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# Customer relationship management (CRM) and Innovation: A qualitative comparative analysis (QCA) in the search for improvements on the firm performance in winery sector

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ABSTRACT

The main objective of modern Information Technology (IT) is to convert the transactional data derived from productive activity into business management information. It should, therefore, provide the Business Decision Makers (BDM) elaborate, meaningful and essential information for decision making. Customer Relationship Management (CRM) is one of the IT areas that has grown the most in interest and development during recent decades, due to the potential that CRM offers its users to have a global vision of their clients and to put them at the center of their business efforts. Given the potential that the CRM technological solution offers to successful companies in the business world, this study determined the necessary and sufficient conditions to obtain good firm performance (the outcome) when CRM is implemented and used in a company. For this purpose, the Qualitative Comparative Analysis (QCA) methodology was used. The empirical test was carried out in the sector of wine production and distribution in Spain.

## 1. Introduction

One of the most important differential values in companies that survive in an increasingly dynamic and competitive market today is their capacity for innovation and adaptation to the environment (Dew et al., 2011; AlQershi et al., 2020). Technology is one of the basic pillars that allows companies to face their challenges in the field of innovation, both in products and in processes (Nambisan et al., 2017). The increasing variability and demand due to the expectations of customers, who are part of a society that has increasingly greater and better access to information, imposes the need to face digital transformation in entrepreneurial companies (Kane et al., 2015) and to have the most appropriate management information to meet such customer demands, so one of the technological areas in which it is most important to be up-to-date is that of business management systems (Ribeiro-Navarrete et al., 2021). In the search for the most efficient management systems that allow companies to successfully face their digital transformation processes, CRM emerges (together with ERP systems) as one of the business solutions with the greatest impact and relevance today (Saura et al., 2019a;Heavin and Power, 2018).

The fairly widespread perception that small and medium-sized enterprises (SMEs) have a lower level of digitization suggests that sectors with smaller, more family-run companies are where the greatest difficulties can be found in facing the challenge of process digitization (Müller et al., 2018; Saura et al., 2019b). However, the very weakness of size in this aspect can be transformed into a virtue if its greater flexibility is taken into account to face innovation and change in its procedures. The wine production and distribution sector in Spain fits perfectly into this typology of SMEs with difficulties in facing digital transformation, in addition to being one of the most representative of the national economy and of the national tradition (Tecnovino, 2018; MAPA, 2020). These are the two main reasons why this study was carried out in the Spanish winery sector.

There is not a wide background in the literature covering the use and impact of Information Technology (IT) in the winery sector, raising the question about why this sector does not arouse interest in studying the

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impact of the use of new technologies and therefore becoming in a very interesting development opportunity. Searching for published information on CRM and the wine industry yields even fewer results. In none of the studies published on CRM and the wine sector are the most relevant conditions analyzed that can be postulated as necessary and sufficient for there to be good performance in companies that use CRM intensively, which is the main objective of this study. In the search for evidence that digital transformation can help SMEs to successfully face their challenges related to innovation and adaptation to the economic and social environment, the main objective of this study is to analyze the conditions and requirements that can make use of CRM systems leading to firm performance improvements in the Spanish winery sector, SMEs and family-run companies being its main representative typology of companies. Digital transformation, in which important tools such as ERP, CRM, and Social Media participate, appear as the keys to the development of a sustainable business for any productive sector (Oltra-Badenes et al., 2019; Vicedo et al., 2020; Reyes-Menendez et al., 2020; Saura et al., 2020)

To achieve this objective, this paper begins by defining the theoretical framework on which to work, both from the point of view of the sector under study (that of the production and distribution of wines in Spain) and from the point of view of the technological solution on which the study is based (the CRM systems and the main dimensions that identify it). The next stage is the definition of the database used, as well as the selection process of the representative sample of the population. The methodology used for the empirical validation of the conditionality relationship (need and / or sufficiency) between the main variables that define the chosen research model is described below. Finally, the results are presented, as well as a discussion about them and the conclusions obtained.

