



DOCTORAL THESIS

**WAYS OF BEING GREEN: EXPLORING
ALTERNATIVE APPROACHES TO
ENVIRONMENTAL SUSTAINABILITY**

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**FORMAS DE SER VERDE: DIFERENTES
ENFOQUES DE LA SOSTENIBILIDAD
AMBIENTAL EN LA EMPRESA**

Ana Labella Fernández

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RESUMEN

La sostenibilidad ambiental es ahora uno de los desafíos más importantes para las empresas y la sociedad. La literatura académica ha prestado mucha atención a la propuesta de soluciones para que las organizaciones reduzcan su impacto ambiental y mejoren su rendimiento ambiental. A pesar de los avances prometedores en la investigación académica, los estudios organizacionales todavía tienen un margen importante para avanzar en el conocimiento mediante la integración de diferentes áreas de investigación. En este sentido, los enfoques que se centran en el análisis de determinadas prácticas de gestión podrían arrojar luz sobre la contribución de las organizaciones a la resolución de los problemas ambientales. Esta tesis doctoral tiene como objetivo explorar enfoques de gestión alternativos para la sostenibilidad ambiental y avanzar en el conocimiento actual sobre la efectividad de estos enfoques y la forma en que pueden abordar los problemas de sostenibilidad ambiental.

Centrándonos en el papel que desempeña la gestión de recursos humanos en la gestión ambiental, el capítulo 2 revisa la literatura sobre la gestión de recursos humanos medioambiental. Este capítulo desarrolla los fundamentos de la implantación de sistemas de gestión de recursos humanos medioambientales en una empresa específica, presenta la gestión de recursos humanos medioambiental como una herramienta útil para apoyar la sostenibilidad ambiental desde un enfoque de abajo hacia arriba, y clasifica las diferentes prácticas de gestión de recursos humanos medioambiental que se han abordado en la investigación hasta el momento. Así, a partir del esquema de Habilidad-Motivación-Oportunidad, las prácticas de gestión de recursos humanos medioambientales se agrupan en las siguientes tres dimensiones: prácticas orientadas a mejorar las *habilidades*

medioambientales de los empleados, las prácticas que mejoran la *motivación* de los empleados para involucrarse en problemas medioambientales y las prácticas que mejoran las *oportunidades* de los empleados para contribuir a la sostenibilidad ambiental.

Continuando con el estudio de las prácticas de gestión de recursos humanos, el capítulo 3 presenta un marco teórico que explica cómo las organizaciones abordan la sostenibilidad medioambiental. Teniendo en cuenta dos tipos de aprendizaje organizacional, la exploración y la explotación, se proponen cuatro enfoques alternativos: uno al que pertenecen los “*rezagados*” medioambientales, el cooperativo, el emprendedor y el ambidiestro. Además, destacando el papel crucial de la gestión de los recursos humanos medioambiental en el logro de la sostenibilidad ambiental, se proponen prácticas específicas que refuerzan los diferentes arquetipos y que podrían contribuir a mayores beneficios económicos y medioambientales de cada uno de ellos.

Para continuar avanzando en el conocimiento sobre emprendimiento medioambiental, el cuarto capítulo propone, desarrolla y valida una escala de medición para la orientación emprendedora medioambiental. El análisis factorial exploratorio muestra una estructura de tres dimensiones: la innovación medioambiental, la proactividad medioambiental y la asunción de riesgos con respecto a los problemas ambientales. El análisis factorial confirmatorio y los índices de ajuste del modelo correspondiente corroboran la estructura factorial previamente descrita. Para verificar la validez de criterio o nomológica, se examina el efecto directo de la orientación emprendedora medioambiental sobre el rendimiento medioambiental y las prácticas de gestión medioambiental. A la vista de los resultados favorables, cabe esperar que la escala de medición propuesta ayude a generar más investigación empírica sobre emprendimiento ambiental.

En el último estudio de esta tesis doctoral, una vez que se ha validado la escala de la orientación emprendedora medioambiental, el capítulo 5 estudia los efectos de dicha orientación sobre la innovación ambiental. Así, utilizando datos obtenidos de una muestra de 239 empresas españolas de los sectores agroalimentario y cerámico, este estudio analiza las relaciones entre la orientación emprendedora medioambiental, la gestión de recursos humanos medioambiental y la eco-innovación. Se encuentra evidencia empírica de que la orientación emprendedora medioambiental y la gestión de recursos humanos medioambiental están positivamente asociados con la eco-innovación. Pero también, se encuentra evidencia empírica de que la relación entre la orientación emprendedora medioambiental y la eco-innovación está mediada por la gestión de recursos humanos medioambiental.

En definitiva, esta tesis doctoral aporta conocimiento teórico y empírico a la identificación de diferentes estrategias y al estudio de acciones organizacionales dirigidas a abordar la sostenibilidad medioambiental. Así, esta tesis subraya la importancia primordial de la acción emprendedora y la "dimensión humana" en la gestión medioambiental.

ABSTRACT

Environmental sustainability is now one of the most important challenges for business and society. The academic literature has focused much attention on proposing solutions for organizations to reduce their environmental impact while improving their environmental performance. Despite many promising developments, organizational researchers have yet to advance knowledge by integrating different research areas. In this regard, cooperative approaches might shed light to such environmental problems. This doctoral dissertation aims to explore alternative approaches to environmental sustainability and to advance current knowledge about whether and how these approaches are effective to address environmental sustainability problems.

Focusing on the role of Human Resource Management (HRM) in environmental management, chapter 2 review the literature on Green Human Resource Management (GHRM). This chapters develops a logic for implementing GHRM systems in a specific company, presents GHRM as a useful tool to implement environmental sustainability from a bottom-up approach and takes stock and classifies the different GHRM practices that have been addressed in previous literature. Thus, building on the Ability–Motivation–Opportunity theory, GHRM practices are grouped into the three dimensions of practices oriented toward improving employees’ green abilities, practices improving employees’ motivations to engage in environmental issues, and practices improving employees’ opportunities to contribute to environmental sustainability.

Continuing with the study of GHRM practices, chapter 3 presents a theoretical framework that explains how organizations address environmental sustainability. Taking into account two types of organizational learning,

exploration and exploitation, four alternatives approaches are proposed: environmental laggards, cooperative, entrepreneurial and ambidextrous approach. Moreover, highlighting the crucial role of GHRM in achieving environmental sustainability, we propose specific GHRM practices that reinforce the different archetypes and might contribute to economic and environmental benefits of each archetype.

To continue advancing knowledge about environmental entrepreneurship, the fourth chapter proposes, develops and validates a measurement scale for Environmental Entrepreneurial Orientation (EEO). Exploratory factor analysis showed a structure of three dimensions, namely, environmental innovativeness, environmental proactiveness and risk-taking regarding environmental issues. Confirmatory factor analysis confirms the previous factor structure and the model fit indices corroborates the model fitness. To check the criterion validity out, the direct effect of EEO on environmental performance and environmental management practices was examined. The proposed measurement scale will help to sparkle empirical research on environmental entrepreneurship.

In the last study of this doctoral dissertation, once EEO scale is validated in chapter 4, chapter 5 studies the outcomes of EEO. More specifically, using data obtained from a sample of 239 Spanish agri-food and ceramic firms, this study analyses the relationships among EEO, GHRM and Eco-innovation. We found empirical evidence that EEO and GHRM is positively associated to Eco-innovation. But also, our evidence shows that the relationship between EEO and Eco-innovation is mediated by GHRM.

All in all, this doctoral dissertation contributes theoretical and empirical knowledge to the exploration of different strategies and the study of organizational actions aimed to address environmental sustainability. In this

regard, this thesis is intended to underscore the paramount importance of the entrepreneurial action and the “human dimension” in the environmental management.

CHAPTER 1: INTRODUCTION

1. RESEARCH ON ENVIRONMENTAL MANAGEMENT

Climate change is one of the greatest challenges humankind confront in the 21st century. Combating global warming, safeguarding ecological support systems and reducing energy and resource use are key challenges for societies in the coming years. These environmental problems have been traditionally addressed under the concept of sustainable development (World Commission on Environment and Development, 1987). However, climate change has been included within the recent term “Grand Challenges” due to its importance and emergence (Howard-Grenville et al. 2014; George et al., 2016). Grand challenges refer to social global problems that are critical and requires cooperative and global efforts and actions. To solve these problems, changes in individuals and societal behavior are required (George et al., 2016). Grand challenges account for multiple actors, not only individual citizen, but also communities, organizations, among others.

In this regard, organizations are an equally important key factor in mitigate environmental problems. Institutional and stakeholders pressures are forcing organizations to make substantial changes towards their commitment to environmental sustainability. Corporate initiatives are focusing on building up an image as a “green” or “sustainable” organization as part of their drive for social approval, not meeting many times the necessary requirements to combat environmental problems (Wolf, 2013). However, much more needs to be done, deeper and substantial changes are necessary. Environmental problems are becoming increasingly significant threats to economic growth.

Against this backdrop, environmental sustainability research has emerged over the last decades as a consequence of these little efforts. For organizational scholars, environmental sustainability has become a central line of research due to their promising outcomes. It has been argued that environmental management has the potential to contribute to the generation of competitive advantage, crucial to the survival of organizations (Aragón-Correa and Sharma, 2003). Moreover, environmental management not only contribute to increase financial performance leading to the achievement of positive results in the long-term but also environmental performance (Ortiz-de-Mandojana et al., 2019; Lankoski, 2008; Nakao et al., 2007). Ultimately, it creates value and provides legitimacy for the organization' stakeholders (Buysse and Verbeke, 2003; Henriques and Sadorsky, 1999).

Therefore, it seems that environmental management provides multiple benefits for firms. However, to fully tap the potential of such benefits, organizations should to go beyond the mere social approval and make substantial internal changes. The implementation of environmental strategies become necessary to achieve strategic fit (Sharma and Vredenburg, 1998; Wolf, 2013).

Within the environmental strategies, the scope of this doctoral thesis is the analysis of environmental entrepreneurship and GHRM at organizational level as alternatives to adopt a specific environmental strategy.

2. ENVIRONMENTAL ENTREPRENEURSHIP

There is a widespread assumption in the literature that entrepreneurial action stimulates not only economic development but also the environmental and economic performance of organizations (Covin and Slevin, 1986). Environmental entrepreneurship is global phenomenon that has arisen over

the last decades due to its potential to solve environmental problems (Demirel et al., 2019; Antolin-Lopez, et al., 2019; York, 2018). Although it is still in a nascent phase of research stream (York, 2018), it has been published some recent reviews that starts to integrate the research (i.e. Antolin-Lopez et al., 2019; Gast et al., 2017; Galkina and Hultman, 2016).

Environmental entrepreneurs are typically characterized by the exploitation of the opportunities that are inherent in environmentally relevant market failures (Dean and McMullen, 2007). Environmentally-oriented entrepreneurs seek to earn economics benefits while help to decrease environmental problems (Schaltegger and Wagner, 2011; York and Venjataraman, 2010). Entrepreneurs act proactively and innovatively, and take risks (Covin and Slevin, 1989). However, these three typical characteristics that represents entrepreneurs are not limited only to them but can also characterize established companies. In this regard, recent research has highlighted that environmental entrepreneurship encompasses different forms: the typical entrepreneur who assembles small green businesses, organizations that create or introduce new business models carrying out environmental entrepreneurial actions, among others (Antolin et al., 2019). For that reason, environmental entrepreneurial orientation (EEO) can be conceptualized at business-level to study the environmental entrepreneurship phenomenon at organizational-level.

3. GREEN HUMAN RESOURCE MANAGEMENT

In the context to combat climate change, Howard-Grenville et al. (2014) calls for a “radical rethink of employment practices and human resource management”. Further, the literature has suggested that employees might provide fundamental support in realizing organization’s environmental aspirations (Jabbour and Santos, 2008; Daily and Huang, 2001). The process

of adaptation to environmental sustainability requires a workforce that appreciate and understand, on the one hand, environmental problems and, on the other hand, the environmental initiatives, objectives and strategies that an organization pursue it (Mathapati, 2013). This can be achieved when Human Resource functions are aligned with environmental strategic goals (Jackson et al., 2011).

With this objective, it emerges in the literature the nascent stream of research of Green Human Resource Management (GHRM) (Renwick et al., 2013). This research stream incorporates green management elements into the HRM functions (training, recruitment and selection, rewards systems, among others) in order to develop employees' abilities, motivation and involvement which, in turn, contribute to achieve environmental organizational objectives and improve employee pro-environmental behavior (e. g. Shah, 2018; Renwick et al., 2013; Martínez-del-Río et al., 2012).

In this sense, the implementation of GHRM practices has multiple benefits for organizations. First, it helps organizations to accomplish environmental organizational goals. Second, employees become more proactive and come up with innovative suggestions and ideas towards environmental sustainability. This is due to the fact that employees acquire environmental knowledge as environmental training programs are implemented and organizations offer incentives or bonuses linked to the achievement of environmental objectives (Ramus, 2001; Denton, 1999). Finally, employees play a fundamental role in contributing to environmental results. Scholars have explored how GHRM systems contribute to better environmental and economic performance (Gupta, 2018; Razab et al., 2015; Martínez-del-Río et al., 2012; Jackson and Seo, 2010).

4. ECO-INNOVATION AS AN OUTCOME OF ENVIRONMENTAL ENTREPRENEURSHIP AND GHRM

Eco-innovation has emerged in the literature and formed rapidly an extensive body of research (see recent reviews: Xavier et al., 2017; Bossle et al., 2016). This term has been used to describe innovations that contribute to environmental sustainability through the development of environmental improvements (Leyva-de la Hiz, 2019; Díaz-García et al., 2015; Carrillo-Hermosilla et al., 2009; Pujari, 2006). Kemp and Pearson (2007, p. 7) defined eco-innovation 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”*.

Long-term environmental sustainability requires the achievement of radical innovations. The new ideas, products or processes must be introduced by actors. On the one hand, entrepreneurs have been regarded as promising innovators who seek environmentally favorable solutions (Antolín et al., 2019; Hockerts and Wüstenhagen, 2010; York and Venkataraman, 2010). On the other hand, as indicated and argued in the previous paragraph, employees are also potential source of innovative environmental solutions (Ramus, 2001; Denton, 1999).

As we have seen, the common objective of lowering environmental problems has been reflected in each of these concepts and lines of research. Despite many promising research developments, a more complete approach is necessary to the various phenomena that have been introduced. Next section reflects the objectives of this dissertation.

5. RESEARCH OBJECTIVES

The present dissertation has been developed with a general objective in mind: to explore alternative approaches to environmental sustainability and to advance current knowledge about whether and how these approaches are effective to address environmental sustainability problems.

This general objective is pursued across the four papers comprised in this doctoral dissertation.

1. The first article attempts to give an overview of the literature on GHRM. Consequently, the goal is threefold: (1) to develop a logic for implementing GHRM in a specific company; (2) to present GHRM as a useful tool to implement environmental sustainability from a bottom-up approach; and (3) to take stock and classify the different GHRM practices that have been addressed in previous literature. To achieve this good, we will first conceptualize what GHRM phenomenon is and its entailed characteristics and manifestations. Second, building on the Ability–Motivation–Opportunity theory, this paper will provide a unified body of knowledge on how organizations could improve economic and environmental performance through the increase of employees' environmental abilities, motivations and opportunities. Consequently, green human resource practices are grouped into the three dimensions of practices oriented toward improving employees' green abilities, practices improving employees' motivations to engage in environmental issues, and practices improving employees' opportunities to contribute to environmental sustainability. This general aim is addressed in chapter 2.

2. The aim of the second paper is to propose a conceptual framework that sheds light in how organizations address environmental problems. First, building on organizational learning literature, this paper considers two types of organizational learning (exploratory and exploitative learning) to propose that, at least, there are four different approaches which explain how environmental management could be integrated into business. Second, realizing the importance of HRM in environmental management, it is arguably a crucial step in advancing current knowledge to study the role of GHRM on environmental strategies. At this point, the goal is to propose specific green human resource practices that reinforce the different archetypes. This overall goal is tackled in chapter 3.
3. A third goal of this dissertation is to propose, develop and validate a measurement scale for EEO. We contend that a measurement instrument of EEO will be useful to sparkle business-level research on environmental entrepreneurship. The proposed measurement scale will help to advance theory and understanding of how and why firms behave in environmentally entrepreneurial way. To accomplish this overall aim, a multi-stage process is followed. First, we aim to obtain two different samples to carry out two separate analysis to confirm the correspondence between the definitions of EEO previously proposed and the operational procedure used to measure it (Schwab, 1980). Second, we explore the dimensions of the EEO scale and to guarantee that all items only loaded into their respective dimensions. To do so, an exploratory factor analysis will be carried out using SPSS software. Third, to confirm the factor structure of latent variables, we will perform confirmatory factor analysis using EQS. Finally, we will check for construct reliability, convergent and discriminant validity as well as

related criterion validity. To check the criterion validity out, the direct relationship between EEO scale and environmental performance and environmental management practices was explored using Structural Equation Modeling. Chapter 4 deals with this global aim.

4. A fourth goal of this Ph.D. dissertation is to study the relationships among EEO, GHRM and Eco-innovation. More specifically, the proposed model aims to explore the internal driving forces (EEO and GHRM) that support eco-innovations in organizations. To address this research objective, this paper aims to hypothesize the relationships aforementioned by bridging the literature on EEO, GHRM, and eco-innovation. Moreover, we test the hypothesis using Structural Equation Modeling using data obtained from a sample of 239 Spanish agri-food and ceramic firms. This objective is addressed in chapter 5.

6. STRUCTURE OF THIS THESIS

To achieve the proposed objectives, the present thesis is structured as follows.

First, an overview of GHRM is presented in chapter 2. This review summarizes the extant research in order to propose framework about how implement GHRM and the GHR practices that have been studied in the literature contributing to the Ability–Motivation–Opportunity theory. This chapter serves as an introduction of chapter 3 and 5.

Once the GHRM practices are known in chapter 2, chapter 3 proposes a theoretical framework of the different approaches that organizations could pursued to address environmental management. Moreover, this chapter propose how the environmental management archetypes could be

implemented and the green human resource practices that might contribute to economic and environmental benefits of each archetype.

Focusing on the entrepreneurial archetype studied in the previous chapter, chapter 3 propose a measurement scale for EEO. More specifically, chapter 3 section 2 provides a review, bringing together relevant literature of the main dimension of EEO which is currently fragmented across different related fields. Chapter 3 section 3 deal with the methodology to develop and validates the scale.

Once EEO scale is validated, chapter 4 analyses thoroughly the outcomes of EEO. More specifically, this chapter will deal with: 1) reviewing and extending the field of eco-innovation; 2) providing a conceptual framework that bridging the gap among EEO, GHRM and Eco-innovation literatures; 3) studies the empirically the relationship between EEO and GHRM; EEO and eco-innovation; GHRM and Eco-innovation as well as the mediation effect of GHRM between EEO and eco-innovation.

Finally, chapter 6 presents the conclusions, the potential future lines of research and the limitations of the thesis.

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CHAPTER 2: GREEN HUMAN RESOURCE MANAGEMENT¹

1. DEFINITIONS

During the 2000s, researchers realized the importance of studies of Green Human Resource Management (GHRM) as a topic at the intersection of corporate environmental sustainability and Human Resource Management (HRM) (e.g., Aiman-Smith et al., 2001; Albinger and Freeman, 2000; del Brío et al., 2007).

GHRM can be defined as a set of people-centered practices oriented toward developing and maintaining the workforce's abilities, motivation and opportunities to contribute to an organization's economic and environmental sustainability (e.g., Martínez-del-Río et al., 2012; Renwick et al., 2013). Therefore, it can be conceived as a set of best HRM practices oriented toward enhancing the overall environmental sustainability orientation of all of the functions and dimensions of an organization.

These best practices include green recruitment and selection, green education and training, rewards systems, appraisal and performance management, involvement, employee empowerment in environmental issues, green communication and green teamwork (Jabbour et al., 2010; Renwick et al., 2013).

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2. INTRODUCTION. THE LOGIC FORM IMPLEMENTING GHRM

Several studies have emphasized the importance of employee contributions to achieving environmentally sustainable production systems (e.g., Hart 1995; Jackson et al., 2011; Martínez-del-Río et al., 2012; Renwick et al., 2013; Russo and Fouts, 1997). Environmental sustainability requires the attraction and selection of employees motivated by environmental concerns.

Corporate environmental issues are typically complex, changing and multi-faceted. For instance, there is growing awareness of the implications of the extensive use of plastics in production systems for wildlife. A company producing food packaging that relies on plastics as the primary raw material might require complex knowledge related to product re-design and biodegradable new materials to adapt corporate processes to less-polluting raw materials. The problem is changing because, for a long time, plastics were regarded as a recyclable, more sustainable solution than other options (e.g., paper, glass). The new evidence requires adaptation from companies and employees. Finally, the problem is multi-faceted because microplastics entail implications for wildlife, but customers might also perceive microplastics to be in contact with food, endangering their personal health. To approach complex, changing and multi-faceted environmental issues, the ongoing training, motivation and retention of a talented workforce are necessary.

The primary and most evident rationale for implementing GHRM is to create a “green workforce that understands, appreciates, and practices green initiatives and maintains its green objectives all throughout the HRM process of recruiting, hiring, training, compensating, developing, and advancing the firms human capital” (Mathapati, 2013). In other words, the most evident goal is to create the most suitable human capital to obtain sustainability-related

competitive advantages such as green products or increased eco-efficiency. Therefore, GHRM may ultimately improve economic performance by generating competitive advantages related to environmental sustainability (e.g. del Brío et al., 2007; Carmona-Moreno et al., 2012; Martínez-del-Río et al., 2012).

