Human capital and export performance in the Spanish manufacturing firms

Journal:	*Baltic Journal of Management*
Manuscript ID	BJM-04-2019-0143.R1
Manuscript Type:	Original Article
Keywords:	Specific human capital, General human capital, Export propensity, Export intensity, Logit models, Tobit models

This is an ACCEPTED VERSION of the following published document:
López Rodríguez, J. and Serrano Orellana, B. (2020), "Human capital and export performance in the Spanish manufacturing firms", *Baltic Journal of Management,* Vol. 15 No. 1, pp. 99-119. https:/doi.org/10.1108BJM-04-2019-0143

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Abstract

Previous empirical studies have identified the founders and managers´ human capital as an important driver of firm export performance and internationalization. However, the impact of the organizational human capital has been less well examined when collective human capital is considered and important source of competitive advantage. Using a dataset of 1525 Spanish manufacturing firms and employing Logit and Tobit models, this paper investigates the effects of firms' general and specific human capital on the export propensity and intensity. The results shown that differences exist in the effect of general and specific human capital. While the firms' general human capital -employees' education- affects both export propensity and intensity, only some dimensions of specific human capital -employees' experience- affects export propensity and intensity but no the employees' training. Moreover, the firms' general human capital generates greater changes than the effect of specific human capital on export performance.

JEL: D22, F14, F23

Keywords: Specific human capital; General human capital; Export propensity; Export intensity; Logit models; Tobit models

Structured abstracts

Purpose of this paper

This paper investigates the effects of firms' general and specific human capital on the export propensity and intensity.

Design/methodology/approach

The resource-based view of the firm provides the theoretical background to examine export performance. Empirical analysis is carried out using a national representative sample of Spanish manufacturing firms and

employing Logit and Tobit models. Export performance is evaluated in a dual way, as export propensity and export intensity. In relation to human capital a distinction is made between general and specific human capital.

Findings

The results shown that differences exist in the effect of general and specific human capital. While the firms' general human capital (education of the firm's employees) affects both export propensity and intensity, only some dimensions of specific human capital (employees' experience at the workplace) affects export propensity and intensity but no the employees' training on-the-job. Moreover, the firms' general human capital generates greater changes than the effect of specific human capital on the export behavior.

What is original/value of paper

1)This paper extends a line of research underexplored in the literature by analyzing the effect of organizational human capital on the firm's export performance; moreover, it is the first study for Spanish manufacturing firms; 2) The distinction between general and specific human capital enhances our comprehension of the human capital as a determinant of export performance 2) In relation to the specific human capital, besides training on-the job we add a new variable related to experience at the workplace.

1. INTRODUCTION

Over the past five decades international business studies and particularly the determinants of export performance have attracted an enormous amount of research. All these studies have been reviewed and systematized comprehensively approximately every ten years by successive literature reviews (Bilkey, 1978; Aaby and Slater, 1989; Zou and Stan, 1998; Sousa, Martínez-López and Coelho, 2008; Chen, Sousa and He, 2016). There are numerous determinants, external to the firm and internal factors, that may help explaining performance differences across firms. However, one of the major problems detected in this literature is diversity, indicating the excessive number of antecedents developed in various conceptual models (pure empirical models), but few in-depth studies with solid theoretical basis (Sousa et al., 2008;

Chen et al., 2016). In this sense, the present paper bases the study of export performance on the resource-based view (Wernerfelt, 1984) that seeks to identify firm's specific resources (or resources and capabilities) as drivers of competitive advantage (Barney, 1991) and performance. We focus our analysis of export performance in one firm specific resource, the human capital. RBV scholars have identified human capital (e.g., employee skills, knowledge) as an organizational resource with potential to create competitive advantages (Colber, 2004).

In relation to the empirical literature, most of the studies examining human capital-exports/ internationalization relationship have focused on the human capital of the entrepreneurs and managers. For instance, factors such as commitment (Dhanaraj and Beamish, 2003); international experience (Reuber and Fisher, 1997); university education, technical and business education (Stucki, 2016); general education, general experience, technical education, business education, technical experience, commercial experience, sector experience, managerial experience (Ganotakis and Love, 2012), attitudes (Bijmolt and Zwart, 1994) have all been shown to be important to export behavior and internationalization. However, less well explored has been the effect of the human capital at the entire organization (Onkelinx, Manolova and Edelman, 2012). This is surprising because as the organization gains size, not only the resources and capabilities of entrepreneurs and management team, but also the collective human capital plays an important role to achieve competitive advantages that may affect the firm´s export performance. Therefore, our study seeks to address this gap.

Specifically, we focus on the effect of general human capital (education) and specific human capital (training and experience inside firm) on the export propensity (the decision to enter into foreign markets) and export intensity (the share of export sales over total sales). Therefore, the present study makes the following contributions to the literature. First, by adding new empirical evidence on organizational human capital-export performance relationship we extend a line of research underexplored in the literature and, thus, in need of more empirical studies. Moreover, to the best of our knowledge, this is the first study to test the effect of general and specific human capital for Spanish manufacturing firms. Second, by examining the

importance of general and specific human capital our paper augments the literature on the RBV and the ongoing conversation about the importance of the firm´s resource base in supporting firm export performance and internationalization (e.g., Dhanaraj and Beamish, 2003; Ferreira and Simoes, 2016; He, Brouthers and Filatotchev, 2013; Kaleka, 2002; 2012; López-Rodríguez and García, 2005; Ruzo, Losada, Navarro and Díez, 2011). Finally, our study contributes also to the literature of human resource management (HRM). In the 1990´s, scholars in this tradition have argued that the potential of human capital to gain competitive advantages depends on the quality of its workforce and its human resources policies and practices (e.g., Pfeffer, 1994, 1998; Lawler, 1992; Levine, 1995). In this sense, the firms´ endowment of specific human capital is a consequence of implementing some strategic human resource practices by which employees develop and acquired specific skills, competences and knowledge related to the tasks performed at the workplace.

