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Exploring the Relationship Between Internationalization Stage, Innovation, and Performance: The Case of Spanish Companies

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ABSTRACT

Innovation and internationalization activities are considered two key sources of firms' competitiveness, growth and profitability. This study evaluates the relationship between both strategies, and with business performance. The analysis is based on survey data from a sample of Spanish manufacturing firms from different industries and stratified according to their internationalization involvement, divided for the first time in this field in different stages according to their level of exports and FDI. We argue that companies in more advanced internationalization stages will be more innovative. The results show a positive and significant increase in the level of product innovation as companies advance through the internationalization stages, with exporters as a whole exhibiting a higher level of both product and process innovation. Furthermore, internationalization shows a stronger contemporaneous effect on performance, while the direct impact of innovation is not significant. Conclusions are offered regarding both companies' management and public policy.

Keywords: *internationalization theories; standardized regression; resource-based view; product innovation; process innovation; profitability; export performance; export promotion programs; internationalization stage*

I. INTRODUCTION

In todays' highly competitive economic environment, both innovation and internationalization have become the most commonly recommended recipes, from both scholars and economic development agencies, for companies to survive and grow. Consequently, an increasing amount of government budget is allocated every year to different innovation and export promotion programs and agencies established to assist companies in developing new products and processes, and to commercialize them across borders. However, further research is required to verify empirically the relationship between innovation investment, internationalization and firms' performance. Specifically, previous literature has pointed out the need to enhance the research rigor and scope by considering both product and process innovation (Kyläheiko, 2011), including multidimensional performance outcomes and measuring internationalization by using not only exports, but also the manufacturing capacity or research and development (R&D) abroad (e.g., Kafouros *et al.*, 2008; Golkovo and Valentini, 2011). Other methodological recommendations include the use of contrast groups, with companies from different industries, sizes, or levels of internationalization involvement, and consideration of both managers' perceptions and the firm's objective results in the performance evaluation (e.g., Brouthers and Wilkinson, 2000; Katsikeas *et al*., 1996).

This study aims to contribute to this area by considering the relationship between internationalization, product and process innovation, and different performance measures. Furthermore, it includes companies from a variety of sectors and internationalization levels, taking into account both exports and foreign direct investment (FDI). This investigation may prove useful to scholars, business managers, and government innovation/export agencies. The former may gain new insights into how the intuitive relationship between innovation and international performance is produced, while agencies may develop a better understanding on the design and implementation of their programs.

II. THEORETICAL BACKGROUND AND HYPOTHESIS

A. The Internationalization Process

In their expansion to other countries, companies follow a process of gradual increases in their involvement. Over time, as they improve their knowledge about exporting and foreign markets, they raise their level of risk and resources committed to the international activities, obtaining in return more control and revenue potential. Hence, companies progress through a series of learning and commitment steps, also known as internationalization stages (this model was first suggested by Johanson and Vahlne in 1977 and is termed the Uppsala model). There has been extensive debate on the validity of this model, challenged by the emergence of the so-called born globals (Knight *et al*., 2004), or the big-step hypothesis (Pedersen and Shaver, 2011). In this vein, and although some companies may internationalize shortly after their creation, leapfrog stages in the foreign-market establishment chain, or follow a discontinuous process, previous research indicates that the level of export involvement directly affects the company's international decisions and its export performance (Freixanet, 2012; Filipescu *et al.*, 2009; Francis and Collins-Dodd, 2004; Gençtürk and Kotabe, 2001). Furthermore, both literature reviews

(e.g., Kafouros *et al.*, 2008) and analysis of the innovation process have pointed out that the internationalization stage affects companies' innovation potential, as further discussed in Subsection II.C. As a consequence, this study uses the internationalization stage as the main segmentation criteria.

This work considered and tested other classification variables, including size and industry. Some research has suggested that firm size may moderate the relationship between innovation and performance (e.g., Lichtenberg and Siegel, 1991; Cohen and Klepper, 1996). For example, Mansfield (1968) suggested that large companies may enjoy higher economies of scale and scope, as well as more technical and management human resources, which may enable them to make the most of their innovation efforts. However, other authors (e.g., Wand and Tsai, 2003; Griliches, 1980) concluded that size did not play a role in this relationship. Regarding the classification by industry, it proved non-significant in this study, either when considering each industry separately, or when grouping them as low-tech and medium/ high-tech industries. Sector-based evaluation of the impact of innovation is also, in our opinion, worthy of further analysis, though considering the previous analysis and results, in this study we decided to classify the companies based on their export involvement as a main critical moderating factor.

To classify companies in different internationalization stages, previous research has either allowed companies to self-assign a stage or utilized a single moderating variable. Frequently used criteria include the export intensity (exports/total sales), exports to total assets, or number of countries within which the firm is present (Kotabe *et al.*, 2002). However, we consider that using only one of these measures is simplistic and that it fails to reflect the real change in the level of involvement with the foreign markets and the evolution in the internationalization skills developed by the company. These are the two main features that determine the progress through the various internationalization stages. We reason that it is necessary to use a combination of explicit and reasoned criteria, which may allow for a more consistent and objective segmentation procedure. Hence, we selected the following criteria (Freixanet, 2012):

Export Level: many studies point to the international sales volume as one of the main indicators of the degree of a company's international involvement. To obtain these sales firms must invest in marketing, production infrastructure, inventory, personnel, etc. Therefore, the export volume is related to the commitment of resources for the foreign markets; also, more skills will usually be required to attain and preserve these exports.

Creation of Permanent Commercial Establishments Abroad (Branch Offices/Sales Subsidiaries): they entail investments in personnel, legal formalities, renting or buying the business premise. It also raises exit barriers, making it more difficult giving up internationalization. Furthermore, it implies the company will have to develop a set of skills (international management, adaptation to different legal environments…), which is wider than the one from exporters which have not created permanent establishments.

Creation of a Production Subsidiary: all the factors of international involvement related to sales establishments are enhanced when a production subsidiary is created. The firm must invest not only in the sales area but also in the rest of the departments (technicians, managers, production employees, machinery, inventory, etc.). Significant exit barriers are thus created, and consequently, producing abroad is a decisive step in the company's internationalization. Moreover, using this entry form implies that extensive information is needed on topics such as the tax or labor legal system, the law regarding foreign investment, logistics inside the country and with the company's

country of origin, etc. The firm will, therefore, develop a set of more advanced skills than those of companies in the previous stages (Barret and Wilkinson, 1986).

