Measuring eco-innovation dimensions: The role of environmental corporate culture and commercial orientation [1]

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Abstract

Eco-innovation (EI) is a complex process that involves product, process, organizational and marketing dimensions, each with its own determinants, characteristics and contributions to environmental business performance. Thus, analyzing EI activity is essential to obtaining a holistic view in order to achieve sustainable development. This study offers a multidimensional EI measurement and, what is more, evaluates its relationship with environmental corporate culture and commercial orientation drivers in a high environmental impact context, i.e., the agri-food sector. The proposed model was tested using the partial least-squares technique, which was applied to data collected from a sample of 93 companies located in southeast Spain. This study confirms the importance of several dimensions, namely marketing, organization and process, to corporate adoption of EI. Additionally, this research also reveals the positive relationship that both drivers, environmental corporate culture and commercial orientation, have with EI. The findings also suggest that theorists and practitioners must contemplate EI from the point of view of its four dimensions in order to achieve an efficient, more realistic analysis. Subsequently, this work carries some theoretical conclusions and implications for research and practice.

Keywords: eco-innovation; multidimensional; commercial orientation; environmental corporate culture; partial least square technique.

JEL codes: O13, O32, Q01, Q12, Q55, Q56

1. INTRODUCTION

Despite decades of academic and practitioner attention, interest in the analysis of the eco-innovation (EI) process continues to increase. In fact, growing awareness of climate change and environmental degradation makes it necessary for companies to implement

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EI to respond to consumers' environmental demands and regulatory requirements. In this context, there is a growing belief that the agri-food sector is a key factor in the development of more sustainable economies, mainly because of its multidimensional performance (Gómez-Limón and Sánchez-Fernández, 2010). The complex relationship of this sector with the environment (e.g., resource conservation, socioeconomic factors, etc.) positions EI as a significant element for achieving economic and environmental benefits (Galdeano-Gómez et al., 2017). Implementing EI allows companies and sectors to be more sustainable and, at the same time, to increase their competitiveness and productivity (Adams et al., 2012; OECD, 2013).

EI is defined as "the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organization (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" (Kemp and Pearson, 2007 p.7). This complex process has been addressed from different perspectives in recent decades. From the firm-level perspective, a growing body of literature on EI drivers has been developed and there are common conclusions about which are the stimuli that motivate firms to implement greener practices. Some research defends the positive impact that internal characteristics have on a company's decision to be 'greener', such as firm size, solvency rate, social structure or personal circumstances (Feder et al., 1985; Diederen et al., 2003; Gardebroek, 2006; Knickel et al., 2009). In contrast, other authors focus their investigations on the influence that external environment has on a firm's reason for implementing EI. Some of the external factors most commonly considered by EI literature are the regulatory and institutional frameworks, for instance setting new standards, and the demand-pull drivers, i.e., market conditions (Reinnings, 2000; Horbach, 2008; Kesidou and Demirel, 2012; de Marchi, 2012; Doran and Ryan, 2016). Technology-push factor, i.e., advances in science and R&D, is also a key determinant of EI (Cleff and Rennings, 1999; Horbach, 2008; Ghisetti and Pontoni, 2015). Other works outline a combination of these factors that affect firms' EI adoption (Carter and Williams, 1959; Kleinknecht and Verspagen, 1990; Ghisetti and Pontoni, 2015). In this line, recent EI literature brings to the forefront the effect that firm commercial orientation as well as environmental corporate culture have on the business decision to implement eco-innovative practices, especially in agri-food firms (Rkein and Andrew, 2012; Rodríguez-Rodríguez et al., 2012; Ortiz-de-Mandojana et al., 2016; Tsai and Liao, 2017; Liao, 2018). Commercial orientation, as an organizational capability, significantly influences environmental business strategy and environmental corporate identity (Wang et al., 2018).

Regarding the EI implementation perspective, and despite its having generated considerable advances, there is no prior research that provides insights related to a complete and efficient EI measurement. Most studies in this field prove incomplete as they only consider EI implementation analysis from the product and process dimensions (Doran and Ryan, 2016; Castellacci and Lie, 2017; Rodríguez and Wiengarten, 2017).

Very few studies contemplate the four EI dimensions, i.e., product, process, organization and marketing (Marcon et al., 2017; Astuti et al., 2018), and they only focus on the industrial sector and multinational companies. Furthermore, those works that are focused on the agri-food sector include a limited range of green indicators for assessing environmental performance (Rodríguez-Rodríguez et al., 2012; Galdeano-Gómez et al., 2017; El Bilali, 2018). In this sense, further investigations are necessary to develop a body of knowledge on this subject, especially due to the increased awareness of the importance that green marketing and organizational practices have on company environmental performance (BID, 2007; Marcon et al., 2017; García-Granero et al., 2018). Likewise, it is important to conduct research in the agri-industry due to a need for increased food production in a world combined with a need for better degrees of sustainability in the food value chain (Barth et al., 2017).

As some authors mention "you cannot manage what you do not measure" (Cooper and Edgett, 2008; Ehrenfeld, 2008). In this sense, this work aims to analyze EI implementation using a multidimensional approach. Therefore, the main objective is to develop a holistic EI implementation level model, regardless of firm size, and, more specifically, offer a multidimensional EI measurement including green product, process, organizational and marketing dimensions. In the same model, this study also tests the relationship between EI and firm features of environmental corporate culture and commercial orientation, within the agri-food sector. These go beyond the limitations established in other research, analyzing EI implementation in a context of study which differs from the industrial sector, while at the same time helping to understand this multifarious practice. In this way, we address the following research questions: 1) Is environmental corporate culture positively related to EI level? 2) Is commercial orientation positively related to EI level? 3) What is the relationship between EI level and its four dimensions (product, process, organization and marketing)? To answer these questions, a Partial Least Squares based-structural equation modeling method (PLS-SEM) was applied to the agri-food sector. In particular, we focus on the fruit and vegetable farming-marketing companies of southeast Spain, which operate in environments aimed at international markets and whose evolution has been notably marked by environmental issues (Galdeano-Gómez et al., 2013). These farming-marketing companies, acting as wholesalers in origin (i.e., located in the production areas), are characterized by an intensive horticulture and a commercial activity aimed at European countries. This agri-food system implies considerable amounts of waste and residues, intensive use of resources and water consumption (Rodríguez-Rodríguez, 2012). Therefore, these firms have an important role in overcoming externalities and moving towards a more environmentally-respectful production system (Galdeano-Gómez et al., 2017).

Consequently, this study makes two main contributions. First, this paper contributes to the stream of research providing a novel multidimensional EI measurement contemplating all types of companies, regardless of size. It offers a holistic view on which EI types provide greater opportunities to comply with environmental requirements.

Secondly, this research also tests a more complex relationship between environmental corporate culture, commercial orientation and EI level in a sector closely linked to the environment: the agri-food sector. To our knowledge, there are no previous works that have studied all these aspects in the same empirical model; thus, a considerable research gap is herein addressed.

The present study is structured as follows. Section 2 presents the theoretical background, model and hypotheses. It also includes a brief conceptual delimitation of the different constructs (environmental corporate culture, commercial orientation and EI level) that shape the research model. Section 3 contains a description of the research methodology used to test the hypotheses posited. Subsequently, Section 4 provides a detailed description of the main results derived from the data analysis through Partial Least Squares (PLS) path-modeling. Finally, Section 5 presents the discussions, conclusions, implications and limitations of this study.

2. BACKGROUND AND HYPOTHESES

EI activity is a complex process that includes a vast diversity of innovations which can be classified into four dimensions: product, process, organization and marketing (BID, 2007; Marcon et al., 2017; García-Granero et al., 2018). These four types of EI coexist in all sectors; thus, developing a scale to measure them by identifying their key performance factors is crucial to achieving an accurate measurement level of EI implementation.

Although the phenomenon of EI has received increasing attention in recent decades, most of the literature approaches this topic in a variety of industrial sectors (García-Granero et al., 2017). For example, Van Hemel and Cramer (2002) and Alkaya and Demirer (2015) highlight EI implemented in the chemical industry; Crabbé et al. (2013) study EI in companies from building industry, chemical industry, furniture manufacturing, medical equipment, metal processing and plastic processing industry; while Theyel (2000) focuses on the plastic and resin sector. More studies about EI in the industry have been carried out with the aim of exploring and explaining the EI process itself (Dalhamar, 2015; Castellacci and Lie, 2017; Rodriguez and Wiengarten, 2017). However, in recent years, there has been a trend towards highlighting the importance that the agri-food sector has in the sustainability transition and the role EI has as a competitive advantage for the future of these companies (Barth et al., 2017; García et al., 2018). In fact, the attention paid by institutions and businesses to the environmental and social implications of this sector has encouraged companies to improve their environmental performance. Moreover, as far as quality is concerned, consumers are increasing their demand for environmentally-friendly production methods (Carpentier and Ervin, 2002; Galdeano-Gómez et al., 2013). Sustainable agricultural development can enhance the nutritional quality of food and thereby produce positive health effects (Benbrook et al., 2013). Several studies address these questions and agree on the capacity that the agri-food sector has for implementing EI and adapting to these green demands (Galdeano-Gómez et al., 2017; Labella et al., 2017). One line of EI research in the agri-food sector is focused on analyzing a series of

motivating factors that lead companies to adopt more sustainable practices. Lioutas and Charatsari (2018) contemplate the adaption to social requirements, environmental concern, convenience, economic incentives and the internal need to pursue change, such as factors related to EI adoption decisions. Guerrero-Lara et al. (2019) investigate the influence of legislation, administrative support and social-economic values on the promotion of EI in the Spanish agri-food sector. In the same context of study, Rabadán et al. (2019) focus their investigation on the influence that market green demand, regulation, cooperation and economic objectives have on firm EI strategy. As for other aspects, a great deal of the EI literature in the agri-food sector addresses the development of a framework, which enables the conceptualization of EI practices. (Dangelico et al., 2019). Galdeano-Gómez et al. (2013) investigate the EI process and the synergies between the sustainability dimensions integrating technology and green practices oriented towards the efficient use of resources in ecological aspects. Rodríguez-Rodríguez et al. (2012) analyze the environmental performance contemplating technology, efficiency and environmental indicators related to environmental investment intensity or environmental audits. Other studies, such as Godoy-Durán et al. (2017) and Labella et al. (2017), use eco-indicators associated with product and process practices to analyze EI and measure sustainability. Furthermore, Langendahl et al. (2016) include commercial and organizational practices to conceptualize the sustainable innovation journey in the UK agri-food sector. Drejeris and Miceikienè (2018) and Shih et al. (2018) propose product and process green practices while also highlighting the important role that environmental oriented staff have in EI process in the Lithuanian and Asian agri-food sectors, respectively. What is more, Caffaro et al. (2019) analyze EI in the Italian agri-food sector by contemplating variables related to information and environmental attitude behavior. Nevertheless, despite the effort to offer an efficient measurement, these investigations only consider a sparse assortment of eco-indicators, not all EI dimensions. Thus, more empirical research is needed to discover a wide range of EI practices that are aimed at developing a solid theoretical foundation.

