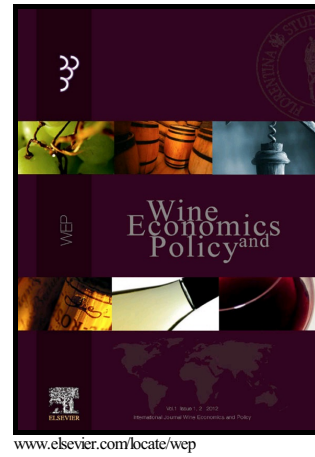


Author's Accepted Manuscript

The Renaissance of a Local Wine Industry: The Relevance of Social Capital for Business Innovation in DOQ El Priorat, Catalonia

María José Fernández Aldecuá, Yancy Vaillant, Esteban Lafuente, Jorge Moreno Gómez



PII: S2212-9774(17)30034-0

DOI: <https://doi.org/10.1016/j.wep.2017.10.001>

Reference: WEP92

To appear in: *Wine Economics and Policy*

Cite this article as: María José Fernández Aldecuá, Yancy Vaillant, Esteban Lafuente and Jorge Moreno Gómez, The Renaissance of a Local Wine Industry: The Relevance of Social Capital for Business Innovation in DOQ El Priorat, Catalonia, *Wine Economics and Policy*, <https://doi.org/10.1016/j.wep.2017.10.001>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

The Renaissance of a Local Wine Industry: The Relevance of Social Capital for Business Innovation in DOQ El Priorat, Catalonia

María José Fernández Aldecua

Instituto de Turismo, Universidad del Mar (UMAR)
Ciudad Universitaria, Santa María Huatulco. Oaxaca, México, 70989
Email: mjose@huatulco.umar.mx

Yancy Vaillant

Department of Strategy and Entrepreneurship. Toulouse Business School (TBS)
1 Place Alphonse Jourdain, 31068 TOULOUSE Cedex 7, France
Email: y.vaillant@tbs-education.org

and

Departamento de Gestión Organizacional, Universidad de la Costa
Calle No 58, 55-66. Barranquilla, Colombia

Esteban Lafuente

Department of Management, Universitat Politècnica de Catalunya (Barcelona Tech)
EPSEB, Av. Gregorio Marañón, 44-50, 2da planta. 08028. Barcelona. Spain
Email: esteban.lafuente@upc.edu

Jorge Moreno Gómez

Departamento de Gestión Organizacional, Universidad de la Costa
Calle No 58, 55-66. Barranquilla, Colombia
Email: jmoreno@cuc.edu.co

Abstract

The paper presents the results of a case study that aims to investigate whether the presence of both bridging and bonding social capital, acting together, can stimulate entrepreneurial innovation within the wine industry at a regional level. The study also investigates the manner in which both types of social capital interact to motivate such innovation. This is done through the analysis of the Catalan region of Priorat, and more specifically the entrepreneurial innovations that the region's wine sector experienced over a twenty year period at the turn of the current millenium. The results indicate that

both forms of social capital do not act in isolation, but on the contrary are jointly responsible for stimulating innovation within the wine-producing network.

Keywords: Social capital, social networks, regional innovation, entrepreneurs, Catalonia

JEL: O18, R11, Z13

1. Introduction

The economic development of certain regions has been associated with the existence of an innovative environment or learning region (Maillat and Lecoq, 1992; Maillat, 1995; Morgan, 2007). These concepts imply the social capacity to learn and circulate innovative knowledge via social networks. This innovative environment has been related with social capital, defined as the set of resources transferred between the members of a network of relations based on confidence and reciprocity (Westlund and Bolton, 2003; Peredo and Chrisman, 2006). So, the social capital of a region can act as a 'public asset' (Westlund and Bolton, 2003: 79), with the potential capacity to boost regions' innovative economic activity (Dakhli and De Clercq, 2004; Guth, 2005).

In the specific case of wine producing regions, innovation has been identified as the key success factor within the increasingly competitive wine industry (Dressler, 2013; Galbreath, 2016; Signori et al., 2017). To face the background of severe industry restructuring, competition and internationalization, numerous successful wineries have been able to count on and benefit from local social resources giving them the required capability to confront many of these challenges (Pomarici, 2016; Rendleman et al., 2016). This social capital has been repetitively linked, in wine-making regions of Italy, Chile and the US, to the competitiveness and innovativeness of their wineries (Giuliani,

2007; Hira and Swartz, 2014). Therefore a wine region's social capital is understood as key for the success of local wine producers. However, little is yet known of the mechanisms at play, which help wine producers of a specific social network transform the local social capital into innovative capabilities.

Theorists have established two types of social capital, bonding social capital and bridging social capital, and have analysed different socio-economic scenarios on the basis of their possible combinations (Flora et al., 2007). In this sense, knowledge within a focal region may be accessed and disseminated out of a certain composition of social capital that maximises the region's capacity to innovate and stimulate the local economic dynamics.

The research being presented here analyses the local business network of a wine producing region in which it is possible to verify a particular articulation between bonding social capital and bridging social capital in the context of the revitalization of wine-making activity, the basis of the local economy. The research provides empirical evidence on the relationship between social capital and innovation implemented by local wine producers over the twenty year period of study (1989-2009) that saw the renaissance of the Catalan wine-producing county of El Priorat, Spain.

By evaluating the mechanisms that convert a wine-region's social capital into the innovative capabilities of its wineries, this research aims to verify the empirical possibility of the simultaneous and articulated existence of bonding social capital and bridging social capital. More specifically, we analyse how both types of social capital were connected to the innovation process of the wine-making sector in El Priorat, Spain, during the twenty year period from 1989 to 2009 that saw the renaissance of the region's wine-producing industry.

The analysis of the relationship between social capital and innovation on a meso scale in complex regional contexts has been largely sidelined in prior studies (Westlund and Bolton, 2003; O'Brien et al., 2005). The Priorat case study enabled us to describe a certain specific articulation between the two types of social capital and how their integration contributes to business innovation processes; thus providing new knowledge on the mechanisms through which social capital fosters regional competitiveness for local wineries. This knowledge is of major interest to researchers and policy makers (Dressler, 2013).

2. The structural dimension of social capital

Against the background of the spectacular increase in social capital theory from the late 1980s up to the current decade, different voices have highlighted the danger and error of reducing the construct of social capital to elements such as networks, confidence, reciprocity and social norms (Lin, 2001; Adler and Kwon, 2002); elements that may well be related with social capital, but are not the essence of social capital. The core issue of the concept of social capital are the resources attached to social networks, i.e., the factors of economic (immediate or potential) use derived from specific interactions between individuals; links whose motives are not necessarily economic in nature (Lin, 2001: 9; Glückler and Doreian, 2016). In this respect, the links between the people belonging to a collective may be associated to affection, friendship, kinship, solidarity, etc. However, these links or interactions are not social capital per se because, for them to be so, they would need to produce some kind of specific resource of an economic nature.

In this research, we shall be employing a definition of social capital that draws upon this essential nucleus and the structural dimension of the construct:

“...We define social capital as the sum of present or potential resources adhered to, derived from and available in the network of relations that an individual or social unit possesses.” (Nahapiet and Ghoshal, 1998: 243).

Bonding social capital and bridging social capital

On the basis of the definition adopted for this study, we can note that the structural bases of social capital are social links or relations (Molina, 2005).¹ There is a theoretical distinction between the notions of strong links and weak links, where weak links have the capacity to indirectly relate the people in a network with the people moving in other networks (distant acquaintances or friends of friends) and strong links represent constant, and much closer, relations between relatives and intimate friends of the same network (Granovetter, 1973). Whereas weak links are more efficient for attaining valuable new resources such as non-redundant information (Granovetter, 1973), strong links are far less likely to offer resources or information that are any different to what one already has (Putnam, 2000: 22-23; Woolcock, 2002: 23).

