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Do institutional networks affect winery survival?

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

Fernandez-Olmos M., Gargallo-Castel A.F., Malorgio G. (2021). Do institutional networks affect winery survival?. BRITISH FOOD JOURNAL, 123(7), 2478-2491 [10.1108/BFJ-09-2020-0836].

Availability:

This version is available at: <https://hdl.handle.net/11585/827109> since: 2021-06-30

Published:

DOI: <http://doi.org/10.1108/BFJ-09-2020-0836>

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(Article begins on next page)

This is the final peer-reviewed accepted manuscript of:
Fernández-Olmos, M., Gargallo-Castel, A.F. and Malorgio, G. (2021),
"Do institutional networks affect winery survival?",
British Food Journal, Vol. 123 No. 7, pp. 2478-2491.
The final published version is available online at:
<https://doi.org/10.1108/BFJ-09-2020-0836>.

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Journal:	<i>British Food Journal</i>
Manuscript ID	BFJ-09-2020-0836.R1
Manuscript Type:	Research Paper
Keywords:	winery survival, DOC RIoja, networks with institutions

Do institutional networks affect winery survival?

Abstract

Purpose

The present study aims to provide new evidence regarding the factors that determine the survival of firms in the Spanish wine industry and to improve the understanding of sector dynamics.

- **Design/methodology/approach**

The empirical analysis, conducted over a representative sample of wineries in the DOC Rioja wine industry, is based on non-parametric (Kaplan-Meier graph) and semi-parametric survival models (Cox proportional hazard model).

- **Findings**

Our empirical model finds that wineries with a greater number of networks with institutions enjoy better prospects of survival. This study also shows that a winery's previous performance affects its probability of survival. Consequently, wineries that have been successful in the past have a lower hazard of exit. Although spending on R&D and exporting are factors likely to improve wineries' efficiency and competitiveness, these factors did not contribute significantly to the survival of DOC Rioja wineries.

- **Originality**

This paper makes a significant contribution to the understanding of the determinants of wineries' survival and has important policy implications. In order to raise the probability of survival, policy makers should promote the networks that link wineries and institutions. Moreover, this study is based on survival analysis which, although frequently used in medical and behavioural sciences, has rarely been applied to wine economics. Finally, it uses a unique data set obtained from primary data collection, which previous studies have not analysed in relation to the probability of winery survival.

Type of article: Research paper

Keywords: winery survival, DOC Rioja, networks with institutions

Introduction

The wine sector, which is mainly composed of SMEs, represents an important agricultural segment of the EU (Vrontis et al., 2016; Pomarici and Sardone, 2020). The European wine sector is the top EU agri-food exporter, with almost €12.8 billion in exports in 2019 (www.ceeuv.es). Nevertheless, European wineries currently face a variety of challenges, including the coronavirus recession in the global economy, the rise of concerns regarding sustainability and competition from new wine-producing countries. In this respect, European wine producers will be motivated to collaborate with institutions and this will be crucial for their survival. In this conceptual framework, the effect of networks with institutions on winery survival is an important issue in the future of the European wine sector (Fernández-Olmos and Malorgio, 2020).

The topic of firm survival has been researched extensively in the theoretical and empirical literature. A number of factors that influence the probability of a firm's survival in the market have been empirically evaluated, including size, age, productivity, innovation at firm level, quality policy, agglomeration and industry concentration at industry level (Blanchard et al., 2004; Dimara et al., 2008; Bontemps et al., 2012; Wang et al., 2014). The role played by institutional networking has been largely ignored in these studies. Nevertheless, the institution-based view has recognized the importance of institutional factors for understanding firms' competitive advantage (Garrido et al. 2014), and in the agri-food sector particularly the role of networks is a research subject that merits additional investigation (Camanzi and Giua, 2020).

To fill this gap, the present paper attempts to shed light on the link between institutional networks and winery survival by focusing on wineries operating in the DOC (Designation of Qualified Origin) Rioja wine sector.

