



Who are the researchers that are collaborating with industry? An analysis of the wine sectors in Chile, South Africa and Italy

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ABSTRACT

Research on University–industry (U–I) linkages and their determinants has increased significantly in the past few years. However, there is still controversy on the key factors explaining the formation of U–I linkages, and especially related to individual researcher characteristics. This paper provides new empirical evidence and, in particular, looks at the importance of researchers' individual characteristics and their institutional environments in explaining the propensity to engage in different types of U–I linkages. Based on an original dataset, we present new evidence on three wine producing areas – Piedmont, a region of Italy, Chile and South Africa – that have successfully responded to recent structural changes in the industry worldwide. Empirical findings reveal that researchers' individual characteristics, such as centrality in the academic system, age and sex, matter more than publishing records or formal degrees. Institutional specificities at country level also play a role in shaping the propensity of researchers to engage with industry.

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1. Introduction

University–industry linkages (U–I) are not a new phenomenon, although their number and importance have been increasing (Etzkowitz, 1998). This may be due to the increased transdisciplinarity of the knowledge production process which is requiring tight and continuous interaction between science and technology (Faulkner, 1994), and to policies in the US and Europe – and increasingly in developing countries – aimed at promoting interaction between research organizations and industry (Geuna, 2001; Mowery et al., 2001; Velho and Saenz, 2002; van Looy et al., 2003).

All this has promoted growing interest in U–I interactions, which are usually investigated from the perspectives of the firm or the university involved. In the past, studies have focused on patenting, licensing and spin-offs, but these represent only a small fraction

of possible U–I collaborations (Cohen et al., 2002). Several authors (Bonaccorsi and Piccaluga, 1994; D'Este and Fontana, 2007; Mora Valentin, 2002; Scharfing et al., 2002) highlight the many other types of links between universities and firms, ranging from informal meetings to researchers' involvement in industry commissioned consultancy, to joint research programmes, to the purchase of industry prototypes.

Since the late 1990s, the literature on U–I linkages is focused on the existence and drivers of U–I linkages and demonstrates that a variety of factors needs to be taken into account to explain U–I linkages, e.g. organizational characteristics, history and tradition (e.g. Bercovitz et al., 2001; O'Shea et al., 2005; Boardman, 2009) and researchers' individual attributes (e.g. Blumenthal et al., 1996; D'Este and Fontana, 2007; D'Este and Patel, 2007; Landry et al., 2007; Bekkers and Freitas Bodas, 2008; Bercovitz and Feldman, 2008; Van Rijnsoever et al., 2008; Boardman and Ponomarev, 2009). However, there is little consensus so far on what factors mediate the formation of U–I linkages.

This study aims to contribute by taking the researcher as the unit of analysis and providing new original evidence to assess the importance of two sets of factors on the propensity to engage in U–I linkages: (a) researchers' individual features such as: gender, age, education and academic reputation; and (b) the characteristics of the researchers' organizational contexts such as the type of

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organization (university vs other research organizations), department size and peer effect, that is, the impact of the presence of colleagues with U-I linkages in the same department. An improved understanding of these individual mechanisms, complementary to those concerning organizations, is a key input for policy makers in charge of designing and implementing policies to enhance U-I collaborations.

The focus of the present study is on researchers specialized in wine-related disciplines. The wine industry recently has experienced a process of dramatic technological change and modernization, spurred by the results of applied research from universities and research institutes and increased interaction between researchers and the industry (Aylward, 2003; Giuliani and Arza, 2009; Morrison and Rabellotti, 2007). These changes are occurring worldwide, with new producing areas emerging in countries as diverse as Argentina, Australia, Chile and South Africa among others. We provide new evidence on three particular wine producing contexts – Piedmont in Italy, Chile and South Africa – that have responded successfully to the structural changes experienced in the industry worldwide. We exploit an original set of data collected by the authors through a questionnaire survey administered to researchers in these three wine systems, and conduct an econometric analysis to study the microeconomic determinants of U-I linkages.

The evidence reveals that individual researcher characteristics, such as centrality in the academic system, sex and age, matter, while academic status, publishing record and formal education degrees are not significantly related to the formation of U-I linkages. Working in a university rather than in another type of research organization, makes a positive difference, while other organization characteristics do not appear to influence the emergence of U-I linkages. Institutional specificities at country level also play a role in shaping the propensity of researchers to engage with industry.