Interestingly, there is another way in which GHRM may contribute to the firm's goals. Several studies are finding cumulative evidence suggesting that GHRM can be a useful tool to achieve the most general HRM goals of firms, such as enhancing overall employee motivation, attracting talented candidates and retaining most valuable employees. For instance, Turban and Greening (1997) and Jones et al. (2014) found that a green reputation effectively attracts most talented prospect employees, Delmas and Pekovic (2013) found that the adoption of environmental standards increases employee productivity. Therefore, GHRM may also improve economic performance by contributing to HRM-related competitive advantages such as superior human capital, employees' involvement and skills repertoire.

The objective of this book chapter is to explain what GHRM is, as well as to expose how this phenomenon can contribute to Sustainable Development Goal 12: Ensure sustainable consumption and production patterns.

3. HOW TO IMPLEMENT ENVIRONMENTAL SUSTAINABILITY: GHRM AS A BOTTOM-UP APPROACH

Moved by stakeholders (Sharma and Henriques, 2005) and institutional - e.g., regulatory- and competitive pressures (e.g., Bansal and Roth, 2000), increasing numbers of firms have explicitly introduced environmental sustainability into their values and mission statements. As a consequence, firms are increasingly setting sustainability as a strategic goal to later introduce sustainability to lower firm levels. This approach represents a “top-

down” perspective in which top management establishes sustainability as a strategic goal, and middle managers and employees must determine how to implement it.

Alternatively, environmental sustainability implementation can be approached as an emerging, bottom-up process (Dangelico, 2015). Eco-initiatives frequently emerge from creative ideas from bottom-line employees (Fernandez et al., 2003), and environmental strategies depend to a great extent on employees’ behavior, commitment, involvement and dedication (Daily et al., 2009). Effective environmental sustainability requires crucial contributions from HRM (Rothenberg, 2003; Govindarajulu and Daily, 2004).

The extant literature has stressed the influence of human factors on companies’ environmental policies. For example, Ramus and Steger (2000) assessed the relationships of environmental policy with supervisory support behaviors and employee environmental initiatives. Boiral (2009) emphasizes the role of environmental citizenship behaviors. Russo and Harrison (2005) studied the link between compensation systems and environmental results. In addition, it has frequently been argued that proactive environmental strategies are human resources-based (e.g., Hart, 1995; Aragon-Correa and Sharma, 2003).

In this sense, GHRM can be conceived as an approach to implementing environmental sustainability. GHRM practices are instrumental to generating a bottom-up and cross-functional process based on employee involvement and contributions through new ideas, common values and goals, the use of environment-related skills and knowledge, shared meanings, etc., which “spread up” through formal and informal daily interactions and decision making. By aligning practices such as training, selection, recruitment, rewards and performance evaluation toward environmental sustainability, GHRM

facilitates the process of the successful formulation and implementation of corporate environmental sustainability (Daily and Huang, 2001).

Dangelico (2015) recommended some initiatives based on GHRM to implement sustainability as a bottom-up process:

- Create a favorable business environment with high levels of environmental orientation and awareness;
- Provide employees with the appropriate training to improve environmental competences and awareness;
- Implement awards systems to praise and reward employees' environmental efforts and achievements; and
- Provide adequate support from top managers to employees in environmental challenges.

A bottom-up approach also emphasizes the importance of tacit knowledge in environmental sustainability. The environmental initiatives of employees not only come from explicit knowledge but also, most frequently, they rely on tacit knowledge (Boiral, 2002). Due to their physical proximity to the production processes, employees frequently hold valuable tacit knowledge about the production process that is not written in any procedure and is unknown by middle and top-management. Emphasizing the role of bottom-line employees facilitates the use of employees' tacit knowledge in the struggle to achieve environmental sustainability.

What hampers GHRM implementation processes? Yuriev et al. (2018) conducted a systematic literature review of the empirical studies addressing this question. The authors categorized the obstacles into organizational and individual. Organizational barriers include non-green corporate values, poor

communication, lack of management commitment and support regarding ecological issues and non-authentic pro-environmental goals. Individual barriers include environmental attitudes and values, lack of knowledge, social norms, perceptions of self-efficacy and time pressures. Most of the organizational barriers were proved not to influence intentions but actions, while individual barriers influenced staff intentions in going green.

4. GHRM PRACTICES

GHRM has a multidimensional nature and consists of diverse groups of best practices (Renwick et al., 2013; Tang et al., 2018). These best practices resemble the Ability–Motivation–Opportunity model (Appelbaum et al., 2000), suggesting that human resource practices enhance firm performance through increases in employees’ abilities, motivations and opportunities. Applied to GHRM, the logic is similar. The goal is to achieve environmental sustainability through increases in employees’ *abilities* (i.e., attracting and training employees with relevant environmental skills), *motivations* (i.e., rewarding employees for environmental achievements, performance appraisals including environmental issues) and *opportunities* (i.e., communication of environmental ideas, teamwork applied to environmental goals).

Table 1 illustrates most commonly used GHRM practices. This table does not intend to be exhaustive or exclude other HRM practices that can also be considered “green”.

Table 1. Summary of GHRM practices

Dimension	GHRM practices
Green recruitment and selection	<p>Using green employer branding to attract green employees (App et al., 2012)</p> <p>Improving organization's green reputation (Turban and Greening, 1996)</p> <p>Recruiting employees who have environmental awareness (del Brio et al., 2007)</p> <p>Including environmental aspects in job descriptions and candidate specifications (Renwick et al., 2013)</p> <p>Evaluating candidates' environmental knowledge, values and beliefs (Renwick et al., 2013)</p> <p>Displaying information about environmental activities in the recruitment process (Ehnert, 2009)</p> <p>Including information about environmental activities of the organization in recruitment websites (Ehnert, 2009)</p>
Green education and training	<p>Providing specific training to technical staff on issues such as more efficient technologies, new materials, recycling processes, waste treatment or process re-design.</p> <p>Developing training programs on broader, industry-specific environmental issues to enhance employees' awareness of the environmental impact of their organization's activities (Bansal and Roth, 2000; Ramus, 2001)</p> <p>Developing training programs which provides the necessary knowledge to develop preventive solutions (Tang et al., 2018)</p> <p>Implementing experiential practices with educational purpose, such as employee gardens (Jackson and Seo, 2010)</p>
Pay and reward systems	<p>Implementing economic incentives related to the achievement of environmental objectives.</p> <p>Recognition-based rewards for environmental initiatives such as merit certificates, recognition in the organization's newsletter or the greening monthly award (Ramus, 2001).</p> <p>Including non-monetary rewards such as paid vacations, time off and gift certificates (Govindarajulu and Daily, 2004).</p> <p>Providing financial or tax incentives for environmental initiatives, for instance, bicycle loans, use of less polluting cars (Tang et al., 2018).</p> <p>Offering green benefits (transport/travel) in preference to give out pre-paid cards to purchase green products (Tang et al., 2018).</p>
Green appraisal and performance management	<p>Using green performance indicators in PM system and appraisals (Zibarras and Coan, 2015).</p> <p>Setting green goals and responsibilities for managers and employees (Milliman and Clair, 1996).</p> <p>Evaluating green outcomes of managers and employees (Tang et al., 2018).</p> <p>Providing employees with constructive feedback about environmental issues (Jabbour et al., 2010).</p>
Green communication	<p>Implementing environmental information and idea sharing program (Spreitzer et al., 2005).</p> <p>Implementing a communication policy with several formal or informal communication channels (Renwick et al., 2013).</p> <p>Promoting a participatory and open-style communication for employees (Ramus, 2001)</p> <p>Using environmental reports or newsletters to get employees informed about environmental priorities and goals of organization (Ketokivi and Castaner, 2004)</p>
Green teams	<p>Using cross-functional teams to address environmental issues or crises (Denton, 1999).</p> <p>Including environmentally aware staff in new product development and quality teams.</p> <p>Using functional teams to implement environmental plans and strategies (Govindarajulu and Daily, 2004).</p>
Empowerment and supportive managerial behaviors	<p>Fostering employee participation in environmental management (Remmen and Lorentzen, 2000)</p> <p>Extensive support from managers to employees in environmental issues (Ramus and Steger, 2000)</p> <p>Setting out a clear environmental vision (Harris and Crane, 2002)</p>

In the following sections, we explain in-detail the most common practices of GHRM.

4.1 Practices oriented toward improving employees' green abilities

4.1.1 Green recruitment and selection

To manage the challenges associated with the natural environment, organizations should attract, recruit and select people intrinsically motivated to display pro-environmental behaviors (Jabbour and Santos, 2008), particularly high-quality recruits. Employees with greater environmental awareness will be more willing to apply their environmental knowledge in the operational process, in turn improving the environmental performance of their organizations (e.g., del Brio et al., 2007). Moreover, it is necessary to have employees who are willing to become involved and to volunteer in environmental management activities. Selection is crucial to selecting employees with environmental knowledge and training them to fit the organization's environment and culture (Vlachos, 2009). In the selection process, interviews and evaluations to draw out candidates' environmental knowledge, values and beliefs should be conducted to ensure that the candidates are fit for the job. Job descriptions and candidate specifications that reflect the environmental aspects of the job have been identified in the literature as useful to recruiting employees with environmental knowledge and values (Rewick et al., 2013).

Conversely, job seekers can be attracted by a firm's environmental reputation. Prospective employees can perceive a strong environmental stance from a firm as a signal of the firm's future behavior (Turban and Greening, 1996; Jones et al., 2014). Accordingly, organizations are using "green employer branding" (App et al., 2012) and are displaying information about environmental activities during the recruitment process to enhance their

attractiveness to the most conscious and aware candidates (Ehnert, 2009). In this vein, an organization's green reputation is crucial to attracting job seekers who identify with organization's values. Willness and Jones (2013) suggested that signaling-based mechanisms should be used during the recruitment process. Job seekers thus can: (1) perceive that their own environmental values and the firm's values are strongly fitted; (2) consider information regarding the organization's environmental and social performance as a signal of the future relationship between employer and employees; and (3) feel a sense of pride in working for a firm with a green reputation (Willness and Jones, 2013; Zibarras and Coan, 2015).

4.1.2 Green education and training

Extensive employee training on environmental issues has a significant effect on overall environmental sustainability (e.g., Ramus, 2001). Green education and training programs enhance employee awareness of the environmental impact of their organizations' activities (Bansal and Roth 2000). Training involves employees intellectually and emotionally in environmental issues and informs them about possible solutions to current problems (Fernández et al., 2003). Environmentally aware employees are more likely to suggest ideas and initiatives to preserve the environment, such as methods for recycling and reusing waste, solutions for environmental problems, or identification of pollution sources (Sammalisto and Brorson, 2008). Employee-enhanced environmental awareness also facilitates a mass-critique of employees embracing top-management plans and goals about environmental sustainability and decreases resistance to change regarding environmental issues.

In addition to increasing employee awareness, green training programs can also improve employees' specific knowledge and skills regarding

environmental activities (Tang et al., 2018). Firms' environmental initiatives demand new practices and knowledge. Environmental management activities are usually complex and require specific skills that can only be acquired through specific training.

Several theories can facilitate understanding of the effect of training. Reinforcement theory proposes that training provides a positive outcome if training programs are aligned with organizational goals (Skinner, 2014). Careful planning of any environmental training program is of paramount importance to attaining relevant environmental goals. Although training programs should be tailored in accordance to firm specificities, training should be cross-functional to increase employees' overall environmental awareness and should include topics such as new technologies, new materials, product and process redesign, environmental life-cycle assessment, environmental goal setting, waste monitoring and so on.

Social learning theory suggests that employees learn in a social context. New skills and behaviors can also be learned by observing and imitating others (Ismail, 2017). Therefore, awareness and knowledge can become more widespread among employees through social interactions. Employees can informally learn from their colleagues with environmental expertise in contexts with a positive "green work climate" (Tang et al., 2018). In this sense, voluntary participation in environmental programs could complement formal training to improve environmental skills and the employees' motivations (e.g., Todd, 2010). Jackson and Seo (2010) emphasized the relevance of experiential practices. For instance, organizations such as Google and Intel have established employee gardens on company facilities, where employees can help in growing the gardens and even organic vegetables, which are later used as food in company cafeterias and restaurants. These

initiatives can be introduced with educational purposes to help employees learn environmental sustainability informal.

4.2 Practices oriented toward improving employees' motivations to engage in environmental issues

4.2.1 Pay and reward systems

Reward systems are widely seen in the literature as a catalyst in motivating employees and increasing their commitment with environmental tasks, processes and objectives (Patton and Daley, 1998; Govindarajulu and Daily, 2004). The aim of a reward system is to attract, retain and motivate employees to achieve environmental goals (Renwick et al., 2013). In fact, Jackson and Seo (2010) suggested that rewards and incentives could be the most powerful way of aligning organizational environmental goals with employees' self-interest goals among all the of practices that constitute the human resource system up. Monetary (e.g., incentives and bonuses) and non-monetary (e.g., recognition and praise) rewards have been found to favor job satisfaction and work motivation (Lawler, 1973). Researchers have suggested that a combination of both monetary and non-monetary rewards would be more effective in motivating employees (Renwick et al. 2013). Berrone and Gómez-Mejía (2009) found empirical evidence that environmental performance is positively associated with CEO long-term pay. Along the same line, Cordeiro and Sarkis (2008) found that top executive compensation was positively related to environmental performance only in firms with an explicit linkage between environmental performance and top executive compensation.

Regarding non-financial rewards, Ramus (2001) revealed that recognition and praise of environmental initiatives are essential to supporting

eco-innovation and increasing the commitment to environmental policies. Recognition in the organization's newsletter, public cheering of employees' environmental initiatives, and giving merit certificates to individuals and teams, among other measures, are frequently effective in motivating employees (Enander and Panullo, 1990). Govindarajulu and Daily (2004) included paid vacations, time off and gift certificates among non-monetary environmental rewards.

All in all, organizations should compensate employees who contribute to improvements in environmental sustainability to align corporate and employees' objectives. Contributions in areas such as waste reduction and recycling or lowering the environmental impact of processes and products are the usual suspects to be recognized, awarded or compensated by firms to reduce the environmental impact of their activities.

4.2.2 Green appraisal and performance management

The goal of green appraisal and performance management (PM) is to analyze and evaluate employees' performance linked to their tasks and responsibilities by comparing goals and outcomes (Ivancevich, 1995). Using PM for environmental issues provides employees with valuable and constructive feedback about their contributions to environmental sustainability. Feedback can be useful in preventing undesirable attitudes and reinforcing exemplary behavior (Jabbour et al., 2010). Moreover, Jackson (2012) claimed that green appraisal must be dynamic and include new goals and challenges, instead of being stuck in the same green behaviors and skills.

Although PM has been found to be beneficial for firms (e.g., Berrone and Gomez-Mejía, 2009; Russo and Fouts, 1997), it also entails some challenges (Renwick et al., 2013). In particular, it can be complex to set goals

and to gather useful data to measure environmental performance across different departments. Organizational units and functional areas might have environmental risks and goals of a different nature, and collecting objective data about these goals and risks is frequently costly and complex. For this reason, most firms limit green appraisals and PM to plant or division managers and executives (Milliman and Clair, 1996).

A green appraisal and PM system requires setting green goals for all employees, creating green performance indicators, evaluating and analyzing employees' green outcomes, and using dis-benefits (Tang et al., 2018). First, setting green goals for all employees means putting environmental objectives into an action plan for all of the firm's members. Second, the creation of green performance indicators refers to setting green standards and criteria according to employees' incumbencies. These indicators must be clear so that employees know what is expected of them and allow them to focus their efforts on the goals. Third, the evaluation of green outcomes is aimed at comparing the pre-established objectives with the results. Finally, the term "dis-benefit" refers to a negative measure aimed at addressing employees' green goals not being achieved. Dis-benefits are powerful tools to have employees finally meet their green goals (Tang et al., 2018).

Although green performance appraisal is used to motivate, employees might experience the opposite effect if the feedback is overly negative. A good example appears in Chan and Hawkins' (2010) study. Employees working in Hong Kong hotels with an environmental system reported being "repeatedly reminded" and "scolded" when they did not fully implement environmental practices. Overly negative feedback can result in employees engaging in self-protective attitudes and not revealing environmental problems (Renwick et al., 2013).

4.3 Practices oriented toward increasing employees' opportunities to contribute to environmental sustainability

Employees' green involvement is fundamental to identifying potential green opportunities (e.g., Renwick et al., 2013) and improving the most important outcomes of environmental sustainability (e.g., del Brio et al., 2007).

4.3.1 Green Communication

The importance of environmental information-sharing programs has been suggested by several researchers (e.g., Anderson and Bateman, 2000; Ramus and Steger, 2000; Rothenberg, 2003). Green communication aims to create a green work culture within organizations that can be extended among employees encouraging green behaviors and awareness. Through formal and informal communication channels, employees can be well informed about environmental issues in their workplaces (Tang et al., 2018), motivating them to participate in environmental sustainability. Ramus and Steger (2000) revealed that organizational support, in the form of a well-communicated environmental policy, was positively related to employees' willingness to promote eco-initiatives. Employees should know the priorities and goals of the organization to support organizational integration (Ketokivi and Castaner, 2004) through newsletters or environmental reports. Moreover, employee interactions (e.g., environmental information sharing program) are directly linked to innovations (Spreitzer et al., 2005).

Informal communication channels are particularly useful for progress in environmental sustainability. Informal conversations that arise unexpectedly among members of organizations without following official procedures, motivated by the need to communicate, allow employees to attain

additional information, which is not written, for example, in newsletters or reports (Anderson and Bateman, 2000). Open style communication “in an honest and unrestrained manner” (Ramus 2001, p 94) generates and spreads tacit knowledge among organization members. Boiral (2002) highlighted the relevance of employees’ tacit knowledge in identifying pollution sources, managing emergency situations and developing preventive solutions.

4.3.2 Green teams

Green teams are “groups of employees helping to identify and implement specific improvements to help their business operate in a more environmentally sustainable fashion” (Bray 2008, p 10). These teams can be created voluntarily or involuntarily. Firms typically create these teams as a means to assure the implementation of a specific environmental program or strategy or to solve an environmental problem (Laabs, 1992). Green teams positively affect firm environmental performance and reputation and are particularly useful to integrating environmental sustainability into corporate strategy (Dangelico, 2015).

Most green projects require a large number of diverse individual skills and competences (Rothenberg, 2003). Cross-functional teams (i.e., comprised of employees from more than one organizational area) are appropriate for managing complex and interdisciplinary environmental issues (Denton, 1999). However, functional teams (i.e., comprised of employees from a single organizational area) can also be useful for implementing, functional-area specific environmental practices, especially when cooperative work is necessary, and the teams are composed of people at several hierarchical levels who perform several different functions (Govindarajulu and Daily, 2004).

4.3.2 Empowerment and supportive managerial behaviors

Engagement from both top managers and employees is essential to support the success of environmental management (Renwick et al., 2013). When targeting environmental sustainability not only is necessary the initiative but also the involvement of all employees (Denton, 1999). Management commitment powerfully fosters employee empowerment (Kitazawa and Sarkis, 2000). Consequently, it is important not to restrict participation in environmental sustainability to managers and specialists in environmental management (Remmen and Lorentzen, 2000). As employees are given opportunities to participate in environmental management, they are encouraged to prevent pollution and identify environmental opportunities (del Brio et al., 2007; Tang et al., 2018). To stimulate employees to become involved in environmental issues, it would be particularly useful to provide employees with opportunities, such as engaging in environmental quality improvement and environmental problem solving in the production process (Tang et al., 2018). A change in mindset that leads to a feeling of psychological empowerment could increase the employee's willingness to come up with suggestions for increasing environmental performance (Kitazawa and Sarkis, 2000). Indeed, supportive managerial behavior such as communication, rewarding and competence building is important in achieving employee engagement and empowerment. Moreover, supportive behavior is strongly related to innovative environmental activities and eco-innovations (Ramus and Steger, 2000; Ramus, 2001)

A clear environmental vision that sets out environmental values not only will support environmental management in developing an environmental culture in the workplace but will also provide guidance and support to employees involved in environmental issues (Harris and Crane, 2002;

Renwick et al., 2013). The literature has so far identified some practices that companies can implement to involve employees in environmental initiatives: the use of videoconferencing; car-sharing and home-working; low carbon champions; recycling schemes; green communication and green action teams; and problem-solving groups (Renwick et al., 2013).

5. ALIGNMENT AMONG GHRM PRACTICES

The practices described above reinforce each other and produce synergy when they are coherent and aligned with an overall pro-environmental corporate and HRM strategy (Jackson and Seo, 2010; Martinez-del-Río et al., 2013). Long-term progress in corporate environmental sustainability largely depends on making full use of training, teamwork, the appraising of environmental goals, non-financial rewards, and organizational cultures (Jabbour et al., 2008). The impact of each practice is greater when the others are also implemented because of interdependence and reinforcement (Renwick et al., 2013).

The coherent and complementary use of GHRM practices disseminates an environmental vision that is shared by top management and employees. The existence of a common vision, mental models, and shared meanings facilitates coordination and creates a sense of common purpose among employees. This pro-environmental common purpose promotes collective responses that are consistent with organizational strategic pro-environmental goals (Martinez-del-Río et al., 2013). GHRM practices clearly transmit the idea to the employees that environmental sustainability is relevant.

In contrast, misaligned practices could work against each other (Schuler and Jackson, 1987). Developing a coherent system of GHRM practices is complex and costly, and “organizations are not using the full range of GHRM

practices and this may limit their effectiveness in efforts to improve Environmental Management” (Renwick et al., 2013, p 1).

Therefore, GHRM must be approached with a comprehensive and integrative perspective. The careful design and implementation of a *system* of GHRM practices, in which all of the dimensions, functions and practices are considered, are particularly important.