¹ Although, as stated earlier, social capital is not limited just to networks of social links, as another element *sine qua non* of social capital are *resources*.

Weak links have been associated to what was later dubbed bridging social capital; while strong links have been considered the basis of bonding social capital (Putnam, 2000; Adler and Kwon, 2002; Woolcock, 2002). Generally speaking, bonding social capital is made up of the resources that flow between a group of people belonging to the same social network and whose links act like a kind of ‘social adhesive’ by generating loyalty, union and solidarity within the group (Putnam, 2000: 23). To the extent that bridging social capital exists, the resources available in separate networks are transferred by certain actors that are strategically positioned between them, thus connecting them and enabling the flow of resources that would otherwise be unreachable; these actors act as ‘bridges’ between the actual network and these other networks (Adler and Kwon, 2002: 19). Without these actor or bridges, local networks would be isolated and the circulation of resources and innovative ideas from one network to another would be blocked (Granovetter, 1973; Burt, 1992 and 1997).

Both types of links and both types of social capital are important (Lin, 2001; Woolcock, 2002; Westlund and Bolton, 2003). In fact, some authors are more explicit: both types of social capital are essential because one cannot substitute the other; both are valuable for the economic competitiveness of a region (Jack, 2005; O’Brien et al., 2005; Flora et al., 2007). It would be socially damaging if there was imbalance between the two (Flora et al., 2007). For example, high bonding social capital with low bridging social capital would lead to social isolation, a lack of innovation and economic development, inflexibility and intolerance of external groups, and the emergence of opportunistic groups. On the other hand, a lack of bonding social capital, but high bridging social capital would cause individualism with high transaction costs, social confrontation and other problems. In this latter panorama, innovations and the circulation of information would not be socialised and would only be obtained by a certain few individuals or economic units, for example by privileged actors who possess external links. The rest of the collective would be marginalised (Westlund and Bolton, 2003; O’Brien et al., 2005; Flora et al., 2007).

This is especially important in the context of the wine industry’s trend towards restructuring, competition and internationalization that characterised the period under study (Dana et al., 2013). The capacity of wineries for innovation and change to follow and keep up to industrial trends depend on their ability to remain in the state of the art in their field. Rural entrepreneurs have been found to use their networks of strong and

weak relations as ‘searchers and feeders’, linking to external and internal structures (or networks) to access valuable new information and resources (Jack, 2005: 1250-1251).

The analysis of the value of both types of social capital, whether acting in isolation or in a simultaneous and balanced fashion, for enhanced innovativeness and territorial development is the core of this study.

3. The Catalan region of El Priorat: a long history of crisis

The case of El Priorat drew our attention because, over a period of just two decades, it stopped being a rural region of ‘little economic significance’, where the scant population came across as having a ‘fatalistic and pessimistic attitude’ (Margalef and Tasia, 1985), and became a dynamic and entrepreneurial wine-exporting region. If other neighbouring regions (such as Garrigues and Terra Alta), which had similarly backward economies, failed to go through a similar process of economic reactivation, what factors and what actors were associated to such an extreme turnaround in the region of El Priorat?

The vines of El Priorat tend to ‘suffer’ as a result of the specific land, water and whether conditions of the area. But because of these conditions ‘the wines produced in this area have a very unique personality’ (DOQ Priorat website). The harvest yields are very low, at an average of 1kg per plant (as compared to yields of up to 8kg per plant in areas of central Catalonia).² Winegrowing in El Priorat is characterised by slopes with a gradient of more than 15% in most cases and up to 60% in certain estates. Such steepness means that the vineyards often cannot be worked with farm machinery. Together with the extreme hot and dry weather patterns, the El Priorat’s soil has a low organic content matter formed mostly by the disintegration of slate rock, which is called ‘llicorella’. This causes the roots of the vines to dig deep in search of moisture, water and nutrients.³

It was in the 10th century, when the Carthusian monks arrived in El Priorat, that vine-growing and the production of wine for domestic consumption began in the region. In the late 19th century, El Priorat experienced an increase in wine-making motivated

² Interview with the president of the Regulating Council of the Qualified Denomination of Origin Priorat, Señor Salustiano Álvarez, February 2007.

³ All the producing areas of the DOQ Priorat have the CERVIM designation (Centre de Recerca, Estudi i Valorització per a la Viticultura de Muntanya an agency that works for the valuation and preservation of mountain viticulture) that certifies a series of common characteristics that give rise to the term ‘heroic’ viticulture. This is defined by a number of conditions such as orographic conditions with little mechanization; small vineyards, divided and often organised on terraces; producers with a surface of enclosed farmland; and, the existence of adverse weather conditions (DOQ Priorat website).

by the rise in wine prices resulting from the fall in production in France⁴ (Margalef and Tasia, 1985: 57-61). In 1894, El Priorat's prosperity suddenly ended as a consequence of the phylloxera plague that devastated all of the region's vineyards. The local vines and wine industry, the area's main economic activity, were completely wiped-out, leading to a mass out-migration of El Priorat's population. In the second decade of the twentieth century, only a quarter of El Priorat's pre-phylloxera population remained. Those resilient enough to remain replanted resistant vines, but only a fraction of the number that once existed in the region (from 20,855Ha of cultivated surface area of vines in 1900, to 2,613Ha in 1989) (Margalef and Tasia, 1985; Instituto de Estadística de Catalunya, www.idescat.cat). Because of the small remaining number of producers and the fact that they had to reinitiate their wine industry from scratch, the residents organised themselves in producer cooperatives in order to jointly process their grape into wine and market it within the regional urban centres. They adapted their wine to the market demand of the time and produced a low quality wine that could be sold at a popularly affordable price demanded by the low-income urban mass-consumers. This model persisted throughout most of the twentieth century.

Early efforts to re-launch El Priorat as a wine producing area and consolidate the region around its main produce have existed since the first half of the twentieth century. A significant milestone was the establishment of the Denominación de Origin Priorat in 1954, one of the first such appellation in Spain, that aimed to give greater visibility to the wines produced in the area (DOQ Priorat website). This geographical indication of origin gave protection under Spanish law to the wines produced within the designated Priorat territory following the standards established by the DO's regulatory body (Hudin & Varela Serra, 2015).

With such a wine dependent history, El Priorat is found to have a wide wine-production human capital base, which has survived in the region despite high emigration rates and the ageing of its population. These small business owners had the necessary production means: land, vines, cooperatives with facilities and equipment. Yet, a whole century passed before the sector was reactivated. In El Priorat, the ultimate cause for the economic decadence observed from 1894 to 1990 was not the phylloxera, a plague that was dealt with quickly, but the low value-added of wine (Margalef and

⁴ At this time, a plague (the phylloxera) was brought to Europe on vines brought from America, and devastated the French vineyards.

Tasias, 1985). Before the last decade of the 20th century, El Priorat wine was known to be a popular and low status wine sold mostly in bulk at the regional market and in some taverns in Barcelona. It was low in price and quality.

