PRODUCT AND BUSINESS PROCESS INNOVATION, COMPETITIVE ADVANTAGE, AND EXPORT PERFORMANCE

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ABSTRACT

Purpose: This paper aims to contribute to the understanding of the relationship between innovation and export performance by examining the effect of different types of innovation on export performance and testing the assumption underlying most studies in the field that competitive advantage mediates this relationship.

Design/methodology/approach: From the literature review, we propose a research model which is estimated using a sample of 200 Spanish exporting manufacturing companies. Data for this study were collected with an ad-hoc questionnaire, and the partial least squares structural equation modeling (PLS-SEM) technique was chosen to analyze the data.

Findings: The results show that there is a positive relationship between product and business process innovation and export performance and that competitive advantage mediates this relationship, but only when it is based on costs, not on differentiation.

Originality/value: This paper provides evidence that product and business process innovation are positively related to export performance and that competitive advantage mediates these relationships, but only when the advantage is low-cost. Unexpectedly, we find that differentiation is neither related to export performance nor explains the relationship between innovation and export performance.

Keywords: Product innovation, business process innovation, export performance, competitive advantage, mediation

Paper type: Research paper

Introduction

This paper examines the relationship between two types of innovation, product innovation and business process innovation, and firms´ success in international markets, and explore whether this relationship is mediated by competitive advantage.

Innovation and internationalization are increasingly considered as essential tools for company growth and survival by researchers, managers, and policymakers (Azevedo *et al.*, 2021; Freixanet and Churakova, 2018; Freixanet and Rialp, 2022). Internationalization is usually understood as the process by which companies search for and develop new opportunities outside their local markets (Freixanet and Churakova, 2018). The literature defends that operating in foreign markets enables firms to reduce their dependence on the domestic market, obtain economies of scale, experience, and localization, and acquire new knowledge that helps them succeed in their local and international markets (Freixanet and Rialp, 2022; Lages and Montgomery, 2004; Piercy *et al.*, 1998). To gain access to international markets, companies have different options, such as exporting, licensing, franchising, partnering, and acquisitions. Exporting is the most common entry method because it provides quicker and easier access to foreign markets (e.g., Cassiman and Golovko, 2011; Leonidou *et al*., 2010; Sousa *et al*., 2008).

Innovation allows businesses to respond to environmental changes and is a key source of competitive advantage (Fernández-Mesa and Alegre, 2015; Filipescu *et al*., 2013; Gunday *et al*., 2011). Furthermore, much research defends that innovation helps companies export and succeed in international markets (e.g., Bıçakcıoğlu-Peynirci *et al*., 2019; Tavassoli, 2018; Paul *et al*., 2017; Sui and Baum, 2014; Filipescu *et al*., 2013; Yi *et al*., 2013). However, the results of empirical studies examining the relationship between innovation and export performance are not always consistent. Some scholars argue that this may be due to the

different ways prior studies have conceptualized and measured innovation and export performance (Bıçakcıoğlu-Peynirci *et al.*, 2019; Chen *et al.*, 2016) and even the different export stages they focus on (pre-entry, post-entry), which may influence the relationship between innovation and success in international markets (Ayob *et al.*, 2022).

The literature argues that, when studying innovation, it is more appropriate to focus on output variables (development/implementation of new or improved goods/services, production processes, or other business practices and processes), because R&D spending only influences export performance in terms of a firm´s capacity to compete internationally, that is, whether the firm succeeds in launching its innovations in the market (Azar and Ciabuschi, 2017; Edeh *et al.*, 2020; Tavassoli, 2018). Recent research has also highlighted the need to consider different types of innovation, arguing that their effect on export performance may differ (Bıçakcıoğlu-Peynirci *et al.*, 2019; Edeh *et al.*, 2020). Regarding export performance, the literature suggests using a broad definition of export performance to capture different aspects of a company's success in foreign markets (Azar and Drogendijk, 2016; Chen *et al.*, 2016).

This paper contributes to the understanding of the relationship between innovation and export performance by first examining this relationship following the recommendations from the literature. We consider innovation as an ouput and distinguish between two types of innovation, product innovation and business process innovation, following the classification proposed in the latest version of the Oslo Manual (OECD/Eurostat, 2018). We also use a broad definition of export performance and, based on Cavusgil and Zou (1994), define it as the extent to which a firm´s exporting objectives are attained in the post-entry stage. In addition, this paper contributes to the literature on the innovation-export performance link by providing evidence that both product innovation and business process innovation are drivers of export performance.

This paper also contribute to the literature by testing the assumption underlying most studies in the field that the positive effect of innovation on export performance is mediated by competitive advantage (Ayob *et al.*, 2022; Haddoud *et al.*, 2021; Saridakis *et al.*, 2019). Empirical studies on this assumption are scarce, and, to our knowledge, there are no studies considering different types of innovation and competitive advantage, as we do. According to some authors, research on the antecedents of export performance should test their mediating effects to provide a more comprehensive view of how to improve this variable (e.g., Haddoud *et al*., 2021; Chen *et al*., 2016). Furthermore, examining the role of competitive advantage as a mediator of the relationship between innovation (in product and business processes) and export performance contributes to the literature by testing some of the predictions of well-established theoretical frameworks in the international business field, international trade, and strategic management, such as the monopolistic advantage theory, the technological gap theory, the product life cycle theory, and the resource-based view.

