



VNIVERSITAT
E VALÈNCIA



UNIVERSITY OF
PORTSMOUTH

Programa de Doctorado en Dirección de Empresas (UV)

Strategy Enterprise and Innovation (UoP)

**ENTREPRENEURIAL ORIENTATION, EXPORT PERFORMANCE AND
GREEN INNOVATION PERFORMANCE:
THE MEDIATING EFFECT OF OPEN INNOVATION IN SMES.**

DOCTORAL THESIS

PhD STUDENT:

Francisco José Romera Cámara

SUPERVISED THESIS:

Professor Joaquín Alegre Vidal

Professor Paul Trott

February 2018



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Declaration

Whilst registered as a candidate for the Doctor of Philosophy, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award.

Acknowledgments

I'm looking out of the window of my room, cold day in an England where I feel at home and, in these moments, I must write my acknowledgements in a few lines. But the truth is that I could fill a chapter of this doctoral thesis thanking.

I want to start by thanking this thesis to my parents Pedro Luis and María José, without our parents we would not be here. Thanks for the spirit of achievement and the values that you, Pedro Luis, transmitted to me from a very young age. To my brother Luis Ángel and his wife Natalia. In general, to all my family, uncles, cousins, each and every one of them, thank you. To Noelia, thank you for all your time, your sleepless nights, your patience with me, for being like you are and for all your collaboration. This investigation is as mine as of all them.

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Finally, I would like to thank each and every one of the people who have accompanied me during this adventure, helping me to improve every day.



Abstract

Entrepreneurship, innovation and internationalization are topics of great interest for the scientific community, companies and for all major governments worldwide.

In literature there are many studies that are interested and look for the relationship between entrepreneurship and performance. Based on the literature on entrepreneurship, open innovation (OI), green innovation performance (GIP) and export performance (EP), we extend the model by hypothesizing and studying to what extent the entrepreneurial orientation (EO) is influenced and mediated by a construct that has become a hot topic among the scientific community in the last decade, as is open innovation; impacting and facilitating the processes of green innovation and the internationalization of the companies.

All this is done in an empirical study in Small and Medium Enterprises (SMEs), where resources are scarce and strategies linked to green production and export plays a fundamental role for their performance. Taking as a sample Spanish companies in the footwear industry and companies related to science parks, the analyses are carried out to test these relationships through Structural Equation Modelling (SEM). It is expected to find a positive relationship in the object of study.

ACRONYMS

Spanish association of footwear components	AEC
Analysis of Moment Structures	AMOS
Average variance extracted	AVE
Valencian Community and the Valencian Footwear Association	AVECAL
Structural Equation Modeling (CALIS)	CALIS
Covariance based	CB
Chief executive officer	CEO
Chief Operations Officer	COO
Polytechnic city of innovation	CPI
Composite Reliability	CR
Geodesic discrepancy	d_G
Dinamyc capabilities	DC
Eco-Management and Audit Scheme	EMAS
Entrepreneurial Orientation	EO
Export Performance	EP
Structural Equation Modeling Software	EQS
European Union	EU
Federation of Spanish footwear industries	FICE
Green innovation performance	GIP
Heterotrait-Monotrait Ratio	HTMT
General Directorate of Industry and of Small and Medium Enterprises	IPYME
International Organization for Standardization	ISO
Linear structural relations	LISREL
Non gubernamental organizations	NGOs
Organization for Economic Cooperation and Development	OECD
Open innovation	OI
Partial least squares	PLS
Programa de las Naciones Unidas para el Medio Ambiente	PNUMA

Research and Development	R&D
Resource-based view	RBV
Structural equation models	SEM
Structural Equation Modeling (SEPATH) Analysis	SEPATH
Small and medium enterprises	SMEs
Standardized root mean squared residual	SRMR

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CHAPTER 1 INTRODUCTION

Entrepreneurial orientation, export performance and green innovation performance: The mediating effect of open innovation in SMEs.

1.0 Introduction.

This chapter presents an introduction to the current thesis entitled “Entrepreneurial orientation, export performance and green innovation performance: The mediating effect of open innovation in SMEs”.

This chapter discusses and presents the following areas:

1. Research background (Section 1.1)
2. Research problem and objectives of the thesis (Section 1.2)
3. Overview of the research (Section 1.3)
4. Key findings and contributions (Section 1.4)
5. Structure of the doctoral thesis (section 1.5)

Each of these points will be discussed to explain the fundamental reason for this study. This will take account of the previous research carried out in these areas of study. This will help to contextualise this research and understand the importance of this research related to entrepreneurial orientation, open

innovation and performance (measured here using green innovation performance and export performance). It will also show how the research contributes to develop the literature.

This Introduction Chapter will also address the main objectives developed in this doctoral thesis. It will provide an overview of the research, present the key findings and contributions. Finally, the last section outlines the structure of the thesis.

1.1 Background of the research.

Entrepreneurship, innovation, the environment and internationalization are topics of great interest for the scientific community, companies and for all the main governments and governmental institutions in the European Union (European Union [EU], 2014a). Today this is accentuated even more because of the globalised environment and the economic cycles that cross the countries where a company performs its economic activity (Fabian, Molina, & Labianca, 2009; Raymond, St-Pierre, Uwizeyemungu, & Le Dinh, 2014). Even in areas close to researchers, such as university institutions, we can find a special interest in these fields; a clear example is in our alma mater, the University of Valencia and the University of Portsmouth, where many activities try to promote and encourage entrepreneurial orientation, innovation and exit abroad with exchange programs such as those of Erasmus+ programme (EU) for undergraduate and postgraduate studies. Within all industry sectors there is great interest in the study of SMEs. Since according to the EU 99.8% of the companies belonging to the member states are SMEs. Similar figures are registered in Spain, the Central Companies Directory (DIRCE) estimates SMEs make up 99.88% of the business network in Spain (January 1, 2015). This helps to explain why there are numerous entrepreneurship, innovation, sustainability and export plans generated from the governmental institutions in favour of economic development. At the same time, the EU proposes, among others, the following objectives for the year 2020:

- Reinforcing Europe's industrial base through greater competitiveness;
- Favour the transition to a low-carbon economy (*green innovation performance*);
- Promote innovation as a means of generating new sources of growth and meeting the needs of society (*open innovation*);
- Encourage the creation of SMEs, promote their growth and promote a culture of entrepreneurship (*entrepreneurial orientation*);

- To ensure the opening of the internal EU market of goods (***export performance***).

By 2020, the EU has imposed binding targets on energy and climate change in order to reduce EU greenhouse emissions by at least 20% compared to 1990. Increase to 20% the share of renewable energies in total EU and improve energy efficiency to reduce primary energy. Coupled with this, the EU and all its member countries have offered to increase emission reductions from 20% to 30% by 2020.

Finally, in October 2014, EU officials agreed on new climate and energy targets for 2030. Which have a greater degree of effort and impact on the part of all the set of companies that are constituted within their borders. These objectives can be achieved through open innovation strategies between the companies (EU, 2017).

The EU clearly believes that industry can help drive these changes. Technological innovation lies at the heart of this ecological and sustainable development. An ecological growth in which industry plays a fundamental role can adopt green strategies to combat climate change and contributing to save human and economic costs in the long term (Boons & Lüdeke-Freund, 2013; Triguero, Moreno-Mondéjar, & Davia, 2016). At the same time, the growing demand for clean technologies also offers opportunities (Triguero et al., 2016) to modernize Europe's economy and create green growth and employment.

Understanding entrepreneurship and entrepreneurial orientation are fundamental characteristics for the development of companies and wider economic growth (Lumpkin & Dess, 1996; Rodríguez-Gutiérrez, Fuentes-Fuentes, & Rodríguez-Ariza, 2014), both for their contribution to the solution to unemployment (Birch, 1979; Birley, 1987; Rambe & Mosweunyane, 2017) and as well as the development of technological innovations (Hisrich, 1988; Acs & Audretsch, 2005; Fellnhofer, 2017). Against this backdrop it is not surprising that the literature has numerous investigations that study the relationship between entrepreneurial orientation and performance in SMEs (e.g., Wiklund & Shepherd,

2005; Avlonitis & Salavou, 2007; Wang, 2008; Rauch, Wiklund, Lumpkin, & Frese, 2009; Martin & Javalgi, 2016).

Similarly, innovation management is a field that needs further study by the scientific community (Birkinshaw, Hamel, & Mol, 2008). Various constructs have emerged within this field of research. Key amongst them emerged in 2003 and is labelled as 'open innovation'. This construct is identified with collaboration and knowledge flows to accelerate innovation processes within the literature (e.g., Nelson & Winter, 1982; Powell, Koput, & Smith-Doerr, 1996; Granstrand, Patel, & Pavitt, 1997; Chiesa & Manzini, 1997; Sugawara & Liyanage, 1999; Veugelers & Cassiman, 1999). Open innovation has been embraced by the scientific community as a hot topic in the last decade (Chesbrough & Borges, 2014).

On the other hand, the need for policies to encourage green practices by governments (Chen, 2008; Rezai, Sumin, Mohamed, Shamsudin, & Sharifuddin, 2016) and the importance of the environmental agenda for industry (Abdullah, Zailani, Iranmanesh, & Jayaraman, 2016) has made this another construct which also has seen great interest amongst the research community in recent years; it has been labelled 'green innovation' (e.g., Chen, 2008; Triguero, Moreno-Mondéjar, & Davia, 2015; Rezai et al., 2016; Triguero et al., 2016).

Finally, we need to consider the last construct within our research. We refer to exports. The strategies of companies based on the key attributes of: valuable, rare, perfectly immobile and non-substitutable resources will facilitate the company's exports (Duarte-Alonso & O'Brien, 2017).

Table 1.1 on the next page gathers our research constructs and provides definitions of each.

Table 1.1. Definitions of the constructs.

Construct	Definition
Entrepreneurial orientation	The organizational processes, methods and styles that firms use to act entrepreneurially" (Lumpkin & Dess, 1996, p. 139).
Open innovation	Distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model (Chesbrough & Borges, 2014, p.12).
Green innovation performance	“as a type of innovation whose main objective is to mitigate or avoid environmental damage while protecting the environment and enabling companies to satisfy new consumer demands, create value, and increase yields” (Albort-Morant, Henseler, Leal-Millán, & Cepeda-Carrión, 2017, p.3).
Export performance	Export Performance is defined as the result of a company in its activities in the export markets (Shoham, 1996).

Source. Own development.

1.2 Research problem and objectives of the thesis.

Given the arguments presented above in the previous section entrepreneurship has always been closely linked to innovation, indeed sometimes the results of innovation are seen as an indicator of entrepreneurship (Ireland, Reutzel, & Webb, 2005). In addition, open innovation and green innovation can be considered as strategies of innovation. At the same time, there is empirical evidence that there is a relationship between business innovation and export performance (Pla-Baber & Alegre, 2007) and between the innovation of companies and the search for green strategies (Kunapatarawong & Martínez-Ros, 2016; Xavier, Naveiro, Aoussat, & Reyes, 2017).

Nonetheless, within the literature on entrepreneurial orientation and business performance there are some contradictory relationships. While some papers find a positive relationship (e.g., Rauch et al., 2009; Alegre & Chiva, 2013; Wales, Gupta, & Mousa, 2013), other studies do not support this relationship (e.g., George, Wood, & Khan, 2001; Matsuno, Mentzer, & Özsomer, 2002; Rua & França, 2015), requiring further study to establish the nature of this relationship and the aspects that can influence this relationship (Wiklund, 1999; Wiklund & Shepherd, 2003; 2005; Rauch, Wiklund, Frese, & Lumpkin, 2004; Walter, Auer, & Ritter, 2005; Covin, Green, & Slevin, 2006; Basso, Fayolle, & Basso et al., 2009; Rauch et al., 2009; Martins & Rialp, 2013). Due to this, some studies have looked for an explanation in the mediating variables (e.g., Green, Covin, & Slevin, 2008; Alegre & Chiva, 2013), understanding that these variables can help provide an answer to this relationship and possibly open a door to further studies that consider this type of variables.

In line with the above, a conversation is opened where there are some studies that are beginning to examine the relationship of entrepreneurial orientation with a certain type of performance, this is the performance in internationalisation or export (e.g., Lisboa, Skarmeas, & Lages, 2011; Thanos, Dimitratos, & Sapouna, 2017; Ismail & Alam, 2017). Export performance is accepted as a proxy variable of the company's overall performance (Stoian, Rialp & Rialp, 2011).

Internationalisation and EO are essential for SMEs that seek to increase performance and be more competitive (Kasemsap, 2017). In general, the literature shows that EO increases export performance in SMEs, but to understand this relationship better more studies are required about the positive impact of EO on export performance (Fernández-Mesa & Alegre, 2015; Ngoma, Ernest, Nangoli, & Christopher, 2017). For example, Rua & França (2015) found that two particular dimensions have an impact on EO and export performance; these dimensions are innovativeness and proactiveness. Therefore, future studies are required to know what dimensions of entrepreneurial orientation favour export performance.

At the same time, an emerging line of research has focused on the link between entrepreneurial orientation and green innovation (e.g., Ebrahimi & Mirbargkar, 2017; Jansson, Nilsson, Modig, & Hed Vall, 2017; Fellnhofer, 2017). Although some studies show the positive relationship between EO and Green Innovation Performance (e.g., Jansson et al., 2017) other studies indicate that this relationship does not have to be positive in all dimensions of EO (Namagembe, Sridharan, & Ryan, 2016). Linked to the above, Yang & Ju (2017) found that innovativeness may help deliver superior product quality, however, risk-taking decreases product quality. In addition, proactiveness has a U-shaped relationship with the quality of the products. These differences illustrate the need for more studies to better understand the influence of the dimensions on EO with respect to green innovation and its performance. Finally, we show that the two variables: export performance and green innovation performance can be considered a proxy variable for the company's overall performance.

Finally, we show that EO is a construct closely linked to open innovation and has generated a large number of studies in recent years (e.g., Hung & Chiang, 2010; Chaston & Scott, 2012; Ahn, Minshall, & Mortara, 2017; Schmelzle & Tate, 2017). These investigations find that EO facilitates OI processes (Ju, Chen, Yu, & Wei, 2013; Ritala, Henttonen, Salojärvi, Sainio, & Saarenketo, 2013). Indeed, studies in this area have shown that the level of analysis is also critical. For example, Ahn et al (2017) found that the EO of the Chief executive officers (CEOs) influence the adoption of open innovation strategies and the firms that

adopt these strategies increase their ability to innovate (Wu, Lin, & Chen, 2013; Ramirez-Portilla, Cagno, & Brown, 2017) and achieve greater performance (Schmelzle & Tate, 2017). The performance of a company can be measured in various ways. One of these is green innovation performance or sustainable performance. Ramirez-Portilla et al. (2017) find a positive influence in this relationship.

The relationship between OI and performance depends on the type of open innovation strategies that the company pursues. Significantly, open innovation strategies can be defined as inbound or outbound, and Ju et al (2013) found that inbound strategies influence performance whereas outbound strategies do not. These findings show that more studies are needed to verify the extent to which the type of strategy followed in open innovation affects the different types of performance. In this research both kinds of strategies (inbound and outbound) are considered to influence the different types of performance (e.g., green innovation performance and export performance).

Previous studies on open innovation have generally focused on large companies and multinationals (e.g., Dodgson, Gann, & Salter, 2006; Song & Shin, 2008; Ghauri & Rao, 2009). A weakness of these studies has been identified by Brunswicker & van de Vrande (2014) who call for new research to provide an empirical response to the relationship between the entrepreneurial orientation of SMEs and open innovation. In addition, several studies have examined the influence of open innovation with high-tech companies (e.g., West & Callagher, 2006, Parida, Westerberg, & Frishammar, 2012), few studies, however, have taken into account low-tech industries (Brunswicker & van de Vrande, 2014).

Similarly, studies on Green innovation in this area of research have considered large companies but few have examined SMEs (Bos-Brouwers, 2010; Triguero et al., 2015; Jansson et al., 2017). This is surprising since SMEs clearly follow different patterns of behaviour regarding green innovation as has been observed in several studies (e.g., Chen, 2008; Bocken, Farracho, Bosworth, & Kemp, 2014). To further our understanding of this line of research more studies are required to take account of small and medium enterprises in green innovation.

Low-technology-intensive industries are characterised as having dependence on the high technology sector (Ford, Trott, Simms, & Hartmann, 2014) consequently this can hinder innovation processes and finally performance. For these reasons this research uses low tech SMEs as a sample of the study and we control the technology with a second sample from high-tech SMEs.

The theoretical approach taken by this investigation adopts a resource-based view (RBV) and focuses on the use of dynamic capabilities (DC). A firm's resources are considered to be tangible and intangible, significantly it is how the firm makes use of them that will help to understand how it obtains higher performance (Wernerfelt, 1984; Rumelt, 1984). We argue that these resources will be sought with greater intensity by those managers with an entrepreneurial orientation. This is because they are more proactive in the search for new sources to develop innovation within the firm (Lumpkin & Dess, 1996). Innovation processes facilitate the generation of capabilities; and open innovation approaches can increase the ability of a firm to acquire resources and knowledge from outside the organisation (Cohen & Levinthal, 1990; Chesbrough, 2006). Significantly, these capabilities can be dynamic and modified or renewed (Teece, Pisano, & Shuen, 1997). Thus, open innovation can contribute to this renewal by identifying and utilising an external knowledge input. This can then lead to the creation of a new R&D capability that is essential for green innovation (Melander, 2017). Finally, the dynamic capabilities of a firm and its level of entrepreneurial orientation have also been shown to directly influence export performance (Monteiro, Soares, & Rua, 2017).

Given the above summary of a firm's entrepreneurial orientation (measured as a multidimensional construct) and how this influences its performance (green innovation performance and export performance) this study will examine the role played by open innovation strategies (inbound and outbound) in mediating this relationship with SMEs. Therefore, the objectives of this research are:

The primary objective is:

- ❖ To fill the theoretical gaps through the construction of an integral model; investigate the mediating effect of open innovation on entrepreneurial orientation and performance (green innovation performance and export performance) in the context of small and medium-sized.

The secondary objectives are:

- ❖ To analyse the influence of innovativeness, dimension of EO, in relation to green innovation performance (process).
- ❖ To analyse the influence of innovativeness, dimension of EO, in relation to green innovation performance (product).
- ❖ To analyse the influence of innovativeness, dimension of EO, in relation to export performance.
- ❖ To analyse the influence of proactiveness, dimension of EO, in relation to green innovation performance (process).
- ❖ To analyse the influence of proactiveness, dimension of EO, in relation to green innovation performance (product).
- ❖ To analyse the influence of proactiveness, dimension of EO, in relation to export performance.
- ❖ To analyse the influence of risk-taking, dimension of EO, in relation to green innovation performance (process).
- ❖ To analyse the influence of risk-taking, dimension of EO, in relation to green innovation performance (product).
- ❖ To analyse the influence of risk-taking, dimension of EO, in relation to export performance.
- ❖ To analyse the influence of OI (inbound strategies) in relation to green innovation performance (process).
- ❖ To analyse the influence of OI (inbound strategies) in relation to green innovation performance (product).
- ❖ To analyse the influence of OI (inbound strategies) in relation to export performance.

- ❖ To analyse the influence of OI (outbound strategies) in relation to green innovation performance (process).
- ❖ To analyse the influence of OI (outbound strategies) in relation to green innovation performance (product).
- ❖ To analyse the influence of OI (outbound strategies) in relation to export performance.
- ❖ To analyse the mediation of OI (inbound strategies) between innovativeness and green innovation performance (process).
- ❖ To analyse the mediation of OI (inbound strategies) between innovativeness and green innovation performance (product).
- ❖ To analyse the mediation of OI (inbound strategies) between innovativeness and export performance.
- ❖ To analyse the mediation of OI (outbound strategies) between innovativeness and green innovation performance (process).
- ❖ To analyse the mediation of OI (outbound strategies) between innovativeness and green innovation performance (product).
- ❖ To analyse the mediation of OI (outbound strategies) between innovativeness and export performance.
- ❖ To analyse the mediation of OI (inbound strategies) between proactiveness and green innovation performance (process).
- ❖ To analyse the mediation of OI (inbound strategies) between proactiveness and green innovation performance (product).
- ❖ To analyse the mediation of OI (inbound strategies) between proactiveness and export performance.
- ❖ To analyse the mediation of OI (outbound strategies) between proactiveness and green innovation performance (process).
- ❖ To analyse the mediation of OI (outbound strategies) between proactiveness and green innovation performance (product).
- ❖ To analyse the mediation of OI (outbound strategies) between proactiveness and export performance.
- ❖ To analyse the mediation of OI (inbound strategies) between risk-taking and green innovation performance (process).

- ❖ To analyse the mediation of OI (inbound strategies) between risk-taking and green innovation performance (product).
- ❖ To analyse the mediation of OI (inbound strategies) between risk-taking and export performance.
- ❖ To analyse the mediation of OI (outbound strategies) between risk-taking and green innovation performance (process).
- ❖ To analyse the mediation of OI (outbound strategies) between risk-taking and green innovation performance (product).
- ❖ To analyse the mediation of OI (outbound strategies) between risk-taking and export performance.

1.3 Overview of the research.

All the objectives of this research have been measured through the use of a questionnaire, using a sample from low-tech SMEs from the footwear sector (72 companies) and high-tech SMEs from science parks (42 companies). This was achieved using the control variables of the age of the company and the degree of technology (high and low-tech).

This research methodology adopts Structural Equation Modeling (SEM), and specifically uses variance-based partial least squares (PLS-SEM; Lohmöller 1989; Wold, 1982; 1985) to test the hypothesis proposed. SEM is a technique that combines multiple regression and factor analysis. It allows the researcher to evaluate the complex dependency interrelationships and at the same time incorporate the effects of the measurement error on the structural coefficients.

Smart PLS 3.2.7 is a software application that was selected as the statistical program to perform the valuation analysis of the validity and reliability of the measuring instrument. This is achieved using the PLS algorithm and the evaluation analysis of the structural model through bootstrapping and blindfolding.

1.4 Key findings and contributions.

The main finding in this research are:

Innovativeness has a positive and significant relationship with green innovation performance in process ($p < 0,01$), product ($p < 0,5$), export performance ($p < 0,001$) and open innovation strategies, specifically inbound strategies ($p < 0,001$).

Proactiveness has a positive and significant relationship with green innovation performance (process) ($p < 0,5$) while risk-taking has a positive and significant relationship with open innovation strategies, both inbound ($p < 0,5$) and outbound ($p < 0,01$) strategies.

On the other hand, open innovation strategies, specifically inbound strategies have a positive and significant relationship with green innovation performance (process) ($p < 0,5$) and (product) ($p < 0,5$). Finally, inbound strategies mediate among innovativeness and green innovation performance (process) (VAF=22,2%. Partial mediation) and (product) (VAF=26,1%. Partial mediation).

This research has theoretical and academic implications as well as more practical implications for companies, governments and for society. This research contributes to the on-going debate amongst scholars on which and what type of mediating variables help to explain the relationship between entrepreneurial orientation and business performance (Wiklund & Shepherd, 2005, Avlonitis & Salavou, 2007, Wang, 2008, Rauch et al., 2009). It also provides new lines of research to better understand this complex relationship.

Another significant academic contribution is the study of SMEs. SMEs are important providers of employment and producers of a large part of the total industrial product in developing countries (Programa de las Naciones Unidas para el Medio Ambiente [PNUMA], 2003; Luetkenhorst, 2004) and have been overlooked by the scientific community in relation to these variables studied here (Dodgson et al., 2006, Triguero et al., 2015).

Second, the study has a practical implication for SMEs in Spain. Within Spain and the EU more than 99% of all companies are SME according to data from the

European Commission (EU, 2014a). Thus, this research is of interest to a large number of firms and shows the importance of adopting an entrepreneurial position to seek open innovation and green innovation strategies to secure higher performance.

Also, the findings of this research can help governments to better understand the influence of SMEs with respect to entrepreneurial orientation, open innovation, green innovation and export. This should enable them to develop policies to promote and facilitate this type of strategy.

Arguably the most outstanding contribution of this study is the social contribution. That is companies and governments are not entities outside of society and if these companies utilise the practices uncovered in this thesis the whole of society may benefit from the arrival of new innovative, green and sustainable products.

1.5 Structure of the thesis.

This study comprises five chapters and is structured as follows:

Chapter 1. Introduction:

This chapter presents the research background of this study and highlights the research gaps and objectives. It provides an overview of the research, presents the key findings and illustrates the key contributions.

Chapter 2. Theoretical framework:

In this chapter the theories supporting this research are analysed. This theory includes RBV and DC. Next, the constructs entrepreneurial orientation, open innovation and performance (green Innovation performance and export performance) are reviewed. Finally, we consider the main links between these constructs to develop the hypotheses proposed.

Chapter 3. Methodology.

This chapter offers a detailed explanation of the methodological development, which includes the explanations of the type of analysis, population and sample, measures, type of variables, the questionnaire, data collection, reliability and validity. It also contains the research ethics adopted.

Chapter 4. Analysis.

The analysis is developed in two steps. First, attending to the validity and reliability of the model proposed. Next, the structural model is analysed to test the hypotheses of the research.

Chapter 5. Conclusions.

This chapter presents and details the findings of this research. The contributions of this study are fully explained. In addition, the implications of this study are then explored. These include policy implications, managerial implications; academic implications and social implications. To conclude this chapter examines the limitations of this research and suggestions future lines of research.

CHAPTER 2 THEORETICAL FRAMEWORK

Entrepreneurial orientation, export performance and green innovation performance: The mediating effect of open innovation in SMEs.

2.0 Objectives and content of the chapter.

The following chapter considers the theoretical approach supporting this research, the review of the literature of the constructs object of study of this investigation. Finally, the hypothesis development, the chapter is structured:

I. Theory supporting the research;

In the first place, the approaches or theories that support the proposed model are considered. These approaches are resource-based view (RBV) and dynamic capabilities (DC). Each of these approaches will be structured in the following way. First, a description of the background and presentation of the approach. Secondly, the approach and its main definitions will be detailed, followed at this point the main criticisms on the respective approach will be considered. Finally, the structure of each approach and its direct relationship with the proposed research will be addressed.

II. development of constructs;

Following this, the constructs studied in this doctoral thesis are detailed in depth: entrepreneurial orientation, open innovation, green innovation performance and export and its performance.

III. development of hypothesis.

Finally, the hypotheses are development. Attention to the main connections between the constructs are analysed one by one to justify the importance of each hypothesis generated.

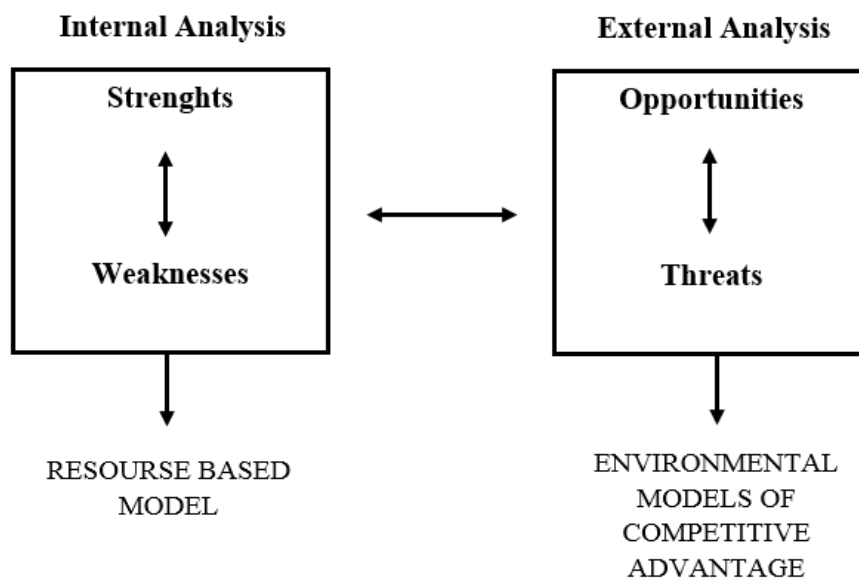
I. THEORY SUPPORTING THE RESEARCH.

2.1 Resource-based view.

The resource-based view (RBV) is a useful theoretical framework to understand how competitive advantage is achieved within companies and how that advantage can be maintained over time (Penrose, 1959; Wernerfelt, 1984; Prahalad & Hamel, 1990; Barney, 1991; Nelson, 1991; Peteraf, 1993). It has become one of the key theoretical perspectives with widespread acceptance in strategic management (Powell, 2001; Priem & Butler, 2001a; Rouse & Daellenbach, 2002; Newbert 2007; Kraaijenbrink, Spender, & Groen, 2010).

While, traditionally, market-based approaches (Porter, 1980; 1985; 1996) focused on how external factors -opportunities and threats- or internal sources - strengths and weaknesses- (Stinchcombe, 1965; Hofer & Schendel, 1978) in an isolated way influenced the strategies and the performance of the company, and how these could be combined to explain how companies could prosper and achieve a competitive advantage. RBV adopts a different perspective. It argues that companies are able to achieve certain competitive advantages and a given performance according to the resources and capabilities that they have at that moment, and the way they use them (Rumelt, 1984; Hansen, & Wernerfelt, 1989; Barney, 1986; 1991; Montgomery & Wernerfelt, 1988; Peteraf, 1993). This approach focuses on a more internal vision of the company. The following figure published in Jay Barney's seminal article in 1991 shows the basic scheme of traditional market-based approaches and the resource-based view.

Figure 2.1. RBV and environmental models of competitive advantage.



Source. Barney (1991).

2.1.1 Definition of RBV.

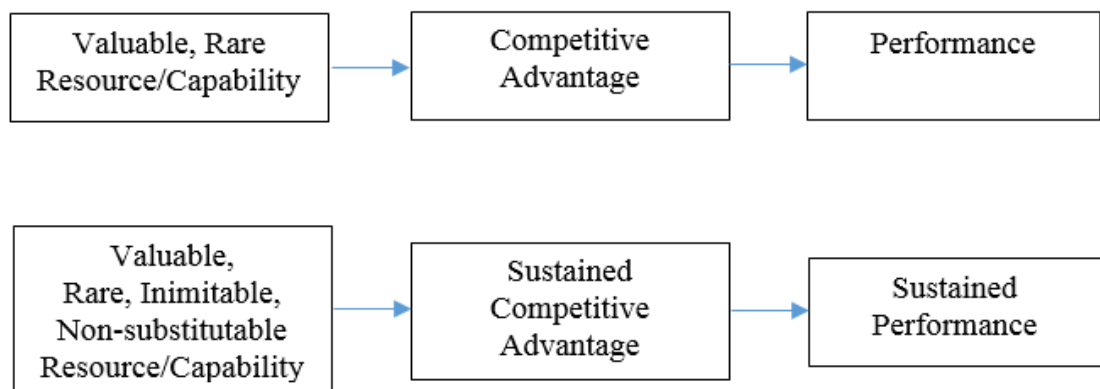
Although this theory has relatively recently dominated scientific studies in strategic management (Zupic & Drnovsek, 2014), its roots can be traced back many decades. In the 50s, the literature began to introduce concepts that bring us closer to this theory, Selznick (1957) introduces the concept of “distinctive competence” and seeks to obtain efficiency through scarce resources owned by the management teams.

After that, Edith Penrose (1959) begins to consider the company as a set of productive resources, indicating that the growth of companies (both internal and external) through growth strategies such as mergers, acquisitions and diversification will depend on how companies use their resources. This author also made a distinction between physical and intangible resources. This debate or scientific dialogue is frequently forgotten except for the study of Rubin (1973) and his conceptualisation of the company as a set of resources. This was until the 80s, where Professor Wernerfelt in his research entitled “The resource-based

view of the firm” (1984) introduces ideas such as heterogeneity in the allocation of resources.

Following the contribution of Wernerfelt in 1984, Jay Barney published in 1991 his article, “Firm resources and sustained competitive advantage” in the *Journal of Management*. With this article, Barney has become the most influential author on this approach. This seminal article distinguishes between competitive advantage and sustainable competitive advantage and explains how each of them is achieved. Next figure taken from the article by Newbert (2007) show these processes.

Figure 2.2. Performance and sustained performance.



Source. Newbert (2007).

RBV is based on basic premises for the construction of advantages over the competition. The first, is that there is a heterogeneity in intangible factors and therefore companies differ from each other according to the resources and capabilities that each of them has at a given time. The second, is that this theory is based on the market of factors and their imperfections, and not the imperfections of the market of products when looking for a competitive advantage that generate the obtaining of economic rents.

Thus, due to this heterogeneity composed of a set of unique resources on each company and the possibility of maintaining those resources, a sustainable competitive advantage can be created over time (Rumelt, 1984; Amit & Schoemaker, 1993; Peteraf, 1993; Foss, 1997). That is, the heterogeneity in resources and capabilities explains the variations in the performance of the

company (Makadok, 2001; Lockett, Thompson, & Morgenstern, 2009). Furthermore, its potential to achieve a sustainable competitive advantage over time will be more related to the availability of valuable, rare, imperfectly imitable resources that cannot be substituted by others (Barney, 1991; Barney, Ketchen Jr, & Wright, 2011) rather than by its competitive position in its sector of activity (Porter, 1985).

Barney (1991) defines each of these characteristics of resources to obtain a sustainable competitive advantage over time in the following manner:

First, *valuable*, understanding that they should allow opportunities to be exploited and neutralize possible threats in the company's environment. Second, *resources* must be rare or different from competitors. Third, *inimitable* by competitors and fourth *non-substitutable* means that they cannot be replaced by counterpart resources.

All this takes vital importance since all the companies from their formation try to find the formula that takes them to own a competitive advantage respect to the rest of companies to increase their performance and to obtain certain economic rents (Newbert, 2007).

Likewise, rare and valuable resources constitute the generation of a competitive advantage in international markets (Pla-Barber, 2001; López-Rodríguez, & García-Rodríguez, 2005; Navarro-García, Rey-Moreno, & Barrera-Barrera, 2017).

In the scope and importance of this theory of the strategy, an evolution is observed, from an initial position where the characteristics that give value to resources are studied (Barney, 1986; Dierickx & Cool, 1989; Peteraf, 1993) to a more recent position where the process by which resources are obtained or created is analysed (Amit & Schoemaker, 1993; Teece et al., 1997).

In the literature, different definitions for this approach to resources are seen, while Prahalad & Hamel (1990) define them based on the concept of essential competences and conclude their definition assuming that the essential competences are generated by the collective learning of the organisation.

According to Amit & Schoemaker, (1993, p.35) the resources are defined “as stocks of available factors that are owned or controlled by the firm”. While for Helfat & Peteraf (2003, p.999) argue a resource can be defined as an “input to production (tangible or intangible) that an organisation owns, controls, or has access to on a semi-permanent basis”.

Other authors define resources as the set of factors that a company must carry out in its strategy (Navas & Guerras, 2002). This definition is consistent with the original proposal of Wernerfelt (1984). At the same time, the resources are distinguished between tangible and intangible, being able to be the physical or financial tangible resources, while the intangibles can be technological or organisational or human. In addition, through the coordination and combination of resources, companies obtain organisational skills or competencies (Navas & Guerras, 2002). Aaker (1989) defines the resources as the explicit knowledge deposited in the organisation. A problem generated by all the definitions is that all of them suffer from being inclusive (Kraaijenbrink et al., 2010). This is analysed in the following section.

In the same way, the capacities are organised following a hierarchical structure, and therefore, they must be classified (Teece & Pisano, 1994; Lawson & Samson, 2001), there are capacities of different levels. The first of these is the static capacities, functional or operational, second level, coordination and cohesion capacities, and third level innovation or exploration capabilities, the latter can be transformed or modified with greater intensity in companies that perform open innovation.

On the other hand, resources are something that by definition can be complex to measure. Some researchers rely on this difficulty to criticise this theory, nevertheless in the literature, there are several techniques, both quantitative - proxy variables- (DeCarolis & Deeds, 1999; Afuah, 2002; Hemmati, Feiz, Jalilvand, & Kholghi, 2016), as qualitative to measure the resources and capacities of organisations (Sharma & Vredenburg, 1998; Peters, Siller, & Matzler, 2011; Duarte Alonso & Bressan, 2016).

In this research the classic definition from Helfat & Peteraf (2003, p.999) is followed. Resource can be defined as an “input to production (tangible or intangible) that an organisation owns, controls, or has access”. Subsection 2.3 explains in depth why this approach is very useful to reinforce our theoretical framework.

Next, we highlight the main criticisms that this approach has generated as well as the responses to these criticisms.

2.1.2 Criticism and defence of RBV.

Possibly, one of the foremost criticisms, that has gained the most weight and notoriety about RBV, was the generated by Priem & Butler (2001a) and Barney's response in the same year. This conversation between these authors was published throughout several articles in “Academy of Management Review”. Next, we highlight the main criticisms that identified in the literature (see Kraaijenbrink et al., 2010).

Table 2.1. RBV. Criticism.

Criticism	Assessment
1. The RBV has no managerial implications.	Not all theories should have direct managerial implications. Through its wide dissemination, the RBV has evident impact.
2. The RBV implies infinite regress.	Applies only to abstract mathematical theories. In an applied theory such as the RBV, levels are qualitatively different. It may be fruitful to focus on the interactions between levels rather than to consider higher levels prior as a source of SCA (sustained competitive advantage).
3. The RBV's applicability is too limited.	Generalizing about uniqueness is not impossible. The RBV applies to small firms and start-ups as well, if they strive for an SCA.

	Path dependency is not problematic when not taken to the extreme. The RBV applies only to firms in predictable environments.
4. SCA is not achievable.	By including dynamic capabilities, the RBV is not purely static, though it only explains ex post, not ex ante, sources of SCA. Although no CA can last forever, a focus on SCA remains useful.
5. The RBV is not a theory of the firm.	The RBV does not sufficiently explain why firms exist. Rather than requiring it to do so, it should further develop as a theory of SCA and leave additional explanations of firm existence to TCE.
6. VRIN/O is neither necessary nor sufficient for SCA.	The VRIN/O criteria are not always necessary and not always sufficient to explain a firm's SCA. The RBV does not sufficiently consider the synergy within resource bundles as a source of SCA. The RBV does not sufficiently recognize the role that judgment and mental models of individuals play in value assessment and creation.
7. The value of a resource is too indeterminate to provide for useful theory.	The current conceptualization of value turns the RBV into a trivial heuristic, an incomplete theory, or a tautology. A more subjective and creative notion of value is needed.
8. The definition of resource is unworkable.	Definitions of resources are all inclusive. The RBV does not recognize differences between resources as inputs and resources that enable the organization of such inputs.

	There is no recognition of how different types of resources may contribute to SCA in a different manner.
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Source. Kraaijenbrink et al. (2010).

1. The RBV is tautological.

Priem & Butler (2001b) criticise the theory of RBV as tautological. To this Barney (2001) replies that rethinking parts of the argument of the seminal article on this approach published by Barney (1991) in a tautological way is not the same as demonstrating that the argument is tautological.

2. The RBV has no managerial implications nor is it a theory.

Priem & Butler (2001a) indicate that the RBV has no managerial implications or “operational validity”. They argue that it puts forward a recipe for success (resources VRIN and a good company) nevertheless does not indicate how it is done (Connor, 2002; Miller, 2003). Another criticism is that this approach seems to simplify reality, it is not an easy task to control or predict its future value (McGuinness & Morgan, 2000).

To these critics Van de Ven (2007) responds that the problem of the RBV happens in all research related to management; and Barney (2005) indicates that although RBV is useful for the manager, this approach has never had the objective of being a managerial recipe book. On the contrary, the author maintains that RBV is not a theory of the company and that they had no intention of explaining the existence or limits of companies.

3. The RBV implies infinite regression.

RBV implies an infinite regression (Collis, 1994; Priem & Butler, 2001a). Collis (1994, p. 148) says about this: “A company that has the superior capacity to develop structures that better innovate the products will, in due course, surpass the company that has the best capacity for product innovation at present”. This is because a second-order capacity (developing structures that optimize the

products) will have greater value than first-order capacity (product innovation), the RBV indicates that companies should try to achieve second-order capabilities. This criticism goes to say that companies following these indications will never stop looking for superior capabilities and this will become an infinite search. Kraaijenbrink et al. (2010) indicate that this cannot happen since no theory can have an unlimited number of levels of analysis.