With respect to the empirical development, the data used in the analysis come from the Business Strategies Survey (ESEE). The sample used to test the hypothesis is made of 1525 Spanish manufacturing companies corresponding to the year 2014, the last data available in the survey. The statistical technique used are the regression models logit and tobit, given the nature of our export behavior measure variables –they are limited dependent variables: *export propensity*, i.e., the decision to export, measured as a dichotomous variable, taking the value of 0 if the firm has no exports and 1 if it has export activity, and export intensity, measured as the proportion of foreign sales to total sales, a continuous variable bounded between zero and 1 0 100% expressed in percentage-. These models are most appropriate and suitable than OLS and allow us to get more precision in our estimates.

The rest of the paper is structured in the following manner. In the following section the theoretical fundamentals are developed and the hypotheses on the relationship between the human capital and the export performance are derived. Section 3 describes the empirical methodology: data set, variables and econometric procedure. Section 4 shows the estimation results. Finally, in Section 5 the main conclusions and implications derived from the paper are discussed.

2. THEORETICAL INSIGHTS AND DERIVATION OF HYPOTHESES

2.1 Human capital, competitive advantage and export performance

The Resource-Based-View of the firm (RBV) is a theoretical perspective for explaining competitive advantage. In this sense, export research has also benefited of this theoretical framework, seeking to identify firm´s specific resources as drivers of competitive advantages that may help to explain export performance differences across firms (e.g., Dhanaraj and Beamish, 2003; Ferreira and Simoes, 2016). Rooted in the work of Penrose (1959), the RBV argues that a firm is a pool tangible and intangible resources that may serve as sources of competitive advantage (e.g., Wernerfelt, 1984; Barney, 1991). According to Barney (2001) resources can generate and sustain competitive advantages if they are valuable, scares, inimitable and hard to substitute. Of all bundle of firm´s resources, RBV stress the importance of those called intangibles or invisibles as those resources that enhance the firm´s competitive power and often are the only real force of competitive edge (Itami, 1987). One of such intangible resources is human capital (e.g., employee skills, knowledge and experience) that drives our attention in the analysis of firms´ export performance. Many RBV scholars identify human capital as an organizational resource capable of offering competitive advantage (Colbert, 2004). First, the human resources per se are valuable since the knowledge and skills that the workers accumulate enable them for the resolution of problems and development of new solutions and processes in the company. Second, assuming that the competencies and attitudes of the employees are distributed normally, high levels of these labor characteristics are, by definition, rare (Wright, McMahan and McWilliams, 1994). Third, the resources of human capital can be hard to imitate, and even substitute, since on them operate in many occasions elements of specificity, historic dependency and causal ambiguity (Becker and Gerhart, 1996). Moreover, the literature of HRM makes arguments consistent with the RBV perspective arguing that human resources policies and practices can increase their potential to gain competitive advantages (e.g., Berisha Qehaja and Kutllovci, 2015; Delery and Roumpi, 2017; Lado and Wilson, 1994; López-Cabrales and Valle-Cabrera, 2019).

Therefore, the main argument of this research is that firms endowed with a high quality of human capital can achieve some competitive advantages that are expected to stimulate the export performance, both the export propensity – the firm´s decision to start export activities- and the export propensity- the firm´s expansion of sales abroad-.Moreover, following Becker´s human capital theory (1975), within the human capital we can distinguish between general and specific human capital by considering the specificity of the accumulated human capital. We explore the effect of these two dimensions of human capital on export performance, what constitutes our research model (see Fig.1).

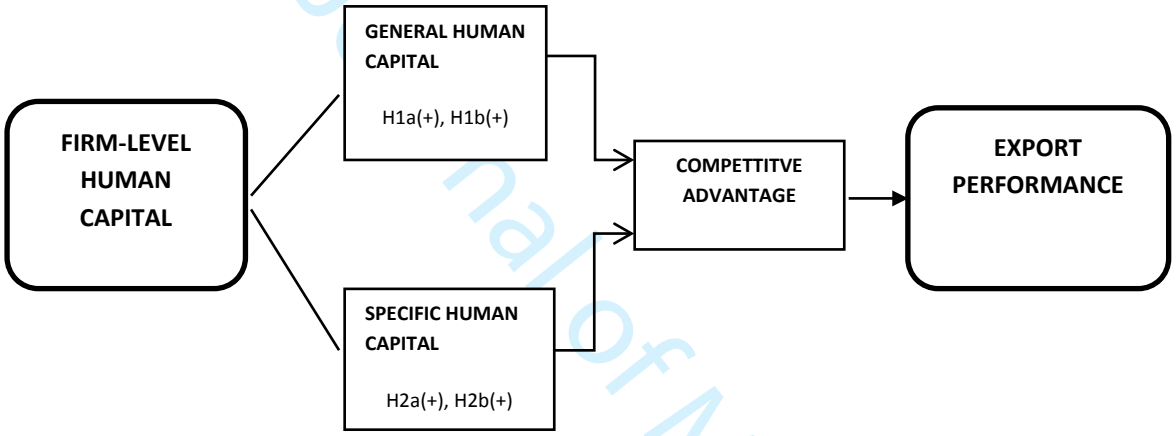

Fig.1. Research model of human capital and export performance

2.1.1 General and specific human capital: effect on export performance

General human capital is related to the general knowledge and skills accumulated by individuals through formal education and general experience that can be used in a broad spectrum of tasks, while the specific human capital refers to the specific knowledge and skills related to a specific job context (Becker, 1975). As we mentioned above, human capital has the potential to generate competitive advantages. General and specific human capital helps to deploy competitive advantages by enhancing the firm´s innovation capacity (Fonseca, Faria and Lima, 2019); successful exporting firms have been found to require a higher capability for innovation and knowledge creation (Knight and Cavusgil, 2004). In this sense, a higher level of general

human capital -education- provides individuals with greater knowledge, cognitive skills, problem solving ability, discipline and creative capacity (Cooper, Gimeno-Gascon and Woo, 1994) which are the basic inputs to perform innovation activities. In this sense, several empirical studies have provided strong evidence on the positive relationship between education and firms´ innovation performance (e.g., Arvanitis and Stucki, 2012; D´Amore, Iorio and Lubrano Laavedra, 2017; Leiponen, 2005). Moreover, the importance of education is also supported by their effect in absorptive capacity development (Cohen and Levinthal, 1990). Highly educated employees provide firms with a greater capacity to integrate, assimilate and create new knowledge from external sources which bring firms higher innovation capabilities (Lund Vinding, 2006) and thus the possibility to achieve differentiation competitive advantages by adding innovative features to their products.