This paper provides the first analysis of key factors that explain the survival of a sample of wineries in the DOC Rioja industry. Specifically, this study analyses how internationalization and networks with institutions, as well as other factors, may be associated with the decisions of wineries to remain in the sector. On the one hand, our study differs from most previous studies on survival in that it not only examines the

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3 main determinants of firms' survival based on firm and industry-specific characteristics,
4 but also the role of institutions under the institutional network approach. Our results
5 suggest that institutions play an important role in wineries' survival by providing
6 learning and knowledge regarding domestic and foreign markets, as well as promoting
7 their wines. Moreover, this study shows that a winery's previous performance affects
8 its probability of survival. Consequently, wineries that have been successful in the past
9 have a lower hazard of exit.
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15 We focus on Rioja because it is Spain's leading Designation of Origin with more
16 than 600 wineries and 14,800 grape growers. It produces the largest number of barrels
17 in the world. Rioja wines are present in 139 different countries
18 (<https://www.riojawine.com/es-es/>).
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23 Wines from DOC Rioja are internationally recognized, not only due to the control
24 of the quality of the grapes and the winemaking process, but also because of the
25 region's exceptionally long history and cultural background. As an example, two Rioja
26 vineyards are in the top 50 of the World's Best Vineyards to Visit 2020
27 (<https://www.worldsbestvineyards.com/>).
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32 The evolution of the main economic indicators in DOC Rioja shows the growth of
33 this sector in the last three decades. Qualified production increased 300%, sales nearly
34 tripled and the number of wineries grew six-fold (Barco, 2018). Thus, the DOC Rioja
35 wine sector is strategic not only because of its potential to produce high-quality wines,
36 but also as a source of employment and wealth in the region that is difficult to substitute
37 with other economic activities. However, this industry has an important group of SME
38 wineries that face the pressures of competition at home as well as in international
39 markets, which can slow the sector's growth (Barco, 2018). Given the crucial socio-
40 economic role that the DOC Rioja wine sector plays, it is necessary to understand the
41 factors that determine the survival of wineries to improve our understanding of sector
42 dynamics. The paper's objective is to contribute to the analysis of these factors.
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52 This study demonstrates the usefulness of survival analysis in understanding the
53 decisions by wineries to remain in the industry. Our study makes three important
54 contributions to understanding winery survival. First, by studying the factors that affect
55 the exit decisions of wineries, this paper makes a significant contribution to the
56 understanding of the determinants of winery survival. It also has important policy
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3 implications given that in order to develop effective policies to achieve a sustainable
4 wine sector, it is crucial to have a better understanding of wine producers' behaviours
5 and the factors influencing their decisions to exit the industry. In particular, our results
6 suggest that in order to raise the probability of survival, policy makers should promote
7 the networks between wineries and institutions. Our second contribution is the use of
8 survival analysis which, despite being a well-known methodology in medical and
9 behavioural sciences, has rarely been applied to wine economics. Third, this study
10 differentiates itself from previous research on survival strategies by using a unique data
11 set obtained from primary data collection, which previous papers have not analysed in
12 relation to the probability of winery survival. One advantage of using this database is
13 the availability of individual winery data regarding their networks with institutions and
14 information on their level of social capital, as well as comprehensive
15 internationalization information and other winery characteristics.
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26 This paper is divided into four sections, with the first being the Introduction. The
27 second section presents the literature relevant to the analysis of winery survival. The
28 empirical results are presented and discussed in section three. Finally, the last section
29 contains concluding remarks and proposes avenues for further research.
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33 **2. Theoretical framework**