Until the late 1990s, the quality and sophistication of its tastes, i.e. the refined preferences of the most demanding segments of wine consumers, were not considered to be a key element for promoting the identity or differentiation of the product. Meanwhile, neither did the few wine-producers and members of cooperatives in El Priorat have much idea of the commercial value of their wines in the gourmet markets of the sector. It is a fact that, until the 1990s, very few wine-producers in El Priorat had the knowledge, information and conditions to identify the new demands of external markets, and therefore be able to appreciate the potential of their wines.⁵

We suggest that—prior to the wine-making boom in El Priorat during the last decade of the 20th century—this strategic information was missing due to the lack of bridging social capital in the region: there were no bridging agents to transfer the required knowledge. The native producers of El Priorat were organised in cooperatives in which grapes cultivated by the members were indiscriminately bulked together producing a wine of low aggregate value using a production process that had not changed for over a century. There was a need to innovate in terms of business strategies and wine production processes in order to access the global market. But without the bridges required to obtain information from the international business context, i.e. without bridging social capital, said innovation was not possible.

The first bottles of wine produced as part of an innovative entrepreneurial strategy appeared on the market in the early 1990s and were the result of the work of four people from outside of the region, who joined forces to conduct their entrepreneurial project: the creation of wines aimed at knowledgeable segments of the market that were willing to pay high prices in exchange for a unique product. A certain recuperation of the region's wine-making sector became evident a few years later, in the late 1990s. One indicator of the recovery of the sector was the notable increase in the number of wineries whose product carried the Denomination of Origin Priorat; this indicates the increasing mood of optimism sensed among small entrepreneurs, on the one hand, and large investment companies, on the other (see Figure 1). By 2008, production in El Priorat had reached 27,698 hectolitres of wine coming from 4,796

⁵ Interview with the president of the Regulating Council of the Qualified Denomination of Origin Priorat, Señor Salustiano Álvarez, February 2007.

tonnes of locally harvested grapes; mostly garnacha tinta (37.8%) and cariñena (25%) varieties (DOQ website). This increase in production came from an increase in cultivated area. Total production increased despite the growing emphasis on quality production led to lower harvest yields corresponding in 2008 to 2,700 kg of grapes per hectare equivalent to an average of only 16 hectoliter of wine per hectare (DOQ Priorat) with some producers having yields of only around 5 hectoliter per hectare (Robinson, 2006).

In 2009, the Spanish administration recognised the important qualitative transformation of the Priorat wines that occurred at the turn of the millennium by elevating its status to a Denomination de Origin Calificada (DOCa, although Priorat wines usually label themselves with the Catalan language equivalent DOQ) (Hudin & Varela Serra, 2015). The DOQ provides greater guarantees of quality standards that are certified and monitored by the DOQ Priorat Regulatory Council. The Regulatory Council is a legal entity formed by wine producers and members of the local administration that, mandated by Spanish Law and in parallel with EU regulations, certifies the registration of El Priorat's wineries and vineyards. This Council also certifies the quality of the products obtained from both the vineyard and the cellars (grapes and wines) (DOQ El Priorat: www.doqpriorat.org).

Specialists in studies of the rural regions of Catalonia agree that El Priorat has gone through an "extraordinary revitalization" of its wine-making sector. In less than half a decade (1999-2003) the number of companies had increased by 18%, much higher than neighbouring counties and well above the Catalan average (12% at this time) (Rosell et al., 2006: 162).

--- Insert Figure 1 about here ---

4. Methodology

This research employs the case study technique of exploratory-descriptive scope (Eisenhardt, 1989). The proposed methodology is appropriate because case studies are particularly helpful when availability of empirical evidence on the subject is limited (Santos and Eisenhardt, 2005). Similar to Gomes et al., (2016) and Bigdeli et al. (2017), we adopted the case study approach based on the industry analysis of multiple firms to enable the systematic analysis of behavioural patterns in businesses operating in the

same industry, thus generating better-grounded and more comparable results than are possible using a single case study analysis (Eisenhardt and Graebner, 2007).

We therefore selected a theoretically driven sample (Eisenhardt, 1989: 537) made up of a group of wine-making entrepreneurs in El Priorat. For that reason, the data collection techniques were of a qualitative nature: 1) semi-structured interviews to wine producers, 2) direct observation and 3) analysis of documentary sources.

To generate the bonding social capital network among native wine-producers, part of the data was processed using Social Network Analysis. The rest of the information was organised into tables and narratives, which help analyse the strength of bonding social capital links and external strategic links (bridging social capital).

Theoretical replication with case studies implies pattern-matching with theory considerations as a result of examining systematic differences between groups of cases (Rialp et al., 2005). In our study, this meant limiting our cases to those wine producers with habitual residence in the region that are endorsed by the DOQ Priorat. In the interviews, special attention was given to the fact that the informants were *key persons* (Yin, 1984). Between February and May 2007, a total of 25 interviews were conducted *in situ* with wine-making entrepreneurs or company managers endorsed by the Qualified Denomination of Origin (DOQ) 'Priorat'. Considering that the foundations of bonding social capital lie in networks of direct interactions and are locally based, the sample was limited to entrepreneurs with their habitual residence in the region of El Priorat. The total number of actors that satisfied this criterion was, at that time, 30 wine entrepreneurs. Therefore, at the time that the fieldwork was conducted, the 25 entrepreneurs we interviewed represented 83% of the group of wine-making entrepreneurs in El Priorat.⁶

The direct observation was conducted by immersing ourselves within the local wine-producing locality. By visiting the facilities, guided by the wine-makers themselves, we were able to observe the degree of innovation employed in the production process as a consequence of theoretically acquired, rather than empiric, knowledge; by walking along the streets of the villages with the entrepreneurs and observing their familiarity with other residents/wine-producers. We were also able to

⁶ In 2009, 76 production units of companies were registered with the Regulating Council of the Qualified Denomination of Origin Priorat (www.doqpriorat.org). This number includes several cooperatives and several entrepreneurs had multiple firms. In 2009, almost 50% of the DOQ Priorat wineries belonged to 30 local entrepreneurs; the other entrepreneurs belonged to the so-called *third wave*, i.e. they are absentee owners of wineries and do not live in El Priorat.

attend the wine fair in Falset, the capital of the county, where we noted the special social status of the identified introducers of innovation to El Priorat.

The documents we used were taken from Internet, mainly from the website of the Regulating Council of DOQ Priorat (www.doqpriorat.org) and some data were directly provided by the president of the Regulating Council himself.

Social Network Analysis

The research analysed the structural aspect of social capital on a meso level, i.e. in an average region. The power of Social Network Analysis (SNA) stems from its difference from traditional social scientific studies, which assume that it is the attributes of individual actors that matter (Wasserman and Faust, 1994). SNA produces an alternate view, where the attributes of individuals are less important than their relationships and ties with other actors within the network. This approach has turned out to be useful for the study of geographically delimited social capital (Westlund and Bolton, 2003: 79; Glückler and Doreian, 2016), i.e. in small and medium regions where it is possible to find specific networks, given that the starting point of an SNA are personal, specific, face-to-face interactions, in order to empirically identify structures in which these are inserted (Molina, 2005). One of the main data collection instruments for an SNA is the *name generator* (Lin, 2001:16). This technique extracts a list of links for each *node* or interviewed actor. Using these data, the location of the node and his or her links (and relations with all of the nodes present in the region or town) can be shown graphically and measured quantitatively. A valid network obtained by the name generator is one that includes all the individuals whose membership affects the social process under analysis and excludes individuals whose membership has no bearing on the process of interest (Burt et al. 2012). A general overview of the resources transferred via a network can also be obtained using this technique. In the case of El Priorat, the nodes were the 25 interviewed entrepreneurs to whom a name generator gave rise to a graph of a network.