Lado, Boyd, Wright, & Kroll (2006) assume that this criticism does not have much use if strategic management is considered as a practical commitment to the indeterminacy and openness of companies. Resources should not be treated as superior or inferior and there are alternatives to it, such as considering a simple cycle of learning (to improve resource efficiency) and a double cycle (to improve innovation and resource exploration) (Lado et al., 2006).

4. The applicability of the RBV is very limited.

Three aspects arise in the literature regarding this criticism.

In the first place, Gibbert (2006a; 2006b) argues that the notion of the singularity of resources, assuming their heterogeneity and immobility, is contrary to generalisation. In the first stage of RBV, this approach implicitly assumes that all these companies will efficiently and effectively organize the strategic processes producing the same commercial results. El Shafeey & Trott (2014) suggest that this will produce the same competitive advantage in all organisations.

Secondly, it deals with the origin of the focus or view. Connor (2002) indicates that the RBV applies only to large companies with great market power, considering the static nature of the resources and leaving out of this approach the small businesses. Although, non-tangible resources enable small businesses to have exclusive capabilities to generate competitive advantage. However, this approach is only useful when companies seek to obtain sustainable competitive advantages.

Thirdly, the criticism of applicability in dynamic environments. Barney (2002) indicates the limit to apply RBV, Barney indicates that this approach only occurs

in stable environments because for dynamic environments other measures must be taken into account when explaining the SCA.

5. SCA is not achievable.

This criticism is linked to the static nature of the approach, since in changing environments, these resources must constantly change and the advantages of today for a company will not be the same tomorrow (Fiol, 1991). Eisenhardt & Martin (2000) indicate that SCA can only be sustained through “dynamic capacities” or “organisational learning”. The logic of the RBV is applicable both to the dynamic capabilities approach and to the other resources of the company.

6. VRIN is neither necessary nor sufficient for VCS.

Armstrong & Shimizu (2007) and Newbert (2007) show in their two studies relating to RBV a rate of positive results in their researches, and this may question whether RBV can explain the SCA. The criticism of sufficiency is not limited to methodological issues. Other studies indicate in the same way that possessing resources without knowing how to use them also do not serve as SCA (Makadok, 2001; Peteraf & Barney, 2003). Subsequently, various authors have suggested the conditions in which SCA can be given (e.g., Foss & Knudsen, 2003; Becerra, 2008).

7. The definition of a resource is unfeasible.

The definitions of resources are all inclusive (Priem & Butler, 2001a). A resource means anything that can be considered as a strength or weakness of a company. More formally, the resources of a company at a moment in time could be defined as those assets (tangible and intangible) that are linked to the company. (Wernerfelt, 1984). Although Barney (2001) suggests that inclusivity is part of the strength of the RBV, it is undoubtedly a weakness as it drives the theory towards tautology. The RBV could be improved if the types of resources were more accurately defined: static, dynamic; tangible, intangible; financial, human, technological; deployed, in reserve; perishable, not perishable; and so on, and between the types of property of the resource (Kraaijenbrink et al., 2010).

Once analysed the criticisms and responses to these criticisms that are in the literature, the following section discusses the concept of natural resource-based view (NRBV). This concept is an extension of RBV that takes into account the changes in environmental terms that companies face.

2.1.3 Natural Resource-Based View.

Hart (1995) developed the concept of natural resource-based view (NRBV) in his study: A natural-resource-based view of the firm. This author extended the view of the resources. He understood that due to the environmental circumstances in which we currently live, new resources associated with the environment will be necessary to have a competitive advantage maintained over time. With these premises, he introduced a conceptual framework based on three interconnected strategies: pollution prevention, product stewardship and sustainable development. The following table shows the forces driving each strategy, the key resources for each of the strategies and the competitive advantages that are sought.

Table 2.2. NRBV Keys.

Strategic Capability	Environmental Driving Force	Key Resource	Competitive Advantage
Pollution Prevention	Minimize emissions, effluents, & waste	Continuous improvement	Lower costs
Product Stewardship	Minimize life-cycle cost of products	Stakeholder integration	Preempt competitors
Sustainable Development	Minimize environmental burden of firm growth and development	Shared vision	Future position

Source. Hart (1995)

The strategy of pollution prevention seeks to prevent waste and emissions instead of cleaning them “at the end of the pipe”, this strategy is associated with cost reduction. For example, eliminating contaminants from the production process can increase efficiency by (a) reducing the inputs required, (b) simplifying the process, and (c) reducing the costs of compliance and responsibility (Hart & Dowell, 2011). These types of strategies are directly related to constructs such as green innovation performance (e.g., Chen, Lai, & Wen, 2006; Chen, 2008).

The administration of the product, does not only take into account the prevention of contamination, also serves the entire value chain or “life cycle” of the company's products. This type of strategy is considered to minimize environmental costs throughout the life cycle of the products. For this, all the members involved in this life cycle must be integrated. This administration of the product can favour obtaining a competitive advantage by differentiating the products through greener strategies both in the resources used for their manufacture and establishing standards that are advantageous for the focal company (e.g., Tilley & Young, 2006; Hall, Daneke & Lenox, 2010; Hockerts & Wüstenhagen, 2010).

Finally, the sustainable development strategy has two notable differences with respect to the two strategies just explained. In the first place, a strategy of sustainable development not only seeks to avoid causing environmental damage, for this type of strategy the need to search for production processes that can be sustained over time in a sustainable manner is essential. Secondly, sustainable development considers the environmental implications and also the economic and social implications (e.g., Hall et al., 2010, Hockerts & Wüstenhagen, 2010).

Once the focus of the resources has been analysed, considering the main criticisms that the approach has generated and NRBV, we can now turn to the dynamic capabilities approach.

2.2 Dynamic capabilities (DC).

RBV has received various criticisms from sectors of the scientific community, the most frequent being the one referring to the static dimension of the concept (Fernandes et al., 2017).

Trying to give an answer to the process by which companies reach positions of competitive advantage in dynamic markets, David Teece and Gary Pisano introduced the notion of dynamic capabilities (DC) as a source of competitive advantage (Teece & Pisano, 1994) in an article published in “Industrial and corporate change”. Although, previously, in a working paper written in collaboration with Amy Shuen and presented at the International Institute of Applied Systems Analysis (IIASA) located in Austria, they had already considered and argued that companies can learn and accumulate new skills and abilities. According to these authors, to adapt to constantly changing environments, companies need both external and internal competences.

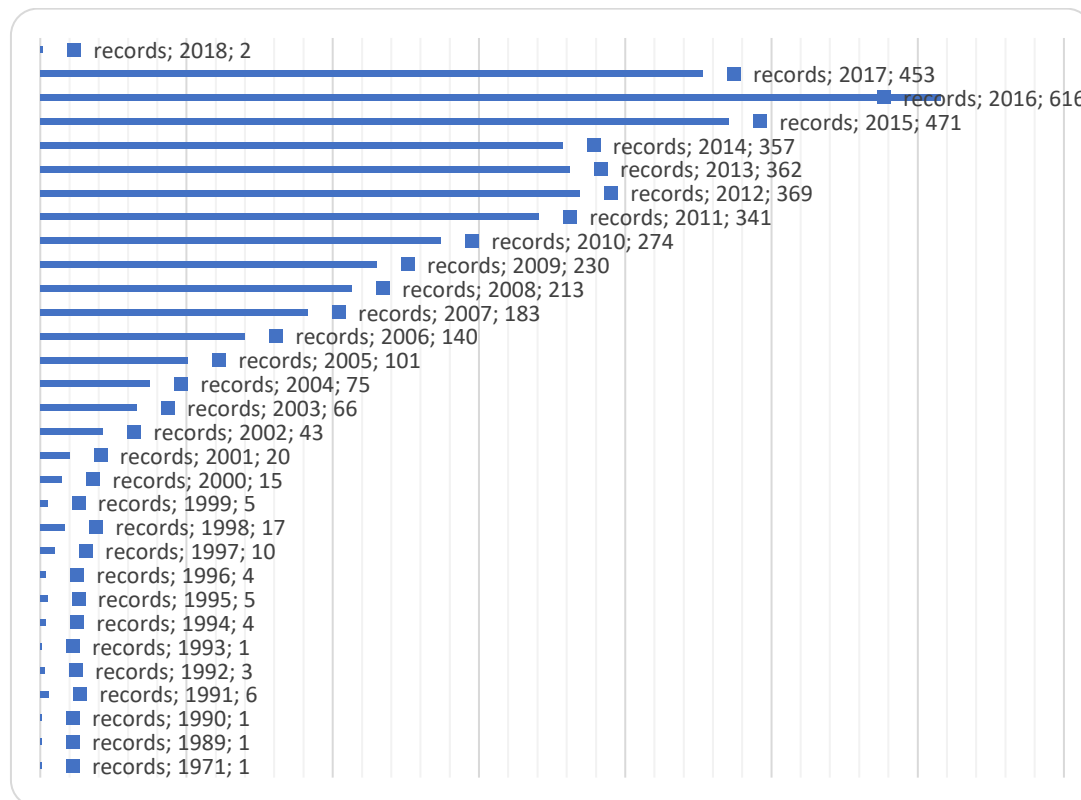
Finally, was in 1997 with the seminal article “Dynamic Capabilities and Strategic Management” (Teece et al., 1997), published in *Strategic Management Journal* when the authors develop the concept of DC and establish their connection with the field of strategic management.

Since then, the theory or perspective of the dynamic capacities has emerged as a field of study based on resources and strategic management (Fernandes et al., 2017) and has had a wide reception throughout these years in the academic world related to management and strategic management (Oliver & Holzinger, 2008; Arend & Bromiley 2009; Barreto, 2010; Di Stefano, Peteraf, & Verona, 2010; Ringov, 2017) complementing the premise of RBV (Wang & Ahmed, 2007; Ambrosini & Bowman, 2009; Barreto, 2010; Schilke, 2014).

As an indicator of this interest and growth of the approach among scholars. The following table shows the evolution of articles published in Web of Science that contain the concept of dynamic abilities in title, abstract or keywords until

December 2017. Since 1997 this concept has generated more than 100 articles per year on average.

Figure 2.3. Articles published about DC. Database WOS.



Source. Own development.

It should be said that the term dynamic capabilities had been used in other areas of study for decades as medicine or robotics (e.g., FitzGerald, Gosling, & Woodcock, 1971; Potkonjak, 1989). For this reason, studies appear in the graph prior to 1994.

Once analysed the reason that this approach arose. The following section shows how DC have been defined in the literature.

2.2.1 Definition of DC.

Perhaps, the definition that has greater relevance on DC comes from Teece et al. (1997, p.516) that define dynamic capabilities “as the ability of the company to integrate, build and reconfigure internally and externally competencies to quickly address changing environments”.

After the introduction and definition that David Teece, Gary Pisano and Amy Shuen made about DC, other definitions have emerged in the literature in studies of great academic impact. DC have been defined as skills (or abilities) and as routines. Recently in the literature and following the previous studies on DC and their definitions or conceptions (abilities or skills vs. routines or processes) some authors (e.g., Barreto, 2010; Peteraf, Di Stefano, & Verona, 2013; Di Stefano, Peteraf, & Verona, 2014; Ringov, 2017) ensure that there are two different and opposite perspectives on DC. The one generated by Teece et al. (1997) as a capacity or ability of the company (Teece et al., 1997; Teece, 2000; Zahra & George, 2002; Benner & Tushman, 2003; Winter, 2003; Knight & Cavusgil, 2004; Zahra, Sapienza, & Davidsson, 2006; Kale & Singh, 2007; Teece, 2007). And the one generated by Eisenhardt & Martin (2000) as processes or organisational and strategic routines through which companies achieve new configurations of resources (Eisenhardt & Martin, 2000; Amit & Zott, 2001; Galunic & Eisenhardt, 2001; Zollo & Winter, 2002; Aragon-Correa & Sharma, 2003; Colbert, 2004; Santos & Eisenhardt, 2005; Sapienza, Autio, George, & Zahra, 2006).

While in general DC research is interested in how companies build and adapt their resources to maximize the organisational fit with the environment (Schilke, 2014). The literature has suggested that not only dynamic environments can be useful DC, but in more stable contexts (e.g., Zollo & Winter, 2002; Zahra et al., 2006; Wu, 2010; Helfat & Winter, 2011) although the dynamic capacities needed in each company could differ according to the context (Eisenhardt & Martin, 2000).

For Easterby-Smith, Lyles, & Peteraf (2009) DC can take different forms and involve different functions, such as marketing, product development or process development, however the main common characteristics are that they are higher level capabilities provide opportunities for the collection and exchange of knowledge, the continuous updating of the operative processes, the interaction with the environment and the evaluations of decision making.

Annex 1 shows the main differences between these two approaches. The following table lists some of the most cited definitions of dynamic capabilities

Table 2.3. Definitions DC.

Study	Definition	Cites 01- 12- 2017
Teece & Pisano (1994, p. 6)	The subset of the competences and capabilities that allow the firm to create new products and processes and respond to changing market circumstances.	-
Teece et al. (1997, p. 516)	The firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.	7703
(Eisenhardt & Martin, 2000, p. 1107).	The firm's processes that use resources —specifically the processes to integrate, reconfigure, gain, and release resources— to match and even create market change; dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die.	3860
Teece (2000, p. 35)	The ability to sense and then seize opportunities quickly and proficiently.	324
Makadok (2001, p. 389)	'capability is defined as a special type of resource—specifically, an organizationally embedded nontransferable firm-specific resource whose purpose is to improve the productivity of the other resources possessed by the firm.	723
Zollo & Winter	A dynamic capability is a learned and stable pattern of collective activity through which the organization	1841

(2002, p. 340)	systematically generates and modifies its operating routines in pursuit of improved effectiveness.	
(Aragon-Correa & Sharma, 2003, p. 73)	DC consist of a set of specific and identifiable processes that, although idiosyncratic to firms in their details and path dependent in their emergence, have significant commonality in the form of best practices across firms, <i>allowing them to generate new, value creating strategies.</i>	
(Winter, 2003, p. 991)	Those (capabilities) that operate to extend, modify, or create ordinary capabilities.	1179
Zahra, et al. (2006, p. 918)	The abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its principal decision maker(s).	602
Teece (2007)	Dynamic capabilities can be disaggregated into the capacity (a) to sense and shape opportunities and threats, (b) to seize opportunities, and (c) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets.	1956
Wang & Ahmed (2007, p.35)	"A firm's behavioural orientation constantly to integrate, reconfigure, renew and recreate its resources and capabilities and, most importantly, upgrade and reconstruct its core capabilities in response to the changing environment to attain and sustain competitive advantage.	421
Barreto (2010, p. 271)	A dynamic capability is the firm's potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and	292

	market-oriented decisions, and to change its resource base.	
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Source. Adapted Barreto (2010).

The present study follows the definition made by Barreto (2010) considering that a dynamic capacity will be that capacity that allows to look for opportunities and to solve the possible problems that the organization faces every day.

The following subsection shows the main arguments for criticism and the main responses to defend this approach.

2.2.2 Criticism and defence of DC.

Despite the great reception that this approach has had during the past ten years as we have already seen through the previous analysis (and in the same way that has happened with resources-based view) the dynamic capabilities approach has generated a division of opinions among scientists. Still emerging in the literature, there are investigations that question the coherence and validity of this emerging conceptual perspective or its inconsistent theoretical justification.

Arend & Bromiley (2009) find four points for which DC are inconsistent. First, they consider that it is not clear what additional value is created through the DC approach compared to existing theories such as the resource-based view (Barney, 1991), knowledge-based approaches or evolutionary economics (Nelson & Winter 1982). Second, there is a lack of coherence in the theoretical foundations. Third, there is a lack of empirical support that shows the positive effects of dynamic capabilities on organisational performance. Finally, the managerial implications of a DC approach are unclear.

Specifically, some researchers have pointed out the lack of clarity and the lack of consensus on the basic elements of the construct. Problems that could hinder development and diminish its potential to be a theory of great impact in strategic management (e.g., Winter, 2003; Ambrosini & Bowman, 2009; Barreto, 2010). In addition, the variability of the theoretical basis behind the DC approach (Wang & Ahmed, 2007; Di Stefano et al., 2010) can complicate the selection of

appropriate research methods. Finally, emerging DC literature and its role in creating value is riddled with inconsistencies, overlapping definitions and outright contradictions (Zahra et al., 2006). That is, DC approaches suffer from inherent conceptual contradictions (Schreyögg & Kliesch-Eberl, 2007).

Other authors have understood that dynamic capacities have a tautological character (Williamson, 1999). Although, in response to this criticism Eisenhardt & Martin (2000) stated in her study “Dynamic capabilities: what are they?” published in “Strategic management journal” that the dynamic capacities are neither imprecise nor tautological.

Kraatz & Zajac (2001, p. 653) for their part, affirmed that “although the concept of dynamic capabilities is attractive, it is quite vague and elusive, having proved to be largely resistant to observation and measurement”. Newbert (2007) in his literature review study found a low level of support (less than 40% of the studies analysed) in his sample of empirical studies that use the dynamic capabilities approach in relation to any competitive advantage or performance, indicating that the field of study was still in a very early research phase. Along these lines, Ambrosini & Bowman (2009) indicate that empirical research on DC is limited. Despite this, several empirical studies report a significant positive relationship between the dynamic capabilities and performance of a company (e.g., Morgan, Vorhies, & Mason, 2009; Schilke, 2014; Stadler, Helfat, & Verona, 2013).

Helfat & Peteraf (2009) respond to the criticisms that DC have received arguing that the terminological and conceptual variety simply reflects the complexity of the phenomena under study and that they require multiple theoretical visions. In the opinion of these authors, any field of research that is in the development phase requires a continuous exploration of the fundamental questions and has a lack of empirical validation. They propose to perform a quantitative research of existing literature to (1) explore the scope of the DC approach within the broader field of SM (strategic management), (2) detect the choices made in current research and the perspectives contained within the scope of the DC approach, and (3) expand their limits, identifying both those questions that have not been addressed so far and the lines of research that have not been connected.

Finally, trying to solve the methodological problems that DC have generated. Eriksson (2013), in his study reviewing the literature on 142 studies, indicates that research in methodological terms suffers among others from a lack of methodological adjustment and a more rigorous sample selection, and mixed methodological approaches should be considered to advance in the DC approach and perform longitudinal studies to understand the evolution of the concept.

2.2.3 Type of capabilities.

Wang & Ahmed (2007) identifies three dimensions of dynamic capabilities in companies: (a) adaptive capacity, (b) absorption capacity, and (c) innovative capacity. The ability to adapt refers to the ability of a company to identify and take advantage of opportunities in emerging markets (Miles & Snow, 1978; Chakravarthy 1982; Hooley, Lynch, & Jobber, 1992). The adaptive capacity, Cohen & Levinthal (1990, p. 128) refer to the absorption capacity: “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends... the ability to evaluate and utilize outside knowledge is largely a function of the level of prior knowledge”.

Zahra & George (2002) in their famous article “Absorptive capacity: A review, reconceptualization, and extension” published in “Academy of Management Review” indicate that absorption capacity is a multidimensional construction and propose four factors that make up the capacity construct of absorption: the acquisition of knowledge, assimilation, transformation and, exploitation. However, empirical studies have not developed and validated a multidimensional construction of absorption capacity (Wang & Ahmed, 2007).

Finally, innovative capacity refers to the ability of companies to develop new products and/or markets, aligning innovative strategic orientation with innovative behaviours and processes (Wang & Ahmed 2004).

According to Fernandes et al. (2017) in their quantitative review of the literature, dynamic capacities can be considered a legitimate approach to strategic management. At the same time, they focus on five differentiated approaches: (a) digital capabilities, (b) knowledge capacities, (c) absorption capacities, (d)

strategic capabilities and (e) Resources. This analysis is congruent with the previous bibliometric study carried out by Ferreira, Fernandes, & Ratten (2016) on strategic management. The first cluster, the digital capabilities, the authors defend the possibility of gaining competitive advantages through the technological resources available. The second, knowledge capabilities, competitive advantages will increase because of that knowledge and access to it. The third cluster, the capacity of absorption, the development of the knowledge of the capacity of absorption and the capacity of learning favours the dynamic capacities and this power the competitive ones. The fourth cluster, the strategic capabilities, considers the company as an entity with unique capabilities, totally different from each other and thanks to this, companies can achieve competitive advantages. Finally, the fifth cluster, of resources and capabilities, is considered as an “umbrella” cluster for the rest of the clusters. This group defends that the best companies achieve competitive advantages through the best use of their resources that drives their respective capabilities.

On the other hand, DC have been catalogued by some scientists as first-order capabilities and second-order capabilities (Collis, 1994; Argote, 1999; Zollo & Winter, 2002; Cepeda & Vera, 2007; Macher & Mowery, 2009). Following this criterion, it is possible to distinguish between first-order dynamic capacities (routines that reconfigure the organisational resource base) and second-order dynamic capacities (routines that reconfigure dynamic first-order capabilities) (Schilke, 2014b).

Once analyzed the types of capabilities. The following section explains how RBV, NRBV and DC support this research.

2.3. RBV y DC supporting this research.

2.3.1 RBV, NRBV and DC in relation to entrepreneurial orientation.

Attending to the literature that precedes us, the resources and capabilities approach offers a theoretical framework that facilitates the study of entrepreneurial orientation (Shum & Lin, 2010; Covin & Miller, 2014; Pindado & Sánchez, 2017; Dickel, 2017) since the interaction of the capabilities that a company possesses with its entrepreneurial orientation will facilitate high business performance (Martin & Javalgi, 2016) and the resources and capabilities that the company possesses will influence its strategy (Hult, Ketchen, & Slater, 2005; Hullova, Trott, & Simms, 2016). Therefore, the EO is one of the most critical resources for business performance (e.g. Covin & Slevin, 1991, Lumpkin & Dess, 1996). At the same time, innovativeness, considered one of the dimensions of the EO, provides a vision and advantages based on processes that make companies more efficient and facilitates the acquisition of resources (McGrath, Tsai, Venkataraman, & MacMillan, 1996). Besides, RBV supports innovativeness in identifying critical firm resources in order to maximize R&D performance (Plank & Doblinger, 2018). In the same way, the proactivity of the company also facilitates the search for resources that facilitate the creation of sustainable or green businesses (Menguc & Ozanne, 2005).

Finally, “senior management and their beliefs about organisational evolution can play an important role in the development of dynamic capacities” (Rindova & Kotha, 2001, p.1274). This suggests that the entrepreneurial orientation of managers in companies will facilitate obtaining certain skills that favour open innovation strategies such as open innovation and green innovation.

2.3.2 RBV, NRBV and DC in relation to open innovation.

In the same way, we must bear in mind that the very definition of open innovation: intentional use of inputs and outputs of knowledge to accelerate internal innovation and expand markets through the external use of innovation

(Chesbrough, 2006), leads us to consider not only the resources and capabilities that the company possesses, but also that a company can improve its results by the ability to renew its resources and capabilities, thus attending to another line based on dynamic capabilities (Teece et al., 1997) . This takes on a relevant importance in a world that evolves more and more with greater speed and where SMEs play with limited resources (Kraus, Mitter, Eggers, & Stieg, 2017).

The resources that the company possesses as well as the capacities, especially the relational ones that favour networking and business collaboration, favour the processes of internationalisation of companies (Pham, Monkhouse, & Barnes, 2017). Likewise, the strategies of companies based on attributes of valuable, rare, perfectly immobile and non-substitutable resources will facilitate the company's exports (Duarte-Alonso & O'Brien, 2017).

Finally, some specific organisational capacities, such as the integration of stakeholders or stakeholders and more sustainable technologies, have a positive impact on green practices in competitiveness (Christmann, 2000; Aragón-Correa & Sharma, 2003; Verbeke, Bowen, & Sellers, 2006; Darnall & Edwards, 2006).

2.3.3 RBV, NRBV and DC in relation to green innovation.

The resource-based view offers a framework for understanding how the company's resources play a fundamental role in the adoption of green strategies (Russo & Fouts, 1997). The NRBV of the company is an adaptation of the company's RBV, which was introduced by Hart (1995) and is necessary to understand the company with the demands imposed by the natural environment (Menguc & Ozanne, 2005). In this way, many studies show how resources and capacities are key factors fostering sustainable innovations in companies (Van Kleef & Roome, 2007; Dangelico, 2016).

At the same time, the resource-based approach and the NRBV favour the relationship between green innovation and the company's financial returns (Bermúdez-Edo, Hurtado-Torres, & Ortiz-de-Mandojana, 2017). This performance will be influenced by the new technologies and sustainable products brought to the market by companies that move their dynamic capacities towards

sustainability (Iles & Martin, 2013). In addition, these relationships will be positively affected by the technological capabilities that companies may possess (Triguero et al., 2016).

On the other hand, Chen (2008) defines green core competence as “the collective learning and capabilities about green innovation and environmental management in an organisation”, these competences being positively related to the performance in the innovation of green products and the performance in the processes of green innovation. Being therefore the capacities that the companies possess or can acquire keys for green innovation performance because new green products may require new R&D capabilities (Melander, 2017). In addition to this, environmental management can be understood as an element of great value in the strategies of companies and this should be understood as a single capacity (Hart, 1995; Chen, 2008).

Hart (1995), argues that environmental management systems in a similar way that Total Quality Management Systems contribute to the development of tacit skills, which are hardly replicable by other firms and therefore can facilitate competitive advantage achievement. This favours the organisational capital of the company, since environmental management processes are generated and established and the administrative processes that serve as a guide for the environmental action of the company (Amores-Salvadó, Martín-de Castro, & Navas-López, 2015).

With all this, it is understood that dynamic capabilities approach can play an important role in the theoretical foundation to understand how companies innovate in a sustainable way (Mousavi & Bossink, 2017).

2.3.4 RBV, NRBV and DC in relation to export.

RBV has been considered as one of the most important theories in the field of export (Morgan, Kaleka, & Katsikeas, 2004; Murray, Gao, & Kotabe, 2011; Chen, Sousa, & He, 2016; Makri, Theodosiou, & Katsikea, 2017).

Resources take the leading role in internationalisation processes (Johanson & Mattsson, 1993; Hutchinson, Fleck, & Lloyd-Reason, 2009). Previous investigations consider the management of the company's resources to obtain a specific performance in the export of the company (Pham et al., 2017; Yan, He, Cheng, 2017).

Other researchers have studied the various resources used by SMEs in their internationalisation processes. These resources have taken into account the existing knowledge base (Yamakawa, Khavul, Peng, & Deeds, 2013), technological knowledge (Karadeniz & Göçer 2007; Bell & Loane, 2010), human capital (Alon, Yeheskel, Lerner, & Zhang, 2013), capital (Prashantham & Dhanaraj 2010), reputation (Yamakawa et al., 2013).

In the same way, companies with a vision towards internationalisation will have a predisposition towards resources that favour the achievement of this strategy in small companies (Sozuer, Altuntas, & Semercioz, 2017) since certain resources facilitate the entry to international markets (Roper & Love, 2002; Quintas, Vázquez, García, & Caballero, 2009; Ochoa, Ríos, & Solano, 2011).

SMEs lack the critical resources needed to effectively manage the innovation process that will produce higher levels of productivity and export performance (Ramaswamy, Kroeck, & Renforth, 1996; Majocchi & Zucchella, 2003). Therefore, obtaining and managing these resources will be key in obtaining their objectives. Acedo & Galan (2011) indicate in their study of small Spanish companies that there is a positive relationship between capabilities and returns in internationalisation. According with this, Monteiro et al. (2017) in their study of 265 Portuguese export companies show that dynamic capabilities and entrepreneurial orientation have a direct impact on export performance. Finally, Zahra & George (2002) suggest, EO capabilities may be particularly useful to firms in international markets.

With all the explained we can understand the mediating role played by open innovation between entrepreneurial orientation and performance in green innovation and export in the achievement of resources from both external sources and internal sources of the organisation, acting as facilitator of the ability to

Entrepreneurial orientation, export performance and green innovation performance: The mediating effect of open innovation in SMEs.

internationalize the products and / or services of a given company and increasing their performance in green innovation.

II. DEVELOPMENT OF CONSTRUCTS.

2.4 Entrepreneurial orientation

This section is composed of the following subsections. In the first place, the term entrepreneurship and its relationship with entrepreneurial orientation are analysed. Next, sustainable entrepreneurship is taken into consideration. After, the entrepreneurial orientation construct is defined and its evolution in literature is analysed. Finally, the dimensions of this construct and the relationships that exist in the literature with respect to the variables studied in this research are considered.

2.4.1 From entrepreneurship to entrepreneurial orientation.

The term entrepreneurship is widely used and applied in many contexts (Lumpkin & Dess, 1996). According to the Royal Spanish Academy (RAE), to undertake is to undertake and begin a work, a business, an endeavour, especially if it contains difficulty or danger. Therefore, it is logical to think that if entrepreneurship is the act of undertaking, this solely is linked to the difficulty or risk. In addition, entrepreneurship is concerned with the discovery and exploitation of profitable opportunities (Shane & Venkataraman, 2000). Hence, entrepreneurship is considered an essential feature to obtain high business returns (Covin & Slevin, 1991). This definition registered in the Royal Spanish Academy is linked to the Entrepreneurial Orientation construct.

Although, by definition, entrepreneurship attends to undertake a business. Many scholars recognize the importance of entrepreneurial activities not only in start-up companies, but also in existing companies (Miller & Friesen, 1982; Burgelman, 1983; Kanter, 1984; Zahra, 1986; Dess et al., 2003; Hult, Snow, & Kandemir, 2003).

Based on previous studies and the numerous typologies that these studies have made in trying to define entrepreneurship (e.g., Webster, 1977; Schollhammer,

1982; Cooper & Dunkelberg, 1986). Lumpkin & Dess (1996) indicate that entrepreneurship can be defined differently according to the various combinations of individual, organisational and environmental characteristics. However, despite all these different ways of classifying the entrepreneurial spirit, the literature has not reached consensus on a definition widely accepted by the scientific community.

In the attempt to define this construct, entrepreneurship is defined by Sharma & Chrisman (1999) as acts of organisational creation, renewal or innovation, which occurs inside or outside an existing organisation. Therefore, considering what happens outside the organisation is an important factor when innovating and therefore relying on external sources will facilitate this vision of the outside of the company.

Despite this, for Shane & Venkataraman (2000) entrepreneurship lacks an intellectual paradigm, these authors described it as “a jumble” of documents that examined scenarios that previous scholars had (arbitrarily) decided involved - business initiation-”

Other scholars have defined entrepreneurship as the study of the formation of companies or organisations (e.g., Klyver, Hindle, & Meyer, 2008; Spencer, Kirchoff, & White, 2008; Reynolds, 2009).

Taking into account the objective of this construct, the entrepreneurial spirit or entrepreneurship has as main objective the creation of wealth (Ireland, Hill, Camp, & Sexton, 2001). In the same way, entrepreneurial activity is basic and fundamental for the development of companies and economic growth and the EO plays a fundamental role in the role of the competitive advantage of entrepreneurial companies (Lumpkin & Dess, 1996).

2.4.2 Sustainable entrepreneurship.

On the other hand, there is a branch of entrepreneurship that tries to link entrepreneurship with sustainability. This line of research has been labelled as sustainable entrepreneurship, green entrepreneurship and eco-entrepreneurship,

understanding that they are synonymous constructs (Gibbs, 2006; Farrinelli, Bottini, Akkoyunlu, & Aern, 2011).

This emerging line of research in sustainable entrepreneurship is based on Schumpeterian entrepreneurial processes and tries to solve the complex dilemma of combining social and ecological problems and acting as an accelerator for industrial transformation (Cohen & Winn, 2007; Hall et al., 2010; Hockerts & Wüstenhagen, 2010; Parrish, 2010; Muñoz & Dimov, 2015).

Considering sustainable entrepreneurship, green entrepreneurship and eco-entrepreneurship, empirical studies have shown that this type of entrepreneurs are capable of propelling social, ecological and economic solutions simultaneously (Schlange, 2006). Finally, there is evidence in the literature that this type of entrepreneurship is related to green innovation (Ebrahimi & Mirbargkar, 2017).

On the other hand, the entrepreneurial orientation is a regular term used in the line of research that studies entrepreneurship (Khandwalla, 1977; Miller & Friesen, 1982; Covin & Slevin, 1989; Rauch et al., 2009; Yeniaras & Unver, 2016). Other authors defend that entrepreneurship at the level of the company is EO (Covin & Lumpkin, 2011).

EO is considered an organisational process that contributes to the survival and performance of the company (e.g., Miller, 1983; Barringer & Bluedorn, 1999; McDougall & Oviatt, 2000; Hitt, Ireland, Camp, & Sexton, 2001; Dimitratos & Plakoyiannaki, 2003) and has become a very popular construct to investigate how companies act in an entrepreneurial way and their relationships with performance and innovation (Stambaugh, Martinez, Lumpkin, & Kataria, 2017).

2.4.3 Definition of entrepreneurial orientation.

Joseph Alois Schumpeter (1934) began with a series of pioneering studies to find the relationship between the entrepreneurs with innovation. For his part, Mintzberg (1973) was one of the first scholars to recognize in his research “Strategy-making in three modes the usefulness of the entrepreneurial strategy”;

another author as Peter Drucker defined innovation in his book «Innovation and entrepreneurship: Practice and principles» (1985) as the specific tool of entrepreneurs.

Danny Miller, is considered the introducer of the concept of EO in the academic literature (Covin & Lumpkin, 2011; Lomberg, Urbig, Stöckmann, Marino, & Dickson, 2017). Although he never mentioned this concept in his initial studies, but the concept of entrepreneurial company, he was the one who aroused the interest of the scientific community with his seminal article “The correlates of entrepreneurship in three types of firms” (Wales et al., 2013). Miller, defined the entrepreneurial company through specific characteristics. According to Miller (1983, p.771), “an entrepreneurial firm is one that engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with “proactive” innovations, beating competitors to the punch” and arriving before its competitors. Therefore, these three characteristics of innovation, proactivity and risk-taking have become the basis of the EO.

On the other hand, Lumpkin & Dess (1996) defined EO as “the organisational processes, methods and styles that firms use to act entrepreneurially” (Lumpkin & Dess, 1996, p. 139). This author, assuming that the conceptualisation and dimensions created in these studies have limitations, comprises the EO as a total of five dimensions that are: ability to innovate or “innovativeness”, “risk taking”, “competitive aggressiveness”, proactivity or “proactiveness” and “autonomy”. In this case, “competitive aggressiveness” refers to how firms react to competitive trends and demands that already exist in the marketplace” (Lumpkin & Dess, 2001, p. 430) and “autonomy refers to the independent action of an individual or a team in bringing forth an idea or vision and carrying it through to completion” (Lumpkin & Dess, 1996, p. 140).

These studies have generated two different perspectives or conceptualisations about the EO. Miller (1983) and Covin & Slevin (1989) have conceptualized the EO as a unidimensional construct in which the common or shared effect of the three dimensions is taken into account. According to Covin & Lumpkin (2011,

p.863) “EO can be understood as a firm-level attribute represented by the unique quality that risk-taking, innovative, and proactive behaviours have in common”.

On the other hand, Lumpkin & Dess (1996) has conceptualized EO as a multidimensional construct in which each dimension has an individual effect on performance (Covin & Wales, 2011; Wales et al., 2013; Covin & Miller, 2014; Lomberg et al., 2017). These two different conceptualisations promote debate (e.g., Covin & Wales, 2011), although this lack of conceptualisation in the concept also generates fragmentation and can hinder progress in their study (Basso et al., 2009).

Other authors indicate that these two conceptualisations are two constructs that require their own definitions (Covin, & Lumpkin, 2011; Covin & Wales, 2011) and that in this way appropriate measurement models can be created for each one. Although, these authors also understand that both conceptualisations can contribute theoretically and practically to research on EO.

Although, the article by Covin & Slevin (1989) is the study that sparked interest in EO by empirically testing the EO construct (Wales et al., 2013), the two conceptualisations have led to a multitude of studies. For example, Voss, Voss, & Moorman (2005) understand the construct under a multidimensional conceptualisation and applying five dimensions of Lumpkin & Dess (1996) examine the relationship between EO and stakeholders understanding that entrepreneurial behaviours facilitate the external search for support in pressure groups or stakeholders. Other studies have considered that the EO must be measured under the composition of four dimensions, being these: ability to innovate or “innovativeness”, “risk taking”, “aggressiveness”, “proactiveness” (e.g., Wang, 2008).

Covin & Slevin (1989) describe entrepreneurial companies as companies with strategies oriented towards innovation and growth through their ability to take on relevant risks, this undoubtedly helps to understand that companies with a greater entrepreneurial orientation tend to look for new challenges and innovate on a regular basis, which drives them to have to look for the best alternatives to achieve these innovations.

Therefore, entrepreneurial orientation can be considered as an orientation characterized by audacity and risk tolerance that lead to a new entry into the market (Naman & Slevin, 1993; Lumpkin & Dess, 1996) and is a key ingredient for the success of the company (Wang 2008).

Regarding the level of study in which EO focuses, there are two levels. In keeping with the definition of Covin et al. (2006, p. 57): “EO is a strategic construct whose conceptual domain includes certain firm-level outcomes and management-related preferences, beliefs, and behaviours as expressed among a firm's top-level managers. “Two stages can be found in the study levels. A first stage in which a large number of studies focused on the characteristics of the firm-level (Miller, 1983; Dess & Lumpkin, 2005) and more recently scholars have focused on the identification of attributes at the individual level that favour orientation towards entrepreneurship (Wiklund & Shepherd, 2011; Eckhardt & Shane, 2013).

Considering the degree of technology of the companies, Zahra & Neubaum (1998) found differences between companies of high and low technology and the possible hostilities on the environment in their sample 321 companies in low and high technology, being the high-tech companies the companies that they have a greater propensity to have typical EO attitudes.

Coupled with this, the EO has long been associated with a proactive competitive stance, the propensity of management for risky projects and the need for the company to participate in “bold, wide-ranging acts” to achieve objectives (Covin & Slevin, 1989; Miller, 1987). On the contrary, senior management is “responsible for the initiation and design of much of the controlled change in his organisation. He continually searches for new opportunities and problems and he initiates improvement projects to deal with these” (Mintzber, 1973, p. 168).

Coupled with this competitive proactivity that is assumed, some scholars have labelled companies as non-entrepreneurial or conservative companies versus entrepreneurial companies, understanding that conservative companies act in a way opposed to entrepreneurial companies (Covin & Slevin, 1998). Considering this character of the entrepreneur, Avlonitis & Salavou (2007) differentiate in

their research between passive and active entrepreneurs, the latter being those who will possess superior characteristics that will facilitate innovation in new products.

The entrepreneur has been seen in the literature as people moved by selfish and for-profit interests (Parrish, 2010). In line with the sustainable entrepreneurship mentioned in the previous section, sustainable or green entrepreneurs are understood as the agents that have the capacity to change the established and unsustainable order of industries and companies (Hall et al., 2010; Hockerts & Wüstenhagen, 2010). That is, it has an entrepreneurial orientation that demands the search for new opportunities bearing in mind the sustainability.

After having considered that, this type of entrepreneur will take into account innovation in the application of more sustainable practices (e.g., alternative technologies, policies for the conservation and efficient disposal of garbage, recycling of materials) in their company (Tilley & Young, 2006; Hall et al., 2010; Hockerts & Wüstenhagen, 2010). Treating this type of EO, other authors include the concept of reflexivity in EO (Suddaby, Bruton, & Si, 2015), showing that both at the individual levels and at the company level attitudes are generated that foster the ability to reflect on opportunities, limitations or impacts of the decisions that are made (DiVito & Bohnsack, 2017).

In addition to the unidimensional or multidimensional character, the level of analysis or technology is also significant for EO construction. Next, a set of the most important definitions of EO is selected.

Table 2.4. Definitions of entrepreneurial orientation.

Selected Past Definitions of (or Pertaining to) Entrepreneurial Orientation	
Authors	Definition of EO
Mintzberg (1973, p. 45)	“In the entrepreneurial mode, strategy-making is dominated by the active search for new opportunities” as well as “dramatic leaps forward in the face of uncertainty”.