These variables complement each other in establishing the level of commitment to the international activities and the corresponding skills. The sample was stratified into five stages, ranging from non-existent export involvement and skills (Non Exporters) to the highest possible level of international involvement (Multinational Companies), as shown in Table 1.

Table 1
Classification criteria by internationalization stage, based on the level of involvement with foreign markets

STAGE	Exports (€ th)	Permanent Establishments	Internationalization Involvement /Skills
1. Non Exporters	0	NO	None
2. Starting/Passive Exporters	1-299	NO	Low – Medium
3. Regular Exporters	> 300	NO[1]	Medium
4. Consolidated Exporters with permanent sales or logistic establishments	> 3500	YES	High
5. Industrial Multinationals with production subsidiaries abroad	> 3500	YES	Very high

Firms with less than 3.5 M € and permanent establishments would be in the third stage, because their export amount indicates a not high export involvement. Anyway, none of the firms in our sample were in such a situation.

B. The Resource-Based View

The resource-based view (RBV), introduced by Penrose in 1959, considers companies as a collection of resources, specific to each firm and imperfectly imitable, that have an impact on their competitive advantage. Several authors have suggested that the RBV should be the foundation for more conceptually rigorous theory building in the field of exporting (Dhanaraj and Beamish, 2003) and in the construction of internationalization models (Andersen and Kheam, 1998). This theory has also been empirically tested. For example, Morgan *et al*. (2004) studied 287 exporting companies and found that resources and capabilities had an impact on their competitive strategy and their international performance. The RBV deals with the creation of knowledge as well as organizational and technological capabilities. In this sense, Barney (1991) pointed out that the innovative capability resulting in competitive advantage does not come from acquiring external technologies, which are readily accessible for competitors, but from internal innovation. Regarding the relationship of resource building and the internationalization process, as Prashantam (2005) and others have suggested, the necessary adaptation of the marketing to the foreign markets results in useful knowledge and experience and, in the end, higher profitability. That is, the experience gained in the international markets may

prove helpful in developing the firm's capabilities regarding innovation and its competitive advantage, as we further analyze in the next section.

C. The Relationship between Innovation and Internationalization

1. On the importance of innovation in the export decision

Numerous scholars have argued that innovation is an important factor in explaining the possibility for companies to enter into new markets (e.g., Becker and Egger, 2009; Cassiman and Martinez-Ros, 2007; Salomon and Jin, 2008; Bernard and Jensen, 2004; Vernon, 1966). As Cassiman and Golovko (2011) demonstrated, successful product innovation leads to the decision by SMEs to venture into foreign countries.

There are basically two ways in which (successful) innovation can result in the company starting to export. First, the creation of improved products or processes may enhance the business's competitive advantage: The company may come out with better products or more efficient processes (resulting in faster service or lower prices), which may attract demand across borders (Hitt *et al*. 1997; Zahra and Covin, 1994). Second, firms that have invested in innovation may find their home markets too small to recover the sums invested and therefore may search for more buyers in other countries.

2. The relationship between the level of internationalization involvement and innovation

Within the exporter group, those with a more advanced level of internationalization may enjoy some advantages compared to starting exporters. The interaction of the internationalization stage in the firm's innovation capacity may be analysed according to the two basic phases related to the innovation process: creation and economic exploitation. Highly internationalized companies may enjoy significant advantages regarding the development of innovation and also concerning its appropriation and marketing. Nonetheless, they also face risks.

3. Effects on the potential for innovation development

Innovation requires for its development specific "raw materials," such as information, technologies, laboratories, or qualified researchers. Companies with high levels of internationalization may have access to a better and cheaper supply of these elements (Kobrin, 1991; Kotabe, 1990). In this vein, firms with a presence in a variety of countries may have contact with a broader base of suppliers, technicians, research centers, and universities. Thus, they may select the most qualified ones and with lower costs, making the most of the competitive advantage of every location (Santos *et al.*, 2004). For example, using a sample of Italian manufacturing small and medium-sized enterprises (SMEs), Pittiglio *et al.* (2009) found that firms that are active in international markets generate more knowledge than their counterparts that sell only in the national market.

When the commercial presence goes together with the creation of multicultural R&D centers, companies may have access to a higher variety of ideas and knowledge, coming from researchers with different backgrounds (Kurokawa *et al.*, 2007; von Zedtwitz and Gassmann, 2002). As Hitt *et al.* (1997) suggested, culturally diverse teams

allow a firm to enrich its sources of knowledge, integrate various cultural perspectives, and, in sum, enhance corporate learning. In the same vein, Chesborugh (2003) pointed out the need for access to external ideas and sources of innovation to unlock the organization's economic potential so that inspired products may be developed.

Advantages in costs may also be significant. Internationalization may provide access to cheaper or more productive innovation inputs. For example, the cost of qualified researchers, technologists, and laboratories in India or China is more than five times lower than the cost in Scandinavia or the United States (Granstrand *et al.*, 1993). Therefore, internationalized companies may enjoy the possibility of increasing innovation output with the same or a lower budget.

On the demand side, the company's contact with customers with different needs and degrees of sophistication may result in the so-called learning-by-exporting effect (i.e., the improvement of products and processes, thanks to the information coming from the different markets, and the need to adapt to their requirements). Different studies have tested this hypothesis. For example, Aw *et al.* (2009) linked exports, R&D, and firm productivity using a sample of Taiwanese electronics producers. They found that exporters had significantly higher productivity growth than those that only sold in their home market, thereby confirming the learning-by-exporting effect.

4. Effects in the potential returns on innovation

Two opposite effects may occur. On one side, economies of scale in R&D are essential for the company to obtain the necessary profitability on its innovation investments. More internationalized firms have access to a larger number of potential customers and may therefore spread out their production and R&D over larger sales volumes, and therefore decrease the unit production costs (Cassiman and Golovko, 2011; Alvarez and Robertson, 2004). In the same vein, as Kotabe *et al.* (2002) suggested, firms with different production plants may make the most of their process innovations by using them in more sites, thereby making these investments more profitable.