The name generator data was processed using three types of analysis:

- 1) *The conversations network analysis*: to graphically show the structure of the bonding social capital among the group of entrepreneurs in El Priorat. The conversations network was obtained by making the following request: “*Name the wine-producers with whom you constantly talk business and exchange ideas and*

information". This network reflects interactions that specifically refer to conversations that are focused on business matters related with wine.

2) *Strength of links analysis*: Granovetter's (1983) 'four criteria' instrument was adopted for the measurement of the strength of links in a network on the basis of:

- *Frequency of interaction*; A general record was made of how long each face-to-face interaction lasted, between the node and the named actor.
- *Emotional intensity*; Nodes are asked whether they feel friendly, affectionate or emotional closeness to the named actor or whether he or she is merely an acquaintance.
- *Intimacy (mutual confiding)*; Nodes are asked whether they share intimate spaces or activities with the named actor.
- *Mutual services or Resources*; Nodes are asked whether favours (of any type) have been given or received between both actors in the dyadic relationship. Mutual or non-mutual favours, but which have occurred.

3) Network structure analysis: using measurement of density, nodal degree and intermediation (betweenness) to determine SNA central actors using the UCINET 6 computer program (Borgatti et al., 2002).

5. Results

The literature on the subject indicates that the two types of social capital (bonding and bridging) are not exclusive, but neither are they exchangeable (Putnam, 2000; Westlund and Bolton, 2003). The presence of both types of social capital, on an adequate and balanced scale, provides the right conditions for a region to undertake a process of innovation and economic revitalisation (Jack, 2005; O'Brien et al., 2005; Flora et al., 2007).

To deal with the objectives of this study, we needed to demonstrate the existence both of bonding social capital and bridging social capital as intangible assets of a specific group: that of the wine-producers of El Priorat; and, subsequently, reveal the way in which both types of social capital are articulated to generate innovation among the group of wine-producers.

Existence of bonding social capital in El Priorat

The first result is the social network or reticular structure of wine-producers in El Priorat (see Figure 2). We must make it clear that this is not a formal or institutional business network, but that it reflects voluntary and informal interactions between the wine-producers of the DOQ Priorat that live in the county. Although this is a conversations network that refers to business and to the sector, in most cases the nature of the interactions goes beyond the bounds of business. This is not therefore a global network of interactions between all of the wine-producers, but rather is a much more specific sub-network in which the subject of the conversations indicates proximity, intimacy and confidence between both parties in the dyad.

--- Insert Figure 2 about here ---

At first sight, this network does not come across as being densely structured, although it can also be noted that the vast majority of the 25 nodes are interconnected on a regional level, either directly or indirectly (via bridging agents, who show the highest level of intermediation). Only two actors seem isolated in this network. By applying the indicator of density⁷ from the Social Network Analysis it is possible to verify that the density of this network is low (6.16%), which reflects weak connectivity involving few links between the actors. However, this low density could be interpreted as normal if we consider that the subject of the conversations is intimate and private. In other words, the actors in this network are highly selective when dealing with business matters and the exchange of business information. That is why most of the named entrepreneurs (61.5%) are considered friends, i.e. colleagues with whom strong links are maintained.

We can verify the existence of strong links that keep the network connected on a regional level, enabling the circulation of ideas, advice, physical and monetary resources and information between the different villages scattered around the county. It is therefore a network that indicates the existence of bonding social capital, whose function is not only the generation of loyalty and social cohesion, but also the faster and more efficient circulation of information and knowledge among the members of the entrepreneurial group.

The main results obtained from the survey instrument (name generator) indicate that 51% of the named persons interact frequently (at least 1 or 2 times a month), 56%

⁷ Density is the result of dividing the total number of relations indicated by the number of possible relations, by one hundred. It is expressed as a percentage.

share activities that suggest intimacy and confidentiality, and 74% have received resources in the form of favours or advice, in some case mutually. This result confirms that, among the wine-making entrepreneurs of the DOQ Priorat, there are strong links (as instrumentalised by Granovetter, 1973) and therefore a network characterised by bonding social capital.

El Priorat has many indications of a history of community life based on shared values consistent with bonding social capital among its wine-producers (such as solidarity, joint work, etc.). The county has a history of cooperative culture. This associative lifestyle, through local agricultural cooperatives, is very important since affiliation to the village cooperative was the fastest and safest way of integrating the local network of bonding social capital. At present, at least 3 cooperatives form part of the DOQ Priorat (Margalef and Tasías, 1985; Viladomiu et al., 2004).

Meanwhile, and along similar lines, it can be verified that in this region there was an important culture of participation both in institutional networks and in informal networks. Priorat wine-producers are often involved in at least four associations: 1) the Regulating Council of the Qualified Denomination of Origin (DOQ) Priorat, 2) the Platform for the Defence of the Natural Heritage of El Priorat, 3) the Small Wineries Group (*Petits Cellers of El Priorat*), and 4) the European Union LEADER programme's Local Action Group (LAG).

In short, the associative lifestyles of wine-producers of El Priorat offer social contexts in which it is possible to forge and reinforce a whole range of constant interactions, based on common business interests. For example, institutionally and imperatively united, through the DOQ, the group of entrepreneurs forges strong links, which serve to maintain, consolidate and defend the group's resources. In the case of El Priorat, cohesion was recorded in relation to the DOQ Priorat, which is indicative of the existence of strong links at least between the entrepreneurs that live in the region. These expressive actions or bonding social capital are being used to preserve a 'good group': the commercial prestige and image of El Priorat wines as a whole as well as a shared asset that guarantees international prestige for all the wineries within the network.

Existence of bridging social capital in El Priorat

To verify the presence of bridging social capital among El Priorat's wine-producers, we used the information gathered during the interviews and some data from the Regulating Council of the DOQ Priorat in order to reconstruct the historical

panorama of before and after the arrival of innovative entrepreneurs alien to El Priorat (*4 pillars*).

The first significant data are the rising figures for export activity that currently exemplify the wine industry in El Priorat (see Figure 3).

--- Insert Figure 3 about here ---

This boom in DOQ Priorat wine exports in the 1990s, initiated by the bridging agents locally called the *4 pillars*, implicitly meant an increase in the interactions between local entrepreneurs and external agents, such as distributors, entrepreneurs in the catering sector, sommeliers, specialised journalists, possible partners, etc. The new outward contacts, weak links of a commercial and entrepreneurial nature, have acted like “antennas” that received information in relation to prices, fashionable markets, new tendencies in consumer tastes, or more innovative production techniques. Thus, the external nodes were acting like bridges between the regional network and international networks. The non-redundant information captured from external networks was of major strategic value to local wineries. The wine-producers of El Priorat have extended their social networks beyond the county and national territory, and at the same time have diversified and broadened the resources derived from their bridging social capital.

From the narrations offered by the entrepreneurs we interviewed, we noted the process that led to the creation of external networks. Nearly all of the interviewees agreed that outward relations like these did not exist in El Priorat until the so-called *pillars* or pioneering entrepreneurs of the innovative period sowed the seeds of bridging social capital in the region. In researching the micro-components of this ‘complex context’ (Flora et al., 2007), we needed to observe the actions of the pillars of the innovation process on a micro level aimed at creating outward nexuses (i.e. their efforts to construct the bridging social capital of El Priorat).