34 *Literature review of networks*

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39 The adoption of institutional networks (i.e., network associations with institutional
40 partners such as governments, research institutions, advisory and support offices,
41 agencies for international development, and so on) has been recognized to be a key
42 element in firm performance because it helps SMEs overcome the limitations of their
43 internal resources (Kontinen and Ojala, 2011; Hernández-Carrión et al., 2017).
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49 In the specific case of the wine industry, institutional networking has been
50 identified as a key success factor in their bid to expand into international markets
51 (Fernández and Malorgio, 2020). Despite the above evidence, the role of institutional
52 networks has been largely neglected with respect to firm survival (Che et al., 2017).
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56 While the issue of firm survival is of central importance in the agri-food industry
57 (Hough et al., 2003; Blanchard et al., 2004; Teratanavat et al., 2005; Cruz et al., 2010;
58 Bontemps et al., 2012; Grashuis et al., 2020), there are relatively few empirical studies
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3 of the determinants of survival for SME wineries. An exception is Valette et al. (2018)
4 which examines the survival rates of cooperatives in the French wine industry.
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7 Traditionally, the main determinants of firm survival analysed in the empirical
8 literature in the agri-food sector have been related to firm- and industry-specific
9 characteristics, such as individual productivity, age, size, innovation effort, and industry
10 maturity (Blanchard et al. 2004; Dimara et al., 2008; Bontemps et al. 2012).
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14 As shown by Broccardo et al. (2015) and Vrontis et al. (2016), family businesses
15 are common in the wine sector. According to the AREF (Asociación Riojana de
16 Empresa Familiar) [Rioja Family Business Association], family firms comprise around
17 88% of all business enterprises in Rioja.
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21 The family nature of the business may affect the likelihood of survival of wineries
22 because an important concern of family firms is to ensure the survival of the business
23 across generations as a family firm (Broccardo et al., 2015). It is well known that first-
24 generation family wineries are more risk averse than non-family wineries, which
25 explains their desire to see the wine business handed on to the next generation
26 (Kellermanns and Eddleston, 2006; Kellermanns et al., 2008).
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29
30 As the top management team of family wineries plays a central role in deciding
31 strategy and differs from teams in non-family wineries, we examine the composition of
32 the top management teams in wineries. In particular, we measure the number of family
33 members holding managerial positions in proportion to the total number of members.
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36
37 Wineries entering the market on a relatively large scale may benefit from cost
38 advantages and greater facilities in accessing capital markets. They have more
39 bargaining power with customers and suppliers, as well as easier access to international
40 markets compared with small firms (Sellers and Alampi-Sottini, 2016). In a sample of
41 723 Italian wineries, Sellers and Alampi-Sottini (2016) find that size has a positive
42 influence on the economic performance of wineries. Bontemps et al. (2012) examine
43 how EU regulations of quality food products affect the survival of cheese firms from
44 1990 to 2006 in France. They conclude that smaller firms still have a lower survival rate
45 compared to larger ones and that this cannot be compensated by the quality label effect.
46 As in Hessels and Terjesen (2010), firm size is measured by the logarithm of
47 employment.
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51 In line with other work on innovation in the wine industry (Doloreux and Friges,
52 2019), the research on dynamic capabilities predicts that those wineries that are able to
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3 successfully innovate are able to establish and maintain a competitive advantage in the
4 wine market since innovation activity enables wineries to deal with new technologies
5 and continuously improve their existing capabilities. Despite the importance of
6 innovation in the growth of the wine industry, empirical research devoted to innovation
7 and survival in the sector remains scarce. Following the previous literature, which has
8 empirically corroborated investment in R&D at firm level as a determinant of survival
9 (Hall, 1987; Esteve-Pérez et al., 2004), we expect that a winery's innovative effort,
10 measured as R&D expenditure, plays an important role in shaping the survival of
11 wineries.

12
13 In response to falling domestic consumption in Old World countries (France, Italy
14 and Spain), exporting has become a necessary strategy to succeed in this highly
15 competitive market (Campbell and Guibert, 2006). When a winery exports, it diversifies
16 risk by spreading sales over different markets. In particular, exports might provide
17 Spanish wineries with a chance to substitute sales at home, where wine consumption
18 has decreased in previous years, with sales abroad. Thus, we expect that a winery's
19 export experience should have positive effects on its probability of survival.
20 Corroborating this argument, empirical evidence has found that the exporting status of a
21 firm is positively correlated with its probability of survival (e.g., Greenaway et al.,
22 2008; Dai et al. 2016).

