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Domestic clustered networks and internationalization of agrifood SMEs

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Abstract

This paper examines how participating in domestic clustered networks in the agri-food industry affects the export status and export intensity of small and medium-sized enterprises (SMEs). The Uppsala internationalization process model has been revisited in light of the knowledge that these networks can contribute to promoting the presence of SMEs abroad. The study uses a sample of companies in the Spanish wine industry and characterizes 76 domestic clustered business networks (Protected Designations of Origin). The value and originality of the paper reside in its contribution in terms of measuring the degree of internationalization of

Abbreviations: DO, designation of origin; EU, European Union; KMO, Kaiser–Meyer–Olkin; NACE, Nomenclature statistique des Activites economiques dans la Communaute Europeenne - Statistical classification of economic activities in the European Community; PCA, principal component analysis; PDO, protected designation of origin; PGIs, protected geographical indications; SABI, Iberian Balance Sheets Analysis system; SMEs, small and medium-sized enterprises; VIF, variance inflation factor.

domestic clustered networks to which SMEs belong. It also assesses the effect of these networks on the internationalization process of the agri-food industry, considering that domestic clustered networks with a strong international commitment generate greater internationalization opportunities. [EconLit Citations: F14, M21, Q13, Q17].

KEYWORDS

agri-food clusters, domestic clustered networks, internationalization, SMEs export performance

1 | INTRODUCTION

The internationalization process has received much attention from the literature (Coviello & Munro, 1997; Johanson & Vahlne, 1977, 1990, 2009; Vahlne & Johanson, 2013, 2017; Vahlne and Ivarsson, 2014). Scholars have mainly focused on large companies, but it is generally assumed that the internationalization of small and medium-sized enterprises (SMEs) differs from that of large firms (Musteen et al., 2010).

From the network theory point of view, an alternative mechanism used by SMEs to overcome resource and skill limitations is cooperation with other firms (Johanson & Mattsson, 2015; Mínguez, 2010). Networks can help firms acquire knowledge of foreign markets, institutions, rules, and regulations (e.g., Johanson & Mattsson, 2015). Although the network approach acknowledges the benefits of networks to achieve success in international markets, there is very little known about the structure or characteristics of the networks that may facilitate the internationalization of the firm (Sharma et al., 2019).

According to the revisited Uppsala internationalization model, to achieve success in international markets a firm must belong to a network; otherwise, it suffers from the liability of outsidership (Johanson & Vahlne, 2009). Some papers also observe that the international commitment of networks plays a key role in the internationalization process of SMEs (Vahlne & Johanson, 2013; Johanson & Mattsson, 2015). The international business literature informs us of several ways to index a firm's degree of internationalization (see the complete review study by Asmussen et al., 2007), but in fact none of the existing indices really measure the international commitment of networks.

Most studies that use a revisited approach of the Uppsala internationalization process focus on the firm and the relationship of the firms in the network (Johanson & Vahlne, 2009; Vahlne & Johanson, 2013, 2017). However, less attention is placed on the heterogeneity of the networks.

Within this framework, this study analyses a very typical kind of network in the agribusiness, the so-called domestic clustered networks (Montoro-Sánchez et al., 2018). Domestic clustered networks, also called "domestic networks," are made up of firms that carry out their activities in a certain geographic area. This concept may be used to define the network formed by the wineries under the umbrella of a differentiated quality seal, such as protected designation of origin (PDO) wines or protected geographical indication (PGIs) in Europe, or the American Viticulture Area in the United States (Centonze, 2010; Porter & Bond, 2013).

Addressing the existing research gaps discussed above, the principal contribution of this study is to attempt to measure the effect of domestic clustered networks on the internationalization process of the industry, considering that those networks having a strong international commitment generate greater internationalization opportunities. Despite the importance of the agri-food industry in international markets, research in this sector has been very

limited in comparison with studies covering other sectors (see Kirca et al., 2012; for a review). Numerous studies have analyzed the impact of business networks on exports in knowledge-intensive firms (Coviello & Munro, 1997; Crick & Spence, 2005; Moen et al., 2004; Ojala, 2009), but few authors have concentrated on analyzing the wine industry (Fernández-Olmos, 2011; Karelakis et al., 2008; Maurel, 2009). In addition, this study makes a relevant contribution to the network approach not only in terms of the importance of the nature and characteristics of the domestic clustered networks, but also with regard to the firm's characteristics, combining micro and macro factors when analyzing the firm's internationalization and its intensity.

The rest of the paper is structured as follows: Section 2 presents the case study. The next section reviews the theoretical framework. Section 4 sets out the hypotheses. Section 5 presents the methodology, describing the sample, variables, and econometric methods used in the study. Section 6 reports the results of the empirical analysis. Finally, Section 7 presents the discussion, and implications.

2 | CASE STUDY

In this paper we will work with a sample of companies in the Spanish wine industry. The sample is formed by small companies with very different resources. Many of the companies of Spain's wine industry belong to 1 of 76 business clusters (see in Figure 1) with highly heterogeneous characteristics and strategic behavior, such as the PDOs. These are networks based on geographic designation with different levels of international commitment and a very broad geographical diversification in terms of their sales. Despite the small size of the majority of wine firms in Spain,[1] exports have more than doubled in recent decades and the number of firms with transactions in foreign markets is constantly on the rise (Serrano et al., 2018).

The PDOs are networks based on the geographic control of production. There is a long tradition of these networks in France as the first law regulating them was passed in 1919 (Chevet et al., 2018). In Spain, the first designations of origin emerged in 1933 in Jerez and La Rioja. Over the next two decades, new designations of origin were created, which sometimes corresponded to regions producing ordinary wines, such as La Mancha with a vineyard of more than 200,000 ha in 1964 (Fernández & Pinilla, 2018). The changes in the international wine market after the 1960s reinforced the control in the designation of origin (DO), banning the introduction of wine from outside of them, establishing stricter regulations of production methods and obliging the bottling process to be carried out within their limits. The number of designations of origin grew until there were 90. From this total, we will exclude 14, which have the designation of *Vinos de Pago*. These correspond to the production of individual vineyards with usually only one winery. In 2017, the remaining 76 designations of origin covered an area of 577,291 ha with 4141 wineries and a production of over 10 million hectoliters, which represented 40% of Spain's wine production. Of this, in the same year, 5 million hectoliters (38% of production) were exported. The existence of designations of origin enables the information asymmetries between producers and consumers to be reduced and fosters the creation of collective quality brands. Therefore, it reduces market failures and improves efficiency (Meloni & Swinnen, 2018; Mérel & Sexton, 2012; Shapiro, 1982). In the case of wine, the reduction in the information asymmetry is achieved by relating the quality of the production to the region from where it is from. The designations of origin are governed through collective governing bodies formed by the local firms (wineries) themselves and regulating councils. They have the capacity to establish the regulations of the production processes, the quality standards and the inputs that can be used (only wine originating from the DO). In this way, they provide more information to the customer and can ensure a minimum quality standard for all wines produced within this DO. However, although the

[1]According to the Directorio central de empresas—Central Companies Directory. Instituto Nacional de Estadística—Spanish Statistical Office. In January 2011, there were 4083 wine-making firms, of which 3444 (84.35%) had <10 employees and 14.03% between 10 and 50. There were only 57 companies that had between 50 and 200 workers, whereas there were just 9 with over 200 employees.