The paper is organized as follows. Section 2 reviews the literature on U-I linkages and develops an original conceptual framework to explore the determinants of the formation of U-I linkages. Section 3 provides an overview of the wine industry generally, and of the three specific contexts in which the research was conducted, and explains the rationale for their choice. Section 4 presents the data and the method of analysis. Section 5 presents the empirical results and Section 6 concludes.

2. Factors influencing the formation of U-I linkages: a conceptual framework

Despite the increasing attention devoted to the determinants of U-I linkages, there is still little consensus on what explains the formation of such linkages. From a theoretical standpoint, at least two approaches can be identified: (i) the ‘evolutionary’ and ‘resource-based view’ approaches, which explain the formation of linkages on the basis of the skills and capabilities of collaborating actors, whether individual researchers (e.g. Van Rijnsoever et al., 2008) or organizations such as firms and universities (e.g. Santoro and Chakrabarti, 2002; Giuliani and Arza, 2009); (ii) the ‘institutional’ approach, which tends to explain the formation of linkages through the context in which they are embedded – i.e. the type of organization, the culture and the environment in which research is undertaken (e.g. Etzkowitz, 1998; Owen-Smith et al., 2002; Feldman and Desrochers, 2004). Some studies combine these approaches, showing that the theories are complementary in explaining the formation of linkages (see e.g. Boardman, 2009; D’Este and Patel, 2007). Although considerable progress has been made, there are no conclusive results on the key determinants of U-I linkages. As shown in the remainder of this section, there is a

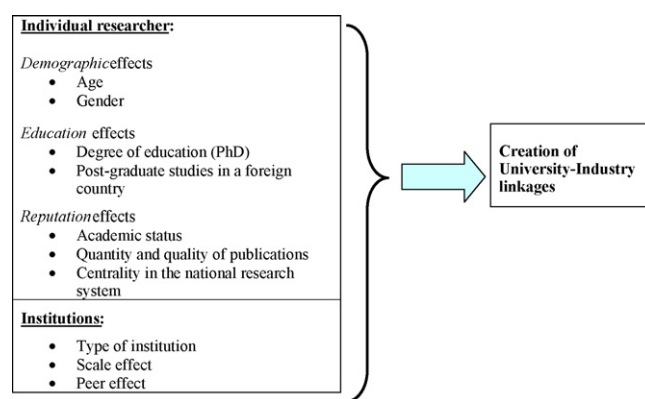


Fig. 1. Factors affecting the formation of U-I linkages.

bourgeoning literature on scientists’ characteristics and their role in forging interactions with the industry (Blumenthal et al., 1996; Louis et al., 2001; D’Este and Fontana, 2007; D’Este and Patel, 2007; Landry et al., 2007; Bekkers and Freitas Bodas, 2008; Bercovitz and Feldman, 2008; Van Rijnsoever et al., 2008). In particular, Boardman and Ponomariov (2009) have proposed an exploratory assessment of the effects of a broad range of individual-level characteristics in a sample of US scientists, on their interactions with the private sector, emphasizing that there is substantial individual-level variation amongst university scientists, which influences whether and how they interact with industry.

Building on these studies, in this paper we provide new empirical evidence aimed at investigating the main factors influencing U-I linkages including in our analysis the characteristics of both individual researchers and their organizations. These factors, summarized in Fig. 1, are discussed in detail in Sections 2.1 and 2.2, with references to the existing literature, and some testable predictions are proposed for the later empirical analysis.

2.1. Individual researchers’ characteristics

The literature identifies a number of factors influencing the probability of interactions between researchers and industry, the most important being: (i) researcher’s *demographic* characteristics, i.e. age and gender; (ii) researcher’s *education* characteristics, i.e. academic degree obtained; and (iii) researcher’s *reputation* effects, related to academic status and scientific output.

2.2. Demographic effects

Debate over the impact of *age* on U-I linkages is inconclusive. On the one hand, some argue in favour of a greater involvement in U-I linkages of younger scholars, explained by the fact that they have been trained in an age of strong integration between universities and industry and by the fact that they may perceive interaction with industry as contributing positively to reputation (D’Este and Patel, 2007; Bercovitz and Feldman, 2008). On the other hand, younger scholars may feel greater pressure than established professors to publish, leaving the latter with more time to network with firms (Levin and Stephan, 1991). Boardman and Ponomariov (2009) find that older scientists are more likely to have worked with industry personnel on patents, and to have co-authored papers based on their greater accumulation of credentials and experience which may be relevant for these activities. At the same time, they find that younger scholars are more likely to have been approached by private companies with requests for information. Given this evidence, a curvilinear (U-shaped) relationship between age and U-I linkages can be envisaged, with the youngest and the

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