## 2. Literature review & related work

### 2.1. The wine sector in Spain

The aggregate economic dimensions of the wine sector in Spain justify the development of this empirical study in this sector. In Spain there is a stable number of wineries that fluctuates every year around 4.300 wineries, specifically 4.373 wineries in Spain at the end of 2018 (Tecnovino, 2018), with a tendency to continue growing in the coming years. This is confirmed by the Spanish Wine Market Observatory (OeMv), that reports the increase in the number of wineries in Spain in 2018 to a total of 4.373 wineries, that represent 280 more than in 2017 (OEMV, 2018). These are data as of January 1st 2018, provided by the Central Business Directory (DIRCE) of the INE. This includes large groups of winemakers, family wineries and medium-sized wineries (the volume is calculated based on the kilos of grapes and liters handled, rather than the number of employees or billing). The value of the production of the wine and must sector, according to the estimation of the Agricultural Income of 2019, has grown by 26% compared to the previous year, amounting to 2142.8 million Euros (estimate in current values at basic prices), contributing 8.02% of Vegetable Production and almost 4.8% of Agricultural Branch Production. The workforce that generates the cultivation of the vineyard has close to 18 million workers (MAPA, 2020). Statistical data from the Ministry of Agriculture, Fisheries and Food (MAPA) states that in Spain the area planted by vineyards according to data from the Viticultural Registry of each autonomous region as of July 31st 2019 amounts to 957,573 hectares. The production of wine and must in Spain is characterized by its great variability from one campaign to another due to the strong dependence of the crop on weather conditions. Thus, the average of the last five campaigns (2008/2009 to 2012/2013) reached 38.6 million hl. In recent years, crops ranging from 21 million hectoliters in the 1994 campaign can be found, until the production of the current campaign that will be a record production.

In any study on the sector of wineries in Spain, it is essential to understand the concept of "Protected Designation of Origin" (PDO) that makes any study carried out in this sector especially relevant. CECRV (2020) says that the PDO were born to differentiate wines of recognized prestige. PDO is a quality brand that accompanies all companies and products in the sector where the objective of quality and satisfaction to the Customer is essential. Currently, in Spain there are 70 PDOs related to wines (among the 95 Spanish protected designations of origin).On the other hand, a Denomination of Origin (DO) is a concept that identifies a product originating in a particular place, whose quality or characteristics are fundamentally or exclusively due to a particular geographical environment, with the natural and human factors inherent to it, and whose production phases take place entirely in the defined geographical area.

#### 2.1.1. CRM and winery sector

The large winery groups in Spain usually have technological departments that develop their technology from the manufacturer's core. They generally have agreements with IT technology companies and develop joint plans in which both parties benefit. Often, they depend on large investment groups, groups of companies in the food sector, and multinational groups. On the other hand, the majority of wineries are family-run and do not require a large amount technology, because there are very few employees and the management processes are simple (Tecnovino, 2017). They usually work with basic accounting and billing programs and some field application or warehouse management, which when they fall short of functionality are replaced by integrated management systems such as Enterprise Resource Planning (ERP) or Customer Relationship Management (CRM).

The current reports certify that the majority of Spanish wineries are Small and Medium Enterprises (SME), in many cases family-run businesses (MAPA, 2020; OEMV, 2018), and have difficulty in facing the challenge of digital transformation and the adoption of modern business management technologies, such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM).

#### 2.1.2. Previous studies on wine sector

There are very interesting previous studies on the effect of using CRM and even more concretely some variants or components of CRM such as Social Web communication. Iazzi et al. (2013) observe and analyze the contributions made by social media in redefining firm-client relations in the wine sector as a support for CRM systems. This study analyzes the emerging trends in the use of Web tools in the wine sector, identifying the main purchase determinants that lead the choice process of consumers and developing new guidelines for the effective implementation of the instruments observed. This will help companies to better manage the social media communication tools called sCRM applications as well as their related marketing strategies.