In addition, a higher level of general human capital, is useful for the management of complex decision-making processes as well as for the analysis of the international environment because it increases the ability to recognize and evaluate information related to foreign market opportunity quickly, to cope with problems, and to acquire new knowledge and skills needed for international markets (Cerrato and Piva, 2012; Stucki, 2016). Also, higher levels of education can create the opportunity to encounter new contexts and people; employees are more likely to have developed information networks that allow firms to be more aware of business opportunities in export markets (Shane, 2000). All these skills are important in managing the challenges of international development and understanding different ways of doing business.

We thus formulate the following hypothesis:

H1: The firm's endowment of general human capital is positively associated with the export performance of the company.

H1a: The firm's endowment of general human capital is positively associated with the export propensity of the company.

H1b: The firm's endowment of general human capital is positively associated with the export intensity of the company.

Specific human capital relates to skills and knowledge specific to a partiular job context (Gimeno, Folta, Cooper and Woo, 1997), and thus has a more limited range of applicability and is less transferable than general human capital (Ucbasaran et al., 2008; Robson et al., 2012). Such specific human capital can be acquired over time through learning by doing –i.e. practical experience- while working at the firms (Gibbons and Waldman, 2004) and by training programs provided by employers (Onkelinx, Manolova and Edelman, 2012). Like general human capital, specific human capital is expected to affect export propensity and intensity because it contributes to deploy competitive advantages by improving firms' innovation; and innovation is crucial for enhancing export performance (Rodil, Vence and Sánchez, 2016; Roper and Love, 2002). In this sense, specific human capital related with training on-the-job programs provide employees with the opportunity to updated and acquired firm-specific technical skills, competences and know-how, which, in turn, enhance their abilities to absorb and transform knowledge to develop product innovations (e.g., Caloghirou et al., 2017; Capozza and Divella, 2018; González et al., 2016; Laursen and Foss, 2014; Freel 2005). In addition, if some of these training programs are related to international business, they will provide employees with some special abilities and skills to deal with activities in foreign markets (López et al., 2018). On the other hand, specific human capital related with the accumulation of experience at the workplace serves to consolidate and reinforce the employees' skills and competences gained through training and, thus, raising the firm´s innovation capabilities. In this sense, Daveri and Parisi (2015) demonstrated that a high share of temporary, thus un-experienced workers, is associated with low innovation and productivity. Besides, long-term employment contracts should enhance motivation -extrinsic and intrinsic, awareness and commitment of employees, and all these factors are be pivotal for the generation of innovative behavior within the organization (Abdullatif et al., 2016; Tomas, 2002).

We thus hypothesize that:

H2: The firm's endowment of specific human capital is positively associated with the export performance of the company.

H2a: The firm's endowment of specific human capital is positively associated with the export propensity of the company.

H2b: The firm's endowment of specific human capital is positively associated with the export intensity of the company.

3. EMPIRICAL METHODOLOGY

3.1 Data and variables

Data and characteristics of the sample

The dataset used in our empirical investigation is provided by the Business Strategies Survey-ESEE-, elaborated by the SEPI Foundation. The ESEE is a statistical research born on the year 1990 by an agreement subscribed between the Ministry of Industry (Spain Government) and the SEPI Foundation which is responsible for the design, control and performance of the survey. The reference population of the BSS is the Spaniard companies with 10 or more employees and belonging to what is known as manufacturing industry. In the present study we use the data corresponding to the year 2014 (latest data available from the BSS). The number of firms making up the sample is 1525. An overview of the distribution of firms –total, and exporters versus non-exporters- across four broad manufacturing classes, based on the taxonomy of Pavit (1984), Marsilly and Verspagen (2002), is presented in Table 1 –see the section of control variables below for a description of this sectorial classification-.

Table 1.
Sample characteristics

	Total		Exporters		Non exporters	
	Quantity	%	Quantity	%	Quantity	%
Number of companies	1525		1106	72.52	419	27.48
Size						

Up to 200 employees	1234	80.92	830	75.05	404	96.42
More than 200 employees	291	19.08	276	24.95	15	3.58
Sectors						
sectorial- PE	608	39.87	438	39.6	170	40.57
sectorial-SB	26	1.7	22	1.99	4	0.95
sectorial-PC	629	41.25	431	38.97	198	47.26
sectorial-FP	262	17.18	215	19.44	47	11.22

Description of the variables

We describe the set of dependent, independent and control variables we use in the regression analysis (Table 2 shows the summary description of variables).

Dependent variable

Export performance. We explore two aspects of export performance, the decision to enter into international markets, also known as export propensity –EP-, and the degree of exporting, known as export intensity –EI-. These export performance indicators have been employed in most research on exports (Gemunden, 1991). Therefore, we construct a dichotomous variable indicating whether the firm exports or not (for the EP) and a continuous variable indicating the proportion of its total sales that are represented by exports (for the EI).

Independent variables

General and specific human capital refers to the stock of knowledge and skills that a firm´s employees gain through education, training, and experience (Becker, 1975). Therefore, the levels of human capital (general and specific) serve to measure to some extent the capacity of firms to deploy competitive advantages by enhancing their innovation capacities (Fonseca e al., 2019). Moreover, the firm´s level of human capital determines the extent of a firm´s absorptive capacity, that is critical in supporting firms' innovation capabilities and successful innovation processes within firms (Cohen and Levinthal 1990). In relation to general human capital, **Education,** is one of the most frequently used measures (Robson et al., 2012).

