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In good company: The influence of peers on industry engagement by academic scientists

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ABSTRACT

Previous research on academic entrepreneurship and engagement with industry has found that the behaviour of academics is influenced by their local social context. However, we know little about the mechanisms that produce this effect. We argue that academic scientists' industry engagement is influenced significantly by the behaviour of their peers, that is, the behaviour of colleagues of similar seniority. Using insights from social psychology, we hypothesize that these peer effects are produced by the mechanism of social comparison. In an analysis of data from multiple sources for 1370 UK academic scientists and engineers, we find that peer effects are stronger for early career individuals and weaker for star scientists, suggesting the incidence of social comparison. We argue that individuals look to their immediate peers for inspiration, because they view them as an important reference group and use them as a benchmark for their own ambitions and behaviours. Our findings have important implications for how universities may encourage scientists' behaviours by paying attention to local work contexts.

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1. Introduction

There is broad agreement that interactions between public science and industry contribute significantly to innovation in products, processes and services (Mansfield, 1991; Cohen et al., 2002; Murray, 2002). It is also true that there can be simultaneous benefits for academic science from interactions with industry since many academics work in more applied fields, such as medicine and engineering (Nelson and Rosenberg, 1994), and industry problems traditionally have served as a powerful stimulus for progress in both basic and applied science (Rosenberg, 1982; Stokes, 1997). These interactions can take many forms from collaborative research to more direct commercial activities such as the founding of university spin-out firms (Louis et al., 1989; Agrawal and Henderson, 2002; D'Este and Patel, 2007).

While academic scientists have long participated in practical problem-solving (Geuna and Muscio, 2009; Mowery, 2009), since the early 1980s the emergence of novel technological opportunities, for example, in biotechnology or computer science, have renewed interest in the conditions that facilitate university-industry interaction (Mowery et al., 2001). Governments increasingly view universities as 'engines of economic growth' (Feller, 1990), and universities are keen to acquire resources via commercialization and industry collaboration, prompting researchers to investigate what drives individual academic researchers to cooperate with industry. Many authors have investigated the role played by individual characteristics and organizational factors such as the attributes of universities (Di Gregorio and Shane, 2003; Lockett and Wright, 2005).

A smaller, but growing body of research considers how the local social context in which academics operate influences their propensity to engage with industry and to commercialize their research (Louis et al., 1989; Stuart and Ding, 2006; Bercovitz and Feldman, 2008). This line of work suggests that individual academics and their achievements are highly influenced by the attitudes and behaviours of their work colleagues, the prevailing local norms, and the local leaders. In other words, academics often emulate their colleagues' behaviours; parallel evidence exists on entrepreneurial behaviour, indicating that an individual's immediate work colleagues exert considerable influence on the individual's propensity to found a firm (Nanda and Sorensen, 2010).

However, despite the insights from previous work, we still know little about *why* individual academics behave in similar ways to their local colleagues. For instance, we are yet to understand whether local effects emanate from a common culture or norms, collective learning and imitation, or hierarchical imposition of

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V. Tartari et al. / Research Policy xxx (2014) xxx-xxx

policies. In this paper, we argue that *peer effects* play a key role in shaping academics' behaviours. We explore how peer effects shape individuals' academic engagement, which encompasses the various ways that academic scientists collaborate with third-party organizations, and includes collaborative research, contract research and consulting as well as informal networking with practitioners (Perkmann et al., 2013). Academic engagement involves a large proportion of academic scientists across many disciplines, generates income for universities and may result in commercialization extending to licensing of patents and spin-out activities (Perkmann et al., 2013). Given the relevance of academics' engagement with industry for innovation and problem-solving (Cohen et al., 2002), it is important to develop a detailed understanding of what drives scientists' collaboration.

We argue that the influence of the local environment on academic scientists is in the form of peer effects, manifested by emulation of the behaviours of colleagues of the same rank. Using insights from social psychology, we argue also that these peer effects are largely underpinned by the tendency for individual academics' to compare themselves with other individuals. *Social comparison* involves individuals choosing a reference group to use as a yardstick to measure their own ambitions and behaviours (Hyman, 1942; Ibarra and Andrews, 1993). The incidence of social comparison suggests the presence of some degree of intradepartmental rivalry, as individuals compare themselves with similarly ranked colleagues in order to advance their careers in competitive professional environments.