Belias et al. (2018) review from a critical point of view the existing literature about the impact of using CRM in the wine, winery, and wine tourism sectors, concluding that there is still a long way to go before having a clear picture of the benefits that the use of CRM is expected to bring to these sectors. The hints reflected in the existing studies about CRM impact on firm performance, together with the ones referring to the winery sector's modernization, predict a clear positive expectation about the impact of using CRM on firm performance indicators, but there are still no concrete studies about it. It is interesting to note that this study is focused on the **Greek tourism wine sector**.

Crescimanno et al. (2017) conducted another local investigation related to the wine sector and IT, specifically reviewing the impact of Social Media (SM) on the **Italian wine sector**. In this case the study shows the clear effects of SM on the corporate image and the customer relationship management developed through all the company's departments and statements. In this case the CRM technological solution is not the protagonist, nor the study focus, but it seems to show an interesting way for further investigation and research.

Ferrer-Lorenzo et al. (2017) conducted a specific **Spanish wine**

**Table 1**
Similar research. Source: the authors.

| Author | Research |
|---|---|
| Iazzi et al. (2013) | Impact of the use of Social Web Communication and CRM in the marketing strategies of wine enterprises. |
| Belias et al. (2018) | Literature review about the expected impact of using CRM in Greek tourism wine sector. |
| Crescimanno et al. (2017) | Study on the impact of Social Media (SM) on the Italian wine sector. |
| Ferrer-Lorenzo et al. (2017) | Study on the different impact of using CRM culture (not CRM technology-based solutions) in Spanish wine companies |

**sector** study, examining the firm's performance differences. In this case the core of the research line comes with the differences between business groups and independent companies, pointing out the impact of size and structure differences. One of the conclusions refers to the more complex and conscious way that big companies use for driving customer centered marketing strategies, always through customer relationship management strategies, but not always through CRM technological solutions. The objective of the business groups using modern knowledge management technologies is frequently to share common information.

Table 1 shows the different studies where the wine sector is linked directly to the use of IT solutions.

### 2.2. Relevance of CRM as a modern business technological solution

The first indications of the CRM technological solution appear in the 1970s, in its beginnings being a clearly and exclusively focused solution for the automation of the sales force (Buttle, 2004). The CRM management solution was initially composed of three modules: sales, marketing and services, which are the three classic axes of the global business management of customers (Chen and Popovich, 2003). In the current dynamic business world, the customer-centered approach is the key to business success (Joo, 2007), for which the use of CRM provides a key component to achieve customer loyalty and attain their trust (Huang and Lin, 2005). This technological solution is gradually expanding its scope of action, and always within its strategic customer-centered management approach, towards the field of marketing and customer service and support.

The bibliometric analysis of the CRM field of study using scientific research methodology, shows the relevance of CRM within the business field as a key solution for the success of business decision makers in the development of their daily functions (Araújo et al., 2018), as well as within the field of scientific research, has grown definitively from the year 2000, and in an exponential form from the year 2010 (Guerola-Navarro et al., 2020a). This quantitative approach to the CRM reality, together with the qualitative approach provided by an extended Literature Review (Guerola-Navarro et al., 2021), provides a clear picture of CRM as a growing focus of scientific research, with a still not very abundant battery of reference studies, but with a continuously growing bibliography database that makes CRM one of the basic pillars of study in the field of the pursuit of business excellence through Customer-centered management strategies (Wahlberg et al., 2009).

The main strength of CRM as a business tool is the sustainable model of benefits that it provides to the companies that use it properly and intensively. Not only the present exploitation (through efficient customer knowledge management) of the tool for managing customer relationships, but also the exploration (through innovation capabilities) of new future benefits that provide the companies the opportunity to reach and maintain a long-term sustainable partnership with customers (Gil-Gomez et al., 2020).

### 2.3. CRM practices

Like any business management tool, CRM can be used to different degrees of intensity by its users, with different purposes as well as in different areas of functionality. A starting point in the analysis of the conditions that lead to CRM producing a good outcome (firm performance) is to have a way to establish the level of effective use of CRM in companies, which is known as "CRM Practices".