The proposed model was developed analyzing the extant literature on EI. Previous studies suggest that environmental corporate culture and commercial orientation have a significant impact on EI adoption (Newton and Harte, 1997; Rkein and Andrew, 2012; Liao, 2018; Wang et al., 2018). In addition, other researches defend the importance of taking into consideration the four EI dimensions to analyze the relationship between the different EI practices and the level of EI implementation (BID, 2007; Marcon et al., 2017; García-Granero et al., 2018). In this line, the sector's environmental performance is represented in six constructs: environmental corporate culture, commercial orientation, product EI, process EI, organizational EI and marketing EI. They are expected to support the efficient measurement of EI level. EI practices, environmental corporate culture, commercial orientation and EI level constructs are discussed in the following subsections.

2.1. Eco-innovation level

EI is a concept that has been widely examined by the economic, business and environmental academic literature from the perspectives of concepts, drivers and consequences. Nevertheless, studies on its implementation are scant (Kemp, 2009). In recent years, researchers have addressed EI from the measurement perspective with the aim of achieving an efficient way to analyze this complex process and fill the gap existing in the literature.

Several EI studies emphasize the necessity to introduce four EI dimensions, namely product, process, organization and marketing, in a sector's environmental performance (OECD, 2005; BID, 2007; Horbach, 2008; OECD, 2012; Triguero et al., 2013; García-Granero et al., 2018). Product EI is related to the product innovation involving environmentally-friendly materials, environmentally-friendly packaging, recovery of products and recycling, and eco-labelling (Chen et al., 2006; Chen, 2008). Process EI refers to a firm's ability to improve existing processes and develop new ones that increase resource savings and prevent pollution (Chen et al., 2006; Chen, 2008). Organizational EI can be explained as either a new or significant improvement in routines, business models, methods and actions that change a firm's practices, relations and decisions, with the aim of reducing adverse environmental impacts (Marcon et al., 2017). Within environmental management systems (EMS), marketing EI involves the integration of environmental aspects into product placement, communication, new methods of product delivery, promotion or pricing strategies (Marcon et al., 2017). Based on these definitions, it is evident that strong interrelationships exist between the four EI dimensions. Firstly, process EI modifies the organization's operational processes systems while simultaneously producing new or significantly improved eco-products, thereby reducing environmental impacts (Negny et al., 2012). Furthermore, it has been demonstrated that organizational EI facilitates the implementation of process EI and product EI (Murphy and Gouldson, 2000). Secondly, the implementation of marketing EI requires the introduction of green products and processes in order to conform to the environmental standards of the markets (García-Granero et al., 2018). However, EI literature analyzes EI activity by studying the EI dimensions separately, without taking into consideration how they are interconnected (Hallstedt et al., 2013; Lozano, 2013). Moreover, the majority of these studies fail to consider the impact that organizational and marketing dimensions have on environmental performance (del Río et al., 2010; Crabbé et al., 2013; Doran and Ryan, 2016; Ishak et al., 2016). In fact, the most complete investigations in this study area are mainly focused on three EI types (i.e., product EI, process EI and organizational EI), ignoring the relevance of EI marketing practices (Horbach, 2008; Rodríguez and Wiengarten, 2017). Thus, EI performance has never been properly examined, and only the studies carried out by Marcon et al. (2017) and Astuti et al. (2018) addressed all the green dimensions, though they only focused on the industrial sector and multinational companies.

2.2. Environmental corporate culture and the eco-innovation level relationship

The effect of environmental corporate culture on environmental firm performance is a subject that is attracting the attention of recent literature on EI. Most studies have shown that organizational attitudes, governance and cultures may affect firm EI (Bleischwwitz et al., 2012; Bossle et al., 2016; Dangelico, 2016; Ortiz-de-Mandojana et al., 2016; Tsai and Liao, 2017). According to Ajzen (1991), it is true that EI might be affected as attitude would naturally influence decisions. A positive attitude in an organization towards a given environmental issue makes it more likely to implement EI behavior (Liao, 2018). For instance, companies may implement new manufacturing practices that prevent pollution, or they may adopt efficient environmental management systems (Eiadat et al., 2008; Wijethilake et al., 2016). Indeed, corporate environmental performance is regarded as a key driver of improving EI strategy (Porter and Kramer, 2006; Glavas and Mish, 2015; Wijethilake wt al., 2016). For example, the number of environmental objectives included in production plans and operations or the inclusion of environmental plans in production processes are a good indicator about how environmentally-friendly a company is (Frosch and Gallopoulos, 1992; Tibbs, 1992; Williams et al., 1993; Kemp and Pearson, 2008). Furthermore, spreading green values within the organization could promote a firm's implementation of green business practices (Parr, 2009). In this sense, the role of managerial agency in a firm proves to be a key factor. Senior staff can encourage employees to be more innovative and respectful with the environment (Anderson, 1998; Andriopoulos, 2001; Halbesleben et al., 2003). Rajala et al. (2016) illustrate the role of the managerial agency in driving environmentally sustainable practices in a company and developing a green business model orientation. The importance of managers in environmental corporate culture has also been analyzed by other researchers (e.g. O'Connor and Ayers, 2005; Hojnik and Ruzzier, 2016a). Without question, there is a consensus in the EI literature on the positive effects that employing staff who are more in tune with environmentally-friendly practices and greener business models has on better ecological performance and higher level of environmentally oriented cultures (Anderson, 1998; O'Connor and Ayers, 2005; Hojnik and Ruzzier, 2016a).

According to Howard-Grenville and Bertels (2012), environmental corporate culture is what builds EI practices. Moreover, Newton and Harte (1997) emphasize the significant impact that environmental corporate culture has on environmental practices. Thus, these findings indicate that the link between environmental corporate culture and EI level is straightforward. However, in general, prior studies on EI only test this relationship in industrial and high-tech sectors (Peng and Liu, 2016; Magsi et al., 2018).
Based on the above findings, the following hypothesis is proposed:

Hypothesis 1 (H1): *Environmental corporate culture is positively related to firms' EI level in the agri-food sector.*

2.3. Commercial orientation and the eco-innovation level relationship

In a context marked by internalization and growing competition, companies seek ways of creating value for their customers by developing new practices that allow them to differentiate and capture market share for the main goal of surviving (Kumar and Reinartz, 2016; Crick, 2019). In this sense, firms' commercial orientation is a key tool for achieving this objective. Nevertheless, defining commercial orientation is not an easy task. The increasing reliance on market-based approaches defends this concept as a business philosophy surrounding the concept of creating value for customers in ways that competitors cannot imitate (Ellis, 2006; Jones and Shaw, 2018; Crick, 2019).

Behavioral and cultural theories suggest that commercial orientation is a practice focused on customers (Kohli and Jaworski, 1990; Narver and Slater, 1990; Rkein and Andrew, 2012). Most studies have shown that demand for corporate social responsibility has a significant effect on EI firm performance (Rehfeld et al., 2007; Kesidou and Demirel, 2012; Doran and Ryan, 2016). This point of view defends that the essence of commercial orientation is customer value. Thus, commercial orientation is related to customer orientation (Deshpandé and Webster, 1993; Mugisha et al., 2005; Rkein and Andrew, 2012).

Furthermore, given the importance of the relationships between an organization and other stakeholders beyond customers, such as competitors (Hákansson, 1982; Dwyer et al., 1987; Anderson and Narus, 1990; Crosby et al., 1990), other research highlights the importance of competitor orientation as an additional commercial orientation dimension (Narver and Slater 1990; Deshpandé, 1999; Martin et al., 2015). In this line, some studies have found the acquisition of a competitive advantage and the motivation of growth in the market to be strong drivers of EI firm performance (Salomon and Shaver, 2005; Weerawardena and O'Cass, 2004). In this sense, as EI is conducive to firm differentiation, it can help firms to gain market opportunities as well as improve their organizational image (Im and Workman, 2004; Cheng and Shiu, 2012; Liao, 2016).

In short, competitor orientation and customer orientation, as two key commercial orientation dimensions, encourage firms to implement green practices (Rkein and Andrew, 2012; Liao, 2018; Martin et al., 2015). Thus, it is important to highlight the relationship between commercial orientation and sector environmental performance (Crick, 2019). Therefore, based on this discussion, the following hypothesis is formulated:

Hypothesis 2 (H2): *Commercial orientation is positively related to firms' EI level in the agri-food sector.*

Figure 1 presents the conceptual model for EI.