The “4 pillars” and their role as actor-bridges

When asking the surveyed entrepreneurs whether they knew anybody non-native who had made some kind of contribution to the community, most of them mentioned the names of one or more of the so-called “*4 pillars*” (nodes B08, B18, B22, and B23). Their answers also coincided in indicating the contribution these people made, whereby most interviewees said: *they caused the rebirth of wine-making activity in the region.*

When in the early 90s two young but experienced non-natives settled in El Priorat, full of enthusiasm for setting up their own winery, the native population had been abandoning the land for several decades and only a handful of nostalgic producers were still making wine in El Priorat. The project convinced another two youngsters. These were also outsiders, although one of them was a teacher from the oenology school in Falset. All four *pillars* had a prior experience in the wine industry: as oenologist, as part of some of the most important wine families of Spain or through their work with French wineries and vineyards of the Bordeaux region. The project established by these four pioneers was a success and sparked off the innovation of the region's wine-making sector (information that coincides with that compiled by Medina and Tresserras, 2008; Viladomiu et al., 2004).

Why was this enterprise such a success? First of all, the 4 pillars formed an excellent team that combined the complementary know-how of each individual to strengthen their human capital to the benefit of their joint business.⁸ However, human capital was not what was missing in El Priorat. The main contribution made by the 4 pillars to the region was extensive bridging social capital, in other words, they had strategic contacts in the international market of select wines. These networks were the result of years of work and study; years of searching, transactions, travel and effort to create and cultivate 'good friends'.⁹ Thanks to their bridging social capital, they had developed in-depth knowledge of the international wine market: they sounded out the changes in the end consumers' tastes, they understood their psychology and they knew where to find gourmet markets that were willing to pay for high quality wines; they were able to work out the maximum market value of wines of a given vintage and ask that price. In summary, they knew how to devise a marketing strategy and how to set prices. But most of all, they knew the best distributors in each country and had established communication links with them. Bridging social capital: that was an important deficiency of native wine-producers in El Priorat.

⁸ Nodes B18 and B22 are from families with a long wine-making tradition in Spain (from the Penedés area of Catalonia and La Rioja, respectively). Meanwhile, node B23 is from Valencia (Spain) and worked in the academic sector as a professor at the Oenology School in Falset, the county capital. Although B18 and B22 are also excellent oenologists, trained in Bordeaux and Napa Valley, the former invited B23 to join the team, because he had heard about his major capacity and expertise with new applications in the field of wine-making, and also because although he was not a native, he knew the area well. The fourth partner, B08, had knowledge of business administration and also had political skills. Source: interviews conducted with the four impresarios between February and May 2009.

⁹ Interview with B22, March 2007.

This factor marked the success of the outsiders' businesses, and this did not go unnoticed by the astounded inhabitants of El Priorat, who sought ways of imitating them. Many sons and daughters who had emigrated outside the county started returning to El Priorat to give the old vineyards another chance.

The innovation of the wine sector: the role of the two types of social capital

The business innovation process and its rapid diffusion on a regional level was the consequence of the combined presence of the two types of social capital in El Priorat. While bridging social capital enabled the creation of outward links, along which the external information required for the innovation of the sector flowed, bonding social capital enabled the diffusion of said information within the region.

Table 1 shows some of the innovations that the 4 pillars introduced to El Priorat and which were later imitated by native producers.¹⁰ The pillar entrepreneurs copied the innovations from other contexts and these were later disseminated around the whole region. As stated earlier, the four outsiders adopted the role of promoting the revitalisation of the wine-making sector thanks to their own bonding social capital; however, they themselves assumed the role of actor-bridges, for it was through them that unknown or hard-to-access information and innovative ideas flowed towards the internal network of native producers in El Priorat. They, as 'bridges', came to form part of the new bridging social capital of the region of El Priorat.

--- Insert Table 1 about here ---

The bonding social capital enabled the rapid and efficient diffusion of the business innovations among the new entrepreneurs in the region. In order to understand the diffusion of these innovative ideas, we should highlight the process of integration in the community that the 4 pillars undertook at the same time as their business activity. In other words, we should stress the fact that the four entrepreneurs settled personally and with their families in the county, and became villagers like everybody else, and—as they themselves say—from the outset, they had nothing but respect for the two or three native producers that had resisted through so many decades of crisis, and also for the

¹⁰ This research applied the definition of innovation offered by North and Smallbone (2000), who highlighted the different perspectives on a micro and meso level adopted by the concept. These authors draw upon the proposals made by Schumpeter (1934) and Porter (1990), for whom the introduction of new ideas and methods is an incremental rather than a radical change (North and Smallbone, 2000: 147).

cooperatives that had grouped the grape producers.¹¹ They approached them and established the necessary links to initiate a process of integration in the community, through confidence and mutual support. 20 years after their arrival, these pillars are considered totally integrated members of El Priorat society.¹²

In the conversations network shown in Figure 2, at least two of the 4 pillars appear as central nodes, with high levels of intermediation and connectivity. One of the first resources transferred via the strong links forged by the 4 pillars in their communities was information in reference to potential buyers. This is confirmed by several of the entrepreneurs we interviewed, natives of the region, recognising that at the start of their entrepreneurial project, one of the 4 pillars put them in contact with international distributors. This mere fact helped reinforce the sense of trust between native and non-native producers, which enriches the bonding social capital and boosts the entrepreneurial spirit of the area (Rendleman et al. 2016).

During the information transfer process, the closest friends and acquaintances to these actor-bridges, in turn, play a central role in the business conversations network of the region (Figure 2) and this explains the rapid dissemination of innovations among other members of the region that were not as close to the 4 pillars.¹³

Supporting the analysis with the indicators of the centrality of said network (nodal degree and betweenness),¹⁴ it is observed how the 4 pillars continued to be ingrained in the network of bonding social capital that we analysed in Figure 1 and that at least two of them are central actors, with high nodal degrees (B18 and B22, see Table 2) and betweenness (see Table 3). They have been and continue to be strong actor-bridges within the regional network.

--- Insert Tables 2 and 3 about here ---

Alternative explanations to the process of innovation in El Priorat and the consequent local economic renaissance could come from institutional, technological or

¹¹ B18, interview May 2007.

¹² Interviews with wine-producers, February-May 2007.

¹³ Many of the interviewees indicated that when a wine-producer cannot supply the amount or type of wines requested by a distributor, they recommend other local wineries. This phenomenon of solidarity confirms the presence of bonding social capital among the network of wine-producers.

¹⁴ The nodal degree makes it possible to locate the focal actors in a network. It is the number of nominations that each node receives or transmits from/towards the other nodes in a network. Meanwhile, betweenness indicates how frequently a node appears in the shortest (or geodetic) path that connects to another two (taken from: www.redes-sociales.net).

even financial hypotheses (see, e.g., Galbreath et al., 2016; Signori et al., 2017). All these factors have played some role in the renaissance of the previously declining wine region. However, evidence from the study suggests that social capital was the precursor that led these factors to effectively contribute to the wineries innovativeness and success.

The deliberate use by the 4 pillars of local informal institutions allowed the knowledge and resources introduced to the county to circulate and take root across El Priorat wine industry. The important communication technology and industry-specific advances made over the twenty-year period under analysis were not exclusive to El Priorat and were equally accessible to neighbouring wine-producing counties. However, it was found to be El Priorat's specific balance between bridging and bonding social capital that allowed its local wine-producers to better appreciate the potential value of these technologies and locally develop the skills and capacity to properly optimise them for the good of their wineries' competitiveness. As for financial capital, the introduction of new sources of capital to El Priorat at the turn of the century was more a consequence than an instigator of Priorat's renaissance, where access to finance by local producers was often the result of referrals gained through the region's social networking.