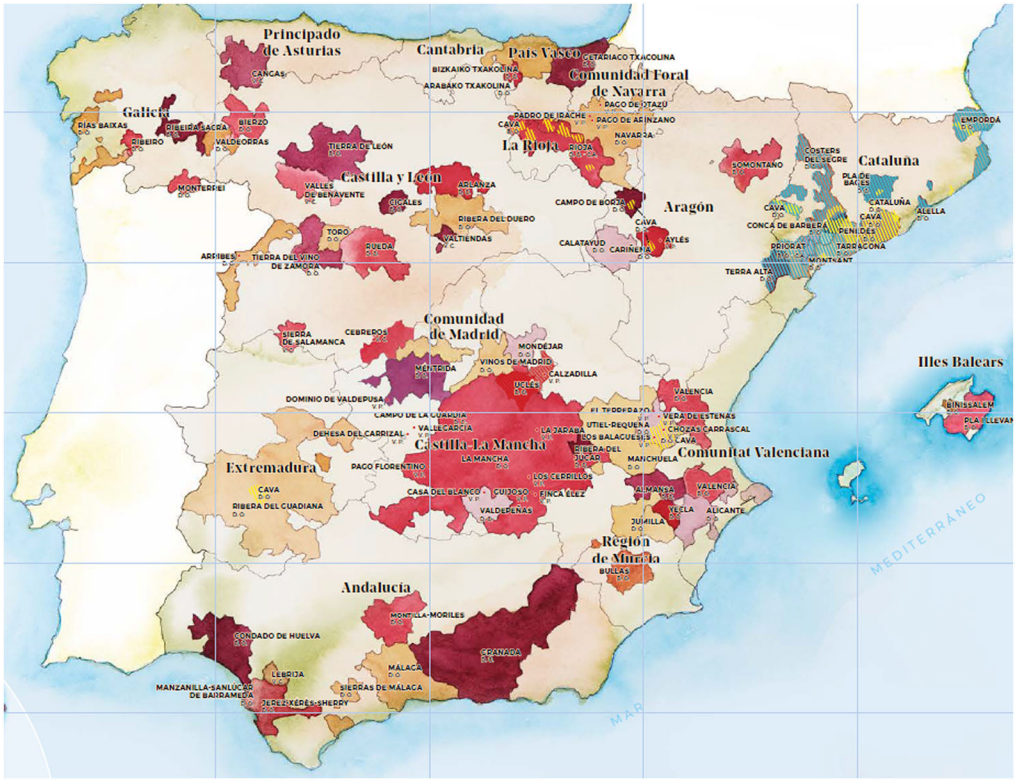

FIGURE 1 Map of the protected designations of origin in Spain

creation of a DO initially only has these objectives, it generates dynamics that enable the collaboration between wineries, taking advantage of their proximity and specialization in the same type of product. From this point of view, an intense business network emerges around the DO as the companies both collaborate and compete with each other. Collaboration is feasible in different spheres of the activity but the most important are related to ensuring the adopted quality standards, which creates a double brand, that of the firm and that of the DO; transferring technology; product development; lowering input purchasing costs; accessing qualified labor; and developing joint marketing campaigns. They also develop joint actions in both local and external markets and often exchange knowledge of the possibilities of internationalization. Therefore, economies of scale and scope are obtained and transaction costs are reduced (Belleti et al., 2017). In short, the DO is similar to an agri-industrial district, which generates economies that are external to the individual enterprises but internal to the local system, making the production process more dynamic (Becattini, 2003). Although the formal institutional cooperation of the designation is focused on quality assurance and marketing, the noninstitutional cooperation is varied, but is essential for the generation and transfer of innovation and technological knowledge or forms of management. In addition, it enables privileged access to suppliers, intermediaries and labor. The DO differs from the Marshallian industrial district in that it is institutionally organized and is also supported and supervised by the public administration. This allows for enhanced cooperation.

Therefore, interaction between the producers belonging to a PDO forms part of their normal operations, but with the current market circumstances it is essential. It is impossible for a winery to belong to a PDO and not interact with the ties and contacts derived from this membership. Good examples of this interaction are the

wine promotion programmes in third countries sponsored by the European Union (EU). It is a measure for the common organization of the wine market and seeks to raise awareness about the characteristics and qualities of European wines, to contribute to improving their competitive position and the consolidation, or penetration, of new markets in third countries. Some of the possible beneficiaries of this support are the management and representation bodies of the wine PDOs, and their associations. To access these promotional programmes, the wines have to belong to a PDO or indicate the wine grape variety. Therefore, the Regulatory Councils of the PDOs, such as management bodies should ensure that all of their members are included in the applications for support. Once these subsidies are granted, they will be able to undertake common actions abroad, such as advertising campaigns, promotion in points of sale, web portals for foreign promotion, wine-tasting events, and so on.

3 | THEORETICAL FRAMEWORK

Following Bernard and Jensen (1999), Helpman et al. (2004) and Chaney (2008), only a small number of firms, the largest and most productive, are able to export and bear the fixed costs of entering new markets (they account for the greatest export volume). However, certain empirical studies highlight the need to incorporate other aspects in addition to internal business characteristics when analyzing their export behavior (Bernard et al., 2012). Specifically, participating in networks is a mechanism that firms can use to compensate for limited resources and skills (Johanson & Mattsson, 2015; Mínguez, 2010). A firm's environment can be assumed to be a network when companies are embedded in relationships with other actors, exchanging not only products or services, but also knowledge and information (Vahlne & Johanson, 2013).

The Uppsala model postulates that internationalization is an incremental process, meaning that over time, different levels of commitment are reached in the process thanks to the firm accumulating experience and knowledge in international markets (Dunning, 1993). Furthermore, the model contemplates the importance of networks in the internationalization process, introducing this concept in the 2009 model as a component of Knowledge Opportunities, taking into account the study by Coviello and Munro (1995, 1997). In this way, the internationalization opportunities for SMEs largely depend on the characteristics of the networks to which they have access, their capacity to facilitate relations, their degree of concentration and internationalization, the relationship with other networks, suppliers, consumers and institutions and how this group of entities interact with potential markets (Phelps et al., 2012; Johanson and Vahlne, 2009).[2]

Furthermore, cooperation between regional organizations is particularly useful for small firms as it helps to reduce the uncertainty surrounding the access to international markets, diminishes transaction costs, allows synergies and the complementarity of resources to be captured, and enables economies of scale to be obtained through the increase in the size of the activities in sectors that require a specific volume to obtain positive results (Mínguez, 2010).

In this study we consider network as "a set of two or more connected relationships that can be with customers, suppliers, competitors, or public and private support agencies" (Coviello & Munro, 1995; Montoro-Sánchez et al., 2018; Zain & Ng, 2006). The types of collaboration that can arise between the companies can be diverse and contemplate different realities or environments. In the case of this study, which contemplates the wine PDOs in Spain, the most applicable type of network is the cluster (e.g., Bell & Giuliani, 2007; Giuliani and Bell, 2005; Porter & Bond, 2013) or domestic clustered network (Montoro-Sánchez et al., 2018). Clusters can be defined as geographic concentrations of companies and institutions in a particular field that share productive, commercial and social

[2]Lo et al. (2016) in a study for SMEs in Taiwan found that the way of entering new markets for SMEs depends on the kind of network relationships. Network relationships can be internal and external, the former being the relationships between a parent company and its subsidiary, and the latter between the company (parent and/or subsidiary) and local suppliers, customers, and regulators in the foreign market (Lo et al., 2016).

interdependencies (Porter, 1998). Within clusters, firms develop different relationships with other firms based on formal agreements, trust-based relationships, family-based contact, commercial transactions, and so on, providing them with opportunities to develop valuable knowledge exchanges (Giuliani and Bell, 2005; Molina-Morales & Martínez-Fernández, 2009). According to Montoro-Sánchez et al. (2018), these relationships can be considered as a domestic network. By participating in the domestic clustered network, the SME will be able to incorporate and accumulate this knowledge that will help it to develop its internationalization process (Yli-Renko et al., 2002). The benefits that an SME can obtain from the domestic clustered network depend on its position within the network (Hohenthal et al., 2014).

The PDO would therefore be a cluster based on a network of formal or informal institutional contacts between its members. Each winery would be a node of the network with the regulatory council of the PDO at the center, which would capitalize on its contact with different institutions, universities, research centers, suppliers, and so on. This, however, does not mean that each of the members of the PDO cannot also establish direct contacts and incorporate them into the network. Therefore, it is a domestic network made up of a group of companies that develop their activity in a specific geographical area and institutions that interconnect in a specific industry to improve their competitiveness (Mesquita & Lazzarini, 2009; Montoro-Sánchez et al., 2018; Porter, 1998). In a study of the wine industry in California, Porter and Bond (2013) refers to this industry as a cluster and defines it as: "the group of interconnected wineries, grape growers, suppliers, service providers, and wine-related institutions located in California." Other authors, such as Arikan (2009), Bell and Giuliani (2007), Giuliani and Bell (2005), among others, also use this term to refer to the wine industry.

