



Contents lists available at ScienceDirect

Sustainable Production and Consumption

journal homepage: www.elsevier.com/locate/spc

Research article

Inbound open innovative strategies and eco-innovation in the Spanish food and beverage industry

Angela Triguero*, Sara Fernández, Francisco J. Sáez-Martínez

Faculty of Economics and Business Administration, University of Castilla-La Mancha, Albacete, Spain

ARTICLE INFO

Article history:

Received 13 December 2017

Received in revised form 3 April 2018

Accepted 8 April 2018

Available online xxxxx

JEL classification:

O3

L66

Keywords:

Low-tech industries

Food industry

Open innovation

Eco-innovation

ABSTRACT

The main purpose of this paper is to analyse the influence of open innovation strategies on eco-innovation by accounting for type of innovation (product vs. process) and novelty degree (radical vs. incremental) in the context of the Spanish food and beverage manufacturing industry over the period 2008–2014. We find that the breadth of external knowledge sources has a positive effect on firms' adoption of most eco-innovations. However, the depth of these sources is only significant for process, product, and incremental eco-innovations related to a more efficient use of materials and energy, but not for radical ones. Moreover, our analysis confirms the presence of path dependence and the influence of both market demand and regulatory factors on adoption in general. Nevertheless, important differences with respect to the influence of embodied R&D, non-embodied R&D, training, external R&D, and cooperation on each type of eco-innovation are highlighted while controlling for past eco-innovation behaviour, size, and age of the firm.

© 2018 Published by Elsevier B.V. on behalf of Institution of Chemical Engineers.

1. Introduction

In Schumpeter's theory, economic development is driven by the discontinuous emergence of new combinations (innovations) that are economically more viable than the old way of doing things (Schumpeter, 1934). In this sense, firms depend on their ability to be innovative for achieving and sustaining competitive advantage. Innovation is acknowledged as one of the main factors of organisational success and survival of a company, regardless its size and the industry where it operates (Bigliardi and Galati, 2013). Literature on innovation is quite vast and some of the most popular definitions were proposed by Utterback (1994), OECD's Oslo Manual (2005) and Urabe et al. (1998), among others. The latter indicates that "innovation consists of the generation of a new idea and its implementation into a new product, process or service..." (Urabe et al., 1998, p. 3). However, most companies do not have the necessary resources to innovate on their own and need to cooperate with different agents. Partnerships are among the fastest and sometimes cheapest ways to innovate (Hagedoorn and Schakenraad, 1994). Through cooperation, firms can improve their efficiency and increase their profits by securing a wider range of resources and more diversified sources (Kranenburg et al., 2004).

This idea of cooperation is an essential part of the open innovation concept, which has recently received increasing attention in the fields of business management and innovation economics (Chesbrough, 2006). This can be described as a shift from the traditional or "closed" innovation model, with a main focus on internal research and development (R&D), toward an "open innovation" approach where firms actively utilise and exploit inward and outward transfer of knowledge and technologies (Chesbrough, Vanhaverbeke, and West 2006).

Open innovation can be defined as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation, respectively" (Chesbrough, 2003, p. 9). According to this paradigm, the use of external knowledge makes innovation easier and faster for firms. Open innovation is commonly associated with fast-growing, technology-intensive industries, such as the information and communication technology sector and the pharmaceutical industry (Sarkar and Costa, 2008), as well as with large and multinational corporations (Chesbrough, 2006). However, the analysis of the consequences of the use of open innovative strategies in traditional industries is under-researched. The literature on open-innovation is traditionally focused on high-tech industries (Del Río et al., 2016), and almost neglects low-tech ones. To the best of our knowledge, only a few studies focus on the open innovation process in the food and beverage industry using large samples (Knudsen, 2007; Pellegrini et al., 2014; Kastelli et al., 2016; Seyfettinoglu, 2016), and even the empirical evidence from case studies is very limited (Sarkar and Costa, 2008; Omta et al., 2014).

* Corresponding author.

E-mail addresses: Angela.Triguero@uclm.es (A. Triguero), Sara.Fernandez@uclm.es (S. Fernández), Francisco.Saez@uclm.es (F.J. Sáez-Martínez).

Recently, environmental responsibility has attracted increasing attention of both practitioners and academics in recent years, and policy makers are making efforts to set it as a priority in their agenda. Environmental concerns are driven by external pressures from stakeholders or regulators (Cuerva et al., 2014), and/or by the recognition that this behaviour can lead to competitive advantages (Díaz-García et al., 2015). Most of these practices lead to the development of environmental friendly products or manufacturing processes, often called environmental innovations, green innovations or eco-innovations. Kemp and Pearson (2007, p. 8) define eco-innovation as “the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organisation (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives”.

In the last decade, the number of theoretical and empirical contributions on the drivers of green- or eco-innovation has been increasing (Horbach, 2008; Lanoie et al., 2011; Triguero and Córcoles, 2013; Díaz-García et al., 2015). Nevertheless, the empirical research on eco-innovation in traditional sectors such as food and beverage industry—typically characterised as low-tech—is still relatively scarce (Blasi et al., 2014; Cuerva et al., 2014; Bossle et al., 2016). Moreover, longitudinal studies analysing the influence of open innovation on the development of eco-innovations are lacking, especially in traditional sectors.