Social capital in El Priorat, it is found, has allowed a variety of different factors to reach and influence the innovative capacity and process of local wineries. Other neighbouring wine counties with similar conditions have not experienced a renaissance anywhere close to that experienced in El Priorat. Most of these neighbouring wine-producing counties have eventually witnessed the introduction of some/most of the innovations observed in El Priorat, but at a much later date, to a lesser degree of cross-county adoption, and mostly as a result of local and regional administrative initiatives aimed to benchmark and duplicate El Priorat's renaissance.

In summary, the regional network of wine-producers—which presupposes the existence of both bridging social capital and bonding social capital—reflects the possible 'paths' followed in the dissemination of the ideas, information and knowledge involved in the process of innovation in El Priorat. The central actors that have been responsible for the dissemination of these innovations enjoy the confidence and appreciation of their colleagues, because they are also friends and neighbours, have been elected to public positions and their children have married local people and formed new families with roots in the land. These bonding and bridging networks are articulated with each other, and though there may be other conditions stimulating

innovation in the region, in the case of El Priorat they have been a factor that is strongly related with the fast and efficient dissemination of collective learning and knowledge throughout practically all of the villages in the county.

6. Concluding remarks and implications

Social capital has been repetitively linked to the competitiveness and innovativeness of wine producing regions and their wineries (Galbreath et al., 2016). Yet little is known of the mechanisms at play, which help wine producers of a specific social network to transform the local social capital into innovative capabilities. The research presented in this paper analysed the local business network of the wine-making sector in the region of El Priorat, Spain, during the twenty year period from 1989 to 2009 that saw the innovation-based renaissance of the region's wine-producing activity.

The results allow us to reinforce the theoretical position that indicates the significant role of both bridging and bonding social capital in the processes of regional innovation (Jack, 2005; O'Brien et al., 2005; Flora et al., 2007). The bridging social capital that currently exists in the region of El Priorat is the result of the arrival in the region of external actors that acted as bridges between the local producers and the international wine-making market; in that the strengthening of bonding social capital, through the integration of these non-native wine-producers in the local communities, led to the rapid and efficient transmission of innovative information throughout the regional social network.

The implications of these results appear to indicate that competitiveness of a wine-producing region requires much more than mere business innovation on a micro level: producers must avoid social isolation and form an active part of the local communication networks (of bonding social capital). This way they disseminate said innovation towards the other members of the community.

This research has verified the importance of creating and strengthening intra-regional links based on trust and solidarity, links that enable the efficient diffusion of this innovative information, in such a way that the knowledge can be shared (Glückler and Doreian, 2016; Rendleman et al. 2016). Thus, the bonding social capital of a regional community is important because it enables inward dissemination –through goodwill and cooperation– of the information introduced by its 'bridges'. In short, extending and diversifying the social capital of a regional collective can be the key to explaining why some wine regions have been able to develop better than others.

The European wine industry is characterised by a large number of wine producers who follow individual paths to pursue their objectives, in terms of production and the development of wine categories (Pomarici, 2016). In an industry where ‘smallness’ is often linked to value added, the effective creation or development of networks with different objectives—e.g., knowledge sharing, shared production, or shared marketing and distribution—may constitute a source of competitive advantage for businesses operating in a sector with a thirst of innovation at the organizational and operational level.

Therefore, the role of policy in this quest becomes essential as a means of overcoming isolation. Historical inertia and routines establish local dynamics that propagate the status quo and block out change and innovation. This becomes more the case in peripheral territories where the wine industry is often based. Not only must policy facilitate the entrance of potential bridging capital to these communities, but must also assure the integration that will allow this capital to flow into the local networks and become bonding capital. Where it is not strong, policy should facilitate the sense of community among local wine producers and between these and the local population. Where external connections are not prevalent, they must be knitted into the local networks in order to permit innovation and the injection of new ideas, methods and perspectives.

Over and above the now common local and international industry networking activities promoted by many administrations, the results of this study suggest that policy should also work on making wine-regions attractive and welcoming regions to outsiders. Efforts to aid individuals not only to settle but to form solid relationships with the local community, focussing more on the individuals than on their business; more on the wine-producers than on their wine-businesses.

Frequent in many wine-producing localities is the presence of absentee estate owners, corporate wine-producers, or hobbyist with little or no intentions of deeply integrating the local social fabric. The results of our study suggest that these individuals and firms would tend to offer little in the way of renaissance stimulating social capital. Little in the way of new resources and knowledge gets injected into the community nor circulated across this community. This should be kept in mind when formulating local development strategies and policies where innovation and new ideas are essential.

Bibliography

- Adler, P.S. and Kwon, S.W. (2002): “Social capital: Prospects for a new concept”, *Academy of Management Review*, 27(1), 17-40.
- Bigdeli, A., Bustinza, O.F., Vendrell-Herrero, F. and Baines, T. (2017): “Network Positioning and Risk Perception in Servitization: Evidence from the UK Road Transport Industry”, *International Journal of Production Research*, in press, doi: 10.1080/00207543.2017.1341063.
- Borgatti, S.P., Everett, M.G. and Freeman, L.C. (2002): *Ucinet for Windows: Software for Social Network Analysis*, Analytic Technologies. Harvard, MA.
- Burt, R.S. (1992): *Structural Holes: The Social Structure of Competition*, Harvard University Press. Cambridge, MA.
- Burt, R.S. (1997): “The contingent value of social capital”, *Administrative Science Quarterly*, 42, 339-365.
- Burt, R.S., Meltzer, D., Seid, M., Borgert, A., Chung, J.W., Colletti, R., Dellal, G., Kahn, S., Kaplan, H., Peterson, L., Margolis P. (2012): “What’s in a name generator? Choosing the right name generators for social network surveys in healthcare quality and safety research”, *BMJ Quality Safety*, 21:992–1000.
- Dana, L.P., Granata, J., Lasch, F., Carnaby, A. (2013): “The evolution of co-opetition in the Waipara wine cluster of New Zealand”, *Wine Economics and Policy*, 2 (1), 42-49.
- Dakhli, M. and De Clercq, D. (2004): “Human capital, social capital, and innovation: a multicountry study”, *Entrepreneurship & Regional Development*, 16, 107-128.
- Dressler, M. (2013): “Innovation management of German wineries: from activity to capacity an explorative multi-case survey”, *Wine Economics and Policy*, 2 (1), 19-26
- Eisenhardt, K.M. (1989): “Building theories from case study research”, *Academy of Management Review*, 14(4), 532-550.
- Eisenhardt, K.M., Graebner, M.E. (2007): “Theory Building from Cases: Opportunities and Challenges”, *Academy of Management Journal*, 50(1), 25-32.
- Flora, C. B., Flora, J.L. and Emery, M. (2007): *Entrepreneurship in rural America: Research and application*. University of Missouri - Kauffman Foundation, Kansas City, Mo. USA.
- Galbreath, J., Charles, D. and Oczkowski, E. (2016): “The drivers of climate change innovations: evidence from the Australian wine industry”, *Journal of Business Ethics*, 135(2), 217-231.