Note that the access to a higher number of countries is especially indispensable in those sectors with shorter product life cycles (Pakes and Schankerman, 1984). For these kinds of products, companies with low internationalization levels may never recover their product innovation investments. As Grant (2012) suggested, one key factor that determines whether or not the innovator will translate its innovation into profits is possession of complementary resources and capabilities, such as production and human resources, marketing, and finance. The company's presence in different countries enables it to have more access to such assets and, therefore, it may be better able to exploit its innovations.

The drawbacks for highly internationalized companies regarding innovation mainly concern the dispersion of their activities. A geographically dispersed network of collaborators brings about different negative consequences, which may be summarized as less control and more coordination costs. Regarding control, the main risks concern technology leakage, that is, the possibility that the know-how developed by the company ends up in competitors' hands (Sanna-Randaccio and Veugelers, 2007). Coordination costs result from the trips that researchers will need to take to share their knowledge with those in other locations (and therefore avoid duplication of efforts) or with suppliers and universities. Such traveling may be costly in both time and expenses. Also,

communication between international teams is often more difficult due to factors such as culture and language barriers, time zones, and different working procedures, delaying the communication and giving rise to possible misunderstandings (Fisch, 2003).

III. RESEARCH DESIGN

A. Model

Once we have developed the theoretical relationships between internationalization involvement, innovation and performance, the next step is to test them empirically. To this end, this study adopts a model based on a Cobb-Douglas production function that has been widely used in previous literature (Wakelin, 2001; Hall and Mairesse, 1995; Kafouros *et al.*, 2008). This model (Eq. 1) relates innovation with changes in firm performance, and it allows for an estimation of the return to the level of innovation. Furthermore, as shown in Odagiri and Iwata (1986) it has the interesting property of avoiding biases produced by simultaneous decisions regarding the company's inputs and outputs.

$$\Delta P_{it} = \tau + \alpha \Delta K_{it} + \omega \Delta L_{it} + \rho I_{it} + \sum \gamma D_i + \varepsilon_{it} \quad (1)$$

Where ΔP_{it} is the change in company's performance, measured as profit change for 2 years. ΔK_{it} is the change in tangible assets, ΔL_{it} is the change in the number of employees (labor), and I_{it} is the level of innovation activity (see next Section III.B, for more explanations on the selected variables).

The next step, in order to make coefficients more comparable, has been to standardize Eq. 1, using beta-coefficients and based on z-scores (Eq. 2). Thus, by using betas for comparative analysis, it's possible to range the independent regressors on the basis of their effect to the dependent variable (profit change), as they are measured in standardized sigma units.

$$Z(\Delta P_{it}) = \beta_1 \Delta K_{it} + \beta_2 \Delta L_{it} + \beta_3 I_{it} + \sum \beta_{4\ldots i} D_i + \varepsilon_{it} \quad (2)$$

The initial model coefficients are thus standardized using the formula:

$$\beta_i = (\alpha, \omega, \rho, \gamma) \frac{SD(X_j)}{SD(Y)},$$

where $\alpha, \omega, \rho, \gamma$ are the regression coefficients from initial regression model. $SD(X_j)$ is a standard deviation of the estimated independent variable, and $SD(Y)$ of the dependent variable, the result remaining the same (Vittinghoff *et al*, 2012).

Then, to find out the moderating role of the internationalization level (IL) on the relationship between innovation and performance, we have introduced the interaction between the moderator and innovation, thus obtaining Eq. 3. This follows the procedure developed by previous authors such as Le *et al.* (2006), according to which the moderating properties of a variable may be tested by studying if the regression coefficient between the dependent and independent variable is a function of that moderator.

$$Z(\Delta P_{it}) = \beta_1 \Delta K_{it} + \beta_2 \Delta L_{it} + \beta_3 I_{it} \times IL_{it} + \sum \beta_{4\ldots i} D_i + \varepsilon_{it} \quad (3)$$

B. Variables

1. Independent variables

There are different possibilities to operationalize the variable "innovation." One measure used in the past has considered it a dichotomous variable (0 = no innovation, 1= innovation) (Cassiman and Golovko, 2011). We believe this measure is too imprecise and does not capture the shades or possible degrees of innovation. Another more sophisticated approach has been based on counting the number of product patents (Griliches *et al*., 1987). While this measure has the advantage of being objective, it leaves uncounted the great number of new developments that by their nature are not patentable but are part of the firm's innovation efforts, as well as the innovative activities of many small firms that seldom obtain patents. It is also common to use the amount of investment in R&D (or the ratio of R&D divided by sales) to proxy this variable (e.g., Wakelin, 2001; Kafouros *et al.*, 2008). The problem is that often the innovation activity is not reflected in the R&D account. Furthermore, this account often varies on consideration of tax incentives[1]. Kyläheiko *et al.* (2011) measured innovation by asking managers the percentage of sales from new products. While this approach solves the mentioned problems, it raises concerns about data reliability because it will likely be difficult for managers to provide an accurate measure in the questionnaire. Taking these points into consideration, as well as the definition by the Oslo Manual (OECD, 1997)[2], managers were asked to report the extent to which their companies launched new products or made significant improvements in their current products (on a 10-point Likert-type scale). A similar question was used to evaluate the degree of process innovation. Reported innovation performance, despite of having the drawback of depending on manager's perceptions, has been widely accepted and used as the most appropriate and accurate method to measure a firm's innovativeness (Golovko and Valentini, 2011, 2014; Salomon and Jin, 2008, 2010; Filipescu *et al*., 2013; Kyläheiko *et al.*, 2011; Salomon and Shaver, 2005).

Regarding "internationalization level", it was operationalized through a dummy variable transforming qualitative into quantitative data. Thus, for non-exporters, all dummies equalled zero; for starting exporters D4=1, all others equalled zero; and then for regular exporters D3=1, for consolidated exporters D2=1, and for multinationals D1=1, all others equalled zero for each one of these strata, thus showing the difference of each of these groups with non-exporters.