23
24 Based on previous literature (e.g., Chen, 2008; Maclean et al. 2014), we argue that
25 wineries with a history of superior performance may have a greater probability of
26 survival. Past successes could provide wineries with sufficient resources to adopt
27 innovative behaviour, which may help them adapt to evolving consumer needs and
28 expand into new international markets. Indeed, Sellers and Alampì-Sottini (2016)
29 consider that winery managers should be aware of the importance of controlling their
30 economic performance in order to guarantee survival in the long term. In short, past
31 success can enable wineries to discover and exploit opportunities to maintain
32 sustainable survival. Based on this reasoning, we predict that wineries with better
33 performance will survive more easily. As Lee and Habte-Giorgis (2004) suggested, this
34 study employs different items to measure performance.

35
36 As we mentioned earlier, the traditional literature on firm survival has analysed
37 firm exits with particular attention to the effects of firm and industry characteristics,
38 while it has largely ignored institutional effects. In recent years, however, researchers
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3 applying the institution-based view have started to emphasize the role of institutions as
4 a factor affecting firms' strategies (Garrido et al., 2014).

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6 With a focus on the wine industry, Giuliani et al. (2011) demonstrated that
7 universities and scientists contribute to innovation in wine firms by providing new
8 technological processes and know-how, which can be used to meet the new demands
9 and increase their sales. Likewise, other papers have shown the relevance of bridging
10 organizations (e.g., industrial associations and/or public organizations) for innovation in
11 the food and beverage industry (Dries et al., 2014; Bresciani, 2017; Santoro et al.,
12 2017). Recently, Monticelli et al. (2018) found that formal institutions are the most
13 important players in the promotion of cooperation between
14 firms in the Brazilian wine industry.

15
16 However, investigating the relationships between institutions and firm survival is
17 an important approach that has received little attention (Che et al., 2017). To fill this
18 gap, we aim to understand the role that institutions play in driving the survival of
19 wineries in DOC Rioja.

20
21 DOC Rioja wineries are an appropriate subject of study because both public and
22 private institutions have a strong presence in this sector. Institutions play a crucial role
23 in the wine activity, reducing uncertainty (North, 1990), and have become a benchmark
24 for partners involved in the wine value chain.

25
26 In order to figure out what the effects of institutions are, we need to understand
27 what happens to wineries after they establish networks with institutions. These
28 relationships increase the competitiveness of the domestic wine market by developing
29 learning and relationship networks, reducing transaction costs, and facilitating
30 internationalization (Monticelli et al. 2018). Moreover, the networks formed by the
31 winery can strongly influence the perceived quality of its wines within the market
32 (Guibert, 2006).

33
34 The concept of survival (time-to-event) analysis is a method developed to analyse
35 the time to an event of interest, taking into account the presence of censored data
36 (Hough et al., 2003). In our study, it occurs whenever the time until the firm exits the
37 market cannot be observed exactly. This methodology has been widely used to analyse
38 how firm characteristics can influence firm survival in the agri-food industry (e.g., Cruz
39 et al., 2010; Bontemps et al., 2012; Akhundjanov et al., 2019), but not to analyse
40 institutional networks, which may be a key driver of wineries.

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4 The empirical analysis, conducted over a representative sample of wineries in the
5 DOC Rioja wine industry, is based on non-parametric (Kaplan-Meier graph) and semi-
6 parametric survival models (Cox proportional hazard model).
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13 **3. Empirical analysis**

14 **3.1 Data collection**

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16 Before explaining the survival analysis, we shall describe the data employed. The
17 DOC Rioja context was used to test the survival of wineries. The data for this research
18 came from a single study of DOC Rioja wineries.
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22 The main data sources used to obtain the list of wineries in the target population
23 were the directories drawn up by the Regulatory Council of the Rioja Designation of
24 Origin (the number of wineries in this directory numbered 580). The data for this study
25 were collected using a structural survey. The questionnaires were sent and the
26 information contained in them was collected depending on the preferences of the
27 winery: by phone, email or internet. In the collection via the internet, the winery itself
28 logged onto a web questionnaire directly. In a first phase, the questionnaire was sent by
29 mail to the wineries together with the cover letter. Subsequently, wineries that had not
30 responded were contacted by telephone. The survey targeted the wineries' president (or
31 the highest-ranking corporate officer) because he or she participates directly in the
32 winery's business and is considered a reliable source of information (Alayo et al.,
33 2019).
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43 To be included in the sample the wineries had to meet the following requirements:
44 (1) they belong to the Rioja Designation of Origin, (2) they manage the full winemaking
45 process from grape to bottle, and (3) they are obliged to present accounting information
46 to the authorities. In total, 123 valid questionnaires were obtained, with a response rate
47 of 21.21%.
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52 The variable of interest is the time (in years) until the occurrence of some event, to
53 which we generically refer as the exit from the wine activity. This is the length of time
54 that elapses from the time of observation, in our case from the time a winery begins in
55 the wine activity, until its exit (complete observations) or until the end of the study, 31
56 May 2020 (right-censored observation). In this last group are, therefore, wineries that
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3 continue in the industry after the study is finished. Wineries that changed names were
4 treated as continuing entities. Thus, survival time, in our case, is the length of time that
5 a winery remains active in the wine industry, i.e., the period between its entry and exit
6 in the case of complete observation or until the end of the study, in the case of right-
7 censored observation.
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11 12 13 14 *Measurement of variables*