- Galbreath, J. (2016): “Exploratory study of climate change innovations in wine regions in Australia”, *Regional Studies*, 50(11), 1903-1918.
- Giuliani, E. (2007): “The selective nature of knowledge networks in clusters: evidence from the wine industry”, *Journal of Economic Geography*, 7, 139-168.
- Glückler, J., and Doreian, P. (2016): “Social network analysis and economic geography—positional, evolutionary and multi-level approaches”, *Journal of Economic Geography*, 16(6), 1123-1134.
- Gomes, E., Angwin, D., Peter, E. and Mellahi, K. (2012): “HRM Issues and Outcomes in African Mergers and Acquisitions: A Study of the Nigerian Banking Sector”, *International Journal of Human Resource Management*, 23(14), 2874-2900.
- Granovetter, M. (1983): “The strength of weak ties: A network theory revisited”, *Sociological Theory*, 1, 201-233.
- Granovetter, M. S. (1973): “The strength of weak ties”, *American Journal of Sociology*, 78(6), 1360-1380.
- Guth, M. (2005): “Innovation, social inclusion and coherent regional development: A new diamond for a socially inclusive innovation policy in regions”, *European Planning Studies*, 13(2), 333-348.
- Hira, A., Swartz, T. (2014): “What makes Napa Napa? The roots of success in the wine industry”, *Wine Economics and Policy*, 3 (1), 37-53.
- Hudin, M., and Varela Serra, E. (2015): *Vinologue Priorat*, Vinologue. Barcelona.
- Jack, S.L. (2005): “The role, use and activation of strong and weak network ties: A qualitative analysis”, *Journal of Management Studies*, 42(6), 1233-1259.
- Lin, N. (2001): “Building a network theory of social capital”. In: N. Lin, K. Cook and R.S. Burt (eds.), *Social Capital: Theory and Research*, Aldine de Gruyter. New York.
- Maillat, D. (1995): “Territorial dynamic, innovative milieu and regional policy”, *Entrepreneurship & Regional Development*, 7, 157-165.
- Maillat, D. and Lecoq, B. (1992): “New technologies and transformation of regional structures in Europe: the role of the milieu”, *Entrepreneurship & Regional Development*, 4, 1-20.
- Margalef, J. and Tasiaf, J. (1985): *El Priorat. Anàlisi d'una crisi productiva*, Caixa d'Estalvis de Catalunya. Barcelona.

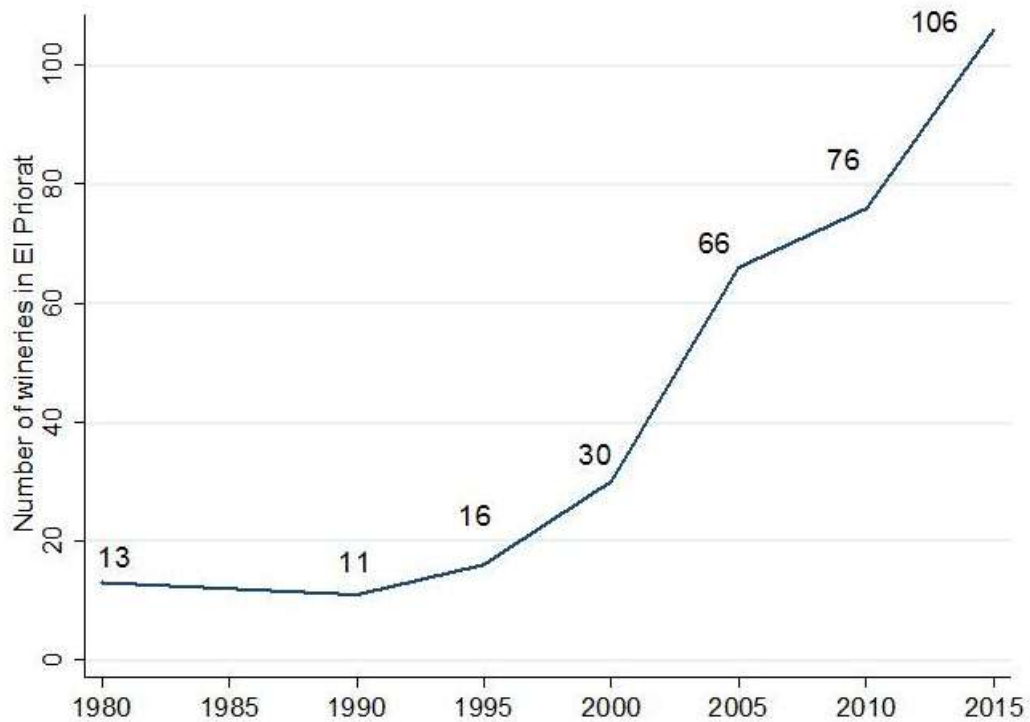
- Medina, F. X. and Tresserras, J. (2008): “Turismo enológico y rutas del vino en Catalunya. Análisis de casos: D.O. Penedés, D.O. Priorat y D.O. Montsant”, *Pasos. Revista de Turismo y Patrimonio Cultural*, 6(3): 493-509.
- Molina, J.L. (2005): “El estudio de las redes personales: contribuciones, métodos y perspectivas”, *Empiria*, 10, July-December, 71-106.
- Morgan, K. (2007): “The learning region: institutions, innovation and regional renewal”, *Regional Studies*, 41(S1), S147-S159.
- Nahapiet, J. and Ghoshal, S. (1998): “Social capital, intellectual capital, and the organization advantage”, *Academy of Management Review*, 23(2), 242-266.
- North, D. and Smallbone, D. (2000): “The innovativeness and growth of rural SMEs during the 1990s”, *Regional Studies*, 34(2), 145- 157.
- O’Brien, D.J., Phillips, J.L. and Patsiorkovsky, V.V. (2005): “Linking indigenous bonding and bridging social capital”, *Regional Studies*, 39(8), 1041–1051.
- Peredo, A.M. and Chrisman, J.J. (2006): “Toward a theory of community-based enterprise”, *Academy of Management Review*, 31(2), 309-328.
- Pomarici, E. (2016): “Recent trends in the international wine market and arising research questions”, *Wine Economics and Policy*, 5(1), 1-3.
- Porter, M.E. (1990): *The Competitive Advantage of Nations*, Macmillan. London.
- Putnam, R.D. (2000): *Bowling Alone: the Collapse and Revival of American Community*, Simon and Schuster. New York.
- Rendleman, C.M., Hoemmen, G., Altman, I., Taylor, B., Moon, W., Smith, S. (2016): “Wine Industry Competitiveness: A survey of the Shawnee Hills American Viticultural Area”, *Wine Economics and Policy*, 5 (1), 4-13.
- Robinson, J. (2006): "Priorat". *Oxford Companion to Wine (Third ed.)*. Oxford: Oxford University Press.
- Rosell, J., Vaillant, Y. and Viladomiu, L. (2006): “Apoyo a las empresas y empresarios en las zonas rurales de Cataluña”, *Revista de Estudios Regionales*, 77, 153-178.
- Santos, F.M. and Eisenhardt, K.M. (2005): “Organizational Boundaries and Theories of Organization”, *Organization Science*, 16(5), 491-508.
- Schumpeter, J. (1934): *The Theory of Economic Development*, Harvard University Press. Cambridge.
- Signori, P., Flint, D.J., Golicic, S.L. (2017): “Constrained innovation on sustainability in the global wine industry”, *Journal of Wine Research*, 28(2), 71-90.

- Viladomiu, L., Rosell, J., Vaillant, Y. and Zamora, A. (2004): *Empresas y empresarios en las comarcas rurales de Catalunya*, Centre d'Economia Industrial, No. 21. Bellaterra, Barcelona.
- Wasserman, S., and Faust, K. (1994): *Social Network Analysis: Methods and applications* (Vol. 8). Cambridge university press.
- Westlund, H. and Bolton, R. (2003): "Local social capital and entrepreneurship", *Small Business Economics*, 21, 77-113.
- Woolcock, M. (2002): "Social capital in theory and practice: where do we stand?", pp 18-39. In: J. Isham *et al.*, *Social Capital and Economic Development. Well-being in Developing Countries*, Edward Elgar. Cheltenham, United Kingdom.
- Yin, R. (1984): *Case Study Research*, Sage Publications. Beverly Hills: CA.