Thereby, we use this variable as a proxy for general human capital calculated as the proportion of employees with university studies (technical and superior degree) over the total employees as a measure of the level of the firms´ general human capital (similar definitions were adopted, for instance, in Cerrato and Piva, 2012; Gashi, Hashi and Pugh, 2012; López-Rodríguez et al., 2018 and Onkelinx et al., 2012; Wagner, 1996). In relation to specific human capital, there is not a universally used indicator as it happens for general human capital -the level of education-, although studies usually refer to training and different measures of specific experience -international experience, commercial experience, etc. (e.g., Ganotakis and Love, 2012). Thereby we measure the level of firms´ specific human capital as: 1) **experience**, calculated as the share of firm´s employees with long-term contracts (e.g., Daveri and Parisi, 2015); the length of contracts increases the level of experience accumulated at work (in our database we don´t have information about specific types of experience); and 2) **training**, calculated as the total spending on training on-the job divided by the number of firm employees (e.g., Cerrato and Piva, 2012; Gashi, Hashi and Pugh, 2012; Onkelinx et al., 2012).

Control variables

Based on prior research the basic model is extended including the following variables of control: size of the company, integration in a business group, age of the company, participation of foreign capital, R&D intensity and sectorial controls.

Size has been one of the most analyzed variables in the empirical literature on firm's export behavior (Bonaccorsi, 1992; Calof, 1994; Lefebvre and Lefebvre, 2002), given that it is considered that those companies of greater size have a greater availability of resources to start other activities. The generalized evidence is that a greater size increases the probability that a company exports and, also, even though the consensus is less generalized, the exporting intensity of the company (Bonaccorsi, 1992; Wagner, 2001). We use as control for size the number of total employees in the firm.

Firm' integration in a business group is a variable that can influence firm performance because of the accumulated experience and knowledge at the group level can be used by an affiliated company. In this

sense Lamin (2013) shows that the international roots of a business group increases the international sales of its affiliated companies, since they take advantage of the knowledge and the reputation of the group to increase their international position. We consequently build a dichotomous variable indicating whether the firm belongs to a business group.

Firm's age is a factor that can also affect the international projection of the company. Normally it is expected that young companies have a smaller international orientation than the larger ones. On the other hand, the development of the international markets can take time, in such a way that the older companies can have a greater penetration into the international markets (Lefebvre and Lefebvre, 2002; Smith, Madsen and Dilling-Hansen, 2002). We introduce this control variable in the form of the number of years since the firm's start-up.

Foreign ownership in the capital of the companies can facilitate the penetration into the international markets, because of the knowledge about opportunities for business in the foreign markets and/or exporting experience brought by these foreign alliances (Wignaraja, 2002; Suárez and Mesa, 2012). Hence, a dichotomous variable is created indicating if the firm has foreign ownership in its capital structure.

R&D intensity is a measured of the firm's technological level. Since the companies of high technological level invest considerably in the development and acquisition of new technologies, as well as the development of new products and processes (Hall and Mairesse, 1995; Kafouros, Buckley, Sharp and Wang, 2008) converting it in the nucleus of their business strategy (Lee and Habte, 2004) they are better able to enter and sell products in international markets. In this line, some studies (e.g., Fagerberg, 1994; López-Rodríguez and García, 2005; Pla-Barber and Alegre, 2007 and D'Angelo, 2010) found that innovation and technological development allow the companies to produce differentiated products, which in turn improve their exporting performance. To control for this variable, we use a continuous variable which is measured as the proportion of internal R&D expenses over total sales of the company.

Finally, different sectorial controls have been introduced. The BSS classifies the companies in 20 sectors, but this sectorial variability has been condensed into four types (see Appendix A1) taking as a reference the works of Pavitt, Marsili and Verspagen (Pavitt, 1984, Marsili and Verspagen, 2002). According to these authors, the manufacturing sectors can be classified into four types: Industries of Continuous Process (CP), Industries of Basic Processes (FP), Industries of Product Engineering (PE), Industries Based on Science (SB). The control "Industries of Continuous Process" includes sectors of continuous production and complex processes such as, among others, food and beverage, tobacco, confection and textile, paper or wood and cork. The control "Industries of Basic Processes" includes sectors such as oil refining or non-pharmaceutical chemical industry, among others. The control "Industries of Product Engineering" includes, among others, sectors such as machinery, mechanical equipment and toys. The control "Industries Based on Science" includes, among others, sectors such as pharmaceutical, electrical and electronic materials and components or informatics equipment. The results using the sectorial classification of the BSS hold for the variables of interest and are available from the authors upon request.

Table 2.
Description of model variables

Variable	Description
Dependent variables	
Export propensity (EP)	Dichotomous variable taking value 1 if firm exports
Export intensity (EI)	Proportion of firm´s total sales represented by exports
Independent variables	
General human capital	
Education	Employees with a university degree (either technical or superior) divided by the number of total employees
Specific human capital	
Training	Total spending on training divided by the number of total employees
Experience	Employees with long-term contracts divided by the number of total employees

Control variables

Size of the Company (SizeCom)	The number of employees of the company
Business Group (BGroup)	Dichotomous variable that takes the value of 1 if the company belongs to a business group
Age (AgeComp)	Number of years that the company has in operation since its foundation
Foreign Capital (FrgCap)	Dichotomous variable that takes the value of 1 if the company has participation of foreign capital
R&D intensity (R&D Intensity)	Total expending in R&D divided by the total sales of the company
Sector (Sectorial-SB;-PC; -FP)	Controls according to the belonging manufacturing group: PE (Industries of product engineering), SB (industries based on sciences), PC (industries of continuous process), FP (industries of basic processes). PE: is a dichotomous variable that takes the value of 1 when the company develops its activity in this sector and 0 to the contrary. SB: is a dichotomous variable that takes the value of 1 when the company develops its activity in this sector and 0 to the contrary. PC: is a dichotomous variable that takes the value of 1 when the company develops its activity in this sector and 0 to the contrary. FP: is a dichotomous variable that takes the value of 1 when the company develops its activity in this sector and 0 to the contrary.