Khandwalla (1977, p. 25, [] added)	“The entrepreneurial [management] style is characterized by bold, risky, aggressive decision-making”.
Miller & Friesen (1982, p. 5)	“The entrepreneurial model applies to firms that innovate boldly and regularly while taking considerable risks in their product-market strategies”.
Miller (1983, p. 771)	“An entrepreneurial firm is one that engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with ‘proactive’ innovations, beating competitors to the punch”.
Morris & Paul (1987, p. 249)	“An entrepreneurial firm is one with decision-making norms that emphasize proactive, innovative strategies that contain an element of risk”.
Covin & Slevin (1998, p. 218)	“Entrepreneurial firms are those in which the top managers have entrepreneurial management styles, as evidenced by the firms’ strategic decisions and operating management philosophies. Non-entrepreneurial or conservative firms are those in which the top management style is decidedly risk-averse, non-innovative, and passive or reactive”.
Merz & Sauber (1995, p. 554)	“. . . entrepreneurial orientation is defined as the firm’s degree of proactiveness (aggressiveness) in its chosen product-market unit (PMU) and its willingness to innovate and create new offerings”.
Lumpkin & Dess (1996, pp. 136–137)	“EO refers to the processes, practices, and decision-making activities that lead to new entry” as characterized by one, or more of the following dimensions: “a propensity to act autonomously, a willingness to innovate and take-risks, and a tendency to be aggressive toward competitors and proactive relative to marketplace opportunities”.

Zahra & Neubaum (1998, p. 124)	EO is “the sum of a firm’s radical innovation, proactive strategic action, and risk-taking activities that are manifested in support of projects with uncertain outcomes”.
Voss et al. (2005, p. 1134, [] added)	“... we define EO as a firm-level disposition to engage in behaviours [reflecting risk-taking, innovativeness, proactiveness, autonomy, and competitive aggressiveness] that lead to change in the organization or marketplace”.
Avlonitis & Salavou (2007, p. 567)	“EO constitutes an organizational phenomenon that reflects a managerial capability by which firms embark on proactive and aggressive initiatives to alter the competitive scene to their advantage”.
Cools & Van den Broeck (2007/2008, p. 27)	“Entrepreneurial orientation (EO) refers to the top management’s strategy in relation to innovativeness, proactiveness, and risk taking”.
Pearce, Fritz, & Davis (2010, p. 219)	“An EO is conceptualized as a set of distinct but related behaviors that have the qualities of innovativeness, proactiveness, competitive aggressiveness, risk taking, and autonomy”.
Covin & Lumpkin, (2011, p. 857)	EO, then, could be understood as a usually general or lasting direction of thought, inclination, or interest pertaining to entrepreneurship.

Source. Adapted from Covin & Wales (2011).

This research follows the theoretical definition from Covin & Slevin (1989; 1998). Focusing on the definition of entrepreneurial orientation used in this study, Miller (1983) and Covin & Slevin (1989) define the entrepreneurial orientation as a construct with three dimensions (the capacity for innovation or “innovativeness”, “proactiveness” and “risk taking”).

This definition based on 3 dimensions and 9 items can be considered as the best representation of a conceptual vision of EO (George & Marino, 2011). Consequently, it has been tested in several studies (e.g., Covin et al., 2006; Escribá-Esteve, Sánchez-Peinado, & Sánchez-Peinado, 2008; Green et al., 2008; Brettel, Chomik, & Flatten, 2015; Felzensztein, Ciravegna, Robson, & Amorós, 2015; Lonial & Carter, 2015; Deb & Wiklund, 2017).

Researchers generally regarded EO as a unidimensional variable to examine the cause and effect relationships. Nevertheless, unidimensional construct of EO does not consider the various factors involved in entrepreneurial processes and their diverse impact on performance (Shan, Song, & Ju, 2016).

Following Lumpkin & Dess (1996) scholars also have studied and measured EO as multidimensional construct. Other researchers have considered to use the scale proposed for Covin & Slevin (1989) as a multidimensional construct namely innovativeness, proactiveness and risk-taking (e.g., Wang & Yen, 2012; Dai, Maksimov, Gilbert, & Fernhaber, 2014; Lomberg et al., 2017; Ngoma et al., 2017).

Next, we analyse how these three characteristics have been studied within the scientific community.

2.4.4 Dimensions of entrepreneurial orientation.

2.1.4.1 Innovativeness

Innovativeness is the first dimension that is considered to analyse in EO. This dimension is defined as the opening to new ideas promoted through the culture of a company (Hurley & Hult, 1998). Covin & Slevin (1989) define innovativeness as a tendency towards innovation and Naman & Slevin (1993) refer to the aptitude to innovate and one of the critical factors of leadership to obtain innovation success (Martensen, Dahlgaard, Mi Park-Dahlgaard, & Grønholdt, 2007; Dahlgaard-Park & Dahlgaard, 2010). Therefore, innovativeness refers to the ability of a company to participate or introduce new

processes, products, or ideas (Damanpour, 1991; Hult, Hurley, & Knight, 2004). Being, this feature linked to performance (Chen, Chang, & Chang, 2015), allowing the successful implementation of new and creative ideas within an organisation (Amabile, 1996) and create sustainable competitive advantages that favour the survival of companies (Rhee, Park, & Lee, 2010).

On the other hand, Lumpkin & Dess (1996) in their seminal article described this dimension as the tendency of the company in the search for new ideas, experimentation and creative processes that can result in the acquisition of new products, services, or technological processes. Therefore, consequently to higher yields. Relating to this the last definition, Wang & Yen (2012) using survey data from 267 firms found that innovativeness has a positive relationship with performance. Nevertheless, in the literature does not always exist a positive relationship between innovativeness and performance.

Considering exporting activities, although some research has shown that firm innovativeness is associated with enhanced export success. Rua & França (2015) found that innovativeness has a positive relationship with export performance, however these relations will depend on the conditions under which firm innovativeness activities are done (Boso, Story, Cadogan, Micevski, & Kadić-Maglajlić, 2013). Boso et al. (2013) in their research from Ghana and Bosnia and Herzegovina indicated that innovativeness is beneficial in competitive and dynamic export markets, although less competitive and static markets do not benefit from innovativeness.

At the same time, Yang & Ju (2017) found that innovativeness may drive to superior product quality and green products possess a high quality. Therefore, innovativeness is able to contribute to take green product strategies. Frishammar & Åke Hörte (2007) through a sample of 224 mid-size manufacturing companies showed that innovativeness was positively related to performance in the new product development. At the same time, Slater & Narver (1995, p.68) indicated that companies that possess the entrepreneurial characteristics “improve the creation of new businesses within the existing company and the renewal or reactivation of operating companies that have stagnated or require

transformation”. Innovativeness takes a key role in all these processes of transformation and renewal and can help companies to start the processes towards green strategies.

Finally, Shahzad, Wales, Sharfman, & Stein (2016) suggest that innovativeness play an important role in the generation of stakeholder value. Ramirez-Portilla et al. (2017) through their research from 48 specialized SMEs manufacturing supercars found that to adopt OI strategies affect positively on the innovativeness. At the same time, innovativeness increases innovation speed (Shan et al., 2016) and open innovation is considered a strategy to enhance this speed.

2.1.4.2 Proactiveness.

Regarding this second dimension. Proactive is defined in the Oxford Advanced Learner’s Dictionary as “(of a person or action) creating or controlling a situation rather than just responding to it after it has happened”.

Coupled with the previous definition, scholars have defined proactiveness as the capacity to anticipate and explore new opportunities (Lumpkin & Dess, 1996; Setiawan, Erdogan, & Ogunlana, 2015). That is, a behaviour that seeks opportunities constantly acting on the needs and future trends ahead of competitors, seeking new markets and products (Lumpkin & Dess, 1996; Wiklund & Shepherd, 2003; Anderson, Kreiser, Kuratko, Hornsby, & Eshima, 2015).

Proactiveness plays a fundamental role in achieving business objectives and has been related to the company's ability to obtain resources, in this line companies that are inclined towards proactivity will seek to invest both in training the employees of their company and in recruiting employees by improving human resources (Liu, Zhang, & Hu, 2011).

Scholars have found a positive relationship between proactiveness and performance. For instance, Wang & Yen (2012) using survey data from 267 firms found that proactiveness has a positive relationship with performance. Yeniaras

& Unver (2016) found in their study of 384 companies related to 4 differentiated industries (automobile, electronics, food and textile) that proactivity has a direct relationship with the performance of new products. Nevertheless, Yang & Ju (2017) were not able to support this relationship and found a U-shaped relationship between proactiveness and the quality of the products.

Considering green innovation performance, Dickel (2017) in her article “The impact of protectability and proactiveness on the environmental performance of new ventures” analysed the relationship between the proactive behaviour in 150 companies of clean technology, finding that such behaviour improves the performance of the companies. Regarding performance in new product Frishammar et al. (2007) not found a positive relationship with proactiveness, this finding is directly related with the performance in green products because this kind of products normally require new and cleaner characteristics.

At the same time, other studies have analysed how proactiveness favours interaction with the external environment of the company (Tang, Tang, & Katz, 2014). Link to this, Shahzad et al. (2016) suggest that proactiveness play an important role in the generation of stakeholder value. Therefore, proactive companies will seek open innovation strategies to obtain a network that facilitate to obtain a higher performance.

Finally, Rua & França (2015) found a positive relationship between proactiveness and export performance. Boso, Oghazi, & Hultman (2017) in their study among SMEs in a Sub-Saharan African economy – Ghana suggested that proactiveness positively influences small business activities in the local country and beyond the borders being an essential aspect of competitive on the international market (Rua & França, 2015).

2.1.4.3 Risk-taking.

The third characteristic that is associated with EO is the ability to take risks. By definition, the acts of entrepreneurial activity are uncertain, and the risk is a fundamental aspect of the entrepreneurial process (McMullen & Shepherd,

2006). Therefore, entrepreneurial companies tend to tolerate higher levels of external and internal uncertainty (Wang, 2008).

Covin & Slevin (1998) understand the risk taking as the propensity to favour high return projects, high risk and bold and aggressive strategic actions against low return and lower risk projects and conservative strategic actions.

Cantillon (1734) cited by (Praag, 1999), considered one of the first and oldest experts on entrepreneurship, indicated that one of the factors that differentiated entrepreneurs from other employees is risk-taking, since the entrepreneur assumes the risks of being employed by himself.

Taking into account risk-taking and performance Wang & Yen (2012) using survey data from 267 firms found that risk-taking has a positive relationship with performance. Similarly, Flores Novelo, Ojeda-Villagomez, Kim, & Ramirez-Cedillo (2016) in their research from 41 Mexican software firms showed risk-taking has a positive influence on performance. Nevertheless, there are finding that not support this positive influence.

Wickramaratne, Kiminami, & Yagi (2017) in their study from 109 tea factories found that risk taking is influenced by external relationships. Specifically, the authors indicated risk-taking has a positive relationship with supply chain partners and government and at the same time is negatively influenced by the relationship with other tea factories. While Shahzad et al. (2016) suggest that risk-taking play an important role in the generation of stakeholder value and this relationship can generate OI strategies.

Basile (2012) found a strong link between entrepreneurs' risk taking and the ability to start international activities. Lin & Chang (2017) found a positive significant relationship between management attitude towards risk and internationalisation in their study about key success factors of international market development, being certain tolerance for risk-taking necessary to motivate international expansion (Pérez-Luño, Wiklund, & Cabrera, 2011).

Finally, Yang & Ju (2017) found that risk-taking would decrease product quality and Frishammar & Åke Hörte (2007) not found a positive relationship between

risk-taking and performance in new product. Different and diverse results have been showed through the analysis of innovativeness, proactiveness and risk-taking. Therefore, more studies are required to know better about the relationship among these dimensions of EO and the performance in different performance.

2.5 Open innovation.

This section will consist of three subsections. The first is an analysis of the definitions of the construct as well as the main research that has contributed to open innovation in the literature. Next, criticisms that this construct has received from the scientific community are analysed. Finally, the main research in OI within SMEs is taken into account. In this way, we try to give greater clarity to the newest construct in our study.

2.5.1 Definition of open innovation.

In recent years, open innovation (OI) has attracted a great deal of attention in innovation management research (Rangus, Drnovšek, & Di Minin, 2016; Popa, Soto-Acosta, & Martinez-Conesa, 2017). This construct was initially identified with the collaboration (Alegre, Romera, García-Granero, & Fernández-Mesa, 2018) and the search of external sources and in the literature includes previous studies in this line (e.g., Nelson & Winter, 1982; Granstrand et al., 1997), the study of von Hippel's (1988) "The sources of innovation" or other previous concepts such as those developed by Teece (1986); Cohen & Levinthal (1990); March (1991). The study of Dyer & Singh (1998) also indicated that companies that only rely on closed innovation are losing potential success opportunities and other examples are found in the literature from where they drink many of the studies on OI, the emergence of this construct dates to April 2003. Teece (2007) tell "External search and acquisition of technology have been going on for decades, but as Chesbrough (2003) explains, 'Open Innovation' is now a mandate for enterprise success.

Other authors such as Rosenbloom & Spencer (1996) begin to argue that this innovation closed model was reaching the end of its era, and companies could benefit from other strategies in the generation of innovation. The concept and practice of open innovation underscore the importance of broad-based external search and subsequent integration involving customers, suppliers, and other sources of knowledge.

Open innovation has been embraced by the scientific community as a hot topic in the last decade and by many organisations as a key practice in achieving their new tools and innovation processes, thus increasing competitiveness and performance (Chesbrough & Bogers, 2014).

It should be noted that on this term, several definitions have been used by various authors and this causes some confusion regarding the construct:

“There is also a big drawback of being too imprecise in defining open innovation. An imprecise definition not only makes open innovation more difficult to understand, because little research has been done on the current phenomenon, it also makes it more difficult to implement, because there are a lot of people who talk about “open innovation”. Nevertheless, they are talking about something else” (Christensen, 2012).

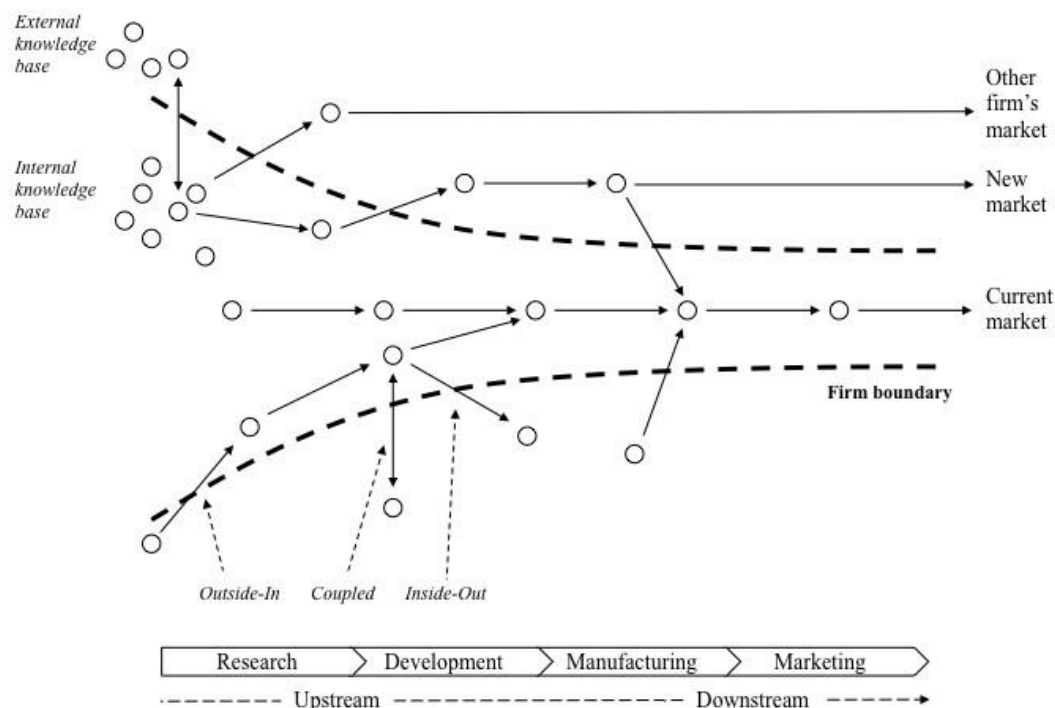
To clarify this discussion, we now refer to a series of definitions that explain the construct under study. While initially open innovation was initially defined as the possibility to take valuable ideas from inside or outside the companies or as Chesbrough (2003, p.37) refers: “in the new model of open innovation, a company commercializes both its own ideas as well as innovations from other firms and seeks ways to bring its in-house ideas to market by deploying pathways outside its current businesses”.

Subsequently and to try to give greater clarity and overcome some limitations open innovation was defined as: “the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand markets by the external use of innovation” (Chesbrough, 2006, p.1).

Finally, in 2014 OI is defined as “a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model” (Chesbrough & Bogers, 2014, p. 12), this being the definition that is followed throughout this research.

Next figure represents the processes in OI strategies.

Figure 2.4. Processes in Open Innovation.



Source. Chesbrough & Bogers (2014).

Open innovation was initially developed based on case studies of industrial practices. Being preceded by a large number of articles (Chesbrough, 2003, 2006).

Together with the particular phenomenon of open innovation in the cooperation with external agents to obtain new innovation projects, there are studies that point to such cooperation in any area of the company. Thus, Urrea (2010) says that inter-company cooperation is a booming phenomenon in an increasingly globalized world and where technological innovation is increasing and increasing speed.

In the literature, over the years, numerous scholars have examined and addressed issues related to open innovation and performance (Roberts, Hann, & Slaughter, 2006; Avlonitis & Salavou, 2007; Lee, Park, & Song, 2009), increase of basic competences (Gassmann & Enkel, 2004), reduction of development costs and time to market new products and processes (Kolk & Püümann 2008), increased

sales ratios and new products (Lichtenthaler 2008; Lazzarotti, Manzini, & Pellegrini 2010) and the open innovation model and performance in innovation (Nieto & Santamaria, 2007). Issues related to the degree of openness have also been addressed by linking it to performance in innovation (e.g., Laursen & Salter, 2006), assuming that by collaborating on R&D activities, internal knowledge can be increased and thus improve performance in the innovation (Ahuja, 2000; Cassiman & Veugelers, 2002; Belderbos, Carree, Diederer, Lokshin, & Veugelers, 2004; Abramovsky, Kremp, Lopez, Schmidt, & Simpson, 2008).

Regarding the main levels of analysis studied on OI, unsurprisingly there have been many different levels of analysis such as the individual level or group, the company level (e.g., Chesbrough & Crowther, 2006; Laursen & Salter, 2006), network (e.g., Perkmann & Walsh, 2007), industry or sector (e.g., van de Vrande, de Jong, Vanhaverbeke, & de Rochemont, 2009) and national or institutional.

Similarly, considering the main topics on OI there have been many different topics of analysis such as the strategy (e.g., Teece, 2007), the development of products (e.g., Chesbrough & Crowther, 2006), innovation processes (e.g., Laursen & Salter, 2006), users, the limits, risks and costs of open innovation (e.g., Laursen & Salter, 2006), the university (e.g., Perkmann & Walsh, 2007) and the environmental context (e.g., Ghisetti, Marzucchi, & Montresor, 2015; Popa et al., 2017).

Considering that OI mainly has three kinds of strategies. Next section takes into account the main processes studied in OI, inbound, outbound and outbound.

2.5.1.1 Inbound, outbound and coupled processes.

With the development of the theory in open innovation, several processes accepted by the scientific community have been labelled: Outside-In (or Inbound); Inside-Out (or Outbound) and a third type of processes which I label as Coupled, where inbound and outbound processes are combined. (Gassmann & Enkel, 2004; Chesbrough & Crowther, 2006).

Outside-In (or Inbound) refers to the processes in which the company searches external sources of knowledge outside its borders to improve internal innovation (Ritala & Huizingh, 2014). In general, the results of the research carried out on open innovation have yielded positive results (Cheng & Huizingh, 2014; Alexy, Bascavusoglu-Moreau, & Salter, 2016).

Nevertheless, not all studies conclude with the same statement. Laursen & Salter (2006) through their study with 2707 manufacturing companies in the United Kingdom found that the search for actors and external sources (breadth and strength) to obtain performance in innovation is curvilinear (taking the form of a U), while that Bengtsson et al. (2015) find in their sample of 415 Italian, Swedish and Finnish companies that the depth of the relations is positively related to the performance in innovation. On the other hand, Barge-Gil (2010) obtains from a sample of Spanish companies that the degree of openness influences performance, with an intermediate degree of openness being better. For their part, Knudsen & Mortensen (2011) showed through an exploratory article that individual strategies are better than collaborative strategies in the development of new products. Finally, Zhu, Dong, Gu, & Dou (2017) in their study of 260 Chinese firms found informal ties with business, government, and university affect positively the inbound innovation openness. Nevertheless, market dynamism only strengthens the relationship between university ties and inbound innovation and weakens the effect of business ties on inbound innovation. Popa et al. (2017) found that organisational factors as commitment-based human resources practices have a positive influence on innovation climate and that innovation climate promotes inbound strategies, although another factor such as environmental dynamism was not supported in this relationship.

Inside-Out (or Outbound) includes activities involved in the exploitation of internal ideas, such as through licensing out or outright selling of knowledge (Lichtenthaler, 2009).

The realization of outbound open innovation strategies is related to both internal factors and external factors (Lichtenthaler, 2015). Zheng, Jiao, & Cai, (2018)

understand that these factors are exploitation (exploitative capability), exploration (explorative capability) and organisation control.

In line with the above, Lichtenthaler (2009) used a sample of 136 industrial companies to test four hypotheses about the moderating effects of environmental factors on the relationship between open innovation strategies and company performance. The results showed that the degree of technological turbulence, the transaction rate in technological markets and the competitive intensity in technological markets strengthen the positive effects of outgoing open innovation on the performance of companies. Zheng et al. (2018) found in their research about Chinese entities that both, internal factors as organisational capabilities and external factors as the role of Intellectual Property protection affect the transferring effects. Zhu et al. (2017) from their study of 260 Chinese analysed as informal network with business, government, and university affect outbound strategies finding only business ties facilitate outbound innovation openness. Popa et al. (2017) revealed that organisational factors such as commitment-based human resources practices have a positive influence on innovation climate and that innovation climate contributes outbound strategies. Besides, contingent factors such as environmental dynamism strengthen the positive effect of innovation climate on outbound strategies. De Jong & Flowers (2018) discovered that outbound strategies are not made for SMEs in their sample of 1004 small businesses in the United Kingdom.

Finally, regarding the processes inbound-outbound or coupled process Cassiman & Valentini (2016) do not find empirical evidence of such positive complementarity in their sample of Belgian manufacturing firms. While De Araújo-Burcharth, Knudsen, & Søndergaard (2014) show in their study a sample of 331 companies that intraorganisational challenges exist for the adoption of any type of inbound or outbound strategies; these being the workers themselves who can be reluctant to use these strategies. Therefore, with all these findings that not always are in the same direction or with the same intensity, more studies in this kind of strategies are required to try of explaining its influence in the firms.

2.5.2 Criticism of OI.

During these years, while a lot of theoretical and methodological papers have been published following this wave of the literature, OI has also suffered critics. Trott & Hartmann (2009) are one example in the paper entitled “Why 'open innovation' is old wine in new bottles”. In this paper the authors explain that the principles of OI are not new and have been used by many firms for many years and further that OI is not a panacea.

At the same time, Groen & Linton (2010) generated a discussion in the Technovation Journal about OI and supply chain management. These two constructs have the same meaning for them. In this way, they opened a discussion: “whether the term OI should be modified or even abandoned in favour of the term supply chain management- a term that is older and has broader use”. In this discussion, Badawy (2011) assumes one distinction between the understandings of the two constructs; in the term “supply chain management” the focus is on efficiency while in the term OI the focus is on effectiveness.

For his part, von Hippel (2010) pointed to some similarity among OI and supply chain management and Von Krogh (2011) concludes with the discussion in Technovation that OI is a very useful term for both scholars and industry.

Meanwhile, Oahey (2013) said “Chesbrough can be criticised for overstating the potential for greater openness in terms of industrial research and development, since a degree of openness has always existed, while simultaneously understating the merits of closed innovation systems”.

2.5.3 Open innovation in the framework of SMEs.

Open innovation is a construct that has given rise to a large number of research papers, either theoretical, qualitative or quantitative in recent years. Despite this, there have been relatively few studies that have taken into account open innovation within the framework of small and medium enterprises (SMEs), having been excluded from the main discussion of open innovation (Lee, Park, Yoon, & Park, 2010; Wynarczyk, Piperopoulos, & McAdam, 2013; Henttonen

& Lehtimäki, 2017; Marangos & Warren, 2017; Popa et al., 2017). In addition, very few empirical studies have considered SMEs in this new paradigm (Verbano, Crema, & Venturini, 2015; Popa et al., 2017) and few focus on the type of open innovation practices in the SMEs (Spithoven, Vanhaverbeke, & Roijackers, 2013). In line with this, Van de Vrande et al. (2009) have made the distinction between exploration or acquisition and exploitation of technology. Being the exploitation of technology linked to inbound processes and exploration with outbound processes.

This exclusion presents severe problems. The first is that some studies suggest that innovation models and processes in SMEs are different when compared to large firms (Edwards, Delbridge, & Munday, 2005). The second reason is that it is not only multinationals that have the capacity for innovation, SMEs also have the capacity for innovation (Acs & Audretsch, 1988) and therefore can benefit from these practices that offers advantages to the company (Guertler & Lindemann, 2016), this becomes more important considering that these types of companies (SMEs) contribute very significantly to the development of our economies. Added to this, Chesbrough (2006) assumes that open innovation is a practice that benefits both large and multinational companies and small and medium-sized enterprises. In addition, as discussed earlier SMEs should be considered because of their high percentage of the total number of companies in Spain and the world.

On the other hand, there is some confusion in the literature as to whether size positively or negatively influences the firm's degree of openness. While some studies show that size positively influences openness (Drechsler & Natter, 2012). Other studies have found that size has an inverted U-ratio on the degree of openness (e.g., Barge-Gil, 2010). Finally, other studies showed that the size of networking affects the performance of a company's innovation (e.g., Egbetokun, 2015). Thus, the problem of size is not an issue that deserves more empirical attention to continue to give clarity to the variables that interact in these models. More recently, some studies have begun to take into account the influence that open innovation can have on SMEs (van der Meer, 2007; van de Vrande et al.,

2009; Ahn et al., 2017; Radicic & Pugh, 2017). Consequently, this line of study can be considered to be still at an early stage. Despite being at an early stage, there is already evidence that SMEs can benefit from knowledge outputs and inputs (Lee, et al., 2010). In fact, small and medium-sized enterprises are increasingly opening their innovation processes to improve innovation outcomes (De Zubielqui, Jones, & Lester, 2016). These early studies already show the importance of the need for further research in the SME sector to provide greater insight. Thus, without this detail, both open innovation researchers and professionals in their firms will continue to struggle with the practical application of the principles of open innovation in different contexts (Schuurman, De Marez, & Ballon, 2016).

In addition, not only do firms that belong to high technology sectors innovate, since SMEs in low-technology sectors also have and play their part in innovation (Koberg, Uhlenbruck, & Sarason, 1996; Santamaría, Nieto, & Barge-Gil, 2009; Ford et al., 2014).

The few studies that have taken SMEs into account and their analysis with open innovation in an empirical way have usually focused on the impact of open innovation on firm performance (e.g., Laursen & Salter, 2006).

By definition, innovation in SMEs has an external focus (Baum, Calabrese, & Silverman, 2000; Edwards et al., 2005), indicating that for these companies and their innovation processes the role inter-organisational is a factor is vital and necessary. In addition, SMEs are increasing their open innovation activities in recent years (van de Vrande, et al., 2009) because collaboration is important to access knowledge, markets and technologies (Goodman, Korsunova, & Halme, 2017).

In the following section we analyse the following construct that is considered in this research, this construct is green innovation performance.

2. 6 Green innovation performance.

This subsection is organized as follows. Firstly, the main definitions of the construct in question are shown. Secondly, a review of the literature is carried out from green innovation to green innovation performance. Finally, the main drivers and barriers in green innovation and its performance are considered.

2.6.1 Definition of green innovation.

Green innovation, eco-innovation, environmental innovation and sustainable innovation are recognized as synonymous and used in the same way by the scientific community (Carrillo-Hermosilla, Del Río, & Könnölä, 2010; Schiederig, Tietze, & Herstatt, 2012; Boons et al., 2013; Díaz-García, González-Moreno, & Sáez-Martínez, 2015; Kunapatarawong, & Martínez-Ros, 2016; Xavier et al., 2017), and these are used interchangeably by of researchers (Hojnik & Ruzzier, 2016; Arfi, Hikkerova, & Sahut, 2017).

Next, we highlight some of the main definitions about the terms that make up this construct.

Sustainable innovation:

- ✓ One of the pioneer authors in this area of study, Brundtland (1987, p. 24) defines sustainable innovation as meeting the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development does imply limits – not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities.
- ✓ Kemp, Arundel, & Smith (2001) and Beise & Rennings (2005) define Green, sustainable, environmental or eco-innovation as processes, techniques, practices, systems and products (new or modified) to avoid or reduce environmental harms.

Eco-innovation:

- ✓ Arundel & Kemp (2009, p.34) indicate that eco-innovation “is a new concept of great importance to business and policy makers. It is about innovations with lower environmental impact than relevant alternatives”.
- ✓ For Horbach, Rammer, & Rennings (2012, p. 119) eco-innovations are “product, process, marketing, and organizational innovations, leading to a noticeable reduction in environmental burdens. Positive environmental effects can be explicit goals or side effects of innovations. They can occur within the respective companies or through customer use of products or services”.

Environmental innovation:

- ✓ Oltra & Saint Jean (2009, p.567) define environmental innovation “as innovations that consist of new or modified processes, practices, systems and products which benefit the environment and so contribute to environmental sustainability”.
- ✓ Arfi et al. (2017, p.2) understand environmental innovation can be defined as “the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organization (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives”.

Finally, green innovation:

- ✓ Chen et al. (2006, p. 332) define green innovation as “hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management”.
- ✓ Triguero et al., (2013, p. 1) Green innovation is the process that “involves the implementation of several management activities aimed at reducing environmental impact”.

- ✓ Albort-Morant et al. (2017, p.3) define green innovation “as a type of innovation whose main objective is to mitigate or avoid environmental damage while protecting the environment and enabling companies to satisfy new consumer demands, create value, and increase yields”.

Although these constructs are considered synonymous. Some researchers qualify that green innovation, eco-innovation and sustainable innovation are more related to an ecological and environmental dimension while sustainable innovation is a concept that also considers the social dimension (Charter & Clark, 2007; Schiederig et al., 2012). Looking at the definitions, only the most recent definition of green innovation (Albort-Morant et al., 2017) mention the two objectives of green innovation. On the one hand, mitigate environmental damage and on the other hand find new opportunities and market niches that allow higher yields.

At the same time, Schiederig et al. (2012) identified 6 fundamental characteristics of green innovation:

1. Innovation object: Product, process, service, method
2. Market orientation: Satisfy needs / be competitive on the market
3. Environmental aspect: Reduce negative impact (optimum = zero impact)
4. Phase: Full life cycle must be considered (for material flow reduction)
5. Impulse: Intention for reduction may be economical or ecological
6. Level: Setting a new innovation / green standard to the firm

Once the concept and its main characteristics have been defined. The next section analyses green innovation and its performance.

2.6.2 From green innovation to green innovation performance.

Although, since the last decades of the last century, issues related to sustainability have begun to arouse interest among researchers from different areas of knowledge (e.g., Porter & van der Linde, 1995; Anderson 1998; Noci & Verganti, 1999) and some researchers begin to use the term green innovation (e.g., Roome, 1992). It is in recent years, when GI has become a central issue in the areas of business, management and industrial organisation (Triguero et al., 2016).

Nowadays, GI is considered by the scientific community and the political sphere a crucial factor in the implementation of corrective measures to alleviate environmental damage (Boons et al., 2013). For this reason, environmental care is on the road map of major economies with treaties and programs supported by major world governments such as the United Nations Environment Program (UNEP). In addition to this, the industry and its manufacturing processes are considered one of the elements that can cause more environmental damage and SMEs make up 99% of companies in the EU (EU, 2014a) and globally (Ebrahimi & Mirbargkar, 2017). Consequently, many SMEs are required to respond to environmental demands (Nunes & Bennet, 2008).

The green innovation is associated with products (services), processes or organisational or management changes that reduce the environmental impact of companies through innovation (Rennings & Zwick, 2002; Chen et al., 2006; Kemp & Pearson, 2007; Wang, 2015; Yang, Zhang, Jiang, & Sun, 2015; Roper & Tapinos, 2016; Arfi et al., 2017; Xavier et al., 2017). Although, green innovation has been categorized in different ways. Thus, Tseng, Huang, & Chiu, (2012) groups green innovation into four main categories: green business innovation; green product innovation; green process innovation; and green technological innovation.

In the same year, Schiederig et al. (2012) assume four main categories in their analysis. These are: product, process, service and method (e.g., business model). Considering the yields in green innovation. Chen, Lai and Wen studied in 2006 green innovation performance. This construct arises from the green innovation division in the performance of green product innovation and the performance of green process innovation.

Green product innovation is defined as an innovation that leads to the design, manufacture and commercialization of products without any or insignificant effect on the human being and the environment during its life phase, and surpasses conventional competitive alternatives commonly used (Wagner, 2009). Therefore, these products will generate a higher value than the products of the competition (Tariq, Badir, Tariq, & Bhutta, 2017).

Similarly, green process innovation is described as the advance in technologies and processes that result in the production of goods with no or minimal environmental impact (Chen, 2011).

The objective of these two concepts process innovation (productive efficiency) and product innovations (product quality) is to combine them in such a way that environmental objectives are achieved (Triguero et al., 2013).

Therefore, green innovation comes from market limitations and customer demands or product life cycles, but also from governmental and/or social pressures. Therefore, GI also creates environmental opportunities for companies (Hall & Mairesse, 1995). Chen et al. (2006) showed that innovations in products and green manufacturing processes are positively associated with the competitive advantage of the company. Chiou, Chan, Lettice, & Chung (2011) found in their study on green supply chain that the companies can improve their environmental performance and improve their competitive advantage in the market if they carry out green strategies in supply chain. Consequently, green innovation will create value for all stakeholders involved in its adoption (Arfi et al., 2017).

In this sense, companies that are proactive in strategies related to green innovation will tend to obtain competitive advantages over the competition (Buhl, Blazejewski, & Dittmer, 2016). Therefore, companies must do everything possible to carry out green innovation and thus strengthen their competitiveness (Tseng et al., 2012). Attending this proactivity, in recent years, some studies reveal that companies have implemented proactive environmental strategies and practices through the use of management initiatives to mitigate the impacts of the company's innovation activities on the environment (Melnyk, Sroufe, & Calantone, 2003; Tseng, 2010; Lin, Tseng, Chen, & Chiu, 2011) and at the same time, improve their performance. In addition, green innovations are one of the most important strategies for achieving sustainable development in the manufacturing industries (Chen et al., 2006). That is, these strategies improve environmental and economic performance (Ekins, 2010).

Understanding the importance of green innovation, a lot of researches has focused their studies on classifying the motivators or facilitators and the main barriers in the adoption of this type of strategies (e.g., Biondi, Iraldo, & Meredith,

2002; Del Brío & Junquera, 2003; Chen, 2008; Horbach, 2008; Zailani, Iranmanesh, Nikbin, & Jumadi, 2014; Abdullah et al., 2016; Tariq et al., 2017).

Next, we analyse the determinants or drivers of green innovation as well as the main barriers that have been studied in the literature.

2.6.3 Green innovation barriers in SMEs.

In the literature, some studies have taken into consideration the barriers that prevent companies from carrying out green innovation. These barriers have been identified and differentiated into external or internal barriers in the organisation. Internal barriers are those that are found in the organisation itself, while external barriers are the problems that can be found outside the company (Kemp & Pearson, 2007).

Abdullah et al. (2016) argue that there are different barriers depending on whether green products, processes or systems (organisational changes) of innovation are considered. In his study, he indicates that environmental resources, aptitude and perception, business practices, government support and customer demands are barriers to green product innovation. On the other hand, the lack of external partners, the lack of information, and the lack of demand from customers are factors that negatively affect green innovation processes.

Other authors, Biondi et al. (2002) in their study based on two research projects funded by the European Union on SMEs identified the lack of an environmental or green culture on the part of SMEs and assumed that this barrier is accentuated when green innovation involves making decisions about the company's investments.

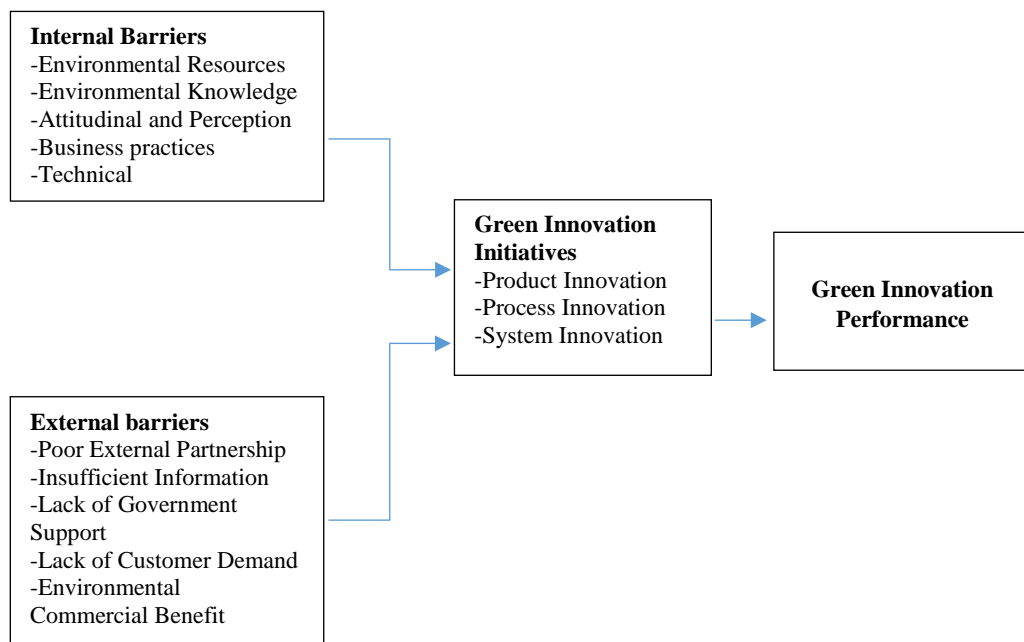
The lack of resources (financial, human, environmental knowledge) are other barriers that companies face. Taking into account financial resources, companies will find major problems especially in technological innovation due to their high costs, SMEs do not usually undertake projects that do not generate a short-term return. The lack of human resources coupled with the amount of time it takes to employ green strategies by managers who do not have knowledge about this type of strategy becomes another problem when taking these strategies.

In a study conducted with Ukrainian SMEs determined that a regulatory framework with needs for improvement and lack of information to companies on the modernization of the green economy are barriers to green innovation (Potapenko, Kornatovskyy, & Shylkina, 2017).

On the contrary, other researchers have highlighted the importance of analysing in future studies the different barriers that exist depending on whether barriers to produce green products, processes or information systems are being analysed (Abdullah et al., 2016).

Next figure shows the main barrier in green innovation.

Figure 2.5. Green innovation barriers.



Source. Adapted from Abdullah et al., (2016).

2.6.4 Green innovation drivers in SMEs.

The drivers or determinants that facilitate green innovation are diverse (Weng & Lin, 2011) and diverse their classifications in different studies.

Several classifications are possible to find in the literature. Del Brío & Junquera (2003) grouped these drivers into financial factors, organisational structure, management style, human resources, environmental management status,

manufacturing activity, technological focus, innovation capacity and external cooperation.

Weng & Lin (2011) for their part, the group in technological factors, organisational factors and environmental factors. Kesidou & Demirel (2012) grouped together the factors that drive green innovation in demand factors, organisational capacities and environmental regulations.

Tariq et al. (2017) analysed in their review article through 195 studies published between 1991 and 2016 different drivers towards green innovation that grouped them into market factors, stakeholders, technological factors, collaborations and networking factor and finally, organisational level factor.

Following this last classification, each of the proposed groupings is analysed.