The rest of this paper is structured as follows. First, we review prior research analyzing the relationship between different types of innovation, competitive advantage, and export performance. Based on this review, our hypotheses are proposed. Second, the characteristics of the empirical study testing the hypotheses and the results are described. The last section contains the main conclusions, implications, limitations, and suggestions for future research.

Theoretical framework

Product and business process innovation and export performance

As previously mentioned, exporting is the most common way for companies to access international markets. However, succeeding in these markets is challenging, so understanding how to succeed has become a crucial issue for researchers, managers, and public policymakers (Chen *et al*., 2016; Papadopoulos and Martín Martín, 2010; Sousa *et al*., 2008).

Numerous articles have attempted to identify factors that improve export performance (Chen *et al.*, 2016; Katsikeas *et al.*, 2000; Pla-Barber and Alegre, 2007), the variable most often used to capture firms' success is their exporting activity. The literature highlights the role of innovation as a key driver of export performance (e.g., Bıçakcıoğlu-Peynirci *et al*., 2019; Tavassoli, 2018; Filipescu *et al*., 2013), especially when innovation is understood as output, that is, the development/implementation of new or improved products/services, production processes, or marketing and management methods and systems (Azar and Ciabuschi, 2017; Edeh *et al.*, 2020; Tavassoli, 2018).

Theoretical perspectives from different fields (international business, international trade, and strategic management) have been used to explain the association between innovation and export performance. As Tavassoli (2018) claims, the two first models that explicitly defend this association are the technological gap theory (Posner, 1961) and the product life cycle theory developed by Vernon (1966), both from a macro level perspective. The first suggests that the main determinant of international trade is technological progress, which is defined in terms of innovation. According to this theory, when a country develops new goods and introduces them into a foreign market, it will gain a comparative advantage in that market until other countries learn to produce the same goods. The product life cycle theory explains changes in a country's long-term trade position (exporter/importer) based on the stages of the product life cycle. The first stage of the development of a new product is based on the advantages of the home market (of a developed country) and its introduction into other markets (developing countries) through exporting. The resource-based view (RBV) has also been used by many authors to propose a positive relationship between innovation and export performance (e.g., Ayob *et al*., 2022; Haddoud *et al*., 2021). The usefulness of this approach for examining the relationships between innovation and performance in the international market has also been highlighted in the international business literature (Hennart and

Verbeke, 2022). The RBV considers the firm´s internal resources, especially intangible resources, as key to a sustainable competitive advantage and, therefore, to superior performance (Barney, 1991; Grant, 1991). One of these intangible resources is the firm´s capability to innovate. This capability is considered a driver of success in international markets since it improves adaptation to foreign market conditions and helps create international value (Sui and Baum, 2014).

Based on these perspectives, numerous studies have empirically analyzed the relationship between innovation and export performance, with results that do not always support a positive association between these two variables, as the meta-analysis by Bıçakcıoğlu-Peynirci *et al*. (2019) shows. According to these authors, the effect of innovation on export performance may depend on the type of innovation considered, among other factors. To shed light on this issue, we distinguish between product innovation and business process innovation, following the classification proposed in the latest version of the Oslo Manual (OECD, 2018).

Product innovation is the development of new products or services or the improvement of existing ones. Different reasons have been suggested to explain why product innovation fosters firms´ propensity to export and their success in international markets. One of them is that product innovation enables companies to better adapt to the demand of new markets (Filipescu *et al.*, 2013; Lewandowska *et al.*, 2016) or offer differentiated products (Ayob *et al.*, 2022; Saridakis *et al.*, 2019). Some scholars also argue that firms focusing on product innovation try to increase sales in international markets to exploit their new product developments on a larger scale (Di Maria and Ganau, 2014) to offset the costs of innovation (Sui and Baum, 2014; Tavassoli, 2018), resulting in improved export performance.

The empirical research has usually found that product innovation has a positive effect on a firm´s propensity to export (e.g., Saridakis *et al*., 2019; Cassiman and Golovko, 2011), but findings regarding the effect of this type of innovation on export performance in the post-

entry stage are inconclusive, as shown in Table 1. Some studies find the relationship to be positive (e.g., Lewandowska *et al*., 2016; D'Angelo, 2012), but others find it to be non-significant (e.g., Haddoud *et al*., 2021; Edeh *et al*., 2020) or negative (Ayob *et al.*, 2022). Some of these authors argue that although product innovation might be necessary to penetrate new markets, during the later export development stage, this type of innovation and internationalization could be "two growth options that compete for a firm´s scarce resources, so firms should not pursue them jointly" (Ayob *et al.*, 2022). Another explanation offered by these studies is that, in some cases, the cost of innovation may outweigh its benefits in international markets (Haddoud *et al.*, 2021) or that other variables are more important for international success once a company has entered foreign markets, for example, distinct home-country advantages (Ayob *et al.*, 2022).

Insert table 1 about here

In conclusion, prior evidence on the relationship between product innovation and export performance is inconclusive, and therefore, further research on this issue could help clarify this relationship. Given the consensus in the literature on the importance of product innovation to help companies adapt to constant changes in demand and operate in highly competitive environments, such as international markets (e.g., Ayllón and Radicic, 2019; Tavassoli, 2018), and based on the theoretical models that support a positive relationship between innovation and export performance, we hypothesize that:

> *H1: There is a positive relationship between product innovation and export performance.*

The second type of innovation defined by the Oslo Manual (OECD, 2018) is business process innovation, which refers to the innovations firms implement in their production processes and other business functions. As the Oslo Manual (OECD, 2018) explains, business process

innovation includes the previous edition´s categories of process, marketing, and organizational/management innovation. To the best of our knowledge, no other studies have examined the link between business process innovation and export performance, although some papers have done so by focusing on one or more of the categories included in this type of innovation.

