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Academic Entrepreneurial Behavior: Birds of more than one feather

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ABSTRACT

While Entrepreneurial behavior involves starting and running a new venture (Gartner, 1988), it seems that *Academic* entrepreneurial behavior (AEB) is somewhat unique as it extends beyond a focus on startups to include both commercial and non-commercial activities (Abreu and Grinevichb, 2013). Additionally, AEB is influenced by both financial and non-financial rewards (Lam, 2010). Despite these differences, studies of AEB have typically focused primarily on academics who have participated (or intend to participate) in a university spinout, as if all academic entrepreneurs are birds of the same feather. Expanding the unit of analysis to also include academics not participating in commercial activities could provide insights for the development of AEB. An in-depth qualitative analysis of 30 life science academics in Australia indicates the presence of four distinctive categories of AEB: *non-entrepreneurial*, *semi-entrepreneurial*, *pre-entrepreneurial* and *entrepreneurial*. More interestingly, the same academic can exhibit different AEB in relation to different research project(s) and depending on the available support mechanisms (particularly financial). Our findings suggest that AEB is not necessarily driven by opportunity recognition, and research on the topic must consider other factors beyond the individual academic, such as the project and funding mechanisms.

1. Introduction

Quintessential entrepreneurial behavior involves starting and running a new venture (Gartner, 1988) and, as a result, the individual and the venture are inextricably linked. However, this model does not seem to fit the notion of *academic* entrepreneurship. While it is generally recognized that academics are significant players in the research commercialization process (Agrawal, 2001) it appears that their role in this process requires further investigation. As noted by Jensen and Thursby (2001), 71 per cent of Technology Transfer Office Managers (TTOMs) argue that the successful commercialization of research discoveries typically requires the cooperation of the scientist. However, a review of 250 articles published in Management Science (since its inception in 1954) on the topics of technological innovation, product development and entrepreneurship found that only five investigated the role of the individual researcher (Shane and Ulrich, 2004). Jain et al. (2009, p.292) conclude that "missing from much of this conversation is a deeper understanding of the involvement of a key actor – the university scientist." Similarly, Siegel et al. (2001) note that the success of technology transfer depends on the participation of academic faculty; however, this topic is not covered in any of the studies to which they refer. This suggests there is a need to develop a better understanding of "the enablers and barriers to entrepreneurship" within the university sector (Brennan et al., 2005, p.319) and, to this end, Philpott et al. (2011) suggest that an inclusive, bottom-up (rather than top-down) approach would seem to be more conducive to the development of *academic* entrepreneurial behavior (AEB). Further, there appears to be a "substantial individual-level variation amongst university scientists that governs whether and how they may interact with private companies" (Boardman and Ponomariov, 2009, p.142).

There are also conflicting findings concerning the appropriateness of various support mechanisms that have been developed to encourage AEB. For example, Kenney and Patton (2009) suggest that existing mechanisms disempower scientists and Louis et al. (1989) conclude that university policies and structures have little effect on *academic* entrepreneurship. However, Audretsch et al. (2002) report that support mechanisms have a positive impact on the commercialization of academic research and Markman et al. (2008) demonstrate that stronger support mechanisms help to reduce the chances that scientists will bypass the TTOM in their attempts to commercialize their research discoveries. Without a deeper understanding of AEB it is difficult to develop an awareness of the subtle, yet important, differences that might explain these conflicting findings. From afar, academic entrepreneurs might seem like birds from the same flock, yet they might fly with different feathers. Acknowledging and understanding these different feathers could help researchers understand how AEB is encouraged, or hindered, and could ensure policy makers are more attuned with the circumstances of individual academics.

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The aim of this study, therefore, was to provide a deeper understanding of the diverse entrepreneurial behaviors exhibited by academics with respect to the commercialization of their research discoveries (for example, through consulting, licensing, or university spinouts (USOs)) and to organize the views and behaviors of academics in a systematic way that will be useful in understanding how AEB evolves. Additionally, such an investigation could also assist in designing, evaluating, and improving mechanisms implemented to support and encourage AEB. Note that, to reduce the influence of external factors, we confined our study to one field of research (life sciences) and a single regional location (Western Australia). We chose to focus on life science academics (LSAs) for four key reasons. First, Agrawal (2001, p.286) notes that this is one of the "most active areas of university knowledge transfer." Second, life sciences represents the largest proportion of academic research in terms of funding; accounting for 60% of all academic research in the US (Board, 2014). Third, life sciences incorporates unique challenges and opportunities that intertwine industry, academia, government, and the non-profit sector (Castillo Holley, 2014). Fourth, as noted by Maine et al. (2015, p.56), "the context of science-based ventures is both intriguing and poorly understood." The examination of this issue within the Western Australian region was based on convenience.