6. THE ROLE OF GHRM IN SUSTAINABLE DEVELOPMENT GOALS

Studies of sustainability and HRM arose to meet the challenge of sustainable development. The Brundtland Commission presented a commonly used definition of sustainable development: “...development, which meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987; p 43). As a consequence, Schaefer et al., (2015) pointed out that the change toward sustainable development must be transformational, involving a “fundamental change in society’s culture and collective consciousness that enables the creation of new collective beliefs and values”.

Elkington (1997) proposed the concept of the Triple Bottom Line of 21st Century Business. The author suggested a responsible approach to businesses for sustainable development, in which businesses should consider the social, environmental and economic dimensions. A new paradigm in which new values are introduced focuses on the promotion of social and environmental performance (Elkington 2004). The nascent stream of GHRM research emerged in opposition to traditional HRM to address the concerns of the environmental dimension.

With the objective of adopting the transformative 2030 Agenda for Sustainable Development, the UN General Assembly established in 2015 a set of 17 SDGs and 169 associated targets (UN 2017). The UN SDGs are aimed at operationalizing the vision of sustainable development and establishing areas of action. This action-based plan consists of bold and transformative steps based on a collaborative multinational and multistakeholder participatory process. The 17 SDGs address important unsustainability global problems with desirable outcomes in which nations and companies can contribute. Accordingly, the role of companies in achieving sustainable development is explicitly mentioned in some SDGs (e.g., SDG12, SDG16 and SDG17). In particular, SDG12 Responsible Consumption and Production in target 12.6 calls for “especially large and transnational companies, to adopt sustainable practice and to integrate sustainability information in their reporting cycle” (UN 2017, p. 16). New research streams have arisen with the objective of addressing sustainable development within companies (see the following chapters: “Sustainable Business Models”; “Green Entrepreneurship”; “Innovation Systems for Sustainability”; “Sustainable Business Strategies”; “Sustainable Supply Chain Management”).

The role of HRM in resolving such sustainable challenges has been increasingly acknowledged in the literature (e.g., Ehnert, 2009). There is an emerging consensus that employees will play an important role in the path toward sustainability because they know the products and processes best. Therefore, employees can also be considered agents of change. In comparison to traditional HRM, GHRM sheds new light on sustainable development because it integrates environmental management into all of the dimensions, functions and practices of HRM. Through the alignment of human resources practices with environmental objectives, employees can assist in the

implementation of more sustainable production processes and in the development of more sustainable products, in turn contributing to SDG 12: Ensure sustainable consumption and production patterns.

7. FINAL REMARKS

In this chapter, we have defined and explained what GHRM is and the main reasons for its implementation, outlined the main practices that comprise HRM, and presented GHRM as a bottom-up approach to implement environmental sustainability.

Environmentally sustainable development is currently one of the most relevant challenges worldwide. Given the current situation, organizations must strive to determine strategies to advance towards more sustainable production systems. Although the changes are way insufficient so far, firms are beginning to transition from purely exploitative mindsets to increasingly sustainable approaches. As has been previously explained, GHRM has a critical role in this process as a necessary tool to make sustainability more human.

To successfully implement environmentally sustainable production processes, scholars and practitioners need to embrace that organizations are composed by people. Human beings are driven by their emotions, their incentives, their life and career aspirations, their identities, their contexts and their relationships. GHRM is a tool to include human beings in sustainability and, consequently, it is a means to assure in a greater extent that sustainability goals are achieved.

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CHAPTER 3: TOWARDS AN AMBIDEXTROUS APPROACH TO ENVIRONMENTAL MANAGEMENT

ABSTRACT

This paper aims to develop a conceptual framework that explains how organizations address environmental sustainability. We integrate perspectives of organizational learning and ambidexterity to propose different archetypes of environmental strategies. Taking into consideration exploration and exploitation dimension, the archetypes proposed are environmental laggards, cooperative, entrepreneurial and ambidextrous approach. To manage the archetypes, we propose that each archetype necessitates a set of best and well-defined Human Resource (HR) practices oriented towards the environmental strategic goals. We thus suggest propositions about how specific HR practices to each archetype and to contribute to greater economic and environmental benefits. Finally, we conclude with a discussion of implications for research.

Keywords:

Environmental Management; Strategy; Environmental Practices; archetypes; Exploration; Exploitation; Ambidexterity; Green Human Resource Management

1. INTRODUCTION

The direct impact of firms' activities on the environment, causing environmental degradation and climate change, and the ever increasing institutional and stakeholders pressures have caused that organizations pay growing attention to environmental issues (Weinhofer and Hoffmann, 2010). The literature on environmental sustainability assumes that environmental strategies consist on the implementation of a number of best practices or initiatives (e.g. Aragón-Correa and Sharma, 2003; Bansal and Roth, 2000) that companies apply in some extent. To reduce the environmental impact, organizations adopt environmental strategies that are typically classified from reactive to proactive (e.g. Roome, 1992; Aragón-Correa, 1998) or as subsequent steps from pollution prevention to sustainable development (e.g. Sharma, 2000; Hart, 1995).

In this sense, current literature seems to assume that environmental strategies are essentially homogeneous and there is little variation in their nature. However, there is scarce empirical evidence about the unidimensionality of environmental strategies and when studies include several practices into a measure of environmental strategy, results tend to show more than one dimension (e.g. Aragón-Correa, 1998; Martínez-del-Río and Céspedes-Lorente, 2014).

In addition, there seems to be a theoretical tension in the previous literature about the content of environmental strategies. On the one hand, authors describe environmental strategies as pollution prevention approaches (e.g. Hart, 1995) that aim to achieve incremental resource and operational efficiency gains (Boiral, 2002; Kitazawa and Sarkis, 2000; Russo and Fouts, 1997). This approach seems to rely on procedures and

practices that require highly formalized and specific components knowledge.

On the other hand, environmental strategies may also emphasize radical product and process innovation (Aragón-Correa, 1998; Aragón-Correa and Sharma, 2003; Russo and Fouts, 1997) or business model innovation (Bohnsak et al., 2014; Schaltegger and Wagner, 2011) that change market structures. These initiatives require creative problem-solving and knowledge integration, are typically much less formalized and rely on architectural knowledge that is typically non-written anywhere and dispersed over the organization.

As a first goal of this paper, we draw on organizational learning literature to argue that at least two different environmental management archetypes may coexist. We define and describe an entrepreneurial archetype based on the search for radical environmental innovations and business models. This archetype requires exploratory learning, architectural knowledge and creative excellence. We also describe a cooperative archetype based on the search for eco-efficiency, incremental environmental improvements and waste reduction. The cooperative archetype relies on exploitative learning, components knowledge and operational excellence.

A second goal of this paper consists of developing theory about how to implement these two archetypes and the role of human resources on it. A growing number of authors emphasize that the success of environmental strategies depends to some extent to employees' behavior, commitment, involvement and dedication (Milliman, 2013; Daily, et al., 2009).

HRM scholars have only recently begun to consider how HRM systems might contribute to the environmental performance of firms

(Carmona-Moreno et al., 2012; Jackson and Seo, 2010; Jackson et al., 2011; Martínez-del-Río et al., 2012; Ones and Dilchert, 2012; Renwick, et al., 2013) and there is a lack of theoretical development on how HRM systems intertwine with environmental practices to contribute to a better environmental and economic performance. In addition, empirical evidence regarding the relationship between HR practices and environmental management has been relatively scarce (but see López-Cabrales and Valle-Cabrera, 2019; Martínez-del-Río, et al., 2012).

Given that there is a widespread assumption in strategic HRM that organizations must strive to align HR practices with its strategic goals (e.g. Schuler and Jackson, 1987; Lundy and Cowling, 1996), organizations should implement different bundles of HR practices depending on the strategic goal these organizations are pursuing. Specifically, organizations should implement different approaches to HRM and bundles of practices, depending on their environmental strategy and goals. However, to our best knowledge, there is a lack of theoretical development in this point. Current literature has not sufficiently described possible HRM approaches to environmental sustainability, and has overlooked to provide guidance about which HR practices would configure such approaches.

2. THEORY AND PROPOSITIONS

2.1 Organizational learning

Organizational learning is a multilevel phenomenon that provides the necessary understanding about how a firm can adapt to market requirements and changes (Huber, 1991; Levitt and March, 1988). While organizations adjust to changing environments, they develop the capacity to learn over time changing their knowledge or behavior (Fiol and Liles 1985; Meyer, 1982)

March (1991) suggested two different modes of organizational learning: exploration and exploitation. Exploratory learning “involves the search for *new* organizational routines and the discovery of new approaches to technologies, businesses, processes or products” (McGrath, 2001). Exploration consists of the pursuit of brand new knowledge (Vermeulen and Barkema, 2001). Exploratory learning is predominantly based on tacit, non-written knowledge that it is not available in books, databases, procedures or files (March, 1991). In addition, it refers mostly to systemic knowledge because it pursues changes (e.g. new technologies, business models and so on) that affect the entire organization as a system (McGrath, 2001; March, 1991).

Exploitative learning involves going in depth and refining or cultivating the current knowledge (Vermeulen and Barkema, 2001). It results in incremental innovations such as *better*, more efficient processes and products and in improvements in current technologies or organizational systems (He and Wong, 2004; Dewar and Dutton, 1986). It is based on explicit knowledge as it is written and codified and is more specific to resources, skills and technologies (McGrath, 2001; March, 1991). Exploitative learning is related to identifiable parts of an organizational system, instead of referring to the organization as a whole (Katila and Ahuja, 2002; McGrath, 2001; March, 1991).

In terms of value creation, exploitative learning carries moderate benefits and expected and more predictable costs (Kang et al., 2007). Conversely, exploratory learning carries higher, less predictable costs of experimentation but also greater potential benefits (McGrath, 2001). Hence, exploratory learning could be a double-edged sword. It would dramatically improve firm performance because it provides the flexibility to adapt to unpredictable changes (March, 1991). However, it might also be completely

unsuccessful, as it entails risky activities with few guarantees of success (Kang et al. 2007).

Conversely, returns from exploitation activities are systematically more certain, as it involves a continuous improvement. However, it confers less flexibility and ability to adapt to external (i.e. regulatory, economic, competitive, institutional) changes (Schulz, 2001).

Both exploitative and explorative learning are valuable sources of knowledge production (Schulz, 2001). The knowledge acquired from exploitative learning is more routine and incremental, while the knowledge obtained from explorative learning is more diverse and unsettled (Schulz, 2001; Dewar and Dutton, 1986). In this context, it has been argued that shared knowledge facilitates organizational learning (Kang et al., 2007). The literature has identified two forms of shared knowledge: architectural and component knowledge (Henderson and Clark, 1990). Next section presents both forms of shared knowledge linked to exploitative and exploratory learning.

2.2 Shared knowledge and organizational learning

2.2.1 Exploratory learning and architectural knowledge.

Architectural knowledge is holistic and systemic, as it refers to the organization as a whole or system. Such knowledge is based on complex, intangible and tacit routines that apply everyday component knowledge owned by the organization. Moreover, those tacit routines help to generate new architectural knowledge as well as component knowledge (Henderson and Cockburn, 1994; Matusik and Hill, 1998; McCaughey, 2002). Likewise, it is dispersed within the organization and evolves over time (Matusik and Hill, 1998; Nelson and Winter, 1982; Reed and DeFilippi, 1990; Tallman et al., 2004). Architectural knowledge is, to a great extent,

specific of each organization (diverse) and, for that reason, it may present causal ambiguity and process dependencies (unsettled) (Henderson and Clark, 1990).

Architectural knowledge helps employees to pursue exploitative learning (Kang et al., 2007). This is due to the fact that architectural knowledge allows employees to understand and interpret larger pictures of knowledge as well as complex, unexpressed and not articulate knowledge (Kogut and Zander, 1992; King and Ranft, 2001).

2.2.2 Exploitative learning and component knowledge.

Component knowledge encompasses specific knowledge about resources, abilities and technologies (Henderson and Cockburn, 1994; Matusik and Hill, 1998). These resources, abilities and technologies are typically related to identifiable parts of an organizational system rather than being related to the organization as a whole. It is subject to discovery rather than creation by organizations (Tallman et al., 2004). Such knowledge is relatively explicit and it is linked to the specific technology of an industry (McCaughey, 2002). Therefore, it can be more easily replicated, transmitted and copied.

Component knowledge helps employees to pursue exploratory learning (Kang et al., 2007). This is due to the fact that component knowledge allows employees to better understand and interpret novel knowledge than if they had not previously acquired component knowledge (Kang et al., 2007; Lane and Lubatkin, 1998).

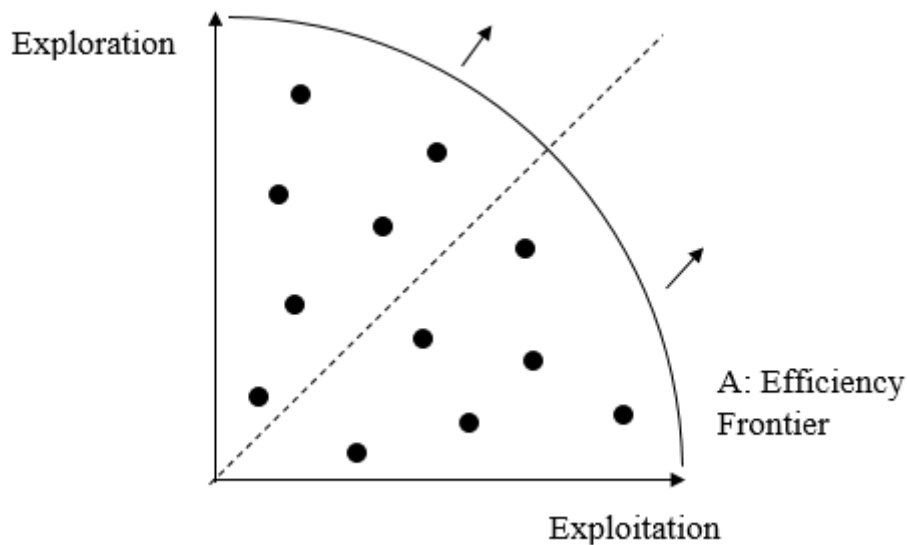
2.3 An ambidexterity perspective to environmental strategies

Although it has been argued that exploitation and exploration are mutually incompatible as they represent independent self-reinforcing patterns of learning (March, 1991), the literature on organizational

ambidexterity underscore that it does not mean that it is impossible to overcome these patterns (Birkinshaw and Gupta, 2013). Their argument, in a nutshell, is that it is very difficult to adopt successfully both patterns of learning at the same time but not impossible because different organizational configurations are required to successfully implement these patterns. This is where the concept of ambidexterity takes part. “Ambidexterity is an organization’s capacity to address two organizationally incompatible objectives equally well” (Birkinshaw and Gupta, 2013: 291). However, it is very difficult to adopt successfully both exploration and exploitation patterns of learning.

As it seems unlikely that firms can achieve the highest level of both different and competing objectives at the same time, some scholars deduced that it might be applied the same logic as the efficiency frontier of Porter (1996) (Birkinshaw and Gupta, 2013; Boumgarden et al., 2012). Figure 1 shows how firms can adopt different approaches to manage ambidexterity, namely, the decision of allocate resources to exploration, exploitation or both at the same time.

Figure 1. Approaches to managing ambidexterity

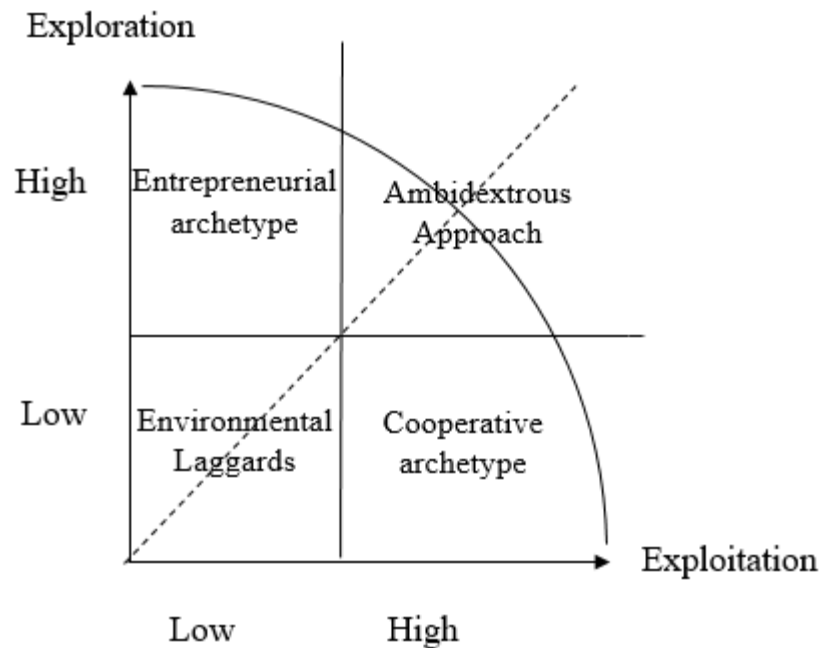


Source: Birkinshaw and Gupta, 2013 (p. 295)

We argue that it is an efficiency frontier as well as environmental value frontier where firms are likely to sit, in what approach is the firm situated, exploration, exploitation or both at the same time. The challenge is not necessarily to find equilibrium between the exploration and exploitation dimension (the dashed line) without considering the efficiency frontier. The key is how to get close to the efficiency frontier on the exploration or exploitation side following cooperative or entrepreneurial archetype and how to push the efficiency frontier to the right and up (Birkinshaw and Gupta, 2013).

Under this framework, Figure 2 propose four different approaches of environmental strategic positioning.

Figure 2. Approaches to environmental strategies.



At one extreme, we can find organizations that pursue an environmental ambidextrous approach. A high level of environmental exploration as well as environmental exploitation characterizes organizations seeking this approach. Organizations are engaged in environmental exploration of new potential actions and the environmental exploitation of current possibilities. Under this archetype, organizations strive to develop mechanisms and formulas that ensure an equilibrium or balance between a long-term and short-term orientation. This orientation really is the ultimate goal of sustainable development which focus on the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987 p. 29). Although this approach is really hard to achieve as two competing objectives are pursued, it characterizes companies that really pursue environmental sustainability. However, in practice, there are organizations that are more ambidextrous than others (Birkinshaw and Gupta, 2013). Due to it is particularly hard to maintain high balance between environmental

exploration and environmental exploitation, it has been argued that organizations change intentionally their position on the efficiency frontier in order to prevent not to remain in one dimension in the pursuit to be ambidextrous (Gulati and Puraman, 2009). Over time and learning from experience, organizations might learn how to find a balance between the allocation of resources to environmental exploration and exploitation (March, 1991) and, thus, achieving the ambidextrous approach.

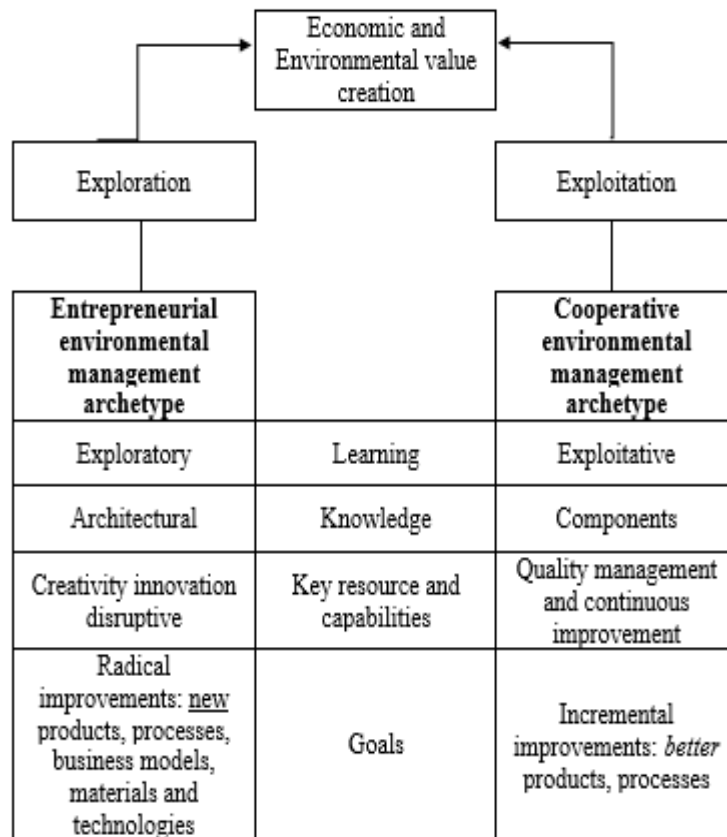
At the other extreme, the environmental laggards approach are characterized by a reactive posture (e.g. Roome, 1992; Aragón-Correa, 1998; Aragón-Correa and Sharma, 2003). Organizations, under this archetype, have no intention to invest in environmental exploration or exploitation activities that reduce the environmental impact of their activities. These organizations are characterized by the lack of an environmental competitive strategy reacting to environmental market changes to maintain their position (Dunphy et al., 2007). An absence of environmental concerns leads organizations not to improve the environmental existing competences or technologies (low level of exploitation) as well as not to experiment with new environmental alternatives such as completely new environmental products (low level of exploration). This approach reflects the refusal to the environmental management and a posture of non-responsiveness with regard to environmental issues (Dunphy et al., 2007).

Entrepreneurial environmental management archetype (high exploration-low exploitation) aims to develop *new* and innovative products, processes, and markets to anticipate competition's initiatives and technological, regulatory and societal changes. The entrepreneurial archetype relies on exploratory learning. Hence, non-routine tasks, associated to creativity and product and process innovation (Adler, 1999) may better contribute to firm competitiveness and survival under an

entrepreneurial archetype (Schaltegger and Wagner, 2011). The rationale consists of applying new technologies and approaches to existing and upcoming environmental challenges or to develop innovative business models to make a profit out of environmental demands. Tesla Motors and Patagonia INC could be good examples of entrepreneurial environmental management primarily consisting in the exploration of new technologies and business models to change the *status quo* and solve environmental challenges (e.g. Schaltegger and Wagner, 2011; Casadesus-Masanell et al., 2009). This archetype relies heavily on architectural knowledge. This knowledge provides employees with the ability to understand large amount of knowledge that is typically complicated, unexpressed and difficult to conceptualize (Kang et al., 2007; Hill and Levenhagen, 1995).