The literature highlights that production process innovation is mainly oriented toward improving productivity and reducing costs (Lewandowska *et al.*, 2016), allowing companies to compete in better conditions than their competitors (e.g., Edeh *et al*., 2020; Lewandowska *et al*., 2016; Becker and Egger, 2013). For example, Saridakis *et al*. (2019) suggest that production process innovation helps firms enter foreign markets because it contributes to more competitive prices, and Ayob *et al*. (2022) that increased efficiency may compensate for the higher transaction costs of international sales. The so-called self-selection perspective presents the same argument. The propensity of productive companies to export is greater than that of non-productive companies because the former are better able to overcome the sunk costs of entering new markets (Tavassoli, 2018; Cassiman and Golovko, 2011). Most empirical studies have found a positive relationship between production process innovation and export performance (e.g., Haddoud *et al*., 2021; Edeh *et al*., 2020; Filipescu *et al*., 2013), regardless of the export performance measure they use, as Table 1 shows.

Research about the influence of innovation on other business processes and export performance is scarce. The few studies focusing on marketing innovation find it is positively related to export performance (Edeh *et al*., 2021; Rodil *et al.,* 2016). This supports that marketing innovation boosts demand among customers in international and domestic markets by improving firms´ brand image and the efficiency of existing distribution channels (Edeh *et al.*, 2020). The little research carried out on management innovation has not found significant results (Alvarez, 2004; Rodil *et al.*, 2016) despite defending that the implementation of new

or improved management methods and processes plays a crucial role in firms' capacity to overcome trade barriers in export initiation and growth (Ayob *et al.*, 2022).

Considering the arguments from previous research favoring a positive relationship between these two variables, we hypothesize that:

> *H2: There is a positive relationship between business process innovation and export performance.*

The mediating role of competitive advantage in the innovation-export performance relationship

As previously mentioned, a general assumption in prior research and the theoretical frameworks defending the relationship between innovation and export performance is that both product and business process innovations help to improve firms´ competitive advantage, producing a positive effect on export performance (Castaño *et al.*, 2016; Saridakis *et al.*, 2019). In other words, competitive advantage mediates the relationship between innovation and export performance. However, empirical research on this topic is scarce, and, to the best of our knowledge, no other studies have examined this relationship considering different types of innovation and competitive advantage and focusing on export performance once a firm has entered international markets. This paper aims to fill this gap and respond to some authors' recommendations to test the mediating effects in the relationship between innovation and export performance (e.g., Haddoud *et al*., 2021; Chen *et al*., 2016).

Competitive advantage comprises any feature that puts a company in a better marketplace position. There is a broad consensus in the strategic management literature, based on the RBV, that innovation is one of the main determinants of competitive advantage (Damanpour and Evan, 1984; Keupp *et al.*, 2012) and that having a competitive advantage positively influences firm performance (Barney, 1991; Grant, 1991; Teece *et al.*, 1997) in domestic and international markets (e.g., Keskin *et al*., 2021; Njegic and Ravic, 2019). However, the

relationship between innovation and competitive advantage has little empirical support, and research on this issue "appears fragmented and out of focus," according to Chatzoglou and Chatzoudes (2018). This could be because most studies have considered competitive advantage as a single construct. This is surprising since prior research assumes that the relationship between innovation and export performance is mainly due to the effect of innovation on firms´ differentiation or low-cost advantage.

As previously explained, one of the most commonly used arguments to defend the effect of product innovation on export performance is that developing new products or improving existing ones allows companies to offer differentiated products (Ayob *et al.*, 2022; Freixanet *et al.*, 2020; Saridakis *et al.*, 2019), thus increasing their differentiation advantage. We suggest that product innovation may also be associated with low-cost advantage, for example, with the design of a new product using fewer raw materials or less packaging, lowering delivery costs.

Business process innovation mainly involves more efficient technologies, systems, and methods in production and other business processes to reduce costs. This is especially true with production process innovation (e.g., Edeh *et al*., 2020; Lewandowska *et al*., 2016; Becker and Egger, 2013), as explained above. However, innovation in production processes and other business functions may also permit companies to give added value to customers, for instance, by offering them faster service, which enhances differentiation advantage.

For competitive advantage to mediate the relationship between innovation and export performance, in addition to an association between innovation and competitive advantage, there must be one between competitive advantage and export performance. This is the fundamental assumption of the monopolistic advantage theory, which states that to access new markets, compete successfully with local firms, and manage the liabilities of foreignness, companies must have a monopolistic advantage over local firms. The literature defends that

differentiation advantage influences customers´ behavior because they prefer higher value products and services and will pay more for them, which has a positive effect on firms´ performance (Keskin *et al*. 2021; Njegic and Ravic, 2019). With some exceptions (Leonidou *et al*., 2011), the research provides evidence supporting a positive relationship between differentiation advantage and export performance, especially when export performance is measured using strategic or market indicators (Keskin *et al.*, 2021; Ling-Yee and Ogunmokun, 2001; Murray *et al.*, 2011). Low-cost advantage is thought to improve export performance because it allows firms to offer their products or services at more competitive prices (Hughes *et al.*, 2010; Keskin *et al.*, 2021; Leonidou *et al.*, 2015). The empirical evidence supports this assumption (Keskin *et al.*, 2021; Leonidou *et al.*, 2011; Ling-Yee and Ogunmokun, 2001; Murray *et al.*, 2011; Zou *et al.*, 2003), again, with some exceptions (Leonidou *et al*., 2015).

