

Effects of different dimensions of social capital on innovative activity: Evidence from Europe at the regional level

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Abstract

This exploratory study investigates how different dimensions of social capital influence a region's innovative activity measured by patent applications. Human capital and R&D are also included in the analysis as factors of innovative activity. The novelty of the paper lies in the fact that for measuring social capital, instead of one overall index, six factors are constructed of 20 indicators using principal components analysis. Unlike many previous studies, this one uses the structural equation modelling approach instead of regression analysis in order to take into account the relationships between the factors of innovative activity. Regional-level data from Eurostat Regio and the European Social Survey are analysed. The findings provide strong support for the argument that social capital indeed influences innovative activity and furthermore, that different dimensions of social capital have dissimilar effects on innovative activity.
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1. Introduction

It is commonly accepted that innovations play an important role in economic development and growth. Hence, there is no doubt that investments in research and development (R&D) as a main catalyst of innovations are needed. However, the innovation process is additionally influenced by many other factors. One of the factors that has received much attention in the literature is the overall level of human capital of a particular country or region. Another very important factor is the social environment, i.e. networks, trust, norms, etc., which can be jointly referred to as social capital.

Social capital as a relevant factor of innovative activity has been actively dealt with in the literature over the last few years both at the level of firms and society as a whole. In the current study, the focus is on the innovative activity of society, which, however, is mainly based on the innovative activity of single firms. First, the social capital of society can be viewed as an aggregate of the social capital of individuals who, in turn, work in the firms being

engaged in innovative activity. Networks, trust, and norms of the individual workers form the social capital of firms, which is assumed to influence their innovative activity, for example by favouring cooperation and information exchange both within and between firms, or reducing risk aversion. Second, the social capital of society as a whole can also be supposed to encourage innovative activity, for example by forming a trustworthy milieu, including trust in the patent system.

The purpose of this exploratory study is to examine the effect of different dimensions of social capital on innovative activity measured by patent applications in Europe at the regional level. Analysing European regions has an advantage of a relatively homogeneous sample, where the possible unobserved factors of innovative activity are less influential (Akçomak and ter Weel, 2005). The regional level was chosen for two reasons. First, prior research has shown significant within-country differences in the levels of innovative activities, human and social capital (Dakhli and de Clercq, 2004). Second, considering the number of possible variables in the model, for the sake of getting reliable results, a larger sample than the number of European countries is necessary. The current study uses data from the European Social Survey (ESS) and Eurostat.

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Although the density and composition of firms (by industries) varies by regions, this aspect is left out from this study for reasons of both simplification and data unavailability. To take account of other possible factors, the current analysis includes human capital and R&D as control variables presumably influencing patent applications. Although there are no doubt many other factors, these control variables were chosen on the basis of their importance.

The novelty and contribution of this study lies in the following aspects. First, many previous studies have viewed social capital as a one-dimensional concept, measuring it by an overall index, one variable or one latent construct (see, for instance, Akçomak and ter Weel, 2005, 2006; Subramaniam and Youndt, 2005). However, it is possible that different dimensions of social capital may have dissimilar impacts on innovative activity, for example, networks that facilitate information exchange are expected to encourage innovative activity, while norms of orderliness may suppress new ideas and counteract innovations. Therefore, this paper examines the influence of social capital on patent applications by separate dimensions. Second, the number of different dimensions of social capital included in the present analysis is higher than in previous studies analysing more than one dimension (Dakhli and de Clercq, 2004; Landry et al., 2002; Tsai and Ghoshal, 1998). Third, with regard to methodology, the previous studies using regression analysis have failed to take into account the relationships between the factors of innovative activity themselves. To overcome this problem, this study uses the structural equation modelling (SEM) approach.

The paper is structured as follows. Section 2 presents the conceptual background and discusses the possible causal relationships. Section 3 introduces the data analysed and deals with the measurement. Section 4 presents the results of the structural model estimation. Section 5 comprises the discussion, points out the limitations and makes recommendations for future research. Section 6 draws the conclusions.

2. Theoretical background

2.1. Conceptual framework

Innovation is usually understood as the introduction of something new or significantly improved, be they products (goods or services) or processes. The innovation process has two aspects: inputs and outputs (Nasierowski and Arcelus, 1999). The inputs include, for example, expenditures on R&D and employment in R&D, both in the government and business sector. The results of innovative activity such as patent applications are understood as the outputs of innovation process. It is important to distinguish between inputs and outputs when constructing a theoretical model and testing it empirically. Hereafter, when innovative activity is mentioned,

the outputs of innovation process are actually borne in mind.

One important factor of innovative activity is human capital—an individual's knowledge, skills and abilities that can be improved with education—both formal education and lifelong learning. Human capital can be firm-, industry- or individual-specific. The last type can also be understood as the general level of human capital in a country or region. The general level of human capital is more connected with formal education, while lifelong learning contributes more often to the industry- or firm-specific human capital. Although assessing and utilising the human capital at the firm level is very important for innovation processes (European Commission, 2006), as this analysis focuses on the society level, the general level of human capital of a society as a whole is used here as a control variable.

Next, social capital can be considered as a factor of innovative activity. There are many definitions of social capital. Adler and Kwon (2002) and Tamaschke (2003) provide exhaustive overviews of different definitions. One of the first introducers of the concept, Bourdieu (1986), for example defines social capital as “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance and recognition”. Social capital has been analysed at different levels (see, for example, Leana and van Buren, 1999): it can be considered as an asset of an individual (for example, Bourdieu, 1986; Coleman, 1988), but it can also be viewed at the firm level (Ahuja, 2000; Burt, 2000; Subramaniam and Youndt, 2005; Tsai and Ghoshal, 1998).

The third approach advocated by Robert Putnam is to study social capital at the level of society—as an attribute of a country or a region (Portes, 1998). According to Putnam (1995), social capital “refers to features of social organisation such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit.” The definitions covering networks, norms and trust have often been used when analysing the impact of social capital on economic growth or, more specifically, on innovation (Dakhli and de Clercq, 2004; Fountain, 1998; Knack and Keefer, 1997; Landry et al., 2002). Although firm-level social capital is undoubtedly very important in determining innovativeness (Subramaniam and Youndt, 2005; Ahuja, 2000; Burt, 2000; Tsai and Ghoshal, 1998), the previous studies have also shown that firm performance is closely related to social capital of individuals (Burt, 2000). Firm-level social capital is based on networks, trust and norms of individual workers. The social capital of individuals, in turn, is strongly interrelated with and can be aggregated to the society-level social capital of a country or region (van Oorshot and Arts, 2005). Therefore, this article focuses on regional-level social capital as an aggregate of social capital of individuals, viewing the social capital of a region as a proxy for the social capital of the individuals working for the firms in this particular region.

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