Cooperative environmental management archetype (low exploration-high exploitation) attempt to develop incremental environmental improvements in already existing products, routines and processes such as the substitution of hazardous and polluting materials, reducing resource consumption and waste during productions or product usage or others ways to reduce environmental degradation (Borel-Saladin and Turok, 2013; Young and Tilley, 2006). The cooperative archetype is predominantly based on exploitative learning. Therefore, frequently relies on goal setting, records, measurements and formal evaluations and can be found in written procedures, and environmental management systems. This archetype depends to a great extent on component knowledge. This knowledge provides employees the necessary understanding about specific resources, abilities and technologies of a specific industry (Kang et al., 2007; McCaughey, 2002).

Figure 3. Characteristics of the entrepreneurial and cooperative archetypes



3. IMPLEMENTING AND MANAGING THE HRM ARCHITECTURE OF THE ARCHETYPES

3.1. Archetype implementation

Although both archetypes require top-management commitment with environmental issues, we contend that in the entrepreneurial archetype there is an explicit conscious decision of the founders to explore novel technologies and markets to create environmental and economic value. The agency role of the entrepreneurs requires the managerial intention of investing precious resources on exploring new business models or technological avenues to challenge current environmental problems (York

and Venkataraman, 2010; Lenox and York, 2011). Therefore, the genesis of the entrepreneurial archetype necessarily requires a specific managerial intention and investment to pursue architectural knowledge about a specific system or technology. For example, the vision of the founders of Tesla Motors was “to accelerate the advent of sustainable transport” and subsequent long-term decisions and strategies derive from that vision. This initial decision can be hardly affected by lower level employees’ initiatives and ideas. In this sense, the entrepreneurial archetype is related to the companies’ *raison d’être*. Therefore, we suggest that the entrepreneurial environmental management archetype will be predominantly implemented top-down.

Conversely, the cooperative environmental management archetype depends on middle managers and lower level employees in a greater extent. Since it is predominantly based on component knowledge, initiatives and incremental environmental innovations come more frequently from employees at lower hierarchical levels (Ramus, 2001). This is, in part, due to the fact that employees are closer to the operations. For that reason, low and middle managers are frequently more knowledgeable of routine-based specific component knowledge than top management. Lower level employees are more capable to understand the shortcomings of the production processes and technologies. In this sense, it will be more likely that lower level employees come up with suggestions or ideas and take initiatives to refine and improve existing products and processes. Therefore, their role is more relevant under the cooperative archetype so that this archetype will be predominantly implemented bottom-up.

Pl1a: The entrepreneurial environmental management archetype will more frequently be implemented top-down.

P1b: The cooperative environmental management archetype will more frequently be implemented bottom-up.

In both archetypes, the employees' collaborative behavior and initiatives are of paramount importance. Thus, to be effective, any environmental strategies needs an active participation of employees as a source of opportunities and innovations as pointed out by Ramus (2002). Employee' involvement was conceptualized as "a participative process to use the entire capacity of workers, designed to encourage employee commitment to organizational success" (Cotton, 1993). Employees' environmental involvement leads to support for improvement to processes and products and solves environmental problems as well. Furthermore, to achieve employees' environmental involvement requires to design mechanisms (Kitazawa and Sarkis, 2000) by top-management that favors environmental behavioral aspects and voluntary initiatives. However, each archetype is based on different learning processes, knowledge and goals. Therefore, the mechanisms designed by the organization to involve employees will depend on the fit with the archetype.

We propose in the next section some practices that support employees' involvement with the entrepreneurial and cooperative archetypes.

3.2. Training

Training allows a company to align individual competences with those required by established strategies (Wright et al., 2001) and has been studied as an antecedent of environmental strategies (e.g. Vidal-Salazar et al., 2012). Environmental training helps employees of being aware of the environmental impact of their organizations' activities (Bansal and Roth, 2000) as well as to acquire abilities to protect the environment (Jabbour, 2011; Ramus, 2001). Organizations should develop specific environmental

training programs according to the demands of their organizations (Perron et al., 2006). However, previous literature is not clear about what type of training is more effective to develop environmental strategies (Tang et al. 2018; Shah, 2019).

The entrepreneurial environmental management based on exploratory learning and architectural knowledge requires a general understanding of the technological system, about different technologies and raw materials that could possibly be used in the industry (Bansal and Roth, 2000). Effective environmental training should be focused on skills related to articulating existing knowledge and to generating new knowledge. Training on industry wide new technologies and materials might better contribute to generate new knowledge instead of specific environmental skills (Perron et al., 2006). In essence, under an entrepreneurial environmental management, training should be holistic and systemic and comprise knowledge creation skills because it is more likely to produce disruptive new ways of approaching environmental problems.

We suggest that, for the cooperative environmental management archetype, specific training on work-related tasks will be more effective, resulting in incremental product or process improvements and operational efficiency (Fernández et al., 2003; del Brío et al., 2007). First, the cooperative archetype relies in a greater deal on component knowledge about specific resources, abilities and technologies rather than about the system as a whole (Matusik and Hill 1998; Nelson and Winter, 1982). Therefore, it is relatively easy to identify which part is relevant to a given functional area or operational unit and articulate specific training activities on that knowledge. Second, components knowledge is relatively explicit (Reed and DeFilippi, 1990; Tallman et al. 2004), what makes specific task-related training more

effective to develop the skills to optimize existing process and improve green products.

P2a: The entrepreneurial environmental management archetype effect on environmental and economic benefits will be positively moderated by training on i) industry wide technology and materials, and ii) knowledge creation skills.

P2b: The cooperative environmental management archetype effect on environmental and economic benefits will be positively moderated by training on i) knowledge specialization task-specific and ii) specific technologies and materials.

3.3. Information sharing programs

The importance of environmental information sharing program to develop environmental initiatives and strategies has been suggested by several researchers (e.g. Andersson and Bateman, 2000; Ramus and Steger, 2000; Rothenberg, 2003). However, environmental information dissemination should be developed differently in accordance with the archetype that is pursued.

Entrepreneurial environmental management approach demands informal conversations that exchange tacit knowledge (Boiral, 2002). Casual, non-written communication among members of organizations outside of the official procedures is more effective for ideas generation (Andersson and Bateman, 2000). Architectural knowledge is complex and dispersed among the organization and evolves in an un-organized way (Matusik and Hill 1998; Tallman et al. 2004). Therefore, it is very difficult to apprehend in a written form and, when it is done, is difficult for the reader to apply. For that reason, it would be useful to eliminate barriers to environmental communication (Ramus, 2001). Casual encounters may

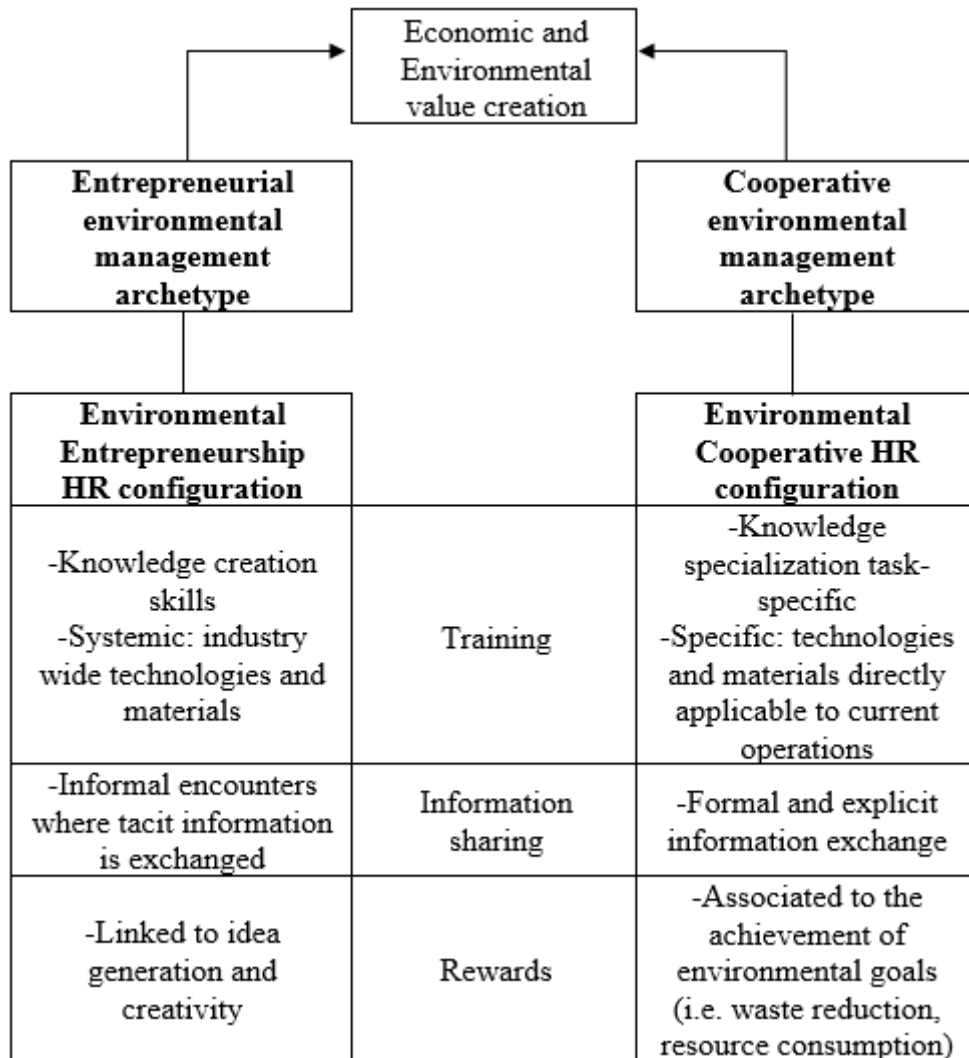
provide additional context to tell useful from non-useful information and expertise advice to “make sense” of how to use the information.

We contend that formal information sharing programs such as environmental management manuals and procedures, newsletters, environmental reports, and so on, are particularly effective under cooperative environmental management archetypes. This archetype relies on lower level managers and employees’ suggestions and initiatives. When employees clearly perceive the priorities and goals of the organization via formal information mechanism, tend to align their behavior with those intended by the organization (Ketokivi and Castaner, 2004; Martínez-del-Río et al., 2012; Ramus, 2001). In addition, through formal information sharing programs, employees are more aware of the environmental impact of their daily routines, and consequently, employees will be more conscious of the positive effect and the benefits of a possible environmental change, which will lead them to greater involvement in such environmental change.

P3a: The effect of the entrepreneurial environmental management archetype on environmental and economic benefits will be positively moderated by the frequency of informal encounters where tacit environmental information is shared.

P3b: The effect of the cooperative environmental management archetype on environmental and economic benefits will be positively moderated by formal and exploit environmental information sharing programs.

Figure 4. HR configurations to manage the entrepreneurial and cooperative archetypes.



5. DISCUSSION AND CONCLUSIONS

The literature on environmental sustainability has suggested different corporate postures or strategies that organizations adopt to address environmental problems. These environmental strategies are commonly classified from the most reactive (end-of-pipe solutions) to the most proactive postures (sustainable development solutions) (Roome, 1992; Hart, 1995; Aragón-Correa, 1998). Our paper aims to contribute to this research stream. In this regard, we integrate perspective of organizational learning

and ambidexterity to propose a fresh theoretical framework. Based on two types of organizational learning, exploitation and exploration, we identify four possible approaches for managing environmental sustainability. First, environmental laggards is characteristic of organizations that lack of environmental concerns and, therefore, do not invest in environmental exploration or exploitation. Second, organizations under the entrepreneurial archetype focus on environmental exploration of new environmental possibilities within a specific industry. These types organizations seek to put themselves in an environmental market-leadership position by applying new technologies and developing new business models. Third, cooperative archetype is characteristic of organizations that seek to maintain in the market by exploiting the current environmental possibilities and developing environmental incremental innovations. Finally, ambidextrous approach describes organizations that seek not only environmental exploitation but also environmental exploration. These types of organizations seek to be leader regarding environmental issues by exploring promising opportunities and seek to exploit the current environmental opportunities.

Hence, our work has framed the environmental challenges organizations face through the lens of ambidexterity theory. The four approaches represent different positions that organizations can adopt regarding environmental problems.

This paper has provided insight into the alignment that must have between the environmental management strategy and HR practices to manage the archetypes (e.g. Schuler and Jackson, 1987; Lundy and Cowling, 1996). To date, several works have provided insight into environmental HR practices that can be useful to attain employees' involvement, creativity and commitment. Although previous studies have also addressed how environmental HR practices that can reduce the environmental impact of

firms, little effort has been made to identify the HR practices that support different environmental management strategies. In this sense, we posit that organizations should implement specific green human resource practices according to their environmental management strategy. This paper proposes some different HR practices for managing and developing each archetype. By better understanding the depth of environmental HR practices, organizations might improve their environmental and financial performance. HR practices are of paramount importance in making organizations and their operations more sustainable reducing environmental degradation.

An ambidextrous environmental approach (a balance between the cooperative and the entrepreneurial archetype) has the highest positive impact on environmental sustainability. However, this approach is really hard to achieve (Birkinshaw and Gupta, 2013) as two different competing objectives and organizational configurations are pursued. We argue that it is really difficult to pursue environmental exploitation and explorations due to several reasons. First, the necessary knowledge is completely different. While the entrepreneurial archetype demands architectural knowledge, the cooperative archetype requires component knowledge. Second, the implementation is also different. To be successfully implemented the entrepreneurial archetype might be top-down and the cooperative archetype bottom-up. Third, green HR practices that support each archetype and help to manage them are configured completely different to foster each competing objective. These reasons lead organizations to opt for one option: the entrepreneurial archetype or the cooperative archetype. The pursuit of the two competing objectives entails high risk and it is possible to get “stuck in the middle” and not achieve any of the two objectives.

Despite the contributions provided by this work, much remains to be done. Future research is encouraged to consider other HR practices not

included in this work that may also contribute to the better development and implementation of the archetypes. Moreover, other organizational antecedents of the archetypes and how they create competitive advantage can be studied.

Further research is needed to comprehend how the risk management would be in each archetype. Future research to look into the role of leadership needed in each archetype (Kurucz et al., 2017; Redekop, 2010). Leadership style could be a decisive factor in the development of environmental strategies (e.g. López-Cabrales and Valle-Cabrera, 2020). Studies could also evaluate the effect of the leadership style on the economic and environmental performance.

Finally, researchers could study and propose several dependent variables or results linked to the archetypes. This kind of analysis would be of great interest, given that each archetype could contribute to different outcomes. Thus, for example, the entrepreneurial archetype can lead to eco-innovation (e. g. Adams et al. 2016) and the cooperative archetype can get more efficient organizations (e.g. Miron et al., 2004).

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CHAPTER 4: ENVIRONMENTAL ENTREPRENEURIAL ORIENTATION AS AN USEFUL CONSTRUCT IN ENVIRONMENTAL STRATEGY RESEARCH: SCALE DEVELOPMENT AND VALIDITY

ABSTRACT

The aim of this study was to propose a measurement scale for Environmental Entrepreneurial Orientation (EEO), adapting the research on entrepreneurial orientation to the specifics of environmental entrepreneurship. Exploratory factor analysis found a structure of 3 dimensions: environmental innovativeness, environmental proactiveness and risk-taking regarding environmental issues. Confirmatory factor analysis confirms the previous factor structure. Model fit indices confirms the model fitness ($\chi^2/d.f.= 1.13$; CFI: .995; RMSEA= .033). Convergent and discriminant validity of the construct were supported. To evaluate the nomological validity, the direct effect of EEO on environmental performance and environmental management practices was examined using Structural Equation Modeling. We expect our proposed measurement scale helps to sparkle empirical, organizational-level research on environmental entrepreneurship.

Keywords

Environmental entrepreneurial orientation; Scale development; Environmental entrepreneurship, Environmental performance, Environmental management practices, Entrepreneurial orientation.

1. INTRODUCTION

Environmental entrepreneurship, understood as individuals and organizations seeking to combine economic and environmental goals to bring new solutions addressing ever-increasing environmental degradation (e.g. Anderson, 1998; Dean and McMullen, 2007, Meek et al., 2010; Antolin-Lopez et al., 2019), has gained both societal and scholarly attention in the past few years. Companies approaching environmental issues as an entrepreneurial opportunity –such as Patagonia Inc. or Tesla Motors— have been heralded as the solution to the environmental grand challenges our planet is facing. As a consequence, the research on the topic has sparkled in the last 20 years. Some recent reviews (i.e. Galkina and Hultman, 2016; Gast et al., 2017; York, 2018; Antolin-Lopez et al., 2019) characterize the existing literature on EE as emerging and vigorous, but also as still young and underdeveloped.

Most existing research on EE is still qualitative or conceptual (Lenox and York, 2011; Gast et al., 2017). In addition, existing empirical research is dominated by either macro-level studies –such as those framed in the institutional entrepreneurship literature (e.g. Sine and Lee, 2009; Sine et al., 2005; York et al., 2014; Meek et al; 2010; Georgallis et al., 2019)— or individual-level studies (e.g. York et al., 2016; Shepherd et al., 2013). Therefore, there is a relative lack of empirical business-level studies addressing how and why firms behave in an environmentally entrepreneurial way. As Gast and colleagues (2017:47) point in their review, what is missing in the literature is a framework that explores “how truly entrepreneurial enterprises (i.e. start-ups and established SMEs alike) apply proactive strategies guided by their management’s commitment to and orientation towards ecological sustainability”.

To address this gap, scholars have recently directed their attention towards adapting the concept of entrepreneurship orientation (Covin and Slevin, 1989) into the environmental context. Environmental entrepreneurship orientation (EEO) can be conceived as managers' tendency to explore and exploit entrepreneurial opportunities with both economic and environmental potential benefits (e.g. Höriš et al., 2017, DiVito and Bohnsack, 2017). However, there is still not a clear conceptualization of how to measure EEO and the limited number of existing empirical studies lack consistency in the measurement of EEO (Demirel et al., 2017). For instance, some studies measure EEO using company declarations (e.g. Jiang et al. 2018; Ahmad et al., 2015), while others use a combination of scales of entrepreneurship orientation and sustainability orientation (e.g. DiVito and Bohnsack, 2017).

The goal of this study is to propose EEO as a useful concept in environmental strategy and entrepreneurship research domains. To do so, we first adapt the scale of entrepreneurial orientation (Covin and Slevin, 1989) to the specificities of environmental entrepreneurship. Second, we empirically validate the measurement instrument for EEO. Third, we hypothesize and test the effect of EEO on firm environmental performance and environmental management practices (EMPs). In doing so, we show that EEO is useful to explain these two key variables in environmental strategy research. More specifically, there are three advantages of developing a proper measure for EEO.

A first advantage of the development of an EEO instrument is to gain useful insights about two potentially highly-relevant avenues of research that have been mostly neglected so far, the analysis of EE phenomena in established firms and in “regular” entrepreneurs. Addressing EEO in established firms would be useful to understand how incumbents engage in

EE (Hockerts and Wüstenhagen, 2010) through research questions such as: What organizational paradigms (i.e. antecedents) stimulate EEO in incumbents? Addressing the levels of EEO orientation in regular entrepreneurs would allow to explore the effect of levels of EEO on firm growth, environmental impact, industry evolution, and alleviation of environmental problems.

These two avenues of research would provide a more strategic view to EE by exploring the conditions driving organizations to seek and exploit new opportunities that create concurrent economic and environmental value. EEO may potentially affect strategic repertoire and decision making in a significant portion of firms (Gast et al., 2017), and affect their ability to thrive and create their own competitive opportunities.

Second, an instrument specifically designed to capture EEO could sparkle much needed quantitative studies addressing EE to explain organizational success. “When do these founders not only enter but thrive?” (York, 2018: 25). How do organizations combine market and ecological logics, overcome tradeoffs and paradoxes to create competitive advantages in form of new green products, waste avoidance, or enhanced employee motivation?

Third, most EE existing empirical studies either focus on cases of firms with strong environmental values, or measure EE using entry in green sectors. However, these approaches are inherently categorical (i.e. firms are environmental entrepreneurs or not, there are no degrees of EE). However, EE is a phenomenon that may admit different levels of intensity and may vary over time in the same company (Schaltegger and Wagner, 2011). For instance, The Body Shop may have lowered its green spirit after its acquisition by a large multinational company (Chun, 2016). EEO

conceptualization and measurement may help to overcome this gap in the literature and would provide a basis for research that provides a much richer and fine-grained analysis of the EE phenomenon.

2. LITERATURE REVIEW

2.1 The relevance of managers perceptions in environmental decisions

Previous studies on environmental entrepreneurship underscore the role of the managers and focus on the managerial initiatives to introduce large-scale changes and innovations (Schaltegger and Wagner, 2011: 226; Keogh and Polonsky, 1998). Entrepreneurial managers and teams may determine in a large extent their companies' ability to pursue environmental market opportunities. For instance, through opportunity recognition and assessment (Shepherd et al., 2013), prioritizing ecological (vs commercial) venture goals, prioritizing long-term (vs short-term) orientation (Wang and Bansal, 2012) or in the way they approach and engage with the stakeholders (York, et al., 2016). For instance, the tendency of Yvon Chouinard to pursue business opportunities that address environmental problems clearly reflects on Patagonia's strategic decision-making (e.g. Chouinard, 2016; Chouinard et al., 2011). A measurement scale of EEO allows theorizing and measuring the role of managers in the exploration and exploitation of entrepreneurial opportunities associated to the environment.