2. Dependent variable

The *firm's performance* measure is normally related to either the firm's profitability or its revenues. Profitability shows the firm's final result for shareholders and is, according to many scholars, the most suitable yardstick for firm performance (e.g., Grant, 2012). Consequently, we have adopted profit growth as the measure of performance, which has also the advantage of relating to changes and not levels (Boermans and Roelfsema, 2015).

IV. DATA COLLECTION AND SAMPLE DESCRIPTION

To empirically test the impact of innovation on internationalization, the use of firm-level data was essential because such data allow for separating the aforementioned effect for

firms belonging to different internationalization stages and sectors. In addition, we also decided to use panel data from 2012 to 2014 to capture how innovation affects the internationalization expansion of firms across time.

Our multi-industry panel data were collected in 2015, considering both managers' perspective on their innovation and internationalization outcomes, as well as the objective monetary gross and net amounts obtained by firms. To obtain a more homogeneous sample, we ruled out primary sector and service companies and, as Gençtürk and Kotabe (2001) recommended, we limited the data collection to a single state. Eight industries were chosen, thus resulting in a sample of 1,200 Spanish manufacturing firms.

A questionnaire was used to capture managers' perceptions, developed in three steps: first, by carrying out an extensive review of the previous literature (e.g. Francis and Collins-Dodd, 2004; Freixanet, 2012; Kafouros, 2008); second, by conducting in-depth interviews with both export and top managers of 18 companies from different sectors; and third, by pre-testing with 9 companies. Besides the abovementioned questions about product and process innovation, the questionnaire included questions about export profitability, export growth (on a 10-point Likert-type scale), export intensity in 2012 and 2014, the availability or not of permanent sales or logistic establishments in other countries, and of production subsidiaries.

The questionnaire was addressed to top management so as to obtain reliable information. The response rate was 14.17%, thus representing 170 companies, of which 123 operated internationally. This response rate is in line with previous research on international business (e.g., Francis and Collins-Dodd, 2004), and within the recommended range for social studies in general (Nulty, 2008; Carley-Baxter, 2009).

Additionally, to collect all the data related to the firms' performance measure during the sample years, we used the SABI database, which provides the values of the different interest values across time[3]. Among these 170 enterprises, five internationalization stage groups were represented: non-exporters (26%), starting exporters (29%), regular exporters (25%), consolidated exporters with commercial subsidiaries (15%), and consolidated exporters with production subsidiaries (5%). Hence, the responses provided a significant representation of firms not involved in any kind of exporting activity, which constituted more than one fourth of the total sample (Koch and Blohm, 2016). Furthermore, following Armstrong and Overton (1977), non-response bias was tested through an analysis of the answers of early versus late respondents, and we achieved satisfactory results.

This dataset constitutes an appropriate setting to test the relationship between innovation and internationalization. First, the data obtained allow for evaluating the performance measures of all the firms belonging to different internationalization moments from 2012 to 2014 (related to sales, profits, and exports). In addition, the data provide the level of effort in the creation and improvement of products and processes for every firm belonging to each internationalization stage. When applying our model, we evaluated all our dependent, independent, and control variables taking two-year differences for all of them, because one-year differences are inclined to be biased due to short-term deviations of the data (Mairesse and Sassenou, 1991).

V. DATA ANALYSIS AND RESULTS

Table 2 presents the descriptive statistics for the companies in the sample. The average firm had a turnover of €12,907,000 and profits of €719,000. Approximately 74% was exporters, with €6561 thousand in exports and an export growth of €996 thousand in the last two years. The innovation level can be considered acceptable, with an average of 6.7 out of 10 for product innovation and 6.3 for process innovation, and in this latter case without significant differences among groups.

Table 2
Descriptive statistics

	INTERNATIONALIZATION STAGE					
MEASURES OF IMPACT	**1**	**2**	**3**	**4**	**5**	Mean
	n = 44	n=50	n = 42	n = 25	n =9	n =170
Economic performance						
Sales Volume (in Th. €)	2,869.3	919.3	5,836.8	32,060.1	108,362.7	12,906.6***
Sales growth (Th. €, n-2)	894.1	-86.1	236.0	4,272.2	-1,117.4	833.5*
% Sales Growth	12%	40%	19%	55%	19%	29%
Profits (in Th. €)	83.9	3.8	109.1	1,564.8	8,290.4	718.8***
Profit growth (Th €, n-2)	54.4	2.6	-29.1	51.4	6,441.0	323.5***
Internationalization performance						
Export Sales (2014, in Th. €)	0.0	80.8	1,398.7	11,483.0	85,048.3	6,560.6***
Export Growth[a] (Th. €, n-2)	0.0	-8.8	386.5	4148.2	5531.5	995.8***
Export Growth (reported, n-2)[b]	0.0	4.18	5.48	7.84	7.8	5.6***
Export Profitability[c]	0.0	5.6	6.7	7.0	7.1	6.3***
Export Intensity (%)	0%	18%	48%	62%	78%	30%***
Increase in Export Intensity (%)	0%	1%	10%	14%	11%	5%***
Innovation performance						
Level of Product Innovation	5.8	6.6	7.1	7.2	8.1	6.7***
Level of Process Innovation	6.0	6.4	6.5	6.7	6.6	6.3

[a] Export Growth obtained through considering the turnover in SABI database, multiplied by the reported export intensity. [b] Export Growth reported by the companies (Likert scale from 0 to 10). [c] Perception of the profitability of exports compared to local sales (Likert scale from 0 to 10) ANOVA tests of significant differences between groups of firms. * Indicates significant differences between groups, $p < 0.05$. ** Indicates significant differences between groups, $p < 0.01$. *** Indicates significant differences between groups, $p < 0.001$.

The results exhibit significant differences between firms belonging to the different internationalization stages regarding all measures of performance: economic, internationalization, and innovation performance. This proves inter-firm heterogeneity and validates the segmentation variables selected and shown in Table 1.

Another interesting finding is that *export profitability* increases as companies advance through the internationalization process. This supports the export hysteresis theory (Baldwin, 1990) regarding the decrease in the transaction costs as, over time, companies gain knowledge and experience and adapt to the foreign markets. It is also in agreement with the studies on foreign market entry costs from Sanghamitra *et al.* (2001) and Baldwin and Krugman (1989).

