



# Creativity and regional innovation: Evidence from EU regions<sup>★</sup>



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## ABSTRACT

We analyse the role of creative workers in the region as a source and foundational element of regional innovation in the European Union. We show the empirical relevance of this factor – which we label *inspiration* – within the structure of a recursive model of regional innovation for a set of 83 European regions. We show that, when differentiated from the presence of regional *intelligence* – as measured by the availability of human capital – and from technological *infrastructure*, *inspiration*, along with the degree of development of national and regional *institutions*, has the strongest direct and indirect effects on regional patenting activity.

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## 1. Introduction

A widely cited OECD report, ‘Regions Matter’, illustrates how regions grow in very varied ways (OECD, 2009). A key finding of the report is that the concentration of resources in a region is not sufficient for long-term growth. The report adds weight to the conclusion that the substantial difference in growth performance across regions is accounted for by the way investments are made, and the manner in which regional assets are used and synergies exploited. Hence, opportunities for growth exist in regions of all types, but actual growth performance will depend on how well a region is able to mobilise its assets in order to fully exploit its potential for growth. Differences in performance across regions and their growth over time cannot solely be explained by regional differences in the quantity and quality of productive factors.

The unexplained variation across regions has been associated with the (imperfect) working of three creative processes: innovation, impact entrepreneurship, i.e. new firms creating jobs, and

internationalisation (see e.g. Devoldere and Sleuwaegen, 2006). There is growing evidence that not only are these creative processes strongly associated with economic growth but they are also endogenous and, to a large extent, dependent on the differing political and economic systems that operate across countries and regions (Hill, 2011). While recognizing the importance of, and the interaction between, all three creative processes for advanced regions, the emphasis has clearly shifted to innovation as the key driver in creating further welfare and sustainable growth.

Many of the ‘old industrialized’ regions of Europe are indeed facing important challenges: ageing populations, environmental pressure, and the rapid emergence of new ‘distant’ economic powers call for action. At the same time, new trends in industrial management and technology offer creative opportunities for firms to benefit from changes in the global environment. A rapidly growing number of firms are developing a strong competitive position by co-creating new products and services with suppliers, customers, knowledge institutions and, increasingly, the creative sector (Verganti, 2009). The combination of these developments has given rise to a new paradigm in the development of business models. This new paradigm holds creativity to be central to the development of sustainable production and consumption patterns for the future. Creativity is what makes people, firms and regions unique. It is the ability to find innovative solutions to problems, to create new products and processes, to set up new firms, and to expand into new areas that create economic value. Thus, creativity should be linked to innovation and entrepreneurship in order to guarantee its translation into market opportunities.

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In this paper, we focus on innovation as a key driver of regional entrepreneurial creativity and investigate the underlying conditions that are essential for directing resources towards innovative use and for stimulating the region to become a strong innovative performer. We devote particular attention to the role of creative workers as the source of inspiration in regional innovation systems. The literature on the creative class and the competition for talent have provided valuable insights into the context of innovation systems in North America (Florida, 2002; Florida et al., 2008, 2010). This stream of research has received growing attention in Europe as well (Hansen et al., 2009; Boschma and Fritsch, 2009). Yet, the debate concerning the role of the creative class as a principal source of inspiration compared to other fundamental drivers of innovation remains unresolved. In this paper, we seek to contribute to the debate by testing whether the role of the creative workers can be distinguished from other fundamental drivers of regional innovation in the EU. The results shed light on the question of what stimulates innovation: is it the result of technologically advanced clusters existing in the region; does it merely reflect the availability of a highly educated workforce; or does it stem from the specific activity of creative individuals?

After a short review of the literature in Section 2, we proceed in Section 3 to define the key concepts and introduce a conceptual model that is built on four fundamental factors driving the regional innovation system. Following the logic of this conceptual model, we develop a set of indicators for each fundamental driver of regional innovation in Section 4. We then develop a structural equations model of regional innovation and test the relevance of each driver against the innovation performance of a set of 83 European regions, defined according to the NUTS 1 classification, in Section 5. The empirical results support the significance and importance of each of the four fundamental drivers for regional innovation, clarifying the particular role played by creative workers in a region's innovation performance. The paper concludes with a number of policy recommendations.