Recent studies have established different approaches for defining, measuring, and using the CRM degree of usage in the companies as a condition. Li et al. (2019) proposed a two-stage model for CRM value, with operational and strategic benefits and targeted firm performance, including an initial independent variable called "CRM Usage" in their model. One of the main conclusions from Li et al. (2019) is that Operational and strategic benefits of CRM usage improve firm performance. In this case, as per performing a quantitative analysis, CRM usage for a firm is calculated as the revenue-weighted average proportion of CRM use among all the subsidiaries of that firm. Kebede and Tegegne (2018) use the "CRM Practices" concept to identify the degree of CRM usage, defining CRM Practices as: Key Customer Focus, Knowledge Management, CRM organization and Technology-Based CRM.

In previous studies, Reinartz et al. (2004) consider the degree of use of CRM through three stages or dimensions: relationship initiation, relationship maintenance, and relationship termination. The vision of the use of CRM by Reinartz et al. (2004) is therefore to establish what influence CRM has in each temporal phase of the development of the relationship with the client. It is not an approach that quantifies or values the degree of use, but the use phase of CRM. Azad and Ahmadi (2015) define five elements influencing CRM use and its impact: customer relationship technologies, customer oriented, enterprise development strategies, customer services and business plan.

In a very recent research model, Valmohammadi (2017) highlights the importance of the degree of use of CRM in the measurement of its impact on business results. Valmohammadi (2017) uses five elements for measuring the level of use that any company may have:

- Information sharing,
- Customer involvement,
- Long-term partnership,
- Joint problem-solving,
- Technology-based CRM.

With the appropriate scale, these five elements provide a clear picture of how much the CRM tool capabilities are being used by the companies (Valmohammadi, 2017). This modern, current approach is the one that comes closest to the planning of the study of the conditions of use of CRM in the empirical environment in which this study was developed, as accepted by some recent study models (Guerola-Navarro et al., 2020b) and which is therefore the one used for the current empirical study.

### 2.4. Innovation

Pisano (2015) highlights the innovation strategy as one of the key drivers for leading and sustaining performance, giving sense to some efforts such as R&D teams, internal entrepreneurship ventures, pursuing external alliances, collaborating with customers and implementing rapid prototyping. Technological innovation appears as a huge creator of added value and as a driver of competitive advantage, making innovation strategy one of the pillars for any study on the conditions for obtaining acceptable firm performance (Alonso and Bressan, 2014). Pisano (2015) also highlights the choice that every company has to make when creating an innovation strategy: how much to focus on technological innovation and how much to invest in business model

innovation. In the present study both the technological and the business model strategy were considered in the selection of conditions.

Previous studies showed that innovative companies have some common elements: management commitment to entrepreneurial activities and innovation; integration of talent in teams and task forces; group and collective orientation; and a reward system that reinforces entrepreneurial behavior (Saleh and Wang, 1993). Hurt et al. (1977), proposed a scale of measurement of the global capacity of innovation composed of twenty items leading to a strategic vision of innovation. This approach has been used massively in the literature (Hult et al., 2004). Pearson (1990) describes a certain number of models for studying how innovation processes take part in entrepreneurship projects.

Regarding studies specifically focused on product innovation, Cooper and Edgett, S. J. (2010) present a framework for developing a product innovation strategy, defining innovation goals and objectives through to the selection of strategic arenas and the development of the strategic map. Product innovation strategy appears in this research paper as essential and strongly linked to positive performance, showing how important it is to consider product innovation as a condition for analyzing firm performance.

Cassiman and Veugelers (2006) link innovation to knowledge management and firm performance, stating the same hypothesis that the present study relies on. The use of both complementary views from CRM, future exploration through innovation together with present exploitation through customer knowledge management, should bring important opportunities for companies to improve their results (Gil-Gomez et al., 2020).

From another perspective, Calantone et al. (2002) developed a different scale for measuring the capacity of innovation, in this case composed of six more specific items. The items that make up the scale by Calantone et al. (2002) are:

- Our company frequently tries out new ideas,
- Our company seeks new ways to do things,
- Our company is creative in its methods of operation,
- Our company is often the first to market with new products and services,
- Innovation in our company is perceived as too risky and is resisted,
- Our new product introduction has increased over the last 5 years.