In summary, the literature on the relationship between innovation and competitive advantage and between competitive advantage and export performance supports them both. Therefore, it is reasonable to suggest that competitive advantage mediates the relationship between innovation and export performance. The results of some studies focusing on the effect of product innovation on firms´ exporting activity support this idea. The study by Bagchi-Sen (2001) finds that product innovation allows SMEs to offer more added value to their foreign customers, thus improving their export performance. Although this study does not explicitly include the competitive advantage variable, it is mentioned because added value is related to competitive advantage. For their part, Cassiman and Golovko (2011) determine that product innovation improves productivity, which fosters firms' exporting ambitions. Finally, Hughes *et al*. (2010) provide evidence that low-cost advantage and differentiation advantage mediate the relationship between innovation and export performance, although they do not consider different types of innovation.

To contribute to the understanding of why product innovation and business process innovation affect export performance, we put forward the following hypotheses:

H3: Competitive advantage mediates the relationship between product innovation and export performance.

H3a: Differentiation advantage mediates the relationship between product innovation and export performance.

H3b: Low-cost advantage mediates the relationship between product innovation and export performance.

H4: Competitive advantage mediates the relationship between business process innovation and export performance.

H4a: Differentiation advantage mediates the relationship between business process innovation and export performance.

H4b: Low-cost advantage mediates the relationship between business process innovation and export performance.

Figure 1 shows the model summarizing the hypotheses proposed in this research.

Insert Figure 1 above here

Methodology

Sample and data collection

The proposed research model was tested using a sample of 1,518 exporting manufacturing companies in southeastern Spain, taken from the SABI (Iberian Balance Sheet Analysis Sytem) database.

A specialized company collected the data using a questionnaire designed for this purpose. Following our instructions, the companies that made up the population were contacted by

telephone and asked to collaborate in the study. The survey was addressed to export managers, or, failing that, to the person responsible for sales operations, or, finally, the company manager. The information was collected between May and June 2020. To prevent the COVID-19 pandemic from impacting the data, the interviewees were asked to answer the survey considering their company's circumstances before the pandemic. Two hundred three questionnaires were obtained, and 200 were considered valid, which represents a response rate of 13.9%. The average age of the companies in the sample is 32 years, all are SMEs, and more than 60% are family-owned. Their average exporting experience is 21 years, and their exports over total sales are around 40%. More than 60% of the companies have R&D departments and more than 65% state that they have launched a new product in the last three years and have made innovations in their business processes during the same time period.

Different analyses were carried out to verify that there were no statistically significant differences between respondents and non-respondents. In the case of the industry variable, the two groups were compared by applying Pearson's Chi-square test ($\chi 2 = 7.2$, $p = 0.126$). The one-factor ANOVA test was used to examine likely differences between respondents and non-respondents concerning size ($F = 0.935$, $p = 0.062$) and profitability ($F = 0.135$, $p = 0.955$). The results suggest no significant differences between them.

Measures

Export performance. Recent works advocate using comprehensive measures of export performance that include different aspects of export success (Azar and Ciabuschi, 2017; Carneiro *et al*., 2016; Chen *et al*., 2016). With this in mind and based on Okpara and Kabongo (2009), we measured the extent to which a firm´s exporting objectives were attained using a 5-item scale (Table 2, Appendix).

Product innovation and business process innovation. This paper adopts the typology of innovation proposed in the latest edition of the Oslo Manual (OCDE/Eurostat, 2018), which

distinguishes between product innovation and business process innovation. Most previous studies used dummy variables to measure innovation (Haddoud *et al.*, 2021; Saridakis *et al.*, 2019). However, some authors support using non-binary measures, such as Likert-based measures, to capture nuances or degrees of innovation (Freixanet and Churakova, 2018). Following this recommendation, product innovation and business process innovation were measured using 6-item scales based on Cassiman and Golovko (2011) and Gunday *et al*. (2011), respectively (Table 2, Appendix).

Competitive advantage. In line with most previous studies, this paper distinguishes between low-cost and differentiation competitive advantage (López Rodríguez and García Rodríguez, 2005; Murray *et al.*, 2011). Scales to measure them were developed from those proposed by Kotha and Vadlamani (1995) and Molina-Azorín *et al*. (2015). Since competitive advantage is a comparative term, respondents were asked to compare their company's situation with that of their competitors in different aspects (Table 2, Appendix).

Control variables. This paper includes five control variables that are usually considered determinants of export performance: firm size, measured as the number of employees in the company (Gkypali *et al.*, 2015); firm age (Saridakis *et al.*, 2019); the degree of competition in the industry (Saridakis *et al*., 2019); firm exporting experience (Cadogan *et al.*, 2012); and the number of countries the company exports to (Chen *et al.*, 2016).