A. Regression Findings

1. The relationship between internationalization and innovation

Following the theoretical framework, the first model (Table 3) shows the relationship between innovation and the internationalization level. The model is significant at 10% level with a determination coefficient (adjusted) equal to 2.84%. Two regression coefficients are significant: for D1 = Very high (at 1% level) and D3=Medium (at 5% level).

Table 3
Regression model coefficients for process and product innovations

Regressors	Coefficients	
	Product Innovation	**Process Innovation**
Dummies for levels of internationalization (2014):		
D1 = Very high	1.847***	0.676
D2= High	-0.207	0.854*
D3=Medium	0.840*	1.032**
D4=Low	0.209	0.629*
Control variables:		
Age of the firm (2014)	0.007	0.000
Number of employees difference (2014-2012)	-0.003	0.001
Model quality:		
Constant	5.996***	5.743***
Adj R-squared, %	2.84*	0.44

Subsequently, in order to validate the conceptual relationships, we may conduct the Student's t-test to estimate differences in innovation between companies with different internationalization involvement (Table 4). The results show significant differences in product innovation between multinationals and both the rest of companies, and other exporters. Interestingly, they also exhibit a significantly higher level of both product and process innovation for exporters as a whole, than for the rest of companies.

Table 4
Between groups level of innovations comparisons for multinational companies and exporters (170 Spanish companies, 2014)

	Multinational Companies				Exporters	
	Product Innovation, MNC vs other companies	Process Innovation, MNC vs other companies	Product Innovation, MNC vs other exporters	Innovations to process, to other exporters	Innovations to product, to non-exporters	Innovations to process, to non-exporters
Mean difference	1.60	0.13	1.49	.099	0.47	0.79
P-value (Ha: diff > 0)	0.01	0.42	0.02	0.43	0.09	0.01
t-test	2.25	0.20	2.07	0.15	1.33	2.33
N	170	170	123	123	170	170

As argued in the theoretical development, multinationals appear to benefit from their presence and deeper contact with foreign markets in order to access the inputs that lead to an enhanced product development. It is also clear, as theorized, that exporter status is associated to the development of innovative products, but also to the improvement of the manufacturing processes. This may be the result of LBE (learning-by-exporting), complemented by the efforts of more innovative companies to commercialize their innovations in new and larger markets.

2. The relationship between internationalization, innovation and performance

Based on the equations in Section III, we built different models relating the two independent variables and performance. Table 5 in appendix shows their evolution regarding the improvement of the model. Models 1-3 are all based in equation (1) but use alternative measures of internationalization level (IL) introduced in previous literature, namely a subjective measure for export growth, the level of export intensity and our classification in stages according to the level of internationalization involvement. The results show a better fit for Model 3, thus confirming that differences between firms on diverse internationalization stages affect performance, while other IL measures do not provide statistically significant coefficients.

The next step consisted of using standardized regression models. Model 4 in Table 6 is a standardized version of Model 3. Besides the rather obvious relationship between change in tangible assets, labour, and changes in performance, the findings exhibit an increase in performance depending on the internationalization level. Specifically, companies in internationalization stages 4 and 5, show a positive and statistically significant higher performance. Therefore, the higher is the firm's internationalization involvement, the greater is the change in profit and the more significant is this effect. Interestingly, innovation does not show a significant impact in performance in the same period, as the coefficient is relatively small and not significant. Model 6 also indicates that the interaction effect between innovations and IL levels is insignificant in the same time period.

Table 6
Standardized regression coefficients for firm performance difference.

Component	Variable	Model 4		Model 5	
		Regression coefficients	Beta coefficients	Regression coefficients	Beta coefficients
Change in company's performance	Profit growth (2014 – 2012), constant	No constant	No constant	No constant	No constant
Tangible assets change	Tangible assets difference (2014-2012)	0.223***	0.166	0.255***	0.190
Labour change	Number of employees difference (2014-2012)	79,820***	0.774	80,647***	0.782
Innovation	Innovation level (2014)	-32,049	-0.014	-76,944	-0.033
Internationalization Involvement	Dummies for levels of internationalization (2014), D1 = Very high, D2= High, D3=Medium, D4=Low	4,305,756*** 1,414,925** -406,396 -364,393	0.202 0.100 -0.035 -0.036	3,733,060*** 1,729,454** -272,728 -184,477	0.175 0.122 -0.020 -0.018
IL × Innovations interaction effect	D1×Innovations D2×Innovations D3×Innovations D4×Innovations			513,778 483,089 42,886 73,021	0.056 0.075 0.008 0.017
Control variable	Age of the firm (2014)	21,489	0.062	26,973*	0.077
Determination	Adj. R-sq	68.58%***	68.58%***	68.43%***	68.43%***

* p<0.1, ** p<0.05, *** p<0.01

These results are consistent with the study from Boermans and Roelfsema (2015) who, by using a sample of 150 Dutch firms, found that, when controlling for internationalization, there was no effect of innovation on firm performance. They even found a not significant indirect effect of innovation on performance and a slightly negative coefficient. The findings are also comparable to those of Dhanaraj and Beamish (2003) who built a model with firm resources, internationalization and innovation, using a sample of firms from Canada and United Sates, and found clear effects of internationalization on innovation. Remarkably, the results differ from several previous studies that found positive impact of innovation on performance (e.g., Kafouros 2008, Cassiman, Altomonte *et al*. 2013) as our results highlight the role of internationalization and not innovation.

3. Endogeneity concerns

There are a wide variety of sources of endogeneity problems. One of them can be caused by omitted variables (unobserved heterogeneity), or from explanatory variables being correlated with the error term in a given regression model. We can minimize this bias by including control variables and monitoring the randomness of the selection entities into sampling process on a research planning stage.

