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ECO-innovation and economic crisis: a comparative analysis of environmental good practices and labour productivity in the Spanish hotel industry

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ABSTRACT

In recent years, respect for the environment has been taken into account by tourists as a factor in their purchasing decisions. The concept of eco-innovation has gained an important role in adapting the tourism product to this new demand. Using a previous database already compiled by the authors, this paper has two aims: to address the effect of implementing environmental measures on labour productivity in the Andalusian hotel industry; and to show how its implementation has evolved during a period of deep economic crisis in all the productive sectors in Spain (2008–2012). For this purpose, the variable *ei* was defined as indicator by which to measure the eco-innovation and was introduced in a standard Cobb–Douglas production function. The two estimates of the production function for 2008 and 2012 show that the introduction of eco-innovative measures had a positive and significant influence on labour productivity, despite the fact of the economic crisis reduced the productivity growth observed for each additional eco-innovative practice implemented by the hotels from 8.15% in 2008–7.45% in 2012.

1. Introduction

Tourism, and in particular the hospitality sector, is enormously important in the Spanish economy. According to the Spanish Tourism Satellite Account,[1] the weight of tourist activity in Spain, as measured by final tourist demand, was 10.9% of the Gross Domestic Product (GDP) in 2012 (10% higher than in 2011). More than 2.1 million people were employed in the tourism sector, representing 11.9% of total employment in 2012. Net tourist income, as measured by the balance of payments, was 33,344 million euros, representing an increase of more than 1000 million euros compared to the previous year. The economic relevance of hotel accommodation is shown by the vast and well-known body of research literature, which has used a wide variety of methodological approaches to investigate various aspects of this sector (Sánchez-Ollero et al., 2014).

The emergence of new technologies, increased environmental awareness, and changes in consumption patterns have led to marked changes in the tourism industry (Miret-Pastor et al., 2011) that have given rise to a new paradigm.

Under the new paradigm, the concept of eco-innovation has gained an important role in adapting the tourism product to a demand that, as Hillery et al. (2001) suggested, considers the environment to be a strategic factor in purchasing decisions. However, despite its importance, the analysis of its impact on the non-industrial sector, and particularly the tourism sector, has not been given as much attention or the same conceptual importance as its impact on the industrial sector. This may not simply be due to conceptual difficulties (i.e., what is meant by eco-innovation in the service industry), but may also be due to technical shortcomings caused by the absence of clear indicators to measure its impact on the sector. As a consequence, some effects of implementing new management measures in tourist establishments, such as their impact on productivity, have barely been addressed in the literature.

To assist in filling these gaps, this article defines an indicator by which to measure the impact of eco-innovative measures on apparent labour productivity. Based on the available data for 2008

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[1] Available at: http://www.ine.es/en/prensa/np829_en.pdf (downloaded 17/01/2014).

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and 2010, this indicator was used to build a standard production function that can be used to not only measure this impact, but also to determine its evolution during a period of severe economic crisis.

The remainder of the article is organized as follows: After a brief review of literature on the potential relationship between eco-innovation practices and labour productivity in the hotel industry, the econometric specification and the database used in the analysis is presented. This is followed by the descriptive statistics and econometric analysis, which indicate to what extent eco-innovative practices contribute to variations in hotel productivity levels. The final section summarizes the main conclusions of this article.

2. Eco-innovation in the literature

The concept of environmental innovation, also known as eco-innovation, is recent and therefore in a continual process of development and review. In a broad sense, any innovation that reduces environmental damage is considered to be eco-innovation (Kanerva et al., 2009). However, eco-innovation has been defined in a variety of ways (Eco-Innovation Observatory, 2012; Fussler and James, 1996; Kemp, 2009; OECD, 2010; Wuppertal Institute, 2009), but none is clearly better than any other.

However, one of the most widely accepted definitions of eco-innovation among researchers in this field was provided by the Europe INNOVA project[2]: "the creation of novel and competitively priced goods, processes, systems, services, and procedures designed to satisfy human needs and provide a better quality of life for everyone with a whole-life-cycle minimal use of natural resources (materials including energy and surface area) per unit output, and a minimal release of toxic substances". Interest in the concept began in the 2000s with the promotion of environmental technologies that contributed to the "Lisbon Objectives"[3] for growth and innovation, and to the "Gothenburg Priorities"[4] for sustainable development (Cainelli et al., 2011). During the same period, a new method to understand and analyse the concept of eco-innovation emerged that was based on three dimensions[5]: target, mechanism and impact. Its use has proliferated among companies and some governments in order to describe their contributions to sustainable development and to improve their competitiveness (OECD, 2010). Recently, the European Commission[6] defined the concept as follows: "*…eco-innovation is about changing consumption and production patterns and market uptake of technologies, products and services to reduce our impact on the environment. Business and innovation come together to create sustainable solutions that make better use of precious resources, reduce the negative side-effects of our economy on the environment and create economic benefits and competitive advantage*."

