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Technovation

journal homepage: www.elsevier.com/locate/technovation

The entrepreneurial university, academic activities and technology and knowledge transfer in four European countries

Barbara Kalar¹, Bostjan Antoncic*

Faculty of Economics, University of Ljubljana, Ljubljana, Slovenia

ARTICLE INFO

Available online 27 November 2014

Keywords:

Entrepreneurial university
 Technology and knowledge transfer
 Entrepreneurially oriented university department
 Entrepreneurial academic activities
 Traditional academic activities
 Cross-cultural study

ABSTRACT

This paper aims to provide an insight into academics' perceptions of an entrepreneurial university. In spite of all the initiatives, environmental changes and desire to create entrepreneurial universities, there is limited research on how the entrepreneurial orientation within a university may influence academics' engagement in different activities. Based on analyzing academics' survey responses at four European universities (University of Amsterdam, University of Antwerp, University of Ljubljana and the University of Oxford), our findings indicate that more academics in the natural sciences perceive their university department as being highly entrepreneurially oriented than their counterparts in the social sciences. The results also reveal that perceiving a university department as having a high or low entrepreneurial orientation may have a significant effect on whether an academic would engage in some activities that are more entrepreneurial in nature, but a negligible effect on whether an academic would engage in more traditional activities. Further, academics perceiving their university department as being highly entrepreneurially oriented are less likely to believe that engagement in technology and knowledge transfer can be harmful to academic science. At the end, the implications, limitations and future research areas are discussed.

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1. Introduction

Recently, the mutual relationship between the university and industry through the exchange of knowledge has become a global trend (Arvanitis et al., 2008). Since the early 1990s, environmental changes aimed at promoting the university's role in technology and knowledge transfer have spread across Europe (Grimaldi et al., 2011; Santoro and Bierly, 2006). Many European countries have introduced reforms and policy initiatives to encourage and improve university technology and knowledge transfer (Messeni Petruzzelli, 2011; Rasmussen, 2008).

Following these trends, a number of universities have transformed themselves from a traditional research university to an entrepreneurial university with strong ties to industry, thereby encouraging the entrepreneurial activities of their academics (Krabel and Mueller, 2009). Now the role of the entrepreneurial university is not simply producing new knowledge, but also disseminating this new knowledge to industry and society (Guerrero et al., 2012). The entrepreneurial university tries to provide a culture and suitable atmosphere for encouraging academics to disseminate their knowledge through

traditional academic activities as well as through activities that are more entrepreneurial in nature (Kirby et al., 2011; Philpott et al., 2011). The entrepreneurial university phenomenon brings some changes to university routines, culture and policies (Tijssen, 2006). Based on these changes, an entrepreneurial orientation within the university is starting to be formed (Todorovic et al., 2011). Yet, despite the growing awareness of the entrepreneurial university, little is still known about the entrepreneurial orientation within the university and how such an orientation there may influence academic activities (Todorovic et al., 2011).

There is a wide variety of activities through which academics transfer their new technology or knowledge (Bekkers and Bodas Freitas, 2008; Lockett et al., 2003). Some of these activities are more formal than others. Many prior studies have concentrated on more formal activities based on intellectual property rights as the main outcomes of universities such as patenting, licensing and the formation of spin-offs (D'Este and Patel, 2007). However, several studies (e.g. Abreu and Grinevich, 2013; Caldera and Debande, 2010; Cohen et al., 2002; D'Este and Patel, 2007; Scharinger et al., 2001) emphasized that to most industries and universities less formal and informal as well as non-commercial activities are at least as, or even more, important as formal activities and agreements. Indeed, academics' engagement in less formal activities has been shown to provide an important economic and social value for both academics

* Corresponding author. Tel.: +386 40 800 259.

E-mail addresses: barbara.kalar@gmail.com (B. Kalar), b.antoncic@gmail.com (B. Antoncic).¹ Tel.: +386 31 216 240.

and industry partners (Abreu and Grinevich, 2013). In addition, the significance of informal interactions is highlighted by Audretsch et al. (2012). One of their concluding remarks is that there is a need for an increased focus and further research on informal technology and knowledge transfer (Audretsch et al., 2012).

Another neglected issue in the literature refers to the unit of observation. Previous studies focusing on technology and knowledge transfer have examined university incentives and the role of institutions, especially universities and university transfer offices, in fostering knowledge transfer (Krabel and Mueller, 2009; Landry et al., 2010). Fewer studies have examined factors that allow a deeper understanding of an academic who is actually the key actor in the technology and knowledge process (Jain et al., 2009; Krabel and Mueller, 2009; Rothaermel et al., 2007; Shane, 2004). Indeed, using the individual academic as a unit of observation provides a complete picture of actual engagement in academic activities (Grimaldi et al., 2011). In this way, all activities of an academic, disclosed as well as undisclosed, are considered. This is important since a number of studies argue that many academics do not always disclose all parts of their technology or knowledge transfer to the university administrators (Agrawal, 2001; Landry et al., 2010). Most prior studies focused on disclosed academic activities (Landry et al., 2010; Philpott et al., 2011) which underestimated the academics' overall engagement in technology and knowledge transfer (Grimaldi et al., 2011).