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16 We examined previous literature to measure all variables. Table 1 provides a brief
17 description of the variables used in this study. Table 2 presents the means, standard
18 deviations, and Spearman correlations for the variables employed in the model.
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21

22 **INSERT TABLE 1 & TABLE 2**

23 24 25 *The econometric technique*

26
27 The focus of our study is to analyse what factors affect wine firm survival and,
28 particularly, how the influence of networks with institutions, previous performance, as
29 well as other factors, may be associated with the decision by wineries to remain in the
30 wine sector.
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33 To analyse whether the likelihood of winery survival is invariant to these factors,
34 we use survival analysis¹, which allows us to estimate the time until failure. Survival
35 analysis is used to process censored data that represent situations where the response of
36 interest (the exit of the winery from the sector) has not yet occurred, and it is only
37 known that the winery has survived for at least a given period t. Therefore, the time-to-
38 event is known for only a portion of the sample of wineries. Because of the nature of the
39 dependent variable, ordinary least squares regression can yield parameter estimates that
40 are biased and inconsistent, thus being inappropriate for this type of analysis. For this
41 reason, we estimate a semi-parametric Cox proportional hazard regression, in which the
42 hazard function is assumed to be of the form
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$$50 \lambda(t|z) = \lambda_0(t) \exp\{z\beta\}$$

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¹ In previous studies, the terms, such as event history analysis, duration model, hazard model and failure-
59 time model have often been employed interchangeably.
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3 Where β is the vector of regression coefficients, z is the vector of measured
4 explanatory variables, and $\lambda_0(t)$ is the baseline hazard function² which represents the
5 probability of failure conditional on the winery surviving until time t .
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8 In the context of the Cox model, if the hazard ratio for a predictor is close to 1 then
9 that predictor does not affect survival. If the hazard ratio is less than one or negative,
10 then the predictor is associated with improved survival. If the hazard ratio is greater
11 than one, then the predictor is associated with decreased survival.
12
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14 Although the model is semi-parametric (i.e., no particular shape is assumed for the
15 baseline hazard), the proportional hazard assumption requires testing that the hazard
16 ratio is constant over time. This was checked using Schoenfeld residuals ($\chi^2(6) =$
17 $2.96, Prob > \chi^2 = 0.8142$).
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23 **3.2 Results**

24 The results of the Cox regression model are presented in Table 3. This model
25 presents a satisfactory indicator of overall significance, with a chi-squared value corresponding
26 to levels of significance lower than 0.05 ($Prob > Chi^2=0.0245$).
27
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30 To assess whether a fitted Cox regression model adequately describes our data,
31 we have to confirm that continuous covariates are linear. We calculated the Martingale
32 residual to assess nonlinearity and the goodness-of-fit was assessed for the model using
33 the Gronnesby and Borgan test. We obtained an insignificant p-value ($Prob >$
34 $Chi^2=0.4208$), which suggests good model fit.
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40 **INSERT TABLE 3**