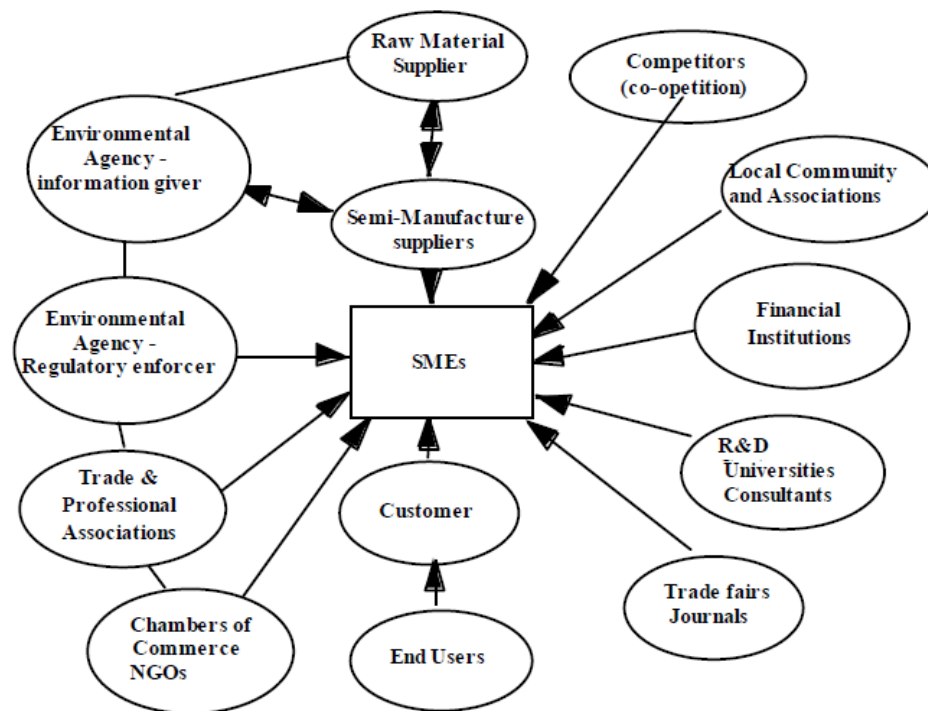
These are:

- ❖ Market factors, such as the extra price that consumers are willing to pay for environmentally friendly products (Bhate & Lawler, 1997). Linked with this, Triguero et al. (2016) found that the business opportunities that arise in terms of green innovation exerts a facilitating role as companies positively evaluate the existence of green market niches. The demands of the market (Artiach, Lee, Nelson, & Walker, 2010; Mondéjar-Jiménez, Segarra-Oña, Peiró-Signes, Payá-Martínez, & Sáez-Martínez, 2015). In this sense, the social conscience of consumers as a variable of market demands influences organisational decisions to carry out green innovation processes and products (Kammerer, 2009).

Stakeholder pressure is considered another key element for green innovation (Berman, Wicks, Kotha, & Jones, 1999; Biondi et al., 2002; Zailani et al., 2014; Gast, Gundolf, & Cesinger, 2017). Tarik et al., (2017) distinguishes two types of stakeholders. The first consists of policies, regulatory frameworks, rates that make companies apply green measures. Nevertheless, along these lines, Triguero et al. (2016) find that environmental policies have no effect on the level of eco-innovation in any of the four categories in which they classify their sample of European SMEs (leaders, followers, loungers and laggards). The second individual or institutional stakeholders among which includes suppliers, customers,

competitors, employees, shareholders and industry associations. On the other hand, Biondi et al. (2002) names supply chains, environmental regulations, cost savings, waste reduction, risk avoidance and pressures exerted by pressure groups such as customers, environmental agencies and consumers are considered facilitators by part of SMEs. To summarize, Meredith & Biondi (1997) describe the main stakeholders that influence and put pressure on SMEs, as can be seen in the following drawing.

Figure 2.6. Green innovation. Stakeholders.



Source. Meredith & Biondi (1997).

- ❖ Technological factors, which require advanced technology that can be provided by patents, copyrights, R&D, or specialized knowledge (Morgan & Piercy, 1998). On the other hand, Zailani et al. (2014) indicate that the adoption by the company of technological innovations favours green innovation.
- ❖ Collaborations and networking factor. Sharing knowledge and transferring it through collaboration and networking with external agents

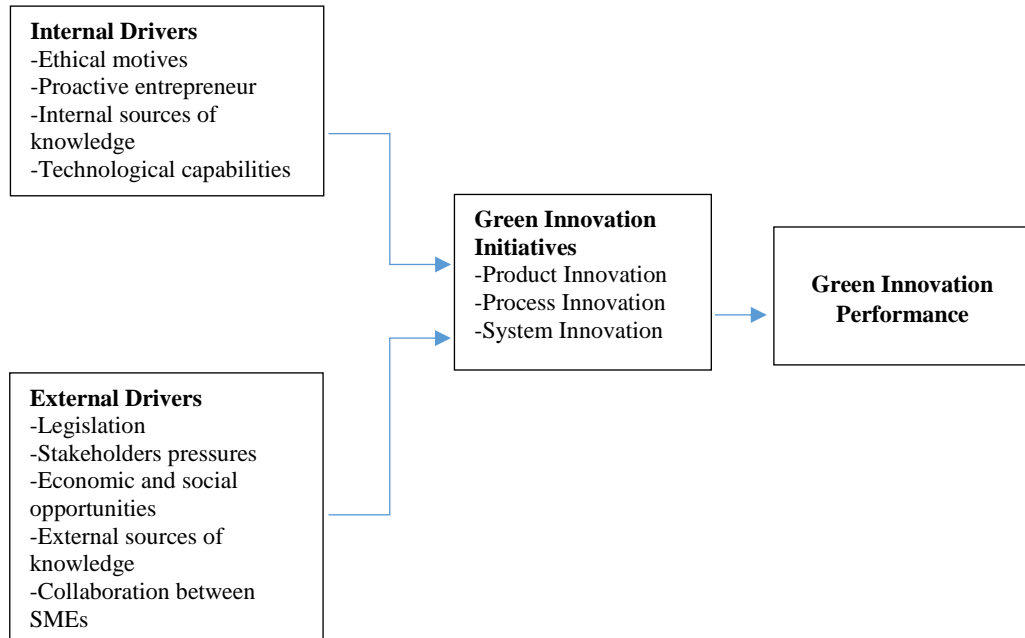
to learn and exchange information is important in achieving green innovation processes and products (Tariq et al., 2017). In the literature, there is evidence that networking and collaboration is positively related to the implementation of green innovations in processes and products (Quist & Tukker, 2013).

On the other hand, Del R  o (2005) cited by Triguero et al. (2013) consider that suppliers, competing clients, NGOs, research centres and financial institutions form an environmental network that pushes and facilitates the adoption of sustainable or green practices.

- ❖ Factors at organisational level such as capacities, size, and quality of human resources or environmental management systems are included in this group of factors favouring green processes and practices (Tariq et al., 2017). Zailani et al. (2014) found in their study focused on the transport industry in Malaysia a positive relationship between the quality factors of human support favouring green innovation. Regarding the size of the company, some studies have perceived that a larger size of the company favours the implementation of green processes and products (Przychodzen & Przychodzen, 2015). On the other hand, Zhu & Sarkis (2004) did not find differences between smaller Chinese manufacturing companies and larger companies.
- ❖ Social, cultural and ethical factors. Considering these factors, Chang (2015) found that Taiwanese manufacturing companies with a green organisational culture have a positive relationship with performance in green product innovation. At the same time, a proactive attitude towards corporate social responsibility mediates between the green organisational culture and performance in the innovation of green products. Other studies have noted that well-designed environmental standards can help sustainability by increasing manufacturers' initiatives to innovate in green products and technologies and thus differentiate their products and reduce production costs through innovations in products and processes (Tseng et al., 2012; Yung et al., 2011).

The main drivers or determinants that have been studied in a schematic manner are shown below.

Figure 2.7. Green innovation. Internal and external drivers.



Source. Adapted from Bansal & Roth (2000); Triguero et al. (2016); Arfi et al. (2017); Marzucchi & Montresor (2017).

2.7 Internationalization. Export performance.

This subsection is organized as follows. Firstly, the main definitions about internationalization are shown. Secondly, an exhaustive review of the literature is carried out, where we find the main topics of interest on the part of researchers on export performance. Finally, the barriers and determinants of export are analysed.

2.7.1 From internationalization to export performance.

Internationalisation is one of the most common growth strategies (Cerrato & Piva, 2012; Kraus, et al., 2017) considered as an incremental process that directly depends on the company's experience, starting with processes of low involvement, as it is the export, and increasing these processes as experience is acquired (Johanson & Wiedersheim, 1975). This definition supported by Johanson & Vahlne (1977). In addition, globalization makes it inevitable that SMEs should bet to internationalize their activities (Fabian et al., 2009; Raymond et al., 2014).

Internationalisation has traditionally been understood from different approaches and has been defined as such in the literature. Some definitions or conceptualisations of internationalisation are based on the processes and operations of the company. Following this conceptualisation, Welch & Luostarinen (1993) define internationalisation as all those movements abroad that the company carries out with its international operations; Calof & Beamish (1995) define it as the process of increasing international operations and Johanson & Mattson (1993) as the process of adapting the operations of companies to international environments to achieve business objectives. Although, this author already begins to take into account the resources within those business operations.

In line with Johanson & Mattson (1993) and with a conceptualisation in which resources take the leading role, Ahokangas (1998) considers that

internationalisation is based on the processes of mobilization, accumulation and development of resources that the company has for international activities.

Others consider that the network or the relationships that the company obtains are the key to these processes. Johanson & Vahlne (1990) conceptualize internationalisation as the cumulative process in which relationships are established, developed, maintained and dissolved according to the objectives of the company. While Coviello & McAuley (1999) define it as a strategy that leads to expansion to markets other than the local one. All this through the constitution of different relationships and processes of adaptation to different environments.

Finally, Lehtinen & Penttinen (1999) define internationalisation as business relations with other countries through the extension, penetration and integration that are achieved through networking that the company possesses. That is, these authors consider that for the internationalisation process to take place, it is necessary that the company is open to the outside world and has resources that encourage external relations to carry out international activities. This last conceptualisation takes into account the resources and capabilities of the company, internal and external operations as well as collaborations to achieve an internationalisation process.

There are different facilitators and barriers for internationalisation processes (Kanda, Hjelm, Kairento, & Nygård, 2016). Li (2018) points out that a past international experience provides greater confidence in future trips abroad, which facilitates internationalisation processes and their returns as an appointment (Reuber & Fischer, 1997). Johanson & Vahlne (1977) consider that knowledge of the market and the country are facilitators to carry out an internationalisation process.

Other factors serve as barriers to these processes. Factors such as cultural distance, among others, classified by Hofstede (1983) in four dimensions, where they show that there are several barriers that organizations face when they are preparing to enter a new country¹.

¹ Next sections develop determinants and barriers in exports activities.

Although the theories about internationalisation have originally focused on large companies and multinationals (Johanson & Vahlne, 1977). In the mid-90s the scientific community began to focus its attention on SMEs, noting that despite having fewer resources than multinationals also perform internationalisation tasks (Rennie, 1993; Oviatt & McDougall, 1994; Madsen & Servais, 1997).

Understanding that internationalisation is a growth strategy widely used by SMEs (Kraus et al., 2017) and export being the most used mode in international processes (Eusebio, Llonch-Andreu, & López-Belbeze, 2007; Westhead, 2008). We now examine export and its study by the scientific community.

2.7.2 Definition of export and its performance.

Export Performance is defined as the result of a company in its activities in the export markets (Shoham, 1996).

There are three modes of entry into international markets: export, licensing and direct investment. Having each of the three forms and their corresponding subdivisions. A basic difference must be considered between the first method or mode of entry, the export, the rest. This difference is the localization effect, since the added value of the product is generated in the country of origin. This form of entry implies conversely a lower degree of commitment and control, since the resources and efforts that are implied by the companies that export are smaller.

The literature distinguishes between two types of exports, indirect and direct. The former, in which the company sells its products in foreign markets through other independent companies, while in the latter the company takes more actively the distribution of its products to consumers in foreign markets (Plá-Barber & León, 2004).

Export has a very important contribution to the global gross domestic product (almost 30% in 2015 according to World Bank statistics) (Makri et al., 2017). In the literature, there are many studies that indicate that export is the most used mode in the early stages of the internationalisation of companies (Burgel & Murray, 2000).

Export represents a viable strategic option for companies seeking to internationalize and has remained the most used mode of entry in recent decades (Zhao & Zou, 2002). It is usually the first step in the process of internationalisation being the method of internationalisation preferred by companies (Johanson & Vahlne, 1977; Agarwal & Ramaswami, 1992; Leonidou, Katsikeas, & Coudounaris, 2010; Paeleman, Fuss, & Vanacker, 2017) including SMEs (Jones, 2001). This is due to the fact that export compared with other modes of international market entry requires a smaller amount of resources (Cavusgil, 1984; Leonidou et al., 2010; Paeleman et al., 2017), vital for SMEs due to their scarcity of resources (Manolova, Brush, Edelman, & Greene, 2002), and a lower risk (O'Cass & Weerawardena, 2009). All this makes exporting a medium with great flexibility that facilitates rapid entry into other markets (Leonidou 1995). In addition, exports play an important role in the survival of companies (Chen et al., 2016).

For these reasons, during the past decades export activities have been analysed and have received great attention from the scientific community (Francioni, Pagano, & Castellani, 2016).

Returns on internationalisation have been considered as sales growth abroad (Antoncic & Hisrich, 2012). In the literature, we find two criteria to measure these performances.

The first and most used is based on economic measures (Chen et al., 2016), among these criteria are profitability in export (e.g., Ahamed & Skallerud, 2013; Boso et al., 2013); export intensity, which refers to the percentage of sales obtained in exports (e.g., Bijmolt & Zwart, 1994; Nakos, Brouthers, & Brouthers, 1998; Pla-Barber & Alegre, 2007; Smith, 2007; Lages, Silva, & Styles, 2009; Eberhard & Craig, 2013; Yi, Wang, & Kafouros, 2013) and export sales (e.g., Aaby & Slater, 1989; Moini, 1995; Foedermayr, Diamantopoulos, & Sichtmann, 2009; Boehe & Cruz, 2010; Bloemer, Pluymaekers, & Odekerken, 2013).

The second, based on non-economic performance measures, has been less studied by researchers. In this group the main measures are: the geographical scope of sales abroad (Culpan, 1989; Reuber & Fischer, 1997); the satisfaction of export

performance (Bijmolt & Zwart, 1994; Sousa & Bradley, 2009; Li, 2010; Sundqvist, Kyläheiko, Kuivalainen, & Cadogan, 2012) and achievement of objectives in exports (Lages, Jap, & Griffith, 2008; Durmuşoğlu, Apfelthaler, Nayir, Alvarez, & Mughan, 2012; He & Wei, 2013).

Over the past decades, numerous studies have considered barriers (e.g., Leonidou, 2004; Pinho & Martins, 2010; Al-Hyari, Al-Weshah, & Alnsour, 2012; Paul, Parthasarathy, & Gupta, 2017) and the facilitators or determinants of export strategies (e.g., Zou & Stan, 1998; Leonidou, Katsikeas, Palihawadana, & Spyropoulou, 2007; Zucchella, Palamara, & Denicolai, 2007; Acedo & Galán, 2011; Nowiński & Rialp, 2013; Chen et al., 2016; Kraus et al., 2017). Next, we analyse in depth both lines within the export investigation.

2.7.3 Export barriers in SMEs.

Assuming that depending on whether the exporters are passive or active, there is a different perception of export problems (Sharkey, Lim, & Kim, 1989). Exports barriers are understood as all the attitudinal, structural, operational and other limitations that hinder a company's ability to initiate, develop or maintain commercial operations in foreign markets (Leonidou, 1995).

In the literature, we can find that barriers to export have been studied at different levels. For example, Katsikeas & Morgan (1994) find four groups of problems or barriers that are: internal, external, operational and informational problems.

Although, the classification of export barriers can be considered in two main groups, external and internal problems (e.g., Leonidou, 2004; Hutchinson et al., 2009; Al-Hyari et al., 2012; Paul et al., 2017).

Leonidou (2004) conducted an analysis of 32 articles in which he classified 39 export barriers. Among the internal barriers considered information barriers such as access to sources of information or ignorance of foreign markets; functional barriers such as the lack of skills to export; financial as the need for capital to carry out this growth strategy and barriers related to marketing and its dimensions (product, price, distribution and logistics).

Among the external barriers encountered procedural barriers: such as the complexity of the procedures required in the export, the possible difficulties of making the collections or communications with customers abroad; of governmental type like the lack of incentives, regulations or bureaucratic complexity; and the tasks of the environment (economic, politico-legal and socio-cultural).

Hutchinson et al. (2009) in their case study of companies from the UK. They disaggregated external and internal barriers relating them to management: deficiencies in the company's vision, fear of losing control, lack of knowledge; the company: lack of resources, lack of consolidation in the domestic market; and the external environment: legislation, cultural and logistic differences or the types of currency in different countries.

On the other hand, Al-Hyari et al. (2012) based on the research conducted by Leonidou (2004) test 36 of the 39 variables that were taken into account in the initial study in his sample of 250 manufacturing companies and SMEs from Jordan. These authors found that external barriers related to economic, governmental and politico-legal variables and internal barriers related to financial and informational variables have a negative relationship with export performance.

Finally, Paul et al. (2017) in their review of the literature through 211 articles published between 1980 and 2016 differentiate between two types of barriers that SMEs have to face when they want to export. These types are internal barriers or micro level, referring to the barriers that the company has internally and externally or macro level barriers, referring to the barriers that arise in the environment of the company.

Among the internal barriers are the difficulty in the selection of trusted distributors, the low bargaining power, the lack of knowledge about the target market, the poor organisation of the export department, the difficulties in accessing information, poor international experience, the lack of capacity to achieve competitive advantages in international markets and the lack of resources.

Among the external barriers, these authors find the lack of adequate commercial institutions, lack of incentives and protection from the government, political instability, legal and political problems, insufficient demand and the problem of adaptation to the entry market.

2.7.4 Export drivers in SMEs.

Determinants of export, also called export stimuli, motives, incentives, or attention evokers (Leonidou et al., 2007) or more recently, drivers. All these terms refer to those factors that trigger companies to carry out export activities.

The determinants of export performance have been studied over the last 50 years (Zou & Stan, 1998; Katsikeas, Leonidou, & Morgan, 2000; Leonidou, Katsikeas, & Samiee, 2002; Chen et al., 2016), generating a greater number of studies than barriers to export (Chen et al., 2016).

As in the case of export barriers, considering the determinants or drivers that facilitate export processes, there are internal facilitators and external facilitators (Sousa & Bradley, 2008). The internal determinants are the factors that belong to the level of the company and the external determinants that belong to the environment. On the contrary, these determinants have been classified into different groups.

Analysing the internal factors, Chen et al. (2016) in their review of the literature through 124 articles selected between 2006 and 2014 found among internal determinants that export marketing strategies; the characteristics of the company; the capabilities of the company and the characteristics of the management team are the variables that facilitate or lead to successful export strategies. Linked to these determinants, Bell & Loane (2010) finds that Web 2.0 tools favour export marketing strategies and the rapid and early internationalisation of companies.

On the other hand, Francioni et al. (2016) distinguished among internal factors: human resources, R&D and productivity activities, marketing tasks and shopping activities. Considering R&D activities Cassiman, Golovko, & Martínez-Ros (2010) found positive the relationship between the innovation of products and the

propensity to export. Nevertheless, cannot sustain this relationship taking into account the processes. Francioni et al. 2016 conclude that R&D and innovation activities can be determinants of export although there are studies that do not reinforce this statement.

Another group of determinants are human resources. These resources are considered vital in the growth and internationalisation of SMEs (Paul et al., 2017). In this sense, companies formed by management teams with international experience can take advantage of this experience to accelerate the development of organisational routines and capacities that facilitate internationalisation (Zucchella et al., 2007; Fernandez-Ortiz & Lombardo, 2009; Bruneel, Yli-Renko, & Clarysse, 2010). Understanding that the human capital of the company is key and has a positive impact on internationalisation processes (Cerrato & Piva, 2012; Onkelinx, Manolova, & Edelman, 2016). The strategic orientation of the company has also been understood as a factor that encourages the internationalisation of the company (Zucchella et al., 2007; Kaur & Sandhu, 2014). Therefore, the entrepreneurial orientation can be considered key as an export facilitator.

Considering external determinants, the factors of the country of origin and the country of destination have given rise to a large number of studies. Chen et al. (2016) highlight the characteristics at the industry level and at the level of the country in which export is intended as the facilitators that have been most studied in this period. On the other hand, Francioni et al. (2016) grouped external drivers into factors of the country of origin; factors of the country of entry and finally the network.

Considering the factors at the level of the country, export promotion programs by local governments are considered effective in the internationalisation of the company (Durmuşoğlu et al., 2012; Cardoza, Fornes, Li, Xu, & Xu, 2015).

Respect on the factors of the country of destination, low levels of hostility (Torkkeli, Puumalainen, Saarenketo, & Kuivalainen, 2012), opportunities in arbitrary markets (Nowiński & Rialp, 2013) and the proximity of customers and

suppliers (Korsakienė & Tvaronavičienė, 2012) play in favour of the internationalisation of companies.

Attending to the network, the international networking that managers have in international markets facilitates knowledge of these markets (Musteen, Datta, & Butts, 2014) and export activities (Torkkeli et al., 2012; Ciravegna, Lopez, & Kundu, 2014).

D'Angelo (2012) in his study on 689 Italian high-tech SMEs that R&D activities and collaboration with external partners for R&D activities positively favour the export. On the other hand, Ramos, Acedo, & Gonzalez (2011) in their study found no positive relationship between open innovation activities and rapid access to international markets. Generating a door to future studies that help to clarify these meetings.

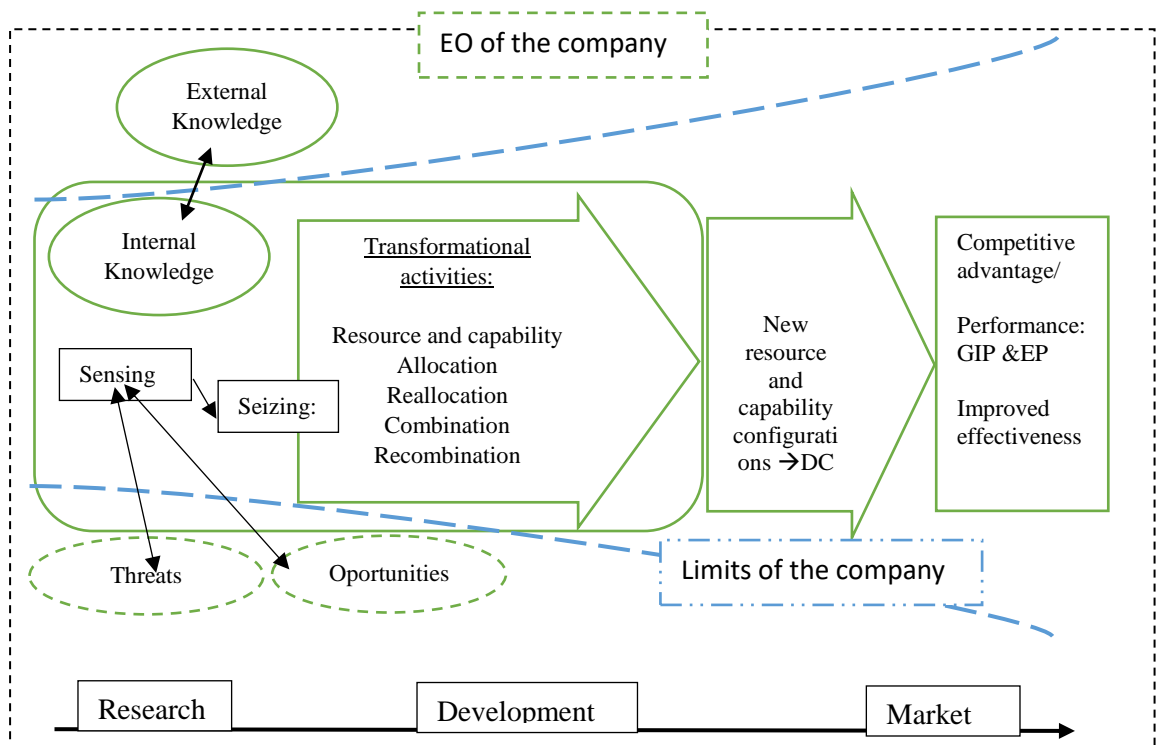
At the same time, Mesquita & Lazzarini (2008) show in their study of Argentine SMEs how collaboration favours and promotes productivity and innovation, which help SMEs to internationalize.

Finally, Rundh (2007) tries to find behavioural differences between SMEs and large companies, although he does not find differences between both in terms of the possession of marketing capabilities and the internationalisation of companies. On the other hand, Paul & Gupta (2014) did find differences between SMEs and large companies, with large companies having advantages over SMEs in the era of globalisation.

2.8 Development of conceptual framework.

Once analyse the concepts of RBV, DC, EO, OI, GIP and EP; an adapted map that considers all the constructs and theories is developed. For this task we consider next studies: Covin & Slevin (1989); Chesbrough (2003); Eriksson (2013); Matysiak, Rugman, & Bausch (2017). In this map, sensing refers to the recognition and evaluation of opportunities and threats. Seizing refers to addressing opportunities and threats to facilitate the creation and exploitation of competitive advantages. At the same time, we see how the flows of knowledge external and internal to organizations go in both directions (basis of collaboration or open innovation). This exchange of knowledge to promote the innovation and favours the integration, the allocation, reassignment, combination or recombination of resources to create capacities. This produces new configurations of resources and capacities that can facilitate competitive advantages, export performance and green innovation performance. All this will be promoted by EO.

Figure 2.8. Research framework.



Adapted from Chesbrough (2003); Eriksson (2013); Matysiak et al. (2017).

III. DEVELOPMENT OF HYPOTHESES.

2.9 Entrepreneurial orientation and its relationship with green innovation.

While traditionally there was a belief that entrepreneurs are often recognised as the creators of economic growth, optimistic, selfish and materialistic individuals (Casson, 1995, p.3, cited by Anderson, 1998) and this may be incompatible with green innovation. At the end of the last century, studies that observe a new trend begin to emerge and assume that the belief that entrepreneurs cannot be environmentally conscious, or do not care to be environmentally aware, is becoming obsolete (Porter & van der Linde 1995; Anderson 1998).

Due to environmental crises and a new generation of consumers, the emergence of environmental entrepreneurs has been encouraged (Dean & McMullen, 2007; Hall et al., 2010) and academics and professionals have stated that entrepreneurs must take an active role in the search to balance economic objectives with sustainability and environmental objectives (Allen & Malin, 2008; Hockerts & Wüstenhagen, 2010) leaving behind a traditional approach to entrepreneurship.

For these reasons, sustainability related to entrepreneurship has become a line of study within entrepreneurship research (Koe & Majid, 2014; Outsios & Kittler, 2017). In the same way as with the term green innovation, in this case several terms have been used for these studies “sustainable entrepreneurship”, “ecopreneurship”, “environmental entrepreneurship/enviropreneurship”, “green entrepreneurship”, and “ecological sustainable entrepreneurship” (Gast et al., 2017) generating a multitude of studies on the same subject with a different name.

Sustainable or green entrepreneurship is based on a long-term value creation model that combines innovation, open collaboration with all stakeholders and a sense of community (Ramos-González, Rubio-Andrés, & Sastre-Castillo, 2017).

On the contrary, entrepreneurship towards sustainability can bring financial benefits from investments made by companies, such as: (1) facilitating access to

certain markets; (2) creation of differentiated products; (3) new revenues from the sale of green technology; (4) better risk management and relationships with external pressure groups; (5) savings in material, energy and services costs; (6) lower cost of capital and labour (Ambec & Lanoie, 2008).

In the field of entrepreneurship, the entrepreneur acts proactively, innovatively and taking risks (Runyan, Droge, & Swinney, 2008) and entrepreneurial orientation is considered as the sum of these three basic characteristics.

First, the capacity for innovation or “innovativeness”. Secondly, proactivity or “proactiveness” and thirdly the decision making that involves a high risk or “risk-taking” (Miller, 1983; Covin & Slevin, 1989). These characteristics or factors are also clearly linked to green innovation and sustainable business practices (Hooi, Ahmad, Amran, & Rahman, 2016; Jansson et al., 2017).

In terms of proactivity and the ability to innovate, they can be considered as fundamental characteristics in the search for new business opportunities where sustainable business practices are found (e.g., Menguc & Ozanne, 2005). In this way, the entrepreneur with a high entrepreneurial orientation will contribute towards the transition of new sustainable processes by incorporating their new sustainable or green products (Klein-Woolthuis, 2010).

One of the problems of SMEs not doing or participating in green practices is that small companies not perceive sustainability related innovation as part of their responsibility (van Hemel & Cramer, 2002) and another problem is not perceiving the link between the implementation of this type of green strategies and the benefits for the company (Weerasiri & Zhengang, 2012; Rezai et al., 2016).

This problem will be less in companies with a high entrepreneurial orientation since proactiveness and risky decision-making are considered as determinants of the generation of innovative green products (Popovici, Marghitas, Dezmirean, & Ilea, 2015).

There is still no adequate understanding of how knowledge sharing can be used to develop green innovation in SMEs (Arfi et al., 2017) and it is necessary to

know how entrepreneurial companies (e.g., new companies and established SMEs) apply proactive strategies guided by the commitment and orientation of their management towards ecological sustainability (Gast et al., 2017).

The above discussion leads us to propose the following hypotheses:

Hypothesis 1a. The entrepreneurial orientation (Innovativeness) positively affects the search and development of green innovation performance of process by SMEs.

Hypothesis 1b. The entrepreneurial orientation (Innovativeness) positively affects the search and development of green innovation performance product by SMEs.

Hypothesis 1c. The entrepreneurial orientation (proactiveness) positively affects the search and development of green innovation performance in process by SMEs.

Hypothesis 1d. The entrepreneurial orientation (proactiveness) positively affects the search and development of green innovation performance in product by SMEs.

Hypothesis 1e. The entrepreneurial orientation (Risk-taking) positively affects the search and development of green innovation performance in process by SMEs.

Hypothesis 1f. The entrepreneurial orientation (Risk-taking) positively affects the search and development of green innovation performance in product by SMEs.

2.10 Entrepreneurial orientation and its relationship with export.

Entrepreneurship has always been a key element in the internationalisation processes of SMEs (Ruzzier, Hisrich, & Antoncic, 2006; Antoncic & Hisrich, 2012) and entrepreneurs have always been considered as the protagonists in the internationalisation of SMEs (Miesenbock, 1998). In addition, the entrepreneurial orientation of the founders or managers of companies is one of the main reasons why companies start exporting (Kaur & Sandhu, 2014). For these reasons, entrepreneurial orientation, internationalisation and competitive strategies continue to focus the interest of scholars (Mathews & Zander, 2007; Cavusgil & Knight, 2015; Hernández-Perlines, Moreno-García, & Yañez-Araque, 2016).

Together with the line of research that studies the relations of entrepreneurial orientation with performance, other conversations have been open, since returns can be of many kinds. One of these types of performance are those produced by the processes of business internationalisation, more specifically export performance and in this line new studies emerge that mark a line to follow (e.g., Fernández-Mesa & Alegre, 2015).

Following the relationships between entrepreneurial orientation and performance, some contradictory relationships are found in the literature, while some studies find a positive relationship (e.g., Stam & Elfring, 2008; Rauch et al., 2009; Wales et al., 2013; Martens, Machado, Martens, & de Freitas, 2018), other studies do not support this relationship (e.g., Smart & Conant, 1994; George et al., 2001; Matsuno et al., 2002) specifying a greater study of the phenomenon. Due to this, some investigations begin to look for an explanation in the mediating variables (e.g., Green et al., 2008), understanding that they are variable can give an answer to this relationship.

Lumpkin & Dess (1996) assumes that the strength in this relationship depends both on the external characteristics of the environment and on the internal characteristics of the organisation. Considering the external characteristics of the environment, it is understood that entrepreneurial orientation companies will be

encouraged to search for elements that help alleviate the possible difficulties of the same.

There are studies that have studied the relationships between EO and performance taking into account contingency variables that are related to organisational factors, such as structure, culture, among others and environmental factors such as the characteristics of the industry or environment (Wiklund, 1999; Wiklund & Shepherd, 2003; 2005; Wiklund, Frese, & Lumpkin, 2004; Rauch, Walter et al, 2005; Covin et al., 2006).

In the same way, there are other factors of a different nature that facilitate the internationalisation of companies, these factors are classified as push and pull factors (Pla-Barber & Leon, 2004). Pull factors are associated with a proactive vision of managers regarding internationalisation activities and as seen in the section on entrepreneurial orientation, proactivity is one of the three dimensions that make up this construct.

The push factors are associated with the difficulties in local markets, such as economic conditions, something consistent with the situation that may exist and exists in many economies worldwide, including Spanish companies. Where the companies of our study are located.

As it has been observed, the processes of internationalisation are complex and risky processes, motivated by various external and internal factors of various kinds. The entrepreneurial orientation favours proactivity and carries with it a lower aversion to risk in making complicated decisions, these nuances make favourable the search for internationalisation strategies by these SMEs. Acedo & Galán (2011) finds in their study of small Spanish companies that the proactivity in decision-making and the perception of risks and opportunities in exports influence the decision to export, this is closely linked to the entrepreneurial nature of managers.

Added to this, the export is the most used route by SMEs as a first step for their internationalization. Our second hypotheses are:

Hypothesis 2a. Entrepreneurial orientation (Innovativeness) has a positive relationship with export performance in SMEs.

Hypothesis 2b. Entrepreneurial orientation (Proactiveness) has a positive relationship with export performance in SMEs.

Hypothesis 2c. Entrepreneurial orientation (Risk-taking) has a positive relationship with export performance in SMEs.

A fact to be considered as an indicator of the importance of the study of certain relationships between variables can be the call for papers. International and renowned magazines such as International Small Business Journal, calls to study the relationships between entrepreneurship and small business management (2014).

2.11 Entrepreneurial orientation and its relationship with open innovation.

Management Innovation is a field that needs further study by the scientific community (Birkinshaw et al., 2008), just as entrepreneurship is a young field that is growing and needs new studies (Ireland et al., 2005), starting from this framework, we intend to study this direct relationship between both variables.

Innovation is considered a specific tool for entrepreneurs (Drucker, 1985) and entrepreneurship has always been closely linked to innovation, sometimes considering the results of innovation as an indicator of entrepreneurship (Ireland et al., 2005). In addition, there are investigations that corroborate and empirically disclose the positive relationship between entrepreneurial orientation and the performance of innovation in companies (e.g., Alegre & Chiva, 2013). Although innovation is an inherent condition of the field of entrepreneurship (Avlonitis & Salavou, 2007), it must be known to what extent open innovation affects that field, since OI is considered an alternative way of combining and integrating ideas, knowledge and resources in business innovation processes (Huizingh, 2010).

The innovation aims to improve the performance of a company through obtaining competitive advantages, or simply maintaining competitiveness (Oslo Manual, 2005), as a result of that, companies with entrepreneurial orientation seek to innovate constantly. In SMEs the entrepreneur plays a crucial role in innovation processes, pursuing and exploring new business opportunities and with his attitude and conviction he will successfully obtain a network for the innovation of his company Vanhaverbeke, Chesbrough, West (2014), this points out that by the characteristics of the entrepreneur it will be easier to access this necessary network. In addition to this, Presenza, Abbate, Meleddu, & Cesaroni (2017) point out that SMEs with greater propensity to access and use external sources of knowledge show a greater capacity for innovation.

Likewise, Vanhaverbeke et al. (2014) points out that the role of the founder or director of an organisation plays a fundamental role in the choice of an open

innovation strategy and that, therefore, new studies must be carried out based on that line to understand the link that unites these two variables. In this sense, the entrepreneur with low aversion to take risks will propel the processes of open innovation (Aquilani, Abbate, & Codini, 2017).

However, according to the Organisation for Economic Cooperation and Development (OECD) in its 2013 annual report says that open innovation is an act that every day emerges more in SMEs and today's innovators use an innovation system where they trust users, suppliers and a deep range of institutions (Szulanski, 1996). That is, they rarely innovate alone (Lee et al., 2009).

Therefore, this does not fail to provide a practical truth that demonstrates a possible connection between the entrepreneurial orientation of SMEs and the search for a strategy that allows them to compete in new markets such as open innovation. In addition, entrepreneurs proactively seek opportunities or associations that can add value, in the field of R&D, associations with participants in the supply chain of SMEs have a positive and significant effect on the overall performance of the company (Rezaei, Ortt, & Trott, 2015).

For all these arguments, understanding that entrepreneurial orientation has a positive relationship with innovation and added to this the EO favours proactivity the search of new strategies as open innovation strategies, we propose:

Hypothesis 3a. Entrepreneurial orientation (Innovativeness) positively affects the search and development of open innovation (inbound strategies) by SMEs.

Hypothesis 3b. Entrepreneurial orientation (Innovativeness) positively affects the search and development of open innovation (outbound strategies) by SMEs.

Hypothesis 3c. The entrepreneurial orientation (proactiveness) positively affects the search and development of open innovation (inbound strategies) by SMEs.

Hypothesis 3d. The entrepreneurial orientation (proactiveness) positively affects the search and development of open innovation (outbound strategies) by SMEs.

Hypothesis 3e. Entrepreneurial orientation (Risk-taking) positively affects the search and development of open innovation (inbound strategies) by SMEs.

Hypothesis 3f. The entrepreneurial orientation (Risk-taking) positively affects the search and development of open innovation (outbound strategies) by SMEs.

As in the previous relationship, there are indicators that show that certain relationships are of high interest to the scientific community. Entrepreneurship and its relationships with other variables such as open innovation are currently in vogue; It is not uncommon to see a lot of call for papers where you are invited to submit articles that include these variables, such as the Annual World Open Innovation Conferences (2014; 2015; 2016 and 2017) where one of the topics addressed is to the role of individuals in open innovation.

2.12 Open innovation and its relationship with green innovation performance.

Open innovation means that valuable ideas can come from within or outside the company and can go to the market from within or outside the company as well. This approach places external ideas and roads external to the market at the same level of importance as ideas and internal paths (Chesbrough, 2003) using monetary or non-monetary mechanisms in line with the business model (Chesbrough & Bogers., 2014). With this approach, it is understood that companies will benefit both from external sources and from the ideas that are found within the company.

Open innovation has been welcomed by the scientific community as a hot topic in the last decade, and by many organisations as a fundamental practice in the achievement of new tools and innovation processes, thus increasing competitiveness and performance (Chesbrough & Bogers, 2014).

Green innovation must create value for all stakeholders involved in the adoption of these strategies (Arfi et al., 2017) and green collaborations with external partners are beneficial to firms' performances (Dangelico & Pontrandolfo, 2015). This suggests that all parties involved in the green innovation process can benefit from the knowledge shared among the companies. The exchange of knowledge is the fundamental means through which employees can exchange their knowledge and contribute to the application of knowledge, innovation and consequently to create a competitive advantage for organisations (Wang & Noe, 2010). That is, the sources of knowledge have a positive effect on the yields of green innovation (Ghisetti et al., 2015).

More recently, a large number of studies have highlighted the importance of complementing the analysis of these external drivers with internal factors of the company, both specific to environmental innovation, such as the presence of environmental management systems such as EMAS and ISO14000 (e.g., Rennings, Ziegler, Ankele & Hoffmann, 2006; Wagner, 2009) and common to all innovations, including investment in R&D, the purchase of patents and

innovation-oriented cooperation (e.g., De Marchi, 2012; Horbach et al. ., 2012). Therefore, external and internal factors play a fundamental role in green innovations and their performance and open innovation facilitates this type of strategies.

According to the above, De Marchi (2012) finds in his study of Spanish companies that companies that cooperate with external partners have better results in green innovation than companies that do not cooperate and assume that this cooperation is more effective with suppliers and universities. Although, in his study, cooperation with clients does not seem to be as effective. Other studies suggest that sustainable innovations require inputs of knowledge from different sources, even these inputs must be greater than for other types of innovations (Horbach, Oltra, & Belin, 2013) and open innovation strategies facilitate this knowledge to the company from external sources.

Given the above we propose the following:

Hypothesis 4a. Open innovation (inbound strategies) has a positive relationship with green innovation performance in process.

Hypothesis 4b. Open innovation (inbound strategies) has a positive relationship with green innovation performance in product.

Hypothesis 4c. Open innovation (outbound strategies) has a positive relationship with green innovation performance in process.

Hypothesis 4d. Open innovation (outbound strategies) has a positive relationship with green innovation performance in product.