3.2 Econometric framework

Given that our dependent variables are limited dependent variables (a) a firm's export propensity (indicating whether a firm has export activities in the year 2014) and (b) export intensity, measured as export share in 2014 (export sales as a percentage of total sales) we use non-linear regression models, Logit and Tobit models. Both types of regression models are more suitable than the linear regression techniques (OLS), since OLS estimation strategy do not take into account the distribution of the endogenous variable - between zero and one - and the adjusted values of a linear regression technique are not restricted to lie between 0 and

1. Moreover, Tobit regression models are especially suitable when the dependent variable, in our case export intensity, has accumulations around a certain value, in this case zero[1].

For the analysis of the impact of the human capital on the decision of exporting and the exporting intensity several models are estimated. In each case, four models are generated, three "single" models containing only one of the variables we use to analyze the human capital and one "full" model which contains all of the variables used to test the importance of human capital. This procedure allow us to determine how the human capital affects export behavior more precisely, detecting whether there exists any sensitivity depending on which variables are introduced into regressions. The econometric analyses have been done with the Stata program.

4. ESTIMATION RESULTS

The results of the logit and tobit regression models for the export propensity and export intensity are presented in Tables 3 and 4, respectively. In the Appendix we present the main descriptive statistics and correlation matrices of the variables (Tables A2 and A3)

[1] A more detailed information of these models can be consulted on the texts of Maddala (1983) and Amemiya (1984, 1985).

Table 3.

Results of the logit analysis (Dependent Variable = EP)

Independent Variables	Model 1		Model 2		Model 3		Model 4	
	Coefficients	dy/dx	Coefficients	dy/dx	Coefficients	dy/dx	Coefficients	dy/dx
Education	3.021542***	0.231584***					3.003508***	0.2345115***
	(5.47)	(4.35)					(5.43)	(4.36)
Training on-the job			0.000295	0.000023			0.0000984	0.0000077
			(0.88)	(0.87)			(0.37)	(0.37)
Experience					0.9526594***	0.0763505**	0.9814957***	0.0766344**
					(2.70)	(2.47)	(2.71)	(2.49)
SizeCom	0.0093883***	0.0007196***	0.0093959***	0.0007426***	0.0093515***	0.0007495***	0.0092947***	0.0007257***
	(7.28)	(13.01)	(7.24)	(13.29)	(7.25)	(13.38)	(7.24)	(13.09)
BGroup	0.1893996	0.0142443	0.258344	0.019909	0.192066	0.015103	0.1100766	0.0084994
	(1.06)	(1.03)	(1.47)	(1.40)	(1.08)	(1.05)	(0.61)	(0.60)
AgeComp	0.0228911***	0.0017545***	0.0247515***	0.0019562***	0.0230139***	0.0018444***	0.0207834***	0.0016228***
	(4.78)	(3.96)	(5.27)	(4.23)	(4.88)	(4.04)	(4.31)	(3.69)
FrgCap	1.577486***	0.0797715***	1.734793***	0.0875305***	1.696051***	0.0875709***	1.492095***	0.0784375***
	(3.59)	(4.51)	(3.96)	(4.85)	(3.88)	(4.81)	(3.38)	(4.33)
R&D Intensity	8.825213*	0.6764024*	12.89167**	1.018897**	12.88831**	1.032928**	8.565175*	0.6687622*
	(1.71)	(1.66)	(2.41)	(2.27)	(2.42)	(2.28)	(1.69)	(1.64)
sectorial-SB	-0.2916344	-0.0251368	0.164175	0.012154	0.129589	0.009864	-0.3137672	-0.0277805
	(-0.44)	(-0.39)	(0.26)	(0.27)	(0.20)	(0.21)	(-0.48)	(-0.42)
sectorial-PC	-0.0038312	-0.0002937	-0.082751	-0.006581	-0.051633	-0.004154	0.0323437	0.0025195
	(-0.03)	(-0.03)	(-0.60)	(-0.59)	(-0.37)	(-0.37)	(0.23)	(0.23)
sectorial-FP	0.1863962	0.0135839	0.271729	0.019971	0.271828	0.020263	0.1827598	0.0135840
	(0.89)	(0.93)	(1.32)	(1.39)	(1.32)	(1.38)	(0.87)	(0.90)
Cons	-1.001288***		-0.7081388***		-1.422273***		-1.748953***	
	(-5.53)		(-4.16)		(-4.45)		(-5.27)	
Indices								

Log Likelihood	-705.94765	-722.86598	-719.73367	-702.13902
LR Chi2	381.29	347.46	353.72	388.91
Probability (LR chi2)	0.0000	0.0000	0.0000	0.0000
McFadden R-Squared	0.213	0.194	0.197	0.217
Businesses with Dep, 0	419	419	419	419
Businesses with Dep, 1	1106	1106	1106	1106
Number of businesses	1525	1525	1525	1525

* The upper number of the cell is the estimated parameter, the numbers in parenthesis are z-statistics; ***p<0.01; ** p<0.05; * p<0.1. The column dy/dx reports the marginal effects.

Table 4.
Results of the tobit analysis (Dependent Variable = EI)