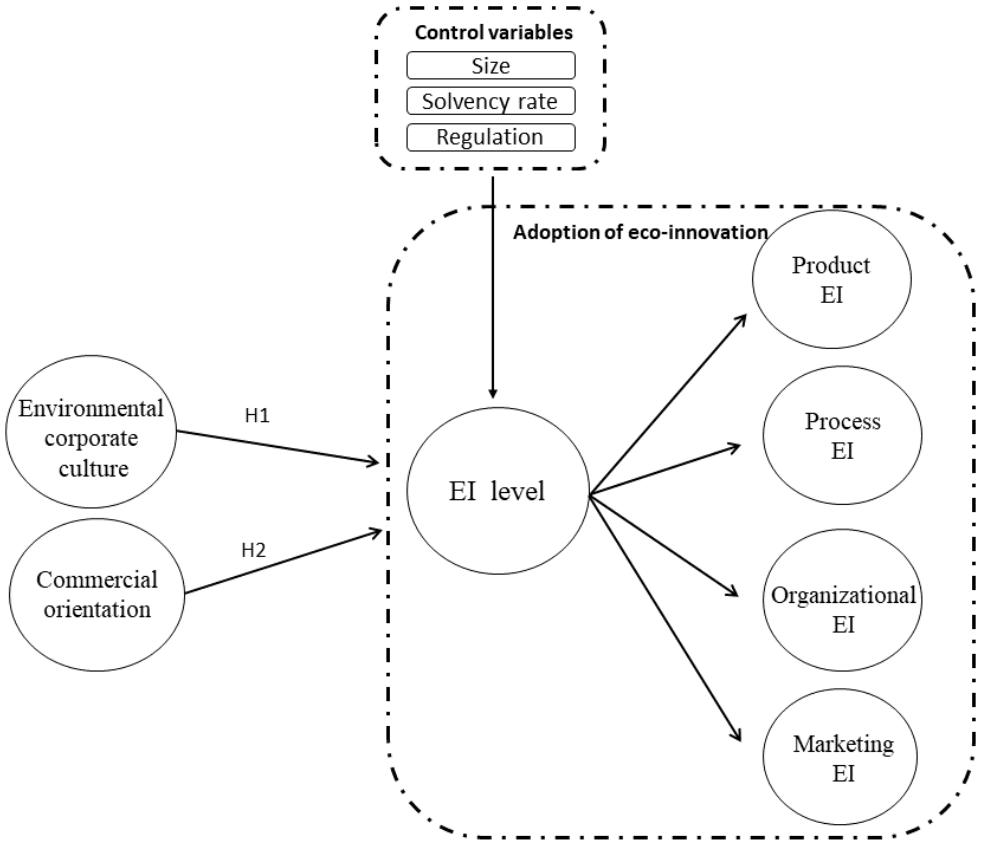

Fig.1. Conceptual model for eco-innovation (EI)

3. RESEARCH METHOD

The methodology used in this study is based on a survey to provide a multidimensional EI analysis at firm level. This section presents a discussion of the data collection process and the sample used for statistical analysis as well as the development of the EI measurement.

3.1 Sample and data collection

The agri-food sector located in the southeast Spanish region (Granada, Almeria and Murcia provinces) constitutes the reference for this empirical setting, which uses data for farming-marketing firms in the period 2017-2018. This sector constitutes a key economic activity, representing 24% of GDP (Gross Domestic Product) and 27% of employment (Galdeano-Gómez et al., 2013). Greenhouses are the principal feature of production in this area (Rodríguez-Rodríguez et al., 2012) and they require intensive use of resources and generate considerable amounts of waste and residues (e.g., packaging materials, fertilizers, plastics, etc.). On the other hand, the agri-food sector also contributes to the development of services (e.g., financing, consulting, R&D, etc.) and an associated

auxiliary industry with a high environmental orientation (e.g., fertilizers, bees, seeds, etc), which accounts for approximately 32% of GDP in the area (Aznar-Sánchez et al., 2011; Galdeano-Gómez et al., 2017).

Furthermore, this sector clearly targets foreign markets and has a strong capacity for growth and adaptation to new demands. Over 60% of the production of these firms is exported, which accounts for over 35% of total Spanish agricultural exports and about 18% of all vegetables consumed in Europe (Cajamar, 2016). Thus, these firms must operate in a highly complex environment and deal with international competitors, regulations, standards and requirements, making EI implementation a highly relevant topic for this group (Antonietti and Marzucchi, 2014; Hojnik et al., 2018). Consequently, such firms have been evolving towards environmental adaptation with a more efficient use of resources and a reduction of environmental impact (Martos-Pedrero et al., 2019). This is particularly important in the agri-food context, where all supply chain members have a high environmental impact (Spielman and Birner, 2008; OECD, 2013). As a result, this agri-food model has drawn international attention, as several studies show (e.g., Galdeano-Gómez et al., 2013, 2017; Piedra-Muñoz et al., 2016; Godoy-Duran et al., 2017), and constitutes an adequate empirical frame of reference.

The data were collected using a questionnaire targeted at the environmental management of the companies. The survey was designed specifically for this purpose based on field studies and the relevant literature on EI (García-Granero et al., 2018). Next, the survey instrument was pre-tested on five firms' environmental quality managers, and the questions were selected and modified according to their comments and suggestions. Following these steps, the final questionnaire was structured in three main sections: (1) company economic and financial information, (2) perception of drivers influence, and (3) a series of items on process EI, product EI, organizational EI, and marketing EI.
According to the Iberian Balance Sheet Analysis System (*Sistema de Análisis de Balances Ibéricos* in Spanish, SABI), 302 firms commercialized fresh fruit and vegetables in the provinces of Almería, Murcia and Granada during that period. The sample was simple randomly selected without replacement. The final number of valid surveys was 93. This represents a satisfactory response rate of 30.8% (Menon et al., 1996).

The final sample companies are all internationalized and commercialize fresh fruit and vegetables production to the European Union. According to European legislation (European Commission, 2009), the sample includes 9 micro companies (fewer than 10 employees), 19 small companies (10-49 employees), 37 medium-size companies (50-249 employees), and 28 large companies (250 or more employees). With regard to EI, all companies implement product, process, organizational and marketing EI. 88 companies in the sample have some kind of environmental certification.

3.2 Measurement and variables

Previous studies have identified and validated the scales which measure EI variables (e.g., Damanpour et al., 2009), although none of them were specifically developed for EI. Thus, based on EI research and literature (BID, 2007; Rodríguez and Wiengarten, 2017; García-Granero et al., 2018), the present study expressly develops new scales with multiple items for EI, following the suggestions of Churchill (1979).

Once an initial set of EI items was ready, a pilot-test was performed to ensure its reliability and validity. Performing a pilot-test is an important step in the scale development process because it can remove any invalid items (Anderson and Gerbing, 1991; Cheng et al., 2014). For this purpose, five environmental managers from five different marketing-producer companies were asked to review and comment on the items, their clarity, ambiguity, completeness, readability and structure. As a result, 24 multi-item scales were generated, including three constructs (environmental corporate culture, commercial orientation and EI level).

Table 1 describes the multi-scales of each one of these items and Table 2 shows the descriptive analysis of them.

Table 1. EI multi-scale items and variables measurements

Variables and items	**Measurement scale**
Control Variables	
Solvency rate	Natural numbers
Size	Natural numbers
Regulation	Likert scale (1-5)
Commercial orientation	
Customer orientation	Likert scale (1-5)
Achieve competitive advantage	Likert scale (1-5)
Improve corporative image	Likert scale (1-5)
Growth in market	Likert scale (1-5)
Environmental corporate culture	
Degree of importance of implanting environmental plans and objectives	Likert scale (1-5)
Degree of importance of achieving environmental objectives	Likert scale (1-5)
Degree of importance of the company' staff being environmentally respectful	Likert scale (1-5)
Degree of importance of the company' environmental initiatives investment	Likert scale (1-5)
Degree of importance of the company' environmental impact	Likert scale (1-5)
Product EI	
Ecological/integrated production	Percentage
Biodegradable packaging	Dichotomous scale
Recycling packaging	Percentage
Process EI	
Packaging control system implemented	Dichotomous scale
Green technology investment	Thousand euros
Green patent number	Natural numbers
Material recycling	Percentage

Organizational EI	
Environmental advisory implemented	Dichotomous scale
Environmental audit implemented	Dichotomous scale
Cooperation with stakeholders	Dichotomous scale
Environmental quality staff	Natural numbers
Marketing EI	
Environmental quality standard certifications	Natural numbers
Environmental management system certifications	Dichotomous scale
GlobalGap certification	Percentage
GRASP certification	Percentage

Table 2. Descriptive analysis of the variables and items

Variables and items	**Min.**	**Max.**	**Mean**	**Std. desv.**
Control variables				
Solvency rate	0.27	3.06	1.17	0.44
Size	3	1200	220.9	295.2
Regulation	1	5	3.46	1.22
Commercial orientation				
Customer orientation	1	5	4.22	0.92
Achieve competitive advantage	1	5	3.62	0.95
Improve corporative image	1	5	4.03	1.00
Growth in market	1	5	3.70	0.78
Environmental corporate culture				
Degree of importance of implementing environmental plans and objectives	1	5	3.85	0.99
Degree of importance of achieving environmental objectives	1	5	3.76	1.11
Degree of importance of the company' staff being environmentally respectful	1	5	3.96	0.93
Degree of importance of the company' environmental initiatives investment	1	5	3.67	1.06
Degree of importance of the company' environmental impact	1	5	3.72	1.02
Product EI				
Ecological/integrated production	0	1	0.22	0.34
Biodegradable packaging	0	1	0.22	0.42
Recycling packaging	0	1	0.47	0.37
Process EI				
Packaging control system implemented	0	1	0.68	0.47
Green technology investment	0	280	19.52	53.4
Green patent number	0	8	0.52	8
Material recycling	0	1	0.48	1.57
				0.39
Organizational EI				
Environmental advisory implemented	0	1	0.43	0.5
Environmental audit implemented	0	1	0.42	0.5
Cooperation with stakeholders	0	1	0.36	0.48
Environmental quality staff	0	28	4.78	5.58
Marketing EI				
Environmental quality standard certifications	0	11	4.36	2.4
Environmental management system certifications	0	1	0.81	0.39
GlobalGap certification	0	1	0.67	0.37
GRASP certification	0	1	0.49	0.42

The reflective or formative relationships of the items with respect to their corresponding latent variables were proposed following the suggestions of Jarvis et al. (2003) and Mackenzie et al. (2005). According to these authors, commercial orientation, product EI, process EI, organizational EI and marketing EI constructs have a formative character because they are determined by their items, and present indicators that are established exogenously and are not correlated among one another (Chin, 1998). In contrast, the environmental corporate culture construct presents a reflective relationship as the items cover different aspects of the concept included in the construct (Podsakoff et al., 2006). Finally, the relationships between environmental corporate culture and commercial orientation constructs with EI construct, respectively, are both formative; meanwhile, the relationship between EI level construct and its first order structure (four dimensions) is reflective.