2.13 Open innovation and its relationship with export performance.

A stream of research has tried to study what are the critical factors that determine the success of exports in SMEs (Sousa, Martinez-Lopez, & Coelho, 2008; Morgan, Katsikeas, & Vorhies, 2012). A factor that is largely related to export is the capacity for innovation (Covin & Miller, 2014) and open innovation increases innovation activities (Chesbrough, 2006).

Innovation activities are understood as all the scientific, technological, organisational, financial and commercial activities aimed at driving the application of innovations, these activities being innovative in themselves, or simply necessary for implementation (Oslo Manual, 2005), with which and taking into account the above, open innovation should be considered as a critical factor that must be studied.

Academic studies have examined the relationships between degrees of openness and the positive effects of corporate learning (e.g., Love, Roper, & Vahter 2013). In addition, knowledge creation processes are interrelated with the internationalisation of organisations (Love & Ganotakis 2013). Added to this, for SMEs export plays an important role, as a factor in the development and achievement of their strategies (Golovko & Valentini, 2011).

The literature argues that, in general, innovative companies have a greater tendency to search for markets abroad in order to increase their sales volume and achieve certain economies of scale (Tidd, Bessant, & Pavitt, 1997; Rogers, 2004).

Likewise, it is shown that innovation gives companies greater market power and therefore makes them have greater performance in the export of their products or services (Roper & Love, 2002). Other studies argue that the existing relationship between export and performance in innovation only occurs in one direction, positively impacting export processes in innovation (Arvanitis, Gkypali, & Tsekouras, 2014), unable to demonstrate that innovation positively impacts the processes of internationalisation, while others argue that there is a relationship

between the influence of innovation on export having been corroborated in various studies (e.g., Pla-Barber & Alegre, 2007).

The literature shows how there are external and internal factors that facilitate the processes of internationalisation, among the factors intern level are the mentality of managers that is a distinctive feature among managers with an entrepreneurial orientation, while among external factors among others are the facilities that can be provided by a series of agents such as associations (Pla-Barber & Leon, 2004), these associations at the innovation level are the precursors of the practice of open innovation.

Despite the problems that arise when a company intends to internationalise and sell its products or services abroad, companies that implement open innovation, are favoured by obtaining products and services with a greater degree of adaptation to the country of destination by the adoption of knowledge, both external and internal to the company, even this external knowledge can provide the country of destination.

And on the other hand, SMEs that take advantage of closed innovation only limit their capacity to innovate due to their limited resources compared to those of large companies, putting into practice open innovation strategies can increase the level of sales in the export of their products.

That is why the scientific community has devoted special attention to the results of exports in companies. In the literature on open innovation, insufficient attention has been given to the internationalisation of the company, which is essential for companies to increase their performance (Sekliuckiene, Sedziniauskiene, & Viburys, 2016).

For these reasons, the conclusion reached is that the most coherent input mode to analyse this study, where the sample is SMEs, is export and that it should be studied within the framework of open innovation and it is suggested that:

Hypothesis 5a. Open innovation (inbound strategies) positively influences the export performance of SMEs.

Hypothesis 5b. Open innovation (outbound strategies) positively influences the export performance of SMEs.

2.14 Entrepreneurial orientation and green innovation performance: The mediating effect of open innovation in SMEs.

As with the mediation between entrepreneurial orientation and export performance in this case, we find that the entrepreneurial orientation is understood as the processes to carry out strategies, structures and behaviours of companies that possess a certain degree of proactivity, taking decision on risk and ability to innovate that facilitate the search for opportunities (Lumpkin & Dess, 1996, Lumpkin, Cogliser, & Schneider, 2009).

Research on mediators remains scarce and there is little understanding of the causal mechanisms of how or why EO affects other variables (Wales et al., 2013). These variables can be mediated variables. Some studies suggest that for the development of entrepreneurial orientation, more variables should be added in future research to help unite entrepreneurial orientation and performance (Rauch et al., 2009). At the same time, in general, research indicates a positive impact of EO on company performance, although associated analyses suggest that the relationship between EO and performance is mediated or moderated by several variables (Messersmith & Wales, 2013; Lechner & Gudmundsson, 2014). These variables can be mediating variables, such as open innovation.

The entrepreneurial orientation of the company will make them moved by the ability to innovate that characterizes this type of companies together to see an opportunity in green innovation as consumers are willing to pay an extra price for environmentally friendly products (Bhate & Lawler, 1997). In addition, the business opportunities that arise in terms of green innovation play a facilitating role since companies positively evaluate the existence of green market niches (Triguero et al., 2016) and entrepreneurial orientation facilitates the search for opportunities (Lumpkin & Dess, 1996; Lumpkin, et al., 2009). Nonetheless, entrepreneurial companies create, define, discover and exploit opportunities frequently far ahead of their competitors (Miller, 1983; Hamel & Prahalad, 1994; Sathe, 2003), therefore these types of companies will discover and exploit the opportunities described that facilitates green innovation and will obtain better

performance in the innovation of products, processes and organisational innovations linked to sustainability.

Therefore, once the previous hypotheses have been raised and to finalize the proposed model of mediation, we study the mediating role of open innovation between the dimensions of EO and the yields of green innovation. Understanding that in order to carry out green innovation, a series of resources and external knowledge are required to be used in the organisation, enabling entrepreneurs or CEOs of companies with an entrepreneurial orientation to obtain superior tools and innovation, which allows obtaining new opportunities with more sustainable products and processes. Thus, we propose the following:

Hypothesis 6a. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (innovativeness) and green innovation performance in process by SMEs.

Hypothesis 6b. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (innovativeness) and green innovation performance in process by SMEs.

Hypothesis 6c. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (proactiveness) and green innovation performance in process by SMEs.

Hypothesis 6d. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (proactiveness) and green innovation performance in process by SMEs.

Hypothesis 6e. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (risk-taking) and green innovation performance in process by SMEs.

Hypothesis 6f. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (risk-taking) and green innovation performance in process by SMEs.

Hypothesis 6g. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (innovativeness) and green innovation performance in product by SMEs.

Hypothesis 6h. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (innovativeness) and green innovation performance in product by SMEs.

Hypothesis 6h. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (risk-taking) and green innovation performance in product by SMEs.

Hypothesis 6i. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (risk-taking) and green innovation performance in product by SMEs.

2.15 Entrepreneurial orientation and export performance: The mediating effect of open innovation in SMEs.

Finally, people who have an orientation towards entrepreneurship tend to be more innovative and hence another dimension to measure entrepreneurial orientation is the ability to innovate. This capacity is increased when innovation ceases to be closed and becomes open, since the speed to innovate and resources and capacities can be multiplied thanks to open innovation (Chesbrough, 2006). In addition, it is logical to think that people who have a greater capacity for innovation, together with less aversion towards decisions that involve high risk will be more open to models generated by open innovation.

We find in the literature positive relationships between product innovation and export (e.g., Alegre, Plá Barber, Chiva, & Villar, 2012), between the decisions to operate in foreign markets and the relationships between companies such as networking (Vissak & Francioni, 2013) which to the contrary facilitate open innovation strategies and in the same way, positive relationships between entrepreneurial orientation and export processes (e.g., Yeoh & Jeong, 1995).

The literature on the management innovation argues that generally innovative companies have a greater tendency to search for markets abroad, in order to increase their sales volume and obtain certain economies of scale and distribute the fixed costs of the innovation (Tidd et al., 1997; Rogers, 2004).

Conversely, entrepreneurial companies create, define, discover and exploit opportunities frequently far ahead of their competitors (Miller, 1983; Hamel & Prahalad, 1994; Sathe, 2003) therefore, it is understood that innovation can empower the market and facilitate internationalisation processes (Roper & Love, 2002). At the same time, innovation allows the acquisition of new knowledge and companies need specific knowledge to enter new markets (Majocchi, Bacchiocchi, & Mayrhofer, 2005). This specific knowledge can be achieved using open innovation strategies. D'Angelo (2012) in his study of 689 high-tech Italian SMEs that R&D activities and collaboration with external partners for

R&D activities, such as universities, positively favour export intensity. That is, open innovation strategies are facilitators of internationalisation.

Some studies suggest that for the development of entrepreneurial orientation, more variables should be added in future research to help unite entrepreneurial orientation and performance (Rauch et al., 2009). At the same time, in general, research indicates a positive impact of EO on performance, although associated analyses suggest that the EO-performance relationship is mediated or moderated by several variables (Messersmith & Wales, 2013; Lechner & Gudmundsson, 2014).

Research on mediators remains rare and there is little understanding of the causal mechanisms of how or why EO affects other variables (Wales et al., 2013). These variables can be mediating variables, which play an important role in the studies of export performance, so it is important to take them into account (Katsikeas et al., 2000).

In addition, there are numerous studies that associate the size of companies with export results (e.g., Pla-Barber & Alegre, 2007; Can & Gozgor, 2017), with the positive relationship between size and export success in some cases, (e.g., Emodi, Murthy, Emodi, & Emodi, 2017), because of the capacities and advantages that size provides, while in other studies the relationship has been negative (e.g., Lu & Beamish, 2001). In this case, a sample of SMEs is chosen to observe the behavior of these companies and contribute to respond to the line of literature that considers the size with the export. Taking into account a variable that has not been considered in this conversation, it is open innovation.

Therefore, once the previous hypotheses have been raised and to finalize the proposed model, the mediating role of open innovation between entrepreneurial orientation dimensions and export performance is studied. Understanding that open innovation facilitates the search and acquisition of resources and external knowledge to be used in the organisation, enabling entrepreneurs or CEOs of companies with an entrepreneurial orientation to obtain superior tools and innovation, which allows the exit to new international markets and hence the yields in export. Thus, we propose the following:

Hypothesis 7a. Open innovation (inbound strategies) plays a mediating role between entrepreneurial orientation (innovativeness) and export performance in SMEs.

Hypothesis 7b. Open innovation (outbound strategies) plays a mediating role between entrepreneurial orientation (innovativeness) and export performance in SMEs.

Hypothesis 7c. Open innovation (inbound strategies) plays a mediating role between entrepreneurial orientation (proactiveness) and export performance in SMEs.

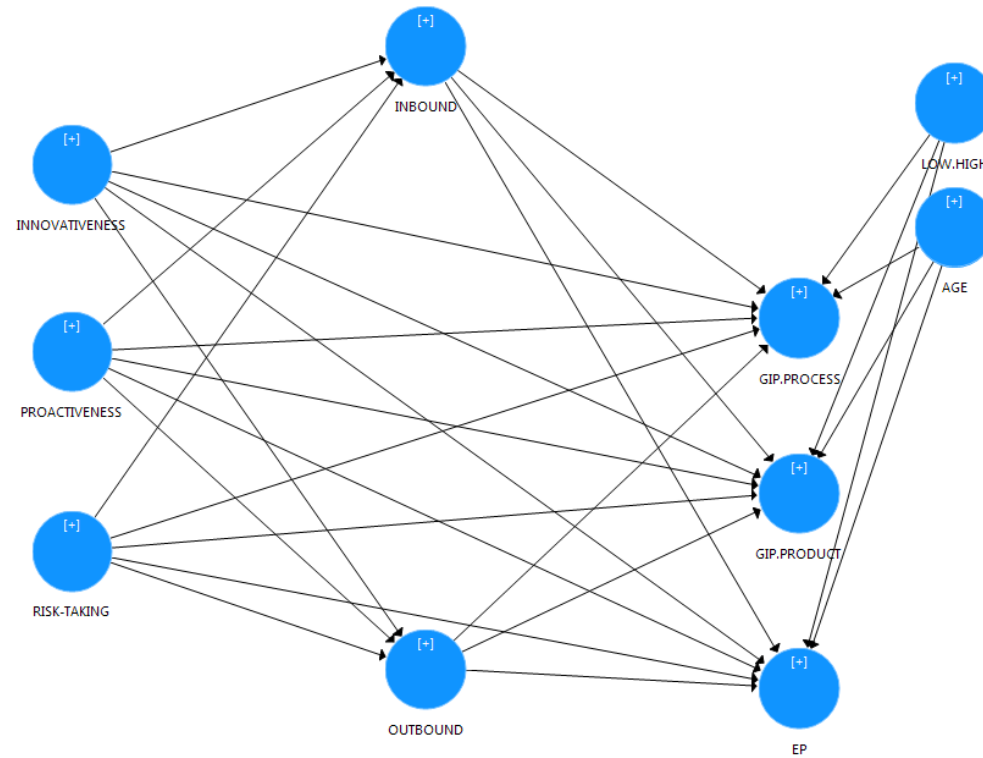
Hypothesis 7d. Open innovation (outbound strategies) plays a mediating role between entrepreneurial orientation (proactiveness) and export performance in SMEs.

Hypothesis 7e. Open innovation (inbound strategies) plays a mediating role between entrepreneurial orientation (risk-taking) and export performance in SMEs.

Hypothesis 7f. Open innovation (outbound strategies) plays a mediating role between entrepreneurial orientation (risk-taking) and export performance in SMEs.

2.16 Summary of hypotheses.

Figure 2.9. Summary of hypotheses

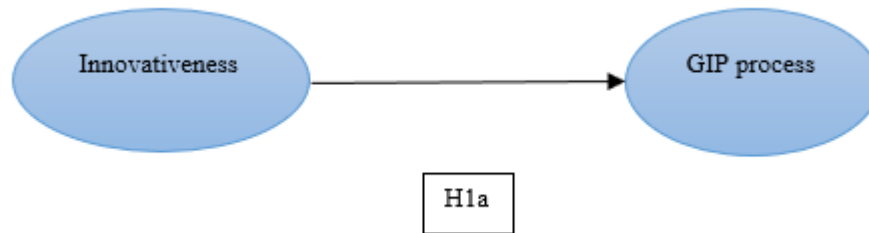


Source. Smart PLS.

2.16.1 Direct relationships.

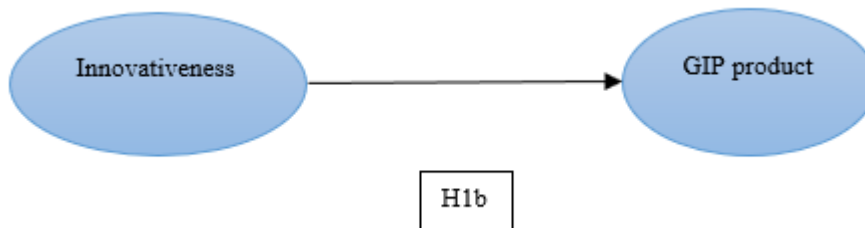
Hypothesis 1a. The entrepreneurial orientation (Innovativeness) positively affects the search and development of green innovation performance (process) by SMEs.

Figure 2.10. Hypothesis 1a.



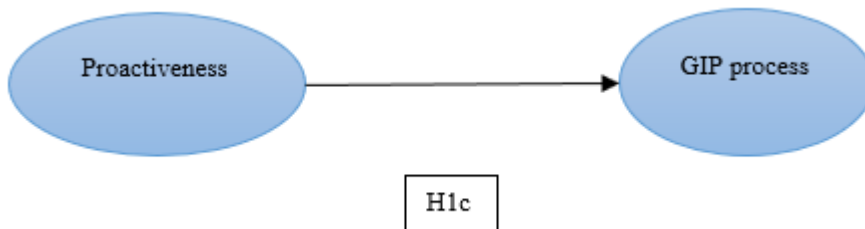
Hypothesis 1b. The entrepreneurial orientation (Innovativeness) positively affects the search and development of green innovation performance (product) by SMEs.

Figure 2.11. Hypothesis 1b.



Hypothesis 1c. The entrepreneurial orientation (proactiveness) positively affects the search and development of green innovation performance (process) by SMEs.

Figure 2.12. Hypothesis 1c.



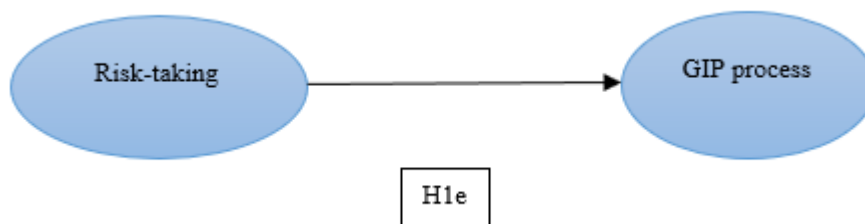
Hypothesis 1d. The entrepreneurial orientation (proactiveness) positively affects the search and development of green innovation performance (product) by SMEs.

Figure 2.13. Hypothesis 1d.



Hypothesis 1e. The entrepreneurial orientation (Risk-taking) positively affects the search and development of green innovation performance (process) by SMEs.

Figure 2.14. Hypothesis 1e.



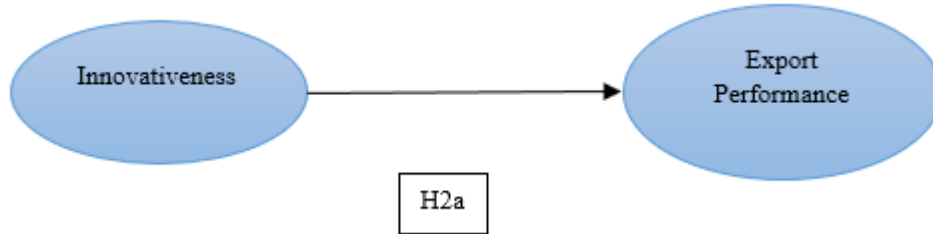
Hypothesis 1f. The entrepreneurial orientation (Risk-taking) positively affects the search and development green innovation performance (product) by SMEs.

Figure 2.15. Hypothesis 1f.



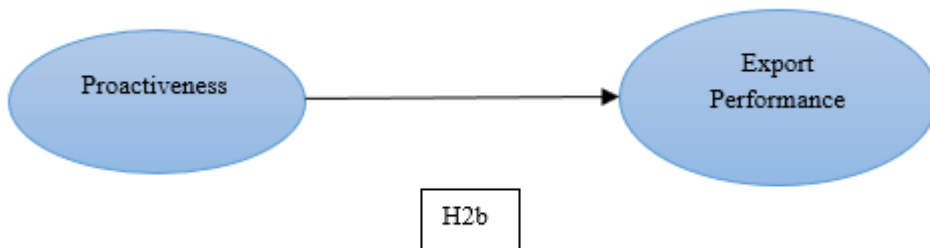
Hypothesis 2a. Entrepreneurial orientation (Innovativeness) has a positive relationship with export performance in SMEs.

Figure 2.16. Hypothesis 2a.



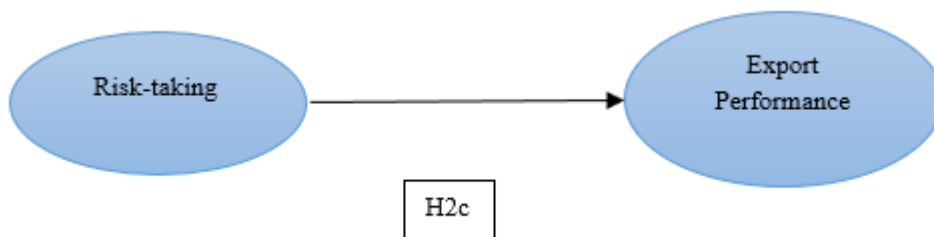
Hypothesis 2b. Entrepreneurial orientation (Proactiveness) has a positive relationship with export performance in SMEs.

Figure 2.17. Hypothesis 2b.



Hypothesis 2c. Entrepreneurial orientation (Risk-taking) has a positive relationship with export performance in SMEs.

Figure 2.18. Hypothesis 2c.



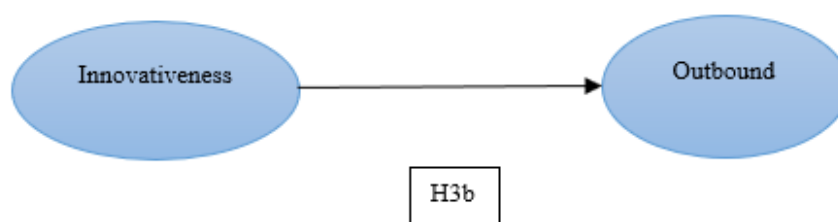
Hypothesis 3a. Entrepreneurial orientation (Innovativeness) positively affects the search and development of open innovation (inbound strategies) by SMEs.

Figure 2.19. Hypothesis 3a.



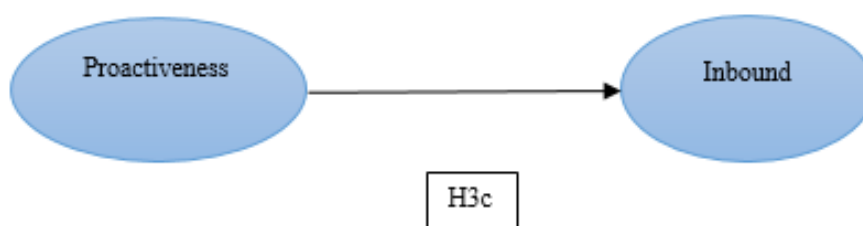
Hypothesis 3b. Entrepreneurial orientation (Innovativeness) positively affects the search and development of open innovation (outbound strategies) by SMEs.

Figure 2.20. Hypothesis 3b.



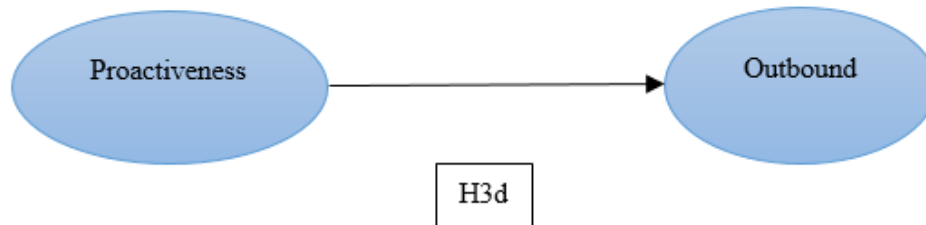
Hypothesis 3c. The entrepreneurial orientation (proactiveness) positively affects the search and development of open innovation (inbound strategies) by SMEs.

Figure 2.21. Hypothesis 3c.



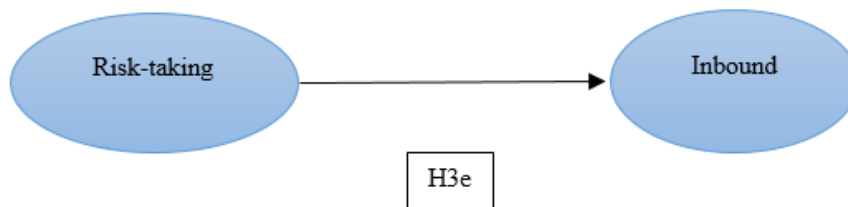
Hypothesis 3d. The entrepreneurial orientation (proactiveness) positively affects the search and development of open innovation (outbound strategies) by SMEs.

Figure 2.22. Hypothesis 3d.



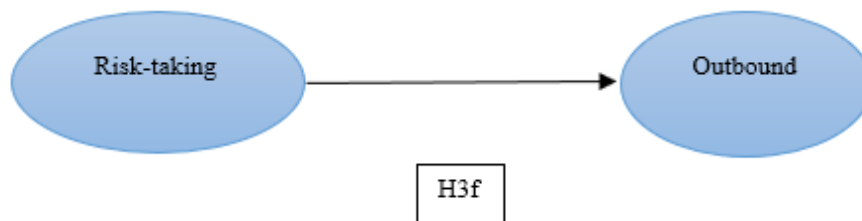
Hypothesis 3e. Entrepreneurial orientation (Risk-taking) positively affects the search and development of open innovation (inbound strategies) by SMEs.

Figure 2.23. Hypothesis 3e.



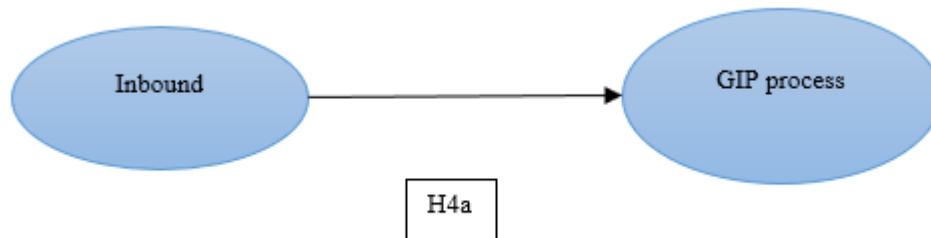
Hypothesis 3f. The entrepreneurial orientation (Risk-taking) positively affects the search and development of open innovation (outbound strategies) by SMEs.

Figure 2.24. Hypothesis 3f.



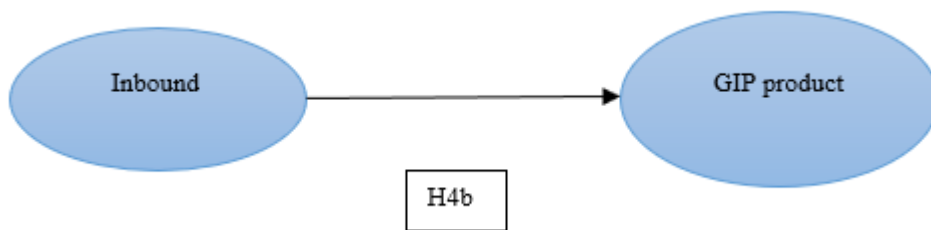
Hypothesis 4a. Open innovation (inbound strategies) has a positive relationship with green innovation performance in process.

Figure 2.25. Hypothesis 4a.



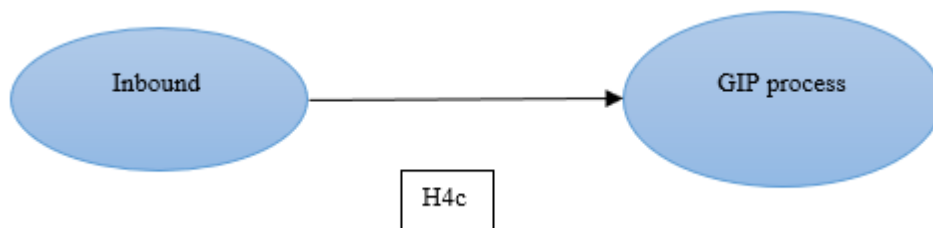
Hypothesis 4b. Open innovation (inbound strategies) has a positive relationship with green innovation performance in product.

Figure 2.26. Hypothesis 4b.



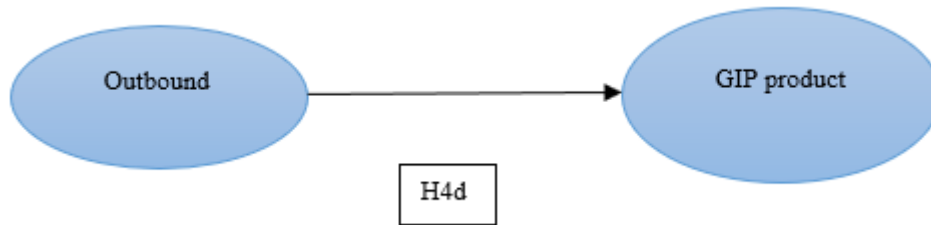
Hypothesis 4c. Open innovation (outbound strategies) has a positive relationship with green innovation performance in process.

Figure 2.27. Hypothesis 4c.



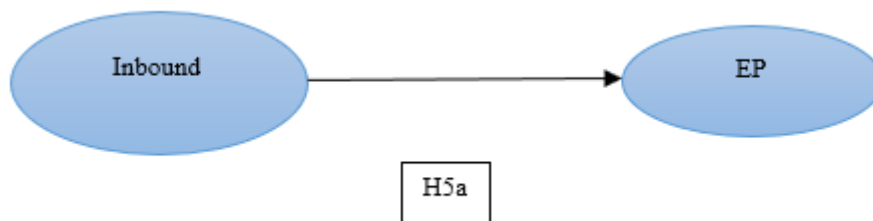
Hypothesis 4d. Open innovation (outbound strategies) has a positive relationship with green innovation performance in product.

Figure 2.28. Hypothesis 4c.



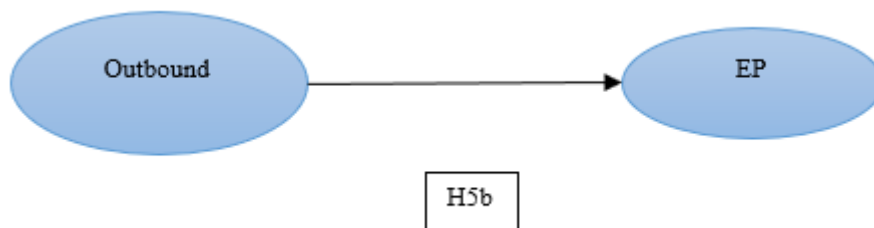
Hypothesis 5a. Open innovation (inbound strategies) positively influences the export performance of SMEs.

Figure 2.29. Hypothesis 5a.



Hypothesis 5b. Open innovation (outbound strategies) positively influences the export performance of SMEs.

Figure 2.30. Hypothesis 5b.

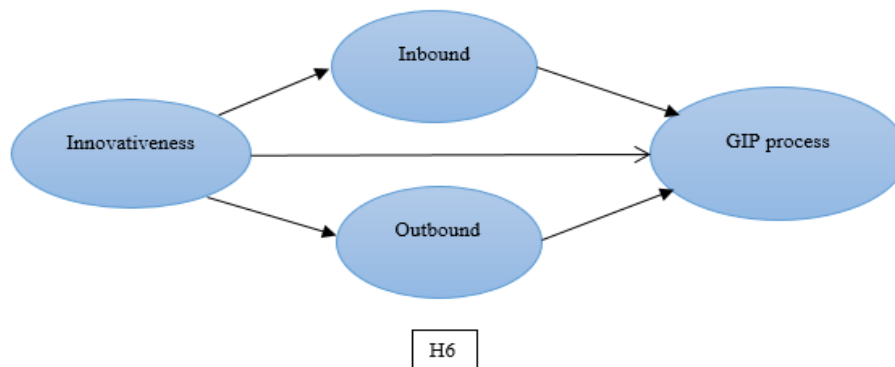


2.16.2 Mediated relationships.

Hypothesis 6a. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (innovativeness) and green innovation performance in process by SMEs.

Hypothesis 6b. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (innovativeness) and green innovation performance in process by SMEs.

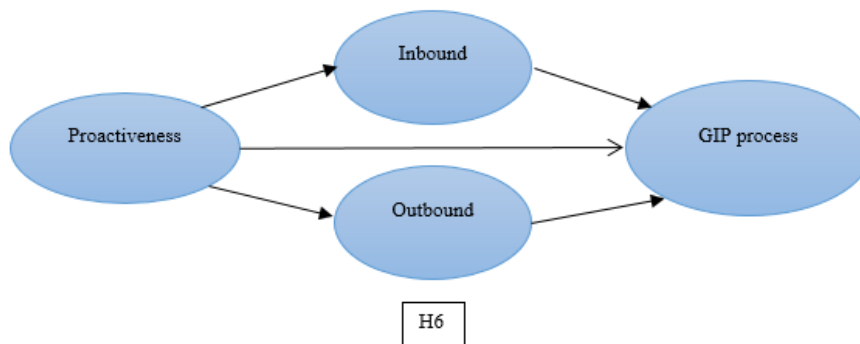
Figure 2.31. Hypothesis 6a/b.



Hypothesis 6c. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (proactiveness) and green innovation performance in process by SMEs.

Hypothesis 6d. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (proactiveness) and green innovation performance in process by SMEs.

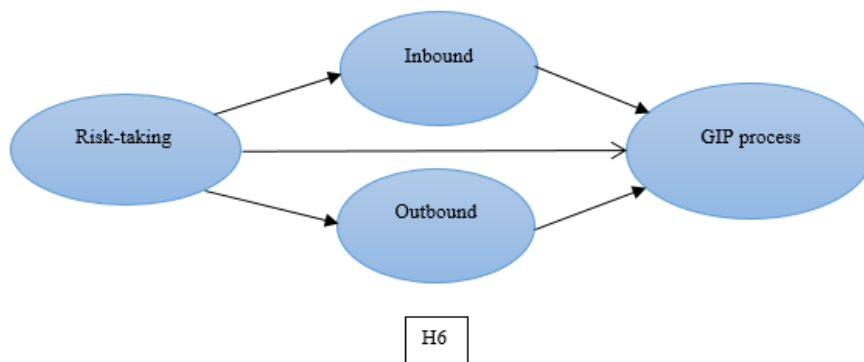
Figure 2.32. Hypothesis 6b/c.



Hypothesis 6e. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (risk-taking) and green innovation performance in process by SMEs.

Hypothesis 6f. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (risk-taking) and green innovation performance in process by SMEs.

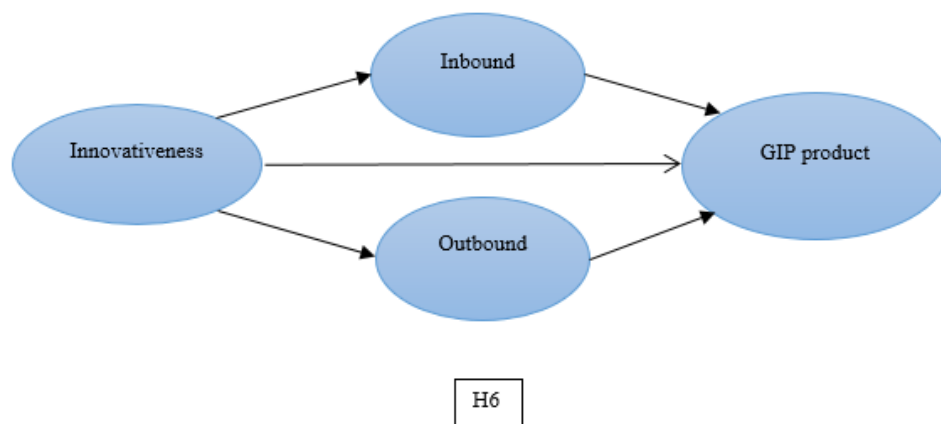
Figure 2.33. Hypothesis 6e/f.



Hypothesis 6g. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (innovativeness) and green innovation performance in product by SMEs.

Hypothesis 6h. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (innovativeness) and green innovation performance in product by SMEs.

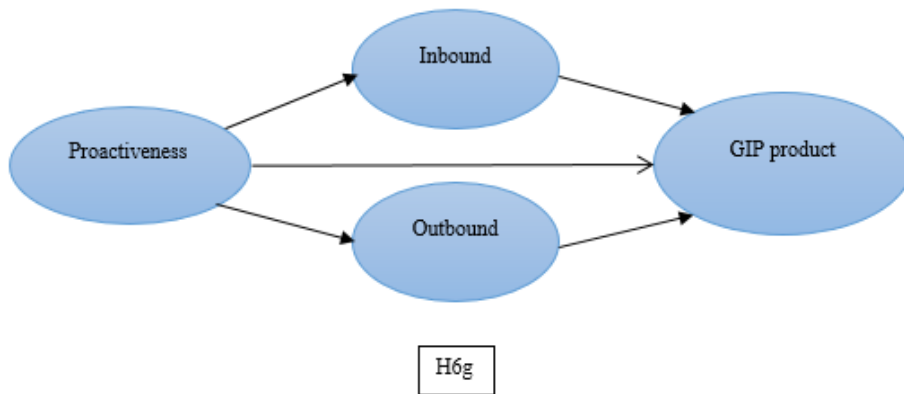
Figure 2.34. Hypothesis 6g/h.



Hypothesis 6i. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (proactiveness) and green innovation performance in product by SMEs.

Hypothesis 6j. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (proactiveness) and green innovation performance in product by SMEs.

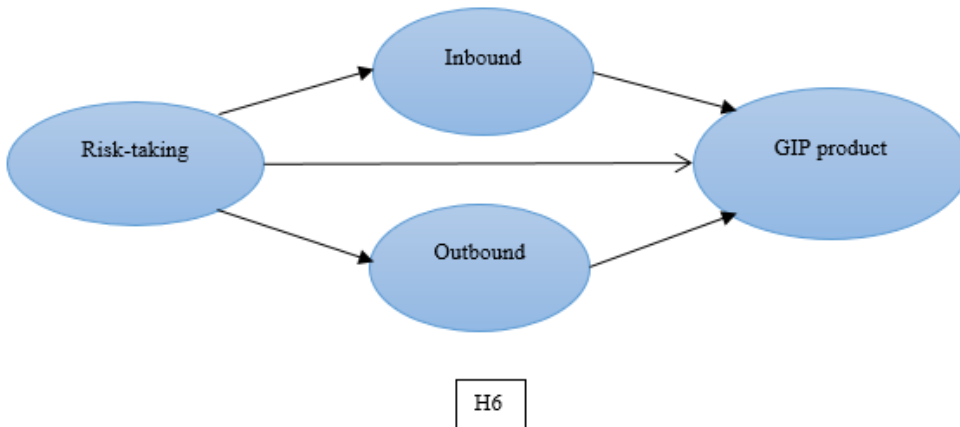
Figure 2.35. Hypothesis 6i/j.



Hypothesis 6h. Open innovation (inbound strategies) plays a mediating role between the entrepreneurial orientation (risk-taking) and green innovation performance in product by SMEs.

Hypothesis 6i. Open innovation (outbound strategies) plays a mediating role between the entrepreneurial orientation (risk-taking) and green innovation performance in product by SMEs.

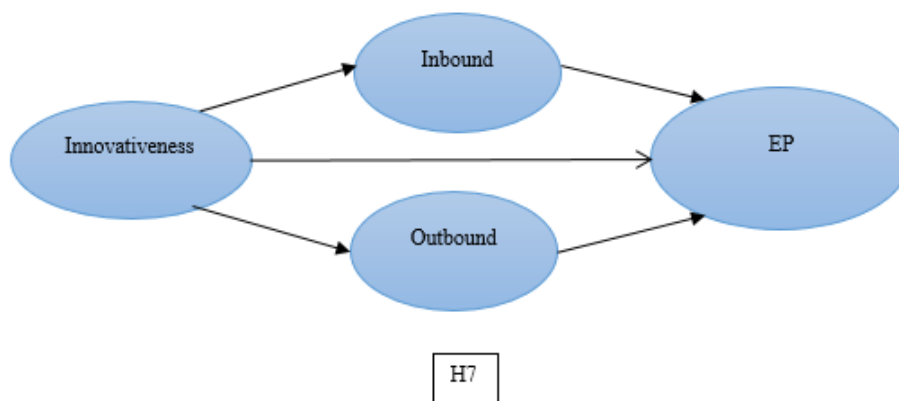
Figure 2.36. Hypothesis 6h/i.



Hypothesis 7a. Open innovation (inbound strategies) plays a mediating role between entrepreneurial orientation (innovativeness) and export performance in SMEs.

Hypothesis 7b. Open innovation (outbound strategies) plays a mediating role between entrepreneurial orientation (innovativeness) and export performance in SMEs.

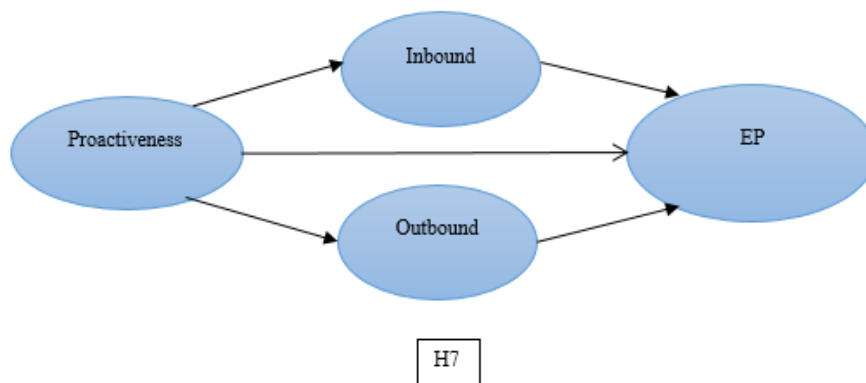
Figure 2.37. Hypothesis 7a/b.



Hypothesis 7c. Open innovation (inbound strategies) plays a mediating role between entrepreneurial orientation (proactiveness) and export performance in SMEs.

Hypothesis 7d. Open innovation (outbound strategies) plays a mediating role between entrepreneurial orientation (proactiveness) and export performance in SMEs.