The scale from Calantone et al. (2002) and the proposal itself is one of the most cited and used in the literature. This article has been cited a total of 1265 times to date (according to the Web of Science records), since its publication in 2002, which means it is cited more than 70 times each year. It also has 51 references cited. Besides, it appears in the Google Scholar database with 3.831 citations to date; which is why this scale was selected in the present paper to measure and define the relevance of Innovation elements to reach firm performance as a desired outcome.

### 2.5. Firm performance

Firm Performance represents the main objective for any strategy that any company can invest in. Any initiative that enterprises have both internally and externally must be clearly related to the main mission of the company, and it is intimately linked to firm performance.

Belderbos et al. (2004) relate innovation to firm performance, establishing that the different areas of innovation between different agents of the business asset management process are closely linked to the performance obtained in innovative companies. Bharadwaj et al. (1999) establish a strong link between Information technology (IT) and firm performance, in the same field in which this study is developed, concluding that IT definitely contributes to a firm's future performance potential.

In the search for firm performance measurement models that can be used in empirical test models, Bryant et al. (2004) use a global performance measurement system that tracks measures across four hierarchical perspectives: learning and growth, internal business processes, customers, and financial perspectives. Some more specific models such as Ng et al. (2009) link firm performance to the level of adverse selection, as characterized by the degree to which order flow moves prices, associating the firm performance measure to increases in future earnings volatility.

Dawes (1999) and Zegarra (2014) propose different subjective measurements of organizational performance in market-oriented studies. In the same line, the Nakata et al. (2008) scale uses subjective measures to measure organizational performance. The scale compares the performance of the organization to that of other competitors and is composed of the following items:

- The quality of the product or service,
- The success of new products or services,
- The customer retention rate,
- The level of sales,
- The return on capital,
- Gross profit margin
- The return on investment.

Nakata et al. (2008), despite its relatively recent publication in 2008, has 42 citations to date in the Scopus database, ranking in the 66th percentile. It also has 98 citations in the Google Scholar database. The relevance of the study and measurement proposal of Nakata et al. (2008) means that in the present study its measurement scale is used to evaluate the firm performance factor.

## 3. Conceptual framework

The main objective of this work is to verify the link between the use of CRM management technology solutions and the improvements obtained in organizational performance, including the deployment of business innovation strategies as an intermediate variable.

The literature review justifies taking the following hypotheses as a starting point. Previous studies suggest that the use of CRM technology-based solutions, as well as management based on the culture of customer relationship management, will have a positive impact on the results of the company. This impact is expected to occur as a consequence of the improvement in organizational performance that the use of CRM should induce. In the same way, it is also to be expected that the implementation of business strategies for innovation in products and processes, enhanced by an improved management of the information available to customers and their expectations (thanks to the use of CRM), ends up also generating improvements in organizational performance and therefore in business results. The starting hypotheses on which this study is based are therefore:

- the use of CRM (as a technology and as a culture) positively impacts organizational performance.
- the deployment of innovation strategies in processes and products has a positive impact on organizational performance.

These expectations, due to the nature of their variables and dimensions, can be raised as generally valid starting hypotheses. As the main objective of the work, this empirical study aims to demonstrate whether this link between CRM and Innovation with Organizational Performance is confirmed in the specific case of the wine production and distribution sector in Spain. The objective is twofold:

- From an academic point of view, we intend to demonstrate this link empirically, as it is theoretically expected to happen.
- From a practical point of view, we intend to confirm in a practical and definitive way whether it is interesting for companies in the

**Table 2**
Sample size for empirical study. Source: the authors.

| Criteria | CNAE-1102 in Spain | More than 2 million Euros annual invoicing | Using CRM | Not belonging a business group |
|---|---|---|---|---|
| Sample size (number of companies) | 2.575 | 418 | 84 | 74 |

sector under study to invest in CRM management systems and in Innovation strategies.