3.2.1 Variables

The environmental corporate culture variable refers to green organizational capabilities, ecological organizational commitments and environmentally-friendly organizational philosophies. Adapted from previous studies (Williams et al., 1993; Montalvo, 2003, 2008; Scarpellini et al., 2012; de Jesus Pacheco et al., 2016), it includes five 5-point Likert scale items related to the introduction of environmental objectives and plans, environmental implementation practices and compliance with environmental initiatives. What is more, adapted from Rajala et al. (2016) and Hojnik and Ruzzier (2016a), it includes one item related to the ecological preference of workers and staff.

The commercial orientation variable represents business orientation towards the identification of customer needs. Respondents were asked to answer four questions about the motivating factors to be more customer oriented, such as customer demand, acquisition of competitive advantage, improvement in corporative image and the growth in market (Weeranwardema and O'Cass, 2004; Kesidou and Demirel, 2012; Rkein and Andrew, 2012; Doran and Ryan, 2016). 5-point Likert scale items were used, ranging from "strongly disagree" (1) to "strongly agree" (5).

The EI level construct relates to these green practices that companies implement in order to be more environmentally friendly. Drawing upon previous research (BID, 2007; OECD, 2005; Marcon et al., 2017; García-Granero et al., 2018), this variable presents a second order structure formed by product EI, process EI, marketing EI and organizational EI constructs. Product EI is determined by three items: ecological production; use of biodegradable packaging input; and recycled packaging input (FAO, 2012). Process EI is assessed by four items: package control system; green technology investment; green patents; and recycling (Florida, 1996; BID, 2007; Johnstone et al., 2010; Dalhammar, 2015; Rodríguez and Wiegarten, 2017). Organizational EI is measured by four items that include: implantation of external environmental advisory and audits; cooperation with stakeholders; and environmental quality staff (Frosch, 1994; Boons and Lüdeke-Freund, 2013; de Jesus Pacheco et al., 2016; Peng and Liu; 2016). Based on Uscebrka et al. (2009),

Chiarvesio et al. (2015) and Hernádez-Rubio et al. (2018), marketing EI includes four items related to environmental certifications: environmental quality standards certifications (which includes most common certifications, such as Tesco Nature, Naturland and Integrated Production); environmental management system certifications (which includes other certifications, such as IFS Food, QS and ISO); volume of certified hectares with GlobalGap; and volume of certified hectares with GRASP.

3.2.2 Control variables

This study controlled for possible confounding effects by including three relevant variables: firm size, solvency rate and environmental regulation (Klomp and de Haan, 2008; Amin and Chin, 2019; Zhao et al., 2019). Firm size was measured by total number of employees (Huang and Li, 2015). Solvency rate assesses the company's ability to meet its liabilities with its cash flow (Diederen et al., 2003). Finally, environmental regulation includes one 5-point Likert scale item to indicate the regulatory and normative pressures implemented by the Spanish Government in order to reduce negative environmental company impact (Bocken et al., 2011; De Marchi, 2012).

3.3 Statistical analysis

A Partial Least Squares based-structural equation modelling method (PLS-SEM) is applied to test the research model and hypotheses proposed (Roldán and Sánchez-Franco, 2012). PLS-SEM method estimates complex cause-effect relationship models with latent variables or constructs. It is composed of two sub-models: the measurement model and the structural model. The first one represents the relationships between the observed data and the latent variables. The second takes into account the relationships between the latent variables. An iterative algorithm solves the structural equation model by estimating the latent variables using both sub-models in alternating steps. The measurement model estimates the latent variables as a weighted sum of its manifest variables. The structural model estimates the latent variables by means of linear regression between the latent variables estimated by the measurement model. This algorithm repeats itself until convergence is achieved (Hair et al., 2018). PLS-SEM is considered the most appropriate technique when structural models are complex, with formative and reflective indicators, as in this study (Hair et al., 2014). This method was preferred over covariance approaches since it is designed to predict relationships among variables in relatively small samples (although representative) with less sensitivity to normality assumption (Henseler et al., 2016). It was also applied because it accounts for measurement error and corrects for attenuation, thereby overcoming many of the problems associated with regression models (Jaccard and Wan, 1996). Moreover, due to the shape of the proposed model, PLS was chosen because it allows evaluation of a composite measurement model (Henseler et al, 2014; Sarstedt et al., 2016). As it is a structural model that includes a second order construct, a build-up approach was carried out (Aldás-Manzano, 2012).

As previous researchers have suggested that unusual patterns of scores can disproportionately influence the results (Tabachnick and Fidell, 2006), an outliers analysis was conducted with the aim of identifying and discarding them.

3.4 Common method variance (CMV)

CMV is addressed because the collected data were reported using a single informant from each of the companies and they were collected from the same questionnaire during the same period of time. Therefore, an exploratory factor analysis was conducted which included all the measurement scales proposed in the model using SPSS. Similar methodological approaches have used CMV to assess the potential existence of common method variance (Cheng et al., 2014; Hojnik et al., 2018).

The results reveal that no single factor accounts for most of the variance and that the first factor captures only 24.97% of the variance, which demonstrates a low threat of common method variance.

4. STATISTICAL RESULTS

4.1 Evaluation of measurement model

The evaluation of the measurement model is intended to assess the relationships between the indicators and the constructs. Due to the fact that the study uses both reflective and formative measurements, the measures of the variables were tested and validated in several ways. Two statistical tests were performed to evaluate the formative variables of the model in both steps of the build-up approach method: (i) multicollinearity analysis, and (ii) analysis of the weight-loading relationship of each indicator (Hair et al., 2014). The relative relevance of each formative indicator was supported by a comprehensive literature review, interviews with managers, and previous questionnaires pre-tests (as reported in Section 3.2). Based on the feedback and insights from the interviews with managers, the wording of some items was slightly modified to an acceptable level of significance.

As for another aspect, the existence of collinearity in formative constructs can cause erroneous results. In this line, Hair et al., (2011) defines Variance Inflation Factor (VIF) values below 5.00 for each item to avoid multicollinearity problems. As shown in Table 1A (Appendix A), all VIF values are under this value in the proposed model. Therefore, the existence of multicollinearity problems can be rejected, which validates the formative constructs for the model composition.

Likewise, the convergent and discriminant validity was examined to evaluate the reflective variables. Composite reliability is an indicator of shared variance among the set of observed variables used as indicators of a latent construct (Fornell and Larcker, 1981;

Cheng et al., 2014). As shown in Tables 1B and 2B (Appendix B), the composite reliabilities of all constructs exceed the usual 0.60 benchmark in both steps of the build-up approach method (Bagozzi and Yi, 1988). The results provide the necessary evidence that all reflective constructs exhibit convergent validity. Moreover, all factor loadings are greater than 0.50 and the p-values are significant at the 0.05 level; thus, the convergent validity is assured (Fornell and Larcker, 1981; Hojnik et al., 2018). Discriminant validity was tested by comparing the average variance extracted (AVE) with the variance if each factor was shared with the other factors of the model (Cheng et al., 2014). All the diagonal elements representing the square root of the AVE are greater than the highest shared variance (the off-diagonal correlations).

4.2 Evaluation of structural model

Once the measurement model was assessed by testing the multicollinearity and the weight-loading relationship of the measurement scales for the formative indicators as well as the convergent and discriminant validity for the reflective indicators, partial least squares structural equation modelling (PLS-SEM) was used to test the hypothesized relationships between the latent variables. The steps suggested by Aldás-Manzano (2012) were followed as the proposed model is a second order construct and it is necessary to apply the build-up approach method. With this approach, firstly, the structural model is estimated ignoring the second order construct in order to calculate the residual value of the first order dimensions. Secondly, these residual values are included as indicators of the second order construct to estimate the model proposed. The evaluation of the structural model aims to determine the relationships between the constructs. Thus, three statistics were used: (i) structural model path coefficients, (ii) coefficients of determination R^2, and (iii) the predictive relevance Q^2.

Standardized betas (β) for the path coefficients measure the strength and direction of the significance of the structural model (Wijethilake et al., 2016). According to Chin (1998) and Hair et al. (2014), path coefficients must be above 0.20 in order to be meaningful predictors. The model presented all path coefficients above 0.20, demonstrating that the relationships maintained are significant. However, following Chin (1998) and Hair et al. (2014), a bootstrapping technique (5000 re-samples) is employed to generate standard errors and t-statistics that permit the evaluation of the statistical significance for the relationships hypothesized within the research model. Figure 2 shows the results. All correlations among latent variables are statistically significant.