41 Although the presence of family members in management teams and on the board
42 of directors (FAMILY_BOARD) is a factor that is likely to affect wineries' efficiency
43 and competitiveness, this factor did not contribute significantly to the model. This
44 indicates that this variable is not the most crucial factor for the survival of DOC Rioja
45 wineries in the period analysed.
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50 A possible explanation is that those family winery owners who do not have heirs
51 wishing to continue their wine activity prefer to close down rather than hand control of
52 the winery to an outsider (Santarelli, 2001).
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² No particular shape is assumed for the baseline hazard; it is estimated nonparametrically
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3 Similarly, the estimated coefficient for size is not significant. The possible
4 explanation for this finding is the sample of wineries used in this study. Winery size
5 influences survival only insofar as it is associated with economies of scale, which will
6 affect efficiency relative to the viticulture activity. However, it is difficult to exploit
7 economies of scale in DOC Rioja due to their differentiation strategy and the small size
8 of vineyards, which makes the mechanization of viticulture tasks difficult.
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13 The impact of the crisis on purchasing power, increasing regulations for
14 certification, and the need for cost reductions to increase competitiveness, are pushing
15 wineries to boost R&D investments. However, the results of the regression do not
16 confirm that R&D is a driver of winery survival. This may be because R&D is highly
17 complex and offers unclear rates of return (Doloreux and Frigon, 2019). Other
18 researchers suggest that only the combination of the winery's tradition values and
19 innovation will maintain its competitive advantage (Vrontis et al., 2016; Giacosa et al.,
20 2017).
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27 Although exporting activity is considered in the literature as a determinant of
28 wineries' success, we find no significant results for the relationship between exporting
29 experience and wineries' survival. We have replicated³ the model with other alternative
30 variables of exporting, such as export intensity (Maurel, 2009) or the degree of
31 internationalization (Fernández-Olmos, 2011) and have obtained similar results. In a
32 similar vein, Valette et al. (2018) found that exports, measured by the ratio of exports to
33 total sales, do not improve the survival probability of cooperatives. In line with López
34 (2006), exporting, per se, does not seem to increase wineries' survival.
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41 As new exporting wineries face the dual challenge of overcoming the liabilities of
42 newness and of foreignness (Stinchcombe, 1965; Dunning, 1981; Zaheer, 1995; Autio
43 et al. 2000), it is interesting to analyse the extent to which a winery is able to
44 accumulate social capital in the international market in which it exports. Based on the
45 definition of Bourdieu and Wacquant (1992), social capital comprises the sum of
46 resources that a winery can access or mobilize by virtue of possessing a durable network
47 of relationships. By applying general knowledge-based theory to the study of winery
48 exports, we propose that the greater the international social capital of the winery, the
49 greater its knowledge will be (Yli-Renko et al., 2002). In particular, international social
50 capital allows foreign market knowledge to be shared and acquired in relationships
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59 ³ Results are available upon request
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3 between new exporting wineries and their partners in the foreign target markets.
4 Therefore, international diversification will be faster and survival will increase.
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6 To answer our main question about the effects of international social capital on
7 the survival of exporting wineries, we performed a Kaplan-Meier analysis that makes it
8 possible to compare the estimation of survival over time between two groups of
9 wineries.
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13 The measure of international social capital reflects the number of contacts or the
14 connectivity that the winery has in the international market. In this paper, we have
15 followed the methodologies used in previous studies to measure this variable (Maula et
16 al., 2003; Musteen et al., 2010; Parra Requena et al., 2010; Yli-Renko et al., 2002).
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20 Figure 1 depicts the Kaplan-Meier estimates (Kalbfleisch and Prentice, 2011)
21 comparing wineries with high and low levels of international social capital. The
22 estimated survival function for wineries with high international social capital lies above
23 the one for wineries with low international social capital throughout the period
24 analysed.
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29 The results, taken together, suggest that the exporting process itself can be
30 considered as a process of developing and accessing international social capital, as
31 wineries initiate, establish, and deepen relationships (Johanson and Vahlne, 2006).
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35 **INSERT FIGURE 1**

36
37 Two factors noticeably improve the survival of the DOC Rioja wineries: previous
38 performance and networking with institutions.
39

