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INDICATORS FOR CHARACTERISING TECHNOLOGY AND MARKET TYPES IN PROTECTED DESIGNATIONS OF ORIGIN OF WINE

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1. INTRODUCTION

Vine growing has formed part of the Spanish agricultural landscape since ancient times (QUESADA, 1994; BLÁZQUEZ, 1998; BURILLO, 2010). Today 90 Protected Designations of Origin (PDOs) are active in Spain. The wine sector is clearly important in the country's historic and cultural heritage, its landscape and economy.

Although the designations of origin operate under the same protection system, their marketing model can differ. Some areas focus more on elite markets comprising a small number of consumers and other PDOs target larger markets. Other differences mainly concern the production model: the way production factors are combined differs in each designation. Lastly, recognition of the wine's quality and its sales price vary considerably, not only between brands or wineries, but also, when averages are analysed, between production areas.

Production model characteristics, marketing issues and the predominant form of competition are aspects that can be considered when analysing the sector's structure, comparing production regions and identifying homogenous PDO groups. The worlds of production theory (SALAIS et al., 1992) provides a suitable study framework since it analyses industrial activity based on two main dimensions—production technology type and destination market type—leading to some specific conventions that include the competition model.

The purpose of this study is to define some intelligible indicators for technology type and market type for the PDO wine classification adopting the framework of the worlds of production theory.

2. THEORETICAL FRAMEWORK

SALAIS *et al.,* (1992) posited the existence of four product types, each characterised by a specific competitive model based on a combination of two dimensions: the type of production technology and the type of destination market. The technology type differentiates specialised products, for which the knowledge required to produce them is not generalised, from standardised products, for which the knowledge to produce them is widely known and economies of scale appear in their production. The market type differentiates dedicated markets, where product personalization based on customer preferences predominates, from generic markets, where demand is predictable and comprises anonymous consumers. The crossover of these two main dimensions enables us to identify the four worlds of production.

2.1 THE WORLDS OF PRODUCTION

The interpersonal (specialised-dedicated) world is the one in which personalised high-quality products are marketed. Competition between companies in this world of production focuses on product attributes above price.

In the market (standardised-dedicated) world, differentiated products produced with a high level of automation are marketed. Competition in this type of product focuses on price. However, as companies must meet the differentiation requirements for this market niche, there

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is some internal tension between price and product attributes.

In industry, the world of innovation (specialised-generic) is related to the development of new products targeted at the general public, although they are manufactured by a small group of experts due to their novelty. Wine is a consolidated product; although innovation can be introduced in its production processes, the product itself has been around since ancient times. Consequently, quality wines can be found in this world of production targeted at large-scale markets at a medium-high price.

The industrial world comprises mass consumption products with well-known attributes and an easily attainable quality under industrial standards, thus enabling production to be automated (SALAIS *et al.,* 1992). All the products in the industrial world have similar quality standards so competition focuses on prices.

2.2 PRODUCT DIMENSIONS

2.1.1. Technology type

The type of technology differentiates between specialisation and standardisation. In the former, production is small-scale and restricted to a small group of experts, while in the latter it is widespread and prone to automation. Mechanisation of agricultural tasks and the introduction of high-yield vines have decreased the burden of labour costs and the work–capital ratio, while the surface area per vine grower has increased. In the new wine culture context, wineries' search for a homogenous product has helped the château vineyard-winery model gain importance (SÁNCHEZ *et al.,* 2010; ESCALONA *et al.,* 2013). This winery model, in which grape production is restricted to a small group of specialists, can be contrasted with the cooperativist model, in which a large number of small vine growers supply grapes to a single winery. The presence of large cooperatives, which foster economies of scale (SALAZAR *et al.,* 2011) and produce large volumes of wine, can be used to contrast with Vinos de Pago (a PDO, "estate wines", in which the vineyard and the winery belong to the same company; these wines have their own quality management system from the vineyard to the market) to define the dominant technology type in each designation (ESTEBAN, 2016). As SÁNCHEZ *et al.,* (2010) posited, the supply of grapes by a large network of vine growers is related to the standardised industrial model compared with the specialised Vinos de Pago model.

2.1.2. Market type

Market type differentiates between generic and dedicated depending on the product's target consumer. Small market niches, filled with a limited product supply, are related to dedicated markets (MURDOCH *et al.,* 2000; KIRWAN, 2006). In contrast, the number of potential consumers in generic markets is high and consumption is predictable. KIRWAN (2006) highlights the importance of direct contact between producers and purchasers in dedicated markets, which tallies with the viewpoint put forward by SALAIS *et al.*, (1992) on how product attributes are negotiated. Long distribution chains are related to generic markets (STRÆTE, 2008) and in the wine sector they include sale in supermarkets (ADINOLFI *at al.,* 2011). Long homogenous product series are required to supply supermarkets.

