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A behavioural perspective of organic wine production decisions:

An application to the Spanish wine industry

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Abstract

- **Purpose**

Using the behavioural perspective as a theoretical complement of rational models, this paper examines factors that influence the decision of producing organic wines.

- **Design/methodology/approach**

Based on a quantitative analysis of 687 wineries belonging to Denomination of Origin in Spain, we empirically examine the sequential relationships between manager's personality and winery and institutional level factors, on organic wine production activity and winery export performance.

- **Findings**

This paper investigates the direct and indirect sequential relationships between wineries' factors including an organic production activity and two dimensions of export performance, namely: volume-based and value-based performance. The results of a sequential model provide evidence that openness to experience, a manager's personality trait, has a positive causal relationship with organic wine production.

Originality

This study contributes to a new strategic implication of organic wine production activity and export performance linkage in behavioural and traditional theoretical perspectives. These findings are valuable for policy makers in the wine sector, as they can better inform and guide policies directed to identify organic production support programs.

- **Practical implications**

This paper offers richer insights into the factors leading wine production managers to change from conventional to organic production methods. Specifically, the study shows that wine production managers are susceptible to make decisions to whether produce organic wine

or not that may not be consistent with the current theoretical models based on economic efficiency (i.e. comparing costs and benefits). Instead, these decisions are, in part, based on their personality traits. Future research could study how the functional attribute affects the willingness to produce organic wines.

Keywords: organic wine production, behavioural perspective, Spanish wineries

1. Introduction

No longer a new phenomenon, organic wine production is becoming more common, in particular for smaller wineries (Marco-Lajara et al., 2023; Veccio et al., 2023). Indeed, organic production is identified as “the centre of debate on the so-called “green architecture” of the new Common Agricultural Policy (CAP)” (Varia et al., 2021). Research on organic wine production has demonstrated that while organic production leads to better environmental conservation, wineries can also reap other benefits as a result of producing organically their wines. These include greater differentiation, healthier wines (Castellini et al., 2014) and better meeting customer expectations (Cobelli et al., 2021). However, studies suggest that organic production can lead to negative outcomes such as increasing production risks and costs (Crescimanno et al. 2002; Castellini et al., 2017), and failure of consumers’ willingness to pay a premium price for organic wine due to the lack of communication of their benefits (Macht et al., 2021). For academics studying economics and management in the wine sector, the recent trends in organic production raise questions about the factors that drive organic wine production (Dejo et al., 2022).

Until today, research has viewed the decision to incorporate sustainable wine business practices (e.g., organic production) as a function of various external, internal and strategic drivers, including voluntary, market-driven and government-led drivers (Dodds et al., 2013). An aspect not yet fully explored in the scientific literature concerns the extent to which personal characteristics of producers influence organic production decisions (Dejo et al. 2022). A few exceptions include work by Aubert et al. (2012), Rogers (2003), Alexopoulos et al. (2010) and Tepic et al (2012) focusing on farmers’ innovativeness and Austin et al. (2001) in their openness to experience as a determinant of organic farming.

To fill this gap, the objective of this paper is to find out whether winery manager’s personality, in particular the trait associated with openness to experience, influences the decision to produce organic wines. With the purpose of performing our aim empirically, we use a survey of 687 Spanish wineries distributed among the 68 appellations of origin that exist in Spain and complement it with qualitative information obtained from interviewing winemakers located in Spain.

This paper contributes to the improvement and broadening of current knowledge about organic wine production in several ways. Firstly, with respect to the organic wine production decision related factors, we evaluate a new factor under the behavioural perspective, manager’s personality, which has been increasingly used in the broader sustainability literature (e.g.,

Dessart *et al.*, 2019; Dwyer *et al.*, 2007). Secondly, we conduct our research in Spain, one of the leading organic wine exporters, exporting around 70 million euros per year (ICEX). Thirdly, given the importance of organic wine in the international market, it is essential to identify which factors affect the winery's organic production decision and further how a winery's organic production contributes to its export performance. However, most of the past studies on organic wine production focused on the direct and partial linkage between the winery's strategic factors and organic activity (e.g., Dejo *et al.*, 2022) and / or linkage between export performance and organic wine separately (e.g., García-Cortijo *et al.*, 2021). To accomplish this aim, the paper estimates the direct and indirect sequential relationships jointly between wineries' factors including an organic production activity and two dimensions of export performance, namely: volume-based and value-based performance.

Spain is the world's leading producer of organic wine thanks to its more than 130,000 hectares dedicated to this type of cultivation, which account for 13.8% of the national vineyard according to 2020 data from the Ministry of Agriculture, Fisheries and Food. On a global scale, it concentrates 27% of the total area dedicated to the cultivation of organic vines, which makes it the largest organic vineyard in the world in its own right, according to data from the Organization International of Vine and Wine (OIV).

This paper is organized as follows. In section 2 the factors on the organic production decisions are presented. In section 3 we describe the data and measures of variables employed. In section 4 we present our estimation method and results. Finally, we provide a summary and offer conclusions and implications in sections 5 and 6 respectively.

2. Literature review

Previous literature has used various definitions of organic wine, since there are different regulations and eco-labels related to organic certification which are only partially recognized and understood by consumers (Castellini *et al.*, 2017; Mauracher *et al.*, 2019). For the purpose of our study, we adopt the new standard, set by Regulation No. 203/2012 (EU), which identifies oenological techniques and substances to be authorized for organic wine, including a maximum sulphite content.