4 | HYPOTHESES

This paper maintains that the participation in domestic clustered networks not only has a positive effect on the export status of SMEs, but it also has a positive effect on their export intensity, which can be formulated by considering four hypotheses:

Hypothesis 1 (H1): *The active participation in domestic clustered networks (H1a. Commercial network or H1b. Technological network) has a positive impact on the export status of SMEs.*

Hypothesis 2 (H2): *The active participation in domestic clustered networks (H2a. Commercial network or H2b. Technological network) has a positive impact on the export intensity of SMEs.*

Hypothesis 3 (H3): *The active participation in domestic clustered networks with a high level of foreign commitment (H3a. Commercial network or H3b. Technological network) has a positive impact on the export status of SMEs.*

Hypothesis 4 (H4): *The active participation in domestic clustered networks with a high level of foreign commitment (H4a. Commercial network or H4b. Technological network) has a positive impact on the export intensity of SMEs.*

According to Bai and Johanson (2018), network capabilities favor opportunities for firms seeking to internationalize. However, there is still a lot of ground to cover in terms of determining all the factors that configure the network capability. The characteristics of the network that facilitate internationalization still remain unknown. In this sense, there are contradictory studies. Some focus on the intensity of the relationships, whereas others concentrate on the size and the density of the relationships, as contact between members favors exchange and, therefore, learning. Finally, others reveal how networks with weak but highly internationalized relationships enable the identification of new opportunities. According to network theory, the international commitment of networks plays a key role in the internationalization process of the firm (Johanson & Mattsson, 2015; Vahlne & Johanson, 2013). Unfortunately, despite the growing body of studies on networks and internationalization, there are very few studies on network structures and their

impact on internationalization (Bai & Johanson, 2018). With very few exceptions (e.g., Coviello, 2006), the majority of studies (see the literature review in Hohenthal et al., 2014) consider that all types of network knowledge are equally important.

Studies on network structures show the importance of the density of relationships. The SMEs that form part of a geographically close business network enjoy the advantages of accessing specialized labor, suppliers, and distributors. There is a particular focus on the advantages of the network associated to trust and reputation within it, created by physically close organizations (Lin & Chaney, 2007; Manolova et al., 2010).

According to Bai and Johanson (2018), drawing the information from stable network sources enables companies to verify the quality of the information. Furthermore, closed networks allow a profound knowledge to be gained of the other firms that make up the network.

According to the internationalization process theory, the lack of foreign market knowledge is the most important obstacle to the internationalization of small firms (Johanson & Vahlne, 1977). Therefore, the participation in a network which has a high export presence, in terms of both scope (present in different regions) and volume (high export intensity), means having greater access to international market knowledge and export performance.

Also, authors such as Su et al. (2009) emphasize the importance of both internal capabilities and external partnerships for reaping the benefits of the networks. Particularly, the networking capabilities and absorptive capacity of SMEs are highly relevant for taking advantage of the network (Yli-Renko & Autio, 1998). When the networks are international, the firms with absorptive capacity can access knowledge that will favor their internationalization process. This is because the strong and cohesive ties within the network allow firms to exploit the learning, reputation, and cooperation benefits to be gained from being able to access the broader array of information, resources, and opportunities they need for their development (Maurer & Ebers, 2006). Being a member of an international network provides the information and resources needed to improve not only export status but also the propensity to export.

In line with these arguments, this paper maintains that the export status and intensity of an SME are related to the development of network ties with other firms and institutions belonging to a domestic clustered network with a high degree of international commitment.

5 | METHODOLOGY

5.1 | Variables

5.1.1 | Network collaboration variables

There are many ways to classify networks. One of them consists in identifying the objective that they pursue (Möller et al., 2005). Thus, we could find technological networks (which have the objective of exchanging information and resources related to technical or technological issues), entrepreneurial networks (that seek to undertake a joint venture) or commercial networks (which have the objective of sharing resources and information related to marketing campaigns, logistics networks, market information; Escolá et al., 2021). This study focuses on two of these types of networks: commercial and technological. This constitutes an innovative element of this article, as, with very few exceptions, it is unusual for studies to analyze different types of networks (Escolá et al., 2021; Hohenthal et al., 2014). This is why, to analyze the effect of clusters on the internationalization process, this paper includes two different measures regarding the participation of the firm in domestic clustered networks[3].

Active commercial collaboration (Commercial_ Domestic Networks) is calculated as the average value of three variables that indicate whether a firm has collaborated with customers and distributors. To measure this variable, the items are "have contracts and alliances with conventional distributors," "have agreements and alliances with wholesalers," and "have information about customers." The respondents are asked to compare their firms with those of their competitors and the responses are measured on a scale from 1 (*much weaker than*) to 5 (*much stronger than*). Previous research has already argued that successful firms "add value by collaborating with suppliers, business partners allies, and customers" (Chetty & Holm, 2000; 78), and that vertical network (those formed between firms along the supply chain that include suppliers and customers) improve export performance more than the horizontal networks (relationships with firms competing in the same market; Easmon et al., 2019).

Active technological collaboration (Technological_ Domestic Networks) is a variable that indicates whether the firm has "collaboration with public research bodies or other firms." It is measured comparing the situation of the firm with that of its competitors, on a scale from 1 (*much weaker than*) to 5 (*much stronger than*). Some studies have previously used this variable, such as Batterink et al. (2010), Kühne et al. (2015), or McAdam et al. (2015), and in fact, collaboration in innovation is achieving importance for the agri-food businesses, as it allows SMEs to be able to obtain the updates they need in terms of procedures or capital (Gellynck et al., 2007; Murdoch, 2000).

This paper uses a new measure of the foreign commitment of domestic clustered networks, a proxy based on the degree of the cluster's internationalization and the degree of the company's participation in the network (a recurrent theme in international business literature with a network perspective). The literature on the degree of a firm's internationalization commonly uses a variable for capturing the geographic scale and knowledge of the firm's foreign operations (Capar & Kotabe, 2003; Grant et al., 1988; Rugman, 1979). Other authors that have used similar indexes to measure the degree of internationalization of a firm are Fernández-Olmos (2011, 2015), Grant et al. (1988), and Pangarkar (2008).

The variable Degree of Internationalization of the Domestic Clustered Network quantifies the degree of internationalization of the PDO and is the ratio between its export intensity and the geographical diversification of its exports. Thus, the numerator is calculated as the proportion of foreign market sales of each PDO, which includes the sales for all the wineries included in that PDO, which adds up to 1.0. The denominator is calculated as the sum of the squared percentage of foreign market sales in each world area (i.e., proportions are based on foreign sales and not total sales, which adds up to 1.0). The criterion applied is used by the Spanish Ministry of Agriculture, consisting in dividing the world into five different geographical areas: EU, Rest of Europe (non-EU), the Americas, Asia, and Oceania.

$$\text{Degree of internationalization} = \frac{\text{Proportion of foreign sales}}{\sum_{i=1}^{n}\left(\text{Proportion of sales in area}_i^2\right)(0 \le H \le 1)} \times 100, \quad (1)$$

where n = number of geographical areas.

In the model, this variable is used first independently and then in a multiplicative way. In the latter case, the degree of internationalization is alternatively multiplied by each of the variables of afore-described network collaboration, namely Commercial collaboration and Technological collaboration, giving rise to (a) Commercial_Domestic_Network_*Degree Internationalization and (b) Technological_Domestic_Network_*Degree Internationalization. This implies that if the

[3]In this study, we use subjective scales to as certain business resources as network relationships. There are Likert scales, where companies are compared with their competitors. Subjective scales have been used in many empirical studies (Ferrer & Villanueva, 2020; Ferrer-Lorenzo et al., 2018; Ortega, 2010; Spanos & Lioukas, 2001; among others), and several studies confirm the statistical confluence of subjective and objective scales (Dess & Davis, 1984; Richard et al., 2009; Santos & Brito, 2012). In the subjective scales, the comparison that the firm makes with its competitor is not usually with the closest company, but with the one that offers similar products in similar markets. This avoids localism in the responses and explains the statistical confluence of the two scales.

multiplicative variable is positive and significant, the effect of participating in a network is moderated due to the participation in networks with different degrees of internationalization.