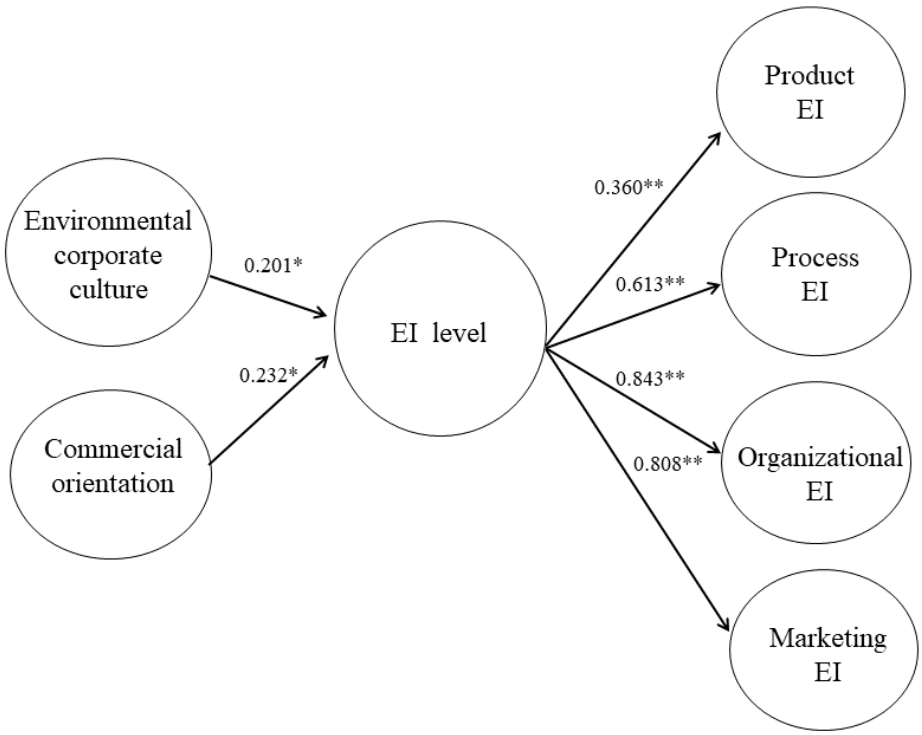

Fig.2 EI model testing results. *p < .05; **p < .01.

Moreover, Table 3 reports that, as hypothesized, environmental corporate culture and commercial orientation have a positive relationship with EI level. Therefore, H1 and H2 are supported.

The Coefficient of Determination (R^2), which measures the predictive accuracy, is the central criterion for judging the quality of the partial least squares structural equation modeling (Chin, 1998; Wijethilake et al., 2016). The R^2 of the model is 0.43, which greatly exceeds the 0.1 minimum level proposed by Falk and Miller (1992), indicating that it is a good explanatory model. Concerning the cross-validated redundancy measure (Q^2), it assesses the model's predictive relevance, i.e., if the model has the ability to predict the reflective indicators of endogenous latent variables. Stone-Geisser's Q^2 value was calculated by referring to a blindfolding sample reuse technique with a data omission distance (D) equal to 6 (Wold, 1982). Q^2 values larger than zero for a particular endogenous construct indicate the path model's predictive relevance. The Q^2 value of the model is above zero (0.154), which indicates the satisfactory predictive relevance of the model.

Table 3. Testing the EI model hypotheses

Hypotheses	Supported or rejected	Coefficient (related to path analysis)	p-value (related to path analysis)
H1. Environmental corporate culture is positively related to firms' EI level.	Supported	0.201	0.035*
H2. Commercial orientation is positively related to firms' EI level.	Supported	0.232	0.014*

*$p < 0.05$

5. DISCUSSIONS AND CONCLUSIONS

Testing the structural model by means of PLS-SEM, the study offers a multidimensional measurement of EI level that previous studies fail to provide. The analysis of the relationship of environmental corporate culture and commercial orientation with EI level also provides evidence about important reasons that motivate companies to be environmentally friendly.

Firstly, the results shown in Figure 2 enhance the significance of contemplating product, process, organizational and marketing EI dimensions, as they are all important. Unlike several research studies that only analyze product and process EI types (Doran and Ryan, 2016; Castellacci and Lie, 2017; Rodríguez and Wiengarten, 2017), the explicative level of the other two dimensions (organizational and marketing) are stronger in the agri-food sector. Among all four, organizational EI is the most significant ($\beta = .843$), followed by marketing EI ($\beta = .808$). Product and process EI dimensions also display significance, though less than the other two ($\beta = .360$ and $\beta = .613$, respectively). These results call into question the effectiveness of measurements used in most previous EI investigations that do not consider all EI types. The findings also lend support to the defense of some authors (BID, 2007; García-Granero et al., 2018) who advocate the introduction of organizational and marketing EI practices to obtain an efficient analysis of the state of EI in any sector or country. Consequently, the results imply that any EI research should contemplate the four dimensions to offer an analysis which more closely resembles business reality.

Secondly, another interesting finding is the positive relationship that environmental corporate culture has with the EI level of agri-food firms. In line with the results of other investigations (Parr, 2009; Bossle et al., 2016; Dangelico, 2016), greater environmental awareness of the company is reflected in a higher predisposition to introduce more environmentally-friendly practices. In this context, the role of senior staff is a key factor in promoting green values throughout the company (Andriopoulos, 2001; Halbesleben et al., 2003; Rajala et al., 2016). Managers can have a great influence on assessing the conditions for a successful implementation of EI by their organizations.

Additionally, this investigation also found that commercial orientation is a significant driver that encourages firms to be more eco-innovative in the agri-food sector. Moreover, those firms that are more customer and competitor oriented are more open to implementing ecological practices with the aim of reaching environmental requirements and demands. According to Narver and Slater (1990), Deshpandé (1999) and Rkein et al. (2012), customer and competitor orientation are the two most important commercial orientation items, along with the motivation of results such as acquired competitive advantage or growth in markets (Salomon and Shaver, 2005; Weerawardena and O'Cass, 2004). Thus, organizations with commercial orientation might develop EI according to consumer preferences and changes in market conditions with the aim of pursuing reduction of costs, improvement of company reputation, and operational efficiency increase in terms of an output gained to run a business operation.

5.1 Concluding remarks

This study presents novel empirical research in this field, showing a multidimensional EI level measurement. The analysis argues that a better understanding of the complex relationship between EI and environmental corporate culture and commercial orientation in the agri-food sector is crucial to attain sustainable development.

Today, it is well-known that EI is necessary to achieve the transition towards 'greener' production process, distribution and consumption. However, although product, process, and organizational innovations are commonly taken into consideration in studies related to EI in several industrial sectors, the relationship between marketing practices and EI is scarcely contemplated. Unlike most studies, the present one focuses on highlighting the key role of each EI dimension in stimulating sustainable development. This is particularly relevant in the agri-food sector due to its capacity to generate socio-economic growth and its high capacity of adaptiveness to international market requirements.

The model developed in this study offers empirical evidence on the positive relationship between environmental corporate culture and commercial orientation and EI. A practical contribution for companies to implement EI involves two aspects. On one hand, regarding environmental corporate culture, acquiring more environmentally-friendly human capital is essential to promote more sustainable work habits that enhance EI. On the other hand, in order to improve EI level, this study provides a conceptual framework that explains which eco-practices should be implemented, while the adoption of EI represents an opportunity for achieving environmental standards and satisfying customers' needs. From a research perspective, this multidimensionality approach should be taken into account to properly study EI implementation in other sectors and/or regions. It suggests that environmental corporate culture and commercial orientation are connected to business decisions on implementing EI practices. What is more, it enhances the importance that marketing and organizational dimensions can have, the same as product and process types when analyzing business EI practices.

The presented study has several limitations which could encourage future works. For example, the analysis is focused on the Spanish agri-food export sector and the data are collected in one period, offering static results. Also, the measurement variables are limited, and other omitted factors may influence these complex relationships. Although the study's findings can be extended to other well-developed economies, it would be interesting for future research to replicate it in other countries and sectors with the aim of being able to compare different economies and business groups. Finally, exploring the EI level over an extensive period of time with the aim of analyzing the evolution of different green practices over the years is a worthwhile direction for future research.

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Data availability statement: Data will be made available under reasonable request.

Appendix A.

Table 1A. Multicollinearity analysis

Measurement items	VIF Values
Commercial orientation	
Customer orientation	1.242
Achieve competitive advantage	1.741
Improve corporative image	1.619
Growth in market	1.482
Product EI	
Ecological/integrated production	1.207
Biodegradable packaging	1.041
Recycling packaging	1.163
Process EI	
Packaging control system implemented	1.016
Green technology investment	1.010
Green patent number	1.011
Recycling materials	1.014
Organizational EI	
Environmental advisory implemented	1.540
Environmental audit implemented	1.588
Cooperation with stakeholders	1.321
Environmental quality staff	1.306
Marketing EI	
Environmental quality standard certifications	1.416
Environmental management system certifications	1.131
GlobalGap certification	1.406
GRASP certification	1.142

Appendix B. Composite reliability (CR) analysis.

Table 1B. Step 1 build-up approach method

Measurement items	**Factor loading**	**p-value**
Environmental corporate culture (CR = .911)		
Degree of importance of implementing environmental plans and objectives	0.924	0.000
Degree of importance of achieving environmental objectives	0.909	0.000
Degree of importance of the company' staff being environmentally respectful	0.825	0.000
Degree of importance of the company' environmental initiatives investment	0.770	0.000
Degree of importance of the company' environmental impact	0.648	0.000

Table 2B. Step 2 build-up approach method

Measurement items	**Factor loading**	**p-value**
Environmental corporate culture (CR = .910)		
Degree of importance of implementing environmental plans and objectives	0.924	0.000
Degree of importance of achieving environmental objectives	0.909	0.000
Degree of importance of the company' staff being environmentally respectful	0.825	0.000
Degree of importance of the company' environmental initiatives investment	0.770	0.000
Degree of importance of the company' environmental impact	0.648	0.000
EI level (CR = .736)		
Product EI	0.512	0.002
Process EI	0.548	0.001
Organizational EI	0.748	0.000
Marketing EI	0.742	0.000

References

Adaliku, C., 2011. Impact of international and home-based research and development (R&D) on innovation performance. International Journal of Human Sciences 8, 474-498.

Adams, H. D., Luce, C. H., Breshears, D. D., Allen, C. D., Weiler, M., Hale, V. C., Smith, A. M. S., Huxman, T. E., 2012. Ecohydrological consequences of drought- and infestation- triggered tree die-off: insights and hypotheses. Ecohydrology 5, 145-159. DOI: 10.1002/eco.233

Ajzen, I., 1991. The theory of planned behavior. Organizational Behavior and Human Decision Processes 50 (2), 179–211.

Aldás-Manzano, J. (2012). Partial least squares path modelling in marketing and management research: An annotated application. In: L. Moutinho & K. Huarng (Eds.), Quatitative Modelling in Marketing and Management (pp. 43–78). London: World Scientific.

