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Determinants of PhD holders' use of social networking sites: An analysis based on LinkedIn

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ABSTRACT

Social networking sites are an increasingly important tool for career development, especially for highly skilled individuals. Moreover, they may constitute valuable sources of data for scholars and policy makers. However, little research has been conducted on the use by highly skilled individuals of those social networks. In this paper, we focus on PhD graduates, who play an important role in the innovation process and in particular in knowledge creation and diffusion. We seek to increase understanding of the determinants that induce PhD graduates to register on LinkedIn and to develop wider or narrower networks. Controlling for the most relevant individual characteristics, we find that (i) PhD holders moving to the industry sector are more likely to have a LinkedIn account and to have a larger network of connections in LinkedIn; (ii) PhD holders are more likely to use LinkedIn if they have co-authors abroad; and (iii) they have wider networks if they have moved abroad after obtaining their PhD. In light of our analyses, we discuss the usefulness of – and main concerns about – the adoption of LinkedIn as a new data source for research and innovation studies.

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1. Introduction

Today, the routine practices of everyday life have incorporated Internet services and social networking sites (SNSs). Among other aspects, the spread of the Internet has had a great impact on professional lives. This is due to the pivotal role of information in labor markets (Autor, 2001) and in the development of professional networks. In particular, the Internet may have important implications for the careers of highly skilled individuals (Acemoglu, 1998; Cairncross, 2001; Varian, 2010). Not surprisingly, the use of the Internet is significantly more widespread among highly skilled workers than among low-skilled ones. However, little research has been conducted on how highly skilled individuals use Internet applications and, in particular, SNSs.

Some studies provide evidence on the effect of the diffusion of broadband infrastructure on employment at an aggregated level (see for instance Czernich, 2014). Other evidence suggests that Internet-based technologies are effectively adopted in order to establish collaborations and networks at greater geographical dis-

tances among universities and firms (Ding et al., 2010; Forman and van Zeebroeck, 2012; Hoekman et al., 2010). Few authors have investigated the use of specific Internet platforms. As noted by Zide et al., “most of the empirical research on SNSs [...] has focused on Facebook”, a non-professional site, even when studying recruitment processes (Zide et al., 2014). Finally, in academia, some studies have demonstrated that a large number of researchers increasingly make strategic use of Internet-based tools (emails, personal web pages, SNSs) to coordinate team activities, promote their competences and professional profiles, disseminate scientific results and establish new connections (Bar-Ilan et al., 2012; Barjak, 2006a; Barjak et al., 2007; Mas-Bleda and Aguillo, 2013; Walsh et al., 2000; Ward et al., 2015; Winkler et al., 2010).

In this work, we contribute to knowledge on this topic by analyzing the use of LinkedIn's SNS by PhD holders graduated from two European institutions: the Politecnico di Milan in Italy, and the École Polytechnique Fédérale de Lausanne in Switzerland.

We focus on PhD holders, given their high level of qualification, and their importance in the creation and transfer of knowledge (Casey, 2009; Stephan, 2012). PhD holders play an important role in the innovation process, in pure and applied research, and especially in the transfer and diffusion of knowledge (Herrera et al., 2010; Zellner, 2003) and its economic exploitation (Agrawal, 2006; Herrera and Nieto, 2015). The number of students awarded a doc-

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torate each year has increased greatly worldwide in recent years (Bloch et al., 2015), and the job searching strategies of younger generations are changing nature thanks to the Internet-based technologies (Smith, 2015). Consequently, understanding how SNSs are adopted by PhD holders, and how they influence their professional trajectories, has implications for the debate on the modes of creation and transfer of knowledge. Furthermore, insights on the dynamics of this emerging digital environment can help policy-makers to develop adequate policy responses.

Specifically, we intend to shed light on the actual use of SNSs by PhD holders by analyzing the determinants that correlate with PhD holders' probability of registering on LinkedIn and developing wider networks. We focus on three potential determinants for the use of LinkedIn: sector mobility (from academia to industry), international mobility, and professional collaborations (measured with the number of co-authors in scientific publications). Indeed, not all PhD holders – like not all professionals – are registered on LinkedIn, and those that have an account on this SNS do not have the same numbers of “connections”: whereas some are connected only with their closest colleagues, others have a network with hundreds or even thousands of connections.

As noted by Burke et al., studies on SNSs “generally differentiate their use based on motivations, rather than actual behavior. This focus on motivation occurs in part because fine-grained behavioral data are not available, while survey measures of users' attitudes are easy to collect” (Burke et al., 2011). Our study focuses on fine-grained behavioral data instead of users' declared motivations. We have used university data, curricula vitae, the Scopus database, and LinkedIn data to create a novel dataset on PhD holders' behavior during and after graduation.