Many studies reveal that wineries' actions towards sustainable production have been generally accompanied with positive image towards organic wines for consumers (Carollo *et al.* 2022; Pagliarini *et al.*, 2013; Truant *et al.*, 2020; Wiedmann *et al.* 2014). Based on it, many studies have determined the premium price that consumers are willing to pay for an organic wine

(Mollá-Bauzá *et al.* 2005; Macht *et al.* 2021; Mazzochi *et al.* 2019, Sellers-Rubio and Nicolau-Gonzalbez, 2006; Wang *et al.*, 2022).

Other studies have analysed the effects of organic production on wineries' performance focusing on efficiency and profitability (Cisilino *et al.* 2021, Crescimanno *et al.* 2002, Pullman *et al.* 2009).

Thus, previous literature has focused on concerns related to climate change and consumer awareness on sustainability issues (Aprile *et al.*, 2012; Di Vita *et al.*, 2019; Maesano *et al.*, 2022). Similar to consumer's attitudes (Chinnicci *et al.* 2002), understanding what is in winery manager's mind and what drives his decision of wine production is crucial for knowing the determinants of organic wine production, especially as the wine sector, as a large part of the agro-food industry, faces the challenge of attaining sustainability (Ferrer *et al.*, 2022).

The main reasons to produce organic wine, have been addressed, at least to some degree, by the literature on sustainability (Castellini *et al.* 2014, Cobelli *et al.* 2021, Dodds *et al.* 2013, Fairweather, 1999, Hauck *et al.* 2021). Researchers have relied mostly on the resource-based view (RBV) to explain organic production as a winery's decision to ensure the continuous availability of resources, sustained profits and growth (García-Cortijo *et al.*, 2021). The norms of organic wine production (i.e., rules or regulations) has usually been examined using the institutional framework (Varia *et al.* 2021). To some extent, the Transaction Cost Economics framework which deals with the cost of participating in the organic markets (e.g., certification) may also play a role in the decision of organic production (Falconer, 2000). According to our interviewees, the primary motivation for wineries to produce organically has been that it provides competitive advantage in the long term. Other interviewees have acknowledged other strategic benefits of organic wines. For example, concerns about environmental impact, European funding for organic production, and market needs.

The theoretical approaches and the interviewees' opinions discussed above received empirical support in previous studies. For example, Dodds *et al.* (2013)'s study of wineries in New Zealand supported the RBV-derived assertions that internal factors are key motivating factors to implement sustainable practices. Using a sample of 157 Italian wine producers, Cobelli *et al.* (2021) found that performance expectancy, effort expectancy, social influences, facilitating conditions, attitude and self-efficacy have strong effects on producers' intentions and behaviour for adopting organic wine techniques and procedures. In some cases, however, studies provided a mixed or somewhat counter-intuitive evidence of organic production decisions or failed to find empirical evidence for arguments based on the traditional theoretical frameworks. Cobelli *et al.*

(2021), for example, found that the experience level of respondents in the sector is not important, contradicting the results of previous studies. In their study based on the analysis of resources and capabilities of Spanish wineries, García-Cortijo *et al.* (2021) found that having greater technological or financial resources seems to be insufficient and of little importance to adopt a sustainability policy. Thus, it may be that, while providing insights, the traditional theoretical approaches such as the RBV may not be able to fully explain the organic production decision. Alternatively, over the last years, researchers have increasingly suggested that behavioural factors can also influence farmers' adoption of environmentally sustainable practices (Austin *et al.*, 2001; Crase and Maybery, 2004; Willock *et al.*, 1999). Thus, ignoring these factors could result in an incomplete overview and limited theoretical understanding of the how and why of the decision-making process with respect to organic farming (Dessart *et al.*, 2019).

Behavioural factors

As explained previously, it is useful to make use of the assumption of rationality in economic behaviour as a starting point (Troussard and van Bayel, 2018). However, it is also important to acknowledge the presence of systematic violations of rationality in human behaviour.

On the basis of the “distance” between the behavioural factors and the decision-making in question, Dessart *et al.* (2019) distinguishes three types of behavioural factors: dispositional, social and cognitive. The first factor corresponds to individuals' internal variables such as personality, motivations, values, beliefs, general preferences and objectives (Malle, 2011). The second ones relate to wine producers' interactions with other wine producers and include social norms. Finally, cognitive factors, related to learning and reasoning, include wine producers' perceptions of the relative benefits, costs and risks associated with organic wine production activity.

In this study, we focus on the personality factor because it is probably the most stable behavioural factor (Dessart *et al.*, 2019), partly because it may have a genetic component (Pedersen and Reynolds, 2002). Moreover, it is directly related to other dispositional factors, such as resistance to change (George and Zhou, 2001) and/or risk tolerance (Frey *et al.*, 2017).

Wine production managers' personality characteristics consist in habitual patterns of thinking, feeling and behaving (American Psychological Association, 2018). In turn, these are related to the types of objectives, values and attitudes that managers hold (Willock *et al.*, 1999;

Grube *et al.*, 1994). Therefore, it is expected that they should be key to their wineries' activities and business performance.