This paper fills this gap by studying the influence of open innovative strategies on the adoption of eco-innovation by firms in a traditional industry — the food and beverage industry in Spain. Using multivariate probit models, our main purpose is to identify the influence of open innovative strategies on the adoption of three different types of eco-innovation (material-efficiency, energy-efficiency, and environment-responsiveness) in agro-food firms distinguishing between product and process eco-innovators and between incremental and radical eco-innovators. Thus, we expect to increase our understanding about the drivers enhancing the adoption of eco-innovation in a sector traditionally considered as a mature and low-tech industry. Particularly, this paper aims to shed light on the dynamism of the innovation processes in the food industry by considering the relationships with partners that contribute to complement firms’ internal knowledge base that leads them to develop eco-innovations.

The main contributions of this work are threefold. First, instead of cross-sectional survey data, we use longitudinal data for a representative sample of Spanish food firms over the period 2008–2014. Such data enable us to study whether eco-innovation in the food sector over time is the result of previous experience. In this regard, we introduce potential influence of past behaviour towards eco-innovation on current eco-innovation. To the best of our knowledge, there are no studies considering the persistence in eco-innovative activities. Second, we attempt to examine the influence of different factors on three types of eco-innovations closely related and not mutually exclusive. To address this issue, we use a multivariate econometric methodology. Finally, we distinguish between product and process eco-innovators and between radical and incremental eco-innovators to determine whether open inbound innovation flows have a different or a similar influence on the adoption of innovation with environmental benefits.

The outline of the paper is as follows. Section 2 reviews the literature on open innovation and eco-innovation with a special attention to food industry, and proposes the benchmark conceptual model. Section 3 describes the data and the econometric methodology. Section 4 presents the main results, while Section 5 concludes.

2. Theoretical framework and hypotheses

The interest in the drivers of environmental innovation has been usually focused on high-tech, polluting, or energy-intensive industries, overlooking low-tech sectors such as the food industry. Nevertheless, the increase of competition in globalised markets has forced to introduce new, improved products and processes even in sectors traditionally characterised as low-tech (Bender, 2004; Von Tunzelmann and Acha, 2004; Hirsch-Kreinsen, 2009; Robertson et al., 2012). Among these innovations, we specifically refer to environmental ones under the assumption that the drivers of innovations reducing the negative impact of human activities on the environment can be different from those of other kinds of innovation. However, to the best of our knowledge, only few studies investigate the specific drivers of environmental innovations in the food industry using firm-level data (Cuerva et al., 2014; Bossle et al., 2016). In this regard, Cuerva et al. (2014) show that there are differences between the factors influencing “environmental” and “non-environmental” innovations in low-tech sectors. Specifically, using survey data of 301 food and beverage Spanish firms, the authors find that technology push, market pull, and regulatory push-pull factors exert a different influence on eco-product (i.e. ecological products) and eco-process innovations (e.g. recycling of waste or waste disposal, sustainable use of natural resources and environmental technologies and energy efficiency) as compared to non-environmental ones. On the other hand, by considering 581 Brazilian food companies, Bossle et al. (2016) show that both internal factors (e.g. human resources) and external ones (e.g. collaboration) are the most important drivers of environmental innovation. On the same line, Tanguy (2016) theoretically analyses the influence of open innovation on the French food industry and finds that some agro-food companies adopt radical innovations by cooperating with different partners.

Following Horbach (2008), we assume there are three main types of determining factors of eco-innovation adoption (Fig. 1). Among these drivers, the influence of consumer demand for greener products and services has been identified as a market pull towards environmental responsibility (Kesidou and Demirel, 2012; Triguero and Córcoles, 2013), and recent studies show that customers are currently more willing to pay for products or services produced in a more environmentally-conscious way (McDonagh and Prothero, 2014). Regulation and fiscal incentives have also been highlighted as effective drivers of companies’ environmental responsibility, because benefits of adoption of environmental technologies are higher than costs of paying fines to governments for non-compliance. The Porter hypothesis (Porter and Van der Linde, 1995) suggests that environmental regulation leads to a double “win-win” situation, because firms achieve to accomplish environmental regulation and improve their competitive advantage. Some studies confirm this hypothesis by showing the increase in productivity of companies that implemented environmental-friendly practices (Frondel et al., 2008; Ashford and Hall, 2011; Cuerva et al., 2014). Additionally, technology push has been identified as another driver affecting environmental innovation (Sáez-Martínez et al., 2016a). Then, firms’ resources and capabilities enable to develop the necessary knowledge base to promote eco-innovations (Segarra-Oña et al., 2013; Triguero et al., 2014). The role of technology push also generates from the creation of technological alliances (De Marchi, 2012) with different stakeholders, including suppliers, business partners, universities, and research centres (Sáez-Martínez et al., 2014). Therefore, firms’ openness and their knowledge networks constitute other elements promoting eco-innovation (Cuerva et al., 2014).

Based on the Resource-based View (RBV) of the firm (Barney, 1991), we will analyse the influence of openness on the adoption of different types of environmental innovation by taking into

Download English Version:

<https://daneshyari.com/en/article/7107362>

Download Persian Version:

<https://daneshyari.com/article/7107362>

[Daneshyari.com](https://daneshyari.com)