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## Do Total Early-stage Entrepreneurial Activities (TEAs) foster innovative practices in OECD countries?

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## ABSTRACT

The objective of this study involves identifying the influence of Total Early-stage entrepreneurial activities (TEA) over the propensity to engage in innovative practices in OECD member states. The study correspondingly applies aggregate data at the national level based upon the statistics gathered by the Global Entrepreneurship Monitor (GEM), the Organisation for Economic Co-operation and Development (OECD) in conjunction with the Global Competitive Index (GCI) for the years between 2009 and 2013. The analysis deploys endogenous variables (capacity for innovation, quality of scientific research institutions, company spending on R & D, and university-industry R & D focused collaboration) for the capturing of innovation, and uses mediating effects to explain how and under what conditions these innovation variables are shaped by TEA. We conclude that the relationship between TEA and innovation practices differs in accordance with the state of development of each economy. Furthermore, the proportion of ongoing entrepreneurial activities in a country has an impact on the emergence of innovation based practices. We seek to contribute reflections focused on the support policies enacted for entrepreneurship and innovation. We report that such decisions cannot be the same for countries in different stages of development.

## 1. Introduction

The absorption capacity of companies stems from technological innovations and improvements to efficiency and thereby results in higher levels of organisational technological capacity (Koh and Wong, 2005; Zahra and Kirchoff, 2005; García-Morales et al., 2014) and also boosts competitiveness (Gupta and Thomas, 2001; Lee et al., 2001). The literature maintains that high levels of absorption capacity foster similarly high levels of distinctive technological competences (Antoncic and Hisrich, 2001). The absorption capacity shapes competitive advantage through the development of new products, processes, systems and organisational structures interrelated with entrepreneurial activities (Zampetakis and Moustakis, 2010).

Hence, high levels of absorption capacity nurture the ability to recognise opportunities for growth and wealth creation through engagement in entrepreneurial activities (Zahra et al., 2009; Bojica and Fuentes Fuentes, 2011). According to the World Development Report (2000), technological progress and innovation have played highly important roles in economic growth where the wealthiest countries have proven to be the ones with the capacities to develop state-of-the-art

technologies and establish themselves as global technological leaders.

Economies, in different phases of development, face different challenges and the choice of an appropriate growth strategy depends on the endowment of initial factors and the existing range of technological capacities (Koh and Wong, 2005; Dean and Kretschmer, 2007; van Stel et al., 2014). Economies that deploy significant primary resources may initially seek to grow strategically. However, to the extent that they move towards the production frontier, the capacity to innovate and create new technologies becomes an important driver of competitive advantage.

The literature also contains various studies that identify the entrepreneur as an actor able to identify and explore business opportunities endogenously created by the intentional accumulation of technological knowledge (Audretsch and Keilbach, 2008; Braunerhjelm et al., 2010; van Stel et al., 2014). Following an empirical study of German regions (1992–2000), Audretsch and Keilbach (2008) report a strong statistically positive relationship between economic growth and entrepreneurial activities (as measured by the founding of new companies), suggesting that the role of these actors in exploring such new opportunities contributes towards the transmission of knowledge to the

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marketplace in the form of innovation.

Popov and Roosenboom (2012) examine the impact of venture capital investments in patented innovation in 10 manufacturing industries, and they report a poor association between venture capital and patented innovation although this association becomes relatively stronger in countries with lower barriers to entrepreneurship, countries adopting friendly fiscal and regulatory frameworks and those with lower levels of capital gains taxation.

Van Stel et al. (2014) study the role of environmental technology in determining the chances of survival of entrepreneurial employers before proposing that deployment of the most advanced environment technologies proves favourable to both survival and the surrounding entrepreneurial context.

Therefore, entrepreneurial activities, alongside all the factors that underpin their existence, and the influence that they possess on regional economic development have been the subject of study by various different authors (Birley, 1985; Kirchoff and Phillips, 1988; Storey, 1994; Arauzo Carod and Manjón Antolín, 2004). In reference to the relationship between entrepreneurship and economic growth, various researchers conclude that this proves to be a fundamental aspect and requires an understanding of the role of entrepreneurs given their important contribution towards job creation and implementing innovation (Wennekers and Thurik, 1999; Thurik and Wennekers, 2004; Koh and Wong, 2005; Welter and Lasch, 2008).

However, little attention has been paid to the study of the influence of Total Early-stage Entrepreneurial Activities (TEA) over the propensity to engage in innovative practices at the country-level. According to the OECD (2007), the motivation behind the studies on differences in innovation in regions and firms is the creation of policies that allow the poorer regions to achieve better innovation performance.

What is the impact of TEAs on diverse innovation practices at the country level? Our current study seeks to answer this question and contributes to fill this gap in past literature. Furthermore, our research seeks to contribute towards a better understanding of those innovation variables influenced by TEAs in order to better construct innovation support policies and the entrepreneurship encapsulated in such results.