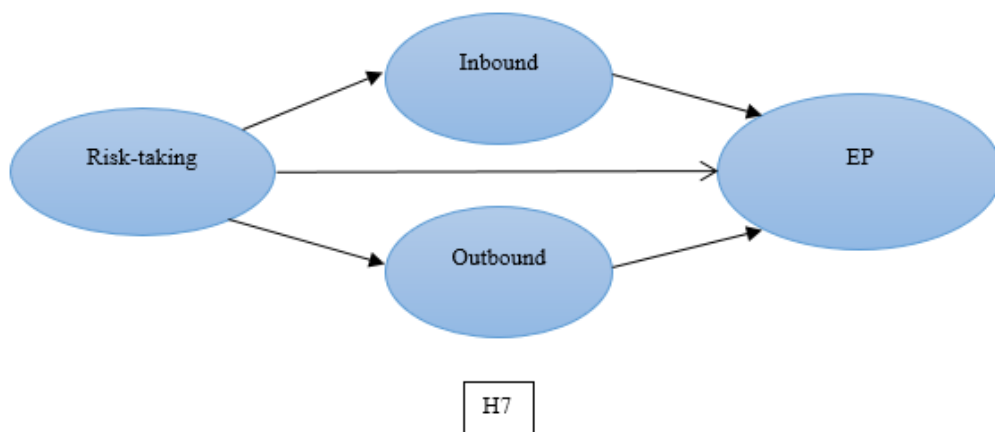
Figure 2.38. Hypothesis 6c/d.



Hypothesis 7e. Open innovation (inbound strategies) plays a mediating role between entrepreneurial orientation (risk-taking) and export performance in SMEs.

Hypothesis 7f. Open innovation (outbound strategies) plays a mediating role between entrepreneurial orientation (risk-taking) and export performance in SMEs.

Figure 2.39. Hypothesis 7e/f.



CHAPTER 3 METHODOLOGY

Entrepreneurial orientation, export performance and green innovation performance: The mediating effect of open innovation in SMEs.

3.0 Objectives and content of the chapter.

This third chapter develops the entire research plan that has been carried out.

Firstly, the type of analysis used, the measurement model and the SEM process used are taken into account. The sample, the sector and the main differences between SMEs and large companies are considered in the second section. The measurements and their scales are analysed. The questionnaire and the process of sending, tracking and collecting data is detailed. The following section considers questions about the reliability and validity of the research. Finally, the ethical approaches that have been considered. In addition, all the sections and decisions presented here are rigorously justified.

3.1 Type of analysis.

Over the past three decades, structural equation models (SEM) have become one of the most important developments in multivariate analysis and their use has extended into social science research.

SEM combines the use of latent (unobserved) variables that represent concepts of the theory, with data that come from measures (indicators or manifest variables) that are used as inputs for a statistical analysis that provides evidence about the relationships between latent variables (Williams, Vandenberg, & Edwards, 2009).

SEM arises as a result of the union of two traditions (Chin 1998). On the one hand, the econometric perspective (e.g., linear regression models) that focuses on prediction. On the other hand, the psychometric approach (e.g., factor analysis) that models the concept as latent variables (unobserved) that are indirectly inferred from multiple observed measures (indicators or manifest variables). Therefore, the SEM approach is particularly useful in social science research where most of the key concepts are not directly observable.

SEM assess in a single systematic and integrating analysis, both the measurement model. That is, the relationships between the latent variables and their indicators and the structural model as part of the complete model that proposes relationships between the latent variables. Such relationships reflect substantive hypotheses based on theoretical considerations (Gefen, Rigdon, & Straub, 2011). In addition, SEM has a number of additional advantages over other analysis such as regression analysis, since SEM reports measurement errors and makes it possible to test the reliability and validity of the instruments we use in our measurement (Hair, Anderson, Tatham, & Black, 1998; Dhanaraj & Beamish, 2003).

When applying SEM, we must consider two types of methods: covariance-based techniques -CB-SEM- (Jöreskog, 1978; 1993) and variance-based partial least squares -PLS-SEM- (Lohmöller, 1989; Wold, 1982; 1985). Although, CBSEM was the first technique to appear with the development of LISREL in 1970 by

Karl Jöreskog, other softwares have been used with success in this type of techniques, such as EQS, Amos, CALIS (a module of SAS), SEPATH (a module of Statistica), and Mplus.

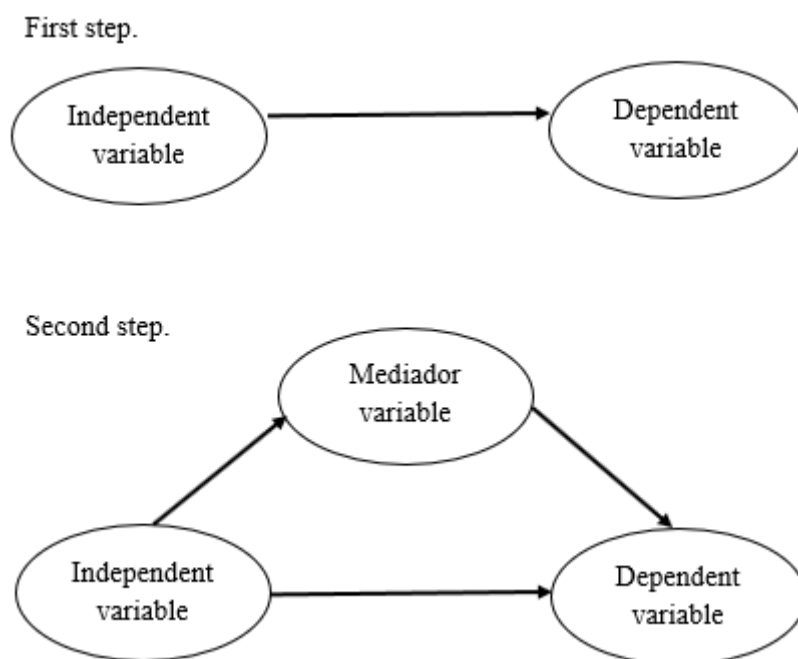
We use PLS-SEM for the specifications of this technique. PLS has certain characteristics that make it a powerful tool for our analysis. These characteristics are:

- a) PLS is a flexible tool that does not impose any specific distribution assumption (e.g., normality) for indicators and does not need observations to be independent of each other (Chin, 2010).
- b) PLS avoids two serious problems (Fornell & Bookstein, 1982). The first is that of ineligible solutions such as negative estimates of the variance of indicators and standardized charges (correlations) greater than 1. The second is the indeterminacy of factors. PLS explicitly defines the latent variables (compounds) so that the scores of the factors or latent variables are easily available.
- c) PLS allows nominal, ordinal scales, by intervals or ratios (Wold, 1985). In addition, it does not require uniformity in measurement scales (Sosik, Kahai, & Piovoso, 2009).
- d) PLS can estimate structural models with smaller samples than CBSEM (Chin & Newsted, 1999; Reinartz, Haenlein, & Henseler, 2009). It should be noted that PLS, although it is more flexible, also requires a minimum sample size. Reinartz et al. (2009) recommend at least 100 cases for the correct functioning of the software.
- e) PLS can estimate reflective (Mode A) and formative (Mode B) models without any identification problems (Chin, 2010).
- f) PLS is quite robust against biased distributions in manifest variables instead of symmetric ones. Against multi-collinearity between latent variables and indicators and finally against incorrect specification of the structural model or omission of regressors (Cassel, Hackl, & Westlund, 1999).
- g) PLS also allows measuring indirect or mediated relationships (Nitzl, Roldán, & Cepeda, 2016).

This means, relationships in which a third variable plays an indeterminacy role in the relationship between an independent variable and a dependent variable and the effect of an independent variable on a dependent variable is mediated by a third variable, called the mediating variable. This case is the one proposed in this investigation.

Next, figure 3.1 shows the process.

Figure 3.1 Example of mediation.



Source. Nitzl et al. (2016).

For all these reasons that have been detailed this technique is used in this investigation.

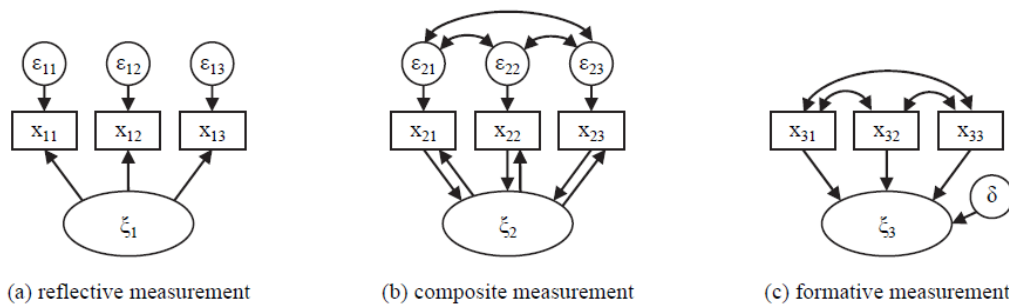
3.1.1 Measurement model.

Once the tool and the technique to be used have been selected, we must consider the measurement model.

In the SEM context, there are three types of measurement models:

- a) Common Factor Model (reflective measurement).
- b) Composite Model.
- c) Causal indicators model (formative measurement).

Figure 3.2. Models in SEM.



Source. Henseler (2017a).

To make a decision on what kind of measure we should take, we follow the indications of Henseler (2017b).

Table 3.1. PLS-SEM Keys.

<i>Factor</i>	<i>a) Common Factor Model (reflective measurement).</i>	<i>b) Composite Model.</i>	<i>c) Causal indicators model (formative measurement).</i>
<i>Relations between the construct and the indicators</i>	The construct causes its indicators	The indicators make up the construct	The indicators cause the construct
<i>Expected correlation pattern among indicators</i>	High correlations are expected	High correlations are common but not required	There is no reason to expect the measures to correlated

<i>Validity of scale score</i>	The scale score does not adequately represent the construct	The scale score adequately represents the construct	The scale score does not adequately represent the construct
<i>Dealing with measurement error</i>	Takes measurement error into account at the item level	Does not involve measurement error	Takes measurement error into account at the construct level
<i>Consequences of dropping an indicator</i>	Dropping an indicator does not alter the meaning of the construct	Dropping an indicator alters the composite and may change its meaning	Dropping an indicator increases the measurement error at the construct level
<i>Nomological net</i>	Indicators are required to have the same antecedents and consequences	Indicators are required to have the same consequences	Indicators are not required to have the same antecedents and consequences

Source. Henseler (2017b).

In our case it is understood that the measurement model is reflective since this type of measure complies with:

1. We assume that the variance of a block of indicators is completely explained by an unobserved variable (the common factor) and its errors. However, that measurement errors are not correlated with other variables, constructs or errors in the model.
2. The latent variable is not directly observable.
3. The construct causes its indicators and the indicators are expected to correlate.
4. Eliminating an indicator from the measurement model does not alter the meaning of the construct and the indicators are interchangeable.
5. The measurement error is considered at the indicator level.

Once the measurement model is selected, we must understand how the SEM process works.

3.1.2 SEM process.

The SEM process is carried out according to the order commonly used. As suggested by Gerbing & Anderson (1988), it should be done in two steps. The first step evaluates the measurement model to demonstrate the dimensionality, validity and reliability of the model to be investigated. The second step tests the structural model to estimate the significant relationships between the constructions.

We selected the Smart PLS 3.2.7 statistical program to perform both the valuation analysis of the validity and reliability of the measuring instrument and the evaluation analyses of the structural model.

In the first step, all analysis of the validity and reliability of the measuring instrument for (reflective) indicators were evaluated:

- ❖ Individual reliability of each indicator (loads λ).
- ❖ Individual reliability of each construct (Alpha de Cronbach).
- ❖ Compound reliability of each construct (CR).
- ❖ Convergent validity (significance and size of loads, AVE).
- ❖ Discriminant validity (Correlation between factors, cross-loadings, Heterotrait-Monotrait Method).

The analysis was carried out through the PLS algorithm. The configurable options in this step are few, but we consider selecting path weighting scheme (Hair, Sarstedt, Ringle, & Mena, 2012; Henseler, 2010). The stopping criterion: 10-5 (Hair et al, 2012; Wold, 1982) and the maximum number of iterations: 300 (Hair et al, 2012).

In the second step, the necessary analysis was carried out to evaluate the structural model:

- ❖ Analysis of the significance of structural relationships.
- ❖ Analysis of the variance of the latent dependent variables explained by the constructs that predict them (R^2).
- ❖ Predictive relevance (Q^2 through blindfolding).

This analysis was done through “Boostrapping”. In this step, it is necessary to take into account the option to allow individual sign changes (Henseler, Ringle, & Sinkovics, 2009; Hair, Hult, Ringle, & Sarstedt, 2017). Number of subsamples: 5,000; always superior to the number of observations. The latest research recommends using 10,000 subsamples (Andrews & Buchinsky, 2000; Streukens & Leroi-Werelds, 2016). Finally, use one-tailed when we want to test hypotheses with sign and two-tailed for other cases such as testing the control variables of a model (Kock, 2015; Felipe, Roldán, & Leal-Rodríguez, 2016). All with a significance level of 0.05. The analysis and results are presented in the next chapter.

3.2 Population and sample.

The study has been carried out through a quantitative methodology among small and medium-sized. We thought in a sample of low-tech companies due to the characteristics of this type of companies and controlled by another sample of high-tech companies. Therefore, we can to check if there are differences considering the degree of company technology.

Therefore, industries have been sought where the set of companies under study meet the following characteristics:

- ❖ Low technology industries.
- ❖ In the beginning, industries that are rooted in Spanish markets.
- ❖ Industries with a high number of SMEs.

With these premises as a starting point, the footwear sector meets the established requirements. In order to contrast the results of these low-tech companies, a second sample of high-tech companies is obtained. This second one is multi-industry, collected in the scientific parks of the Valencian Community.

Specifically, for this study we focused on the companies associated with the Spanish association of footwear components (AEC) where approximately 82% of the companies that belong to AEC are housed in the Valencian Community and the Valencian Footwear Association (AVECAL). These two associations have a total of 458 companies associated. Of which approximately 60% are shoe and shoe component manufacturers according to AVECAL. In this sense, we contacted the 274 shoe manufacturing companies and footwear components manufacturers belonging to these two associations, obtaining a response rate of 26% and a total of 72 companies.

In order to access the subsample of companies that have been used to control the effect of technology, the scientific parks of the Valencian Community were contacted. These parks have some entrance requirements which means that the companies that stay there have a high degree of technology. These companies

account for 175 of which we obtained 42 responses which represents a 24% response rate.

The scientific parks housed in the Valencian Community are the following:

1. University of Valencia Science Park
2. CPI. Polytechnic University of Valencia Science Park.
3. Espaitec. Universitat Jaume I de Castello Science Park.
4. University Miguel Hernandez Science Park.
5. University of Alicante Science Park.

We developed three subsections to examine SMEs. The first one where we define what we mean by SMEs in this investigation. The second where we analyse the differences that exist between SMEs and large companies and that serve as justification of our choice of SMEs. Finally, the third gives us an overview of the SMEs in the footwear sector, which we analyse in this research.

3.2.1 Definition of SMEs.

The concept of SMEs varies depending on the territory where the SME is housed and the legislation that governs it. For this reason, in the literature we find previous studies that have used different criteria to differentiate between SMEs and large companies, for example Chen (2008) that following the criterion of the Ministry of Economy of Taiwan assumes that SMEs are companies that do not exceed 200 employees; Bala Subrahmanya (2009) sets at 300 the maximum number of employees of SMEs in their sample from Japan. Briozzo & Vigier (2014) in their sample from Argentine SMEs use a different monetary classification to classify micro, small and medium enterprises depending on the sector in which the SMEs is integrated, or Weerasiri & Zhengang (2012) who consider small and medium companies all the companies that have between 1 and 99 employees in their sample from Sri Lanka.

This research project follows the definition of SMEs provided by the EU in its Regulation (EU) No. 651 / • 2014 OF THE COMMISSION - of June 17, 2014.

Definition of SMEs:

Article 1. Company.

Any entity, regardless of its legal form, that exercises an economic activity will be considered a company. In particular, companies that exercise an artisanal activity or other activities on an individual or family basis, as well as companies of individuals and associations that exercise an economic activity on a regular basis, will be considered companies.

Article 2. Cash and financial limits that define the categories of companies.

1. The category of micro, small and medium-sized enterprises (SMEs) is made up of companies that employ less than 250 people and whose annual turnover does not exceed EUR 50 million or whose annual balance sheet does not exceed EUR 43 million.

Attending to this definition, SMEs are determined as shown in the following table:

Table 3.2. SMEs classification.

Size	Workers	Business Volume	Balance general
Medium	<250	<= 50 million EUR	<= 43 million EUR
Small	<50	<= 10 million EUR	<= 10 million EUR
Micro	<10	<= 2 million EUR	<= 2 million EUR

Source. IPYME.

3.2.2 SMEs VS. Large companies.

The main differences between SMEs and large companies are presented in tables 3.3 and 3.4, according to the literature. Clearly the primary difference is availability of resource. These differences are of vital importance in our research since they support and justify the need to carry out studies using samples of SMEs in the literature. Nevertheless, SMEs are very important contributors to global economic growth (Shutyak & Van Caillie, 2015).

Table 3.3. Differences between SMEs and large corporations.

SMEs	Large Companies
Dominant role of the entrepreneur/owner Resource poverty (capital, time, knowledge and skilled personnel) Flexible organization capacities Focus on short term Strong local/regional focus and customer needs orientation Low degree of formalization	Delegated management control between board of directors and shareholders Economy of scale, resource abundance Bureaucratic rigidity Focus on mid to long term Strong (inter) national focus and looser ties with customers High degree of formalization

Source. Bos-Brouwers 2010.

Table 3.4. Advantages and disadvantages of SMES vs. large companies.

SMEs	
Advantages	Disadvantages
Flexibility of organization – Less bureaucratic – Responsiveness to changing circumstances (technology and market) – Rapid decision making – Close relationships to costumers – Internal communications faster and more efficient –Customer oriented Owner/manager	Owner/manager – Poor managerial skills (planning, inadequate delegation, lack of functional expertise or support) – Dependency on persons for survival – Lack of formalized planning Financial: – Difficulties attracting venture capital and bank investments – Failure of innovation projects may be financially disastrous – High fixed costs for technological investments and start-up Labour:

<ul style="list-style-type: none"> – Dynamic, entrepreneurial – Horizontal leadership style – Direct role in innovation as ideas generator 	<ul style="list-style-type: none"> – Difficulties attracting skilled personnel – Harder to update technological knowledge <p>Organizational</p> <ul style="list-style-type: none"> – Lack of education and training resources – Lack of ability to establish new relations – Lack of vision and capacity to innovate
<p>Large companies</p>	
<p>Advantages</p>	<p>Disadvantages</p>
<p>Financial</p> <ul style="list-style-type: none"> – Less difficulties attracting venture capital and bank investments – Innovation risks averted by diversity in production, sales and innovation projects <p>Labour:</p> <ul style="list-style-type: none"> – Less difficulties in attracting skilled labour <p>Knowledge:</p> <ul style="list-style-type: none"> – Participation in networks and conference visits to update (technological knowledge) – Information management systems <p>Management:</p> <ul style="list-style-type: none"> – Decentralized management style with decision 	<p>Management:</p> <ul style="list-style-type: none"> – Top management isolated from customers and work floor – Emphasis on short-term cost-cutting instead of long-term infrastructural enhancements <p>Labour:</p> <ul style="list-style-type: none"> – No entrepreneurial fanatics tolerated <p>Flexibility of organization:</p> <ul style="list-style-type: none"> – Bureaucratic, highly formalized organization structure

<p>power on lower levels in the organisation – Long-term strategic management capabilities</p>	
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Source. Adapted from Bos-Brouwers (2010).

3.2.3 Footwear Sector.

The footwear sector is made up of all the companies that participate in the supply chain, however for the sample of this study only the manufacturing companies are taken into account. The manufacturing companies are those that carry out transformation activities. They receive the raw materials that they incorporate or complement through processes and add value to them. Therefore, in this section attention is paid to the two subsectors in which we can subdivide the sector considering the manufacturing companies. These sectors are the auxiliary subsector of footwear or footwear components and the final footwear producer sector.

Taking into account the companies that make up the footwear components sector according to (AEC, 2015), 82% of them are housed in the Valencian Community. Considering the whole of the sector, a similar situation occurs where a high percentage of companies are housed in Valencian Community. About 66% of Spanish footwear companies are found in the province of Alicante (Elche, Elda, and Villena), Castellón (specifically in Vall de Uxo) and in other localities of the Community (Federation of Spanish footwear industries [FICE], 2017). This high percentage is a clear indicator of the importance of the sector in the Valencian Community and of the representativeness of the territory for the whole country. According to FICE, the Valencian Community exported 44,16% of the total national exports in the footwear industry in 2016. In table 3.5² we observe the export data for the main autonomous communities (exports tasks) from January

² Table 3.5 on the next page

to August 2016. This support that this research takes in account export performance as a dependent variable.

Table 3.5. Footwear sector. Exports 2016.

Community	2016 (Euro)	2016 %
Valencian Community	1.163.362.867	44,16%
Galicia	399.495.431	15,16%
Catalonia	239.943.596	9,11%
Rioja, La	193.828.505	7,36%
Castilla-La Mancha	187.358.597	7,11%
Aragon	109.491.919	4,16%
Murcia, Región de	108.872.857	4,13%
Balearic Islands	85.506.132	3,25%
Madrid, Community of	83.360.381	3,20%
Andalusia	29.617.645	1,12%
Rest of the communities	32.713.687	1,24%

Source. FICE.

3.3 Measures.

The scales chosen in this research are scales accepted and tested by previous studies in the literature. To measure entrepreneurial orientation, we adopt the scale of Covin & Slevin (1989). A scale used by Cassiman & Valentini (2016) is employed to measure open innovation. The scale of Chen et al. (2006) is used to measure green innovation performance. Finally, to measure export performance, we use the scale proposed by Lages et al. (2009).

Below are the scales that make up our study:

Scale to measure the Entrepreneurial Orientation

To measure the entrepreneurial orientation, the scale of Covin & Slevin (1989) has been used successfully in several previous studies (Covin et al., 2006; Escribá-Esteve et al., 2008; Green et al., 2008; Brettel et al., 2015; Felzensztein et al., 2015; Lonial & Carter, 2015; Deb & Wiklund, 2017).

The scale has 3 dimensions, with a total of 9 items, is a semantic differential scale of 8 points. The first three items refer to innovativeness, the next three to proactiveness and the last three are referred to risk taking (Covin & Wales, 2011; Wales, Covin, & Miller, 2014). Lumpkin & Dess (1996) has conceptualized EO as a multidimensional construct in which each dimension has an individual effect on performance (Lomberg et al., 2017). As already justified in chapter 2 - methodological framework - an extra contribution to this research is to analyse EO as a multidimensional construct since it has been less considered in the literature (Wales et al., 2013). The dimensions are:

Innovativeness

In general, the top managers of my firm favour.

1. A strong emphasis on the marketing of tried and true products or services.
Vs. A strong emphasis on R&D, technological leadership, and innovations.

How many new lines of products or services has your firm marketed in the past 2 years?

2. No new lines of products or services. Vs. Very many new lines of products or services.
3. Changes in product or service lines have been mostly of a minor nature. Vs. Changes in product or service lines have usually been quite dramatic.

Proactiveness

In dealing with its competitors, my firm . . .

1. Typically responds to actions which competitors initiate. Vs. Typically initiates actions which competitors then respond to.
2. Is very seldom the first business to introduce new products or services, administrative techniques, operating technologies, etc. Vs. Is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.
3. Typically seeks to avoid competitive clashes, preferring a 'live-and-let-live' posture. Vs. Typically adopts a very competitive, 'undo- the-competitors' posture.

Risk-taking

In general, the top managers of my firm have...

1. A strong proclivity for low-risk projects (with normal and certain rates of return). Vs. A strong proclivity for high-risk projects (with chances of very high returns).

In general, the top managers of my firm believe that...

2. Owing to the nature of the environment, it is best to explore it gradually via timid, incremental behaviour. Vs. Owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives.

When confronted with decision-making situations involving uncertainty, my firm

...

3. Typically adopts a cautious, 'wait-and-see' posture in order to minimize the probability of making costly decisions. Vs. Typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.

Scale to measure open innovation

In the case of open innovation, a scale of Cassiman & Valentini (2016) is used. This scale is composed of six items to measure the inbound and outbound strategies. Although in previous studies a previous question was asked, a dichotomous question (yes / no). In the present investigation, each of the indicators is measured by a Likert scale of 1 to 8, where 1 indicates a null degree of use of that strategy and 8 a high degree of use of this type of strategy.

This scale has been tested and has been successfully tested in other studies that precede us (e.g., Zhu et al., 2017). The items with which the collaboration is sought are the following:

Buy.

1. External R&D contracting.
2. Buys the rights to use inventions of others (e.g., in-licensing).
3. External R&D consulting.

Sell.

1. Provide R&D contracting.
2. Sells the rights to use internal inventions (e.g., licensing).
3. Does R&D consulting for others.

Measure green innovation performance.

Green innovation performance is measured with the scale of Chen et al. (2006) and tested by other studies (e.g., Chang & Chen, 2013, Albort-Morant, Leal-Millán, & Cepeda-Carrión, 2016; Leal-Millán, Roldán, Leal-Rodríguez, & Ortega-Gutiérrez, 2016) in a satisfactory manner.

This scale is composed of 8 items or variables measured through a Likert scale of 8 points where 1 indicates total disagreement with the statement and 8 total agreement with the statement. There are two types of performances.

The performance of green innovation process.

1. The company chooses the materials of the product that produce the least amount of pollution for conducting the product development or design.
2. The company chooses the materials of their products that consume the least amount of energy and resources for conducting the product development or design.
3. The company uses the fewest materials to for conducting the product development or design.
4. The company would circumspectly evaluate whether their products are easy to recycle, reuse, and decompose for conducting the product development or design.

The performance of green innovation products.

1. The manufacturing process of the company effectively reduces the emission of hazardous substances or wastes.
2. The manufacturing process of the company effectively recycles wastes and emission that can be treated and re-used.
3. The manufacturing process of the company effectively reduces the consumption of water, electricity, coal, or oil.
4. The manufacturing process of the company effectively reduces the use of raw materials.

Measurement of export performance.

Export performance is measured through the scale of Lages et al. (2009) adapted from Sullivan (1994) and Morgan et al. (2004). This scale has 4 items or variables measured through a Likert scale of 8 points. Where 1 indicates having the perception of being much worse than the competition and 8 being much better than the competition with respect to the following issues.

1. Export sales volume.

2. Export market share.
3. Profitability.
4. Percentage of sales revenue derived from products introduced in this market during the past three years.

3.4 Type of variables.

- ❖ As exogenous or dependent latent variables we have open innovation measured through inbound and outbound strategies, export performance and green innovation performance measured in performance in green innovation processes and performance in green innovation products.
- ❖ As an endogenous or independent latent variable, we have entrepreneurial orientation.

This research employs two control variables such as:

Age. Firm age is defined as the number of years the firm had been in business (Zhu et al., 2017; Criscuolo, Laursen, Reichstein, & Salter, 2018).

Industry. It refers to the sample group to which each company belongs. Dummy 1: High technology and dummy 2: low technology (Khamseh, Jolly, & Morel, 2017; Stefan, & Bengtsson, 2017).

The variable age has been used very frequently in management (e.g., Rodriguez, Doloreux, & Shearmur, 2017, Criscuolo et al., 2018). Also, is possible to find this variable in the literature as a proxy variable to consider the international experience of the company (e.g., Majocchi et al., 2005).

The industry variable understood by the technological degree of the industry has been considered since previous studies indicate that the technological sophistication of the industry that is studied when considering the international strategy of the company must be considered (Hagedoorn & Narula, 1996; Plá-Barber & Alegre, 2007; Silva, Africano, & Afonso, 2010; Stoian et al., 2011; Stefan & Bengtsson, 2017). In this sense, we control the degree of technology effect by forming a high-tech group and a low-tech group.

There is a third variable such as the variable size has been used in the same way in many investigations and therefore has been widely contrasted in the literature as a control variable (e.g., Camisón-Zornoza, Lapiedra-Alcamí, Segarra-Ciprés, & Boronat-Navarro, 2004; Plá-Barber & Alegre 2007). In our research, it is not

explicitly controlled. However, the size is implicitly controlled since the entire sample is composed of SMEs.

3.5 The questionnaire.

The questionnaire was selected as tool to obtain the primary data.

The questionnaire was translated from English into Spanish. Following Brislin (1980) a review, comparison and adjustment procedure was carried out by independent translators to ensure that the questionnaires were equivalent in both languages. In our case we have the collaboration of English philologist Noelia S. G. (European University of Valencia) for the translation process of the scales.

At the same time, the questionnaire is carried out in electronic format and for this purpose we had the collaboration of ESAM. ESAM is a spin-off of the Universitat de València, established in 2007. The main activity of this spinoff is the development, maintenance and consultancy of integral informatics and information systems. With the e-NQUEST platform (web system for the integral management of questionnaires) that this spin-off has developed we managed to generate trust in the companies since other platforms to carry out on-line questionnaires such as Google Docs can generate distrust regarding the protection of the data provided and therefore obtain a lower response rate.

3.5.1 Chief Executive Officer (CEO) and Chief Operations Officer (COO).

The questionnaire consists of four categories of questions: entrepreneurial orientation; export performance; open innovation and green innovation. These were divided into two groups of questions. Entrepreneurial orientation and export performance was asked of the CEOs of each company, since several researchers have argued that the owner or general manager is the person who makes the key decisions of the strategic orientation of the organization (Miller, 1983; Lumpkin & Dess, 1996; Moreno & Casillas, 2008). Whereas, open innovation and green innovation performance was referred to the head of the company's production department, as the person who is in direct contact with the product and its processes and has contact with all activities concerning innovation (Calantone, Cavusgil, & Zhao, 2002).

When asking two different individuals of the organisation, we try to avoid the error of the common method variance. Although, this process has not been controlled, clear instructions were given in the correspondence and the questionnaire for completion by the CEO and COO. Nonetheless, as with all questionnaires we cannot be certain of the survey's author. The questionnaire was sent in a single shipment to try to obtain better results in the response rate.

Once the questionnaire had been prepared, following Gerbing & Anderson (1988) a pre-test is carried out to verify that it is fully understood in its entirety and thus avoid possible loss of information in the final questionnaires sent to our sample. This pre-test is composed of two stages. In the first stage it is verified by 2 people of the university environment, possible improvements are corrected. In the second stage the questionnaire is checked by 2 businessmen (pilot panel) who in the same way reported their opinion and some design details were corrected to facilitate the understanding of the questionnaire. These 4 people were also asked to indicate the estimated time they required to complete the questionnaire. The average time was eight minutes, and this was indicated in the accompanying email to the companies. This served to obtain a questionnaire that was as understandable as possible and, on the other hand, to ensure that the respondents had an accurate estimate of the time required to complete the questionnaire.

3.6 Sending and collecting information.

Once the questionnaire was tested and the population subject of the study was established, the questionnaire was sent first via email. The process of sending, tracking and collecting the information was carried out in the following stages:

In a first stage we contacted footwear associations and science parks to ask them for collaboration, due to their data protection policies they could not provide company data or act as intermediaries to send emails. The scientific park in network of the Polytechnic University of Valencia if they sent our email directly to the 25 companies that have lodged in their facilities. For the rest of the companies we search the directories of the web pages of AVECAL and AEC (in the case of the footwear sample) and at the University of Valencia Science Park; Espaitec. Universitat Jaume I of Castello Science Park; University Miguel Hernandez Science Park and University of Alicante Science Park (in the case of science parks) the email, name of the company, location of the company and telephone number of all companies that appeared there. These data were coded in an Excel to contact and establish the companies to which we directed our research.

In a second stage and once all the data was encoded, a first shipment was made. This happened on February 1, 2017. This email contained the following information:

1. Presentation of the research to the participating companies.
2. The items to be treated as well as the importance of their collaboration in this research.
3. The person in charge who had to answer each battery of questions.
4. The estimated time of participation.
5. The requirement that they should be SMEs and manufacturing companies.
6. Following to Pla-Barber & Alegre (2007) we give information about our commitment to report a feedback for their collaboration via email where

the information they have answered would appear and the average of the answers that the rest of the companies answered (aggregate data).

The shipment was made to 449 companies. Of the total number of companies, 274 were companies in the footwear sector and 175 were companies in the high-tech sectors.

On February 15, the third stage began once 15 days had passed since the first shipment. The response rate at this time was less than 2% (7 companies). Therefore, a reminder was sent again via email prior to the shipment and to encourage the collaboration of the companies. In addition, for all those companies that had not yet participated (442 companies) were called by telephone, indicating that they were going to receive an email in which they would find a link to complete an online questionnaire. This telephone call also provided the opportunity to seek their collaboration. At the same time, it was verified that the emails we had were correct. Surprisingly, the response rate after 20 days from this second dispatch (March 5) was not as high as was expected, with only a response rate of approximately 5% and 20 companies.

Thus, a fourth stage was used. This involved a third sending of the email after 20 days from the second sending of emails. At the same time, taking advantage of the fact that the high-tech companies we had accessed belonged to science parks. The researcher was able to visit the science parks Espaitec and the University of Valencia to contact the companies in person. As for the low-tech companies, a footwear fair was visited in the last week of March 2017 to again personally make contact with all the companies that met our criteria and request their collaboration. Additionally, some companies housed in the footwear cluster of Elche (Alicante) were visited. After this stage and on May 15, 2017 the response rate was around 20% and 87 companies.

A final stage was held from May 16, 2017 to October 2017, where a shoe fair was visited for the second time to request collaboration. In this last stage a total of 143 responses were obtained in November 2017. On this date we closed the data collection.

At this time, the database was cleaned. The collected questionnaires that had not been completed in their totality were eliminated and 128 full questionnaires were obtained. The answers of these questionnaires were evaluated through SPSS. Two questionnaires were eliminated that had extreme answers (outliers) that could generate noise in the sample. Two questionnaires were eliminated in this step.

Additionally, 12 questionnaires were eliminated, which had answered: do not know / do not answer in all the items (indicators) of the same latent variable. Therefore, we are left with a sample for this investigation of 114 companies. The sample of footwear companies add up 72 valid questionnaires and the sample from sciences parks add up 42 questionnaires.

The rest of those who do not know / do not answer that they were found in the questionnaire in some item (indicator) were automatically replaced by Smart PLS.

3.6.1 Integral analysis of questionnaires.

Attending to the collection of the information, when making the questionnaire with the e-NQUEST platform (web system for the integral management of questionnaires) the companies had the option of saving session if during the completion of the questionnaire they had to stop at some time and the program generated a link that could be used to retrieve the session by the place where they were. At the same time, if they provided their email this link was sent directly to have it located. The questionnaires were automatically collected in an Excel document that we could consult in real time. This facilitates the coding task and the subsequent task of importing the data into the statistical programs SPSS or Smart PLS for its analysis and, on the other hand, it allows for observation of contact details of the participants and whether they wish to receive further contact.

3.7 Reliability and validity.

To ensure the relevance of the instrument to measure the constructs: entrepreneurial orientation, open innovation, green innovation performance and export performance, their validity and reliability are analysed. As indicated in the first section of this chapter, 'Smart PLS' provides a series of analyses to ensure compliance with the requirements established in investigations of this type.

All valuation analyses of the validity and reliability of the measuring instrument for our (reflective) indicators were tested. The following analysis was carried out:

- ❖ Individual reliability of each indicator (loads λ).
- ❖ Individual reliability of each construct (Alpha de Cronbach).
- ❖ Compound reliability of each construct (CR).
- ❖ Convergent validity (significance and size of loads, AVE).
- ❖ Discriminant validity (Correlation between factors, cross-loadings, Heterotrait-Monotrait Method).

A more detailed and justified explanation of each test can be found in the next chapter of this present investigation.

3.8 Ethics.

The entire research process, from the search and selection of the articles used in the literature review chapter through the creation and selection of the sample subject of study to the use and processing of data, has been carried out in a transparent manner and under ethical principles.

The selection of the literature has been carried out fundamentally in the WOS database because it is considered one of the most complete and highest quality databases of those existing in the social sciences, searching for the constructs originating from our study and avoiding possible studies that incur rejection processes.

The scales to measure the constructs have been taken from the literature and tested in many previous investigations as indicated throughout this study. Next, the questionnaires that have been made have been submitted to a pre-test in which two people from the university and two businessmen read the questionnaire to corroborate that the entire questionnaire could be understood and that the estimated time for completing the questionnaire it is adequate to avoid giving erroneous data that cause distrust.

All the participating companies are contacted first by email, this email explains what the research consists of, the type of questions to which they must respond, the use to be given to the information collected, the estimated time to complete questionnaire. In the questionnaire, the name of the company and the email are requested. These data are requested on the first page of the questionnaire and are intended to have a contact to send them a document in which they can see their answers compared with the average values for each question of the total number of participating companies. Besides, it allows us to track the companies that respond. This information is provided to companies so that they know why their email and company name are requested.

The privacy of the participating individuals will be kept at all times and the participants will not be pressured, being free to say if they want to participate and also to indicate if they do not wish to continue their collaboration.

CHAPTER 4 ANALYSIS, RESULTS AND DISCUSSION

Entrepreneurial orientation, export performance and green innovation performance: The mediating effect of open innovation in SMEs.

4.0 Objectives and content of the chapter.

The present chapter gathers the empirical evidence that is obtained from the statistical analyses. These analyses are supported by the review of the literature made in chapter 2 that have given rise to our hypotheses and the methodology presented in chapter 3 that justifies the way of doing things used in this study.

For this, this chapter is composed of three sections. In the first section we find all the valuation tests of the global model. In the second section the evaluation of the measurement model is presented. In the third section the estimation of the significance of the parameters. Finally, in the fourth section we show the tests carried out to test the mediations of the model studied in this research.

All the results will be commented and evaluated both statistically and theoretically.

4.1 Valuation of the global model.

Table 4.1. SRMR.

SRMR		
0,078	Limit: 0,08	Supported

Source. Own elaborated.

Table 4.2. dG 95%.

d_G	Original Sample (O)	Sample Mean (M)	2.5%	97.5%	(O) Is inside of the interval (2.5%-97.5%)
Saturated Model	1.043	0.815	0.620	1.083	Supported

Source. Own elaborated.

Table 4.3. d_G 99%.

d_G	Original Sample (O)	Sample Mean (M)	0.5%	99.5%	(O) Is inside of the interval (0.5%-99.5%)
Saturated Model	1.043	0.814	0.568	1.196	Supported

Source. Own elaborated.

First, the global model is evaluated. The indicators used for this are:

- ❖ Standardized root mean squared residual (SRMR) can be considered an average (specifically the quadratic mean) difference between implied and observed correlations. Its value should be below 0.8. (Hu & Bentler, 1999).
- ❖ Geodesic discrepancy:
 - d_G < 95% bootstrap quantile (HI95of d_G) → 1.043 < 1.083
 - d_G < 99% bootstrap quantile (HI99of d_G) → 1.043 < 1.196

Next section shows the tests to assessment of the measurement model.

4.2 Assessment of the measurement model.

4.2.1 Individual reliability of item.

Loads.

The indicators innovativeness (item 3) and proactiveness (item 3) are eliminated because they do not contribute anything to the model. As Anderson, Covin, & Slevin (2009) and Rauch et al. (2009) indicated, the removal of an item from original EO scale (Covin & Slevin, 1989) is not uncommon and it does not affect its content validity.

In the case of the innovativeness indicator, it refers to the importance that the company gives to the commercialization of existing products or technological innovation. The footwear sector is considered traditional and as reported by the entrepreneurs themselves: this sector does not lead to major changes since there are two campaigns a year and there are many lines of products that are different in each campaign, but they do not seek profound technological changes.

In the other hand, this sector settled mostly in the Valencian Community and in certain municipalities (e.g., Elche). Many entrepreneurs know each other because the market is so concentrated and thus, they do not have an excessively competitive attitude of destroying the competitor. For this reason, an indicator has been removed from the proactiveness variable.

The rest of the loads meet the criteria of Carmines & Zeller (1979) $\lambda \geq 0.707$ except for risk-taking (item 3) with 0.689. Value very close to 0.707 and meets the rest of reliability requirements. Following Hair, Hult, Ringle, & Sarstedt (2014) if any indicator load is between 0.4 and 0.7 and your AVE and CR are below the limits, it must be evaluated if by eliminating the indicator we can increase AVE and CR above the limits. In this case the indicator must be eliminated. In our case, the AVE and its CR are above the limits, therefore, it is considered to leave it and not lose explanatory power. Table 4.4 shows the loads for all the indicators.