## 2. The innovative region

Each region has specific assets, unique capabilities and industrial policies that make it different from other regions. According to an OECD study (2009), national contextual factors are important for regional growth; yet, although they are viewed as a necessary condition for such growth, they are not in themselves considered sufficient. Region-specific assets and policies are what define the relevant sustainable growth path and performance of the regions. Regional growth is an *endogenous* phenomenon, and policy makers need to take this into consideration in designing policies to foster knowledge dissemination, innovation and local entrepreneurship (Cornett, 2009). With innovation becoming the focal point in the discourse on regional development, several approaches have been advanced in the literature to explain how the regional innovation process works.

The first approach, dating back to the early post-war period, took the so-called 'linear model' of innovation and growth as a starting point. In this framework, a linear unidirectional relationship is drawn, running from basic research, applied research, and innovation to the ultimate goal of economic growth (for recent discussions, see e.g. Balconi et al., 2010; Tödtling and Trippl, 2011). Over the years, this approach has been refined and amended to accommodate some of the major criticisms advanced, including the lack of feedback relationships and contextual influences. The revised approach has greatly benefited from the microeconomic work of Griliches (1979) and, subsequently, of Jaffe (1989), who showed the relevance of regional knowledge production functions and geographic proximity in explaining innovation. In a regional knowledge production function framework, regional

knowledge inputs such as R&D expenditures, but also knowledge spillovers among firms, are expected to contribute to regional innovation output, most often measured by the number of patents or new products introduced at the regional level (Jaffe et al., 1993). Jaffe's approach has been extended in a series of related studies, which focussed on other countries and on the roles of different R&D inputs, including offshored R&D and region-specific conditions (e.g. demography, human capital) that influence the region's innovative output (see, e.g., Buesa et al., 2010; Rodriguez-Pose and Crescenzi, 2008; Crescenzi et al., 2007; D'Agostino et al., 2013).

Recent models of regional innovation reflect the wider systems approach that emerged in reaction to the linear approach (see e.g. Buesa et al., 2010). The systems approach focuses on the interplay of institutions, policies and agents (e.g. inventors and entrepreneurs) within a system to explain how innovation is generated in a certain area.

Concepts such as the 'technological system of innovation' (Carlsson and Stankiewicz, 1991) and the 'sectoral system of innovation' (SIS, Breschi and Malerba, 1997; Malerba, 2002) emphasise the importance of the interactions among actors in the generation and diffusion of innovation at different levels, i.e. a technology field in the former, and a sector in the latter.

Combining the geographical dimension and the systemic nature of innovation gave rise to concepts such as 'national system of innovation' (Lundvall, 1992, 2012; Nelson, 1993; Freeman, 1997), 'regional system of innovation' (Cooke and Morgan, 1993, 1998; Cooke et al., 1997; Enright, 2003; Doloreux, 2002; Asheim and Gertler, 2005), and 'learning region' (Morgan, 1997), which emphasise the importance of the territorial dimension, the institutional framework and the so-called 'social filter' (Rodríguez-Pose, 1999) – that is to say, a territory's specific combination of social conditions. Iammarino (2005) introduces a form of meso-level analysis, which blends the national system of innovation with the influence of local regional conditions into an 'evolutionary integrated view of the regional system of innovation' (Buesa et al., 2010).

The 'system' models of the second group place great emphasis on the interactions between public and private actors, including venture capitalists (Mason, 2007), in guiding and sustaining innovation. The system approach holds that there is a large variety of organisations, both public and private, that contribute to the generation of technological innovation. The key insight of the systemic view is indeed the recognition of the centrality of relationships and the mutual influences among the actors in the system (Carlsson et al., 2002). The interactions between companies and the large variety of institutions (the financial system, laws and practices governing labour markets, etc.) are crucially important in generating and diffusing innovation. Companies recombine existing artefacts into innovative solutions with the support of a wide variety of institutions that provide the knowledge and necessary skills (Wolfe, 2011; Lundvall, 2007).

A different but related approach is the 'triple helix paradigm' (Florida and Kenney, 1988), which emphasizes the crucial role of effective cooperation between political decision makers, academia and firms in fostering regional innovation (Leydesdorff and Etzkowitz, 1996) and entrepreneurship (Kim et al., 2012).

The role of the firm's organisation and its strategies in a spatial context is emphasised by Porter (1990). According to Porter, the microeconomic local environment is key in mediating the relationship between competition, innovation and productivity growth. In particular, four contextual factors influence a firm's innovation rate: the presence of high-quality cluster-relevant innovation inputs, the intensity of local competition and the extent to which innovation is rewarded, the presence of demanding customers, and the availability of clusters of vertically- and horizontally-related industries. Integrating the micro-economic context with the knowledge production function and regional

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