The remainder of this paper is structured as follows. In the following section we provide a brief review of the prior literature concerning AEB. Section 3 describes: the methodology we adopted; our research setting; and the sample of academics interviewed for the purposes of this study. In Section 4 we present a suggested categorization of AEB based on the results of our analysis. We then discuss the implications of our suggested categorization for theory, policy and practice in Section 5. A brief summary of our findings, the study's limitations, suggestions for future research and conclusion are provided in Section 6.

2. Literature review

Studies of *academic* entrepreneurship can broadly be grouped under two main headings: institutional activities and the individual academic. Table 1 provides a brief summary of the many forms institutional *academic* entrepreneurship can take. For example, Louis et al. (1989) identify five institutional *academic* entrepreneurial activities: securing large publically funded research projects; deriving supplemental income, mainly through consulting; soliciting private research funding from industry; patenting the results of research (IP management); and forming USOs based on the results of research. Brennan et al. (2005) establish seven areas of a 'third' stream of University funding: public-sector research contracts; consulting to industry; private-sector research contracts; intellectual property (capital) management; joint ventures; forming USOs; and establishing spinin firms. Wright et al. (2008) categorize tacit and codified university-industry knowledge transfer in the following five areas: consultancy (and reach-out) to industry; private research contracts; licensing and patents (IP management); forming USOs; and graduate and researcher mobility. Finally, Philpott et al. (2011) provide a range of nine activities that span across the traditional academic paradigm to the entrepreneurial paradigm, namely: grantsmanship (public research grants); consulting to industry; private research contracts; patenting and licensing (IP management); forming USOs; publishing academic results; certified education (producing highly qualified graduates); industry-training courses; and the creation of technology parks. The conclusions from these studies indicate the need to expand our understanding of AEB beyond the formation of a USO to include a variety of other activities (Boardman and Ponomariov, 2009; Rasmussen, 2008).

Table 1
Institutional academic entrepreneurial activities.

	Louis et al. (1989)	Brennan et al. (2005)	Wright et al. (2008)	Philpott et al. (2011)
Public research grants	x	x		x
Consulting to industry	x	x	x	x
Private research contracts	x	x	x	x
IP management	x	x	x	x
Joint ventures		x		
Spinouts	x	x	x	x
Spinins		x		
Graduate & researcher mobility			x	
Publishing				x
Certified education				x
Industry training				x
Technology parks				x

Attempts to understand the diversity of AEB are not new. Nicolaou and Birley (2003) propose the following trichotomous categorization of USOs based on the Researcher-USO relationship: an orthodox USO, where the researcher leaves academia to take up an entrepreneurial role; a hybrid USO, where the researcher takes a part-time or advisory position in the USO; and a technology USO, where the technology is spunout but the academic does not maintain a connection with the newly established firm, which is then managed by a surrogate entrepreneur (an individual with experience in research commercialization but who is not part of the original research team). In the U.S., university scientists seem to adopt the 'hybrid' approach, navigating between their primary role as academics and their secondary role as 'commercializers' (Jain et al., 2009).

While longitudinal case studies focusing on new venture creation can provide an in-depth understanding of the process of opportunity exploitation (either by causation or effectuation) previous research adopting this approach has typically focused on AEB after an academic has decided to try and commercialize his/her research discovery. While these previous studies provide considerable evidence concerning the various means by which academics are involved in research commercialization, we believe a broader understanding that also includes the views (opinions) of academics who are not currently engaged (and/or are not interested in becoming engaged) in a USO (for example) might provide additional useful insights concerning the factors that can impact AEB. Including such a wide range of opinions is relevant for this study for the following reasons:

1. It is generally accepted that entrepreneurial activity does not only involve the formation of a new venture, but might also include other activities (Schumpeter, 1947; Shane and Venkatamaran, 2000). Furthermore, several authors have included other forms of commercial exploitation, such as consulting and joint-venturing, in their descriptions of academic entrepreneurial activities (Brennan et al., 2005, p.319);
2. Individuals who have not yet started a new venture but are actively engaged in exploring opportunities (referred to as 'nascent' entrepreneurs) are considered part of the entrepreneurial process (Liao and Welsch, 2008) and studying this group has provided useful information about appropriate support mechanisms for individuals at this 'nascent' stage (Davidsson and Honig, 2003);
3. Academic researchers engaging indirectly in academic entrepreneurial activities (for example, as consultants in licensing a research discovery or in launching a USO) can play an important role in the process of commercializing research discoveries (Markman et al., 2008); and
4. Such an approach might also shed light on the factors that can influence (either positively or negatively) *academic* entrepreneurship (Boardman and Ponomariov, 2009; Pries and Guild, 2011).

3. Methodology

Given the nature of this study, we adopted a qualitative research