5.1.2 | Domestic network control variables

The study introduces control variables that affect the characteristics of the business network. In the same vein as the study by Marsden (1990) and those recently conducted by Bai and Johanson (2018) or Montoro-Sánchez et al. (2018), two control variables are introduced to measure the concentration and diversity of the network.

The clustered domestic networks in the wine industry in Spain are similar to the Marshallian industrial district. In this case, the proximity between companies facilitates the movement of individuals from one firm to another (both employers and workers coexist in a community) and benefits are derived from the transfer of information in the industry as are internationalization opportunities. The concentration of companies in a network gives rise to a greater specialization in industries, a reduction in costs, economies of scale and scope, and more efficient logistics systems, favoring the internationalization of the companies (Jank et al., 1999). Within this context, the study proposes the measurement of the density of the network by calculating the concentration of output per square kilometer (a Hoover-type variable based on the agglomeration economies approach). According to Dekle (2002), it is a good measure of density, because it captures the intensity of the resources used by the wineries, such as human and physical capital relative to the physical space. This measure is also in keeping with the measures used and examined by other cluster studies when analyzing district industrial structure. For example, Becchetti and Rossi (2000) use (i) Ulpop (number of productive units per 1000 inhabitants) and (ii) Addpop (number of workers per 1000 inhabitants).

To do this, the Domestic Network Concentration of the 76 wine clusters has been calculated as the proportion of wine output over the land area in square kilometers in the PDO. The data are supplied by the Ministry of Agriculture from the 2015 campaign.

$$\text{Domestic Network Concentration} = \frac{\text{Industry output (hl)}}{\text{Land area in Ha}}. \tag{2}$$

The intense globalization process and the technological revolution have obliged companies to be able to adapt quickly to frequent changes. Companies need to be flexible and able to innovate with the adaptation and development of new products. In this sense, the access to a network of relations with other companies from different industries with a variety of knowledge could provide opportunities of accessing complementary resources and knowledge (Gilsing et al., 2008). According to Diez-Vial and Montoro-Sanchez (2017), belonging to a diverse company network facilitates the internationalization process of firms. Following Frenken et al. (2007), Domestic Network Diversity (Entropy) is considered as the distribution of differences between the cognitive aspects of the firms in the network, measured by differences in the Nomenclature statistique des Activites economiques dans la Communaute Europeenne—Statistical classification of economic activities in the European Community (NACE) codes of the Iberian Balance Sheets Analysis system (SABI, 2017) databases referring to the municipal district where the 76 business networks are located (PDOs).

$$\text{Domestic Network Diversity} = Pi\left(\ln\frac{1}{Pi}\right),$$

where *Pi* represents the number of firms in the wine industry (1120 NACE Code) as a percentage of the total firms in all of the "*n*" 4-Digit NACE codes in the municipal district where the PDO is located.

5.1.3 | Firm control variables

In accordance with Dunning's (1980) resource theory and eclectic paradigm, firms with resources and capabilities can exploit their advantage in foreign markets (Lu & Beamish, 2004).[5] Consequently, the model includes a large number of control variables that characterize the tangible and intangible resources of the firms. Many research studies on international business find that the presence of potentially endogenous explanatory variables can be solved by including control variables, as suggested by Reeb et al. (2012).

First, this study will explain the variables that capture intangible resources (physical and financial; Barney, 1991). Thus, the empirical model includes the approximate firm size (Size) using the volume of assets, measured according to a seven point scale from (1) "*less than 50,000 euros*" (minimum level) to (7), "*more than 20 million euros*" (maximum level). A positive relationship is expected to be found between the size of the company and export performance in accordance with other studies (e.g., Abella & Salas, 2006).

The study also introduces debt level as a proxy of the lack of financial resources, which is measured by the ratio of equity to total assets. This ratio explains how the company can finance its activity with its own resources and the degree to which it depends on external agents. There is a consensus among authors that SMEs prefer, primarily, self-financing and reinvesting profits to any other source of financing (Poutziouris, 2001). A low proportion of own resources would therefore tend to slow down the internationalization process. Therefore, this variable is expected to have a negative effect on exporting (Benito-Hernandez et al., 2014).

A second group of variables seeks to control the access to the intangible resources that influence exports (e.g., Abella & Salas, 2006). The paper includes the experience of the firm proxied by the "Age" of the firm. The effect of the age of a firm on the internationalization process is ambiguous. On the one hand, older companies are usually more stable than younger companies in their provision of resources; therefore, they have a greater capacity (Zahra & George, 2002). Young firms, on the other hand, are not as rigid and they have the advantages of the learning effect (Autio et al., 2000). Age is calculated using the number of years (plus one) from the year the firm was established up to the year in which the survey is carried out (Anderson & Reeb, 2003). In terms of age as a means to measure the firm's learning effect, there are again nonconclusive results. As an example, Welch and Wiedersheim-Paul (1980) find a positive effect of age on export intensity, whereas others find a negative relationship (Ursic & Czinkota, 1984) or no significant relationship (Abella & Salas, 2006).

The model also includes "Innovation Resources" that measure the development of new products, techniques and processes, forming a multiplicative variable of product innovation × process innovation. These two variables were measured on a Likert scale, whereby the managers evaluated the position of the company, from 1 "*much weaker than the competitor*" to 5 "*much stronger than the competitor*." Innovations enable firms to improve their possibilities to expand into foreign markets (Cassiman & Golovko, 2011; Halilem et al., 2014). Several studies have identified the relationship between innovation and export performance as one of the fundamental elements in the internationalization of the firm (Cassiman & Golovko, 2011; Halilem et al., 2014).

To include more intangible resources that are considered in the literature, this paper has conducted a principal component analysis (PCA) to extract one variable for each resource studied (Ferrer-Lorenzo et al., 2018; Spanos & Lioukas, 2001). Thus, technological resources are evaluated with four items, human resources with five items, managerial resources with seven, marketing resources with four, and quality resources with three items. All the resources variables have been measured on a Likert scale, whereby managers evaluated the position of the company, from 1 "*much weaker than the competitor*" to 5 "*much stronger than the competitor*." Supporting Information: Appendix 1 shows the analysis of the principal components, the percentage of variance explained, the

[5]The literature on exports has been focusing on determining which factors are critical for a firm to decide to export and which are the variables that improve export results (Abella & Salas, 2006; Czinkota & Johnston, 1983; Doglosu-Guner, 2001; Katsikeas & Piercy, 1993).

TABLE 1 Percentage of total explained variance, Cronbach's α, and KMO of the PCA for Technological, Human, Managerial, and Quality Resources

Resource	% Total explained variance	Cronbach's α	KMO test
Technological	57.91	0.751	0.713
Human	71.73	0.901	0.867
Managerial	61.65	0.895	0.870
Marketing	72.94	0.873	0.796
Quality	74.29	0.811	0.664

Abbreviations: KMO, Kaiser–Meyer–Olkin; PCA, principal component analysis.
Source: own elaboration.

Kaiser–Meyer–Olkin (KMO) value and Cronbachs's α for all of the six resources analyzed. Table 1 shows the total variance explained, Cronbachs' α and the KMO test of each of the resources to which the PCA has been applied.

Previous studies have found a positive relationship between human resources and internationalization (Brush et al., 2002), as well as between technological, innovation, and marketing resources and internationalization (Abella & Salas, 2006). Companies with products of a higher perceived quality have a greater facility to export (Crozet et al., 2011). Furthermore, those firms with leaders who have greater management capacities are related to a higher level of exporting (Sousa et al., 2010).

5.2 | The Heckman–Probit model

The econometric strategy employed a Heckman-Probit model in a two-stage estimation procedure (Heckman, 1979). Two equations are estimated for this purpose. The first equation is estimated using a probabilistic model. This analyses the factors affecting the firm's decision to export, whereas the second considers the determinants of export intensity (percentage of export sales over total sales). First, all the models have been tested using the Heckman methodology with the inverse Mills ratio to take the problem of selection bias into account. Second, when the selection bias was not significant, the model was regressed again without including the Mills' λ. That is, a model in two stages, the first with the Probit model and the second with the linear regression. The use of the Heckman model allows us to ensure that the problem of selection bias is obviated, which is not possible when using a multivariate linear regression method directly.