Statistical analysis

The research model was tested using the Partial Least Squares (PLS) technique, a variance-based structural equation modeling. PLS was selected because it is appropriate for small samples, does not require the data to follow any particular distribution, and the purpose of the research is to explain and predict the dependent variables (Henseler *et al*., 2016). Given the reflective nature of the scales, type A modeling was used for the main constructs of the model (Henseler *et al*., 2016) SmartPLS 3.3.3 software was used.

Using PLS involves following a two-stage approach. The first is to assess the measurement model. Since the constructs of the paper are reflective, we examined the individual reliability of the items and the construct reliability, convergent validity, and discriminant validity of the constructs. Table 2 shows information to assess the first three requirements. Individual item reliability is considered satisfactory because the loadings for all the items are above 0.7 (Carmines and Zeller, 1979). Construct reliability is also met for all the variables since the Cronbach's alpha (α) and the composite reliability (CR) for all of them exceed the threshold values of 0.7 (Fornell and Larcker, 1981). Finally, the average variance extracted (AVE) is greater than 0.5 for all the variables, meaning that all of them attain convergent validity (Fornell and Larcker, 1981).

Insert Table 2 about here

We followed Fornell and Larcker (1981) to assess the discriminant validity of the variables. As shown in Table 3, all the variables satisfy the criterion that the square root of the AVE (values in the diagonal) for a particular variable is larger than the correlations between that variable and the other constructs (values in the same column, but below the diagonal). In addition, discriminant validity was checked with the Heterotrait-Monotrait Ratio (HTMT) index (values above the diagonal of the matrix in Table 3), verifying that the values are below 0.85.

Insert Table 3 above here

Other tests have been performed on the measurement model (Henseler, Hubona, *et al.*, 2016), showing an adequate standardized root mean square residual (SRMR = 0.054), unweighted least squares discrepancy (dULS = 1.527), geodesic discrepancy values (dG = 0.683), and the Bentler-Bonett index (NFI=0.820) in the saturated model.

With the adequacy of the measurement model verified, the structural model was tested. To analyze whether the relationships in the model are significant, the bootstrapping technique was used with 5,000 subsamples, using one-tailed analysis. The results are given in the following section.

Results

Figure 2 shows that the coefficients of determination (R^2) of the endogenous constructs are above 0.2, the minimum level suggested (Falk and Miller, 1992). The fit values of the structural model are the following: SRMR = 0.074, dULS = 2.874, dG = 0.802, and NFI=0.800.

Insert Figure 2 above here

The results of the structural model tests are shown in detail in Table 4. Our findings support H_1, suggesting a direct and positive relationship between product innovation and export performance ($\beta = 0.180$, $p < 0.05$), but not H_2. That is, according to our results, business process innovation is not directly related to export performance.

Insert Table 4 above here

H_3 and H_4 were tested by analyzing the indirect effects between each type of innovation and export performance considering each type of competitive advantage. Contrary to our expectations, no significant results were obtained when the mediating variable was differentiation advantage. Consequently, H_{3a} and H_{4a} are not supported. The findings show that low-cost advantage mediates the relationships between product innovation and export performance (H_{3b}: $\beta = 0.081$, $p < 0.05$) and between business process innovation and export performance (H_{4b}: $\beta = 0.102$, $p < 0.01$). In this last case, there is total mediation.

Conclusions

There is general agreement in the literature about the strategic importance of firm innovation and internationalization (e.g., Freixanet and Rialp, 2022; Freixanet and Churakova, 2018). The literature also states that innovation helps firms enter and succeed in international markets (e.g., Bıçakcıoğlu-Peynirci *et al*., 2019; Saridakis *et al*., 2019; Filipescu *et al*., 2013). Numerous papers have empirically examined the relationship between innovation and internationalization, specifically exporting (e.g., Haddoud *et al*., 2021; Azari *et al*., 2017; Becker and Egger, 2013; Cassiman *et al*., 2010). Their results suggest that such a relationship exists, but their conclusions are inconsistent. This paper aims to contribute to understanding this relationship by examining it following the recommendations of recent research, for example, by adopting a broader definition of export performance and considering different types of innovation (Bıçakcıoğlu-Peynirci *et al.*, 2019; Chen *et al.*, 2016). Specifically, we adopt the typology of innovation proposed by the latest version of the Oslo Manual (OCDE/Eurostat, 2018), which distinguishes between product innovation and business process innovation. In addition, and to respond to the calls for research on the mediating effects between the antecedents of export performance and this variable (e.g., Haddoud *et al*., 2021; Chen *et al*., 2016), we test the assumption underlying most studies and theoretical approaches in the field that competitive advantage mediates the relationship between innovation and export performance.

Our findings show that the relationship between product innovation and export performance is positive. Specifically, they suggest that developing new products or improving existing ones helps companies achieve their export objectives. Prior research found similar results when export performance was measured as export propensity or the decision to enter foreign markets (e.g., Saridakis *et al*., 2019; Cassiman and Golovko, 2011). However, this is not the case in all the studies focusing on export performance in post-entry stages (e.g., Ayod *et al*.,

2022; Haddoud *et al*., 2021; Edeh, 2020). Our findings support the studies that associate product innovation and firms' success in export markets. We also find that the relationship between product innovation and export success is mediated by competitive advantage, but, unexpectedly, the results do not support what the literature suggests, that its effect on export success is mainly because it improves a company's differentiation (Ayob *et al.*, 2022; Freixanet *et al.*, 2020; Saridakis *et al.*, 2019). What we did find is that product innovation is significantly related to export performance. This could be partly due to the improvement this type of innovation produces in a company's low-cost advantage.