While it has long been believed that managers can't change their personalities, it would be spurious to omit it from the analysis given its influence in the manager's decision model. Our approach to measuring personality is based on the so-called "Big Five" framework (McCrae and Costa, 1997). This is the most widely accepted taxonomy of personality traits in personality psychology (Almlund *et al.*, 2011; Shalender and Yadav, 2019). According to this framework, there are big five personality traits, with each capturing unique bundle of psychological traits (Boudreau *et al.*, 2001). Conscientiousness, the first factor, is associated with a strong sense of direction, self-discipline, persistence and performance motivation (Bono and Judge, 2004). Neuroticism is a personality trait that refers to emotional stability. Individuals high on neuroticism tend to exhibit poor ability to remain calm and balanced in stressful situations (McCrae and Costa, 1997). Agreeableness is associated with tendencies to be compliant and altruistic (Judge and Bono, 2000; Berry *et al.*, 2007). Extraversion is the degree to which someone shows sociability, communicativeness and enthusiasm (McCrae and Costa, 1997). The last factor in the model, i.e. openness to experience, is the tendency to be intellectually curious, open to stimuli, and creative (McCrae and Costa, 1987).

Of these factors, openness to experience is expected to be particularly important for wine producers' uptake of organic production practices. Wine production managers with open mindset are willing to change by nature, allow a unique working environment in which new ideas, behaviour and learning are accepted (Buss, 1991). Managers with high levels of the openness trait are typically more susceptible to innovation and seek risk and excitement in accomplishing new tasks (Judge *et al.*, 2002). The wine production manager's openness will focus on exploiting new opportunities that will be reflected in the innovative functioning of their winery. Perhaps these business ideas are not necessarily new ideas, but often improve existing solutions (Antoncic *et al.*, 2018).

Previous literature has corroborated empirically that openness to experience is significantly correlated with farmers' uptake of sustainable practices (Austin *et al.*, 2001; Crase and Maybery, 2004). As a result of the above studies indicating a positive openness-organic production relationship, the following research hypothesis is put forward:

Hypothesis: Openness to experience is expected to be positively related to wine producers' uptake of organic production practices.

3. Empirical design and methodology

This study is based on a quantitative analysis of 687 wine producers of all Denominations of Origin in Spain. We have also collected qualitative information by interviewing a group of winemakers located in different regions of Spain. We chose this industry for two reasons. First, the wine industry has become “hyper-globalized”. During the first two decades of the 21st century export volumes have increased by 66%. These days 50% of the volume of wine produced globally is exported, against only 20% in 2020. As sustainable and eco-friendly wines are increasing in popularity, winemakers are starting to embrace sustainable farming methods and they are adapting their logistics supply chain in the search for more eco-sustainable solutions that will minimize their overall carbon footprint (Villanueva *et al.* 2022). The adoption of organic methods may also help wineries in reducing energy and water costs while gaining a competitive advantage in an increasingly internationalized competitive and saturated environment. Second, the organic wine industry plays a fundamental role in Spain. Lately, organic wine production has gained popularity, and a greater number of wineries are integrating environmental and health-based considerations into their production routine, leading to changing their production processes from traditional to organic production in Spain (Dejo *et al.*, 2022).

This research project gathered data through online questionnaires sent by email with a hyperlink, which has been used to access wineries in Spain. Key Survey software was used for the online questionnaires. The research sample was obtained through convenience sampling. Eligibility criteria for the selection of respondents were that they belong to Denominations of Origin and the minimum sample size for the wineries sample was set to 10% of the population in each DO. The final sample included 687 wineries, located in 68 different DOs¹. The return rate has been about 18.79% of the total population of wineries belonging to a DO.