The second one is the problem of reverse causality (X may cause Y, but it is also possible that Y causes X), which is particularly challenging to detect and improve. Despite the growing number of papers that have aimed to prove a one way causality (assuming that internationalization brings about innovation or vice versa), it is well documented a reciprocal relationship between these two variables. For example, Filipescu *et al*. (2013), by analysing an 11-year panel data set sample of 696 Spanish firms, found broad support for a reciprocal causal relationship between innovation and exports. Also, as Pérez and Rodríguez (2013) demonstrated, engaging in export (R&D) activities will increase a firm's chances of also engaging in R&D (export) activities; this, in turn, increases firms' chances of succeeding in export (R&D) activities. Finally, Chiva et al. (2014) even consider the idea of regarding any of the two activities as the cause of the other as "contradictory and static", and they propose a dynamic theoretical model based on a mutual causality. In line with these studies and as argued in the theory development, our study assumes the mutual effects of these contemporaneous links.

Complementarily, it could be argued and should thus be analysed the possibility of a reverse causality between performance and innovation/ internationalization. That is to say, that an increase in profits is used for these firm strategies (and therefore results in a higher innovation or IL). To test this assumption we have used the two stages least square method with instrumental variables (Heckman 1979). This model shows a Wald's Chi equal to 311.08, significant at 0.01% level, thus reporting that endogenous regressors are not included into the model 3 (Table 5). So we can conclude that it is internationalization that affects performance (and not the opposite). Finally, we have tested a potential reverse causality between internationalization and innovation and also found no significant effects[4].

VI. CONCLUSIONS AND IMPLICATIONS FOR MANAGEMENT AND PUBLIC POLICY

Innovation and internationalization are considered a key element for economic growth among scholars, managers, and government agencies alike. Previous literature has emphasized the need to deepen the knowledge on the relationship between internationalization, innovation and performance through rigorous research that considers a series of methodological recommendations, which have been included in this study. The study initially introduced the features related to the internationalization process, resulting in the selection of several segmentation criteria. The firms were then stratified according to their level of involvement in internationalization, with clear differences for all company features, thus proving inter-group heterogeneity. The sample analysis also indicated a hysteresis in exporting, pointing out to a reduction in the transaction costs as companies gain internationalization knowledge and experience. Subsequently, drawing on the Uppsala and resource-based view models, the study

developed a conceptual framework explaining the potential relationship between the internationalization level and both in the development of innovation and in the firm's capacity to reap returns from it.

As deduced in the theory development, the results show that exporters, as a whole, have both higher product and process innovation than non-exporters. Thus, the findings confirm the positive relationship between the entry in foreign markets and the level of innovation, and are thus comparable to previous research on the topic. They also indicate that more internationalized firms have a higher performance, while the effects of innovation are insignificant. It may be inferred that companies with a stronger presence in the foreign markets may have access to markets with higher purchasing power or a willingness to pay a premium price for the new products and, therefore, increase their sales margins and profitability.

Regarding the relationship between innovation and performance, the absence of a contemporaneous relationship, does not discard long term effects, as indicated in previous studies (Kafouros *et al*. 2008; Cassiman and Golovko, 2011), thus pointing out to the condition of innovation as a future investment. It is also sensible that time span would have been shorter for high-tech companies, which were not part of the sample in this study, as also suggested in prior research (e.g., Trott 2012), given their rapid product obsolescence and short life cycles.

The findings described above may have some noteworthy implications for managers and government agencies. First, starting exporters must be aware of the initial foreign market entry investment and make the necessary financial provisions to deal with it, as well as the reduction in profitability that it entails. Nonetheless, they should not be discouraged from entering into new countries, given that they may foresee an improvement in the results as they advance through the internationalization process.

Then, public export promotion programs should be strengthened, and be made available to more companies. These programs assist companies in starting and consolidating their internationalization process and have been found to be effective in this regard (e.g., Freixanet, 2012). The present findings also show that such internationalization not only enhances the firm's performance, but it is also associated to a higher innovation, which is a complementary public policy objective.

The main limitations of this study, which suggest avenues for further research, are the following:

- Our sample only allows for the measurement of short-term/contemporaneous relationships. Including longitudinal data with an extended time span could enable the measurement of long-term effects, and offer further tests of causality. This would be especially necessary given that some of the effects on innovation may take considerable time to materialize.
- Using a larger sample with companies from knowledge-intensive industries, or including service companies, could provide for interesting conclusions regarding the sector-based effects of innovation.
- It would also be interesting to specifically test how the hypothesized relationships among innovation, internationalization and performance vary in the specific case of the born-global firms (Knight and Cavusgil, 2004).

ENDNOTES

1. Many governments, for instance, in Spain, provide incentives for investments in R&D. Therefore, the amount that companies register on the R&D account can experience variations depending on whether the company will or will not apply for these grants.
2. The Oslo Manual defines innovation as an iterative process started by the generation of new products and processes or of significant improvements in current products and processes.
3. SABI (Sistema de Análisis de Balances Ibéricos) encompasses financial data and company information coming from official sources such as the stock exchange, press, and commercial registry and, therefore, it has a high degree of reliability.
4. Available upon request to the authors.

APPENDIX

Table 5
Regression results with different IL measures for firm performance difference

Component	Model #	Model 1	Model 2	Model 3
Firm Performance	Profit difference (2014 – 2012), constant	-968,954	-987,803	-772,992
Tangible assets change	Tangible assets difference (2014-2012)	0.24***	0.23***	0.23***
Labour change	Number of employees difference (2014-2012)	81,487***	81,462***	79,497***
Innovation	Level of innovation activity	88,665	89,327	43,709
Internationalization	Subjective measure for export growth	-171,483		
	Export Intensity		-15,557	
	Dummies for levels of internationalization (2014), D1 = Very high, D2= High, D3=Medium, D4=Low			4,287,914***
IL×Innovations interaction effect	D1×Innovations			1,577,120**
	D2×Innovations			-343,628
	D3×Innovations			-199,342
	D4×Innovations			
Control variable	Age of the firm (2014)	36,107***	36,355***	27,505*
Determination	Adj. R-sq	63.48%	64.57%	68.36%

* p<0.1, ** p<0.05, *** p<0.01

REFERENCES

Altomonete, C., T. Aquilante, G. Békés, and G. Ottaviano, 2013, "Firm-Level Evidence on Productivity Differentials and Turnover in Taiwanese Manufacturing." *Journal of Development Economics*, 66 (1), 51–86.