Regarding the links between product innovation, differentiation advantage, and export performance, our findings show that although product innovation is positively related to differentiation advantage, differentiation advantage has no effect on export performance. One possible explanation for these results is that offering products with a higher added value than those of competitors usually implies additional costs, and this could jeopardize performance growth and other objectives related to foreign markets, at least in the short term. Another possible reason for our unexpected findings is that given the increased competition in international markets (Azari *et al.*, 2017), succeeding in this context requires greater price competitiveness. Therefore, low-cost advantage could be more decisive than differentiation in improving export success. This can be particularly important for companies in non-technology-intensive sectors. Following Ma (2000), having a competitive advantage may not improve performance if the advantage is not critical in the firm´s market or the firm fails to fully exploit it. Further research is needed to understand why having a differentiation advantage is not found to be related to export performance in this study.

In addition, the partial mediation we find suggests that other factors may explain the relationship between product innovation and export performance beyond the effect of

innovation on low-cost advantage. Product innovation could enable companies to continuously adapt their products to the changing demand of export markets, even if this does not mean achieving a differentiation advantage.

This paper provides evidence that business process innovation is positively but indirectly related to export performance, through the improvement of low-cost advantage. These results support the extended assumption that innovation in production process and other business processes helps improve firms´ efficiency, which contributes to developing a low-cost advantage, and this, in turn, improves export performance, as predicted by the self-selection perspective (Tavassoli, 2018; Cassiman and Golovko, 2011). The results also show a significant relationship between business process innovation and differentiation advantage, but the latter variable does not affect export performance, as indicated above.

In summary, the main contributions of this paper to the literature are as follows. Firstly, we provide evidence that both product innovation and business process innovation are drivers of export performance, as suggested by the technological gap theory and the product life cycle theory at the country-level and the RBV at the firm-level. Secondly, our findings support the theory of monopolistic advantage by showing that having a competitive advantage is related to a firm´s ability to compete successfully in its export markets. Thirdly, we contribute to the literature by providing evidence supporting the assumption underlying most studies on the relationship between innovation and export performance that this relationship is mediated by competitive advantage (Ayob *et al.*, 2022; Haddoud *et al.*, 2021; Saridakis *et al.*, 2019). We find evidence of such a mediating effect, but only in the case of low-cost advantage. In our study, this advantage mediates the relationship between the two types of innovation considered and export performance. Although product innovation and business process innovation are related to differentiation advantage, we did not find that this variable mediates

the innovation-export performance link or is related to export performance. Several explanations have been provided for this unexpected result.

The conclusions of this study have implications for practitioners, particularly for companies seeking export success, but also at the level of public policies related to export promotion organizations and innovation promotion agencies. Our findings show that companies should foster product innovation and business processes and try to orientate these processes toward improving their costs vis-à-vis their competitors because having a low-cost advantage is positively related to export performance. In addition, we find that practitioners who innovate in their products, production processes, and other business processes improve their firm´s low-cost and differentiation advantages, although the latter is not related to export performance, at least in the short term. The conclusions of this paper also have implications for policymakers, in particular for organizations whose aim is to foster exporting and the improvement of export performance (Freixanet, 2022). The results of the present study suggest that these organizations should coordinate some of their actions with innovation promotion agencies to drive innovation in both product and business process innovation to reduce costs since having a low-cost advantage is related to export performance.

This paper also has some limitations, as most studies on the subject, that should be taken into account when interpreting its conclusions. The cross-sectional nature of the study prevents us from inferring clear causal relationships between the variables in the model. The fact that the questionnaire relies on a single informant may result in biases. And, the sample used in this study is very specific, which could influence some of the findings, making it difficult to generalize our conclusions. The main market for Spanish exports is the European Union, and a large percentage of these exports come from the agri-food sector. This could explain why our findings show that low-cost advantage has a positive effect on export performance and

differentiation advantage is not found to be significant. Distinguishing the market to which exports are directed, whether the industry is more or less technology-intensive, or what objective the firm is pursuing through innovation (efficiency or value creation) would help clarify the relationships between innovation, competitive advantage, and export performance.

Future research should attempt to overcome these limitations. Using longitudinal data for a more accurate evaluation of the causality in the relationships between innovation, competitive advantage, and export performance, using multiple informants, or replicating this research in other contexts or with a larger and more diverse sample including companies from countries with different technological levels could be possible ways to address these issues. The results in this paper also suggest that future research on the relationship between product innovation and competitive advantage should consider the specific type of product innovation implemented by a company and its objectives (to reduce costs, improve the quality of its products, etc.). Similarly, we believe that the relationship between competitive advantage in differentiation and export performance requires additional attention to understand whether different elements of differentiation advantage better support export performance. In line with some other studies (Lewandowska *et al.*, 2016; Saridakis *et al.*, 2019), future research could also contribute to understanding the impact of each type of competitive advantage on export performance by distinguishing different indicators of this variable and examining the joint effects of different types of innovation on export outcomes. Finally, another interesting line for future research would be to consider the export destination market, particularly, whether the effect of low-cost or differentiation competitive advantage on export success depends on the country to which the sales are directed.