3.1. Description and measurement of variables

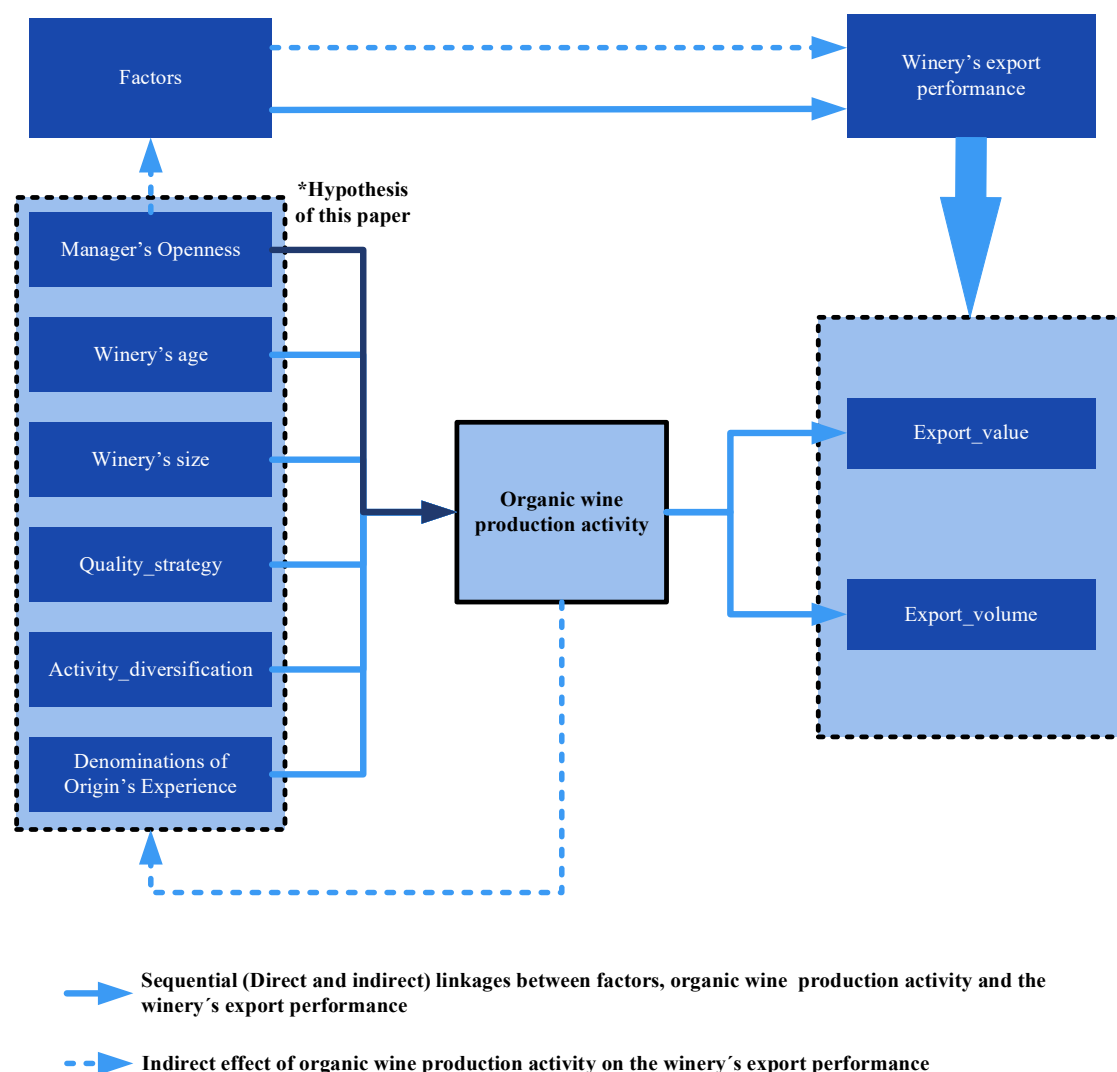
While necessary, a behavioural theory is not sufficient to provide a solid basis for the investigation of organic wine production decision if it does not allow for integrating, for example, the characteristics of the organizational environment in which a winery operates (Schneider, 1987).

In the search of a theoretical frame of the link between factors for organic wine production activity, and their influence on export performance, we consider how these factors

¹ In the region of Spain there are 70 Designation of Origins, but due to their small size, Málaga & Sierra Málaga DOs and Jerez-Xérès-Sherry & Sanlúcar de Barrameda DOs were joined.

are directly and indirectly linked to the winery's export performance. As depicted in a conceptual framework of factors, organic wine production activity, and export performance (see Fig. 1), a proper utilization of well-chosen factors like manager's openness, winery's age, winery's size, quality strategy, activity diversification and DO's experience, are directly and/or indirectly linked to organic wine production decision which, in turn, leads to a better winery's export performance.

Figure 1: A theoretical model explaining the sequential linkages between factors, organic wine production activity, and the winery's export performance.



Source: own elaboration

Manager's openness: The measurement of the openness dimension was done with four items. A representative item is "I am a person who does not like change". All the items were measured by using five-point Likert scales ranging from 1=strongly disagree to 5=strongly agree.

Winery's age: We controlled for winery age because older wineries might undertake entrepreneurial activities less frequently because of inertia (e.g., Hannan and Freeman, 1989). We adopt winery age as our measure of overall winery experience. It is measured as the natural logarithm of one plus winery age in years.

Winery's size: Since the capacity to manage the possible risks inherent in organic wine production may be proportional to the size of the winery (Liouville, 1992), we control the size of the winery. Moreover, small wineries may not have some of the advantages of economies of scale and scope in the organic wine market. Thus, progression to a more efficient production and market penetration in large scale and broad information networking in the organic market may increase a winery's capacity to compete in organic wine markets, resulting in higher organic wine production and higher export performance. It is measured as the natural logarithm of the number of winery employees.

Quality_strategy: Wineries with a quality strategy can choose organic wine production as a strategic lever for achieving product differentiation and to be more competitive on the market (Masson, 2009; Vecchio, 2013). A final 16-item measurement construct is validated to measure the winery's differentiation strategy. The Cronbach's alpha value is 0.9213.

Activity_diversification: In the wine industry, the concept of diversification refers to a risk management strategy that seeks to reduce wineries' dependence on wine production as well as generate additional income. By diversifying, the winery has an opportunity to develop other related activities such as enotourism that promotes environmentally sustainable production, and maintains biodiversity (Barbosa *et al.*, 2018). In this paper we use the count of the number of different diversified activities of the wineries.

DO's_experience: Behaviour within a winery can be the result of both wine producer manager's personality characteristics and the characteristics of the organizational environment in which a winery operates (Schneider, 1987).