40 Results show that a winery's previous performance, assessed using both financial
41 and growth-based measures, is more closely related to a winery's survival. This result is
42 consistent with the theory that predicts that firm growth is a crucial measure for future
43 value creation (Viguerie et al., 2011). This result suggests that the phenomenon of
44 dynamic increasing returns is present in the DOC Rioja wine industry, and learning
45 through growth can increase growth potential in the long term and can therefore
46 enhance a winery's survival.
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52 More notably, our empirical model finds that wineries with a higher number of
53 networks with institutions enjoy better survival prospects. Many DOC Rioja wineries
54 develop networks with associations such as PROVIR (Asociación Bodegas Familiares
55 de Rioja) ARAEX (Asociación de Exportadores de Rioja Alavesa), ARBOR
56 (Agrupación de Artesanos Bodegueros de Rioja), ABC (Asociación de Bodegas por la
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3 Calidad), FECOAR (Federación de Cooperativas Agrarias de La Rioja), ABRA
4 (Asociación de Bodegas de Rioja Alavesa), AEVZR (Asociación de Empresas
5 Vinícolas de la Zona Rioja), and other institutional partners such as Instituto de
6 Ciencias de la Vid y del Vino, Estación Enológica de Haro, Grupo de Empresas
7 Vinícolas de Rioja, Proyecto Europeo Wine Tech, El Grupo Rioja, University of La
8 Rioja, University of Basque Country-Campus Álava, and/or University of Navarra.
9 These links offer both support services (e.g., a wine producer directory, international
10 business planning, and different marketing and promotion activities) and wine business
11 development opportunities (e.g., wine fairs, trade showcases, and actions to meet the
12 buyer). Thus, our results indicate that using these institutional networks not only creates
13 opportunities for wineries to be competitive in the global wine market but also provides
14 them with links that help them survive.

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17 To check robustness, we performed the analysis again using the Weibull
18 parameterization. Similar results were obtained, which confirms its robustness⁴.
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24 25 26 27 28 29 30 **4. Conclusions**

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32 This study contributes to the growing empirical evidence regarding firm survival
33 by examining the effects of networks with institutions. To date, the significance of
34 networks with institutions for the survival of a winery has been rather neglected. Our
35 results verify the positive effect of networks with institutions on firm survival in the
36 wine industry.
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40 This is one of the first studies to apply survival analysis in the wine industry. This
41 paper also advances our knowledge by presenting a more nuanced perspective of
42 exporting strategy based on the distinction between number of years exporting and
43 international social capital. We thus contribute to the discussion regarding the effect of
44 the internationalization strategy on the firm's survival by showing that the quality of the
45 winery's experience is more important than the number of years it has been exporting.
46 The connectivity that the winery has in the international market is key.
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52 In addition, these findings have important implications. First, this analysis makes
53 it possible to evaluate specific support programs to improve winery survival. Policy
54 makers should promote networks between wineries and institutions as these links have
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59 ⁴ Results are available upon request
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3 proven to be a crucial element in their survival. In this respect, public policy directed
4 towards exporting without taking into account international social capital may be
5 inadequate. Likewise, policy makers should devote resources to promoting R&D
6 investments taking into account their efficiency.
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10 Our results could be a useful tool not only for policy makers but also for winery
11 managers by offering them the possibility to identify those wineries with a greater risk
12 of exiting the DOC Rioja wine industry. Wineries could thus have a better
13 understanding of their situation and they could then launch initiatives to reduce the
14 hazard of abandoning the market.
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18 The findings also have academic implications since they underline the need for
19 academics to be alert to the fact that survival could be contingent on different
20 combinations of exporting experience and international networks. This argues for taking
21 a broader view of the range of international activities that improve survival in the wine
22 industry.
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27 These results have important implications and present some interesting avenues
28 for future research. The research population includes only Spanish firms belonging to a
29 particular sector. This could be a problem when attempting to generalize the results, but
30 the Spanish wine industry is of strategic importance, not only because it is a source of
31 high-quality wine, but also because it is one of the most important sectors in Spain's
32 agro-economy. Future research could improve our knowledge by looking at other
33 sectors.
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39 Although we believe that our sample of Rioja wineries has numerous advantages
40 because it allowed us to examine network information, this approach limits our
41 investigation to the survival of wineries from one area, DOC Rioja, with cross-sectional
42 data. Wineries from other regions (e.g. New World countries) may have different
43 strengths that they use to deal with the challenges of survival. Future studies should
44 attempt to construct a longitudinal database that cover multiple countries.
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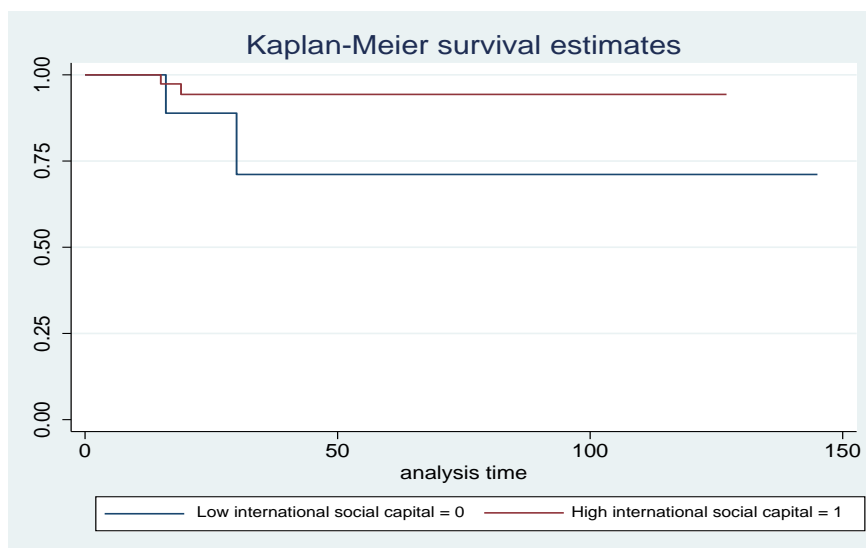
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Figure 1: Kaplan-Meier survival estimates