The research questions that we intend to resolve in this study are, based on the hypotheses of the impact of CRM and Innovation on organizational performance, the conditions of need and sufficiency that accompany these links between the main variables of the study. The main objective of studying the impact of the use of CRM and innovation strategies on organizational performance, is therefore broken down into analyzing:

- what conditions of use of CRM and the deployment of innovative strategies are necessary for there to be effective improvements in organizational performance?
  - in isolation, with CRM and Innovation
  - crosswise, jointly CRM and Innovation
- what conditions of use of CRM and the deployment of innovative strategies are sufficient for there to be effective improvements in organizational performance?
  - in isolation, with CRM and Innovation
  - crosswise, jointly CRM and Innovation

Obtaining the matrix of conditions of need and sufficiency, involving the two starting variables (CRM and Innovation), which lead to the achievement of the final objective (obtaining improvements in organizational performance), is therefore the global objective of this research.

## 4. Methodology and sample

### *4.1. Data and sample selection*

In order to validate the research model of impact measurement on the performance of a select and important group of companies based on the degree of introduction of CRM, the present study investigated which is the most representative segment within the wineries of Spain.

#### *4.1.1. Selection of the database of companies for the study*

The selection criterion to obtain the company database as the object of study was to choose from the **2.575 Spanish companies registered in the National Statistics Institute (INE) with the code CNAE-1102** (corresponding to the heading "Winemaking"), selecting those that invoice at least 2 million Euros annually. This criterion was chosen to have a sufficient number of study elements, that are representative of the sector, and that are not only the ten largest wine corporations (with more than 10 million Euros annual turnover) represented by multinational groups that are not a reflection of the national reality of wine production. This database was obtained from the Axesor (2019) report, as of 10/01/2019 with the public data of the Commercial Registry obtaining **a total of 418 companies above 2 million Euros of annual invoicing**. Looking into the companies below 2 million annual turnover, the ICT adoption ratio falls exponentially, which confirms that the chosen criteria were accurate.

Of these 418 companies, all of them with their corporate name located in Spain, dedicated to the production of wine (with CNAE-code "1102″), and with more than 2 million Euros in turnover, the ones that have implemented and are using some type of CRM system were selected. The process of obtaining information on the use of a CRM system (guessing if the companies are or not using any kind of CRM) was carried out through individual calls to the 418 companies. As a result of these calls, a list of **84 companies** was obtained **(from the initial 418) that have some type of CRM in use and in production**.

Inspecting and carefully analyzing the list of 84 companies, it is observed that 10 of them belong to business groups that direct their management strategies, so it was considered appropriate to eliminate these 10 companies (which do not have decision-making or management capacity on CRM) from the list of targeted companies, thus leaving a definitive **list of 74 companies as the target selected list of companies for the study of the impact of the use of CRM on firm performance**.

The data filtering chain, according to these criteria, is shown in Table 2.

#### *4.1.2. Taxonomy of the database of companies for the study*

In a first and basic analysis of the database under study, some first findings were obtained in terms of classification by basic factors (Guerola-Navarro et al., 2020c).

Spanish companies in the wine production sector that have recognized that they are using some type of CRM as a management solution, represent 20.10% of the total number of wineries with an annual **turnover** of more than 2 million euros. In absolute terms, two thirds of the companies in the sector that use CRM have a turnover level of between 2 and 10 million Euros. The billing range in which the highest percentage of these companies have CRM is between 10 and 50 million Euros per year, where just over one in three companies (37.84%) uses CRM.

Among the **CRM solutions manufacturers**, there is a clear leadership of WOLF-CRM within the companies in the sector, with 41.27% of the total. It is followed by the CRM module of Dynamics NAV (9.52%) and the CRM module of SAP (9.52%); between the three they reach a market share of 60.32%.

Regarding the **number of employees**, 75% of all these companies that use CRM are small (less than 50 employees). The segment with the highest penetration is therefore the Medium-sized company.

The last classification criterion used is that of **geographical distribution**. This sector has very specific characteristics by geographical area, with protected management through Protected Designations of Origin (DPO) and differentiated characteristics of the product for each area and DPO (CECRV, 2020). Most of the DPOs are linked to geographical areas, so it is considered interesting to also classify the number of companies that use CRM according to the geographical area to which they belong. In this sense, Asturias has a 100% penetration rate (the only company in the sample located there uses CRM). Basque Country, Murcia, Catalonia, Aragón, Castilla León, Madrid and Galicia appear with between 20% and 30% of their companies using CRM. Finally, the Valencian Region, Andalusia, Navarra, La Rioja and Castilla La Mancha have between 10% and 20% of their companies using CRM.