These definitions are easy to apply to the management of industrial sector companies. Traditionally, the concept of eco-innovation has been closely tied to the industrial sector in international studies, where the lack of indicators and information by which to design strategic plans to introduce eco-innovation measures has not been considered a limitation. The studies by Doran and Ryan (2012), Sierzchulaa et al. (2012), Horbach (2008), Brunnermeier and Cohen (2003), and Jaffe et al. (1995) are examples of the analysis of eco-innovation in the industrial sector. However, its analysis in the hotel industry is quite complicated due to the specific characteristics of this sector. Thus, Ludevid (2000) showed that tourists have a direct influence on the hotel sector, since their increasing environmental awareness has led to a greater demand for goods and services that respect the environment. It should also be noted that, unlike the industrial sector, environmental legislation in this field is almost non-existent, and thus eco-innovative measures have been barely implemented by the hotel industry. This lack of legislation may be due to the fact that hotel activity is considered to have little environmental impact. Furthermore, as several authors have pointed out (e.g., Álvarez et al., 2001; García-Pozo et al., 2011), establishments in which the natural environment forms part of the tourism product, such as those specializing in sun and beach tourism or nature tourism, would be expected to be more concerned with eco-innovative measures. In fact, the type of tourism determines the type of eco-innovative measures the hotel is willing to implement. Thus, depending on the characteristics of their clients, firms should pay more or less attention to environmental protection.

Rodríguez-Antón et al. (2012) offered three reasons that account for environmental awareness within tourism firms. The first lies in the guilt associated with tourism activities due to the processes involved and the immense amount of water and material resources used, some of which are environmentally unfriendly (non-disposable plastic containers, non-recyclable packaging, etc) (Álvarez et al., 2001). The second is based on the idea that the consumer who "pays to be green" leads the search for the forces underlying the relationship between the environment and firm's economic performance (Molina-Azorín et al., 2009). The third is based on the need to control the costs of hotel operations, their optimization, and the ability to provide a service that meets consumer needs (Judge and Douglas, 1998; Pan, 2003).

The term "green innovation"[7] has mainly been used in studies on the industrial sector and in studies conducted at the national level (Schiederig et al., 2011). Thus, the international literature on eco-innovation within the tourism sector is scarce (Berezan et al., 2013; Chan, 2009; Hunter and Shaw, 2007; Kuminoff et al., 2010; Lee et al., 2010; Nicholls and Kang, 2012; Prud'homme and Raymond, 2013; Tzschentke et al., 2004; Zhang et al., 2010, among others). This unusual circumstance is further accentuated by a similar situation at the Spanish national level: the only exceptions to this lack are studies on the analysis of environmental and quality certifications as indicators of the implementation of eco-innovative measures (e.g., Ayuso, 2007; Bonilla and Avilés,

[2] The Europe INNOVA project is a European innovation policy initiative for a pan-European platform for innovation professionals to develop, discuss, test, and exchange good practice, ideas, tools, and policy recommendations leading to a better understanding of the innovation patterns in different industrial sectors and helping to improve sectoral innovation performance and shape future innovation policies. For more information see http://futures.research.southwales.ac.uk/projects/ecoinnova/(downloaded 18/01/2015).

[3] Defined in the Lisbon Strategy adopted at the European Council meeting in Lisbon in March 2000, where a new strategic goal for the European Union was agreed: making Europe the most prosperous, dynamic and competitive economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion.

[4] They correspond to the ecological dimension of the Lisbon Strategy. The European Council meeting took place in the Swedish city of Gothenburg in June 2001. The need for change was highlighted in the policy development process, committing themselves to the joint assessment of economic, social, and ecological consequences.

[5] *Target* refers to the basic focus of eco-innovation, which includes products (goods and servicios), processes, marketing methods, organizations and institutions; *Mechanism* refers to the method by which eco-innovation is implemented. Four mechanisms have been identified: modification, redesign, alternatives, creation; *Impact* refers to the effect of eco-innovation on the environment (see Machiba, 2010).

[6] See http://ec.europa.eu/eaci/eco_en.htm (downloaded 18/01/2015).

[7] In their review of the literature, Schiederig et al. (2011) accepted 4 concepts indifferently used as synonyms: "green innovation", "ecological innovation", "environmental innovation", and "sustainable innovation".

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