Roberts and Tybout (1997), Bernard and Jensen (2004), and Bernard et al. (2012) describe the firm's decision to export as the result of a series of the firm's individual characteristics and the specific costs of entering each target market. As the aim is to analyze the influence of networks on a firm's exports, the model includes the participation of the firm in networks and some structural characteristics of the network, with particular focus on the network's degree of internationalization. This model also includes a large number of control variables with respect to the characteristics of the firm.

$$D_{i,t}^{exp} = \begin{cases} 1(\text{export}) \Rightarrow P(D_{i,t} = 1) = f(\text{Domestic networks, Degree of internationalisation, control variables}), \\ 0(\text{no export}), \text{ otherwise}, \end{cases}$$

where the dependent variable ($D_{i,t}^{exp}$) is a dummy variable taking the value 1 if firm i exported in year t and zero otherwise.

The second stage of the Heckman model, in the Equation (2), analyses the determinants of export intensity. There are four variants of the equation. The first and second are used to analyze active participation in commercial networks, with the variable degree of internationalization, either independently or as part of a multiplying commercial network. The third and fourth are used to analyze active participation in technological networks, with the variable degree of internationalization either independently or as part of a multiplying technological network:

For the commercial or technological networks, the model is:

$$\begin{aligned}&\text{Export\_Intensity}_i = \beta_1\text{\_Domestic\_Networks}_i\ (\text{Commercial or Technological}) + \beta_2\text{PDO}\\&\text{Degree\_Internationalisation}_j(\text{or PDO Degree\_Internationalisation}_j + \text{Domestic\_Networks}_i{}^{*}\ \text{PDO}\\&\text{Degree\_Internationalisation}_j)\\&+\beta_3\text{Size}_i + \beta_4\text{Age}_i + B_5\text{Innovation Resources}_i + B_6\text{Technological Resources}_i\\&+B_7\text{Human Resources}_i + B_8\text{Managerial Resources}_i\\&+B_9\text{Marketing Resources}_i + B_{10}\text{Quality Resources}_i\\&+\beta_{11}\text{Domestic\_Network\_Concentration}_j + \beta_{12}\text{Domestic\_Network\_Diversity}_j + U_{ij}\end{aligned}$$

The dependent variable in this second stage, Export Intensity, has been calculated as the logarithm of export sales. This measure of export intensity has been widely used in the literature. In the literature on Heckman model, the use of an exclusion variable is often required. The variable "lack of financial resources" was selected. This variable plays a role in the decision process but not in the intensity value. We had tested that this variable had significant effect in the probit equation, but not in the regression part.

Table 2 shows a summary of the variables used in the study, their description, the expected effect on the company's internationalization process and a statistical description of the variables.

Equation 2 is also estimated using a simultaneous quantile regression enabling us to describe the effect of export factors at different points of the degree of internationalization. Standard linear regression techniques summarize the average relationship between network collaboration and export intensity. This provides only a partial view of the relationship. However, we are interested in describing the relationship at different points in the conditional distribution and the quantile regression allows us to do this. Therefore, quantile regression is used in this paper to present more robust empirical evidence. This estimation is performed for the two models previously analyzed; the model that includes the commercial networks variable and the model including the technological networks variable.

5.3 | Dataset

The universe of wineries used for this study has been constructed by combining two different databases. The first is drawn from the Ministry of Agriculture, Fishing and Food for the 2015 campaign, containing information about the PDOs. Each company analyzed has been assigned to just one DO, although a firm may have affiliates in another DO or dependent companies. The authors consider that belonging to different PDOs does not generate bias in the results due to the low incidence of this situation in the overall context. In our case, 191 wineries only belong to 1 PDO (82%), 28 to 2 PDOs, 6 to 3 PDOs, 3 to 4 PDOs, 1 to 5 PDOs, 1 to 6 PDOs, 2 to 7, and finally 1 belongs to 8 PDOs.

The assignation of firms to the DOs has been carried out in accordance with the location of the company's head office, in other words, the assignation is geographic. The sample used is made up of wineries belonging to a PDO, all other wineries existing in the area but which do not belong to the PDO are not included.

The second Database provides information about the companies that make up our sample and has been constructed by the authors of this study. First, data were drawn from the SABI in section 11.02 of the Classification of Economic Activities for the year 2015. The population size was 2413 wineries. A survey was sent to the managers of these firms. This process took place between February and May 2016 and the data provided refer to

TABLE 2 Description of variables and expected effect on export performance

Variable	Description	Expected sign[a]	Mean	SD	Min.	Max.
Dependent variables						
$D_{i,t}^{exp}$ (1st stage)	Variable dummy – Indicates whether the company exported		0.859	0.347	0	1
Export_Intensity (2nd stage)	Log of export sales		2.620	5.90e + 08	0	5.07e + 09
Domestic Network collaboration variables						
Commercial Domestic Network	Indicates whether the company has collaborated with suppliers and clients in marketing	(+)	2.620	0.798	1	5
Technological Domestic Network	Indicates whether the company has collaborated with institutions for developing innovations	(+)	2.358	1.013	1	5
PDO Degree Internationalization	The PDO Degree of Internationalization Index	(+)	0.668	0.482	0	2.47
Commercial Domestic Network PDO Degree Internationalization	Indicates whether the company has collaborated with suppliers and clients in marketing the PDO Degree of Internationalization Index	(+)	1.724	1.407	0	9.06
Technological Domestic Network PDO Degree Internationalization	Indicates whether the company has collaborated with institutions for developing innovation the PDO Degree of Internationalization Index	(+)	1.559	1.403	0	7.41
Structural characteristics of the domestic network variables						
Domestic_Network_ Diversity	$Pi(\ln\frac{1}{Pi})$ Being Pi firms in the Wine (1120) NACE code as a share of total firms in all 4-digit codes in the network	(+)	−38.148	69.585	−356.17	0.36
Domestic_Network_concentration	Wine Output (hl) per area (ha) in the network	(+)	24.869	18.320	0	68.31
Control variables						
Size	Amount of Assets	(+)	2.559	1.32	1	7
Age	Age of the firm.	(+ or −)	35.015	32.923	2	186
Lack of Financial_Resources	Ratio of equity to total assets	(−)	4.137	1.054	1	5

(Continues)

TABLE 2 (Continued)

Variable	Description	Expected sign[a]	Mean	SD	Min.	Max.
Innovation resources	Indicates whether the company has developed product and/or process innovations	(+)	9.832	5.203	1	25
Technological resources	Principal Component Analysis of Efficient and effective production department -Technological capabilities and equipment -Economies of scales. Technical experience	(+ or −)	0.707	0.982	−2.57	2.65
Human resources	PCA of Employee evaluation system -Occupational training and personnel qualification -Plans for growth and promotion of staff -Recruitment and staff selection -Monetary reward system	(+)	−0.019	0.913	−2.93	2.28
Managerial resources	Principal Component Analysis of Strategic planning -Efficient organizational structure -Coordination -Ability to attract creative employees -Work climate -Knowledge and skills of employees	(+)	0.006	0.934	−3.46	2.69
Marketing resources	PCA of advantageous relationships with distributors -Control and access to distribution channels -Market knowledge Customers "installed base"	(+)	0.034	1.013	−2.10	2.56
Quality resources	PCA of establishment of measures to ensure the quality of products and/or services allowed -Process control and decision making based on the behavior of the defined indicators -The existence of quality certificate	(+)	0.010	1.007	−2.93	2.30

Abbreviations: NACE, Nomenclature statistique des Activites economiques dans la Communaute Europeenne - Statistical classification of economic activities in the European Community; PCA, principle component analysis.