Source: Compiled by the author

Table 1. Measures of variables

Label	Variable	Description
<i>FAMILY_BOARD</i>	Composition of top management team	The percentage of family members in the top management team (Minichilli et al., 2010; Kraiczy et al., 2015; Alayo et al., 2019)
SIZE	Size of winery	The natural logarithm of the number of employees (e.g., Hessels and Terjesen, 2010; Cabral and Mata, 2003)
R&D	R&D intensity	The proportion R&D spending/sales (Esteve-Pérez et al. 2007)
INT_EXP	International experience	Number of years exporting (Bugel and Murray, 2000; Wu et al., 2007)
<i>PREV_PERF</i>	Previous performance	A factor derived from 5 items related to growth in sales, market share, employees, profitability, and ability to finance profit growth (Fernández et al., 2020)
<i>INST_NETW</i>	Networking with institutions	Measures the network of relationships with different formal institutions (Fernández and Malorgio, 2020)

Source: Own elaboration

Table 2. Descriptive statistics and correlation matrix (Bonferroni Correction)

	1	2	3	4	5	6
1. FAMILY_BOARD	1					
2. SIZE	-0.468*	1				
3. R&D	-0.199*	0.285*	1			
4. INT_EXP	-0.293*	0.565*	0.376*	1		
5. PREV_PERF	-0.161	0.365*	0.287*	0.356*	1	
6. INST_NETW	-0.116	0.189*	0.219*	0.238*	0.097	1
Mean	80.018	1.394	1.741	11.577	13.587	0.772
Standard Deviation	34.577	1.168	6.230	17.753	4.123	0.913

Source: Own elaboration

Table 3. Estimation of proportional hazards model

	Regression coefficient	Standard error	p-value	Hazard ratio	Confidence interval
FAMILY_BOARD	-0.009	0.011	0.385	0.991	0.970-1.011
SIZE	-0.402	0.380	0.290	0.669	0.317-1.409
R&D	0.124	0.167	0.460	1.132	0.815-1.571
INT_EXP	0.006	0.028	0.841	1.006	0.951-1.063
PREV_PERF	-0.182	0.082	0.026	0.833	0.710-0.979
INST_NETW	-1.398	0.650	0.032	0.247	0.069-0.884

N=123