2.2 Environmental entrepreneurship orientation

Entrepreneurial Orientation (EO) has been one of the fastest growing areas of entrepreneurship research (e.g. Rauch et al., 2009; Amankwah-Amoah, 2019). EO underlies strategy-making processes endowing organization with the foundations for decision-making. Entrepreneurial organizations act proactively, innovatively and take risks to pursue market opportunities (e.g. Covin and Slevin, 1989; Runyan et al., 2008). There is a

strong body of research in EO that has developed cumulative knowledge through the use of shared EO scales (Rauch et al., 2009). The salient dimensions of EO are: Innovativeness, risk taking and proactiveness.

Although EO is well defined in entrepreneurship literature, there is no equivalent instrument in environmental entrepreneurship studies. Environmental orientation was defined by Banerjee et al. (2003:106) as “the recognition by managers of the importance of environmental issues facing the firm”. Consequently, environmentally oriented entrepreneurs² have the disposition or ability to recognize and exploit entrepreneurial opportunities while being committed to run their business in the most ecologically responsible way possible (Lumpkin and Dess, 1996). DiVito and Bohnsack (2017) argued that entrepreneurial orientation influences the recognition, interpretation and evaluation of sustainability decision alternatives. Consistent with this perspective, we define Environmental Entrepreneurship Orientation: *The predisposition to pursue and exploit opportunities that aim to produce both economic and environmental benefits.*

While there is still controversy about the extent to which EO is a multidimensional construct, existing literature in EEO is not clear about the dimensional nature of the construct. For instance, Jiang and colleagues (2018) argue that EEO involves reflects environmental proactiveness, environmental innovativeness, and risk-taking but measure EEO as a unidimensional factor, without considering risk-taking. In this vein, we argue that it is necessary to explore the components and dimensional nature of EEO concept.

² A variety of alternative terms have been coined to name this disposition: green entrepreneurial orientation (Jiang et al. 2018), entrepreneurs’ environmental orientation (Hörisch et al., 2017) and green entrepreneurial inclination (Ahmad et al., 2015).

2.3 Environmental innovativeness

The first dimension in EEO is environmental innovativeness (EI). Entrepreneurship literature regards innovativeness as a “predisposition to engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via R&D” (Rauch et al., 2009: 763). It typically implies exploiting an invention or an untried technological possibility by creating a new product or process (Shumpeter, 1942), and entails departing from established practices and technologies (Lumpkin and Dess, 1996).

In the last 20 years it has flourished a profuse literature on “eco-innovation” (see the recent reviews of Adams et al., 2016; Klewitz and Hansen, 2014; Bossle et al., 2016). This literature conceives eco-innovation as the production or exploitation of a product or process that is new to the firm and results in a reduction of environmental risk or damage (Kemp and Pearson, 2008; Rennings, 2000).

The tendency to implement innovations or changes that results in a reduction of environmental risk or damage is in the essence of environmental entrepreneurship (e.g. Shaltegger and Wagner, 2011; Antolín-López et al., 2019). EI is the managerial predisposition to engage in new products and processes that provide economic and environmental benefits.

After reviewing the current literature, we identified three characteristics of innovativeness: (a) an emphasis on the novelty of the environmental solutions, (b) it entails the introduction of numerous environmental products and services, and (c) the willingness to introduce radical and disruptive solutions.

Strong emphasis and high investments in R&D are characteristic of innovative companies (Lederman, 2010). R&D opens up new areas for

identification of opportunities and helps to exploit such opportunities, for instance developing technologies or processes to make better use of natural resources (Lee and Min, 2015). Innovative companies have a predisposition to experiment and continuously develop new products or services. Thus, they tend to have many lines of new products or services. All these concepts translate smoothly to describe EI. Innovations have a paramount importance in order to make changes towards sustainability. Environmentally oriented entrepreneurs are the ones that continuously invest in research and development to put new green products ideas into practice (Larson, 2000), and as a consequence tend to have a portfolio of environmental new products, services, administrative techniques and operating technologies.

A third component is the manager's willingness to introduce radical and disruptive changes. Effectively and significantly addressing current environmental problems most frequently require innovations that challenge the current market and social stasis (e.g. Hellström, 2007; Shaltegger and Wagner, 2011). Radical environmental innovations refer to activities that are completely new (Teece, 2016). This includes creating a new market, the use of new clean technologies or completely new ecologically friendly products and processes, instead of merely improving current product and processes.

2.4 Risk-taking on environmental issues

Market opportunities associated to environmental issues are often particularly risky and uncertain (Bansal, 2005; Ortiz-de-Mandojana and Bansal, 2016). Entrepreneurial companies tend to differ from same industry incumbents on their willingness to take risks to execute bold strategies that implied wide-ranging technological environmental changes. For example, Tesla has been rumored several times to be close to file bankruptcy, but the company has managed to find creative solutions, such as moving employees

from SolarCity –another firm also owned by Elon Musk– to maintain its strategy and pursue high benefits (e.g., Feeley and Hull, 2019).

Risk-taking involves a proclivity to invest significant resources in projects with high rates of potential return but also high level of uncertainty (Lumpkin and Dess, 1996; Miller, 1983; Miller and Friesen, 1978). In other words, a willingness to assume high risks in the expectation of high rewards. Following Rauch et al. (2009) conceptualization of risk-taking, we identified three aspects for measuring risk-taking on environmental issues.

The first is the degree of boldness in actions to achieve environmental objectives. Timid environmental behavior might incrementally improve firm environmental performance with limited risks. However, gradual and incremental behaviors frequently entail modest economic and environmental gains that are not enough to achieve environmental sustainability (Cohen and Winn, 2007). Wide-ranging and “game changing” initiatives that might disrupt current status quo, frequently hold larger economic and environmental potential but also entail larger amounts of risk (Schevchenko et al., 2016; Shaltegger and Wagner, 2011).

Second, companies differ in their overall willingness to take risk on environmental issues. Entrepreneurial activities frequently entail investing significant resources in new technologies, practices or products with uncertain returns. Top managers play a key role assuming this risk. In particular, managers’ perception of environmental issues as an *opportunity* (vs. a threat) strongly determines risk taking on environmental issues (e.g. Sharma and Vredenburg, 1998; Sharma, 2000; del Brío and Junquera 2003). Managers prioritizing and actively searching for high-potential opportunities will tend to take the risks that these opportunities entail (Hoskisson et al.,

2017). Environmentally oriented entrepreneurs tend to be inclined to take risks, and even actively look for risk-taking.

The third is the competitive aggressiveness in the pursue of environmental opportunities. Entrepreneurial organizations tend to take bold actions to outperform rivals in environmental issues, instead of adopting cautions, or “wait and see” approaches. Companies ranking high in this dimension tend to show a strong offensive posture on environmental issues and display aggressive responses to environmental initiatives of the competitors.

2.5 Environmental proactiveness

There is a profuse literature on *environmental proactivity* (e.g. Aragón-Correa, 1998; Aragón-Correa and Sharma, 2003; Buysse and Verbeke, 2003; González-Benito and González-Benito, 2006). Proactive environmental strategies are conceived as a set of voluntary best practices related to continuous improvement, that extend beyond competition and alter processes and products to prevent negative environmental impacts (e.g. Aragón-Correa and Sharma, 2003). The existing literature on proactive environmental strategies emphasizes that they are preceded by a more general proactive approach of the company (Aragon-Correa, 1998; González-Benito and González-Benito, 2006). In other words, the “firm’s tendency to initiate changes in its various strategic policies, rather than to react to events”, antecedes more advanced approaches to the natural environment (Aragón-Correa, 1998: 557).

Proactive environmental strategies are also strongly affected by managerial perceptions towards environmental issues (e.g. Berry and Rondinelli, 1998; González-Benito and González-Benito, 2006).

Although the literature on environmental proactive strategies has been so far disconnected to the literature on EO, they seem to fit very well. Extant literature on EO conceives proactiveness as managerial tendency, to pursue opportunities through change and competition (e.g. Lumpkin and Dess, 1996). In the context of this study, we define environmental proactiveness orientation as the managerial tendency to pursue entrepreneurial opportunities related to the natural environment. To pursue these environmental opportunities, the companies need to initiate entrepreneurial changes and embrace competition related to environmental issues, instead of reacting to events (Aragón-Correa, 1998).

Entrepreneurial firms have a tendency or ability to recognize and exploit environmental opportunities before competitors do (Lumpkin and Dess, 1996; Rauch et al., 2009). Addressing environmental issues ahead of competitors may create competitive advantages (e.g. Christmann, 2000; Aragón-Correa and Sharma, 2003). For instance, first-mover firms can create advantages over competitors, such as cost advantages associated to learning curves, (Lieberman and Montgomery, 1988) or technological leadership.

Another element of environmental proactiveness is the predisposition to anticipate the opportunities arising from regulatory, managerial and technological changes or disruptions (e.g. Aragón-Correa, 1998). Environmentally proactive firms are open to redesign internal processes and operations –such as those related to circular economy or pollution prevention--, and adopt new clean technologies (e.g. González-Benito and González-Benito, 2006) to minimize wasted and resource consumption. In addition, environmentally proactive firms tend to anticipate regulatory changes to be in favorable competitive position when the changes take place (Aragón-Correa, 1998).

A third aspect related to environmental proactiveness is the overall attitude towards competitors regarding environmental issues. Managers perceiving that environmental issues constitute an opportunity to improve their competitive position tend to compete through new eco-friendly products and processes (Bansal and Roth, 2000). Companies with high levels of environmental competitiveness will tend to compete on environmental issues and remark in a frontal manner the distinctive environmental features of its products (Rauch et al., 2005).

3. METHODS

3.1 Item generation and development

We conceive EEO measurement instrument as an adaptation of the original EO scale to the specific behaviors and features of environmental entrepreneurship. The most commonly employed EO measurement is the Miller (1983)/ Covin and Slevin (1989) scale (see Rauch et al., 2009). This scale has been subject of empirical and conceptual analysis in several studies (e.g. Knight, 1997; Kreiser et al., 2002; Covin and Wales, 2012). The scale was originally intended to reflect EO as originally discussed by Miller (1983). That is, as a second-order reflective factor specification with innovativeness, risk-taking and proactiveness as subdimensions. However, most papers have later measured EO as a unidimensional construct (Covin and Wales, 2012; Rauch et al., 2009). Therefore, we did not assume any ex-ante dimensional structure (aggregate versus independent dimensions) for EEO.

We departure from the nine items of the Miller (1983)/ Covin and Slevin (1989) scale and applied them to an equivalent concept applied to the EE context. Three associate professors with several publications on environmental sustainability independently generated several alternative

wordings for each item. We asked them to generate items to reflect what “approaching environmental issues in an entrepreneurial manner” means. In a subsequent step, all the wordings were collected and we requested the three professors to rank each alternative wording. For all the nine items the participants coincided in which wording represented better the underlying concept of the items of the Miller (1983)/ Covin and Slevin (1989) scale in the context of EE.

We then pilot-tested the items with a set of 8 persons who were entrepreneurs or had been entrepreneurs in the past to test the extent to which these items were understandable for people who are part of the target population (face validity). After this step, we slightly reworded 2 items. We incorporated these 9 items in a 7-point Likert scales as showed in Table 1.

Table 1. Initially proposed EEO questionnaire items.

ENVIRONMENTAL INNOVATIVENESS								
In general, the top managers of my firm favor...								
A strong emphasis on the marketing of tried and true environmental products or services	1	2	3	3	5	6	7	A strong emphasis on R&D focusing on environmental issues, environmental technological leadership, and environmental innovations
How many new lines of environmental products or services has your firm commercialized in the past 5 years or since inception?								
No new lines of environmental products or services	1	2	3	3	5	6	7	Very many lines of environmental products or services
Changes in existing products have not focused in environmental issues	1	2	3	3	5	6	7	Environmental changes in product or service lines have generally been quite dramatic
RISK-TAKING								
In general, the top managers of my firm believe that...								
Owing to the nature of the environment, the best option is to explore environmental issues	1	2	3	3	5	6	7	Owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm’s environmental

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gradually through timid and incremental behavior								objectives
In general, the top managers of my company have...								
A strong proclivity for low-risk environmental projects (with normal and certain rates of return)	1	2	3	3	5	6	7	A strong proclivity for high-risk environmental projects (with the possibility of high rates of return)
When confronted with decision-making situations regarding environmental issues involving uncertainty, my firm...								
Typically adopts a cautious, "wait and see" posture in order to minimize the probability of making costly decisions	1	2	3	3	5	6	7	Typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities
ENVIRONMENTAL PROACTIVENESS								
In dealing with its competitors, my company								
Typically responds to environmental actions that competitors initiate	1	2	3	3	5	6	7	Typically initiates environmental actions that competitors then respond to
Is very seldom the first business to introduce environmental new products/services, administrative techniques, operating technologies, etc.	1	2	3	3	5	6	7	Is very often the first business to introduce environmental new products/services, administrative techniques, operating technologies, etc.
Normally seeks to avoid competitive confrontations with the competition in environmental issues	1	2	3	3	5	6	7	Typically competes in environmental issues with the competition in a frontal manner

3.2 Sampling and data collection

Two independent studies were carried out in order to verify the conceptualization of the main dimensions of EEO and the operational procedure used to measure it. We performed exploratory factor analysis (EFA) to refine the items and obtain preliminary evidence and confirmatory factor analysis (CFA) to determine the factor structure of latent variables. EFA and CFA were performed on different samples (Gerbing and Hamilton, 1996).

For our sample 1, we conducted phone interviews among Spanish agri-food firms. We chose companies with 10 or more employees, which gave us an objective population of 785 firms. The survey was addressed to the general manager because they were the ones who knew best the strategies, resources and capabilities about their respective firms. After three phone waves, we obtained 119 interviews. The response rate was 15,16%.

In our sample 1, the average number of employees was 75.8, the average number of years in which the companies had been operating was 15.1 and the average turnover was 3.98 Million euros.

In our sample 2, the population was made-up of Spanish ceramic product manufacturing firms. Again, we phoned companies with 10 or more employees. The objective population was composed of 320 firms. We obtained 120 general manager interviews. The response rate was 37,5%.

In our sample 2, the average number of employees was 96.9, the average number of years in which the companies had been operating was 17.5 and the average turnover was 14.3 Million euros.

3.3 Results

3.3.1 Exploratory factor analysis

First, we assessed the factorability of our data. The Kaiser–Meyer–Olkin (KMO) test of sample adequacy yielded a value of 0.711 and thus exceeds the lower threshold of 0.5 (Kaiser, 1970). In addition, Bartlett’s sphericity test was significant (chi-square = 552; d.f. = 36; $p < .001$). These analyses indicate strong factorability.

Although there is no consensus in the literature about which is the best extraction method, existing literature tends to agree that principal component analysis is preferable (e.g. Velicer and Jackson, 1990). We used oblique

rotation based on the assumption that any extracted factors relevant to EEO should be correlated (Gorsuch, 1983; Hair et al. 2010). Therefore, we performed a principal component analysis with promax rotation. In accordance with the standard criteria of Kaiser-Guttman, we used an eigenvalue of 1 as the cut-off value for the extraction. We obtained 3 components with eigenvalues larger than 1 (3.24, 2.41, and 1.15, respectively) with explained variances of 36.08%, 26.82% and 12.82%, respectively. The total variance explained was 75.73%, which exceeds the suggested threshold of 60% (Hinkin, 2005). Table 2 shows the factor loadings pattern matrix.

Table 2. Rotated pattern matrix of the initial 9-item scale

Items	Factor EI	Factor RT	Factor EP
EI1	.881	-.033	.078
EI2	.931	-.003	-.007
EI3	.867	.033	-.056
RT1	-.075	.919	-.002
RT2	.086	.967	-.118
RT3	-.002	.834	.109
EP1	.010	.047	.900
EP2	.007	-.009	.921
EP3	-.032	.360	.206

N=119. Principal components analysis with Promax rotation.

Bold values indicate loadings with >.8 in magnitude.

We excluded items with loadings below 0.4. No item loaded on more than one factor (>0.40). We thus re-run the analysis excluding only one item (EP3). Table 3 summarized the factor loadings for the condensed 8-items scale. The results of the exploratory analysis show a factorial structure with three well-defined factors. The significant loadings of all items on the single factor indicated unidimensionality. No item had multiple cross-loadings on

any factor (>0.40), which supported the preliminary discriminant validity of the scale. The coefficients for all 3 factors were above 0.80 indicating acceptable reliability.

Table 3. Rotated pattern matrix of the final 8-item scale

Items	Factor EI	Factor RT	Factor EP
EI1	.881	-.037	.073
EI2	.931	-.001	-.008
EI3	.866	.041	-.053
RT1	.007	.924	.016
RT2	.004	.964	-.107
RT3	-.080	.833	.125
EP1	.083	.027	.909
EP2	-.006	-.020	.936

N=119. Principal components analysis with Promax rotation.

Bold values indicate loadings with >.8 in magnitude.

Table 4 reports means, standard deviations and Pearson correlations of our 8 single items.

Table 4. Means, standard deviations and Pearson correlations the EEO scale

	M	S.T.	I1	I2	I3	P1	P2	R1	R2	R3
I1	3.92	1.81	1							
I2	3.38	1.93	.764***	1						
I3	3.24	1.72	.609***	.718***	1					
P1	4.25	1.78	.045	.057	.018	1				
P2	4.04	1.78	.105	.007	.012	.706***	1			
RT1	3.63	2.05	-.081	-.103	-.036	.366***	.375***	1		
RT2	3.94	1.95	.042	.068	.054	.316***	.268***	.794***	1	
RT3	3.79	1.99	.010	-.011	-.018	.438***	.394***	.748***	.699***	1

*** P < .01.

3.3.2 Confirmatory factor analysis

Next, we assessed our scale with a CFA in a different sample. CFA allows comparing different models with different factor structures (Kline,

1998) and assess which factor structure shows a best fit. Therefore, we compared alternative models with the same 8 indicators but different path specifications (Edwards, 2001). We used EQS 6.4 software. As recommended (Hinkin, 2009), 3 models were taken into consideration. M1 refers to a null model where all items load on separate factors. M2 was specified as a first-order reflective single factor model. Finally, M3 addresses a latent model with the number of factors equal to the number of constructs identified in the EFA, restricting each item to load only on its appropriate factor. In other words, M3 was specified as a “Type I” second-order reflective structure, as shown in Figure 1.

The sample showed the presence of multivariate non-normality (the Mardia’s normalized coefficient was 53.41). Therefore, to estimate de parameters we used the robust maximum likelihood method proposed by Satorra and Bentler (1988) which rectifies the effect of multivariate non-normality over goodness-of-fit estimators.

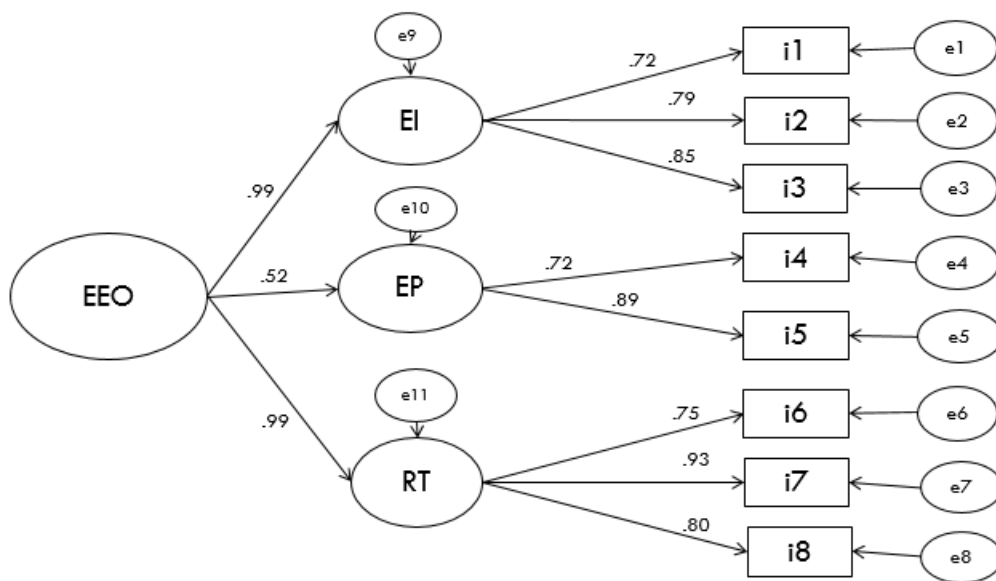
To compare which model showed the best fit to the data, we used a combination of fit indexes (Hooper et al., 2008) summarized in table 5. The Satorra-Bentler scaled chi-square value was nonsignificant in both models M1 ($\chi^2 = 224.75$ d.f. =12, $p = .00$) and M2 ($\chi^2 = 52.87$, d.f. =20, $p = .00$). However, this value was significant in M3 ($\chi^2 = 19.25$, d.f. =17, $p = .31$).

Table 5. Model adjustment comparison.

	χ^2/df	IFI	CFI	RMSEA	90%CI
M1	18.72	.58	.57	.39	[.34 .43]
M2	2.64	.94	.93	.12	[.08 .16]
M3	1.13	.99	.99	.03	[.00 .09]

For all 5 index criteria used, M3 showed a good fit to the data (Bentler, 1992; Hu and Bentler, 1999). In addition, M3 fits the data clearly better than M1 and M2. Therefore, we conclude that a “type I” second-order structure fits the data better than the alternative options. This structure also fits Miller’s (1983) initial conceptualization EO (Covin and Wales, 2012).

Figure 1. EEO CFA structure.