3. METHODOLOGY

To classify wine PDOs based on the worlds of production theory and indicators across several wine years, they must be in line with theoretical assumptions, be collected homogenously for all the PDOs and their variations must be due to changes in technology type or market type conditions.

3.1 SOURCES

Aggregate information on designations of origin can be obtained in the figures and data on Protected Designations of Origin published by the Ministry for Agriculture, Food and the Environment (2000–01 to 2014–15 series). This source provides registration, production, storage and marketing data. Information can also be aggregated at a designation level by working with wine brand or winery sources. Wine directories provide information on the brands each winery markets in every season. Participation in wine competitions and the recognitions a winery obtains can also be aggregated at a designation level. We chose El País wine directory (2002, 2005 and all the editions from 2007 to 2014) and the Bacchus competition (2004, 2006, 2008, 2010 and yearly from 2012 to 2016).

3.2 SET OF INDICATORS

Based on the theoretical assumptions, available sources allow us to construct several indicators for technology type, market type and form of competition. These indicators are analysed in the results section.

4. RESULTS INDICATOR SELECTION

4.1 TECHNOLOGY INDICATORS

To establish an order based on winery size, the volume wineries market is more appropriate than the classified volume, despite its limitations, because its interannual fluctuations are less affected by environmental variations. In practice, the PDO type only enables us to differentiate between Vinos de Pago and the other types. In contrast, the vine grower-winery relationship, which is well described by the ratio of vine growers per winery, provides a comparison between the Vinos de Pago and the large cooperatives model. The size of the vineyard helps us analyse its structure; large sizes are related to standardised technologies and small sizes to specialised technologies. The surface area indicator per winery is highly appropriate for providing a general overview of the technology type. Small vineyards mean more specialisation, although they are unlikely to be a winery's only supplier. Consequently, they form the bulk of the vine growers in cooperatives, which are supplied by large surface areas of vines. The opposite occurs with Vinos de Pago; although the vineyard is larger, just one specialised vine grower supplies one winery. This duality advises the use of indicators combining both dimensions, for example surface area per winery.

4.2 MARKET INDICATORS

With the data currently available, the volume of stored wine per marketed volume ratio does not enable us to distinguish between stored wine types (for example ageing phase or ready for sale), thus making it difficult to use it as a market type indicator.

A higher number of brands is related to poor production segmentation, while less diversity is related to generic markets comprising mass consumer goods and similar characteristics. However, it could create confusion when analysing wineries or designations in other technological contexts; generally, wineries marketing a higher volume of wine have a higher number of brands, although this fact does not directly indicate that these brands are targeted at small markets. Given that large wineries classify and market a higher volume of wine than others, to discover the end market size each brand is targeting and the level of production segmentation, it is advisable to combine the number of brands per winery with the marketed volume. This may result in the average brand size indicator, which can be related directly to the size of the market each brand is targeting (ESTEBAN, 2016).

4.2.1 Average price and awards for marketed volume

The theory posits the existence of differences between worlds of production in forms of competition. Consequently, these indicators should be set aside to verify the results.

4.3 TECHNOLOGY, MARKET AND COMPETITION

A classification was made using winery surface area and average brand size. In this classification, surface area values per winery above the median correspond to standardised technologies and below or equal to the median they refer to specialised technologies. Brand size above the median corresponds to generic markets and below or equal to the median to dedicated markets.

The results we have obtained are similar to the results obtained by Esteban (2016): the average price in the studied series is higher in the interpersonal world (€501.33/hl) and in the innovation world (€462.89/hl) than in the market world (€343.04/hl) and in the industrial world (€255/hl). The differentiated quality indicator is higher in dedicated markets, namely 2.36 medals for every 10,000 hl in the market world and 1.95 in the interpersonal world. In contrast, it is lower in the innovation world (0.98) and, especially, in the industrial world (0.5). The values obtained with the proposed classification indicators fit the theoretical assumption of the worlds of production.

5. CONCLUSIONS

Characterising the axes for the diagram of the worlds of production is complex since several elements coexist in each of them. The indicators we have studied that are significant for characterising each axis are a limited set: in the technology axis, the indicators that are most in line with the theoretical assumptions in the sector are the number of vine growers per winery and vineyard size, in other words, a winery type indicator (Vinos de Pago or cooperative) and a vineyard characteristics indicator. We can use these indicators to arrive at the surface area per winery indicator, which shows the size of the vineyard supplying each winery. High scores correspond to standardised technology and low scores to specialised technology.

The market type can be defined by supplementing the differentiation indicator, average number of brands per winery, with the marketed volume to arrive at an approximation of the market size targeted by each of the wine brands. High levels of personalisation—dedicated markets—correspond to small brands, while generic markets correspond to large brands since long series are required to supply supermarkets.

These proposed elements can be used to produce a classification of designations based on the worlds of production theory. The results we have obtained are consistent with the theoretical model.

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