A Denomination of Origin for wine is the system that is used in Spain to recognise and protect wine with regards to its quality, unique characteristics, origin and tradition. Each Designation of Origin possesses a Code of Practice, implemented by the Regulatory Body, which attains certain standards or quality levels (San Juan and Albisu, 2004). As they play an important

role in the control and management of wineries, we coded each denomination of origin as a dummy variable and calculate the experience in number of years of each one (in logarithm).

Organic wine production activity: The main objective of this paper is to understand the factors that lead to the voluntary adoption of organic wine production activities, regardless of whether it is government-supported or not. We don't consider wineries' decisions to comply with mandatory environmental regulations because the factors leading to complying are likely to be different from those leading to voluntary adoption (Hart and Latacz-Lohmann, 2005).

As being biodynamic is more restrictive than being organic, and the percentage of biodynamic wineries is very small in Spain, the group of biodynamic wineries is included in the group called organic wineries. Thus, a dummy variable that takes value 1 if the winery produced all organic wine was created. The reason is that most wineries that already produce organic wine in Spain, or wish to, convert entirely to organic production.

Export_performance: In our model we examine the antecedents and outcomes of organic wine production for wineries belonging to Denominations of Origin in Spain. Since the demand for organic wine in Spain is lower than the level of production, we assume that the interest in export markets is one of the main drivers for adoption of organic practices by the Spanish wineries. We expect that when wineries engage in organic wine production, they are more likely to succeed in export markets.

We use two alternative measures to capture export performance: (1) the relative share of exports in the total sales of a winery in euros, *export_value*; (2) the relative share of exports in the total sales of a firm in litres, *export_volume*. See table 1 for a description of variables).

Table 1: Description of variables

Variables	Questionnaire
<i>Manager's openness</i>	<p>I am a person...</p> <p>Who does not like the change (reversed item)</p> <p>Curious</p> <p>Open to new experiences</p> <p>Conventional (reversed item)</p> <p>A five-point Likert-type scale (from strongly disagree to strongly agree)</p>
<i>Winery's age</i>	2022-year of creation of the winery in logarithm

<i>Winery's size</i>	Average number of employees (permanent) in logarithm
<i>Quality_strategy</i>	<p>Indicate the degree to which your firm emphasized each competitive method below over the past 5 years:</p> <p>New product development</p> <p>Broad product range</p> <p>Efforts to insure highly trained personnel</p> <p>Strict product quality control procedures</p> <p>Building brand identification</p> <p>Developing and refining existing products</p> <p>Strong influence over distribution channels</p> <p>Major effort to insure availability of inputs</p> <p>Major expenditure on production process oriented R&D</p> <p>Only serve specific geographic markets</p> <p>Promotion advertising expenditures above the industry average</p> <p>Emphasis on the manufacturing of specialty products</p> <p>Concerted effort to build reputation within industry</p> <p>Innovation in production process</p> <p>Products in higher priced market segments</p> <p>Innovation in marketing techniques and methods</p> <p>A five-point Likert-type scale (from not considered to major emphasis).</p>
<i>Activity_diversification</i>	<p>The number of other products and services commercialized:</p> <p>Vegetable oil</p> <p>Fruits / Fruit Juice</p> <p>Regional food products</p> <p>Restaurant</p> <p>Hotel and Spa</p> <p>Rental for events</p> <p>Vineyard services</p> <p>Winemaking services</p> <p>Equipment rental</p>

	Wine marketing/distribution services Other
<i>DO's_experience</i>	<p>The experience in years of each denomination of origin (in logarithm).</p> <p>List of the denominations of origin: (1)Cava; (2) Condado de Huelva; (3) Málaga & Sierras de Málaga; (4) Jerez-Xérès-Sherry & Manzanilla Sanlúcar de Barrameda; (5) Montilla-Moriles; (6) Cangas; (7) Calatayud; (8) Campo de Borja; (9) Cariñena; (10) Somontano; (11) Abona; (12) Lanzarote; (13) El Hierro; (14) Tacoronte-Acentejo; (15) Gran Canaria; (16) Valle Güimar; (17) La Gomera; (18) Valle de la Orotava; (19) La Palma; (20) Ycoden-Daute-Isora; (21) Arlanza; (22) Cigales; (23) Rueda; (24) Arribes; (25) Tierra de León; (26) Tierra del Vino de Zamora; (27) Bierzo; (28) Ribera del Duero; (29) Toro; (30) Alella; (31) Montsant; (32) Cataluña; (33) Penedés; (34) Conca de Barberà; (35) Pla de Bages; (36) Costers del Segre; (37) Tarragona (38) Empordà; (39) Terra Alta; (40) Priorat; (41) Almansa; (42) Mondéjar; (43) La Mancha; (44) Ribera del Júcar; (45) Manchuela; (46) Uclés; (47) Méntrida; (48) Valdepeñas; (49) Alicante; (50) Utiel-Requena; (51) Valencia; (52) Monterrei; (53) Ribeira Sacra; (54) Valdeorras; (55) Rías Baixas; (56) Ribeiro; (57) Ribera del Guadiana; (58) Vinos de Madrid; (59) Binissalem; (60) Pla i Llevant; (61) Bullas; (62) Yecla; (63) Jumilla; (64) Navarra; (65)Rioja; (66) Chacolí de Álava-Arabako Txakolina; (67) Chacolí de Bizkaia-Bizkaiko Txakolina; (68) Chacolí de Getaria- Getariako Txakolina.</p>
<i>Organic wine production activity</i>	Dummy: 1 whether the winery makes organic production (certified) and/or byodynamic production (certified); 0 otherwise
<i>Export_value</i>	100- percentage of production sold on average in domestic market (value)
<i>Export_volume</i>	100- percentage of production sold on average in domestic market (volume)

Source: Own elaboration

3.2. Methodology

Path analysis, a causal modelling technique, was used to test the causal and sequential relationships between factors, organic wine production activity and winery's export performance. Particularly, the path analysis explored a wide variety of causal relationships between the factors and export performance with respect to organic wine production in the Spanish wineries. Sequential analysis has been used in previous papers in the wine industry (Fernández-Olmos et al., 2021; Díez-Vial and Fernández-Olmos, 2023).