[a]Expected sign for both levels of analysis export status and export intensity

the situation of the firms in December 2015. Finally, 264 surveys were considered as being valid (of which 233 answered the questions about exports). The sampling error, based on the standard error of the mean, calculated for the case of finite populations for a confidence level of 95% and $p = q = 0.5$, was 5%. The final sample adequately reflects the structure of the sector in terms of company size and the sector's reality.[6]

6 | RESULTS

Before estimating the models described in the previous section, a preliminary analysis was conducted to determine the relationships between each of the independent explanatory variables used in the regression models. Table 3 shows the correlation matrix for each variable.[7]

If we use a model that contemplates Networks, PDO Degree of Internationalization and also the interactive effect of Network and PDO Degree of Internationalization, we obtain a variance inflation factor (VIF) value that is higher than 10, which indicates problems of multicollinearity (see Table 4). We centered these variables around the mean before assessing the interactions between them to correct the statistical problem, following a common technique recommended in the literature (Cohen et al., 2003).

For each of the two stages, the paper presents four first models (Table 5). Models one and two (Columns 1, 2, 3, and 4) contemplate the commercial domestic network variables, with the effect of the degree of internationalization independently and the multiplicative model that contemplates with mean centered data the Domestic Network, PDO Degree of Internationalization and Domestic Network * PDO Degree of Internationalization (terms of its interaction). Models 3 and 4 (Columns 5, 6, 7, and 8) offer the same results for technological domestic networks instead of commercial domestic networks. We have also rerun the models with these two variables in mean differences and without the interactive effect to ensure the consistency of our results. As we can observe in Supporting Information: Appendix 2, the results are similar to those presented. For the second stage of the Heckman model, two additional models with quantile regressions are offered (see Table 6).

The first stage of the Heckman model is shown in Table 5 in the first, third, fifth, and seventh columns, which present the regression results of the Probit random effect. The second stage models are in Table 5 in the second, fourth, sixth, and eighth columns.

As the model shows, the variable that measures the effect of the Commercial Domestic Networks is significant in the model that presents the effects separately (Column 2) and the model with the interactive terms (Column 4) but only on the second stage, not on the exporter status (Columns 1 and 3). Commercial domestic network * PDO Degree of Internalization is significant in the models with the interactive effect, also only for the export intensity (Columns 3 and 4). For both domestic networks, the PDO degree of internationalization is only statistically significant (Columns 3, 5, and 7) on the export status (for commercial networks only for the model with interactions). However, the variable that measures active participation in technological networks is not significant in any of the models

Active participation in domestic clustered networks (H1a. Commercial network or H1b. Technological network) is not found to have a positive impact on the export status of SMEs. Export status depends mainly on participating in a PDO with a high degree of internationalization.

The statistical significance of Commercial_Domestic Networks allows us to confirm Hypothesis 2a (the active participation in commercial domestic clustered networks has a positive impact on the export intensity of SMEs), but

[6]The wineries of the sample produced around 17% of the wine made in Spain in 2015 and they represent 14% of the population which is the same order of magnitude as the values reported by Baruch and Holtom (2008) for the industrial sector. The appendix shows how the sample is adapted to the typology of the sector and the survey process.

[7]The Kolmogorov–Smirnov test shows that the variables do not show normality in distribution. Consequently, this paper cannot employ Pearson's correlations using Spearman's correlations.

TABLE 3 Spearman correlations for each of the independent variables used

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Exports	1.00																
2. Commercial Domestic_Network	0.37*	1.00															
3. Technological Domestic_Network	0.18	0.43*	1.00														
4. Commercial_Domestic_ Network * PDO Degree International.	0.24*	0.25*	0.09	1.00													
5. Technological_Domestic_Network * PDO Degree International.	0.16	0.09	0.36*	0.86*	1.00												
6. Size	0.59*	0.31*	0.16	0.15	0.11	1.00											
7. Age	0.26*	0.17	0.04	0.28*	0.20*	0.23*	1.00										
8. Lack of Financial_Resources	−0.23	−0.13	−0.07	−0.06	−0.03	−0.13	−0.01	1.00									
9. Innovation_Resources	0.42*	0.46*	0.44*	0.06	0.07	0.34*	0.00	−0.12	1.00								
10. Tecnological_Resources	0.33*	0.45*	0.34*	0.09	0.06	0.35*	0.09	−0.15	0.56*	1.00							
11. Human_Resources	0.19*	0.47*	0.25*	0.13	0.05	0.14	−0.09	−0.17	0.41*	0.40*	1.00						
12. Managerial_Resources	0.28*	0.31*	0.24*	−0.02	−0.04	0.23*	−0.03	−0.03	0.41*	0.38*	0.56*	1.00					
13. Marketing_Resources	0.31*	0.60*	0.39*	0.11	0.06	0.30*	0.07	−0.07	0.52*	0.47*	0.46*	0.38*	1.00				
14. Quality_Resources	0.30*	0.32*	0.34*	−0.03	−0.01	0.31*	−0.13	0.01	0.50*	0.53*	0.36*	0.48*	0.38	1.00			
15. Domestic_Network_Concentration	0.00	−0.11	0.00	0.21*	0.26*	0.05	0.12	0.09	−0.03	0.03	−0.05	0.02	−0.01	−0.10	1.00		
16. Domestic_Network_Diverstity	0.15	−0.12	−0.02	0.22*	0.26*	0.10	−0.02	0.05	0.01	−0.04	−0.14	0.00	−0.01	−0.06	0.37*	1.00	
17. PDO Degree International	0.10	−0.10	−0.03	0.88*	0.85*	0.01	0.23*	−0.01	−0.08	−0.07	−0.03	−0.13*	−0.09	−0.17*	0.28*	−0.21*	1.00

Abbreviation: PDO, protected designation of origin.

*Significant at the 1% level.

TABLE 4 Calculation of the VIF factor of multicollinearity for commercial domestic networks and technological domestic networks, for two types of model

Commercial domestic network				Technological domestic network			
Model 1 (Domestic_Network + PDO Degree of Internationalization)		Model 2 (Domestic Network + Domestic Network * PDO Degree of Internationalization + PDO Degree of Internationalization)		Model 1 (Domestic Network + PDO Degree of Internationalization)		Model 2 (Domestic Network + Domestic Network * PDO Degree of Internationalization + PDO Degree of Internationalization)	
Variable	**VIF**	**Variable**	**VIF**	**Variable**	**VIF**	**Variable**	**VIF**
Commercial Domestic_ Network	2.21	Domestic Network * PDO Degree of Internationalization[a]	13.19	Managerial Resources	2.08	Domestic Network * PDO Degree of Internationalization	8.44
Managerial resources	2.09	PDO Degree of Internationalization[a]	12.20	Human resources	1.94	PDO Degree of Internationalization	7.32
Human resources	1.99	Commercial Domestic_Network	4.40	Technological resources	1.84	Technological Domestic_Network	3.15
Marketing resources	1.92	Managerial resources	2.10	Innovation resources	1.80	Managerial resources	2.08
Technological resources	1.86	Human resources	1.99	Quality resources	1.74	Human resources	1.94
Innovation resources	1.74	Marketing resources	1.92	Technological Domestic_ Network	1.68	Technological resources	1.84
Quality resources	1.70	Technological resources	1.87	Marketing resources	1.61	Innovation resources	1.81
Size	1.43	Innovation Resources	1.80	Size	1.42	Quality Resources	1.75
PDO Degree of Internationalization	1.18	Quality resources	1.70	Domestic Network * PDO Degree of Internationalization	1.25	Marketing resources	1.64
Age	1.17	Size	1.43	Age	1.15	Size	1.44
Domestic Network * PDO Degree of Internationalization	1.06	Age	1.18	Domestic Network Concentration	1.06	Age	1.17

(Continues)

TABLE 4 (Continued)

Commercial domestic network				Technological domestic network			
Model 1 (Domestic_Network + PDO Degree of Internationalization)		Model 2 (Domestic Network + Domestic Network * PDO Degree of Internationalization + PDO Degree of Internationalization)		Model 1 (Domestic Network + PDO Degree of Internationalization)		Model 2 (Domestic Network + Domestic Network * PDO Degree of Internationalization + PDO Degree of Internationalization)	
Variable	**VIF**	**Variable**	**VIF**	**Variable**	**VIF**	**Variable**	**VIF**
Domestic Network Diversity	1.05	Domestic Network Concentration	1.08	Domestic Network Diversity	1.05	Domestic Network Concentration	1.07
		Domestic Network Diversity	1.07			Domestic Network Diversity	1.05
Mean VIF	1.62	Mean VIF	3.53	Mean VIF	1.55	Mean VIF	2.67

Note: Model 1 (Domestic Network + PDO Degree of Internationalization), Model 2 (Domestic Network + Domestic Network * PDO Degree of Internationalization + PDO Degree of Internationalization).