Alkaya, E., Demirer, G. N., 2015. Reducing water and energy consumption in chemical industry by sustainable production approach: a pilot study for polyethylene terephthalate production. Journal of Cleaner Production 99, 119-128.

Amin, M.M., Chin, O. 2019. Business networking and sustainability of small rural business: mediating effects of entrepreneurial orientation. Management Science Letters 9 (4), 595-606.

Anderson, R., 1998. Mid-course Correction. Towards a Sustainable Enterprise: the Interface Model. Chelsea Green Publishing Company, White River Junction, VT.

Anderson, J. C., Narus, J. A., 1990. A model of distributor firms and manufacturer firm working partnership. Journal of Marketing 54, 42-45.

Anderson, J., Gerbing, D., 1991. Predicting the performance of measures in a confirmatory factor analysis with a pretest assessment of their substantive validities. Journal of Applied Psychology 765, 732-740.

Andriopoulos, C., 2001. Determinants of organizational creativity: a literature review. Management Decision 6 (3), 240-249.

Antonietti R, Marzucchi A., 2014. Green tangible investment strategies and export performance: A firm-level investigation. Ecological Economics 108, 150-161.

Astuti, M., Prawoto, P., Irawan, Y.S., & Sugiono, S. (2018). The eco-innovation variables

which influence the performance of creative industries center of natural stone crafts. Journal of Ecological Engineering, 19 (1), 14-24.

Aznar-Sánchez, J. A., Galdeano-Gómez, E., Pérez-Mesa, J. C., 2011. Intensive horticulture in Almería (Spain): a counterpoint to current European rural policy strategies. Journal of Agrarian Change 11 (2), 241-261. http://dx.doi.org/10.1111/j.14710366.2011.00301.x.

Bagozzi, R., Yi, Y., 1988. On the evaluation of structural equation models. Journal of the Academy of Marketing Science 143, 74-94.

Barth, H., Ulvenblad, P-O., Ulvenblad, P., 2017. Towards a conceptual framework of sustainable business model innovation in the agri-food sector: a systematic literature review. Sustainability 9, 1620.

Benbrook, C. M., Butler, G., Latif, M. A., Leifert, C., Davis, D. R., 2013. Organic production enhances milk nutritional quality by shifting fatty acid composition: A United States-wide, 18-month study: E82429. PLoS One 8 (12), e82429.

BID (Banco Interamericano de Desarrollo), 2007. Módulo de capacitación para la recolección y el análisis de indicadores de innovación. Working Paper 8.

Bleischwitz, R., Welfens, P. J. J., Zhang, Z. 2012. Prologue to the special issue 'Resources, energy and eco-innovation' in Mineral Economics. Mineral Economics 24(24), 55–57.

Bocken, N. M. P., Allwood, J. M., Willey, A. R., King, J. M. H., 2011. Development of an eco-ideation tool to identify stepwise greenhouse gas emission reduction options for consumer goods. Journal of Cleaner Production 19, 1279-1287.

Boons, F., Lüdeke-Freund, F., 2013. Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. Journal of Cleaner Production 45, 9-19.

Bossle, M. B., De Barcellos, M. D., Vieira, L. M., Sauvée, L., 2016. The drivers for adoption of eco-innovation. Journal of Cleaner Production 113, 861–872.

Caffaro, F., Roccato, M., Cremasco, M. M., Cavallo, E., 2019. An ergonomic approach to sustainable development: the role of information environment and social-psychological variables in the adoption of agri-environment innovations. Sustainable Development 27, 1049-1062.

Cajamar, 2016. Análisis de la Campaña Hortofrutícola de Almería, Campaña 2014/2015. Cajamar, Almería, Spain.

Carpentier, C. L., Ervin, D. E., 2002. Business approaches to agri-environmental

management: incentives, constraints and policy issues. Paris: Organisation for Economic Cooperation and Development, OECD.

Carter, A.C.F., Williams, B.R., 1959. The characteristics of technically progressive firms. Journal of Industrial Economics 7 (2), 87–104.

Castellacci, F., Lie, C. M., 2017. A taxonomy of green innovators: empirical evidence from South Korea. Journal of Cleaner Production 143, 1036-1047.

Chen, Y. S., Lai, S. B., Wen, C. T., 2006. The influence of green innovation performance on corporate advantage in Taiwan. Journal of Business Ethics 67 (4), 331-9.

Chen, Y., 2008. The positive effect of green intellectual capital on competitive advantages of firms. Journal of Business Ethics 77, 271-286Cheng, C., Shiu, E., 2012. Validation of a proposal instrument for measuring eco-innovation: An implementation perspective. Technovation 32, 329-344.

Chen, C. C., Shiu, E. C., 2012. Validation of a proposed instrument for measuring eco-innovation: an implementation perspective. Technovation 32 (6), 329-344.

Cheng, C. C. J., Yang, C., Sheu,C., 2014. The link between eco-innovation and business performance: a Taiwanese industry context. Journal of Cleaner Production 64, 81-90.

Chiarvesio, M., De Marchi, V., Di Maria, E., 2015. Environmental innovations and internationalization: Theory and Practices. Business Strategy and the Environment 24, 790-801.

Chin, W. W., 1998. The partial least squares approach to structural equation modeling. In: G.A. Marcoulides (Ed.), Modern Methods for Business Research (pp.295-336). Mahwah, NJ, Lawrence Erlbaum Associates, Publisher.

Churchill, G., 1979. A paradigm for developing better measures of marketing constructs. Journal of Marketing Research 16, 64-73.

Cleff, T., Rennings, K., 1999. Determinants of environmental product and process innovation. European Environment 9, 191–201.

Cooper, R. G., Edgett, S. J., 2008. Maximizing productivity in production innovation. Research Technology Management 51, 47-58.

Crabbé, A., Jacobs, R., Van Hoof, V., Bergmans, A., Van Acker, K., 2013. Transition towards sustainable material innovation: evidence and evaluation of Flemish case. Journal of Cleaner Production 56, 63-72.

Crick, J. M., 2019. The dimensionality of the market orientation construct. Journal of Strategic Marketing, http://dx.doi.org/10.1080/0965254X.2019.1677747

Crosby, L. A., Evans, K. R., Cowles, D., 1990. Relationship quality in services selling: an interpersonal influence perspective. Journal of Marketing 54, 68-81.

Dalhammar, C., 2015. Industry attitudes towards ecodesign standards for improved resource efficiency. Journal of Cleaner Production 123, 155-166, http://dx.doi.org/10.1016/j.jclepro.2015.12.035.

Damanpour, F., Walker, R., Avellaneda, C., 2009. Combinative effects of innovation types and organizational performance: a longitudinal study of service organizations. Journal of Managerial Studies 46 (4), 650-675.

Dangelico, R. M., 2016. Green product innovation: where we are and where we are going. Business Strategy and the Environment 25(8), 560–576.

Dangelico, R. M., Nastasi, A., Pisa, S., 2019. A comparison of family and nonfamily small firms in their approach to green innovation: a study of Italian companies in the agri-food industry. Business Strategy and Environment 28, 1434-1448.

De Jesús Pacheco, D. A., ten Caten, C. S., Jung, C. F., Ribeiro, J. L. D., Navas, H. V. G., Cruz-Machado, V. A., 2016. Eco-innovation determinants in manufacturing SMEs: Systematic review and research directions. Journal of Cleaner Production 142 (4), 2277-2287, https://doi.org/10.1016/j.jclepro.2016.11.049.

De Marchi, V., 2012. Environmental innovation and R&D cooperation: empirical evidence from Spanish manufacturing firms. Research Policy 41, 614-623.

Del Río, P., Carrillo-Hermosilla, J., Könnölä, T., 2010. Policy strategies to promote eco-innovation. Journal of Industrial Ecology 14, 541-557.

Deshpandé, R., 1999. Developing a Market Orientation. Sage: California.

Deshpandé, R., Webster, F. E., 1993. Firms' culture, custom orientation, and innovativeness in Japanese firms: a quadrad analysis. Journal of Marketing 57 (1), 23–37.

Diederen, P., van Meijl, H., Wolters, A., Bijak, K., 2003. Innovation Adoption in Agriculture: Innovators, Early Adopters and Laggards. Cahiers d'économie et sociologie rurales 67, 30-50.

Drejeris, R., Miceikienė, A., 2018. Multi-criteria measurement of sustainable innovativeness in farming organisations: evidence from Lithuania. Sustainability 10, 3347, https://doi.org/10.3390/su10093347.

Doran, J., Ryan, G., 2016. The importance of the diverse drivers and types of environmental innovation for firm performance. Business Strategy and the Environment 25, 102-119.

Dwyer, F. R., Schurr, P. H., Oh, S., 1987. Developing buyer-seller relationships. Journal of Marketing 51, 11-27.

El Bilali, H., 2018. Relation between innovation and sustainability in the agro-food system. Italian Journal of Food Science 30, 200-225.

Ehrenfeld, J. R., 2008. Sustainability needs to be attained, not managed. Sustainability: Science, Practice and Policy 4, 1-11.

Eiadat, Y., Kelly, A., Roche, F., Eyadat, H., 2008. Green and competitive? An empirical test of the mediating role of environmental innovation strategy. Journal of World Business 43 (2), 131-145.

Ellis, P. D., 2006. Market orientation and performance: a meta-analysis and cross-national comparisons. Journal of Management Studies 43 (5), 1089-1107.

European Commission, 2009. Commission Staff Working Document on the Implementation of Commission Recommendation of 6 May 2003 Concerning the Definition of Micro, Small and Medium-sized Enterprise. European Commission, Brussels.https://ec.europa.eu/docsroom/documents/10033/attachments/1/translations. (Accessed 19 July 2017).

Falk, R. F., Miller, N. B. (1992). A primer for soft modeling. Akron, Ohio: University of Akron Press.

FAO, 2012. Greening the Economy with Agriculture. Food and Agriculture Organisation of the United Nations (FAO).

Feder, G., Zilberman, D., Just, R. E., 1985. Adoption of Agricultural Innovations in Developing Countries: A Survey. Economic Development and Cultural Change 33(2), 255-298.