A causality from factors to the winery's export performance through organic wine production activity or causal influence of organic production to winery's export performance through other factors may be a new insight into the sustainable production policy toward international competitiveness and trade performance in the wine industry.

The sequential model explains the direct impact of factors on organic wine production activity and direct impact of organic wine production activity on winery's export performance in addition to the potential indirect influence of the factors on winery's export performance.

4. Empirical analysis and discussion

Table 2 presents the means, standard deviations, and Spearman correlations for the variables employed in the model. The average winery in our sample achieved a foreign sales to total sales ratio (in euros and in litres) of 26% approximately. Among the wineries in our sample, 16.2% of them practice organic viticulture. The wineries had been established 23 years ago on average. The average size for wineries in the sample is nearly 4 permanent employees. Over half of the wineries sampled have diversified doing different types of activities. The descriptive results for the Spanish wine Denominations of Origins establish that they were created between 11 and 96 years ago, being the average 52 years. As a useful collinearity diagnostics we examine the bivariate correlations and variance inflation factors. Variance inflation factors, all of them below 1.38, do not indicate that the problem of multicollinearity among regression variables exists. Apparently, most factors with the exception of winery's age and DO's experience were positively and significantly correlated with organic wine production activity. Organic wine production activity was significantly and positively correlated with all export performance measures. Manager's openness, winery's size, quality strategy, and activity diversification were also positively and significantly correlated with export performance regardless of different dimensions of export performance measures.

Table 2: Means, standard deviations, and Spearman correlations among variables used (N=687)

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9
Export_value	27.170	28.584	1								
Export_volume	26.119	28.181	0.987*	1							
Organic	0.162	0.368	0.171*	0.185*	1						
Manager's Openness	3.726	0.675	0.186*	0.181*	0.118*	1					
Winery's_Age	3.155	0.880	-0.035	-0.044	-0.117*	-0.068	1				
Winery's_Size	1.339	1.113	0.400*	0.398*	-0.054	0.121*	0.321*	1			
Quality_Strategy	26.369	6.451	0.355*	0.360*	0.105*	0.312*	-0.107*	0.329*	1		
Activity_Diversification	0.822	1.098	0.122*	0.123*	0.084*	0.166*	0.070	0.244*	0.278*	1	
DO's_experience	3.957	0.608	-0.015	-0.020	-0.089*	-0.135*	0.115*	0.069	-0.175*	-0.172*	1
VIF						1.15	1.22	1.38	1.35	1.13	1.07

*p< 0.05

The hypothesized model was tested along with the research hypothesis to evaluate how openness to experience influences organic wine production decisions.

Table 3 and 4 display the causal nexus of organic wine production activity and the winery's export performance in addition to causal effects of factors on organic wine production activity and winery's export performance.

Table 3 presented the result of path analysis from the regression runs². The hypothesis of the paper proposed that openness to experience would have a positive causal relationship with organic wine production. This was supported in the model, manager's openness ($\beta=0.081$, $p<0.05$), suggesting that with greater openness to experience, organic wine production would increase.

Table 3: Results of path analysis: causal linkage between the "factors", organic activity and export performance

Proposed relationship	B	Adjusted R ²
<i>*Direct linkages between "factors" and organic activity</i>		
		0.0406
Manager's Openness on organic activity	0.081**	
Winery's_Age on organic activity	-0.050	
Winery's_Size on organic activity	-0.100**	
Quality_Strategy on organic activity	0.095**	
Activity_Diversification on organic activity	0.077*	
DO's experience on organic activity	-0.026	
<i>*Direct linkages between organic activity and export performance</i>		
Organic activity on export value intensity	0.151***	0.2041
Organic activity on export volume intensity	0.169***	0.2036

The values indicated the standardized estimate of the path coefficient (indicates standard error of coefficient) in the direct effect of organic activity on the export performance (i.e., factors → organic activity → export performance)

***p<0.001 **p<0.05 *p<0.01

² We present the standardized coefficients because they are more stable than unstandardized coefficients, and thus, they facilitate reliable interpretations of the results (Bentler, 1995; Hair et al., 1998).

With respect to the rest of factors for organic wine production activity in the sequential model, *quality_strategy* ($\beta=0.095$, $p<0.05$), and *activity_diversification* ($\beta=0.077$, $p<0.1$) were significant and positively related to organic wine production activity. Whereas the effect of winery's size on organic wine production activity was negatively significant at the 0.05 level, winery's age and DO's experience were not contributing to organic production.