Alvarez, R., and R. Robertson, 2004, "Exposure to Foreign Markets and Firm-Level Innovation: Evidence from Chile and Mexico." *Journal of International Trade and Economic Development*, 13(1), 57–87.

Andersen, O., and L.S. Kheam, 1998, "Resource-Based Theory and International Growth Strategies: An Exploratory Study." *International Business Review*, 7(2), 163–84.

Armstrong, J. S., and T.S. Overton, 1977, "Estimating Non-Response Bias in Mail Surveys." *Journal of Marketing Research*, 14(3), 396–402.

Aw, B. Y., M.J. Roberts, and D.J. Xu, 2009, "R&D Investment, Exporting, and Productivity Dynamics," *NBER Working Paper 14670*, National Bureau of Economic Research, Cambridge, MA.

Baldwin, R., 1990, "Hysteresis in Trade." *Empirical Economics*, 15, 134–146.

Baldwin, R., and P. Krugman, 1989, "Persistent Trade Effects of Large Exchange Rate Changes." *Quarterly Journal of Economics*, 104(4), 635–54.

Barney, J.B., 1991, "Firm Resources and Sustained Competitive Advantage." *Journal of Management*, 17(1), 99–120.

Becker, S.O., and P. Egger, 2009, "Endogenous Product versus Process Innovation and A Firm's Propensity to Export." *Empirical Economics*, 44, 329–354.

Bellone, F., S. Guillou, and L. Nesta, 2009, "Are Export Premier Robust to Innovation Statistics?" *Documents de Travail de l'OFCE 2009-15*.

Bernard, A.B., and J.B. Jensen, 2004, "Why Some Firms Export." *The Review of Economics and Statistics*, 86 (2), 561–569.

Carley-Baxter, L.R., C.A. Hill, D.J. Roe, S.E. Twiddy, R.K. Baxter, and J. Ruppenkamp, 2009, "Does Response Rate Matter." *Survey Practice*, 2(7), 1-7.

Cassiman, B., and E. Martinez-Ros, 2007, "Product Innovation and Exports: Evidence from Spanish Manufacturing." *IESE Working Paper*, mimeo.

Cassiman, B., and E. Golovko, 2011, "Innovation and Internationalization Through Exports." *Journal of International Business Studies*, 42 (1), 1–20.

Chesbrough, H.W., 2003, *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Harvard Business School Publishing Corporation.

Chiva, R., P. Ghauri, and J. Alegre, 2014, "Organizational Learning, Innovation and Internationalization: A Complex System Model." *British Journal of Management*, 25: 687–705.

Cohen, W.M., and S. Klepper, 1996, "Firm Size and the Nature of Innovation within Industries: The Case of Product and Process R&D." *Review of Economics and Statistics*, 78 (2), 232–243.

Czinkota, M.R., and W.J. Johnston, 1983, "Exporting: Does Sales Volume Make a Difference." *Journal of International Business Studies*, 14, 147–153.

Dhanaraj, C., and P. Beamish, P, 2003, "A Resource-Based Approach to the Study of Export Performance." *Journal of Small Business Management*, 41(3), 242–261.

Filipescu, D.A., A. Rialp, and J. Rialp, 2009, "Internationalization and Technological Innovation: Empirical Evidence on their Mutual Relationship." *Advances in International Marketing*, 20: 125–154.

Filipescu, D., S. Prashantham, A. Rialp, and J. Rialp, 2013, "Technological Innovation and Exports: Unpacking their Reciprocal Causality." *Journal of International Marketing*, 21(1), 23–38.

Fisch, J.H., 2003, "Optimal Dispersion of R&D Activities in Multinational Corporations with a Genetic Algorithm." *Research Policy*, 32, 1381–1396.

Francis, J., and C. Collins-Dodd, 2004, "Impact of Export Promotion Programs on Firm Competencies, Strategies and Performance - The Case of Canadian High-tech SMEs." *International Marketing Review*, 4(5), 474–495.

Freixanet, J., 2012, "Export Promotion Programs: Their Impact on Companies' Internationalization Performance and Competitiveness." *International Business Review*, 21(6), 1065–1086.

Freixanet, J., 2014, "Innovation and Internationalization: Relationship and Implications for Management and Public Policy." *De Gruyter, International Journal of Entrepreneurial Knowledge*.

Gençtürk, E.F., and M. Kotabe, 2001, "The Effect of Export Assistance Program Usage on Export Performance." *Journal of International Marketing*, 9(2), 51–72.

Golovko, E., and G. Valentini, 2011, "Exploring the Complementarity between Innovation and Export for SMEs Growth." *Journal of International Business Studies*, 42(3), 362–380.

Golovko, E., and G. Valentini, 2014, "Selective Learning-By-Exporting: Firm Size and Product versus Process Innovation." *Global Strategy Journal*, 4, 161–180.

Granstrand, O., L. Hikanson, and S. Sjiilander, 1993, "Internationalization of R&D-A Survey of Some Recent Research." *Research Policy*, 22: 413–430.

Grant, R.M., 2012, *Contemporary Strategy Analysis, Text and Cases*. 8th ed., John Wiley & Sons, Ltd.

Griliches, Z., 1980, "Returns to Research and Development Expenditures in the Private Sector." *New Developments in Productivity Measurement*, 419-462, University of Chicago Press.

Hitt, M., R. Hoskisson, and H. Kim, 1997, "International Diversification: Effects on Innovation and Firm Performance in Product-Diversified Firms." *Academy of Management Journal*, 40 (4), 767–798.

Johanson, J., and J.E. Vahlne, 1977, "The Internationalization Process of the Firm – A Model of Knowledge Development and Increasing Foreign Market Commitments." *Journal of International Business Studies*, 8(1), 23–32.

Kafouros, M., P. Buckley, J. Sharp, and C. Wang, 2008, "The Role of Internationalization in Explaining Innovation Performance." *Technovation*, 28: 63–74.

Knight, G., T.K. Madsen, and P. Servais, 2004, "An Inquiry into Born-Global Firms in Europe and the USA." *International Marketing Review*, 21(6), 645–665.