Independent Variables	Coefficients			
	Model 1	Model 2	Model 3	Model 4
Education	0.3426259***			0.3406154***
	(5.41)			(5.35)
Training		0.0000324		0.0000066
		(0.87)		(0.18)
Experience			0.1752856***	0.1726268***
			(2.93)	(2.90)
SizeCom	0.0000302**	0.0000299**	0.0000318**	0.0000316**
	(2.06)	(2.02)	(2.15)	(2.16)
Bgroup	0.1661855***	0.1764767***	0.1674607***	0.1552298***
	(7.64)	(8.05)	(7.58)	(7.03)
AgeComp	0.0024975***	0.0028004***	0.0026087***	0.0022999***
	(4.80)	(5.36)	(4.96)	(4.39)
FrgCap	0.1586699***	0.1782909***	0.1729622***	0.1495789***
	(5.45)	(6.09)	(5.94)	(5.09)
R&D Intensity	0.6503740*	1.061667***	1.063019***	0.6337868*
	(1.71)	(2.82)	(2.83)	(1.66)
sectorial-SB	-0.0767933	-0.0118571	-0.0172717	-0.0806741
	(-0.94)	(-0.15)	(-0.21)	(-0.99)
sectorial-PC	-0.1033563***	-0.1144353***	-0.1090201***	-0.0978537***
	(-4.78)	(-5.27)	(-5.01)	(-4.51)
sectorial-FP	0.0105727	0.0258753	0.0240925	0.0081401
	(0.38)	(0.94)	(0.88)	(0.30)
Cons	0.0135002	0.0476098**	-0.0903226*	-0.1240675**
	(0.55)	(2.02)	(-1.69)	(-2.32)
Indices				
Log Likelihood	-761.72223	-775.89445	-771.95062	-757.42799
LR Chi2	346.16	317.81	325.7	354.75
Probability (LR chi2)	0.0000	0.0000	0.0000	0.0000
Pseudo R-squared	0.1852	0.1700	0.1742	0.1897
Left censored obs	419	419	419	419
Uncensored obs	1106	1106	1106	1106
Number of businesses	1525	1525	1525	1525

* The upper number of the cell is the estimated parameter, the numbers in parenthesis t-statistics; ***p<0.01; ** p<0.05; * p<0.1

The results obtained support completely the first hypothesis –related with the effect of general human capital on export propensity (H1a) and on export intensity (H1b). The results show that the general human capital (Education) affects positively and is highly significant ($p < 0.01$) on firm´s decision to export (Table 3), and this result remains constant both in the "single" model (model 1) and in the "full" model (model 4). In relation to the exporting intensity (Table 4), the results show that the general human capital influences positively and it is statistically significant ($p < 0.01$) ("single" and "full" models –model 1 and 4 respectively).

In relation to our second hypothesis related with the effect of specific human capital on export propensity (H2a) and on export intensity (H2b), the results support only partially this relation. In particular, the employees´ practical experience inside the firm (Firm-experience) is positive and highly significant ($p < 0.01$) on both the firm´s decision to export and the firm´s export intensity and it remains constant in all models estimated –model 3 and 4, "single and "full" models respectively for export propensity (Table 3) and model 3 and 4, "single" and "full" models for export intensity respectively (Table 4); however, the investments in employee human capital (Training on-the job) even though its coefficient is positive in all models, it is not statistically significant in both the export propensity and export intensity.

Moreover, the results show that the effect of general human capital on export propensity and on export intensity is much greater than the effect of specific human capital. In sum, our results give ample support for the relationship between human capital and export performance being positive and highly significant for general human capital (education) and specific human capital (firm-experience), except for the "training on-the job" related with the specific human capital. In the next section we discuss these findings with more detail and justified explanations for the case of "training on-the job" will be pertinently offered.

5. DISCUSSION

In contrast with the dominant literature on the human capital-export performance/internationalization relationship that mostly focus on the founders' and managers' human capital, we shift our attention to the effect of human capital at the whole organization level. In addition, we followed recent research which has distinguished between general and specific human capital (e.g., López-Rodríguez et al., 2018; Onkelinx et al., 2012; Stucki, 2016[2]) allowing to examine the absolute and relative importance of these two dimensions of human capital on export performance. In this sense, our study adds to the conversation around the importance of the firm´s resource base in supporting firm export performance/internationalization.

General human capital or education stimulates firms´ export performance. Our empirical findings indicate that firms with higher levels of general human capital or education have greater export performance (both export propensity and export intensity). A higher level of education provides employees with knowledge and skills useful for the management of complex decision-making processes inherent to export activities (Cerrato and Piva, 2012); besides education plays a key role in the absorptive capacity and innovation (Fonseca et al., 2019; Lund Vinding, 2006) which allow firms to achieve competitive advantages by producing new and different goods and thus stimulating the export capability. This result is consistent with previous work on related literature (e.g., Cerrato and Piva, 2012 for Italian manufacturing SMEs; Gashi et al., 2014 for SMEs pertaining to a group of transition countries and Onkelinx et al., 2012 for Belgium SMEs). Moreover, the effect of education is stable for several measures of internationalization which increase the robustness and reliability of the results, overcoming the limitation associated with the adoption of a single measure[3]. However, the effect of education on export performance should be taken with some caution. For instance, the study of López-Rodríguez et al. (2018) found a non-significant effect of education

[2] We refer here the work of Stucki because it introduces a distinction between general and specific human capital although only in relation with the human capital of the founders.

[3] Cerrato & Piva adopted four proxies: exporters vs. non-exporters, export intensity, geographical scope, and a sales-based entropy measure of international diversification; Gashi et al. use the export intensity and Onkelinx et al. use as a dependent variable to measure the degree of internationalization the number of countries to which a firm export instead of the more commonly measure of export intensity (foreign sales/total sales).

on export intensity for firms belonging to the wine sector. The reason is because wine firms belongs to a very traditional sector, i.e., a sector that exhibit a low-technological intensity -low innovation- and thus education is not a relevant factor to achieve competitive advantages. This argument is supported by the Wagner's (1996) study for German manufacturing firms, where human capital is only significant on export intensity for firms belonging to the mechanical engineering industry, while for those firms belonging to stone, clay, pottery and glass industry, lumber and wood products industry and food, drinking and tobacco industry it is not significant.