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Appendix

Table 1. Empirical studies on the relationship between types of innovation and export performance

	Export performance measure					
Type of innovation	**Export intensity/depth** (Export sales/total sales)	**Export breadth/diversity** (Number of foreign countries)	**Financial** (Multi-item scale)	**Strategic** (Multi-item scale)	**Financial & Strategic** (Multi-item scale)	**Export permanence** (Permanent/ sporadic exporter)
Product	Positive relationship Lewandowska *et al*. (2016) D'Angelo (2012) Kongmanila and Takahashi, (2009) López Rodríguez and García Rodríguez (2005) Negative relationship Ayod *et al* (2022) *Non-significant* Haddoud *et al*. (2021) Rodil *et al*. (2016) Filipescu *et al*. (2013) Ganotakis and Love (2011)	Positive relationship Kongmanila and Takahashi (2009) *Non-significant* Filipescu *et al*. (2013)	Positive relationship Lages *et al*. (2009) *Non-significant* Edeh *et al*. (2020)			*Non-significant* Alvarez (2004)
Process	Positive relationship Haddoud *et al*. (2021) Filipescu *et al*. (2013) D'Angelo (2012) Kongmanila and Takahashi (2009) López Rodríguez and García Rodríguez (2005) *Non-significant* (Rodil *et al.*, 2016)	Positive relationship Filipescu *et al*. (2013) Kongmanila and Takahashi (2009)	Positive relationship Edeh *et al*. (2020)			Positive relationship Alvarez (2004)
Marketing	Positive relationship Rodil *et al*. (2016)		Positive relationship Edeh *et al*. (2020)			
Management	*Non-significant* Rodil *et al*. (2016)					*Non-significant* Alvarez (2004)
Management + Marketing	*Non-significant* Radicic and Djalilov (2019) Negative relationship Ayod *et al* (2022)		*Non-significant* Silva *et al*. (2017)	*Non-significant* Silva *et al*. (2017)	Positive relationship Azar and Ciabuschi (2017)	

Table 2. Reliability and validity of the scales

Construct	Indicator	Load	St D	T Std	Reliability and validity
Product innovation	Introduced new raw materials or components in its products.	0.840***	0.027	30.601	α: 0.922 CR:0.939 AVE:0.720
	Improved or expanded the functionality or performance of its products.	0.839***	0.027	30.988	
	Improved product design or packaging	0.787***	0.041	19.058	
	Launched new products on the market (different from those previously offered)	0.849***	0.035	24.590	
	Improved the service offered to its customers	0.861***	0.027	31.812	
	Expanded services offered to customers	0.912***	0.014	66.188	
Process innovation	Production equipment	0.857***	0.022	38.115	α: 0.927 CR:0.943 AVE:0.733
	Production organization methods	0.826***	0.024	34.560	
	Logistics systems or delivery/distribution methods	0.840***	0.025	33.840	
	Marketing strategies (promotion of your products/services)	0.838***	0.036	23.324	
	Information and communication systems	0.879***	0.020	44.382	
	Internal management processes and methods: administration, accounting, HR management, etc.	0.894***	0.018	48.945	
Differentiation	Quality of your products	0.724***	0.043	16.978	α: 0.829 CR:0.878 AVE:0.591
	Degree of novelty of your products	0.784***	0.035	22.646	
	Quality of customer service	0.772***	0.039	19.567	
	Variety of after-sales services	0.765***	0.042	18.050	
	Brand value	0.795***	0.032	25.142	
Low-Cost	Sales price of your products	0.772***	0.045	17.222	α: 0.749 CR:0.857 AVE:0.667
	Production costs	0.806***	0.036	22.294	
	Operational efficiency of the company	0.869***	0.022	39.945	
Export performance	Foreign sales figure	0.879***	0.023	38.426	α: 0.928 CR:0.946 AVE:0.776
	Weight of foreign sales over total company sales	0.861***	0.019	45.911	
	Profitability of foreign sales	0.872***	0.019	44.998	
	Number of countries to which the company sells	0.879***	0.022	40.455	
	Degree to which the company achieves its sales targets abroad	0.914***	0.017	54.168	
Industry competition	Price promotions are very common practice in the industry.	0.829***	0.056	14.898	α: 0.748 CR:0.856 AVE:0.665
	When an industry company launches a new product, competitors are quick to copy.	0.759***	0.095	8.020	
	Price variable is key to compete in the sector.	0.855***	0.033	25.749	

Note: Bootstrapping with 5000 samples; Load=value of the indicator load on the construct; St D=standard deviation; t-Std=T Student's value; Cronbach's α=alpha; CR=composite reliability; AVE=average variance extracted.

Table 3. Correlations and discriminant validity of the scales

	1	2	3	4	5	6	7	8	9	10
1 Product innovation	0.849	0.740	0.600	0.517	0.492	0.142	0.026	0.222	0.503	0.048
2 Business Process innovation	0.686	0.856	0.558	0.535	0.437	0.051	0.066	0.054	0.598	0.131
3 Differentiation	0.532	0.510	0.769	0.825	0.389	0.115	0.047	0.196	0.440	0.107
4 Low-cost	0.430	0.449	0.667	0.816	0.575	0.029	0.114	0.144	0.518	0.044
5 Export performance	0.455	0.407	0.358	0.484	0.881	0.083	0.054	0.295	0.454	0.056
6 Age	0.137	-0.035	0.103	0.022	0.080	a	0.586	0.178	0.124	0.006
7 Exporting experience	0.022	-0.065	0.021	-0.100	-0.052	0.586	a	0.169	0.045	0.118
8 Exporting breadth	0.213	0.053	0.177	0.089	0.286	0.178	0.169	a	0.103	0.112
9 Industry competition	0.419	0.499	0.363	0.392	0.379	0.106	-0.032	0.093	0.815	0.080
10 Size	0.038	0.125	0.107	-0.004	-0.053	0.006	0.118	0.112	0.056	a