Knight, G.A., and T.C. Cavusgil, 2004, "Innovation, Organizational Capabilities, and the Born-Global Firm." *Journal of International Business Studies, 35*(2), 124–141.

Kobrin, S., 1991, "An Empirical Analysis of the Determinants of Global Integration." *Strategic Management Journal*, 12, 17–31.

Koch, A., and M. Blohm, 2016, "Nonresponse Bias." *GESIS Survey Guidelines*. Leibniz Institute for the Social Sciences. doi: 10.15465/gesis-sg_en_004.

Kotabe, M., 1990, "The Relationship between Offshore Sourcing and Innovativeness of US Multinational Firms: An Empirical Investigation." *Journal of International Business Studies*, 21(4), 623–638.

Kotabe, M., S.S. Srinivasan, and P.S. Aulakh, 2002, "Multinationality and Firm Performance: The Moderating Role of R&D and Marketing Capabilities." *Journal of International Business Studies*, 33(1), 79–97.

Kurokawa, S., S. Iwata, and E.B. Roberts, 2007, "Global R&D Activities of Japanese MNCs in the US: A Triangulation Approach." *Research Policy*, 36: 3–36.

Kyläheiko, K., A. Jantunen, K. Puumalainen, Saarenketo, and A.S. Tuppura, 2011, "Innovation and Internationalization as Growth Strategies: The Role of Technological Capabilities and Appropriability." *International Business Review*, 20(5), 508–520.

Leonidou, L., and C. Katsikeas, 1996, "The Export Development Process: An Integrative Review of Empirical Models." *Journal of International Business Studies*, 27(3): 517–551.

Lichtenberg, F., and D. Siegel, 1991, "The Impact of R&D Investment on Productivity-New Evidence Using Linked R&D-LRD Data." *Economic Inquiry*, 29(2), 203.

Mairesse, J., and M. Sassenou, 1991, "R&D and Productivity: A Survey of Econometric Studies at the Firm Level." *Science Technology and Industry Review*, 8, 317–348.

Mansfield, E., 1968, *The Economics of Technological Change*. Norton, New York.

Morgan, N., A. Kaleka, and C. Katsikeas, 2004, "Antecedents of Export Venture Performance: A Theoretical Model and Empirical Assessment." *Journal of Marketing*, 68(1), 90–108.

Nulty, D.D., 2008, "The Adequacy of Response Rates to Online and Paper Surveys: What Can Be Done." *Assessment & Evaluation in Higher Education*, 33(3), 301–314.

OECD, 1997, *Proposed Guidelines for Collecting and Interpreting Technological Innovation Data.* Oslo Manual, Paris.

Pedersen, T., and J.M. Shaver, 2011, "Internationalization Revisited: The Big Step Hypothesis." *Global Strategy Journal*, 1: 263–274.

Pérez, S.E., and D.R. Rodríguez, 2013, "La Innovación Como Factor de Competitividad de Las Pymes." *Información Comercial Española, ICE: Revista de economía*, (877), 115-130.

Pittiglio, R., E. Sica, and S. Villa, 2009, "Innovation and Internationalization: The Case of Italy." *Journal of Technology Transfer*, 34: 588–602.

Prashantham, S., 2005, "Toward a Knowledge-Based Conceptualisation of Internationalization." *Journal of International Entrepreneurship*, 3(1), 37–52.

Salomon, R., and B. Jin, 2008, "Does Knowledge Spill to Leaders or Laggards? Exploring Industry Heterogeneity in Learning-by-Exporting." *Journal of International Business Studies*. 39: 132–150.

Salomon, R., and B. Jin, 2010, "Do Leading or Lagging Firms Learn More from Exporting?" *Strategic Management Journal*, 31: 1088–1113.

Salomon, R.M., and J.M. Shaver, 2005, "Learning-by-Exporting: New Insights from Examining Firm Innovation." *Journal of Economics and Management Strategy*, 14(2), 431–61.

Sanghamitra D., M. Roberts, and J. Tybout, 2001, "Market Entry Costs, Producer Heterogeneity, and Export Dynamics." *National Bureau of Economic Research*. Working paper No. 8629.

Sanna-Randaccio, F., and R. Veugelers, 2007, "Multinational Knowledge Spillovers with Decentralized R&D: A Game-Theoretic Approach." *Journal of International Business Studies*, 38, 47–63.

Santos, J., Y. Doz, and P. Williamson, 2004, "Is Your Innovation Process Global?" *Sloan Management Review*, 45(4), 31–37.

Spence, M., 2003, "Evaluating Export Promotion Programmes: U.K. Overseas Trade Missions and Export Performance." *Small Business Economics*, 20(83–103).

Sullivan, D., 1994, "Measuring the Degree of Internationalization of a Firm." *Journal of International Business Studies*, 25(2), 325–342.

Trott P., 2012, *Innovation Management and New Product Development*. Prentice Hall. Financial Times. 5th Edition.

Vernon, R., 1966, "International Investment and International Trade in the Product Cycle." *Quarterly Journal of Economics*, 80(2): 190–207.

Vittinghoff, E., D.V. Glidden, S.C. Shiboski, and C.E. McCulloch, 2012, *Regression Methods in Biostatistics: Linear, Logistic, Survival, and Repeated Measures Models*. Springer Science & Business Media.

Von Zedtwitz, M., and O. Gassmann, 2002, "Market Versus Technology Drive in R&D Internationalization: Four Different Patterns of Managing Research and Development." *Research Policy*, 31, 569–588.

Wakelin, K., 2001, "Productivity Growth and R&D Expenditure in UK Manufacturing Firms." *Research Policy*, 30, 1079–1090.

Wang, J., and K. Tsai, 2003, Productivity Growth and R&D Expenditure in Taiwan's Manufacturing Firms." *NBER Working Paper 9724*, National Bureau of Economic Research.

Wilkiston, T., and L. Brouthers, L., 2006, "Trade Promotion and SME Export Performance." *International Business Review*, vol. 15, number 3.

Zahra, S.A., and J.G. Covin, 1994, "Domestic and International Competitive Focus, Technology Strategy and Firm Performance: An Empirical Analysis." *Technology Analysis and Strategic Management*, 6(1): 39–53.