Specific human capital related to experience stimulates firms´ export performance but training doesn´t. The results found do not fully agreed with our expectations. Firms that have a higher proportion of employees with long-term contracts and therefore higher levels of accumulated experience have better export performance whereas higher levels of employees´ training do not show a significant impact on export performance. From the human resource literature, competitive advantage may emerge when HRM activities focus on developing firm-specific skills, less transferable and more difficult to imitate than generic skills (e.g., Becker and Gerhart, 1996; Berisha Qehaja and Kutllovci, 2015; Lado and Wilson, 1994). Moreover, training increases the employees´ capacity to engage in complex and non-routine tasks inherent in innovation processes and to absorb knowledge to develop innovations (e.g., Caloghirou et al., 2017) which are fundamental to increase the firms´ competitive potential and thus to stimulate the firms´ capacity to enter and sell products in foreign markets. In this sense, the empirical evidence obtained for training is contra intuitive. However, previous related works have found similar results (Gashi et al., 2014; Onkelinx et al., 2012). Both studies work with a sample of SMEs and in this sense the main argument is based on financial-resource constraints faced by smaller firms. Gashi et al. (2012) argue that the literature on human resources supports the view that large firms commit greater resources to training than do small firms and in this sense they cite Bryan (2006, p. 635) who explains that “small firms are less likely to train employees than larger firms, because they suffer higher labour turnover and higher failure rates, and they tend to have shallow hierarchies that limit long-term career prospects”. In the same line, Onkelinx et al. (2012) state that training

is expensive and requires a monetary commitment that smaller firms may not be able to afford. In addition, they argue that training may take valuable time away from employees who are already busy in managing day to day activities. And finally, Onkelinx et al. argue that although the measure of training is robust, it is an aggregate measure in that we know the levels of overall training, but not the specifics of the type of training in which the firm is engaged that may help to explain why the results were not significant. In line with this argument, the study of López et al. (2018) measures the specific human capital of employees as training related with the field of international business and showed a positive and significant impact on export intensity for firms in the wine sector. In our case, although our sample is not restricted to SMEs, the argument is also related with financial aspects; training investments maybe are not enough intense to being able to develop specific skills and knowledge of employees that increase their competitive power. In this sense, Devins (2008) states that a certain intensity of training does not automatically imply the possession of the necessary skill to work in an industry/task, nor do skilled workers necessarily have a specific qualification.

In relation to the main control variables, the size of the firm, age, and foreign ownership and R&D intensity shown a positive and significant impact on export propensity and intensity in all models. Size reflects the availability of resources (e.g., managerial, financial) that firms possess. The general acknowledgement is that larger firms are more likely to be exporters (Westhead, 1995; for a dissenting view see Pla-Barber and Alegre, 2007) and to have a better export intensity, even though the consensus is less generalized for exporting intensity of the company (Bonaccorsi, 1992). With respect to age, normally it is expected that older firms have a bigger international orientation and thus they are more likely to be exporters and have a greater penetration into international markets (e.g., Westhead, 1995; Lefebvre and Lefebvre, 2002), although in other studies no linkage with business age has been detected (Nassimbeni, 2001). The presence of foreign capital in the ownership structure provide advantages for exporting activities related to a better access to information about foreign markets, logistics and commercial resources (Wignaraja, 2002). R&D intensity reflects the firms´ technological level and thus the firms´ capacity to develop new products and

processes which enhance the capacity to enter and sell products in international markets (e.g., López-Rodríguez and García, 2005).

6. CONCLUSIONS

This paper seeks to enhance the understanding of firm's export performance by analyzing how the firms´ general and specific human capital affect export propensity and intensity. In doing so, we contribute to extend a line of literature related with organizational human capital-export performance/internationalization relationship underexplored in the literature (Onkelinx et al., 2012). Our predictions are tested using a national representative sample of Spanish manufacturing firms.

The results are largely in line with our expectations. The export performance of manufacturing firms is affected by the endowment of general human capital -education- and specific human capital -experience-. Furthermore, we found that the marginal effects of the general human capital on export performance is greater than the specific human capital. However, some exceptions may occur for firms belonging to sectors with low technological intensity where general human capital -education- is not a source of competitive advantage (e.g., López-Rodríguez et al., 2018; Wagner, 1996).

These results have clear theoretical, managerial and policy implications. From the theoretical point of view our results highlight the importance of the RBV in explaining export-performance differences across firms. RBV seeks to identify firm's specific resources and capabilities as drivers of competitive advantage (Barney, 1991; Wernerfelt, 1984) and performance. Particularly, our study highlights the role played by the endowment of firms´ human capital (general and specific) to foster export performance. However, we want to point an interesting theoretical aspect related to the application of the RBV framework to explain export performance. When using RBV arguments to examine export performance we derive a positive relationship between the endowment of firm´s resources, in our case, human capital and export performance, because the theoretical reasoning is as follows: human capital is a resource capable of offering competitive advantages and thus, those firms that have higher endowment of human capital will achieve a greater export

performance. However, it seems unlikely that this positive relationship can continue indefinitely, as Onkelinx et al. (2012) have stated; in other words, there must be a threshold above which an increase in the endowment of human capital does not translate into a greater export performance (an inverted U-shaped relationship). The strategic human capital theory sheds light on this idea. This theory posits that firms can gain competitive advantages by investments in human capital but there are limits to their ability to deploy this capital to achieve strategic impact (Wright, Dunford and Snell, 2001). Excessive accumulation of human capital give rise to numerous problems in its efficient deployment, stemming from increased overhead and administrative costs, complex workforce requirements, agency problems, lower organizational flexibility, especially in terms of demand for labor (Lepak and Snell, 1999). In this sense, empirical evidence found limits for the impact of general human capital -education- on the degree of firm internationalization. After and optimum level of human capital accumulation, further investments become unproductive, as they are negatively associated with the internationalization (Onkelinx et al., 2012). They attribute this complex relationship to the challenges that SMEs face in developing the managerial tools and administrative systems to manage high levels of employee talent because of their resource constraints.

From the managerial point of view, managers should be aware of the importance of human resources to increase the export potential of firms. Manufacturing firms can improve their export potential by increasing the organizational human capital, having employees with higher levels of tertiary or university studies and with higher levels of experience accumulated in the firm. Thereby, managers through well designed HRM practices can deploy higher levels of employee human capital to enhance firm export performance. In this sense, empirical evidence suggests that those practices known as *high performance work systems* (HPWS), a term used to denote a system of human resource practices designed to enhance employees´ skills and commitment, positively influence the export performance (Martin-Tapia et al., 2009). In terms of public policy and government institutions seeking to expand a country´s export base because of their impact on national productivity, job creation and economic growth, it is important to understand how firms may improve export performance and specially the types of resources required. Our results point the importance

of having skilled workers to develop a superior export performance. In that sense, public programs must combat early school leaving (particularly in Spain it is a very serious problem, around 19% of young people between 18 and 24 leave the education system prematurely, this ratio is only surpassed by Malta within the EU –according to Eurostat data-) since this seriously harms the future firm (export) competitiveness and the growth of the economies.