Note: The values located on the diagonal reflect the values of the square root of the mean extracted variance. Below the diagonal, the correlations between the constructs are represented. Above the diagonal, the Heterotrait-Monotrait ratio (HTMT) is shown. a: Variable with an Indicator

Table 4. Results of the model contrast. Direct and indirect effects

	Coef	**Desv**	**t std**	**Linf**	**Lsup**
Direct effects					
Product innovation → Export performance	0.180*	0.088	2.048	0.036	0.325
Business process innovation → Export performance	0.116	0.104	1.119	-0.059	0.281
Product innovation → Differentiation	0.344***	0.088	3.908	0.199	0.492
Product innovation → Low-cost	0.231**	0.088	2.636	0.087	0.373
Process innovation → Differentiation	0.274***	0.085	3.209	0.130	0.414
Process innovation → Low-cost	0.290***	0.082	3.531	0.155	0.426
Differentiation → Export performance	-0.111	0.089	1.239	-0.256	0.037
Low-Cost → Export performance	0.351***	0.088	4.010	0.204	0.491
Age → Export performance	0.045	0.070	0.643	-0.064	0.168
Exporting experience → Export performance	-0.062	0.080	0.772	-0.197	0.063
Exporting breadth → Export performance	0.231***	0.055	4.182	0.137	0.317
Industry competition → Export performance	0.125	0.076	1.642	0.005	0.255
Size → Export performance	-0.087	0.062	1.390	-0.186	0.021
Indirect effects					
Product Innovation → Differentiation → Export Performance	-0.038	0.033	1.145	-0.096	0.013
Product Innovation → Low-cost → Export Performance	0.081*	0.039	2.089	0.025	0.151
Business Process Inn. → Differentiation → Export Performance	-0.030	0.029	1.057	-0.084	0.009
Business Process Inn. → Low-cost → Export Performance	0.102**	0.036	2.830	0.047	0.164

Note: *p<0.05; **p<0.01; ***p<0.001; t(0.05;4999)=1.6451; t(0.01;4999)=2.327; t(0.001;4999)=3.091. One-tailed t-bootstrap for hypotheses; t(0.05;4999)=1.960; t(0.01;4999)=2577; t(0.001;4999)=3.292. Two-tailed t-bootstrap for control variables; Coef=coefficient value; Dev=Standard deviation; T Std=T Student's value; Linf=Lower limit of confidence interval; Lsup=Upper limit of confidence interval.

Figure 1. Research model

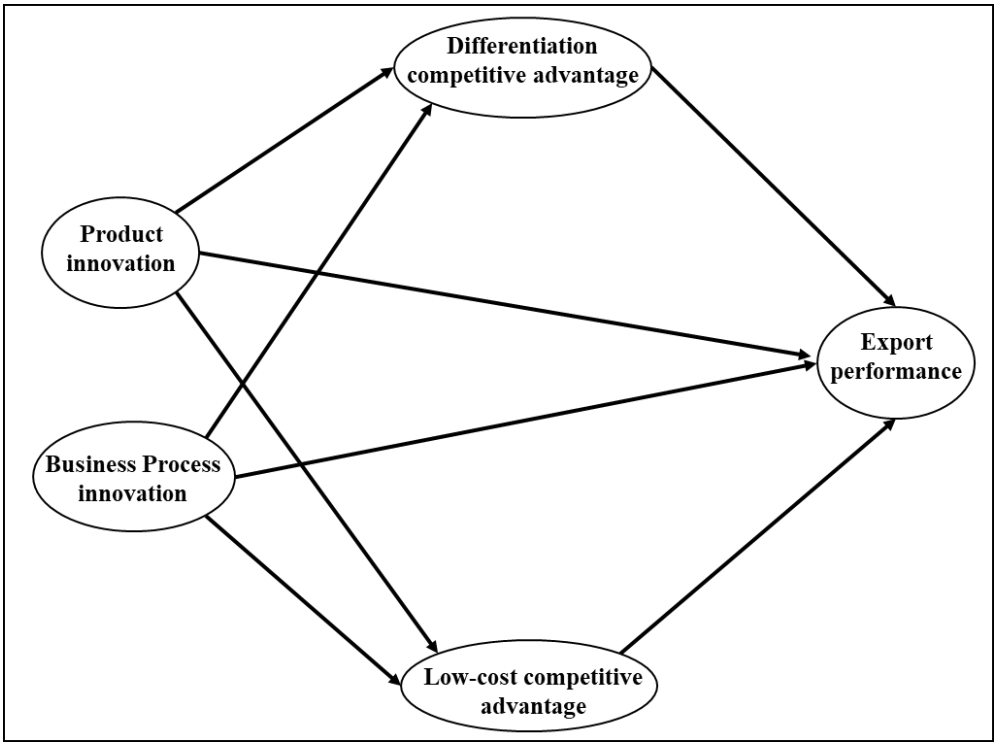

Figure 2. Structural model contrast results