Table 4.4. Loads.

	AGE (CONTR OL)	EP	GIP. PROCES S	GIP. PRODUC T	INBOUN D (OI)	INNOVAT IVENESS (EO)	LOW.HIGH H (CONTR OL)	OUTBOU ND (OI)	PROACTI VENESS (EO)	RISK- TAKING (EO)
AGE	1.000									
EXPPERF 1		0.959								
EXPPERF 2		0.956								
EXPPERF 3		0.949								
EXPPERF 4		0.959								
GIP.PROCESS1			0.890							
GIP.PROCESS2			0.880							
GIP.PROCESS3			0.828							
GIP.PROCESS4			0.761							
GIP.PRODUCT 1				0.898						
GIP.PRODUCT 2				0.906						
GIP.PRODUCT 3				0.924						

Follow on the next page.

	AGE (CONTR OL)	EP	GIP. PROCES S	GIP. PRODUC T	INBOUN D (OI)	INNOVAT IVENESS (EO)	LOW.HIGH H (CONTR OL)	OUTBOU ND (OI)	PROACTI VENESS (EO)	RISK- TAKING (EO)
GIP.PRODUCT 4				0.836						
INBO1					0.845					
INBO2					0.727					
INBO3					0.748					
INNOV1						0.891				
INNOV2						0.751				
LOWHIGH							1.000			
OUTB1								0.740		
OUTB2								0.852		
OUTB3								0.848		
PROACT1									0.740	
PROACT2									0.919	
RISK-TAK1										0.879
RISK-TAK2										0.733
RISK-TAK3										0.689

Source. Smart PLS.

4.2.2 Reliability of the construction, of the scale or internal consistency.

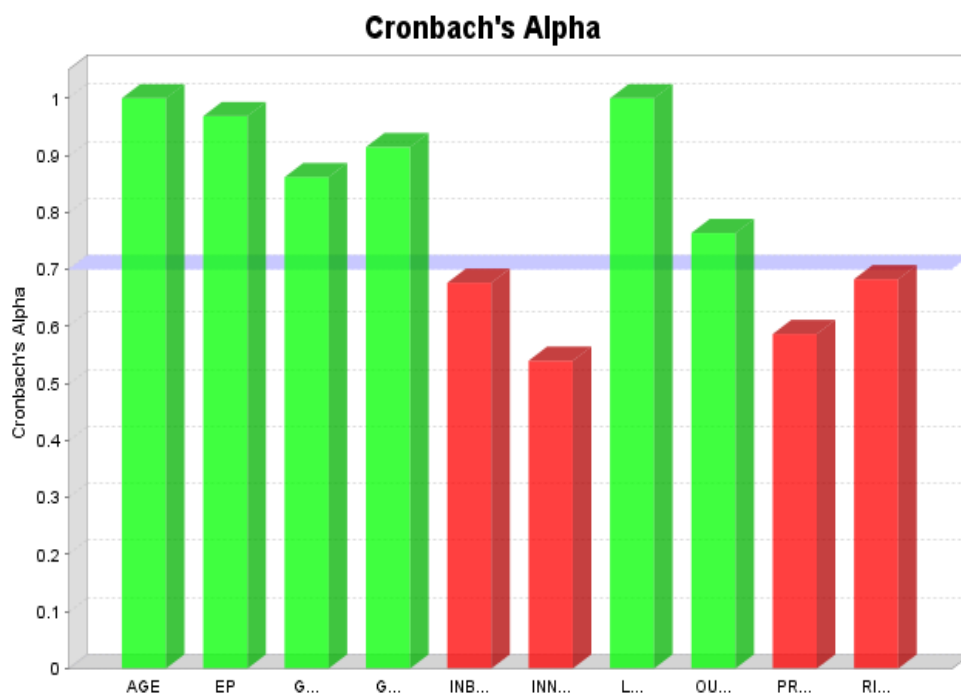
Considering the simple reliability, Cronbach's alpha coefficient indicated a good internal consistency level if it's > 0.6 (Väyrynen, Helander, & Vasell, 2017). Nunnally & Bernstein (1994) are more demanding and indicate that Cronbach's alpha must be higher than 0.7. All the constructs meet the criteria of Väyrynen et al. (2017) except for proactiveness with 0,587 and innovativeness with 0,540. The most demanding criterion of Nunnally & Bernstein (1994) is met in all variables except for inbound variables that score 0.677. Risk-taking with 0.683 and the aforementioned proactiveness (0,587) and innovativeness (0,540). However, they meet the reliability criteria of the construct and the loads of their indicators are high. In addition, observing the confidence intervals for the Cronbach's Alpha for these variables, innovativeness is in the upper limit very close to 0.7 and the rest of the variables are above 0.7. At the same time, considering composite reliability (Werts, Linn, & Joreskog, 1974, Fornell & Larcker, 1981) must score above 0.6 (Bagozzi & Yi, 1988). Nunnally & Bernstein (1994) suggest scoring above 0.7 for reliability in early phases and 0.8 or 0.9 for more advanced phases of the investigation. For all the constructs of the model and in all cases a higher score than 0.8 is fulfilled. Finally, for PLS, composite reliability is more adequate than Cronbach's Alpha since Cronbach's Alpha does not assume that all indicators receive the same weighting (Chin, 1998). Therefore, it is considered that they meet the criterion of reliability of the construct.

Table 4.5. Cronbach's Alpha.

	Cronbach's Alpha
AGE	1.000
EP	0.969
GIP.PROCESS	0.862
GIP.PRODUCT	0.914
INBOUND	0.677
INNOVATIVENESS	0.540
LOW.HIGH	1.000
OUTBOUND	0.764
PROACTIVENESS	0.587
RISK-TAKING	0.683

Source. Smart PLS.

Figure 4.1. Cronbach's alpha graphic. Nunnally & Bernstein (1994) criterion.



Source. Smart PLS.

Table 4.6. Confidence Intervals Alfa de Cronbach.

	Original Sample (O)	Sample Mean (M)	5.0%	95.0%
AGE	1.000	1.000	1.000	1.000
EP	0.969	0.968	0.958	0.977
GIP.PROCESS	0.862	0.859	0.800	0.905
GIP.PRODUCT	0.914	0.911	0.865	0.945
INBOUND	0.677	0.671	0.561	0.763
INNOVATIVENESS	0.540	0.532	0.359	0.674
LOW.HIGH	1.000	1.000	1.000	1.000
OUTBOUND	0.764	0.760	0.685	0.823
PROACTIVENESS	0.587	0.581	0.411	0.718
RISK-TAKING	0.683	0.677	0.564	0.770

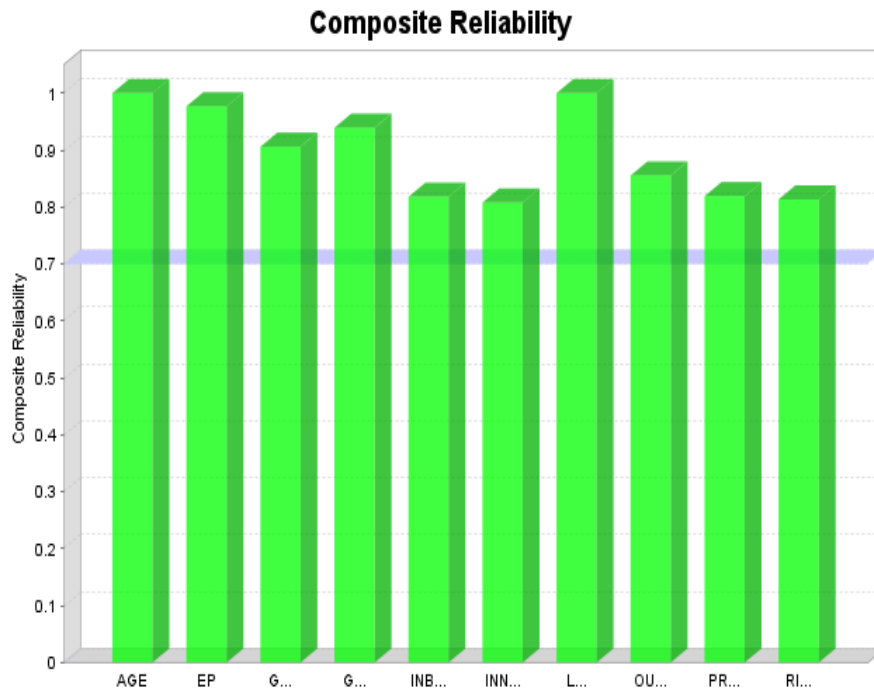
Source. Smart PLS

Table 4.7. Composite reliability.

	Composite Reliability
AGE	1.000
EP	0.977
GIP.PROCESS	0.906
GIP.PRODUCT	0.939
INBOUND	0.818
INNOVATIVENESS	0.808
LOW.HIGH	1.000
OUTBOUND	0.855
PROACTIVENESS	0.819
RISK-TAKING	0.813

Source. Smart PLS.

Figure 4.2. Composite reliability chart.



Source. Smart PLS.

4.2.3 Convergent validity.

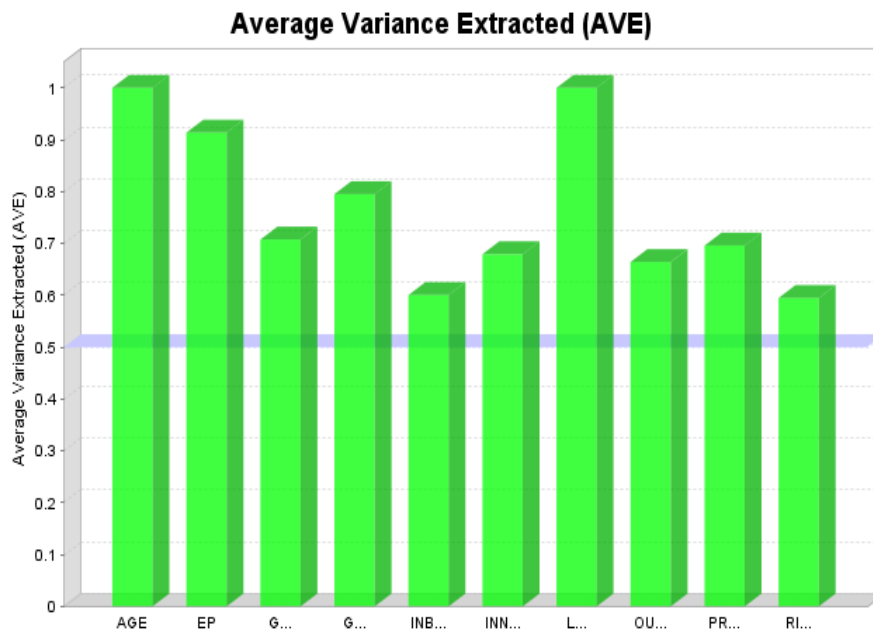
Convergent validity implies that a set of indicators represents a single underlying construct, and this can be demonstrated by means of its unidimensional analysis (Henseler et al., 2009). The average variance extracted (AVE) gives us the amount of variance that a construct obtains from its indicators in relation to the amount of variance due to the measurement error. It must be greater than 0.5 (Fornell & Larcker, 1981). This means that each construct explains at least 50% of the variance of the assigned indicators and is fulfilled for all the constructs analysed.

Table 4.8. Average Variance Extracted (AVE).

	Average Variance Extracted (AVE)
AGE	1.000
EP	0.914
GIP.PROCESS	0.708
GIP.PRODUCT	0.795
INBOUND	0.601
INNOVATIVENESS	0.679
LOW.HIGH	1.000
OUTBOUND	0.664
PROACTIVENESS	0.696
RISK-TAKING	0.595

Source. Smart PLS.

Figure 4.3. Average Variance Extracted chart.



Source. Smart PLS.

4.2.4 Discriminating validity.

The first one, is the Cross Loadings test. This test indicates that to achieve discriminant validity, no indicator should have higher punctuation on another construct than on the construct that it is being measured (Barclay, Higgins, & Thompson, 1995). This test calculates the correlations between the scores of the constructs and the standardized data of the indicators (Gefen et al., 2011). Nevertheless, this test is considered by some too lax (e.g., Hair, Ringle, & Sarstedt, 2011). In our case, all constructs have higher mark in their factors than in the rest of them. Therefore, the criterion is met.

Table 4.9. Cross Loadings test.

	AGE	EP	GIP.PROCES SS	GIP.PRODU CT	INBOU ND	INNOVATIVEN ESS	LOW.HI GH	OUTBOU ND	PROACTIVEN ESS	RISK- TAKIN G
AGE	1.000	0.248	0.258	0.310	-0.172	0.282	-0.618	-0.208	0.114	-0.164
EXPPERF 1	0.233	0.959	-0.061	-0.007	-0.021	0.393	-0.339	-0.113	0.178	-0.057
EXPPERF 2	0.190	0.956	-0.033	-0.016	-0.032	0.395	-0.305	-0.101	0.201	-0.044
EXPPERF 3	0.256	0.949	0.028	0.050	-0.066	0.441	-0.401	-0.099	0.091	0.001
EXPPERF 4	0.265	0.959	-0.029	0.024	-0.123	0.449	-0.354	-0.117	0.171	-0.041
GIP.PROCES S1	0.173	- 0.002	0.890	0.717	0.189	-0.093	-0.100	-0.002	0.156	0.103
GIP.PROCES S2	0.200	- 0.036	0.880	0.630	0.222	-0.114	-0.050	0.050	0.169	0.046
GIP.PROCES S3	0.188	0.075	0.828	0.533	0.188	-0.064	0.021	0.057	0.240	0.041
GIP.PROCES S4	0.279	- 0.094	0.761	0.664	0.207	-0.104	-0.026	0.117	0.206	0.125
GIP.PRODU CT1	0.202	- 0.006	0.707	0.898	0.133	0.006	-0.090	0.053	0.150	0.164
GIP.PRODU CT2	0.316	0.007	0.670	0.906	0.110	-0.029	-0.228	-0.036	0.117	0.116

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	AGE	EP	GIP.PROCESS	GIP.PRODUCT	INBOUND	INNOVATIVENESS	LOW.HIGH	OUTBOUND	PROACTIVENESS	RISK-TAKING
GIP.PRODUCT3	0.345	0.038	0.691	0.924	0.131	0.008	-0.218	-0.122	0.115	0.079
GIP.PRODUCT4	0.210	0.005	0.660	0.836	0.130	-0.080	-0.100	-0.051	0.156	0.038
INBO1	0.148	0.105	0.247	0.209	0.845	-0.259	0.167	0.236	0.041	0.179
INBO2	0.162	0.049	0.164	0.031	0.727	-0.224	0.179	0.257	0.187	0.209
INBO3	0.068	0.103	0.122	0.043	0.748	-0.144	0.145	0.225	0.099	0.060
INNOV1	0.398	0.429	-0.039	0.077	-0.293	0.891	-0.476	-0.041	0.193	-0.002
INNOV2	0.002	0.277	-0.176	-0.161	-0.152	0.751	-0.110	0.053	0.275	0.143
LOWHIGH	0.618	0.367	-0.044	-0.189	0.213	-0.392	1.000	0.444	-0.001	0.199
OUTB1	0.189	0.047	0.116	-0.030	0.246	-0.009	0.474	0.740	0.110	0.141
OUTB2	0.143	0.112	0.061	-0.002	0.295	0.004	0.263	0.852	0.003	0.264
OUTB3	0.200	0.098	0.016	-0.111	0.200	-0.007	0.438	0.848	-0.009	0.150
PROACT1	0.156	0.223	0.150	0.067	-0.051	0.244	-0.119	-0.099	0.740	0.152
PROACT2	0.063	0.095	0.227	0.160	0.212	0.224	0.068	0.098	0.919	0.444
RISK-TAK1	0.184	0.069	0.179	0.176	0.174	0.023	0.245	0.233	0.270	0.879
RISK-TAK2	0.127	0.040	-0.028	-0.028	0.136	0.185	0.090	0.193	0.399	0.733
RISK-TAK3	0.028	0.020	-0.019	0.029	0.177	-0.017	0.055	0.114	0.312	0.689

Source. Smart PLS.

The second criterion of discriminant validity that is proved is the Fornell-Larcker criterion. As stated by Fornell & Larcker (1981) the elements in the diagonal (in bold) are the square root of the variance shared between the construct and its measurements (AVE). The elements outside the diagonal are the correlations between constructs.

To achieve discriminant validity, the square root of the AVE of a construct must be greater than the correlation it has with any other construct. All the constructs reach discriminant validity. The criterion is displayed in table 4.10.

The third criterion of discriminant validity that is checked is the ratio between the Heterotrait-Monotrait ratio (HTMT) correlations. Henseler, Ringle & Sarstedt (2016) developed simulation studies to demonstrate that the lack of discriminant validity is better detected by means of the heterotrait-monotrait ratio (HTMT) they developed. There is a risk of discriminant validity according to this test if $HT / MT > 0.85$ (Clark & Watson, 1995; Kline, 2011). Other authors indicate that the ratio $HT / MT > 0.90$ (Gold, Malhotra, & Segars, 2001, Teo, Srivastava, & Jiang, 2008). All meet levels below 0.85 except green innovation performance (product) scores 0.855. This score meets the most flexible criteria that indicate 0.90 the limit that should not be exceeded. The criterion is displayed in table 4.11.

Table 4.10. Fornell-Larcker criterion.

	AGE	EP	GIP.PRO CESS	GIP.PRO DUCT	INBOUN D	INNOVATIV ENESS	LOW.HIGH H	OUTBOU ND	PROACTIV ENESS	RISK- TAKING
AGE	1.000									
EP	0.248	0.956								
GIP.PROCE SS	0.258	-0.024	0.841							
GIP.PRODU CT	0.310	0.014	0.762	0.892						
INBOUND	-0.172	-0.064	0.243	0.140	0.775					
INNOVATIV ENESS	0.282	0.440	-0.113	-0.024	-0.282	0.824				
LOW.HIGH	-0.618	-0.367	-0.044	-0.189	0.213	-0.392	1.000			
OUTBOUND	-0.208	-0.112	0.073	-0.051	0.308	-0.003	0.444	0.815		
PROACTIVE NESS	0.114	0.166	0.233	0.147	0.135	0.272	-0.001	0.029	0.834	
RISK- TAKING	-0.164	-0.036	0.096	0.110	0.208	0.069	0.199	0.243	0.394	0.771

Source. Smart PLS.

Table 4.11. Heterotrait-monotrait ratio (HT/MT).

	AGE	EP	GIP.PRO CESS	GIP.PRO DUCT	INBOUND	INNOVATI VENESS	LOW.HIG H	OUTBOU ND	PROACTI VENESS	RISK- TAKING
AGE										
EP	0.251									
GIP.PRO CESS	0.269	0.084								
GIP.PROD UCT	0.314	0.032	0.855							
INBOUND	0.196	0.140	0.294	0.168						
INNOVATI VENESS	0.329	0.589	0.188	0.202	0.422					
LOW.HIGH	0.618	0.372	0.063	0.186	0.255	0.482				
OUTBOUN D	0.246	0.121	0.105	0.108	0.415	0.084	0.544			
PROACTIV ENESS	0.170	0.252	0.311	0.189	0.307	0.509	0.145	0.168		
RISK- TAKING	0.175	0.069	0.147	0.149	0.284	0.233	0.201	0.298	0.598	

Source. Smart PLS.

At the same time, it is verified that in the HTMT inference, neither the confidence intervals nor the bias corrected confidence intervals contain the 1 in their confidence intervals. Then, all the constructs have discriminant validity.

Table 4.12. Confidence intervals.

	Original Sample (O)	Sample Mean (M)	5.0%	95.0%
EP -> AGE	0.251	0.254	0.083	0.415
GIP.PROCESS -> AGE	0.269	0.273	0.126	0.405
GIP.PROCESS -> EP	0.084	0.131	0.069	0.225
GIP.PRODUCT -> AGE	0.314	0.317	0.217	0.410
GIP.PRODUCT -> EP	0.032	0.106	0.044	0.215
GIP.PRODUCT -> GIP.PROCESS	0.855	0.852	0.744	0.933
INBOUND -> AGE	0.196	0.211	0.084	0.366
INBOUND -> EP	0.140	0.185	0.083	0.326
INBOUND -> GIP.PROCESS	0.294	0.313	0.182	0.458
INBOUND -> GIP.PRODUCT	0.168	0.220	0.124	0.328
INNOVATIVENESS -> AGE	0.329	0.404	0.265	0.581
INNOVATIVENESS -> EP	0.589	0.599	0.398	0.796
INNOVATIVENESS -> GIP.PROCESS	0.188	0.259	0.115	0.451
INNOVATIVENESS -> GIP.PRODUCT	0.202	0.247	0.128	0.399
INNOVATIVENESS -> INBOUND	0.422	0.455	0.219	0.718
LOW.HIGH -> AGE	0.618	0.621	0.543	0.697
LOW.HIGH -> EP	0.372	0.371	0.216	0.519
LOW.HIGH -> GIP.PROCESS	0.063	0.110	0.042	0.213
LOW.HIGH -> GIP.PRODUCT	0.186	0.198	0.074	0.356
LOW.HIGH -> INBOUND	0.255	0.261	0.097	0.444
LOW.HIGH -> INNOVATIVENESS	0.482	0.500	0.330	0.677
OUTBOUND -> AGE	0.246	0.249	0.110	0.386
OUTBOUND -> EP	0.121	0.160	0.057	0.318
OUTBOUND -> GIP.PROCESS	0.105	0.160	0.089	0.264
OUTBOUND -> GIP.PRODUCT	0.108	0.158	0.085	0.270
OUTBOUND -> INBOUND	0.415	0.420	0.217	0.629
OUTBOUND -> INNOVATIVENESS	0.084	0.192	0.086	0.333
OUTBOUND -> LOW.HIGH	0.544	0.544	0.385	0.690
PROACTIVENESS -> AGE	0.170	0.204	0.056	0.385

Follow on the next page.

	Original Sample (O)	Sample Mean (M)	5.0%	95.0%
PROACTIVENESS -> EP	0.252	0.275	0.126	0.457
PROACTIVENESS -> GIP.PROCESS	0.311	0.335	0.125	0.583
PROACTIVENESS -> GIP.PRODUCT	0.189	0.237	0.075	0.446
PROACTIVENESS -> INBOUND	0.307	0.357	0.202	0.547
PROACTIVENESS -> INNOVATIVENESS	0.509	0.535	0.288	0.806
PROACTIVENESS -> LOW.HIGH	0.145	0.176	0.061	0.317
PROACTIVENESS -> OUTBOUND	0.168	0.237	0.124	0.385
RISK-TAKING -> AGE	0.175	0.213	0.082	0.380
RISK-TAKING -> EP	0.069	0.147	0.069	0.251
RISK-TAKING -> GIP.PROCESS	0.147	0.228	0.125	0.366
RISK-TAKING -> GIP.PRODUCT	0.149	0.215	0.115	0.358
RISK-TAKING -> INBOUND	0.284	0.329	0.186	0.497
RISK-TAKING -> INNOVATIVENESS	0.233	0.330	0.173	0.536
RISK-TAKING -> LOW.HIGH	0.201	0.227	0.101	0.382
RISK-TAKING -> OUTBOUND	0.298	0.341	0.215	0.485
RISK-TAKING -> PROACTIVENESS	0.598	0.627	0.426	0.840

Source. Smart PLS.

Table 4.13. Confidence intervals bias corrected. Follow on the next page.

	Original Sample (O)	Sample Mean (M)	Bias	5.0%	95.0%
EP -> AGE	0.251	0.254	0.003	0.073	0.406
GIP.PROCESS -> AGE	0.269	0.273	0.003	0.113	0.395
GIP.PROCESS -> EP	0.084	0.131	0.047	0.029	0.103
GIP.PRODUCT -> AGE	0.314	0.317	0.002	0.209	0.402
GIP.PRODUCT -> EP	0.032	0.106	0.074	0.019	0.022
GIP.PRODUCT -> GIP.PROCESS	0.855	0.852	-0.003	0.733	0.929
INBOUND -> AGE	0.196	0.211	0.014	0.077	0.354
INBOUND -> EP	0.140	0.185	0.045	0.057	0.230
INBOUND -> GIP.PROCESS	0.294	0.313	0.019	0.160	0.425
INBOUND -> GIP.PRODUCT	0.168	0.220	0.052	0.063	0.218
INNOVATIVENESS -> AGE	0.329	0.404	0.076	0.162	0.403
INNOVATIVENESS -> EP	0.589	0.599	0.010	0.375	0.775

	Original Sample (O)	Sample Mean (M)	Bias	5.0%	95.0%
INNOVATIVENESS -> GIP.PROCESS	0.188	0.259	0.071	0.059	0.289
INNOVATIVENESS -> GIP.PRODUCT	0.202	0.247	0.046	0.079	0.294
INNOVATIVENESS -> INBOUND	0.422	0.455	0.033	0.185	0.670
LOW.HIGH -> AGE	0.618	0.621	0.003	0.535	0.691
LOW.HIGH -> EP	0.372	0.371	-0.001	0.213	0.517
LOW.HIGH -> GIP.PROCESS	0.063	0.110	0.047	0.008	0.090
LOW.HIGH -> GIP.PRODUCT	0.186	0.198	0.011	0.072	0.349
LOW.HIGH -> INBOUND	0.255	0.261	0.006	0.094	0.441
LOW.HIGH -> INNOVATIVENESS	0.482	0.500	0.017	0.304	0.641
OUTBOUND -> AGE	0.246	0.249	0.002	0.106	0.382
OUTBOUND -> EP	0.121	0.160	0.039	0.041	0.245
OUTBOUND -> GIP.PROCESS	0.105	0.160	0.055	0.031	0.124
OUTBOUND -> GIP.PRODUCT	0.108	0.158	0.050	0.046	0.137
OUTBOUND -> INBOUND	0.415	0.420	0.005	0.209	0.620
OUTBOUND -> INNOVATIVENESS	0.084	0.192	0.108	0.016	0.082
OUTBOUND -> LOW.HIGH	0.544	0.544	0.000	0.377	0.685
PROACTIVENESS -> AGE	0.170	0.204	0.034	0.033	0.327
PROACTIVENESS -> EP	0.252	0.275	0.023	0.113	0.427
PROACTIVENESS -> GIP.PROCESS	0.311	0.335	0.024	0.111	0.551
PROACTIVENESS -> GIP.PRODUCT	0.189	0.237	0.048	0.053	0.369
PROACTIVENESS -> INBOUND	0.307	0.357	0.051	0.143	0.434
PROACTIVENESS -> INNOVATIVENESS	0.509	0.535	0.026	0.259	0.761
PROACTIVENESS -> LOW.HIGH	0.145	0.176	0.030	0.032	0.251
PROACTIVENESS -> OUTBOUND	0.168	0.237	0.069	0.058	0.220
RISK-TAKING -> AGE	0.175	0.213	0.038	0.054	0.316
RISK-TAKING -> EP	0.069	0.147	0.078	0.032	0.068
RISK-TAKING -> GIP.PROCESS	0.147	0.228	0.081	0.063	0.172
RISK-TAKING -> GIP.PRODUCT	0.149	0.215	0.066	0.050	0.193
RISK-TAKING -> INBOUND	0.284	0.329	0.045	0.134	0.405
RISK-TAKING -> INNOVATIVENESS	0.233	0.330	0.097	0.077	0.306
RISK-TAKING -> LOW.HIGH	0.201	0.227	0.026	0.080	0.345
RISK-TAKING -> OUTBOUND	0.298	0.341	0.043	0.166	0.399
RISK-TAKING -> PROACTIVENESS	0.598	0.627	0.029	0.384	0.783

Source. Smart PLS.

4.3 Estimation of the significance of the parameters (bootstrapping).

4.3.1 Significance and sign of the hypotheses.

For the estimation of the hypotheses an analysis based on a t-student is followed. Distribution of one tailed with n-1 degrees of freedom to test the hypothesis of our model is used.

Regarding the results of the 39 hypotheses raised in the research model, 11 hypotheses have been supported according to the analyses carried out. What supposes a rate of 28,20% of hypotheses supported. The innovativeness dimension belonging to the EO construct is the dimension with the best results obtained. Next, the tables with the results –signification, control variables, R² and Q²– obtained are displayed and findings are also discussed.

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Signification and sign.

Table 4.14. Signification and sign.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Results
H1a. INNOVATIVENESS -> GIP.PROCESS	-0.276	-0.272	0.107	2.577**	0.005	Supported
H1b. INNOVATIVENESS -> GIP.PRODUCT	-0.189	-0.184	0.114	1.663*	0.048	Supported
H1c. PROACTIVENESS -> GIP.PROCESS	0.237	0.238	0.112	2.110*	0.017	Supported
H1d. PROACTIVENESS -> GIP.PRODUCT	0.099	0.119	0.111	0.895	0.185	Not Supported
H1e. RISK-TAKING -> GIP.PROCESS	0.077	0.080	0.160	0.479	0.316	Not Supported
H1f. RISK-TAKING -> GIP.PRODUCT	0.156	0.138	0.156	0.996	0.160	Not Supported
H2a. INNOVATIVENESS -> EP	0.332	0.328	0.104	3.180***	0.001	Supported
H2b. PROACTIVENESS -> EP	0.097	0.111	0.110	0.878	0.190	Not Supported
H2c. RISK-TAKING -> EP	-0.053	-0.051	0.093	0.572	0.284	Not Supported
H3a. INNOVATIVENESS -> INBOUND	-0.337	-0.329	0.102	3.314***	0.000	Supported
H3b. INNOVATIVENESS -> OUTBOUND	-0.001	-0.004	0.104	0.005	0.498	Not Supported
H3c. PROACTIVENESS -> INBOUND	0.160	0.136	0.163	0.983	0.163	Not Supported

Follow on the next page.

$t(0.05; 9999) = 1,645$; $t(0.01; 9999) = 2,327$; $t(0.001; 9999) = 3,092$. * $p < .05$; ** $p < .01$; *** $p < .001$

Source. Smart PLS.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Results
H3d. PROACTIVENESS -> OUTBOUND	-0.079	-0.069	0.147	0.535	0.296	Not Supported
H3e. RISK-TAKING -> INBOUND	0.168	0.168	0.101	1.669*	0.048	Supported
H3f. RISK-TAKING -> OUTBOUND	0.274	0.258	0.117	2.344**	0.010	Supported
H4a. INBOUND -> GIP.PROCESS	0.184	0.190	0.089	2.078*	0.019	Supported
H4b. INBOUND -> GIP.PRODUCT	0.145	0.146	0.087	1.664*	0.048	Supported
H4c. OUTBOUND -> GIP.PROCESS	0.069	0.069	0.116	0.593	0.277	Not Supported
H4d. OUTBOUND -> GIP.PRODUCT	-0.025	-0.030	0.111	0.223	0.412	Not Supported
H5a. INBOUND -> EP	0.097	0.089	0.104	0.929	0.176	Not Supported
H5b. OUTBOUND -> EP	-0.032	-0.025	0.123	0.257	0.399	Not Supported

t(0.05; 9999) = 1,645 ; t(0.01; 9999) = 2,327 ; t(0.001; 9999) = 3,092. * p < .05; ** p < .01; ***p < .001

Control Variables.

Student t-distribution of two tailed with n-1 degrees of freedom.

Table 4.15. Singnification and sign. Control variable.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Results
AGE -> EP	0.002	0.003	0.135	0.014	0.989	Not Supported
AGE -> GIP.PROCESS	0.356	0.344	0.127	2.797**	0.005	Supported
AGE -> GIP.PRODUCT	0.330	0.314	0.120	2.748**	0.006	Supported
LOW.HIGH -> EP	-0.218	-0.215	0.154	1.414	0.158	Not Supported
LOW.HIGH -> GIP.PROCESS	0.018	0.016	0.147	0.120	0.904	Not Supported
LOW.HIGH -> GIP.PRODUCT	-0.087	-0.088	0.166	0.522	0.602	Not Supported

Source.Smart PLS

$t(0.1; 4999) = 1,645$; $t(0.05; 4999) = 1.960$; $t(0.01; 4999) = 2.577$; $t(0.001; 4999) = 3.292$

† p < .1; * p < .05; ** p < .01; ***p < .001.

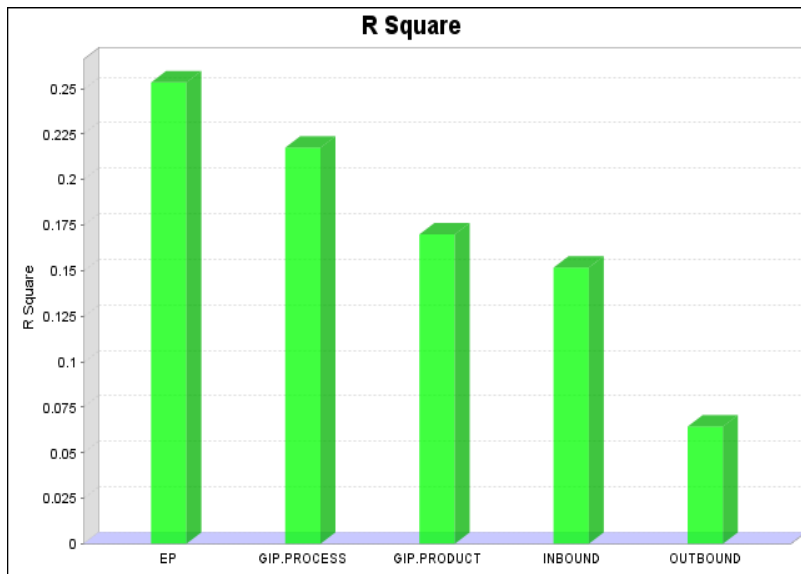
4.3.2 Assessment of the coefficient of determination (R²).

Table 4.16. R².

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)
EP	0.253	0.312	0.072
GIP.PROCESS	0.218	0.288	0.075
GIP.PRODUCT	0.170	0.241	0.067
INBOUND	0.152	0.187	0.068
OUTBOUND	0.064	0.101	0.047

Source. Smart PLS.

Figure 4.4. R² chart.



Source. Smart PLS.

4.3.3 Evaluation of the predictive relevance Q2.

Table 4.17. Q2.

	SSO	SSE	Q² (=1-SSE/SSO)
EP	456.000	363.921	0.202
GIP.PROCESS	456.000	401.400	0.120
GIP.PRODUCT	456.000	406.017	0.110
INBOUND	342.000	320.387	0.063
OUTBOUND	342.000	335.999	0.018

Source. Smart PLS.

4.3.4 Discussion.

In this research we try to clarify the relationship between EO and performance and the calls of new studies that analyse variables that may influence this relationship (Wiklund, 1999; Wiklund & Shepherd, 2003; 2005; Rauch et al., 2004; Walter et al., 2005; Covin, Green, & Slevin, 2006; Basso et al., 2009; Rauch et al., 2009; Martins & Rialp, 2013).

Observing the results and taking into account the significance and the sign of the hypotheses raised, we can conclude that the relations between the EO and performance dimensions are fulfilled in 44.5%, with 4 direct relationships confirmed empirically.

Considering each of the dimensions, innovativeness has a positive and significant relationship to green innovation performance (process) ($p < 0.1$), green innovation performance (product) ($p < 0.5$) and export performance ($p < 0.01$) which indicates that companies that have a high degree of innovativeness tend to innovate in the phases of product development and design, but also in the manufacturing phase of the product. At the same time, they obtain a greater performance in their export activities. That is, innovativeness allows the successful implementation of new and creative ideas within an organization (Amabile, 1996). In addition, some characteristics of management teams are linking export strategies (Chen et al., 2016). Among these characteristics is innovativeness.

Considering the second dimension of EO, proactiveness and its relationship with green innovation performance and export performance, only one of the proposed relationships could be supported in the sample analysed. This relationship tells us that proactiveness has a positive and significant relationship ($p < 0.5$) respect to green innovation performance (process). Proactive companies look for environmental strategies (Melnyk et al., 2003; Tseng, 2010; Lin et al., 2011) as for example, green innovation in the processes. It does not happen in the same way with green innovation performance (product). This may be due to the fact that companies in their design and product development phase will proactively seek new green strategies to manage designs where they can save costs and be more efficient. This same proactive attitude of the company makes them look for a more direct contact with the client and finally have to stick to the demands of the customers in the manufacturing phase. Therefore, in the manufacturing phase they cannot always be as efficient.

Along these lines, some studies reveal that companies have implemented proactive environmental strategies and practices through the use of management initiatives to mitigate the impacts of the company's innovation activities on the environment (Melnyk et al., 2003; Tseng, 2010; Lin et al., 2011). That is, attending to proactiveness in this research, this kind of companies consider using environmental strategies only in the first stage of the life cycle of the product.

Regarding the third dimension of EO and its relationship with performance, we could not support that risk-taking has a significant relationship neither with green innovation performance nor with export performance. This sector is a traditional sector that performs two campaigns a year (summer and winter) with very differentiated products. These products are not very different between the winter or summer campaign of one year and the next year. Perhaps for this reason, it is not a sector involved in major decisions regarding the products they produce. For this reason, it is understood that this relationship has not been supported in our analysis.

Regarding the relationships of the dimensions of EO with the strategies of open innovation, of the 6 possible relationships that have been analysed, 3 of them have been confirmed, which implies a percentage of 50%.

Innovativeness is significant and positive ($p < 0.01$) with inbound strategies, being this the relationship that occurs most intensely in our model. Therefore, we can affirm that in the selected sample the ability to innovate that companies have is the key factor to seek knowledge from external agents.

Regarding the second dimension, proactiveness does not find any positive relationship with open innovation strategies. Nonetheless, risk-taking has a positive and significant relationship with inbound strategies ($p < 0.5$) and with outbound strategies ($p < 0.1$), the two types of strategy. That is, the companies and the entrepreneurs that have lower aversion to risk, will be the most active at the time of looking for strategies that involve the exchange of knowledge with external agents to the company. In addition, in the outbound strategies, that are the strategies in which the company must adopt more risks, the ability to take risks is even greater as we see in the significance of this dimension with respect to the two types of strategy.

Finally, if we take into account the open strategies regarding the different performances analysed, we find that inbound strategies are related to green innovation performance (process) ($p < 0.5$) and green innovation performance (product) ($p < 0.5$). Therefore, it can be affirmed that this type of strategies that allow the company to enrich itself from external knowledge contributes positively with the incorporation of green processes and products. The rest of the relationships between open innovation strategies and the different yields analysed have not been confirmed.

In addition, observing the R^2 results show that EO with its three dimensions explain 25.3% of export performance, 21.8% of green innovation performance (process), 17% of green innovation performance (product), 15.2% of inbound strategies and 6.4% of open innovation outbound strategies. Acceptable levels of explanation are considered to be those that exceed 10% (Falk & Miller, 1992), in the analysed case all variables are above that percentage except for the outbound strategies. We must understand that this percentage depends on the context of the sample. In our case, a high percentage of the sample corresponds to footwear companies, considered low technology companies. These companies usually have

less capacity to produce knowledge and commercialise it. They are usually more active in knowledge acquisition strategies (Ford et al., 2014) such as open innovation inbound strategies.

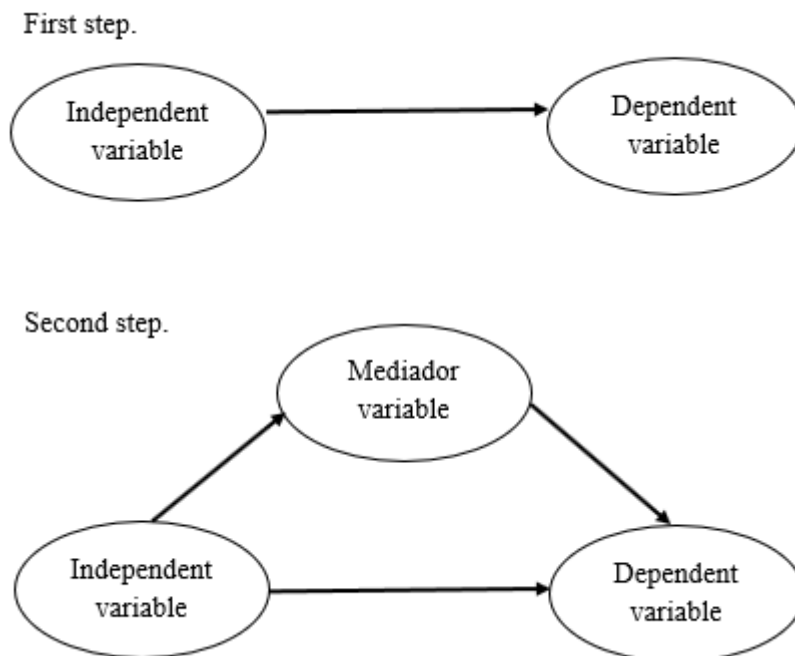
All values $Q^2 > 0$ indicate that the model has predictive relevance (Felipe, Roldán, & Leal-Rodríguez, 2017). In this case, the structural model obtained has a satisfactory predictive relevance for all the constructs ($Q^2 > 0$).