3.3.3 Construct reliability

To check the degree of internal consistency of the indicators measuring the proposed construct, we independently calculated the Cronbach’s alpha and the composite reliability index for each of the three dimensions. A scale is considered reliable if both Cronbach’s coefficient alpha and construct reliability index are above the threshold value of 0.7 (Fornell and Larcker, 1981; Nunnally, 1978). The Cronbach’s alpha for the whole scale exhibit is .898, which indicates good internal consistency. The Cronbach’s alpha values for EI, RT and EP, dimensions were .831, .844 and

.827, respectively. The construct reliability coefficients of EI, RT and EP, dimensions were .833, .847 and .828, respectively. These findings suggest that our items are reliable and form internally consistent factors. The internal consistency and parsimony of our measure suggests content validity and, therefore, actually assesses EEO (Hinkin, 2005).

3.3.4 Convergent and discriminant validity

We evaluated convergent validity to assure that all of the proposed measurement items depicted the construct itself. All items loadings are above the recommended threshold value of .50 in our CFA (Anderson and Gerbing, 1988). The values range from 0.57 to 0.89 and were significant ($p < .05$), which demonstrates that a high proportion of variance is captured by each individual item.

Moreover, average variance extracted (AVE; Fornell and Larcker, 1981) was computed for subconstructs of the scale to evaluate the convergent validity. As depicted in Table 6, the values of the AVE for EI, RT and EP subconstructs are .63, .65 and .71, respectively. The results revealed that the AVE estimate for all constructs is above the recommended threshold of 0.50 (Hu and Bentler, 1999). These results provide a reasonable basis to assume convergent validity of our measure.

Table 6. Items factor loadings, Cronbach's α , CR, and AVE

Dimension	Items	Factor loads	Cronbach's α	CR	AVE
EI	EI ₁	.70	.831	.833	.63
	EI ₂	.76			
	EI ₃	.83			
RT	RT ₁	.69	.844	.847	.65
	RT ₂	.89			
	RT ₃	.79			
EP	EP ₁	.59	.827	.828	.71
	EP ₂	.57			

CR= construct reliability; AVE= average variance extracted

The Fornell–Larcker (1981) criterion for discriminant validity assesses whether the AVE of each dimension is greater than the square of the correlation between this dimension and any other dimension of the scale. As can be seen in Tables 6 and 7, the AVE of the 3 constructs are greater than any correlation among the constructs, which suggests discriminant validity of the scale dimensions. We further explored discriminant validity by examining the correlations among the items. Table 4 shows stronger correlations between any construct's items than inter-construct correlations (Messick, 1988), which suggests discriminant validity of these scale dimensions. A third test for discriminant validity draws from the results of the CFA (John and Benet-Martinez, 2000). The three-factor structure model's fit is greater than the one-factor model, which provides additional support to discriminant validity. Taken together, all these tests provide reasonable support for the discriminant validity of our scale.

Table 7. Correlations among EEO main dimensions.

Construct	EP	EI	RT
EP	1		
EI	.524	1	
RT	.525	0.49	1

Note. EI= environmental innovativeness; EP= environmental proactiveness; RT= risk-taking.

3.3.5 Criterion-related validity

We finally evaluated the nomological validity of the scale (Cronbach and Meehl, 1955). Nomological validity refers to the theoretical relationship between the scale of EEO and other scales of interest based on existing theory. A model was drafted to validate the scale. In the coming sections, we test environmental management practices and environmental performance as outcome variables of EEO to check for the nomological validity.

EEO and environmental management practices

A second natural outcome of EEO is the development of environmental management practices (EMPs). EMPs are practices that go beyond environmental compliance and anticipate regulatory changes and competitor’s strategic actions. EMPs are conceptualized as best-practices aimed to minimize the impact of the firm on the natural environment (Aragón-Correa, 1998).

Previous literature theorizes that EMPs are anteceded by a more general proactive strategic intent of the company (Aragón-Correa, 1998; González-Benito and González-Benito, 2006). We contend that those managers with high levels of EEO will tend to care for environmental issues and facilitate the widespread adoption of practices that minimize environmental impact. In other words, in those firms with a particularly strong managerial tendency

to approach environmental issues in an entrepreneurial manner (i.e. EEO), it will be more likely the widespread development of EMPs.

H₁: EEO has a direct positive impact on firm's environmental management practices

EEO and environmental performance

The ultimate goal of environmentally oriented entrepreneurs is not only economic benefits but also environmental value creation (Schaefer et al., 2015; Dean and McMullen, 2007). Recent research has demonstrated a direct link between green entrepreneurship and environmental performance (e.g. Hockerts and Wüstenhagen, 2010; Gibbs and O'Neill, 2012). The development of business model and the introduction of eco-friendly products and services are expected to have a positive impact on the natural environment (Chen and Chang, 2013). We argue that organizations that are environmentally proactive and innovative and take risks on environmental issues will greatly reduce the environmental impact. It seems logic to expect that companies showing high levels of EEO to improve environmental performance. Thus,

H₂: EEO has a direct positive impact on firm environmental performance.

Hypotheses testing

Seven items, adapted from Aragón-Correa (1998), were used to operationalize the concept of EMPs, (1) the inclusion of natural environmental aspects in administrative work; (2) conducting environmental quality audits regularly; (3) implementing a natural environmental quality system; (4) conducting environmental life-cycle analysis for firm's products or services; (5) natural environmental quality management manual for internal use; (6) taking part in environmental programs and grants developed

by public administrations; and (7) natural environmental training for firm employees.

To measure environmental performance, we used a four-item scale that included whether in, the last two years, the firm has: (1) reduced CO₂ emissions, (2) reduced energy consumption, (3) minimized waste, and (4) reduced costs as a result of environmental initiatives.

The overall goodness of fit of the model is adequate (CFI = .931; RMSEA = 0.069; Hair et al., 2010). H₁ predicted that EEO has a positive effect on EMPs. The path from EEO to EMPs in our model was significant (std. coef. = .45; *t*-value = 4.41; *p* < .001). *These results provide a basis to support H₁.* The path from EEO to environmental performance in our model was significant (std. coef. = .68; *t*-value = 4.71; *p* < .001). *These results support H₂, which predicts that EEO will have a positive effect on environmental performance.*

Therefore, the two hypotheses of our study have been supported. These results also assess how our scale works within a system of related constructs (Nunnally and Bernstein, 1994), what, in turn, suggests the related criterion validity of the EEO scale.

4. DISCUSSION

The aim of this study was to adapt the concept of entrepreneurial orientation to the specificities of the natural environment and to show that it can be a useful tool for research on the larger fields of entrepreneurship and environmental strategy. Using the literatures on entrepreneurial orientation (e.g. Miller, 1983; Covin and Slevin, 1989; 1991; Lumpkin and Dess 1996; 2001; Rauch et al., 2009) and environmental sustainability (e.g. Srivastava and Hart 1995; Aragon-Correa, 1998; Sharma, 1999; Bansal and Roth,

2001), we generated several items to represent the dimensions of environmental innovativeness, risk-taking and proactiveness.

We tested the validity of our measurement instrument in two different samples. Construct validity (convergent and discriminant validity) was confirmed. Although the literature on entrepreneurship has traditionally combined EO dimensions into one single factor (e.g. Covin et al. 2004; Naman and Slevin, 1993; Knight, 1997), more recent studies suggest that EO concept has a multidimensional nature in which each dimension represent an independent aspect of this multidimensional concept (e.g. Covin et al. 2006; Lumpkin and Dess, 2001; George, 2006). Our findings are in line with the more recent research stream.

To confirm nomological validity, we suggested hypotheses about the effect of EEO on two relevant outcome variables, environmental performance and environmental management practices. As suggested, our results show a significant and positive relationship between EEO and environmental performance and between EEO and environmental management practices, which support our hypothesis the nomological validity of the EEO scale proposed.

This study contributes to the literature on EE (e.g. Hockerts and Wüstenhagen, 2010; Schaltegger and Wagner, 2011; York et al., 2014; Gast et al., 2017; DiVito and Bohnsak, 2017) providing a measurement for EE as a firm behavior, topic that has been neglected so far. In particular, EEO could be useful to study EE in the context of established firms and regular entrepreneurs. These two avenues of research could provide a more strategic approach to environmental entrepreneurship literature and help to address the drivers and consequences of environmental opportunities exploration and exploitation in all organizations. In this sense, EEO could be instrumental to

empirically address the call for more empirical studies aiming to discover what happens after the company has been founded (e.g. York, 2018). EEO could also help to better explain the consequences in terms form of competitive advantages, innovations and environmental impact of EE, which is a relevant and unexplored topic (York, 2018). In addition, EEO provides a fine-grained way of measuring EE behaviors, admitting levels or degrees in its measurement and allowing measuring EEO in the same company to study its evolution over time (Schaltegger and Wagner, 2011). We hope this will help to develop more nuanced theories and explanations of antecedents and consequences of EE. In doing so, research on EEO holds the potential to make EE literature more similar to the larger literature on entrepreneurship in which it is immersed.

Our results also contribute to the literature on environmental strategies in organizations (e.g. Shrivastava and Hart 1995; Aragón-Correa, 1998; Sharma, 1999; Bansal and Roth, 2001). We found that that EEO is linked to environmental performance and EMPs. These two variables hold a central position in our field. Our findings may help to connect EE within this field and provide interesting and alternative explanations to the way that organizations find solutions that alleviate the ever-increasing pressure of environmental issues.

5. LIMITATIONS AND FUTURE AVENUES OF RESEARCH

Like any study, this research is not without limitations. First, the dimensional nature of the scale as well as the inclusion and exclusion of the dimensions can be criticized. We strive to build our model on extant research that especially discussed the nature of EO and we reviewed the literature on environmental entrepreneurship to conceptualize the salient dimensions of EEO. However, it is still theoretically possible that EEO could include other

dimensions. Consequently, future research might build upon our model to investigate whether EEO includes others dimensions, and if so, what those dimensions are. Second, although the scale proposed has shown evidence regarding reliability and validity, future research could address improvements of the scale proposed such as including more items per factor. Third, this study has focused on two Spanish sector which limits the generalizability of results. Consequently, future research covering other sectors and cultural contexts would be useful. Finally, it must also be highlighted that the validated scale can be of innovative value in the field of environmental entrepreneurship which could contribute to extend the literature. Future research could explore what motivates and what prevents environmental entrepreneurial organizations in achieve environmental sustainability. Moreover, it might be interesting to explore whether, to what extent and why some organizations exhibit high levels of EEO and others do not.

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CHAPTER 5: HUMAN AGENCY DRIVERS FOR ECO-INNOVATION. THE ROLE OF ENVIRONMENTAL ENTREPRENEURIAL ORIENTATION AND GREEN HUMAN RESOURCE PRACTICES

ABSTRACT

This paper study the internal driving forces underpinning eco-innovation in organizations. More specifically, we study how Environmental Entrepreneurial Orientation (EEO) and Green Human Resource Management (GHRM) may contribute that organizations engage in eco-innovation. We suggest that EEO, that is, managers' strategic predisposition to pursue entrepreneurial opportunities contribute to eco-innovation. In turn, GHRM facilitates the creation of new products and services as GHRM practices enhance employee motivation, abilities and opportunity to engage in eco-innovation. This paper enriches the literature on eco-innovation by connecting it with two fast growing literatures: environmental entrepreneurship and GHRM. The results of our empirical analysis of 239 firms broadly confirm our hypotheses and suggest that although EEO has a direct effect on eco-innovation, this effect is mediated by GHRM.

KEYWORDS

EEO; GHRM practices; Eco-innovation

1. INTRODUCTION

Eco-innovation as a relatively new construct is receiving growing attention and has formed an extensive body of literature (see Cainelli et al., 2020; Kiefer et al., 2019; Dewick and Foster, 2018; Constantini et al., 2017; Horbach et al., 2012; Chen, 2008; Pujari, 2006). Eco-innovation is defined as the process of developing products (goods and services), processes, marketing methods, organizational structure, and new or improved institutional arrangements that will contribute to the reduction of adverse environmental impacts or achievement of environmentally identified sustainability goals (Dewick and Foster, 2018).

Existing studies on eco-innovation have generally focused on the economic and operational and environmental consequences of eco-innovation (e.g. Cainelli et al., 2020; Pujari 2006) or attempted to examine the specific drivers of eco-innovation in business (e.g. Arranz et al., 2020). Drivers include regulations, market pull factors, technology push (e.g. Horbach et al., 2012; Chassagnon and Haned, 2015; Kiefer et al., 2019), networking and R&D cooperation (De Marchi, 2012). As noted by Kiefer et al. (2019), fewer studies have attempted to investigate internal drivers such as environmental management systems, cost-leadership (Kiefer et al., 2019), innovation leadership (Chassagnon and Haned, 2015), innovation capabilities (Arranz et al., 2020) and green competences (Chen, 2008).

Accordingly, there are still many unanswered questions in terms of internal drivers of eco-innovation. One notable gap is the paucity of research investigating individual level, human agency related factors. We know very little about how opportunities to develop new environmental products and services are discovered and created, and in particular, by whom. Who is behind eco-innovations? Is it a deliberate decision from managers, that

decide to systematically orient the company towards opportunities that hold both economic and environmental potential? or – to the contrary– do eco-innovations largely depend on emergent bottom-up processes based on Human Resource Management (HRM) practices aimed to enhance employees’ involvement and ideas on environmental issues?

This research sets out to investigate internal factors underpinning eco-innovation leadership by studying it in the context of two concepts previously understudied in the literature looking at drivers of innovation, namely EEO and GHRM.

On one hand, EEO -derived from the concept of entrepreneurship orientation- indicates the predisposition of organizational leaders to pursue and exploit opportunities that aim to produce both economic and environmental benefits. The presence of EEO in firms does not only increase their emphasis on environmental and society problems, but also willingness to take risks to depart from existing practices and proactively exploit business opportunities to address environmental challenges (Jiang et al., 2018; Hörisch et al., 2017; Ahmad et al., 2015). It is thus believed that EEO is likely to facilitate the eco-innovation in firms. On the other hand, having adopted the resource-based view, extant literature suggests that eco-innovation can be driven internally by a firm’s resources, capabilities, and the pool of knowledge available within the firm (Bossle et al., 2016; Hofmann et al., 2012; Kieffer et al., 2019). This literature emphasizes the role of entrepreneurs, taking deliberate decisions to find and exploit opportunities. Environmental entrepreneurship literature has focused very much on the drivers of entry. However, “we need to better understand what happen next” (York, 2018:27). In other words, we still like a lot of knowledge about the processes that drive entrepreneurial entrepreneurship behaviors within existing organizations.

In parallel, in the last 10 years has emerged a literature on GHRM (Ren et al., 2018; Ahmad, 2015; Renwick et al., 2013; Jackson et al., 2011), which refers to the implementation of human resources practices to achieve environmental objectives (Ren et al., 2018). GHRM underscores the role of employees to enable the internal drivers of competitive advantages (i.e. eco-innovation) in firms (Carmona-Moreno et al., 2012; Martínez-del-Río et al., 2012). This literature suggests that GHRM practices increase employee motivation, abilities and the opportunities to communicate favour the generation of environmental ideas and innovations (Anderson and Bateman, 2000; Jabbour et al., 2017; Martínez-del-Río et al., 2012).

In spite of the discussion above, the existing literature provides little insights into the relationship between EEO, GHRM and eco-innovation. To address this research gap, we first develop a conceptual framework to hypothesize the impacts of EEO and GHRM on eco-innovation in the research, and then test the hypothesis using data obtained from a sample of 239 Spanish agri-food firms and ceramic firms as well as archival data from the *Sistemas de Análisis de Balances Ibéricos (SABI)* database for 2017. The findings of the research have provided strong support to our hypotheses and furnished valuable insights into the underlying driving forces of eco-innovation leadership.

This paper contributes to the literature in several ways. First, we have studied eco-innovation in the context of two constructs related to human agency: EEO and GHRM and attempted to understand how EEO and GHRM interact to facilitate eco-innovation in firms. In doing this, this research does not only furnish valuable insights into the internal driving forces underpinning eco-innovation in firms and identifies a previously unaccounted for mediating role of GHRM, but also bridge the literature of EEO, GHRM and eco-innovation, which has not been done before. Second,

Scholars have called for further research to examine the integration of stakeholders into eco-innovation and its effects on performance (Tyl et al., 2015; He et al., 2018). Having studied the relationship between GHRM and eco-innovation, this research investigates the mechanisms to strengthen the integration of internal stakeholders (employees and managers) into eco-innovation, and thus echoes the research calls. Thirdly, while most studies focus on eco-innovation adoption or diffusion, our dependent variable captures eco-innovation leadership.

Finally, studies of eco-innovation in the existing literature has mainly been based on small samples. Having employed a sample of 239 Spanish firms and the archival data from the Sistemas de Análisis de Balances Ibéricos (SABI) database, we have established the relationship between EEO, GHRM and eco-innovation with strong external validity.

The remainder of this paper is organized as follows. First, existing studies on EEO, GHRM and eco-innovation will be reviewed to establish the initial understanding of the relationship between EEO, GHRM and eco-innovation, and enable the development of the hypotheses. Second, the methodology of the research will be discussed. Third, some descriptive and inferential statistics will be presented, and the main findings of the research will be discussed. The final section of the paper will conclude the research and discuss the possible policy implications of the research.

2. LITERATURE REVIEW AND HYPOTHESIS

2.1 EEO

Entrepreneurial firms are different from other firms in the sense that they are more oriented towards innovation, risk-taking and proactiveness (Gao et al., 2018). Di Vito and Bohnsack (2017) argue that entrepreneurial

orientation influences the recognition, interpretation and evaluation of sustainability decision alternatives. In turn, Environmental orientation was defined by Banerjee et al., (2003:106) as “the recognition by managers of the importance of environmental issues facing the firm”. Consequently, environmentally oriented entrepreneurs have the disposition or ability to recognize and exploit entrepreneurial opportunities while being committed to run their business in the most ecologically responsible way possible (Lumpkin and Dess, 1996)

Consistent with this perspective, we define Environmental Entrepreneurship Orientation (EEO): *The predisposition to pursue and exploit opportunities that aim to produce both economic and environmental benefits.* An examination of the growing literature in EEO and green entrepreneurship (e.g. Hörish et al., 2017, DiVito and Bohnsack, 2017, Demirel et al., 2017, Jiang et al., 2018; Ahmad et al., 2015) suggest that EEO also has a multidimensional nature that comprises three distinct constructs: *environmental proactiveness, environmental innovativeness, and environmental risk-taking* regarding how a firm operates (e.g. Jiang et al., 2018).

Proactiveness is the tendency to anticipate or create market opportunities and initiate change rather than react to it (Venkatraman, 1989). Extant literature on EO conceives proactiveness as a managerial tendency to pursue opportunities through initiation of changes and differentiation from competition (e.g. Lumpkin and Dess, 1996, Aragon-Correa, 1998). Therefore, proactiveness implies a forward looking perspective where firms not only anticipate their competitors in terms of responses to external changes but also initiate change and anticipate new challenges and opportunities in the markets (Aragón-Correa and Sharma, 2003; Herhausen, 2016). Accordingly, environmental proactiveness orientation can be defined

as the managerial tendency to act in advance to be prepared to pursue entrepreneurial opportunities related to the natural environment. To be prepared to pursue environmental opportunities, companies need to initiate entrepreneurial changes and embrace competition related to environmental issues, instead of reacting to events (Brege and Kindström, 2020). Environmentally oriented entrepreneurs are therefore likely to be first movers, they introduce green products and services before their competitors or create new markets untapped by their rivals (Bansal and Roth, 2000; Gao et al., 2018).

Entrepreneurship literature regards innovativeness as a “predisposition to engage in creativity and experimentation through the introduction of new products/services as well as technological leadership via R&D” (Rauch et al., 2009: 763). It typically a propensity to support new ideas and creative processes while engaging in experimentation and departing from internally established practices and technologies (Lumpkin and Dess, 1996). In turn, eco-innovation is defined as the production or exploitation of a product or process that is new to the firm and results in a reduction of environmental risk or damage (Kemp and Pearson, 2008; Rennings, 2000, Adams et al., 2016; Klewitz and Hansen, 2014; Bossle et al., 2016). Environmentally oriented entrepreneurs are the ones that really put new green products ideas into practice.

Risk-taking involves a proclivity to invest significant resources in projects with high rates of potential return but also high level of uncertainty (Hoskisson et al., 2017; Lumpkin and Dess, 1996; Miller, 1983; Miller and Friesen, 1978). In other words, a propensity to assume high risks in the expectation of high rewards (Tan, 2001). Environmental activities frequently entail investing significant resources in new technologies, practices or products with uncertain returns (Berrone et al., 2013). Following Rauch et

al. (2009) conceptualization of risk-taking, we surmise that managers with EEO will prioritize and actively search for high-potential opportunities involving green matters and willingly take the risks that green opportunities entail (del Brio and Junquera, 2003; Hoskisson et al., 2017). This suggests that environmentally oriented entrepreneurs tend to be inclined to take risks, and even actively look for risk-taking. Accordingly, environmentally oriented entrepreneurs will tend to take higher risks in terms of supporting wide-ranging and “game changing” initiatives that might disrupt current status quo and hold larger economic and environmental potential but also entail larger amounts of risk (Shevchenko et al., 2016; Schaltegger and Wagner, 2011). Environmentally oriented managers will also tend to take daring actions to outperform rivals in environmental issues. Instead of adopting risk-averse, “wait and see” approaches they will show a strong offensive posture on environmental issues and display aggressive responses to environmental initiatives of the competitors

2.2 GHRM

GHRM refers to the implementation of human resources practices to achieve environmental objectives. A substantial part of GHRM research (e.g. Tang et al., 2018) share a common foundation in the conceptualization of performance as a function of Ability, Motivation and Opportunity theorizing (Applebaum et al., 2000).

Ability-enhancing GHRM practices such as training in green-related issues have been found to improve the environmental knowledge, skills and abilities needed to successfully implement green practices (e.g. Gupta, 2018; Daily et al., 2012; Sarkis, et al., 2010).