Accepted manuscript

List of Figures

Figure 1. Evolution of the wineries classified with DO-DOQ Priorat (1980-2010)



Source: The authors with data from the Regulating Council of DOQ Priorat).

Figure 2. Wine-producers of El Priorat: Conversation-based social network (February-May 2009)

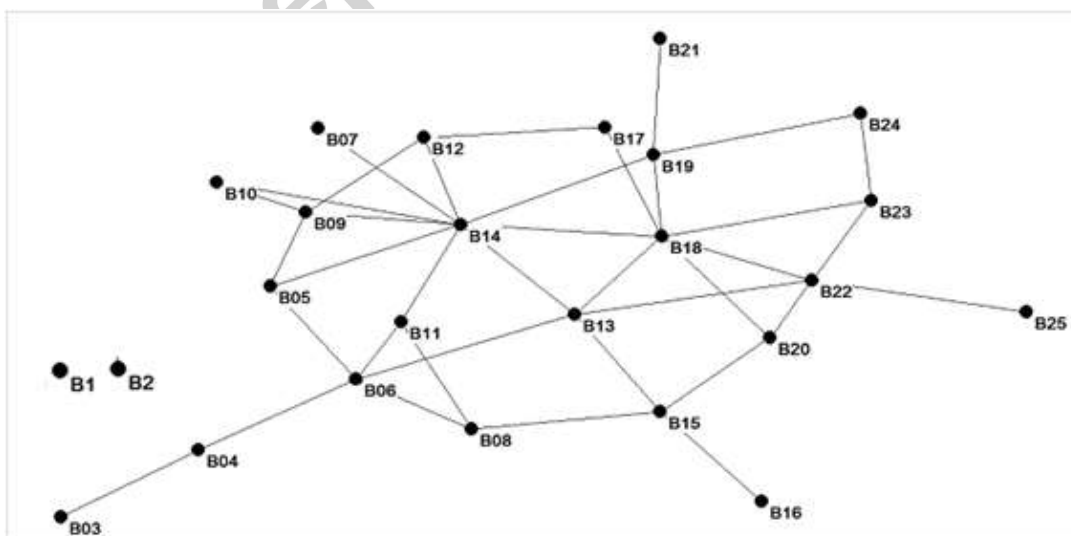
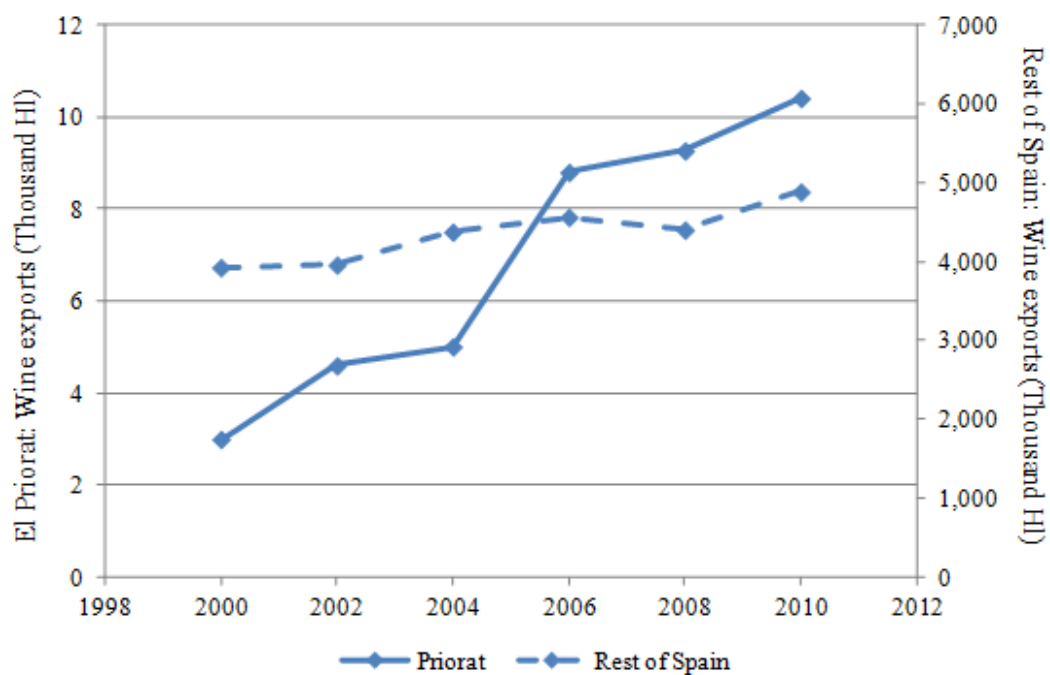


Figure 3. Wine exports between 2000 and 2010 (in thousands of hectolitres)



Values in the Figure are expressed in thousands of hectolitres of DOP & IGP certified wines. Source: Produced on the basis of data from the Regulating Council of the DOQ Priorat and the Spanish Instituto Nacional de Estadísticas (INE).

Accepted manuscript

List of Tables

Table 1. Innovations introduced by the non-local pioneering entrepreneurs (“4 pillars”) and degree of adoption by the local entrepreneurs of El Priorat

Dimension of the innovation	Description of innovations	Proportion of wine producers adopting innovations
Products	- Fine wines, with less alcohol - New mixtures of grapes	100% 100%
Markets	- Export markets - Select (<i>gourmet</i>) markets	100% > 50%
Marketing	- Sustain the quality of DOQ Priorat - Single estate wines - High pricing strategy to validate the prestige of the DOQ Priorat - Better bottle and label designs - New forms of promotion	100% ≤ 50% ≤ 50% > 50% > 50%
Production processes	- New cultivation techniques - New hygiene and process supervision standards - Care of utensils - Care of fermentation facilities	100% 100% 100% 100%
Administration and management	- Incorporation of information technologies (ICTs) - Incorporation of investors - Contracting of wine specialists	100% 100% 100%

Table 2. Bonding social capital: Wine producers with the highest nodal degree in the network of El Priorat

Wine producer (Node)	Nodal degree	Normalization of the degree (%)
B14	9.000	37.500
B18	7.000	29.167
B06	5.000	20.833
B13	5.000	20.833
B22	5.000	20.833
B15	4.000	16.667
B19	4.000	16.667
B09	4.000	16.667

Note: The nodal degree refers to the number of nominations that each node (wine producer) receives or transmits from/towards the other nodes in the network. Values in the normalized range column (normalization of the degree) indicate the percentage of connections that each wine producer (node) has with the other nodes within the network. The remaining wine producers have a nodal degree of 3 or less. Two nodes have a nodal degree of 0.

Table 3. Bridging social capital: Wine producers with the highest betweenness in the network of el Priorat

Wine producer (Node)	Betweenness	Normalization of betweenness (%)
B14	191.145	34.628
B13	129.964	23.544
B18	115.714	20.963
B06	96.119	17.413
B19	67.524	12.233
B22	57.550	10.426
B15	51.521	9.334
B04	42.000	7.609
B11	28.026	5.077
B05	21.000	3.804

Note: Betweenness indicates how frequently a wine producer (node) appears in the shortest (or geodetic) path that connects to another two wine producers (nodes). Values in the normalized range column (normalization of betweenness) indicate the percentage of connections in which each wine producer (node) participates as a bridging node. Seven wine producers have a betweenness of 12 points or less, while eight wine producers have a betweenness of zero (i.e., they do not help other nodes to connect).