Finally, as for the control variables. We find that the age of the company generates significant differences between the two groups in the sample. Specifically, we can affirm that there are differences between the age of the company and green innovation performance in the process and in the product. However, age has no influence on the performance of exports. On the contrary, the variable degree of technology does not support that there are differences between the groups with respect to the variables that are taken into account in this research.

4.4 Testing the mediations in the model.

To test the possible mediations of our model we need to check whether there are direct relationships between the two variables under study. When exists a direct relationship, it is possible to test whether the third variable plays a mediating role between them. Next figure explains the process to analyse a possible mediating effect.

Table 4.18. Example mediation.



Source. Nitzl et al. (2016).

As seen in table 4.14 of significance of our hypotheses, we can test the mediations between innovativeness and green innovation performance in process and green innovation product.

Table 4.19. Positives relationships to test the mediations.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Results
INNOVATIVENESS -> GIP.PROCESS	-0.276	-0.272	0.107	2.577**	0.005	Supported
INNOVATIVENESS -> GIP.PRODUCT	-0.189	-0.184	0.114	1.663*	0.048	Supported
INBOUND -> GIP.PROCESS	0.184	0.190	0.089	2.078*	0.019	Supported
INBOUND -> GIP.PRODUCT	0.145	0.146	0.087	1.664*	0.048	Supported
INNOVATIVENESS -> INBOUND	-0.337	-0.329	0.102	3.314***	0.000	Supported

Source. Smart PLS.

VAF > 80% Complete mediation

20% ≤ VAR ≤ 80% Partial mediation.

VAF < 20% No mediation

Mediated relationship 1:

$$VAF = \frac{(-0.337) \cdot 0.185}{(-0.337) \cdot 0.185 + (-0.218)} = 0.222 \rightarrow 22.2\%$$

20% ≤ VAF ≤ 80% Partial mediation.

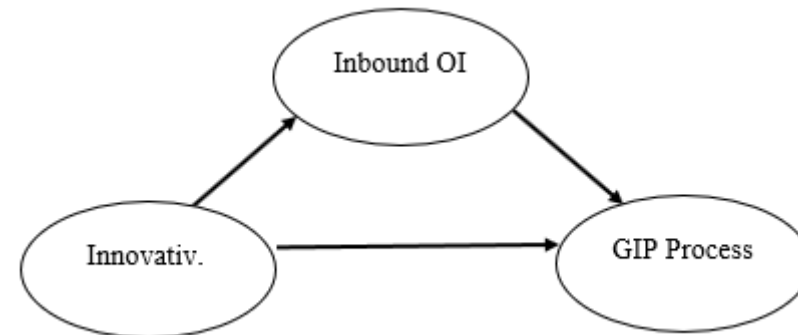


Table 4.20. Positives relations to test the mediations.

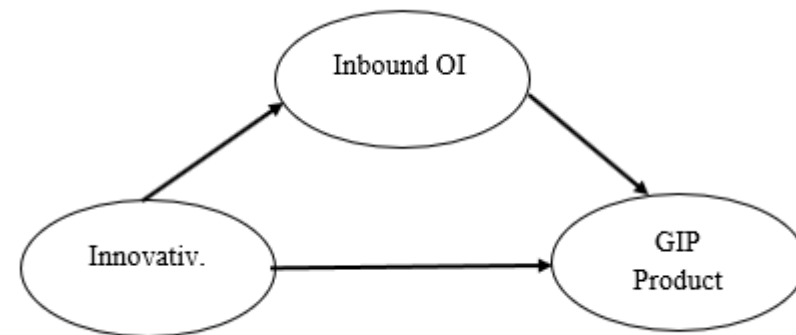
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Results
INNOVATIVENESS -> GIP.PROCESS	-0.276	-0.272	0.107	2.577**	0.005	Supported
INNOVATIVENESS -> GIP.PRODUCT	-0.189	-0.184	0.114	1.663*	0.048	Supported
INBOUND -> GIP.PROCESS	0.184	0.190	0.089	2.078*	0.019	Supported
INBOUND -> GIP.PRODUCT	0.145	0.146	0.087	1.664*	0.048	Supported
INNOVATIVENESS -> INBOUND	-0.337	-0.329	0.102	3.314***	0.000	Supported

Source. Smart PLS.

Mediated relationship 2

$$VAF = \frac{(-0.337) \cdot 0.144}{(-0.337) \cdot 0.144 + (-0.137)} = 0.261 \rightarrow 26.1\%$$

20% ≤ VAF ≤ 80% Partial mediation.



4.4.1 Discussion.

Considering the number of possible mediations in the proposed model, a low percentage of mediations is obtained to analyse. Specifically of the 18 possible mediations we can only analyse 2, which implies 11% of the total. In the two cases in which the study of mediation can be carried out, partial mediation is obtained with a VAF above 20%. This indicates that while mediation is not total, inbound strategies play a role in the relationship between innovativeness and green innovation performance for both green innovation performance (process) and green innovation performance (product). This supports previous studies that have a direct relationship between the capacity of human resources that companies have, such as CEOs and their ability to innovate with the search for external sources as a driver to achieve a certain performance in both green innovation performance (process) and green innovation performance (product) (Del Brìo & Junquera, 2003; Tariq et al., 2017).

CHAPTER 5 CONCLUSIONS,
IMPLICATIONS, LIMITATIONS AND
FUTURES LINES

Entrepreneurial orientation, export performance and green innovation performance: The mediating effect of open innovation in SMEs.

5.0 Objectives and content of the chapter.

This final chapter of the thesis presents the conclusions of the research. To summarise the research shows the advantages of entrepreneurial orientation in the search for open innovation strategies and knowledge flows to accelerate innovation processes in the search for green innovation and export performance. Additional sections explain how these findings contribute to the literature.

This final chapter also examines the implications of this study. These include policy implications, managerial implications; academic implications and social implications. To conclude this chapter examines the limitations of this research and suggestions future lines of research. Finally, a section is dedicated to address the limitations of this study and to propose future lines of research that researchers may wish to explore.

5.1 Conclusions.

Several conclusions are drawn following the analysis of the findings in Chapter 4. These are detailed below:

- ✓ The first conclusion from this study is the positive relationship between entrepreneurial orientation and green innovation performance. More specifically between innovativeness and green innovation performance in the processes and the manufacture of the product and proactiveness in green innovation performance in the processes. Innovativeness is defined as the opening to new ideas promoted through the culture of an organisation (Hurley & Hult, 1998) and proactiveness as the capacity to anticipate and explore new opportunities (Lumpkin & Dess, 1996; Setiawan et al., 2015). More widely, the growing demand for clean technologies offers opportunities (Triguero et al., 2016) to modernise Europe's economy and create green growth and employment. It is logical to suggest that many of these new ideas or strategies developed by the companies in our study may be directed towards greener products to combat climate change and to contribute to saving human and economic costs in the long term (Boons et al., 2013; Triguero et al., 2016). This is driven by stakeholder pressures (Berman et al., 1999; Biondi et al., 2002; Zailani et al., 2014; Gast, Gundolf, & Cesinger, 2017) and governments (EU, 2014a).
- ✓ A second conclusion is that EO is related to export performance. In this case, innovativeness will facilitate the yields in the company's exports. Our findings show that the characteristics of the companies and their capabilities (Chen et al., 2016) facilitate the capacity for innovation which in turn bring additional specific capabilities.
- ✓ As a third conclusion of this research, we find that EO of the companies in our sample facilitate open innovation strategies. More specifically between innovativeness and inbound strategies of open innovation and between risk-taking and inbound and outbound strategies of open innovation. Thus, it is the most entrepreneurial organizations and their

managers that seem most able to use open innovation strategies to obtain alternative and effective ways to attract knowledge to accelerate innovation processes. This supports the findings of Vanhaverbeke et al., (2014). Furthermore, the acts of entrepreneurial activity are uncertain; and this risk is a fundamental aspect of the entrepreneurial process (McMullen & Shepherd, 2006) that can be increased with strategies in which the company interacts with external agents to obtain or give knowledge. It seems entrepreneurial companies tend to tolerate higher levels of external and internal uncertainty (Wang, 2008). Increased levels of risk also occur when a large amount of resource is invested in a single project with uncertain results and a high probability of failure (Madsen, 2007; Grande, Madsen, & Borch, 2011; Hansen, Deitz, Tokman, Marino, & Weaver, 2011) thus outbound strategies contain greater risks of giving up knowledge to others. For this reason, we find that companies with greater willingness and capacity to take risks are more likely to initiate outbound strategies.

- ✓ A fourth conclusion is the relationship between open innovation and export performance. Previous research has found that the relationship between innovation and internationalization processes have generally shown a positive relationship (e.g., Arvanitis et al., 2014). Furthermore, this research has also shown that the most innovative companies are able to obtain power in the market and search for new markets to sell their products (Tidd et al., 1997; Rogers, 2004). In our case, none of the strategies of open innovation has significance. This may be because these companies operate in established markets where they export their products and do not depend on knowledge flows as intensely as other types of companies.
- ✓ Another conclusion is that open innovation mediates the relationship between entrepreneurial orientation of SMEs and the yields of green innovation in processes and products. Specifically, inbound strategies will be used by companies with greater capacity to innovate and these strategies will help to develop over time certain resources and capacities

(Van Kleef & Roome, 2007; Dangelico, 2016). These capabilities include: the integration of stakeholders or partners; and the access to more sustainable technologies that have a positive impact on green practices (Christmann, 2000, Aragón-Correa & Sharma, 2003; Verbeke et al., 2006; Darnall & Edwards, 2006). Therefore, these companies achieve process innovation (productive efficiency) and product innovation (product quality) both of these helps facilitate further objectives. The first is to achieve wider environmental objectives (Menguc & Ozanne, 2005; Triguero et al., 2013). The second is to help the firm create higher value products than its competitors (Tariq et al., 2017); help it to satisfy new consumer demands (Albort-Morant et al., 2017); and finally increase performance (Tariq et al., 2017).

5.2 Implications.

This proposal also has a series of contributions and implications. These are classified into: academic contributions, management and firm implications; policy implications and finally, implications for society as a whole.

Academic contributions:

- ✓ The findings contribute to the calls from the scientific community to provide clarity to better understand which variables influence the relationship between EO and performance (Wiklund, 1999; Wiklund & Shepherd, 2003; 2005; Rauch et al., 2004; Walter et al., 2005; Covin et al., 2006; Basso et al., 2009; Rauch et al., 2009; Martins & Rialp, 2013; Brunswicker & van de Vrande, 2014).
- ✓ Secondly, the research contributes to the stream of literature on SMEs which has been calling for more research on open innovation (Dodgson et al., 2006; Lee et al., 2010; Wynarczyk et al., 2013) and green innovation (Bos-Brouwers, 2010; Triguero et al., 2015; Jansson et al., 2017). Our sample provides insights from SMEs from Spain.
- ✓ Thirdly our research contributes to the stream of literature on entrepreneurship which has been analysing Entrepreneurial Orientation. We analysed EO as a multidimensional construct rather than the more common one dimension (Wales et al., 2013). A one-dimensional construct of EO does not consider the various factors involved in entrepreneurial processes and their diverse impact on performance (Shan et al., 2016).
- ✓ The fourth contribution is to the specific Open Innovation stream of literature on how EO is related to OI. For example, Vanhaverbeke et al. (2014) found in their literature review that open innovation practices had not received the attention necessary to fully understand how open innovation moderates the relationship between EO and performance.

Management and Firm implications:

- ✓ Firstly, the study has a practical implication for SMEs in Spain. Within Spain and the EU more than 99% of all companies are SMEs according to data from the European Commission (EU, 2014a). Thus, this research is of interest to a large number of firms.
- ✓ Secondly, while open innovation has been shown to help enrich strategies for large companies or multinationals this study shows these opportunities also exist for SMEs (Chesbrough, 2006). Our research offers encouragement to SMEs to not be afraid to adopt this type of strategy in their portfolio of activities.
- ✓ Thirdly and more specifically, this research shows that SMEs that follow open innovation strategies can improve their networks to develop new business opportunities to improve their competitiveness through higher quality products such as green products. (Chesbrough, 2006).
- ✓ Fourthly, open innovation strategies can help firms develop green processes and products (Ghisetti et al., 2015) which enable companies to increase their profits by finding new market niches (Triguero et al., 2016).
- ✓ In fifth place, companies with a greater capacity for innovation will be able to access internationalisation processes faster (Rogers, 2004) with products that adapt better to foreign markets. Utilising the experiences of others within an open innovation network can encourage the internationalization of some companies.
- ✓ Finally, the results show that those companies that score high in the dimension of innovativeness are also those that obtain greater benefits from open innovation strategies. These companies also have the highest performance in green innovation of processes and products. Thus, companies should consider increasing the risk of a higher investment in innovation to possibly obtain greater efficiency and competitiveness.

Policy implications:

- ✓ This study provides implications for governments, especially in periods of economic instability such as recently experienced by Spain and Europe. Innovation is a key aspect of the competitiveness of companies (Nonaka & Takeuchi, 1995). Environmental care is on the road map of major economies with treaties and programs supported by major world governments such as the United Nations Environment Program (UNEP). In addition to this, the industry and its manufacturing processes are considered one of the elements that can cause more environmental damage. Furthermore, SMEs make up 99% of companies in the EU (EU, 2014a) and worldwide (Ebrahimi & Mirbargkar, 2017). Consequently, encouraging SMEs to respond to environmental demands (Nunes & Bennet, 2008) is of interest for all governments and politicians (Fagerberg & Verspagen, 2009).
- ✓ This research has implications for the following objectives from the European Union for the year 2020:
 - Support the transition to a low-carbon economy (*green innovation performance*);
 - Promote innovation as a means of generating new sources of growth and meeting the needs of society (*open innovation*);
 - Encourage the creation of SMEs, promote their growth and promote a culture of entrepreneurship (*entrepreneurial orientation*);
 - To ensure the opening of the internal EU market of goods (*export performance*).

Our research is based on these EU objectives and helps to show how companies behave in a manufacturing sector with respect to the objectives set by the European Union. Undoubtedly, the industry plays a fundamental role, can adopt green strategies to combat climate change and can contribute to saving long-term human and economic costs (Boons & Lüdeke-Freund, 2013; Triguero et al., 2016). Therefore, observing the behaviour of companies contributes to the decision making of national governments and European institutions in line with

those already adopted to promote business orientation, open innovation, green innovation and internationalization among companies.

Annex 2 shows some of the aids that political institutions publish in line with the variables that we have considered in our research. This is an indicator of the importance of our findings in contributing to policy makers across Europe.

Social contributions:

It is worthy of note that this research also has implications for the wider society beyond that of firms and governments.

- ✓ With these practices the whole of society would benefit from the arrival on the market of new innovative green especially those that contribute to healthier lifestyles.
- ✓ Actions that lead to an increase in exports should ensure consumers have more choice of products helping to ensure products meet the requirements of consumers more precisely.
- ✓ In the same way, actions that facilitate collaboration and open innovation strategies which deliver benefits in performance will have social repercussions since these collaborations can arise both in the business world and among the citizens of our societies.
- ✓ Finally, SMEs are very important contributors to global economic growth (Shutyak & Van Caillie, 2015). SMEs make up 99% of the total number of companies in Spain and Europe (EU, 2014a) and helping these companies to adopt additional green practices is essential for the search for sustainable development.

Arguably, the findings from this research provide opportunities for firms to help to increase the quality of life for society which in turn can help to preserve the planet in which we live.

5.3 Limitations and futures lines of research.

Clearly this study focused on particular industry sectors and this is a limitation. Future studies could be replicated for other sectors to corroborate the results from this study to explore the extent of generalisability across industry sectors.

In this research the dimensions of entrepreneurial orientation are analysed in a multidimensional way following the research of Lumpkin & Dess (1996); future studies could consider testing our hypotheses following the line of research proposed by Covin & Slevin (1989). That is, using a one-dimensional construct formed by the battery of indicators together. There are different scales to measure EO and other scales could be used to test whether the same results are obtained. Future investigations could make a comparison with different scales. This would help to develop understanding about the effectiveness of the scales and thus contribute to this stream of literature.

The issues of bias within any investigation are ever present and this study is no exception. One issue arose within the questionnaire survey. Initially, it was thought to solve the problem of delays in collecting data to send part of the questionnaire to the CEO and six months later to send the other part of the questionnaire to the COO or production manager. Due to the difficulty of collecting data the entire questionnaire was sent at the same time indicating that each respondent answered the relevant part of the questionnaire.

As with all questionnaires there are limitations of conscientious responses and truthful answers. We have followed the systematic approaches of fellow research colleagues to carefully design a questionnaire that attempts to mitigate against these limitations (Kumar & Phrommathed, 2005). In a future study, after a year could ask to the companies an additional question to solve this possible bias.

Another future line of research would be to corroborate this study with companies of different types such as non-profit companies, since these follow different cultural patterns to commercial companies and, in turn, have received limited attention from scientists (Chesbrough & Di Minin, 2014).

The literature distinguishes between two types of exports, indirect and direct. The first in which the company sells its products in foreign markets through other independent companies, while in direct export the company takes more actively the distribution of its products to consumers in foreign markets (Plá-Barber & León, 2004). In this study this difference was not taken into whether the export is carried out by one type or another.

Another line of research would be to conduct this investigation at another moment in time with the same sample. This could be interesting to see if the same results are generated. In addition, repeating this research at different points in time to investigate the performance of these firms over time would also enrich the results obtained.

This study evaluates the mediation of inbound and outbound strategies between entrepreneurial orientation and green innovation and export performance, but this is conducted in isolation, without considering companies that only perform one type of strategy or both simultaneously. A future line of research could observe if there are differences between those companies that carry out two types of strategy or only one of them. In this way, it would help to develop the literature since more studies are required that take into account the use of inbound and outbound strategies simultaneously (Zhu et al., 2017).

Considering R&D activities, Cassiman, Golovko, & Martínez-Ros (2010) found a positive relationship between innovative products and the propensity to export but cannot sustain this relationship taking into account innovation processes. Francioni et al., 2016 conclude that R&D and innovation activities can be determinants of export although there are studies that do not reinforce this statement. We only analyse the relationship among EO and its dimensions and performance in the green process, product and export performance. Futures studies could analyse the relationship between green product innovation, green process innovation and export performance.

In the relationship between the EO and export performance only the hypothesis in the dimension innovativeness and export performance has been supported. This result contributes to other studies that positively relate innovation capacity to

export (e.g., Rua & França, 2015). Other studies consider that the ability to take risks facilitates internationalisation processes (Junit, 2001; Pérez-Luño et al., 2011; Basile, 2012). In our case we have not been able to corroborate this, therefore new studies are necessary to be able to generalize these results.

Ramos et al. (2011) in their study found no positive relationship between open innovation activities and rapid access to international markets. We cannot support this relationship in this research. This generates another possible door to future studies that help to clarify this relationship.

We use a sample of SMEs that include low-tech and high-tech firms and we use a control variable to analyse the differences. Futures studies could use only low-tech companies. There are calls from the scientific community to take into account the SME sector and low-tech industries (Henttonen & Lehtimäki, 2017). This provides another research opportunity to understand how these low-tech firms can also benefit from open innovation (Chesbrough, 2006).

Finally, in this study we affirm that the dimension of EO that contributes most to the proposed model is the innovativeness and the one that contributes least to be able to explain certain performances is proactiveness. These results are not supported by the literature. Li & O'Connor (2017) found that risk-taking is the dimension that contributes least to EO. On the other hand, Al Mamun, Kumar, Ibrahim, & Bin (2017) conclude that proactiveness is the dominant dimension in EO. Therefore, more studies are required to understand the dimensions that contribute most to EO.

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ANNEX

Annex 1. English and Spanish questionnaire.

ENGLISH QUESTIONNAIRE.

If you wish, you will be sent a personalized report (benchmarking) with your position regarding the total number of companies (aggregated data) that are part of the Study.

This identification data will only be used to send your report.

Name of the company:

Email address:

Identification data

Sector:

Indicate the age of the company (Number of years):

Part one. To answer the CEO.

Mark the position where the company or managers are in the following pairs of opposing statements.

Rate from 1 to 8, being:

1 Totally agree with the affirmation of the left and 8 totally in accordance with the affirmation of the right.

In general, the top managers of my firm favour.

A strong emphasis on the marketing of tried and true products or services.	<table border="1"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	A strong emphasis on R&D, technological leadership, and innovations.
1	2	3	4	5	6	7	8			

How many new lines of products or services has your firm marketed in the past 2 years?

No new lines of products or services.	<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Very many new lines of products or services.
1	2	3	4	5	6	7	8			

Changes in product or service lines have been mostly of a minor nature.	<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Changes in product or service lines have usually been quite dramatic.
1	2	3	4	5	6	7	8			

In dealing with its competitors, my firm . . .

Typically responds to actions which competitors initiate.	<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Typically initiates actions which competitors then respond to.
1	2	3	4	5	6	7	8			

Is very seldom the first business to introduce new products or services, administrative techniques, operating technologies, etc.	<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc.
1	2	3	4	5	6	7	8			

Typically seeks to avoid competitive clashes, preferring a 'live-and-let-live' posture.	<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Typically adopts a very competitive, 'undo- the-competitors' posture.
1	2	3	4	5	6	7	8			

In general, the top managers of my firm have...

A strong proclivity for low-risk projects (with normal and certain rates of return).	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">5</td> <td style="padding: 2px 10px;">6</td> <td style="padding: 2px 10px;">7</td> <td style="padding: 2px 10px;">8</td> </tr> </table>	1	2	3	4	5	6	7	8	A strong proclivity for high-risk projects (with chances of very high returns).
1	2	3	4	5	6	7	8			

In general, the top managers of my firm believe that...

Owing to the nature of the environment, it is best to explore it gradually via timid, incremental behaviour.	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">5</td> <td style="padding: 2px 10px;">6</td> <td style="padding: 2px 10px;">7</td> <td style="padding: 2px 10px;">8</td> </tr> </table>	1	2	3	4	5	6	7	8	Owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives.
1	2	3	4	5	6	7	8			

When confronted with decision-making situations involving uncertainty, my firm

...

Typically adopts a cautious, 'wait-and-see' posture in order to minimize the probability of making costly decisions.	<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">5</td> <td style="padding: 2px 10px;">6</td> <td style="padding: 2px 10px;">7</td> <td style="padding: 2px 10px;">8</td> </tr> </table>	1	2	3	4	5	6	7	8	Typically adopts a bold, aggressive posture in order to maximize the probability of exploiting potential
1	2	3	4	5	6	7	8			

Do you perform any of these activities? Rate from 1 to 8, being: 1 Do not perform and 8 Always do.

External R&D contracting.	1	2	3	4	5	6	7	8
Buys the rights to use inventions of others (e.g., in-licensing).	1	2	3	4	5	6	7	8
External R&D consulting.	1	2	3	4	5	6	7	8

Provide R&D contracting.	1	2	3	4	5	6	7	8
Sells the rights to use internal inventions (e.g., licensing).	1	2	3	4	5	6	7	8
Does R&D consulting for others.	1	2	3	4	5	6	7	8

Part two. To answer the COO.

Indicate your degree of disagreement or agreement with these statements. Assess from 1 to 8, being: 1 Total disagreement and 8 Totally agree.

The company chooses the materials of the product that produce the least amount of pollution for conducting the product development or design.	1	2	3	4	5	6	7	8
The company chooses the materials of their products that consume the least amount of energy and resources for conducting the product development or design.	1	2	3	4	5	6	7	8
The company uses the fewest materials to for conducting the product development or design.	1	2	3	4	5	6	7	8
The company would circumspectly evaluate whether their products are easy to recycle, reuse, and decompose for conducting the product development or design.	1	2	3	4	5	6	7	8
The manufacturing process of the company effectively reduces the emission of hazardous substances or wastes.	1	2	3	4	5	6	7	8
The manufacturing process of the company effectively recycles wastes and emission that can be treated and re-used.	1	2	3	4	5	6	7	8

The manufacturing process of the company effectively reduces the consumption of water, electricity, coal, or oil.	1	2	3	4	5	6	7	8
The manufacturing process of the company effectively reduces the use of raw materials.	1	2	3	4	5	6	7	8

How do you evaluate the following export results of the company comparing them with those of its main competitors in 2015? Rate from 1 to 8, being:

1Roundly worse 2Much worse 3Basic worse 4 Slightly worse 5 Slightly better
6Basic better 7Much better 8Better better.

Export sales volume	1	2	3	4	5	6	7	8
Export market share	1	2	3	4	5	6	7	8
Profitability.	1	2	3	4	5	6	7	8
Percentage of sales revenue derived from products introduced in this market during the past two years.	1	2	3	4	5	6	7	8

SPANISH QUESTIONNAIRE.

Si lo desea, le será remitido un informe personalizado (benchmarking) con su posición respecto al total de empresas (datos agregados) que hacen parte del estudio. Estos datos de identificación solo serán usados para realizar el envío de su informe.

Nombre de la empresa:

Correo electrónico:

Datos de identificación

Sector:

Indicar la edad de la compañía (número de años):

Primera parte. A responder por el CEO.

Marque la posición donde se encuentra la empresa o los directivos en los siguientes pares de afirmaciones.

Valorar del 1 al 8, siendo:

1 Totalmente de acuerdo con la afirmación de la izquierda y 8 Totalmente de acuerdo con la afirmación de la derecha.

¿Cuántas nuevas líneas de productos o servicios ha comercializado su empresa en los últimos 2 años?

Ninguna nueva línea de producto o servicio.	1 2 3 4 5 6 7 8	Muchas nuevas líneas de producto o servicio.
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Los cambios en las líneas de productos o servicios han sido principalmente de naturaleza menor.	<table border="1" style="margin: auto;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Los cambios en las líneas de productos o servicios han sido por lo general bastante drásticos, substanciales.
1	2	3	4	5	6	7	8			

En general, los altos directivos de la empresa ponen...

Un fuerte énfasis en la comercialización de productos o servicios probados o existentes.	<table border="1" style="margin: auto;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Un fuerte énfasis en en I+D, el liderazgo tecnológico y las innovaciones.
1	2	3	4	5	6	7	8			

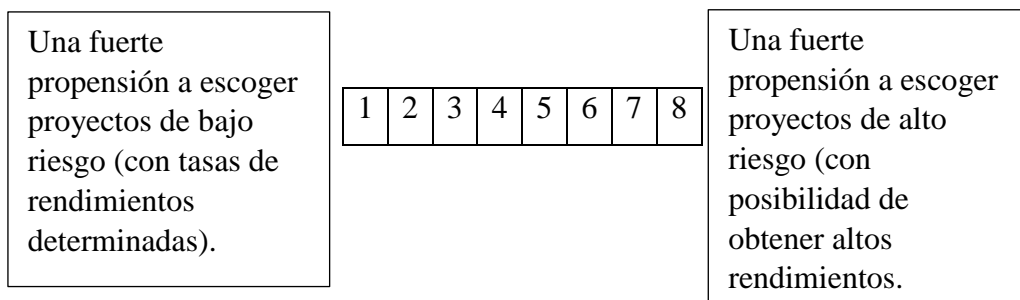
Al tratar con los competidores:

Normalmente responde a acciones que los competidores inician.	<table border="1" style="margin: auto;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Normalmente inicia acciones a las que los competidores responden.
1	2	3	4	5	6	7	8			

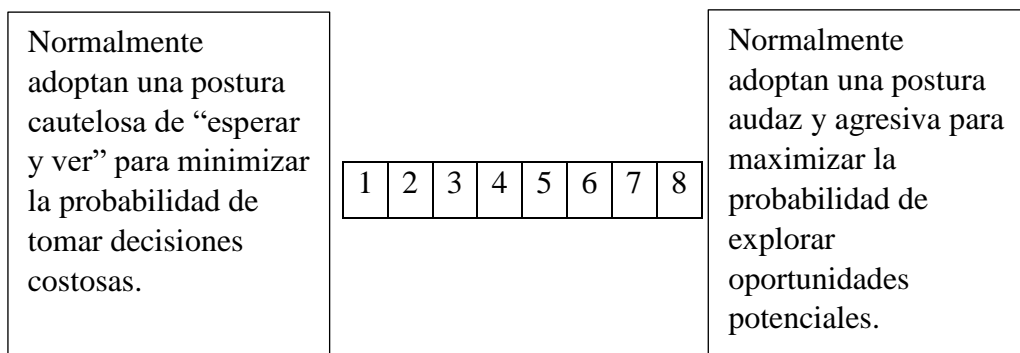
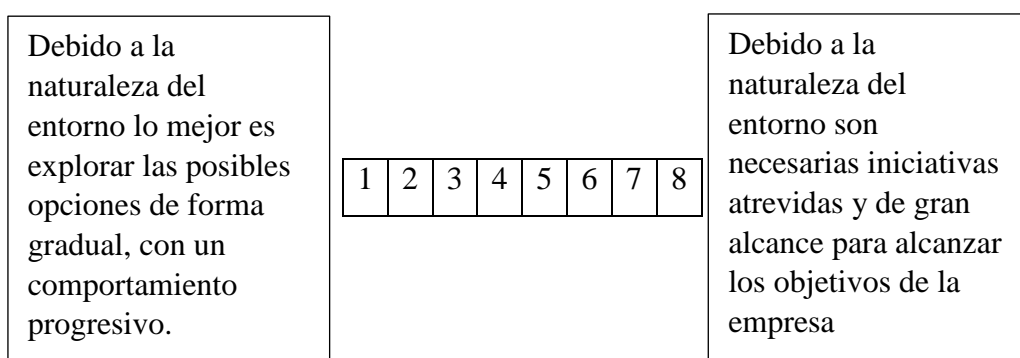
Muy rara vez la empresa es la primera en introducir nuevos productos/servicios, técnicas administrativas, tecnologías operativas, etc.	<table border="1" style="margin: auto;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Muy a menudo la empresa es la primera en introducir nuevos productos/servicios, técnicas administrativas, tecnologías operativas, etc.
1	2	3	4	5	6	7	8			

Normalmente busca evitar enfrentamientos competitivos, prefiriendo una postura "vive y deja vivir".	<table border="1" style="margin: auto;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> </table>	1	2	3	4	5	6	7	8	Típicamente adopta una postura muy competitiva. (destruir a los competidores).
1	2	3	4	5	6	7	8			

En general los altos directivos de la empresa tienen...



En general los altos directivos de la empresa creen que...



¿Usted realiza alguna de estas actividades? Valorar del 1 al 8, siendo: 1 No realiza y 8 Realiza siempre.

Contratar servicios o productos de I+D a otras empresas.	1	2	3	4	5	6	7	8
Comprar los derechos para usar invenciones de otros.	1	2	3	4	5	6	7	8
Contratar servicios de consultoría en I+D.								

Proveer servicios o productos de I+D a otras empresas.	1	2	3	4	5	6	7	8
Vender los derechos de invenciones creadas por su empresa a otras empresas.	1	2	3	4	5	6	7	8
Proveer servicios de consultoría en I+D.	1	2	3	4	5	6	7	8

Parte dos: A responder por el COO.

Indique su grado de desacuerdo o acuerdo con estas afirmaciones. Valorar del 1 al 8, siendo: 1 Total desacuerdo y 8 total acuerdo.

La empresa elige los materiales del producto que producen la menor cantidad de contaminación para llevar a cabo el desarrollo o el diseño del producto.	1	2	3	4	5	6	7	8
La empresa elige los materiales de sus productos que consuman la menor cantidad de energía (más eficientes) y recursos para llevar a cabo el desarrollo o el diseño del producto.	1	2	3	4	5	6	7	8

La empresa utiliza la menor cantidad de materiales para llevar a cabo el desarrollo o el diseño del producto.	1	2	3	4	5	6	7	8
La empresa evalúa detalladamente si sus productos son fáciles de reciclar, reutilizar, y si se descomponen para llevar a cabo el desarrollo o el diseño del producto.	1	2	3	4	5	6	7	8
El proceso de fabricación de la empresa reduce eficazmente la emisión de sustancias o residuos peligrosos.	1	2	3	4	5	6	7	8
El proceso de fabricación de la compañía recicla eficazmente los desechos y emisiones que pueden ser tratados y reutilizados.	1	2	3	4	5	6	7	8
El proceso de fabricación de la empresa reduce eficazmente el consumo de agua, electricidad, carbón o petróleo.	1	2	3	4	5	6	7	8
El proceso de fabricación de la empresa reduce de forma efectiva el uso de materias primas.	1	2	3	4	5	6	7	8

¿Cómo evalúa los siguientes resultados de exportación de la empresa comparándolos con los de sus principales competidores en 2015? Valorar del 1 al 8, siendo: 1 Rotundamente peor y 8 Rotundamente mejor.

Volumen de ventas de exportación de la empresa	1	2	3	4	5	6	7	8
Cuota (porcentaje) de mercado de exportación	1	2	3	4	5	6	7	8
Rentabilidad obtenida	1	2	3	4	5	6	7	8
Porcentaje de ingresos por ventas derivados de productos introducidos en el mercado durante los últimos dos años	1	2	3	4	5	6	7	8

Annex 2. Differences between DC conceptualizations.

Domain	Approach	Papers	Example
Nature	Ability/capacity/enabling device	Teece et al., 1997; Teece, 2000; Zahra and George, 2002; Benner and Tushman, 2003; Winter, 2003; Knight and Cavusgil, 2004; Zahra et al., 2006; Kale and Singh, 2007; Teece, 2007	DC refers to the <i>capacity</i> of an organization to purposefully create, extend, or modify its resources or skills (Kale and Singh, 2007: 982).
	Process/routine	Eisenhardt and Martin, 2000; Amit and Zott, 2001; Galunic and Eisenhardt, 2001; Zollo and Winter, 2002; Aragon-Correa and Sharma, 2003; Colbert, 2004; Santos and Eisenhardt, 2005; Sapienza, Autio, George, & Zahra, 2006	We define DC as the firm's <i>processes</i> that use resources— specifically the processes to integrate, reconfigure, gain and release resources—to match and even create market change (Eisenhardt and Martin, 2000: 1,107).
Agent	Managers	Galunic and Eisenhardt, 2001; Colbert, 2004; Knight and Cavusgil, 2004; Santos and Eisenhardt, 2005; Sapienza et al., 2006; Zahra et al., 2006	We define [DC] as the abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by its <i>principal decision-maker(s)</i> (Zahra et al., 2006: 918).
	Organizations/firms	Teece et al., 1997; Eisenhardt and Martin, 2000; Teece, 2000; Amit and Zott, 2001; Zahra and George, 2002; Zollo and Winter, 2002; Aragon-Correa and Sharma, 2003; Benner	A DC is a learned and stable pattern of collective activity through which <i>organizations</i> systematically generate and modify operating routines for improved effectiveness (Zollo and Winter, 2002: 340).

		and Tushman, 2003; Kale and Singh, 2007	
Action	Change existing	Teece et al., 1997; Eisenhardt and Martin, 2000; Galunic and Eisenhardt, 2001; Zahra and George, 2002; Zollo and Winter, 2002; Benner and Tushman, 2003; Winter, 2003; Colbert, 2004; Santos and Eisenhardt, 2005; Sapienza et al., 2006; Zahra et al., 2006; Kale and Singh, 2007	DC are the organizational and strategic routines by which managers <i>alter their firms' resource base</i> through acquiring, shedding, integrating, and recombining resources to generate new value creating strategies (Sapienza et al., 2006: 914).
	Develop new	Eisenhardt and Martin, 2000; Teece, 2000; Galunic and Eisenhardt, 2001; Aragon- Correa and Sharma, 2003; Benner and Tushman, 2003; Colbert, 2004; Knight and Cavusgil, 2004; Santos and Eisenhardt, 2005; Sapienza et al., 2006; Teece, 2007	DC consist of a set of specific and identifiable processes that, although idiosyncratic to firms in their details and path dependent in their emergence, have significant commonality in the form of best practices across firms, <i>allowing them to generate new, value creating strategies</i> (Aragon-Correa and Sharma, 2003: 73).
Object of the action	Competences/resources	Teece et al., 1997; Eisenhardt and Martin, 2000; Galunic and Eisenhardt, 2001; Zahra and George, 2002; Benner and Tushman, 2003; Winter, 2003; Colbert, 2004; Knight and Cavusgil, 2004; Santos and Eisenhardt, 2005; Zahra et al., 2006;	One can define DC as those that operate to extend, modify, or create <i>ordinary capabilities</i> (Winter, 2003: 991).

		Sapienza et al., 2006; Kale and Singh, 2007; Teece, 2007	
	Opportunities	Teece, 2000; Zollo and Winter, 2002; Aragon-Correa and Sharma, 2003; Santos and Eisenhardt, 2005; Sapienza et al., 2006; Teece, 2007	DC . . . the ability to sense and then seize <i>opportunities</i> quickly and proficiently (Teece, 2000: 35).
Aim	Adapt to changing conditions	Teece et al., 1997; Eisenhardt and Martin, 2000; Knight and Cavusgil, 2004; Benner and Tushman, 2003	<i>We define dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments</i> (Teece et al., 1997: 1229).
	Achieve an advantage over market rivals	Teece, 2000; Zahra and George, 2002; Zollo and Winter, 2002; Teece, 2007; Amit and Zott, 2001	[DC] enable the firm to reconfigure its resource base and adapt to changing market conditions to <i>achieve a competitive advantage</i> (Zahra and George, 2002: 185)

Source. Di Stefano et al (2014).

Annex 3. Institutional subsidies for companies in terms of entrepreneurship, internationalization and sustainability.

Source. Own development.

Type of Help	Help name	Entity that supports it	Help description
Entrepreneurship and innovation.	NEOTEC.	Ministry of Economy, Industry and competitiveness.	Subsidies to finance business projects of innovative small businesses that require the use of technologies or knowledge.
Entrepreneurship and innovation.	Program 170918.	Ministry of Economy, Industry and competitiveness.	Support financially in the early stages of life SMEs promoted by entrepreneurs, without age limit, to undertake the necessary investments and carry out their project.
Entrepreneurship and innovation.	Program 170918. ENISA Young Entrepreneurs.	Ministry of Economy, Industry and competitiveness.	Provide the financial resources to SMEs of recent constitution, created by young people.
Internationalization.	ICO Line Exporters 2017.	Ministry of Economy, Industry and competitiveness.	Finance, self-employed and companies with registered office in Spain that issue invoices derived from the firm sale of goods and services made to a debtor located outside the national territory.
Internationalization.	Program ICEX-NEXT SMEs.	Ministry of Economy, Industry and competitiveness.	Grant a total of 45 hours (30 compulsory hours plus 15 optional hours) of personalized advice to companies in the field of Internationalization.
Energy and the environment.	Plan PYMA.	Ministry of Agriculture and Fisheries, food and the environment.	Incentive mechanism for companies that adopt the carbon footprint as a tool for competitiveness and sustainability.
Energy and the environment.	Energy saving program in the industry	Valencian Institute of Business Competitiveness.	Facilitate the economic viability of investments in energy savings in existing industrial processes in companies in the Valencian Community.

Annex 4. Distribution of cites per year (2000-2018).

YEAR	TOTAL ARTICLES CITED	ARTICLES/ YEAR	PERCENTAGE
2018	660	9	1,4%
2017	660	67	10,1%
2016	660	38	5,8%
2015	660	31	4,7%
2014	660	36	5,4%
2013	660	32	4,9%
2012	660	24	3,6%
2011	660	32	4,9%
2010	660	38	5,8%
2009	660	39	5,9%
2008	660	27	4%
2007	660	30	4,6%
2006	660	24	3,7%
2005	660	19	2,9%
2004	660	16	2,4%
2003	660	21	3,2%
2002	660	18	2,7%
2001	660	22	3,3%
2000	660	13	1,9%
TOTAL			81,2%*

*Rest of cites around 19% of the total.

Source. Own elaborated.