Opportunity-enhancing practices, such as internal communication and information-sharing systems that foster top management and employee

participation, also play a relevant role in introducing environmental innovations (de Sousa Jabbour et al., 2017; Daily et al., 2012). They provide employees opportunities to understand organizational priorities, engage with environmental initiatives within organizations, share environmental knowledge and develop environmental problem-solving skills (Paille et al., 2014). Enhanced internal communication to let employees understand the importance of environmental conservation facilitates the identification of opportunities of pollution reduction and encourages the suggestion of new and new product or service ideas by employees (Boiral, 2002). Many waste reduction programs emphasize the role of ideas from bottom-line employees (e.g., Hanna et al., 2000). In addition, with effective organizational communication and information-sharing systems in place, it is easier to transmit environmental goals and programs. Employees must be aware of an organization's environmental strategy to feel involved and to be able to contribute.

Motivation-enhancing GHRM practices (e.g., compensation related to environmental outcomes and rewards for environmental achievements) aim to increase employees' willingness to commit effort towards environmental protection. Motivation-enhancing practices, such as formal evaluation systems or incentives linked to goal attainment, also play a role in the introduction and development of superior environmental practices. A fully implemented environmental performance assessment provides information to support decision making about rewards, training and task allocation, increase the transparency of individual behavior and gives all organizational actors the medium to voice views and receive feedback on progress towards agreed targets (Wehrmeyer, 2017). As such, its function is that of a motivation-enhancing practice.

In terms of incentives, empirical studies are inconclusive regarding the impacts of rewards associated with environmental targets on the implementation of green practices (Berrone and Gomez-Mejia, 2009a; Daily and Huang, 2001; Tang et al., 2018). Buhl et al., (2016) warns that rewards may be counterproductive when employees are intrinsically motivated by environmental beliefs. Ramus (2001) notes that the motivation for introducing environmental practices may be inherent to individual employees but can also be facilitated by the company through setting environmental objectives, offering rewards for achieving those objectives (Fernández et al., 2003), providing supervisor support for positive behaviors, or monitoring employee activities related to environmental issues.

2.3 EEO and Eco-Innovation

Eco-innovation is “the development of products (goods and services), processes, marketing methods, organizational structure, and new or improved institutional arrangements, which, intentionally or not, contribute to a reduction of environmental impact in comparison with alternative practices” (OECD, 2009, p. 2). Dewick and Foster (2018) expands “Eco-innovation essentially comprises new ideas, behaviors, products and processes, applied or introduced by actors, which contribute to a reduction of environmental burdens or to ecologically specified sustainability targets, relative to existing approaches”

EEO leads firms to place an increased emphasis on environmental and societal problems and increases their willingness to take risks to depart from existing practices and proactively exploit business opportunities to address environmental challenges (Jiang et al., 2018; Hörisch et al., 2017; Ahmad et al., 2015). Thus, the explicit goal of environmental entrepreneurship is to seek and exploit opportunities associated to the solution of environmental

problems. Here we argue that companies with EEO will develop strategies to identify, create and exploit such business opportunities. Introducing and exploiting eco-innovations is a primary strategy to produce economic and environmental benefits (Hockerts and Wüstenhagen, 2010; Antolín et al., 2019). Accordingly, it seems logic to expect that companies in which managers show a stronger tendency to support environmental innovation, environmental risk-taking and environmental proactivity will not only frequently develop eco-innovations but also take the initiative and become leaders in their field.

H₁ = EEO is positively associated with Eco-innovation.

2.4 EEO and GHRM

Prior studies adopting the resource based view argue that firms are able to achieve superior performance outcomes – such as becoming leaders in eco-innovation- through a process that involves first building superior capabilities to acquire available resources and then deploying these resources to change organizational practice. (e.g. Barney, 1991; Helfat, 2000; Morgan et al., 2009). Developing more or less radical eco-innovations might be problematic for environmental entrepreneurs. While start-ups frequently struggle with the liability of newness and smallness that impedes the exploitation of innovations (Schaltegger and Wagner, 2011), established entrepreneurial firms might find problems to deploy resources to change organizational practices because of existing rigid routines and higher levels of administration.

HRM strategies are often formulated to align with the organization's strategy by creating the capacity needed in the workforce and structuring how human resources are organized and aligned to achieve the organization objectives. Thus, GHRM strategy flows directly and naturally from EEO.

HRM practices that represent the firm's strategic goals and investment could be a potential enabler to constitute the pool of unique workforce in order to yield competitive advantage to the firm (Barney, 1991; Shin and Konrad, 2017).

Leaders with EEO are willing to innovate and to invest in research and development to challenge internal practices and established products; they also aim to innovate with respect to their competitors and position themselves as environmental leaders pioneering new markets for green products (Singh et al., 2020; Bos-Brouwers, 2010). Thus, they will be likely to invest in training aimed to develop skills and capabilities to identify and create opportunities for green products and services.

Environmental Innovativeness means that managers are ready to challenge established business models and organizational practices related to the natural environment (Lioutas and Charatzaris, 2018; Ziegler and Novareda, 2009). Organizational inertia and potential organizational lock-in, when a dominant decision-pattern becomes fixed and precludes others, are main obstacles to implementation of internal innovation (Collinson and Wilson, 2006; Sydow et al., 2009) and specifically to eco-innovation (Shrivastava, 1995; Dooley, 2018). Managers can address this issue by hiring new staff with green credentials; such staff will act as a change agent willing to switch to a new set of rules, and be able to think outside the box of ingrained organizational routines and taken for granted practices (Sydow et al., 2009). Environmentally innovative managers will also need to challenge daily routines (Dooley, 2018) and support the development of performance assessment and reward mechanisms with environmental criteria as a way to motivate and monitor the engagement of employees with disruptive practices. Parrish (2010) observed that environmentally innovative entrepreneurs operated under the principles of equanimity and of worth:

balancing their own monetary interests with the provision of monetary rewards, personal development and access to resources to organizational actors that made a worthy contribution to environmental innovation.

Doubts about the legitimacy of eco-innovation practices can be also a powerful deterrent for the implementation of innovation (Hengst et al., 2019). Instrumental legitimacy is provided through espoused organizational level goals motivated by opportunity-driven entrepreneurs aiming at building a profitable business venture and use sustainability as a business opportunity for gaining profit; or moral legitimacy is provided by sustainability-driven entrepreneurs aiming to contribute to sustainability and seeing a profitable business as a means for achieving this (Parrish, 2010). There is yet often a disconnection between espoused-level goals and the everyday actions within which such goals are realized (Hengst et al., 2019). This disconnect involves differences in beliefs, tensions between individual-level goals, function-level goals and organizational level goals; and cognitive and capability mismatches. As a result, entrepreneurs need to develop mechanisms to bring action legitimacy to environmental innovations. For instance, enhanced communication and culture change will be needed to foster bottom-up processes of opportunity creation and opportunity identification; and to align the workforce with the environmental innovations espoused by leaders.

However, GHRM activities can be costly and their results uncertain; therefore, managers are often reluctant to invest to develop them. Nonetheless, managers with entrepreneurial orientation are not only willing but also actively look to take risks. Steve Jobs for instance said

“What I told our company was that we were just going to invest our way through the downturn, that we were not going to lay off people [...] in fact we

were going to hire and up our R&D budget so that we would be ahead of our competitors when the downturn was over...[..] the products we want to make end up meaning everything, the people you hire, who gets promoted. (Jobs quoted in Morris, 2008)

Therefore, managers with EEO will have a propensity to take risks and to make substantial investments in GHRM aiming to build the capabilities needed to discover or create opportunities for high returns through green products and services, building employees' agency to take risk, innovate and proactively search or create green opportunities through everyday actions across departments despite uncertainty about outcomes.

HRM is the only function that enhances agency across all other functions and can align and coordinate practices towards a shared pro-environmental vision (Dubois and Dubois, 2012). Accordingly, the stronger the EEO the more we expect the companies to develop GHRM practices aimed to involve employees with organizational goals and to devolve organizational targets into individual targets; practices aimed to provide instrumental legitimacy to green innovations; practices aimed to improve the skills of current staff to contribute to creation and exploitation of opportunities; and practices aimed to expand the human resource base with actors driven by environmental beliefs and endowed with environmental skills.

H₂ = EEO is positively associated with GHRM practices

2.5 GHRM and Eco-Innovation

Opportunity-enhancing practices such as teamwork and problem-solving groups for environmental concerns help mutual learning and pooling of resources. Empirical consistently showcases such initiatives as strong

predictors of innovative green practice implementation (Buhl et al., 2016; Chuang et al., 2016; Gupta, 2018).

Ability-enhancing practices, such as selective hiring and further employee training, may produce superior technical knowledge that ultimately facilitates the launch of eco-innovations (Vidal-Salazar et al., 2012). New environmental technologies and materials, are typically complex and require a high command of various skills that can be obtained through intensive training or by hiring employees with superior technical competences. Training on standards and sustainability awareness facilitates implementation of eco-innovations, whereas training in state-of-the-art environmental technologies contributes to address the barriers during the introduction process (Buhl et al., 2016)

Bottom-level employee motivation may also facilitate the implementation of environmental process innovations. When a company introduces new environmental practices, highly motivated employees will show lower levels of resistance to change and may even suggest further improvements (Winston, 2008; Selvarajan et al., 2018). Therefore, both supervisor and employee motivation will positively influence the development of environmental innovation (Martínez-del-Río et al., 2012).

Moreover, developing radical innovations may require not only costly investments but substantial time allocation, and line managers may perceive high degrees of uncertainty when it comes to whether such resource allocation will yield a profit (Aragón-Correa, 1998; Berrone and Gomez-Mejía, 2009b). Environmental assessment and rewards for managers and technical staff could prevent inaction or risk avoidance associated to radical green innovations (Berrone and Gomez-Mejia, 2009a). If line managers are only rewarded on the basis of productivity and profits, they will be reluctant

to engage in the implementation of the high-risk environmental innovations promoted by top management. However, performance-related incentives may erode such barriers by rewarding managers for assuming those risks and, as a result, may dissuade managers from avoiding resource intensive environmental investments (Berrone and Gomez-Mejia, 2009b).

Well-developed GHRM systems will further increase eco-innovation because they also address a number of practice-specific agency problems hampering full implementation of innovations. Managers implementing green innovations need to protect the environment and make business sense (Rivera-Santos et al., 2017), and avoid green myopia (e.g., introducing environmental products that are unappealing to customers) but also avoid over-emphasizing business value at the expense of greenness. Training to create emotional involvement with environmental concerns and formal and informal channels to communicate green values and culture across the organization facilitate the formation of environmental teams with business and green skills that can help address trade-offs between business and social benefits/problems that otherwise paralyze the exploitation of innovations (Rivera-Santos et al., 2017).

Without cross-functional engagement, communication of green objectives and a culture that supports green innovation, innovation adoption may turn into merely symbolic actions; thus, complementing green opportunity enhancing practices with environmental assessment and rewards for all staff can sustain a long-term commitment to green innovative practices (Wolf, 2013).

GHRM also contributes to enhanced eco-innovation outcomes because they strengthen employees' motivation to remain with the organization and because they reduce absenteeism (Kehoe and Wright,

2013). Therefore, a GHRM system enhances the implementation of green innovation, as with it, organizational actors are more motivated and able to achieve green objectives; have opportunities to identify and develop eco-innovations and remain in the organization- thus favoring knowledge building- because they feel their endeavors are fairly treated and rewarded.

H₃ = GHRM practices are positively associated with eco-innovation

Having established connections between EEO and GHRM and between GHRM and eco-innovation outcomes, we now consider the question of how EEO increase eco-innovation leadership by influencing GHRM. Central to our argument is the idea that those firms which showcase eco-innovation leadership will not necessarily be those who simply display high levels of EEO; rather, it will be those who develop a strong GHRM system to build resources to support the EEO and “make things happen”. GHRM, by providing organizations with the abilities, motivations and opportunities needed to respond to EEO (Roxas et al., 2017) is responsible for translating the effects of EEO into eco- innovation outcomes.

In a nutshell, GHRM systems are central mechanisms that indirectly channel the influence of EEO into eco-innovation outcomes. Thus, in the domain of EEO we argue that this orientation, via the implementation of GHRM, builds the resources required to achieve environmental leadership. EEO leads to the development of new green capabilities, which in turn increases eco-innovation.

However, we also acknowledge that firms with strong EEO can also acquire resources – particularly knowledge, know-how and technologies- outside the firm (Ghisetti and Pontoni, 2015). Use of external resources can provide a short-cut to eco-innovation; while the organization develops capabilities internally (De Sousa-Jabbour et al., 2016). External sources of

eco-innovation include collaboration with consultants, suppliers and customers, universities, research centers and non-governmental organizations (De Marchi, 2012; Bossle et al., 2016; Van Zanten and Van Tulder, 2018). Companies can also become leaders in eco-innovation through mergers and acquisitions, for instance buying start-ups that struggle to exploit their innovation or through supply chain upgrading (Dewick and Foster, 2018). Van Bommel (2011) notes that environmentally oriented organizations will aggressively develop new supply networks, collaborate with a wide range of companies to develop new, more sustainable products. Overall, the literature suggests a variety of external channels for the translation of EEO into practices.

Thus, we propose the final hypothesis

H₄₌. The relation between EEO and eco-innovation is positively and partially mediated by GHRM practices

3. METHODOLOGY

3.1 Data collection

To test the hypothesis, we identified a population of Spanish agri-food firms and Spanish ceramic firms. We chose companies with 10 or more employees, which gave us an objective population of 785 firms. A total of 239 firms returned the completed questionnaires, for a response rate of 23,62%. In addition to the mail survey, we obtained archival data from the Sistemas de Análisis de Balances Ibéricos (SABI) database for 2017.

3.2 Measures

3.2.1 Dependent variable: Eco-innovation

To measure the dependent latent variable, we used three-item scale that included the launch of products with environmental characteristics, the significant improvement of the environmental impact of some products and the implementation of more efficient processes from an environmental point of view. The responses to these questions were classified on a Likert scale ranging from 1 (“we have not addressed this issue at all and have no plans to do so in the future”) to 7 (“we are the leaders on this in our sector”). Table 1 shows a detailed description of the items.

3.2.2 Independent variables

EEO. To measure the extent to which a firm behave in an environmentally entrepreneurial way, we used a scale including 8 items adapted from the scale of Entrepreneurial Orientation developed by Miller (1983)/ Covin and Slevin (1989). The scale included items measuring environmental innovativeness, environmental proactiveness and environmental risk taking. The questions were measured on a 7-point Likert scale. A detailed description of the items is included in table 1. Note that from an entrepreneurship perspective environmental proactiveness essentially captures the predisposition to introduce environmental practices before competitors. This differs from the approach used by research looking at proactive environmental strategies which are conceived as a set of voluntary best practices related to continuous improvement that extend beyond competition and alter processes and products to prevent negative environmental impacts (e.g. Aragón-Correa and Sharma, 2003; Dou et al., 2019).

The exploratory factor analysis showed three factors that had an eigenvalue higher than 1.0 and explained 79.81% of the total variance. Moreover, to confirm underlying multidimensionality, we conducted a confirmatory factor analysis. The model appeared to be a good fit to the data. The confirmatory factor analysis revealed good internal consistency reliability (Cronbach's alpha = .842) and the goodness-of-fit indexes were good (CFI =.997; RMSEA =.025; all factor loadings were significant at $p < .05$).

GHRM. Our review of the GHRM practices led us to construct a list of 9 practices. Table 1 included a description of the items. The answers to these questions were also classified on a 7-point Likert scale. The confirmatory factor analysis revealed good internal consistency reliability (Cronbach's alpha of .887) and a reasonable fit to the data (CFI=.986; RMSEA=.059; all factor loadings were significant at $p < .05$).

3.2.3 Control Variables

In addition, the following control variables were introduced: sector, firm size and revenue. Sector was classified as dichotomic (1= agri-food firms; 0= ceramic firms). We measured firm size as the natural logarithm of the number of employees while revenue as the natural logarithm of the number of company's total sales in the year. As reported in the SABI database, both data firm size and revenue refer to December 31, 2017.

Table 1. Variables and their operationalization

Construct	Subconstruct	No. of items	Cronbach's alpha	t-value	Std. estimate	Description
Eco-innovation leadership		3	.775	28.984	.85	Please rate your firm from 1 (“we have not addressed this factor and have no plan to do so in the near future”) to 7 (“we are the leaders on this in our sector”)
				34.237	.91	Our firm has launched a product with environmental characteristics
				31.665	.74	Our firm has significantly improved the environmental impact of some product
GHRM practices		9	.906	23.092	.71	Please rate your firm from 1 (“we have not addressed this factor and have no plan to do so in the near future”) to 7 (“we are the leaders on this in our sector”)
				27.243	.78	Our firm recruit employees who have green awareness
				27.923	.65	We develop training programs in environment management to increase environmental awareness, skills and expertise of employees
				27.357	.80	We develop training programs in environment management to increase environmental awareness, skills and expertise of managers
				21.277	.54	We have integrated training to create the emotional involvement of employees in environment management
				21.090	.60	Our firm sets green targets, goals and responsibilities for managers and employees
	24.034	.73	In our firm, managers are set objectives on achieving green outcomes included in appraisals			
						There are economic incentives related to the achievement of environmental objectives.

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				24.362	.66	In our firm, there are a number of formal or informal communication channels to spread green culture in our company
				28.038	.67	Our company emphasizes a culture of environmental protection
EEO	Environmental Innovativeness	3	.842	29.278	.73	In general, the top managers of my firm favor: 1= A strong emphasis on the marketing of tried and true environmental products or services; 7= A strong emphasis on R&D focusing on environmental issues, environmental technological leadership, and environmental innovations
				28.677	.79	How many new lines of environmental products or services has your firm commercialized in the past 5 years?: 1= None; 7=Very many
				29.703	.75	In terms of product or service changes:1= Changes in existing products have not focused in environmental issues; 7= Environmental changes in product or service lines have generally been quite dramatic
	Environmental Proactiveness	2		36.658	.85	In dealing with its competitors, my company: 1= Typically responds to environmental actions that competitors initiate; 7= Typically initiates environmental actions that competitors then respond to
				34.809	.86	In dealing with its competitors, my company: 1= Is very seldom the first business to introduce environmental new products/services, administrative techniques, operating technologies, etc.; 7= Is very often the first business to introduce environmental new products/services, administrative techniques, operating technologies, etc.
	Risk-taking regarding environmental issues	3		27.724	.78	In general, the top managers of my firm believe that: 1= Owing to the nature of the environment, the best option is to explore environmental issues gradually through timid and incremental behavior: 7= Owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's environmental objectives
				29.075	.81	In general, the top managers of my company have: 1= A strong proclivity for low-risk environmental projects (with normal and certain rates of return); 7= A strong proclivity for high-risk environmental projects (with the possibility of high rates of return)
				29.413	.81	When confronted with decision-making situations regarding environmental issues involving uncertainty, my firm: 1= Typically adopts a cautious, "wait and see" posture in order to minimize the probability of making costly decisions; 7= Typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities

3.3 Common method bias

Common method bias is a major concern for survey research that relies on self-reported data. The problem arises when the dependent and the independent variables are obtained from the same subjects at the same point in time (Podsakoff et al., 2003). We followed the recommendations of Podsakoff et al. (2003) to minimize the possible effects of CMV. Two kinds of techniques exist for controlling CMV: procedural remedies, carried out during the design and administration of the questionnaire, and statistical remedies, carried out after data collection.

Related to the procedural remedies, in our cover letter, we guaranteed anonymity to respondents, highlighted that there were no correct or incorrect answers and asked for sincerity and honest answer reduce respondents' apprehension and avoid socially desirable answers. Moreover, we reviewed all the questions and items in order to avoid ambiguous or unfamiliar terms.

Related to statistical remedies, we have used three methods to examine the potential CMV. First, we carried out Harman's single factor test method based on exploratory factor analysis (EFA). The test assumes that, if a single factor accounts for over 50% of the variance, CMV is present (Harman, 1976). Our results show that the first factor explains 20,53% of the total variance. Second, we also applied the Harman's single factor test based on CFA (Podsakoff et al., 2003). In this case, CMV is considered a threat if all items load significantly on one factor with good fit statistics. The fitting result produced poor fit statistics (CFI= 0.595, IFI= 0.598, RMSEA= 0.175), and nine of the twenty standardized estimates were below 0.50.

Third, we performed a procedure known as the "CMV factor method" (Podsakoff et al., 2003). We specified a model where we added a first-order factor with all the measures to our conceptual model and fit the model with

CFA. The overall fit of the model with a common method factor (CFI= 0.939, IFI=0.940, RMSEA= 0.063) shows no significant difference with our original measurement model (CFI= 0.914, IFI= 0.915, RMSEA= 0.070). Moreover, the variation in the CFI indicator in the two models is 0.025 which is well below the recommended threshold value of 0.05 (Little, 1997). Hence, it appears that CMV has no significant effect in this investigation.

3.4 Convergent and Discriminant validity

To examine the convergent validity, the composite reliability (CR) test and the Average variance extracted (AVE; Fornell and Larcker, 1981) was conducted. Table 2 shows the results. The values are above the recommended threshold of .70 (Hair, 1998) and 0.50, respectively (Hu and Bentler, 1999). These results support the convergent validity of the measures used in this study.

To evaluate the discriminant validity, we compared the square root estimates of AVE (table 2) with the construct correlations (table 3). As the square root estimates of AVE were higher than the correlations of any of the other constructs, the discriminant validity of each of the measures is supported (Fornell and Larcker, 1981).