Florida, R., 1996. Lean and Green: The Move to Environmentally Conscious Manufacturing. California Management Review 39 (1), 80-105.

Fornell, C., Larcker, D. F., 1981. Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research 18, 39-50.

Frosch, R. A., 1994. Industrial ecology: minimizing the impact of industrial waste. Physics Today 47 (11), 63-68.

Frosch, R., Gallopoulos, N., 1992. Towards and industrial ecology. In: Bradshaw, A.D., Southwood, R., Warner, F. (Eds.), The Treatment and Handing of Wastes (pp. 269-292). Chapman & Hall, London.

Galdeano-Gómez, E., Aznar-Sánchez, J.A., Pérez-Mesa, J.C., 2013. Sustainability

dimensions related to agricultural-based development: The experience of 50 years of intensive farming in Almería (Spain). International Journal of Agricultural Sustainability 11, 125–143.

Galdeano-Gómez, E., Aznar-Sánchez, J.A., Pérez-Mesa, J.C., Piedra-Muñoz, L., 2017. Exploring Synergies Among Agricultural Sustainability Dimensions: An Empirical Study on Farming System in Almería (southeast Spain). Ecological Economics 140, 99–109.

García, M., Alonso, Á., Tello, M. L., de la Poza, M., Villalobos, N., Lansac, R., Melgarejo, P., Laínez, M. 2018. Identifying agri-food research priorities for Spain-2017 results. Spanish Journal of Agricultural Research 16 (3), e0001.

García-Granero, E. M., Piedra-Muñoz, L. Galdeano-Gómez, E., 2018. Eco-innovation measurement: A review of firm performance indicators. Journal of Cleaner production 191, 302-317.

Gardebroek, C., 2006. Comparing risk attitudes of organic and non-organic farmers with a Bayesian random coefficient model. European Review of Agricultural Economics 69, 798-803.

Ghisetti, C., Pontoni, F., 2015. Investigating policy and R&D effects on environmental innovation: a meta-analysis. Ecological Economics 118, 57-66.

Glavas, A., Mish, J., 2015. Resources and capabilities of triple bottom line firms: going over old or breaking new ground? Journal of Business Ethics 127 (3), 623-642.

Godoy-Durán, A., Galdeano-Gómez, E., Perez-Mesa, J. C., Piedra-Muñoz, L., 2017. Assessing eco-efficiency and the determinants of horticultural family-farming in southeast Spain. Journal of Environmental Management 204 (1), 594-604.

Gómez-Limón, J. A., Sánchez-Fernández, G., 2010. Empirical evaluation of agricultural sustainability using composite indicators. Ecological Economics 69(5), 1062-1075.

Guerrero-Lara, L., Pereira, L. M., Ravera, F., Jiménez-Aceituno, A., 2019. Flipping the Tortilla: social-ecological innovations and traditional ecological knowledge for more sustainable agri-food systems in Spain. Sustainability 11, 1222, https://doi.org/10.3390/su11051222.

Hàkansson, H., 1982. International marketing and purchasing of industrial goods. New York: Wiley.

Halbesleben, J. R. B., Novicevic, M. M., Harvey, M. G., Buckley, M. R., 2003. Awareness of temporal complexity in leadership of creativity and innovation: a competency based model. Leader. Q. 14 (4/5), 433-454.

Hallstedt, S., Thompson, A., Lindahl, P., 2013. Key elements for implementing a strategic sustainability perspective in the product innovation process. Journal of Cleaner Production 51, 277-288.

Hair, J. F., Ringle, C. M., & Sarstedt, M., 2011. PLS-SEM: Indeed a silver bullet. Journal of Marketing Theory and Practice, 19(2), 139–152.

Hair, J. F., Hult, G., Ringle, C., & Sarstedt, M., 2014. A primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). Thousand Oaks: CA: Sage.

Hair, J.F., Sarstedt, M., Ringle, C.M., Gudergan, S.P., 2018. Advanced Issues in Partial Least Squares Structural Equation Modeling (PLS-SEM). Thousand Oaks, CA, USA: Sage.

Henseler, J., Dijkstra, T.K., Sarstedt, M., Ringle, C.M., Diamantopoulos, A., Straub, D.W., Ketchen, D.J., Hair, J.F., Hult, T.M., Calantone, R.J., 2014. Common beliefs and reality about PLS: comments on Rönkkö and Evermann. Organizational Research Methods 17 (2), 182–209.

Henseler, J., Hubona, G., Ray, P. A., 2016. Using PLS path modeling in new technology research: updated guidelines. Industrial Management & Data Systems 116 (1), 2-20.

Hernández-Rubio, J., Pérez-Mesa, J. C., Piedra-Muñoz, L., Galdeano-Gómez, E., 2018. Determinants of food safety level in fruit and vegetable wholesalers' supply chain: evidence from Spain and France. International Journal of Environmental Research and Public Health 15 (10), 2246-2261, http://dx.doi.org/10.3390/ijerph15102246

Hojnik, J., Ruzzier, M., 2016a. The driving forces of process eco-innovation and its impact on performance: insights from Slovenia. Journal of Cleaner Production 133, 812-825. https://doi.org/10.1016/j.jclepro.2016.06.002.

Hojnik, J., Ruzzier, M., Manolova, T. S., 2018. Internationalization and economic performance: The mediating role of eco-innovation. Journal of Cleaner Production 171, 1312-1323.

Horbach, J., 2008. Determinants of environmental innovation- new evidence from German panel data sources. Research Policy 37 (1), 163-173.

Howard-Grenville, J., Bertels, S., (2012). Organizational culture and environmental action. In: T. Bansal & A. Hoffman (Eds.), The Oxford handbook of business and the natural environment (pp.194-210). Oxford University Press.

Huang, J. W., Li, Y. H., 2015. Green innovation and performance: the view of organizational capability and social reciprocity. Journal of Business Ethics 145 (2),

309-324, http://dx.doi.org/10.1007/s10551-015-2903-y

Im, S., Workman, J. P., 2004. Market orientation, creativity, and new product performance in high-technology firms. Journal of Marketing 68 (2), 114–132.

Ishak, S. A., Hashim, H., Ting, T. S., 2016. Eco innovation strategies for promoting cleaner cement manufacturing. Journal of Cleaner Production 136, 133-149, http://dx.doi.org/10.1016/j.clepro.2016.06.022.

Jaccard, J., Wan, C., 1996. LISREL Approaches to Interaction Effects in Multiple Regression. Sage Publications, Thousand Oaks.

Jarvis, C. B., Mackenzie, S. B., Podsakoff, P. M., 2003. A critical review of construct indicators and measurement model misspecification in marketing and consumer research. Journal of Consumer Research 30, 199-218.

Johnstone, N., Hascic, I., Popp, D., 2010. Renewable Energy Policies and Technological Innovation: Evidence Based on Patent Counts. Environmental Resource Economics 45, 133-155.

Jones, D. G. B., Shaw, E. H., 2018. Avoiding academic irrelevance in the marketing discipline: the promise of the history of marketing thought. Journal of Marketing Management 34 (1-2), 52-62.

Kemp, R., Pearson, P., 2007. Final Report MEI Project about Measuring Eco-innovation. Project deliverable 25. http://www.oecd.org/env/consumption-innovation/43960830.pdf.

Kemp, R., Pearson, P., 2008. Policy Brief about Measuring Eco-innovation and Magazine/Newsletter Articles, p. 17. Project deliverable. https://cordis.europa.eu/docs/publications/1245/124548931-6_en.pdf.

Kemp, R., 2009. Measuring eco-innovation: results from the MEI project. Global Forum on Environment on Eco-innovation, 4-5 Nov. OECD, Paris.

Kesidou, E., Demirel, P., 2012. On the drivers of eco-innovations: empirical evidence from the UK. Research Policy 41, 862-870.

Kleinknecht, A., Verspagen, B., 1990. Demand and innovation: Schmookler re-examined. Research Policy 19 (4), 387–394.

Klomp, J., de Haan, J. 2008. Effects of governance on health: a cross-national analysis of 101 countries. Kyklos 61 (4), 599-614.

Knickel, K., Brunori, G., Rand, S., Proost, J., 2009. Towards a better conceptual framework for innovation processes in agriculture and rural development: from linear models to systemic approaches. Journal of Agricultural Education and

Extension 15 (2), 131-146. https://doi.org/10.1080/13892240902909064

Kohli, A. K., Jaworski, B. J., 1990. Market orientation: the construct, research propositions, and managerial implications. Journal of Marketing 54 (2), 1–18.

Kumar, V., Reinartz, W., 2016. Creating enduring customer value. Journal of Marketing 80 (6), 36-68.

Labella, R. C., Fort, F., Rosa, M. P., Murgado Armenteros, E. M., 2017. Determining factors of voluntariness in sustainable environmental innovation (eco-processes) and their certification: Agri-food sector. Proceedings of the 12th European Conference on Innovation and Entrepreneurship (ECIE), Paris, France, 21 – 22 September 2017, 125-132.

Langendahl, P. Cook, M., Potter, S., 2016. Sustainable innovation journeys: exploring the dymanics of firm practices as part of transitions to more sustainable food and farming. Local Environment 21 (1), 105-123, https://doi.org/10.1080/13549839.2014.926869.

Liao, Z., 2016. Temporal cognition, environmental innovation, and the competitive advantage of firms. Journal of Cleaner Production 135, 1045–1053.

Liao, Z., 2018. Market orientation and FIRMS' environmental innovation: the moderating role of environmental attitude. Business Strategy and the Environment 17, 117-127.

Lioutas, E. D., Charatsari, C., 2018. Green innovativeness in farm enterprises: what makes farmers think green? Sustainable Development 26, 337-349.

Lozano, R., 2013. A holistic perspective on corporate sustainability drivers. Corporate Social Responsibility and Environmental Management. http://dx.doi.org/10.1002/csr.1325.

Magsi, H. B., Ong, T. S., Ho, J. A., Hassan, A. F. S., 2018. Organizational culture and environmental performance. Sustainability 10, 2690-2707.