We develop hypotheses to investigate the idea that peer effects are generated by social comparison dynamics, and test them using data from multiple sources on 1371 UK academic scientists in a range of universities and disciplines. We pay particular attention to the so-called 'reflection problem' which often affects econometric studies of peer effects and can result in spurious correlations (Manski, 1993). The reflection problem refers to the overstating of the incidence of peer effects in studies proposing that individual behaviour is explained by the average behaviour of a group (Manski, 1993). We perform several tests to rule out possible alternative explanations for real endogenous peer effects.

Our study highlights the extent to which academic engagement is shaped by the behaviour of the focal individuals' peers. We try to both identify the nature of this local social influence and partly exclude a variety of other mechanisms that might be responsible for generating behavioural alignment in local work contexts. We suggest that individuals look to their immediate peers for inspiration, predominantly because they view these individuals as an important reference group; they 'benchmark' their own ambitions and behaviours against those of their similarly ranked peers. At the same time, we note the absence of effects exerted by local social norms in informing individuals' engagement behaviours, as implied by some previous research (Louis et al., 1989; Haeussler and Colyvas, 2011). Our findings have important implications for the way specific behaviours, related to engagement of academics in local work contexts, might be promoted by universities.

2. Theoretical background

Academia is unique in allowing individuals to engage proactively in a wide range of diverse activities from start-up entrepreneur, to government advisor and other civil society roles. Chief amongst the work areas where academics have considerable discretion is collaboration with industry partners. This type of activity requires initiative on the part of the academic to approach and develop relations with industry partners, going beyond the conventions of academia related to teaching obligations. However, in many universities, academics' engagement with industry is less valuable for career progression than publications and other research-related outputs. So what drives individuals to engage with industry?

Previous work focuses primarily on personal attributes to explain the propensity to engage with industry, that is, on individual scientific productivity, demographic attributes, social capital, experience and professional status (Louis et al., 1989; D'Este and Patel, 2007; Bekkers and Bodas Freitas, 2008; Boardman and Ponomariov, 2009; Giuliani et al., 2010; D'Este and Perkmann, 2011; Haeussler and Colyvas, 2011). This research is complemented by studies exploring the role of organizational structures and other attributes including the features of specialized technology transfer units, and university or department research quality (Bozeman and Gaughan, 2007; D'Este and Patel, 2007; Ponomariov, 2008).

Some studies of the determinants of academic scientists' participation in commercialization have found that the social context in which individuals are embedded is an important explanatory factor. Using a sample of US-based life scientists. Stuart and Ding (2006) find that the greater the involvement of university and department colleagues and co-authors in private sector firms, the more likely an individual academic will be an entrepreneur. Being embedded in an academic department with a culture that is supportive of entrepreneurial activities can help to counteract the disincentives created by a university environment that does not reward such efforts (Kenney and Goe, 2004). A qualitative study on university patenting by Owen-Smith and Powell (2001) illustrates how the prestige associated with successful commercialization affects the aspirations of individuals. Those engaging in successful commercialization can become role models, providing powerful inspiration to work colleagues (Kassicieh et al., 1996; Wright et al., 2004). Bercovitz and Feldman (2008) confirm the existence of such peer effects in their study of medical researchers; they find that individuals are more likely to disclose inventions if departmental colleagues of similar seniority had done so. Also, Giuliani et al. (2010) show in the context of wine research in Chile, South Africa and Italy that the number of industry contacts in the networks of departmental colleagues was positively associated with the scope of an individual's personal network of industry contacts.

Thus, the emphasis has shifted from individual characteristics and organizational structures to consideration of how the local social environment can stimulate proactive behaviour among academics. While one may suspect that similar considerations may hold for greater participation in the traditional missions of the university sector, very few studies have addressed this question. Louis et al. (1989) found that local norms were more powerful predictors of various types of engagement than individual characteristics and Aschhoff and Grimpe (2014), using publications data, show that the publishing behaviours of both departmental colleagues and academic co-authors' shape researchers' academic engagement with industry, with this effect being more pronounced in the earlier stages of their academic careers.

While this emerging body of work suggests that scientists' social environments play an important role in shaping their discretionary activities, it does not point to the specific mechanisms that generate this effect. In this paper, we develop a theory that emphasizes the role of peers. A peer group is a specific type of reference group, which the individual takes account of when selecting a behaviour amongst several alternatives (Hyman, 1942; Kemper, 1968). An individual's peers are defined as those individuals in the immediate social context of similar rank and similar attributes to the focal individual. The influence of peers on individual behaviour has been documented in many different empirical settings, including neighbourhoods (Dietz, 2002), education (Coleman, 1966; Jackson and Bruegmann, 2009), movie sales (Moretti, 2011), health plan choices (Sorensen, 2006), and workplace contexts (Lazega, 2000; Nanda and Sorensen, 2010).

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2

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