This study is not free from limitations, which also provide future research opportunities in this field. Although, we are confident in our findings, our study would benefit from a stronger operationalization of general and specific human capital that would allow a finer-grained analysis of the relative importance of different aspects of human capital. For instance, in relation to general human capital, richer data on educational level (primary education, secondary education and tertiary or university education) and in relation to specific human capital, information about training related to internationalization/export, international work experience or industry or sector experience would enhance our work. Besides, work on the role of human capital also suggests the need to consider any kind of curvilinear (U-shaped) relationship between human capital levels and export performance as it is derived by the strategic human capital theory and if this relation could be moderated by the size of the firms. Also, because the dataset was stripped of any firm identifiers, we could not augment it with matching data on top management team characteristics, such as degree of ethnocentricity, prior international or industry experience, or international business skills. This precluded us from controlling for the effect of the top management team characteristics (Onkelinx et al., 2016).

Finally, only a few studies have analyzed the effect of human capital of the entire organization on export performance. Thus, it is necessary to incorporate more empirical evidence from other institutional contexts, including emerging markets and developing economies as well as consider different aspects of general human capital and specific human capital to extend our knowledge of human capital- export performance relationship. The present study has contributed in this direction by addressing a finer-grained analysis of the

organizational human capital on export performance and it provides important empirical evidence that enhances both our theoretical as well as our practical understanding of this phenomenon.

APPENDIX

Table A1

Sectorial classification

BSS classification	Marsili y Verspagen; Pavitt classification
Meat industry	Continuous process
Food products and tobacco	Continuous process
Beverages	Continuous process
Textiles and confection	Continuous process
Leather and footwear	Continuous process
Wood industry	Continuous process
Paper industry	Continuous process
Graphic arts	Product Engineering
Chemical industry and pharmaceutical products	Basic processes
Products or rubber and plastic	Continuous process
Mineral non-metallic products	Basic processes
Iron and non-iron metals	Basic processes
Metallic products	Product engineering
Agricultural and industrial machinery	Product engineering
Informatics, electronic and optical products	Science based products
Machinery and electrical materials	Product engineering
Motor vehicles	Product engineering
Other transportation material	Product engineering
Furniture industry	Product engineering
Other manufacturing industries	Product engineering

Notes: The group of Continuous Process industries include the sectors of continuous production and complex processes such as, among others, food and beverage, tobacco, confection and textile, paper or wood and cork; The group of Basic Processes industries include, among others, sectors such as the oil refining or the chemical industry non-pharmaceutical; The Product Engineering industries include, among others, sectors such as machinery, mechanical equipment or toys. The group of industries of Science based products includes, among others, sectors such as pharmaceutical, electrical or electronic materials and components or informatics equipment.

Table A2

Descriptive statistics

Descriptive						
Number of Observations	1525		1106		419	
	All firms		Exporters		Not- exporters	
Variable	Median	SD	Median	SD	Median	SD
EI	0.27	0.31	0.38	0.31	0.00	0.00
Education	0.16	0.17	0.19	0.17	0.10	0.15
Training	100.95	271.22	119.09	206.37	53.07	390.45
Experience	0.85	0.18	0.87	0.15	0.79	0.22
SizeCom	189.21	664.45	245.81	770.89	39.82	88.60
BGroup (%)	0.38	0.48	0.46	0.50	0.16	0.37
AgeComp	31.88	18.44	34.06	19.41	26.13	14.04
FrgCap (%)	0.14	0.35	0.19	0.40	0.01	0.12
R&D Intensity	0.01	0.03	0.01	0.03	0.00	0.02
sectorial- PE (%)	0.40	0.49	0.40	0.49	0.41	0.49
sectorial-SB (%)	0.02	0.13	0.02	0.14	0.01	0.10
sectorial-PC (%)	0.41	0.49	0.39	0.49	0.47	0.50
sectorial-FP (%)	0.17	0.38	0.19	0.40	0.11	0.32

Table A3

Correlation matrix

Variables	EP	EI	Education	Training	Experience	SizeCom	BGroup	AgeComp	FrgCap	R&D Intensity	PE	SB	PC	FP
DE	1.0000													
EI	0.5382	1.0000												
Education	0.2448	0.2533	1.0000											
Training	0.1087	0.1031	0.1676	1.0000										
Experience	0.1900	0.1688	0.1155	0.1004	1.0000									
SizeCom	0.1384	0.1815	0.1231	0.1029	0.0658	1.0000								
BGroup	0.2736	0.3184	0.2350	0.1705	0.2464	0.2479	1.0000							
AgeComp	0.1920	0.1545	0.1382	0.0603	0.1621	0.1198	0.1344	1.0000						
FrgCap	0.2284	0.2760	0.2146	0.1855	0.1810	0.2825	0.3621	0.0963	1.0000					
R&D Intensity	0.1249	0.1298	0.3132	0.0715	0.0688	0.1073	0.1500	0.0481	0.0114	1.0000				
PE	-0.0088	0.1127	0.0176	0.0099	0.0494	0.0271	-0.0029	-0.0292	0.0490	0.0151	1.0000			
SB	0.0357	0.0543	0.2379	0.0175	0.0377	0.0842	0.0340	-0.0239	0.0177	0.4279	-0.1072	1.0000		
PC	-0.0751	-0.2210	-0.2089	-0.0621	-0.1360	-0.0658	-0.1319	0.0216	-0.1103	-0.1434	-0.6822	-0.1103	1.0000	
FP	0.0973	0.1236	0.1681	0.0622	0.1005	0.0218	0.1642	0.0179	0.0742	0.0206	-0.3709	-0.0600	-0.3816	1.0000

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