The data revealed four types of factors that appear to come into play when winery managers make decisions related to producing organic wine. First, it is found that that winery manager's openness play an important role in organic wine production decisions in the context of Spanish wineries, supporting the hypothesis of this paper. These findings are consistent with the behavioural perspective in sustainable practice research that decisions related to organic wine production does not always follow the rational economic choice model. Some wine producers are changing their behavior to integrate environmental considerations into production choices. Their environmental consciousness and the impact that winery activities have on natural resources and the environment is expected to be considered by consumers in their purchases (Barber *et al.*, 2009).

In Spain the adoption of a high quality wine strategy appears to have a positive influence on the organic wine production decision. In fact, organic agriculture is a way to differentiate agro-food products, such as wines, based on the positive image of producing organically (Mollá-Bauzá *et al.*, 2005).

Although the measure used for activity diversification in the business model of the winery could be questionable (i.e., we only count the number of activities without considering the degree of diversification), the degree of diversification in winery business is likely to be, to some greater extent, a significant determinant to promoting organic wine production. In response to the potential impact of uncertain events, wine producers can implement various risk management strategies with respect to their production plans (Maesano *et al.*, 2021), and it could include diversification in organic wines.

Contrary to our expectations, the size of the winery is negatively related to organic wine production and export performance. It contrasts with Koesling *et al.* (2008) that obtained that larger farms are associated with organic producers. The small size of organic wineries relative to conventional ones can be due to two main reasons. First, organic production is generally perceived to be more risky than conventional production as organic winegrowers are restricted in the use of pesticides and artificial fertilisers that may help the winegrower in reducing production risk (Van Bueren *et al.*, 2002). Second, vertical integration is one of the strategies implemented in organic wineries to control the entire production process from vineyard planting to the finished wine. However, when the winery size is large and needs large quantities

of grapes, winery managers could have difficulties to control vineyards which are not near the winery (Fernández-Olmos *et al.*, 2009). This could explain the negative association between size and organic wine production activity.

Interestingly, we found no distinguishable differences in the decision to produce organic wine related to other characteristics of wineries. Although age is an important consumer attribute that influences their willing to buy an organic wine (Moscovici *et al.*, 2022; Nieto-Villegas *et al.*, 2022), in our sample younger wineries were no more likely to produce organic wine than older wineries. This result is in line with previous papers such as that of Dejo *et al.* (2022), who found that winery organizational experience plays no significant role in terms of explaining organic wine production. These findings complement the literature on organic production by suggesting that organic production choices are not always a result of careful analysis that can be influenced by the idiosyncrasies of the wineries' background.

Likewise, experience of Denominations of Origin did not appear to play a role to favour organic wine production. Based on Zollo and Winter (2002), it is expected that experience leads institutions to adjust their strategies as they obtain new information (i.e., experiential learning). However, Regulatory Councils of Denominations of Origin are heterogeneous in their efforts designed to assist wineries' organic production. Regulatory Councils' contributions can be divided into export-supporting activities, skill-complementing activities, and technical assistance (Fernández-Olmos and Depetris Chauvin, 2022). Our argument is that supporting activities of Regulatory Countries are more important than the number of years of the existence of Denominations of Origin in promoting organic-wine production and then, improve export performance.

The results in the sequential path analysis model (see table 3) show a positive direct effect of organic wine production activity on winery's export performance regardless of different measures of export performance ($\beta=0.151$, $p<0.001$ for export_value; $\beta=0.169$, $p<0.001$ for export_volume). These findings support the traditional notion of the significance of organic wine production to build up the competitive edge in the international wine market (Menguini, 2018).

Table 4 shows sequential and causal effects of factors and organic wine production on export performance with respect to both measures of export performance. Manager's openness, quality_strategy and activity_diversification have positive and significant indirect effects on both export performance measures. It means that they provide the incentives for wineries to produce organic wine and, in turn, to achieve greater export performance. Also interesting, is the negative and indirect significant effect of winery's size on winery's export performance. This may be due to the fact that the possible risks inherent in exporting organic wine may be proportional to the size of the winery.

Table 4. Decomposition of variance: sequential effects of factors and organic wine production activity on winery's export performance

Variables	Winery's export performance				
	Export_value		Export_volume		Total
	Direct	Indirect	Direct	Indirect	
<i>Organic activity</i>					
Direct effect	0.151***	-	0.151***	-	0.169***
Indirect (causal) effect					
Manager's openness	-	0.012**	-	0.014*	0.014*
Winery's age	-	-0.008	-	-0.009	-0.009
Winery's size	-	-0.015**	-	-0.017**	-0.017**
Quality_strategy	-	0.014**	-	0.016**	0.016**
Activity_diversification	-	0.012*	-	0.013*	0.013*
DO's experience	-	0.004	-	-0.004	-0.004

Note:

- Values indicated the standardized estimates of the coefficients (direct, indirect and total effect)
- Direct effect of organic wine production activity on the winery's export performance from factors (factors → organic activity → export performance)
- Indirect effect of organic wine production activity on the winery's export performance from organic wine production activity (organic activity → factors → export performance)

***p<0.001; **p<0.05; *p<0.01

5. Conclusions, implications, limitations and future research

5.1 Conclusions

The decision to produce organic wine is one of the most critical winery decisions with implications not only for a winery's export performance and its ultimate survival but also for the wine industry and Spanish economy given the increasing awareness of biodiversity and sustainability culture.