Further, there are some doubts about the influence and effects of university entrepreneurial orientation on the academic world. On one side, the commercialization of research generates revenues for the university that are usually reinvested in academic basic research (Grimaldi et al., 2011; Siegel et al., 2004). But, on the other side, commercialization activities may affect both teaching and basic research, which are the main missions of the university (Rasmussen et al., 2006). Therefore, there is still a fear among some academics that entrepreneurial orientation may hold the potential for conflict and may lead academics to neglect their main tasks (Arvanitis et al., 2008; Lee, 1996; Perkmann and Walsh, 2008; Rasmussen et al., 2006).

Although the entrepreneurial university phenomenon has gained attention and increased interest among academics and policymakers, there are still some gaps preventing a complete understanding of the university-industry relationship (D'Este and Patel, 2007; Geuna and Muscio, 2009). Thus, despite all the research and extensive literature on academic entrepreneurship and technology and knowledge transfer, this field of research still has some untapped issues that provide open space for some more and interesting further research (Wright, 2012).

In order to help close the identified research gaps, the objective of this paper is the following. First, we aim to find out how academics perceive the phenomenon of the entrepreneurial university. Based on individual academics' perceptions of the entrepreneurial orientation of their university department, they are divided into two groups. The first group includes those academics who perceive their university department as lowly entrepreneurially oriented (EO) and the second group includes academics perceiving their university department as highly EO. Our goal is to move beyond earlier work and provide contributions to the field of academic entrepreneurship and technology and knowledge transfer by answering research questions considering academics from all scientific disciplines and analyzing various academic activities through which technology and knowledge are transferred, including more entrepreneurial as well as more traditional ones. For the purposes of this study, the entrepreneurial activities refer to a wide range of activities ranging from more to less formal, such as patenting and licensing, business activity, collaboration, contract research, industry interactions, attendance at industry-sponsored workshops or meetings and applied research. While the term

traditional activities includes activities that are closer to the traditional missions of university such as participation at the conferences, scientific publishing, performing basic research and teaching.

Our study is based on a new data set of 1266 academics employed at four European universities: University of Antwerp (Belgium), University of Amsterdam (Netherlands), University of Ljubljana (Slovenia) and the University of Oxford (UK). In sum, this paper aims to provide an overall picture of academics' engagement in different activities by considering an individual academic and ascertaining how an individual perceives the entrepreneurial university phenomenon.

In the following section, we provide a theoretical background along with research issues and hypotheses development. Next, we provide a description of the research data and methodology. The empirical results are then presented. The paper concludes with a discussion, implications, limitations of this study and future research opportunities.

2. Theoretical background and hypotheses development

During the past 20 years many European Union countries have taken initiatives to improve university-industry relations and facilitate technology and knowledge transfer (European Commission, 2007). Although entrepreneurial universities have been facing similar challenges (Guerrero et al., 2012), reforms in national research systems aiming to increase the commercialization of research have affected universities in different ways (Grimaldi et al., 2011). Besides following the European common strategic goal, the "Lisbon Strategy", many countries have taken their own measures to encourage technology and knowledge transfer (Mazgan, 2011). Although a number of good practices have been identified that should help European countries realize goals regarding technology and knowledge transfer, each country has to choose the procedures and practices that are best designed for them and would be most effective in their context (European Commission, 2008). Therefore, different types of technology and knowledge transfer have been emerging in various conditions and industries (Mazgan, 2011). Thus, despite the common strategic goal and certain comparable economic and social conditions shared by European countries, entrepreneurial universities differ from each other due to their traditions, characteristics and policies that are unique to each university (Guerrero et al., 2012).

The literature review and prior research (e.g. Abreu and Grinevich, 2013; Bekkers and Bodas Freitas, 2008; Landry et al., 2010; Philpott et al., 2011) indicate that scientific discipline is likely to play a role in an academic's engagement in different activities of technology and knowledge transfer. As argued by Abreu and Grinevich (2013), in general academics in the natural sciences (engineering, physics and biological sciences) are more likely (relative to those in health sciences, the reference group) to engage in all types of activities through which technology and knowledge are transferred to industry, especially in more formal ones. Meanwhile, academics in the social sciences (education, business, arts and humanities) are more likely to be involved in less formal, informal and non-commercial activities (Abreu and Grinevich, 2013).

The differences in academics' perceptions about the entrepreneurial orientation of their university department are partly a reflection of different scientific disciplines, former relations with industry partners and diverging opportunities for engagement in various academic activities (Lam, 2010). It is quite natural that different departments across universities have more or less potential for entrepreneurial activities and vary in actual involvement in such activities (Davies, 2001). The latter, actual involvement in entrepreneurial activities, is largely associated with the environment surrounding academics. Namely, earlier research (e.g. Amabile et al., 1996; James and James,

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