Abbreviations: PDO, protected designation of origin; VIF, variance inflation factor.

[a]VIF > 10 possible multicollinearity problems.

TABLE 5 Effects of Domestic Networks on the export status and export intensity of SMEs

	Commercial domestic network variables				Technological domestic network variables			
Variable	(1) Selection equation Probit	(2) Regression equation	(3) Selection equation Probit	(4) Regression equation	(5) Selection equation Probit	(6) Regression equation	(7) Selection equation Probit	(8) Regression equation
Domestic Network collaboration	0.1171 (0.2697)	0.4503** (0.2172)			−0.2554 (0.1791)	−0.1105 (0.1454)		
PDO Degree of Internationalization	0.5172 (0.3608)	0.3787 (0.2825)			0.7007* (0.3769)	0.3841 (0.2872)		
mcd_Domestic Network collaboration			0.0140 (0.2667)	0.38787* (0.2108)			0.0694 (0.1917)	−0.0418 (0.1433)
mcd_PDO Degree of Internationalization			0.7092** (0.3721)	0.1162 (0.2846)			0.6218* (0.3571)	0.3124 (0.2862)
mcd_Domestic Network * PDO Degree of Internationalization			−0.1509 (0.4238)	1.0812*** (0.2987)			−0.0901 (0.3421)	0.1853 (0.2647)
Size	0.3015** (0.1451)	0.5114*** (0.1181)	0.3561** (0.1524)	0.5062** (0.1171)	0.3059** (0.1536)	0.5521*** (0.1204)	0.2895* (0.1496)	0.5580*** (0.1147)
Age	−0.0061 (0.0041)	0.0089** (0.0038)	−0.0061 (0.0042)	0.0104 (0.0038)	−0.0065 (0.0044)	0.0095** (0.0038)	−0.0062 (0.0041)	0.0100** (0.0038)
Lack of Financial_Resources	−0.4333*** (0.1678)		−0.4241*** (0.1807)		−0.4410*** (0.1731)		−0.4055** (0.1666)	
Innovation_Resources	0.0860* (0.0486)	0.0373 (0.0324)	0.0799* (0.0478)	0.0514 (0.0324)	0.1057** (0.0523)	0.0478 (0.0338)	0.0857* (0.0502)	0.0459 (0.0327)
Technological_Resources	−0.1337 (0.2296)	−0.0152 (0.1680)	−0.0905 (0.2219)	−0.0466 (0.1630)	−0.1908 (0.2389)	0.0468 (0.1663)	−0.1542 (0.2297)	0.0634 (0.1668)
Human_Resources	0.0003 (0.3003)	−0.0465 (0.1995)	−0.1048 (0.2993)	−0.0604 (0.1929)	0.0811 (0.3025)	0.01809 (0.1963)	0.0676 (0.2909)	0.0229 (0.1973)
Managerial_Resources	0.1790 (0.2636)	0.2993 (0.2120)	0.1165 (0.2669)	0.3363* (0.2050)	0.0855 (0.2593)	0.3024 (0.2121)	0.0770 (0.2500)	0.2903 (0.2115)
Marketing_Resources	0.1158 (0.2401)	−0.2952 (0.1902)	0.2701 (0.2336)	−0.2882 (0.1843)	0.2827 (0.2352)	−0.0972 (0.1746)	0.1596 (0.2398)	−0.1178 (0.1757)
Quality_Resources	0.1613 (0.1831)	−0.0536 (0.1581)	0.1593 (0.1870)	−0.0406 (0.1582)	0.2581 (0.1939)	−0.0497 (0.1602)	0.1957 (0.1916)	−0.0349 (0.1607)
Domestic Network_Concentration	0.0001 (0.0080)	−0.0128* (0.0071)	−0.0016 (0.0079)	−0.0102* (0.0069)	0.0007 (0.0083)	−0.0142** (0.0071)	0.0011 (0.0080)	−0.0136** (0.0071)
Domestic Network_Diversity	−0.0251** (0.0105)	0.0025 (0.0020)	−0.0227** (0.0111)	0.0036* (0.0021)	−0.0258** (0.0116)	0.0025 (0.0020)	−0.0227** (0.0108)	0.0028 (0.0020)
Constant	0.7817 (1.0683)	14.28*** (0.7400)	1.4309 (0.9574)	15.59*** (0.7611)	1.486 (1.0472)	15.22*** (0.6390)	1.3836 (0.9074)	15.46*** (0.5219)
Mills λ	Nonsignificance		−1.1403* (0.6599)		Nonsignificance		Nonsignificance	

(Continues)

TABLE 5 (Continued)

Variable	Commercial domestic network variables				Technological domestic network variables			
	(1) Selection equation Probit	(2) Regression equation	(3) Selection equation Probit	(4) Regression equation	(5) Selection equation Probit	(6) Regression equation	(7) Selection equation Probit	(8) Regression equation
Observations	185	154	185	156	184	154	185	156
Wald χ^2		71.03		88.40		67.68		72.04
Prob > χ^2	0.0000	...	0.0000	...	0.0000		0.0000	...

Note: Errors are presented in brackets.

Abbreviations: PDO, protected designation of origin; SMEs, small and medium-sized enterprises.

***10% of the level of statistical significance. **5% of the level of statistical significance. *1% of the level of statistical significance.

TABLE 6 Effects of Domestic Networks on export intensity of SMEs by levels

	Commercial domestic network variables			Technological domestic network variables		
	Second stage			Second stage		
Variable	(1) QR25	(2) QR50	(3) QR75	(4) QR25	(5) QR50	(6) QR75
mcd_Domestic Network_collaboration	0.1005 (0.3205)	0.3645 (0.2914)	0.1819 (0.2420)	−0.0216 (0.2399)	0.1113 (0.1544)	0.0550 (0.1673)
mcd_PDO Degree of Internationalization	0.8032** (0.3856)	0.4715 (0.3022)	0.2544 (0.4453)	0.7323* (0.4255)	0.5273 (0.3643)	0.3607 (0.4136)
mcd_Domestic Network * PDO Degree of Internationalization	0.6783* (0.3944)	0.4794 (0.5630)	0.9788 (0.5982)	0.0481 (0.3279)	0.0387 (0.3202)	−0.0822 (0.3550)
Size	0.5317*** (0.2101)	0.7179*** (0.1849)	0.7715*** (0.1371)	0.6353*** (0.1957)	0.7934*** (0.1315)	0.7614*** (0.1530)
Age	0.0119** (0.0051)	0.0104* (0.0049)	0.00974* (0.0058)	0.0109* (0.0062)	0.0109** (0.0047)	0.0082* (0.0047)
Innovation_Resources	0.0413 (0.0510)	0.0083 (0.04395)	0.0009 (0.0433)	0.0350 (0.0545)	0.0113 (0.0457)	−0.0113 (0.0418)
Technological_Resources	0.0178 (0.2586)	0.1248 (0.1441)	0.1224 (0.1407)	0.0922 (0.2405)	0.1413 (0.2084)	0.0850 (0.1659)
Human_Resources	−0.1542 (0.2989)	0.0581 (0.2505)	0.0969 (0.3749)	−0.1699 (0.2932)	0.1662 (0.2938)	0.2366 (0.2905)
Managerial_Resources	0.5568 (0.4093)	0.2408 (0.2763)	0.1159 (0.3019)	0.5680* (0.3376)	0.1536 (0.2537)	−0.0006 (0.2709)
Marketing_Resources	0.0356 (0.3383)	0.0413 (0.1777)	−0.3765 (0.2892)	0.1734 (0.2770)	0.2199 (0.2139)	−0.1012 (0.2196)
Quality_Resources	−0.1603 (0.2825)	−0.0278 (0.2172)	0.1840 (0.1839)	−0.2582 (0.2617)	−0.0228 (0.1725)	0.2415 (0.1603)
Domestic Network_Concentration	−0.0062 (0.0083)	−0.0028 (0.008180)	−0.0156* (0.0083)	−0.0080 (0.0107)	−0.0081 (0.0085)	−0.0101 (0.0093)
Domestic Network_Diversity	−0.0006 (0.0032)	0.0011 (0.0021)	0.0015 (0.0021)	−0.0025 (0.0032)	0.0005 (0.0026)	−0.0010 (0.0031)
Constant	14.248*** (0.6988)	14.924*** (0.6353)	16.160*** (0.5859)	13.924*** (0.7072)	14.765*** (0.5682)	16.034*** (0.6158)
Observations	156	156	156	156	156	156
Pseudo R^2	0.2737	0.3282	0.3443	0.2383	0.3067	0.3234

Note: Errors are presented in brackets.

