges and the need to identify new approaches to support small firms, the format, nature and role of incubators has changed considerably since they were first founded in the US in the 1960s. No longer do they only offer small office space and shared facilities. Today's incubators come in various forms and many now also offer intangible services, such as business mentoring and coaching, access to capital and a range of professional services with networking especially becoming part of their valuable offering helping to ensure the survival and growth of small firms (Bruneel et al., 2012; McAdam and McAdam, 2006). This shows how incubator practices and what they can offer has changed considerably over the years, making them much more effective and supportive. It also shows why universities might see supporting incubators and/or the building of University-based incubators (UBIs) a way to respond to the rapid development in entrepreneurship policy and the increasing need for universities to be seen to engage and offer an effective means for stimulating and supporting regional innovation and economic growth.

Understandably, this move in incubator practices has been

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popular. Yet, the failure rate of academic spin-offs continues to remain relatively high (van Geenhuizen and Soetanto, 2009). There is also an indication that academic spin-offs are stagnant in their development and have a slow growth rate, bringing into question the impact of incubators in supporting tenants in performing market exploration and exploitation activities. For newly established and small firms, it is known that a trade-off between exploration and exploitation is inevitable as they compete for scarce resources (Bierly and Daly, 2007; He and Wong, 2004). However, some studies suggest that maintaining an appropriate exploration and exploitation balance is critical for firm survival (Auh and Menguc, 2005; Smith and Tushman, 2005). Others propose that they can be treated as an ambidextrous process so that firms can successfully engage in both activities at the same time (Andriopoulos and Lweis, 2009; Gupta et al., 2006; Jansen et al., 2006; Lavie and Rosenkopf, 2006). In the overall literature on incubators, one aspect of the incubation process that has received little attention is that of tenant strategy. The lack of knowledge in this area is derived from the fact that most studies focus on incubators as the unit of analysis (e.g. Ratinho and Henriques, 2010; Tötterman and Sten, 2005). While this approach has provided good insight into incubation practice in general, it rarely touches on how incubators' resources and types of support influence and impact on the strategy of their tenants. On the other hand, studies on tenants focus heavily on entrepreneurial outcomes during pre-start and launching phases and overlook that firms may face diverse obstacles receive different support from incubators and take different strategy paths as a consequence of the support received. So, a gap in understanding about the link between incubation practice and strategy clearly exists in the wider incubator literature.

Our interest is to address this gap and add to knowledge and understanding about the inter-relationship between firm strategy and incubation support. To do so, we use academic spin-offs as the context for our study and address the research questions: what is the impact of incubation support on strengthening the capability of spin-offs to perform exploration, exploitation or both strategies simultaneously? And to what extent does the support moderate the impact of those strategies on the performance of academic spin-offs? Using data collected from 141 academic spin-offs located at UBI's in the United Kingdom, the Netherlands and Norway we test our hypotheses. In doing so, this study contributes to knowledge and understanding and the emerging dialogue around the future of incubator support, especially that offered by UBI's, in the following ways.

First, we respond to scholar's call (e.g. Colombelli et al., 2014; Sirén et al., 2012; Simsek et al., 2009) for more evidence that links the strategy of small firms to their performance. While previous research has asserted the link between strategy and performance, most studies focus on established firms and overlook the role of external support that is often received by small firms and especially spin-offs. In focusing on spin-offs, we extend understanding to show how incubators can determine outcomes and performance of tenant strategy. Clearly, this impacts on how incubators support firms and the need to work closely alongside tenants from the outset. Second, this study provides new empirical evidence around Voss and Voss (2013) innovation strategy framework. It does so by examining the effect of incubation support on two strategic domains, technology and market, to show how these impact on spin-offs within UBI's. Finally, this study responds to the call for more policy-oriented research examining the added value of business incubators on survival, growth and innovation (e.g. Clarysse et al., 2014; Autio et al., 2014; Autant-Bernard et al., 2013; Huggins et al., 2008). We show this is particularly important for innovative and technology-based firms, such as academic spin-offs, as they are generally

perceived to be more vulnerable than other start-ups, despite often being located in a well-supported environment.

## 2. Setting the context

With the introduction of the Bayh-Dole Act in the US, the commercialisation of research and knowledge from universities became a popular policy in many countries. The study reported a substantial increase in public investments in university research and in other initiatives designed to endorse the capabilities of universities to produce academic spin-offs (Autant-Bernard et al., 2013; Mustar et al., 2008). McQueen and Wallmark (1982) introduced one of the earliest definitions of an academic spin-off. They argue that academic spin-offs should meet the following criteria: (1) founders have to come from a university, (2) the activity of the company has to be based on technical ideas generated in the university environment, and (3) the transfer from the university to the company has to be direct and not through intermediate employment. This definition is echoed by Smilor et al. (1990) and Carayannis et al. (1998) who define a spin-off as a company founded by a faculty member, staff member or student who left the university to start a company or who started the company while still affiliated to the university. Over the years, many definitions of academic spin-offs have emerged where scholars generally agree that these derive from technologies developed within a university and the individuals who pursue their commercialisation including academic staff, students and graduates (Clarysse et al., 2007; Benner and Tushman, 2003; Steffensen et al., 2000; Klofsten and Jones-Evans, 2000). The shape and nature of such spin-offs takes many forms and are thus defined in different ways. Following Klofsten and Jones-Evans (2000) and Pirnay (2003) definition, we define an academic spin-off more generally as a new firm created by students, graduates or academic staff to exploit the results of university research.

Academic spin-offs differ from other start-ups in terms of their constant need for innovation and their relationship with knowledge providers (McAdam and McAdam, 2008; Nosella and Grimaldi, 2009). For academic spin-offs, lack of legitimacy and market access can only be resolved by consistently innovating through the development of innovative products, services and business models. For this reason, academic spin-offs are likely to depend on the continued relationship with the university (Bathelt et al., 2010; Johansson et al., 2005) while other start-ups may not share such affection. With the backing of government and industry, universities have introduced support policies – such as business incubators – to nurture newly established spin-offs while at the same time fostering entrepreneurial spirit among students and academic staff (Gilsing et al., 2010; Link and Scott, 2007). In this study, the incubation of academic spin-offs is defined as a mechanism that links technology, capital and know-how to leverage entrepreneurial talent, accelerate the creation of new companies and exploit the development of technology (Bruneel et al., 2012; Bergek and Norrman, 2008; Grimaldi and Grandi, 2005).

As incubation practices have spread internationally and the number of new incubators has grown exponentially, research on the subject is clearly burgeoning. Yet our knowledge of incubators and incubation practice remains fragmented. One of the biggest challenges in studying incubators is to deal with the heterogeneity in their objectives, stakeholders, type of services, and resources (Bruneel et al., 2012; Grimaldi and Grandi, 2005; Hannon and Chaplin, 2003). Making it more complicated, scholars have proposed different classifications, taxonomies and models to portray the variety of incubators developed resulting in varied perspectives with the conclusion being that no single framework is effective (Bruneel et al., 2012; Bergek and Norrman, 2008). There is

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