Marcon, A., de Medeiros, J. F., Ribeiro, J. L. D., 2017. Innovation and environmentally sustainable economy: Identifying the best practices develop by multinationals in Brazil. Journal of Cleaner Production 160, 83-97, https://doi.org/10.1016/j.jclepro.2017.02.101.

Martin, C. J., Upham, P., Budd, L., 2015. Commercial orientation in grassroots social innovation: insights from the sharing economy. Ecological Economics 118, 240-251.

Martos-Pedrero, A., Cortés-García, F. J., Jiménez-Castillo, D., 2019. The relationship between social responsibility and business performance: an analysis of the agri-

food sector of southeast Spain. Sustainability 11, 6390-6413.

Mackenzie, S. B., Podsakoff, P. M., Jarvis, C. B., 2005. The problem of measurement model misspecification in behavioral and organizational research and some recommended solutions. Journal of Applied Psychology 90, 710-730.

Menon, A., Bharandwaj, S. G., Howell. R. 1996. The quality and effectiveness of marketing strategy: effects of functional and dysfunctional conflict in intraorganizational relationships. Journal of the Academy of Marketing Science 24, 300-313.

Montalvo, C., 2003. Sustainable production and consumption systems-cooperation for change: assessing and simulating the willingness of the firm to adopt/develop cleaner technologies. The case of the In-Bond industry in northern Mexico. Journal of Cleaner Production 11, 411-426.

Montalvo, C., 2008. General Wisdom concerning the factors affecting the adoption of cleaner technologies: a survey 1990-2007. Journal of Cleaner Production 16 (S1), S7-S13.

Mugisha, S., Berg, S. V., Katashaya, G. N., 2005. The influence of commercial and customer orientation on utility efficiency: Empirical evidence from NWSC, Uganda. In: Kayaga, S. (ed). Maximising the benefits from water and environmental sanitation: Proceedings of the 31st WEDC International Conference, Kampala, Uganda, 31 October-4 November 2005, 115-121.

Murphy, J., Gouldson, A., 2000. Environmental policy and industrial innovation: integrating environment and economy through ecological modernisation. GEOFORUM 31, 33-44.

Narver, J. C., Slater, S. F., 1990. The effect of a market orientation on business profitability. Journal of Marketing 54, 20–35.

Negny, S., Belaud, J., Robles, C., Reyes, R., Ferrer, B., 2012. Toward an eco-innovative method based on a better use of resources: application to chemical process preliminary design. Journal of Cleaner Production 32, 101-113.

Newton, T., Harte, G., 1997. Green business: technicist kitsch? Journal of Management Studies 34 (1), 75-98.

O'Connor, G.C., Ayers, A.D., 2005. Building a radical innovation competency. Research Technology Management 48 (1), 23-31.

OECD (Organisation for Economic Co-operation and Development), 2005. Oslo Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation

Data. OECD, Paris. https://www.oecd.org/sti/inno/2367580.pdf.

OECD (Organisation for Economic Co-operation and Development), 2012. Perspectivas ambientales de la OCDE hacia 2050. Consecuencias de la inacción [Environmental perspectives of the OECD towards 2050. Consequences of inaction]. Available at: https://www.oecd.org/env/indicators-modelling-outlooks/49884278.pdf.

OECD (Organisation for Economic Co-operation and Development), 2013. Agricultural Innovation Systems: A framework for analyzing the role of the Government. OECD Publishing. http://dx.doi.org/10.1787/9789264200593-en

Ortiz-de-Mandojana, N., Aguilera-Caracuel, J., Morales-Raya, M., 2016. Corporate governance and environmental sustainability: the moderating role of the national institutional context. Corporate Social Responsibility and Environmental Management 23 (3), 150–164.

Parr, A., 2009. Hijacking sustainability. London: The MIT Press.

Peng, X., Liu, Y., 2016. Behind eco-innovation: Managerial environmental awareness and external resource acquisition. Journal of Cleaner Production 139, 347-360, https://doi.org/10.1016/j.jclepro.2016.08.051.

Piedra-Muñoz, L., Galdeano-Gómez, E., Perez-Mesa, J. C., 2016. Is sustainability compatible with profitability? An empirical analysis of family farming activity. Sustainability 8 (893). http://dx.doi.org/10.3390/su8090893.

Podsakoff, N., Shen, W., Podsakoff, P. M., (2006). The role of formative measurement models in strategic management research: review, critique and implications for future research. In: Ketchen, D. & Bergh, D. (Eds.), Research Methodology in Strategic Management, volume 3. Greenwich, CT: JAI Press.

Porter, M. E., Kramer, M. R., 2006. Strategy and society: the link between competitive advantage and corporate social responsibility. Harvard Business Review 84 (12), 78-92.

Rabadán, A., González-Moreno, A., Sáez-Martínez, F. J., 2019. Improving firms' performance and sustainability: the case of eco-innovation in the agri-food industry. Sustainability 11, 5590, https://doi.org/10.3390/su11205590

Rajala, R., Westerlund, M., Lampikoski, T., 2016. Environmental sustainability in industrial manufacturing: reexamining the greening of Interface's business model. Journal of Cleaner Production 115, 52-61. https://doi.org/10.1016/j.jclepro.2015.12.057.

Rehfeld, K.-M., Rennings, K., Ziegler, A., 2007. Integrated product policy and

environmental product innovations—an empirical analysis. Ecological Economics 61, 91–100.

Rennings, K., 2000. Redefining innovation-eco-innovation research and the contribution from ecological economics. Ecological Economics 32 (2), 319-332.

Rkein, A., Andrew., B. H., 2012. Public sector commercial orientation and the social contract: a study of performance management in a non-competitive environment. Pacific Accounting Review, 24 (3), 292-313.

Roldán, J. L., Sánchez-Franco, M. J., (2012). Variance-based structural equation modelling: guidelines for using partial least squares in information systems research. In: Mora, M. (Ed.), Research Methodologies, Innovations and Philosophies in Software Systems Engineering and Information Systems (pp.193–221). Hershey, PA, IGI Global.

Rodríguez-Rodríguez, M., Galdeano-Gómez, E., Carmona-Moreno, E., Godoy-Durán, A., 2012.Environmental impact, export intensity, and productivity interactions: an empirical index analysis of the agri-food industry in Spain. Canadian Journal of Agricultural Economics 60, 33-52.

Rodríguez, J., Wiengarten, F., 2017. The role of process innovativeness in the development of environmental innovativeness capability. Journal of Cleaner Production 142, 2423-2434.

Salomon, R. M., Shaver, J. M., 2005. Learning by Exporting: New Insights from Examining Firm Innovation. Journal of Economics &Management Strategy 14 (2), 432-460.

Sarstedt, M., Hair, J.F., Ringle, C.M., Thiele, K.O., Gudergan, S.P., 2016. Estimation issues with PLS and CBSEM: where the bias lies! Journal of Business Research 69 (10), 3998–4010.

Scarpellini, S. Aranda, A., Aranda, J., Llera, E., Marco, M., 2012. R&D and eco-innovation: opportunities for closer collaboration between universities and companies through technology centers. Clean Technologies and Environmental Policy 14 (6), 1047-1058.

Shih, D. H., Lu, C. M., Lee, C. H., Cai, S. Y., Wu., K. J., Tseng, M. L., 2018. Eco-innovation in circular agri-business. Sustainability 10, 1140, https://doi.org/10.3390/su10041140.

Spielman, D., Birner, R., 2008. How innovative is your agriculture? Using innovation indicators and benchmarks to strengthen national agricultural innovation systems.

Agricultural and Rural Development Discussion Paper 41. The World Bank.

Tabachnick, B., Fidell, L., 2006. Using Multivariate statistics. Allyn & Bacon.

Theyel, G., 2000. Management practices for environmental innovation and performance. International Journal of Operations and Production Management 20 (2), 249-266.

Tibbs, H., 1992. Industrial Ecology- an Agenda for Environmental Management. Pollution Prevention Review Spring, pp. 167-180.

Triguero, A., Moreno-Mondéjar, L., Davia, M., 2013. Drivers of different types of eco-innovation in European SMEs. Ecological Economics 92, 25-33.

Tsai, K., Liao, Y., 2017. Sustainability strategy and eco-innovation: a moderation model. Business Strategy and the Environment 26 (4), 426–437.

Uscebrka, G., Zikic, D., Stojanovic, S., Kanacki, Z., Sevic, D. D., 2009. Requests of EU and Globalgap in procedure with by-products of agriculture. Kvalitet- IMS, Standardizacija I Metrologija 9 (3), 21-24.

Van Hemel, C., Cramer, J., 2002. Barriers and stimuli for ecodesign in SMEs. Journal of Cleaner Production 10, 439-453.

Wang, Y., Shi, S., Chen, Y., Gursoy, D., 2018. An examination of market orientation and environmental marketing strategy: the case of Chinese firms. The Service Industries Journal, http://dx.doi.org/10.1080/02642069.2018.1551370.

Weerawardena, J., O'Cass, A., 2004. Exploring the characteristics of the market-driven firms and antecedents to sustained competitive advantage. Industrial Marketing Management 33 (5), 419-428.

Wijethilake, C., Munir, R., Appuhami, R., 2016. Environmental innovation strategy and organizational performance: enabling and controlling uses of management control systems. Journal of Business Ethics 151 (4), 1139–1160. http://dx.doi.org/10.1007/s10551-016-3259-7.

Williams, H., Medhurst, J., Drew, K., (1993). Corporate strategies for a sustainable future. In: Fischer, K. & Schot, J. (Eds.), Environmental Strategies for Industry: International Perspectives on Research Needs and Policy Implications (pp. 117-143). Island Press Washington, DC.

Wold, H. (1982). Soft modeling: the basic design and some extensions. In: H. Wold & K. G. Joreskog (Eds.), Systems under indirect observation, volume 2. Amsterdam: North Holland.

Zhao, S., Jiang, Y., Wang, S. 2019. Innovation stages, knowledge spillover, and green economy development: moderating role of absorptive capacity and environmental

regulation. Environmental Science and Pollution Research 26 (24), 25312-25325.