Abbreviations: PDO, protected designation of origin; SMEs, small and medium-sized enterprises.

***10% of the level of statistical significance. **5% of the level of statistical significance. *1% of the level of statistical significance.

in the case of technological networks the variable that measures them is not significant, so Hypothesis 2b is not verified.

The interaction of the Commercial Domestic Networks variable with the degree of internationalization of the PDO (Column 4) is statistically significant and the effect on the export intensity is positive. Therefore, active participation in commercial domestic clustered networks with a high knowledge of international markets generates opportunities for companies to take advantage of, to improve their exporting performance. Consequently, Hypothesis H4a is verified, whereas H4b is not verified.

With respect to the variables referring to the characteristics of the domestic network structure, the results show that domestic network concentration has no influence on the export status and the domestic network diversity has a negative effect on the exporting status of the SMEs. Domestic Network concentration has a significant effect (negative) in the second stage in the interactive model, for commercial and technological.

In summary, we have seen, on the one hand, that participating in commercial domestic clustered networks affects export intensity. On the other hand, when domestic networks have a high degree of internationalization, this favors the propensity to export also in the case of commercial and technological domestic networks. Finally, the active participation in domestic networks with a high degree of internationalization has a positive impact on the export intensity.

With respect to the control variables of the firm, there are two differentiated groups: tangible and intangible resources. Considering the former, the study confirms the key role of size, which has a positive effect on the exporting status and export intensity. Internationalization requires access to the appropriate resources and larger firms find it easier to expand their resources and take risks (Erramilli & Rao, 1993). The model captures the financial situation in the first stage. According to Chen and Yu (2011), the lack of financial resources can negatively interact with exports because of the agency problems that they can generate. In this respect, as exporting implies obtaining part of the profits from abroad, the more a company depends on exports, the more difficult it will be for local investors to analyze and predict its activity (Chen and Yu, 2011).

With respect to intangible resources, innovation resources should be highlighted. These have a positive relationship with exporting status but not with export intensity (see Column 3). The age of the firm, meanwhile, has a positive effect on export intensity. The rest of the resources (technological, human, quality, and marketing) are not relevant in any of the four models; Columns 1–8. The empirical results are not conclusive in terms of the effects of the control variables on export performance. Next, we estimate quantile regressions so as to analyze the heterogeneous behavior of collaborative domestic networks in SMEs of different sizes (Table 6). The simultaneous quantile regressions are conducted using the bootstrap method with 200 iterations[6] and the following quantiles: 25%, 50%, and 75% that are presented in Table 6 (QR25, QR50, and QR75, respectively).

If we look at Quantile 25 (QR25), we can see that the variable that measure the effect of active participation in commercial networks on export intensity (Commercial_Domestic Networks multiplied by the Degree of Internationalization of the PDO) is statistically significant and has a positive effect, implying that these collaborative networks are therefore one of the factors that favor the internationalization of SMEs in the early stages of this process. On the other hand, we can observe that the effect of collaborative networks is diluted in the highest quantiles which represent more intense exporters. This result highlights the importance of belonging to an active domestic clustered network with a high degree of internationalization when a company is initiating its external market operations. This is when the greatest benefits may be reaped from the network. When a large proportion of its sales are exported, the company has acquired sufficient previous experience which makes belonging to a network less important.

The results partially support Hypothesis 2a, as the active participation in commercial domestic networks with a high degree of internationalization has a positive effect in the early stages of the internationalization process. Hypothesis 2b is not verified (the participation in technological domestic networks has a positive impact on the

export intensity and export intensity of SMEs; see Table 6 [QR25, QR50, and QR75]). Export status depends mainly on participating in a PDO with a high degree of internationalization see Table 6 (QR25).

With regard to the control variables, overall, the results confirm that larger firms are most intense in exports. The age factor also has a positive effect, but less significant than size. With respect to the resources analyzed, it is worth highlighting the significance of the management resources in the first stages of exporting and how this factor becomes diluted over time (see Table 6, Column 4). The rest of the resources and characteristics of the domestic network in terms of concentration and diversity are not significant.

7 | DISCUSSION AND IMPLICATIONS

The objective of the paper is to analyze the relationship between an SME belonging to an agrifood domestic clustered network with a strong degree of internationalization and its probability of exporting and the intensity of its exports, based on network theory found in international business literature. Whether to export or not, depends mainly on the degree of internationalization of the network. However, exporting something is not enough to achieve a significant degree of internationalization. The results show that to achieve high export intensity it is important to belong to an active commercial domestic network with a high international commitment, particularly in the first stages of the internationalization process. In our case, participation in a technological domestic network has no influence on either export status or export intensity. The fact that only the participation in technological domestic networks, assimilable to the knowledge that this participation in a technological network confers to a firm, is not relevant to improve export status or intensity in the Spanish wine sector has already been pointed out in other studies (e.g., Ferrer-Lorenzo et al., 2018). Our work highlights the need for this participation to interact with belonging to a network with a high degree of internationalization.

Networks have the potential to be good instruments to increase the export activity of SMEs provided that the firms are committed to the network and particularly if these networks have a high degree of internationalization. This macro element is complemented by the micro elements to explain the relationship between the network and the export performance of the firm. In this regard, the findings show that certain business characteristics, such as size and innovation are key elements in the internationalization of agrifood SMEs, and have a positive impact both on the export status and export intensity.

In this line, this paper places special emphasis on the level of knowledge that agrifood commercial domestic networks have of international markets so as to identify opportunities for the internationalization of SMEs. Internationalization is difficult for small firms. This is why there is a new line of research that is attempting to find alternatives to compensate for the lack of size, focused on the benefits of belonging to a network, as the network can help the firm to acquire the knowledge and resources it lacks to develop its internationalization process (Coviello and Munro, 1997; Johanson & Mattsson, 2015), particularly for small firms (Johanson & Mattsson, 2015; Vahlne & Johanson, 2013). But very few studies have been published on this topic, especially in the agrifood sector and this study seeks to contribute to reducing this gap in the literature. In fact, the principal results of the empirical study further then knowledge in these two directions.

Size is always a key element in any stage and model. However, participating in an agrifood network, particularly in one with a high degree of internationalization, is also a key factor in any stage of the internationalization process and for any size of international business. The study has shown that belonging to commercial rather than technological networks is more important.

The study presents evidence that collaborating in commercial networks that are highly committed to internationalization accelerates the internationalization process of firms. The paper offers theoretical implications. First, collaboration networks are key elements in the internationalization process as they allow synergies to be created. This study uses a new variable to measure the degree of the internationalization of the network and to

observe the effect of this variable on the internationalization process. This paper contributes to the network approach by studying not only the importance of the nature and characteristics of the network, but also the firm's characteristics, combining micro and macro factors in agribusiness.

The findings also have practical implications for SMEs. Firms have to build networks with a high degree of internationalization, in terms of both volume and scope. Developing this type of network can help firms in the agrifood industry to overcome these challenges, increasing the probability of exporting and the intensity of the exports.

One of the limitations of this study is the measurement of a firm's activity in the network. The technological network has been measured through subjective scales referring to participation in Research and Development projects and collaboration with public bodies. Although this gives us an idea of the ties that a company may have with these institutions, as indicated by Maurer and Ebers (2006) sometimes a company may have weak ties or connections and this reality is not captured by the questions in our survey. This would also apply to commercial activities that contemplate the formation of agreements with distributors and suppliers.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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