In responding to our research question, we rely on aggregate data at the national level with statistics collected from the Global Entrepreneurship Monitor (GEM), the Organisation for Economic Co-operation and Development (OECD) and the Global Competitive Index (GCI) for the years between 2009 and 2013. This study reveals an innovative way to relate to other studies by using different databases which permit drawing inferences of diverse nature and covering the more general problem of the phenomenon under study.

The remainder of this article is structured as follows. The next section puts forward the theoretical background on this research theme and accordingly Section 3 describes the research methodological design. In turn, Section 4 sets out and discusses the main results obtained before the final section provides the conclusions and their implications before identifying some lines for future research.

## 2. Theoretical background

Research into the field of entrepreneurship experienced its period of greatest growth after 1990 in conjunction with the emergence of the knowledge economy within the scope of which the development of international trade and the advance of globalisation facilitated the appearance and leveraging of new business opportunities (Landström, 2008). The complexity and the dynamic character of entrepreneurship as a social phenomenon take place and reflect how the pioneering literature very often encountered difficulties in grasping entrepreneurship and leading to multiple approaches and levels of analysis. Holmes and Schmitz (1990) focus on the mechanism that led individuals to choose to become entrepreneurs (their capacities to explore the present opportunities), thus ignoring the processes in which new opportunities emerge: that is, the creation of knowledge (Acs et al., 2009).

A large proportion of the literature on endogenous growth (Aghion and Howitt, 1992) is founded on the “creative destruction” concept proposed by Schumpeter (1947) according to which companies seeking to maximise their profits undertake R & D that enables them to develop new products which are then retailed on the market until another innovation renders them obsolete (Bianchi and Henrekson, 2005). According to Bianchi and Henrekson (2005), this theoretical trend models innovation as a regular activity and takes place on a large scale, where it is developed by companies that in some way appropriate the entirety of the new knowledge generated by their R & D activities.

Block et al. (2013) report solid empirical evidence from a study of OECD member states in favour of the vision of an entrepreneur which conveys how a greater prevalence of entrepreneurship, captured by the proportion of the population that directly holds capital in a company, tends to raise the rate at which new knowledge (patents) is transformed into innovation through the launch of new goods and products.

Over the last decade, some researchers have proposed a theory of entrepreneurship that induces spillovers of knowledge, modelling the endogenous creation of opportunities through the deliberate accumulation of new knowledge (investment in R & D activities). These are, in turn, identified and explored by individuals endowed with certain capacities that are not uniformly distributed throughout the population as a whole (Audretsch and Keilbach, 2007; Acs et al., 2009).

Some studies (Acs et al., 2004, 2012) argue that there are barriers to the automatic transmission of knowledge to markets, which may potentially explain the occurrence of the ‘European Paradox’, namely, how the accelerated accumulation of knowledge which has taken place since the beginning of the 1990s has not been reflected in any proportional rise in the real GDP growth rate, especially in Europe. According to Plehn-Dujowich (2009), the asymmetry in information between economic actors influences perceptions in relation to the expected profitability of any investment and, consequently, the willingness or reluctance to provide financing. Institutional and regulatory barriers, such as the bureaucratic steps to register a patent or set up a company, may raise the transaction costs of retailing new knowledge to the producing organisations that reduces its expected value (Audretsch, 2007; Popov and Roosenboom, 2012). The activities of entrepreneurs who identify and explore the new opportunities returned by technological knowledge increase in proportion to the knowledge resulting from R & D related activities and consequently, the economic knowledge (Koh and Wong, 2005; Audretsch and Keilbach, 2007; Acs et al., 2009).

Entrepreneurship as an inductor of spillovers of knowledge underwent empirical testing by Audretsch and Keilbach (2007) who report an influence on growth. These authors verify how the founding rate of new companies, especially in industries with high levels of technological intensity or interconnected with information and communication technologies, proves to be higher in regions with greater levels of R & D intensity and thus confirms the hypotheses of the endogenous nature of opportunities. Acs et al. (2009) also verify the existence of a correlation between entrepreneurship and the annual R & D expenditures of OECD member states.

Michelacci (2003) analyses the relationship between inventions (produced by researchers) and the entrepreneurs able to explore and commercialise these developments by transforming them into innovations. Forecasting an inverted U-shaped relationship between R & D (the proportion of researchers in the population as a whole) and the economic growth rate, Michelacci (2003) concludes that a high level of R & D may not in itself prove sufficient to sustain high growth rates. He further posits that a decentralised balance may emerge in a descending chain to this relationship; hence, the economy may attain a stationary state of balance and allocate excessive resources to R & D activities (Audretsch, 2007; Acs et al., 2012). Koh and Wong (2005) also examine the role played by science and technology policies in the transition phase from strategic growth towards knowledge and innovation based strategy before discussing the governmental challenges which confronted the economic restructuring of institutions so as to deepen their

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