Using this unique dataset, our study contributes to the literature in two ways. On the one hand, we test simple hypotheses on the determinants of social networking site presence and its extent for PhD holders. On the other hand, in light of our analyses and results, we discuss the value and the limits of LinkedIn as a new data source for research on highly skilled workers. For instance, LinkedIn may provide important data with which to solve the important policy problem of PhD holder employment caused by the limited number of opportunities in academia and the mismatch between PhD holders' skills and expectations and the needs of industry (Huisman et al., 2002; Mangematin, 2000; McAlpine and Emmioğlu, 2015; Nogueira et al., 2015; van der Weijden et al., 2016; Wendler et al., 2012).

The paper is organized as follows. Section 2 contains the literature review and presents the research hypotheses. Section 3 explains the data and the methodology used. Section 4 describes the results. Section 5 discusses the results obtained and concludes.

2. Literature review and hypotheses

The importance of social networks is widely acknowledged. A person's location in social networks determines the type of positions to which s/he has access. Consequently, social networks determine the way in which the positions with the best rewards are assigned (Granovetter, 1990; Lin and Dumin, 1986). Moreover, the social and economic resources, actual or potential, that a person can access depend on the social network to which s/he belongs, the location that s/he occupies within it, and the number, character and strength of the ties that s/he maintains: social networks increasingly shape people's work lives (Bourdieu, 1986; Burke et al., 2011; Granovetter, 1990; Lin and Dumin, 1986).

SNSs make it possible to expand one's social network beyond one's initial position by establishing or maintaining connections with people that would be otherwise unreachable due to institutional or geographical constraints. Expanding one's social network

is more than just delivering information about oneself; it entails interactions with which to corroborate the information exchanged.

Information plays a crucial role in career decisions and professional collaborations, especially for highly skilled workers (Montgomery, 1991; Pezzoni et al., 2012; Ponzo and Scoppa, 2010). Owing to the existence of significant information asymmetries, highly skilled workers need to signal quality and competences in a given domain, to screen the characteristics of potential employers or collaborators, and to exchange information with existing collaborators. Long before the existence of the Internet, economists and sociologists questioned the relative importance of formalized and codified sources of information (e.g. curricula vitae) and informal channels (e.g. referrals and personal social networks). On the one hand, qualifications and formalized sources are necessary; on the other, an individual's access to additional information, and its validation, is contingent upon his/her social position, as well as on the nature of informal social ties. Accordingly, social capital, defined by Bourdieu as “the aggregate of the actual or potential resources which are linked to a durable network of more or less institutionalized relationships of mutual acquaintance or recognition” (Bourdieu, 1986, p. 248), is fundamental.

The Internet, and in particular SNSs, have implications for both channels (Atasoy, 2013; Autor, 2001; DiMaggio and Bonikowski, 2008). First, they make it possible to communicate formalized information (e.g. personal profiles) at any geographic distance, and potentially without intentional transactions. Second, they make it possible to maintain contacts and create new ones (e.g. through the system of connections). Notably, SNSs provide such services for free, thus lowering the costs of these information exchanges to their historic minimum.

However, some authors have noted that costs in the use of such tools still persist in the form of the time spent on using them (Brynjolfsson and Oh, 2012; Greenwood and Kopecky, 2013).

In what follows, for each of the professional factors of interest (sector mobility, international mobility, and international collaborations) we first present the literature that has discussed their determinants and consequences, and then outline our hypotheses on their expected relation with the use of SNSs.

2.1. Researchers and sector mobility

The literature on the sector mobility of PhD holders has focused on the factors that induce them to move to the private or public sector outside academia. It finds that both individual characteristics and scientific fields are important, besides the scarcity of available positions in the university sector (Bloch et al., 2015; Herrera and Nieto, 2015; Mangematin, 2000). PhD holders with previous experience in the private sector, who have collaborated with private firms during their studies, whose research has a commercial potential, or who have valuable patents are more likely to move to the private sector or to become entrepreneurs (Crespi et al., 2007; Fritsch and Krabel, 2012).

In particular, Crespi et al., on analyzing determinants of mobility from academia to business, found the presence of a strong effect of seniority on mobility, while they found no impact of scientific productivity (Crespi et al., 2007).

PhD students are divided equally between those who want to move to the private sector and those who want to remain in academia. The latter are more committed to publishing and less interested in economic factors, thus demonstrating a greater “taste for science” (Mangematin, 2000; Roach and Sauermann, 2010).

Because PhD holders are aware of the limited career opportunities in academia, they consider a professional career in the private sector to be one of the possible outcomes of their educational investment. Once they have moved into the private sector,

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