Table 2. AVE values and CR values

	AVE	$\sqrt{\text{AVE}}$	CR
EEO	.590	.768	.80
GHRM Practices	.510	.714	.90
Eco-innovation	.673	.820	.94

Note. AVE: average variance extracted; CR: composite reliability

Table 3. Correlations among latent constructs and control variables

Construct	Mea	SD	1	2	3	4	5	6
1 EEO	-	-	1					
2 GHRM	-	-	0.525*	1				
3Eco-innovation	-	-	0.515**	0.584*	1			
Controls								
4 Log Size	3.62	1.02	.511*	.339	.272	1		
5 Log Revenue	14.9	1.54	.375	.310	.188	.732**	1	
6 Sector	0.49	0.50	-.099*	-.102	.066	-.194**	-.417***	1

*p< .05; **p < .01; ***p <.001

4. ANALYSIS AND RESULTS

To develop the model, we specified a series of structural equation models (SEMs) using EQSs 6.4. The Mardia's normality estimate was 23.06 which indicate the presence of multivariate non-normality in the sample. We therefore conducted the robust maximum likelihood estimation recommended by Satorra and Bentler (1988). Table 3 presents descriptive statistics and the correlation matrix among aggregated constructs and control variables.

Structural equation modeling (SEM) allows to specify alternative nested models to find out which of the possible models best fit the data. We thus specified and tested an initial model which measures the theoretically justified relationships and the three control variables used in this study. Specifically, we tested the path from each of the controls (sector, log size, log revenue) and EEO, GHR practices and Eco-innovation. Appendix 1 reports the results of this initial model. The model did not fit the data well (CFI= .844; IFI=.846; RMSEA= .096) and some of the paths that linked the control variables with the endogenous variables were not significant.

Following Hair et al. (1998) recommendations to get a more a more parsimonious model that fit the data well, we carried out a process in which we sequentially tested different models erasing the least significant relationship among the nonsignificant paths. Thus, doing this process step by step, we ensure that we did not erase any nonsignificant paths that became significant in a subsequent model. After trying 5 models, the final simplified model is described in table 4. The model appeared to be an acceptable fit to the data. The results were CFI=.914; IFI= .915; RMSEA=.70 (CFI, IFI >.90; RMSEA <0.08) (Hair et al., 1998; Medsker et al., 1994). The Satorra-Bentler scaled chi-square value was nonsignificant ($\chi^2 = 463.65$, d.f. = 213, $p = .000$). However, the chi-square test is biased when the sample size is greater than 200. The chi-square values will be inflated and might erroneously imply a poor data-to-model fit (Hair et al., 1998). Therefore, the results show that the proposed model is acceptable.

Hypothesis 1, which posits a positive relationship between EEO and eco-innovation was confirmed by our data. The standardized coefficient of this path is .173, and the t-value (2.77, $p < .001$) is significant.

Hypothesis 2, which predicts that EEO has a positive effect on the development of GHRM practices was supported. The standardized coefficient of this path in our model is 0.147, and the t-value (3.83, $p < .001$) is significant.

Hypothesis 3 suggests that GHRM practices is positively associated with Eco-innovation. The standardized coefficient of this path is 0.120, and the t-value (5.02, $p < .001$) is significant. Consequently, we find support for H3 in our sample.

Table 4. Results of Structural Equation Modeling. Final Results.

Parameter		Std. Estimate (t)	Conclusion
Structural coefficients			
H1: EEO	Eco-innovation	.173 (2.77) ***	Supported
H2: EEO	GHRM practices	.147 (3.83) ***	Supported
H3: GHRM practices	Eco-innovation	.120 (5.02) ***	Supported
Indirect effect estimation			
H4: EEO	Eco-innovation	.093 (3.66) ***	Supported
Controls			
Size	EEO	.83 (5.32) ***	Significant
Revenues	GHRM practices	.041 (2.20) ***	Significant
Sector	Eco-innovation	1.63 (2.43) ***	Significant
Revenues	Eco-innovation	0.93 (-.052)	Not Significant
Goodness-of-fit statistics			
Chi-square	463.65		
d.f.	213		
p	.000		
CFI	.914		
IFI	.915		
RMSEA	.070		

*p < .05; **p < .01; ***p < .001

To evaluate the mediation effect of GHRM practices on the relation between EEO and Eco-innovation (Hypotheses 4), we adopt the basic four-step Baron and Kenny's (1986) approach. In the first step, we examine whether the casual variable is associated with the outcome. Results shows that EEO is significant and positively associated with Eco-innovation

showing that there is an effect that might be mediated. The second step examines the relationship between the causal variable and the mediator. Results show a significant and positive relationship between GHRM practices and eco-innovation. The third step examines the relationship between the mediator and the outcome variable controlling by the causal variable to establish the effect. The last step examines the effect of the casual variable on the outcome variable controlling for the mediator. If this effect is insignificant, the mediator is considered to fully mediate the relationship between the casual variable and the outcome variable. The effects of step 3 and 4 must be estimated in the same equation. We specified this model in EQS 6.3 which decomposes the total indirect effect that works through a mediating variable. Results indicates that there is a significant and positive relationship between GHRM practices and eco-innovation meeting the expectation of the third step. Regarding the last step, the estimated indirect effect through GHRM practices is supported by our data. The standardized coefficient of this path is .093, and the t-value (3.66, $p < .001$) is significant. However, if the first three step are met but the last one not, there is a partial mediation (Baron and Kenny, 1986). Overall, our findings confirm the hypothesis that GHRM practices partially mediates the relationship between EEO and Eco-innovation.

Regarding the control variables, size was found to have a positive and significant effect on EEO. The positive effect of the revenue on GHRM Practices are found to be significant. Finally, the effect of sector on Eco-innovation is positive and significant while revenue did not have a significant effect on Eco-innovation.

5. DISCUSSION AND CONCLUSIONS

In this paper we merge insights from entrepreneurship and HRM literatures to provide some explanation about how organizations engage in eco-innovation. Is it primarily a result of managers' strategic tendency to pursue entrepreneurial opportunities with economic and environmental potential (i.e. EEO)?, or is mostly a result of employee engagement and motivation rooted in GRHM practices?

We contend that both approaches may co-exist and actually reinforce each other. More specifically, we suggest that both, managers' orientation towards environmental entrepreneurship and the implementation of GHRM practices are relevant organizational antecedents of eco-innovation. Although EEO has a direct positive effect on eco-innovation, this effect is mediated by GHRM. In other words, managerial tendency to approach environmental issues in an entrepreneurial manner works better when it is aligned with the HRM policy and employees actively contribute to eco-innovations, leading to competitive advantage and success. When top-down and bottom-up processes combine as mutually beneficial, organizations excel on eco-innovation.

We contribute to the literature on eco-innovation by connecting it with two relevant emerging literatures. On the one hand, we connect eco-innovation and entrepreneurship literatures by analysing the role of managerial pre-position towards environmental entrepreneurship and suggesting that eco-innovation is a natural outcome of this tendency (i.e. EEO). Environmental entrepreneurship is a nascent stream of research that holds promise to solve ever increasing environmental challenges (Antolin et al., 2019; York, 2018) and to theoretically contribute to the fields of entrepreneurship and organizations and environmental sustainability (York,

2018, Lenox and York, 2011). Environmental entrepreneurship scholars underscore the role of entrepreneurs as agents of change, taking deliberate decisions to find and exploit opportunities that create environmental innovations (Dean and McMullen, 2007). This article provides additional explanation about the processes that drive environmental entrepreneurship within existing organizations to originate eco-innovations. Deliberate managerial approaches (EEO) are related to eco-innovation, but these processes work best when EEO is mediated by aligned and coherent sets of GHRM practices.

We also connect eco-innovation and GHRM literatures. Previous studies on GHRM emphasize the role of employees (Ren et al., 2018; Ahmad, 2015; Renwick et al., 2013; Jackson et al., 2011). GHRM practices are suggested to increase employee motivation, abilities and opportunity that in turn result in novel environmental ideas and innovations (Anderson and Bateman, 2000; Renwick et al., 2013). In particular, we contribute to current knowledge on GHRM by signaling that a logic, although un-adverted so far, outcome of GHRM practices is the generation of new environmental products and services and explaining that GHRM are favored by deliberate managerial orientations towards environmental entrepreneurship.

Three limitations of this study should be recognized. The first limitation is the fact that our cross-sectional analyses do not shed light on changes of eco-innovation levels over time. Here, yearly follow-up surveys conducted over a number of years would be able to capture whether or not eco-innovations were affected by EEO and GHRM practices over time. Longitudinal data would also reveal which GHRM practices become more or less salient for managers over time, and how these practices relate to eco-innovation.

Second, although we used control variables obtained from secondary sources and we applied the recommended methods and performed Harman's single factor test and "CMV factor method" (e.g. Podsakoff et al., 2003), we cannot exclude the presence of common method variance in our relationships. Here, data gathered from secondary sources (e.g. patents) or different kinds of outcomes (e.g. environmental or economic performance) would avoid this limitation and possibly expand the implications of this study.

Third, the empirical data for this study were gathered in two industrial sectors of Spain. Although the variance present in our data provide some base for generalization, our study could be replicated in different contexts to provide additional support for our conclusions. For instance, replications in the context of base-of-the-pyramid or high-tech approaches could provide more nuanced insights to our results.

Finally, some implications for managerial practice derive from our results. Managers should be aware that performing above average on eco-innovation requires of a proactive strategic managerial tendency towards EEO. That tendency should consist on consistently exploration and exploitation of entrepreneurial opportunities associated to the environment. In addition, eco-innovation is also rooted in quite specific GHRM practices. In this sense, our study serves as a roadmap to managers willing to improve the levels of eco-innovation of their companies.

Ways of Being Green: Exploring Alternative Approaches to Environmental Sustainability

Appendix 1

Parameter		Std. Estimate (t)	Conclusion
Structural coefficients			
H1: EEO	Eco-innovation	.180 (2.64)***	Supported
H1: EEO	GHRM practices	.174 (3.41)***	Supported
H2: GHRM practices	Eco-innovation	.125 (4.81)***	Supported
Controls			
Size	EEO	.080 (4.63)***	Significant
Size	GHRM practices	.069 (-.57)	Not Significant
Size	Eco-innovation	.085 (-.112)	Significant
Sector	EEO	.125 (1.62)	Not Significant
Sector	GHRM practices	.131 (-.872)	Not Significant
Sector	Eco-innovation	.16 (2.34)	Significant
Revenue	EEO	.040 (2.13)***	Significant
Revenue	GHRM practices	.039 (2.11)***	Significant
Revenue	Eco-innovation	.053 (-.06)	Not Significant
Goodness-of-fit statistics			
Chi-square	668.72		
d.f.	211		
p	.000		
CFI	.844		
IFI	.846		
RMSEA	.096		

*p < .05; **p < .01; ***p < .001

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CHAPTER 6: CONCLUSIONS

1. INTRODUCTION

The literature on environmental management typically argues that, because organizations are one of the main causes of environmental problems, they should play a large part in addressing environmental challenges. Due to the problematic nature of these problems, it must be approached from different perspectives. In this light, there is a call for organizational and management scholars to reconcile the economic growth with the environment (e.g. Howard-Grenville et al., 2014). In this regard, Howard-Grenville et al. (2014) invites organizational scholar to work in the exploration and development of different avenues of research to contribute to mitigate climate change. The need to explore alternative approaches to environmental sustainability and to advance current knowledge about whether and how these approaches are effective to address environmental sustainability problems have been the guiding thread along this doctoral dissertation.

This chapter summarizes the findings, conclusions and contributions obtained in the four research works forming this doctoral dissertation. The second section discuss the general conclusion as well as the most relevant theoretical implications and contributions. The third section is aimed to reduce the imbalance between academic and practitioners by presenting the implications for managers that can be deduced of the main results of this doctoral dissertation. The last section depicts the limitations of the present thesis and future lines of research.

2. GENERAL CONCLUSIONS AND THEORETICAL IMPLICATIONS

Chapter two was intended to provide a review of the GHRM phenomenon. To achieve this, first, although great research efforts have been made over the last decade, this stream of literature is still in its infancy and there is not a widely used concept in literature. For that reason, this chapter has firstly proposed a concept of such phenomenon so that it can be used in future research. Second, this chapter has also contributed to advance knowledge about the implementation of environmental management as bottom-up process through GHRM faced with top-down approach bringing together the last contributions to this line of research. As we have seen, employees contribute to a great extent to organizations' environmental policies and strategies (Daily et al., 2009; Rothenberg, 2003) as well as eco-initiatives and eco-innovations comes many times from bottom-line employees (Fernandez et al., 2003; Ramus, 2001). Finally, as a result of the fragmentation of GHR practices among diverse groups of best practices, this chapter was aimed to unify GHR practices into an integrative body of knowledge. From the perspective of AMO theory, GHR practices can be conceived as a means to improve organization performance while employees' environmental abilities, motivations and opportunities are increased. Chapter 2 provides a summary of GHR practices that have been studied in the literature classified in the main HR functions (e.g. green recruitment and selection, green education and training, pay and reward systems) and in the three dimensions the AMO model (practices oriented toward improving employees' green *abilities*, *motivations* to engage in environmental issues and *opportunities* to contribute to environmental sustainability).

The organizational learning theory and the ambidexterity theory are presented in this doctoral dissertation as an approach to conceptualize environmental strategies as a solution to environmental problems. Chapter 3 was aimed to propose a conceptual model that incorporate the ambidexterity concept into the environmental strategies. Taking the types of organizational learning (exploration and exploitation) as a reference, four possible approaches were identified to manage environmental sustainability. That is, ambidextrous approach, entrepreneurial archetype, cooperative archetype and environmental laggards. Each of them represented different positions in the face of environmental problems or represent different ways of being green.

Furthermore, focusing on the entrepreneurial and the cooperative archetype, this chapter was aimed to link the literature on environmental strategies with GHRM. As we have seen, this chapter has proposed different GHR practices, within different HR functions (training, information sharing programs, reward system), that support different strategies. All in all, the model proposed and the propositions contribute to the literature on environmental management, environmental entrepreneurship and GHRM. Our findings contribute to the literature on environmental entrepreneurship

Continuing the focus on environmental entrepreneurial action, this doctoral dissertation was also aimed to propose and develop a valid measurement scale for EEO. Even though EEO has been studied in the literature, there is still a lack in its conceptualization as well as a lack of a valid instrument for measuring the concept that allows theory to advance. Chapter 4 has conceptualized this phenomenon and explored the dimensional nature of the concept. EEO consists of the predisposition to pursue and exploit opportunities that aim to produce both economic and environmental benefits and theoretically 3 dimensions have been proposed, namely,

environmental innovativeness, risk-taking on environmental issues and environmental proactiveness. A literature review has been carried out of the dimension proposed. In the validation process, the exploratory factor analysis has clearly corroborated the existence of the three dimensions aforementioned and the confirmatory factor analysis has definitely determined the factor structure of the latent variables. These results provide an empirical backing to the EEO scale. In this regard, EEO was considered to be a latent construct that lies under three dimensions, which are also latent and which are measured using eight different observable variables. Thus, a theoretically grounded and empirically validated instrument to measure EEO was developed in the present doctoral dissertation. Our findings contribute to the literature on environmental entrepreneurship. We hope to help advance environmental entrepreneurship research not only on the antecedents but also the consequences of EEO.

After clarifying what EEO is, its dimensional nature and what are its dimensions and developing an empirically validated instrument to measure EEO, it was opened the possibility to study more deeply the outcomes of EEO. In this regard, how EEO affects GHR practices and Eco-innovation was studied in the fifth chapter. This study contributes to the on-going debate about the outcomes of EEO and GHRM. EEO has been associated, firstly, with eco-innovation founding a significant and positive relationship. This result is justified if we consider environmental entrepreneurs as agent of change that exploit the opportunities that are present in environmental problems (Antolín et al., 2019; Hockerts and Wüstenhagen, 2010; Dean and McMullen, 2007). In this regard, due to their proclivity to support environmental innovations, take risks and be proactive regarding environmental challenges, environmental entrepreneurial organizations are expected to develop eco-innovations.

In this line of reasoning, we also interpret the findings that EEO is positively related to GHRM. Indeed, in the process to achieve environmental sustainability, GHRM serve as a catalyst to put into practice the vision of the entrepreneur. Organizations with a strong EEO is expected to implement GHR practices that contribute to the organizational objectives being the individual objectives of the employees. Even though organizations are frequently reluctant to invest in the implementation of GHR practices, it can be argued the stronger the EEO the more investment in GHR practices aimed to improve environmental capabilities.

The relationship between GHRM and eco-innovation is also studied in the fifth chapter. The results presented in this chapter show that GHRM was positively associated with eco-innovation. These results can be interpreted from the AMO theory. The implementation of GHRM systems, that is practices oriented to provide employees with the abilities, motivations and opportunities needed to come up with innovative ideas. This result is in line with previous studies in the literature that recognize employees as strong eco-innovators (Ramus, 2001).

The last contribution of this doctoral dissertation is that GHR practices is a key mechanism in the relationship between EEO and Eco-innovation. Specifically, GHRM systems furnish employees with the abilities, motivations and opportunities to connect EEO of an organization with eco-innovation outcomes. These findings extent current knowledge by bridging environmental entrepreneurship, GHRM and eco-innovation literatures and by studying the internal drivers that supports eco-innovations within organizations.

3. MANAGERIAL IMPLICATIONS

Although it is often argued that managers and academics frequently occupying “separate worlds” (Rynes et al., 2007; Guest, 2007), this section is aimed to reduce the distance between practitioner and research developments arguing that the results of this doctoral dissertation have important implications for managers.

Firstly, we have argued that GHR practices identified in the review (chapter 2) complement and reinforce each other when they are aligned not only with the environmental strategy but also the HRM strategy. Besides, GHRM might contribute to improve financial and environmental performance as well as environmentally conscious workforce and employee well-being in the workforce. To this end, managers could strive to design and implement a GHRM system that takes into account all HR functions and GHR practices. Managers are thus recommended to invest in GHR practices emphasizing challenging environmental goals and link them to employees’ environmental behavior. On the basis of this, chapter 3 sheds light in how GHR practices might reinforce different proactive environmental strategies.

We have contended that strategies towards environmental sustainability are organizational learning based. Managers must be aware that implementing environmental management strategies necessitate organizational learning as a change on individual and organizational behavior should be accomplished. Moreover, environmental issues within organizations are commonly complex and changing. Consequently, managers should underline organizational learning which improve abilities and capacities for environmental action.

In the field of environmental entrepreneurship, there is still the chance of continuing exploiting the opportunities that are inherent in environmental

challenges. In the light of the essential characteristics that were reconciled to characterizes EEO in the fourth chapter, entrepreneurs could now realize the extent to which their efforts to set up an environmentally organization are being fulfilled or not. In particular, environmental entrepreneurs should consider the three dimensions proposed, namely, environmental innovativeness, risk-taking on environmental issues and environmental proactiveness.

Finally, to practicing managers, our findings emphasize that the role of GHRM is instrumental between EEO and eco-innovations. The disposition of environmental entrepreneurs to recognize and exploit eco-innovations requires to a great extent the implementation of GHRM system. In this regard, managers should understand the strategic importance of GHRM to put the environmental ideas into practice.

4. LIMITATIONS AND FUTURE RESEARCH

More efforts are necessary to contribute to such grand challenges that organizations face to address environmental sustainability. This section addresses not only the main limitations of this thesis but also future lines of research which arise from the studies that form this doctoral thesis.

Limitations of this thesis first arise by the nature of a literature review. Here, the choice of AMO theory can limit the field of study. The overview was focused on GHR practices that had been studied in the literature and contribute to improve the environmental abilities, motivations and opportunities of employees. Future research could address systematic reviews that provides insight about what is know and what is not known about the drivers/motivations and outcomes of the field of GHRM.

Others limitations arise from the empirical studies. In both empirical studies, data was collected on Spanish firms encompassing agri-food and ceramic sectors. Future research could validate the EEO scale in other contexts or regions to make more generalizable the scale proposed as well as the analysis of the relationship examined could be studied in other settings.

Common method variance cannot be completely excluded since a common data source has been used to measure EEO, GHR practices and eco-innovation. In spite that we applied the recommended techniques not only in the design and the administration of the questionnaire but also after data collection by applying statistical remedies, we cannot exclude the presence of common method bias in the study of the relationships among EEO, GHRM and Eco-innovation.

Furthermore, the cross-sectional nature of the data used to measure the relationships in chapter 5 limits the fact that no definitive conclusions on causation can be offered. However, we have provided theoretical arguments indicating the direction of the causal relationships. For further progress to be made, longitudinal research, gathering the data at different points in time, would be useful to amplify upon causality relationships.

Future research could extent the conceptual model proposed in chapter 3 to approach environmental strategies in several ways. Future research is encouraged to study other antecedents of the archetypes proposed. It might also be interesting to include others GHR practices within the HR functions not included in the model such as recruitment and selection, appraisal and performance management, among others. Moreover, environmental outcomes of the archetypes proposed can be studied (e.g. eco-efficiency, eco-innovation, waste reduction). Finally, to gather empirical data to test the propositions of chapter 3.

There are interesting opportunities for future research to better understand how environmentally oriented entrepreneurs get through difficulties and survive while others sometimes fail. We could benefit from study cases and qualitative studies on how the entrepreneurs' hybrid endeavors become success stories. In particular, case studies of entrepreneurs who have taken their environmentally-driven ideas to market and successfully balanced environmental and economic performance. But, above all, more qualitative studies are needed to provide more knowledge to this line of research.

Moreover, from the new promising research stream in environmental management, the so-called circular economy, could arise encouraging lines of research. Future research to look into the role of entrepreneurs in achieving circular economy such as innovative circular economy business models.

This work has focused on conceptualizing EEO at organizational level. However, it might be interesting to investigate what incentives motivate and what prevents environmentally oriented entrepreneurs to achieve environmental sustainability at individual level.

Future studies could evaluate the extent to which GHRM systems consisting in a bundle of mutually reinforcing practices contribute to other environmental outcomes such as energy efficiency, waste reduction, among others. Here, the empirical research base is especially thin as much efforts have been made in studying isolated practices and results associated with them.

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