The aim of this study was to examine the factors surrounding the organic wine production decision using a behavioural perspective. Specifically, we examine whether, besides the commonly acknowledged organic production decision related factors, such as product quality,

differentiation and firm size, there are other influences reflecting personal characteristics of the decision makers. Thus, we attempted to gain insight into the role that non-economic factors play in winery managers' decisions related to producing organically. The path analysis model of a sample of Spanish wineries belonging to a DO provides evidence that the decisions about organic production sometimes do not follow the prescriptions of the traditional theories commonly used to examine organic production, including, the RBV or institutional frameworks.

This study contributes to the existing literature on organic wine production with two contributions. First, by offering richer insights into the factors leading wine production managers to change from conventional to organic production methods. Specifically, the study shows that wine production managers are susceptible to make decisions to whether produce organic wine or not that may not be consistent with the current theoretical models based on economic efficiency. Instead, these decisions are, in part, based on their personality traits. Thus, this paper finds evidence that the behavioural approach provides a more complete picture of the organic production decision for wineries across different Spanish Denominations of Origin (DOs). In fact, our findings suggest that the behavioural perspective may differ in its predictions from the more traditional models. Specifically, personal factors may lead to decision makers to lean toward "wine-production manager-focused rationality" in their organic wine production decisions which may be in contradiction to "winery-focused rationality", or rationality that maximizes the economic interests of the winery. This behavioural aspect is directly congruent with organic wine production, but has been ignored and / or has not been extensively investigated in most previous quantitative studies of organic production.

The second contribution of this study is to provide a more nuanced explanation of organic wine production and the reasons why wineries export their wines. Although organic wine production is influenced by winery characteristics (~~Dejo et al., 2022~~), an investigation of the sequential relationships between wineries' heterogeneity (e.g., winery size, winery age, diversification, quality strategy, etc), organic wine production, and export performance, particularly with respect to diverse measures of export performance, is missing. Previous studies relating to organic issues examined the partial associations between business heterogeneity and organic production and / or organic behaviour and export performance. However, this paper has attempted to investigate the direct and indirect sequential relationships between wineries' factors including an organic production activity and two dimensions of export performance, namely: volume-based and value-based performance. By taking into account wine producers' / managers' attitudes affecting organic wine production decision, it adds to the growing stream of sustainable and international business literature grounded in the behavioural paradigm. We

believe that the behavioural perspective, as a theoretical complement of economic models, offers new opportunities to discover novel mechanisms that contribute to a better understanding of organic production decisions.

5.2 Implications

This paper has important implications for academics, managers and policy makers. First, it provides theoretical support for the behavioural perspective in the research on organic wine production decision. In the literature on organic production decision, insights on the role of decision makers and the impact of their personality on their organic-production related decisions are currently lacking. The findings of the present study indicate that they can have a powerful influence on whether or not to opt for organic production. Second, and even more importantly, the results reveal the relevance of distinguishing in the context of organic-wine production decisions the rationality from the point of view of the winery's interest as a whole and the individual-winery manager rationality, as suggested by Buckley *et al.* (2007). Specifically, our study provides some understanding of the nature of wine-maker preferences by suggesting that in certain cases winery managers' behavioural traits can lead to decisions that could potentially contradict predictions of widely accepted theoretical models exclusively based on the assumption of economic rationality.

Besides the academic implications, this study should be of interest to wine makers, winery managers and policy makers. For policy makers support of organic production to be effective, it is important to understand how wine makers become conventional or organic wine producers and, in particular, by considering not only strict economic factors as the reasons that lie behind wine-makers' choices of production methods. In particular, policy makers may use the insights provided by this study by appealing to the openness side of the wine makers / managers.

5.3 Limitations and future research

As with all studies, there are some limitations in our research. The hypothesis considered in this study may not be complete. The adjusted R² is very low and the development of organic wine production could be greatly encouraged by other factors not included in the model such as macroeconomic or policy factors (Hou *et al.*, 2022). In particular, the presence of abundant winegrowers is essential for organic production sector which is labor intensive. Likewise, the median household income is expected to increase organic wine production. Finally, support from regional government including Regulatory Councils is conducive to the production of organic wine. Nevertheless, future research investigating all these variables not considered in the study is recommended.

The findings of this study are limited by the type of sampling procedure and by the geographical location. Further data collection in additional countries may be needed to confirm that these results are generalizable across the entire wine producers' population, and more evidence on organic production decision in other agri-food products could be useful to support our results. Moreover, our work has not considered the fact that in the European Union there are regulations that affect wine and grape organic production practices. Further research should analyse the interplay between the rules that govern the organic production and the factors considered in our model.

The development of functional wines appears to be a long-term trend with important market potential. As a consequence, wine industry is witnessing developments trying to expand the functional attribute to new groups of wines. A good example is the the reduction of sulfites applied in the European definition of organic wine. Future research could study how this functional attribute affects the willingness to produce organic wines.

Overall, this study was designed with the objective to add to the current literature on organic wine production decision by drawing on the behavioural perspective. Our research illustrates the complexity of the factors that influence decisions to produce organic wine and subsequent influences on export performance. Since the organic wine sector remains in a relatively early developmental stage, we expect that the insights provided by the study stimulate future work, so as to deepen knowledge on this important subject.

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