### *4.2. Methodology: fuzzy-set qualitative comparative analysis (fsQCA)*

In order to find the necessary and / or sufficient conditions for an outcome to occur, the fuzzy set qualitative comparative analysis (fsQCA) was used in this paper. fsQCA is used to analyze the combined effect of variables on an outcome. fsQCA has been applied to different fields of research such as innovation, regional competitiveness and university-business relations (Álvarez-Coque et al., 2017; Nieto Alemán et al., 2018; Garcia-Alvarez-Coque et al., 2020; Berné-Martínez et al., 2020). A condition is sufficient when its mere presence serves to cause the outcome under study, without the need for any other condition. If there is some combination of conditions that can explain the existence of the same outcome, this phenomenon is called multicausality (Ragin, 2009).

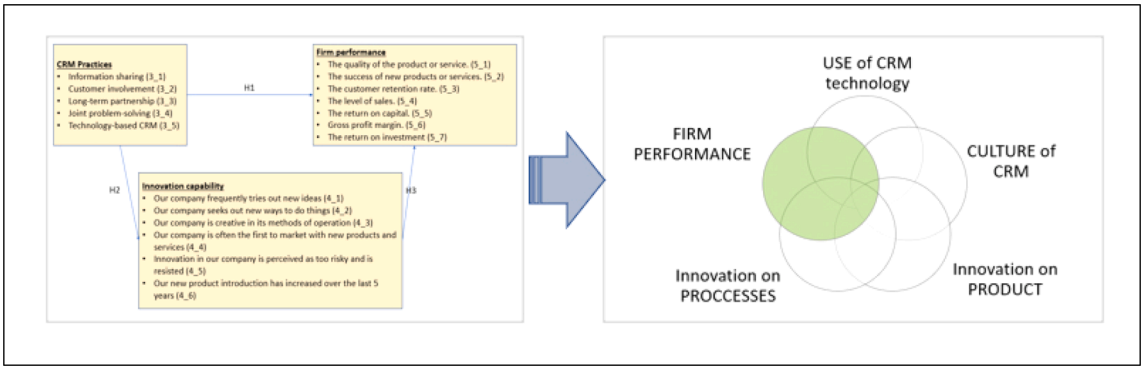


**Fig. 1.** Adaptation from Guerola-Navarro et al. (2020b) Research model based on conditions for fsQCA analysis. Source: The authors.

On the other hand, a condition is necessary if this condition is present whenever the result occurs. In these terms, the methodology FsQCA identifies all combinations of conditions that cause the same outcome (Roig-Tierno et al., 2017).

The QCA methodology was chosen because, within the environment available for the study of the impact of the use of CRM and innovation on the improvement of business results, it offers the possibility of qualitatively analyzing which are the ingredients and paths that can lead to these conditions auguring a good outcome for the company that decides to implement them as management systems and as strategies.

FsQCA is one of the fastest growing analysis methodologies in recent years (Berger, 2016). It was created by Charles Ragin (Ragin, 2009), and has three variants: csQCA, mvQCA, and fsQCA, with fsQCA (fuzzy-set qualitative comparative analysis) being the most complete (Ragin, 2008). fsQCA is based on set theory and Boolean logic, relies on qualitative evidence, and allows for multiple conjoint causality (Ragin, 2009).

In order to perform a fsQCA analysis, there are some common steps to follow (Schneider and Wagemann, 2012; Garcia-Alvarez-Coque et al., 2019):

1 Identify the **sample of relevant cases**: in our case we have a **74 enterprise sample**, to which we sent a questionnaire (Guerola-Navarro et al., 2020b), obtaining **26 final answers**, that were analyzed with fsQCA.
2 Identify a list of **causal conditions and the outcome**: the present study constructed the conditions based in the variables and elements identified in Guerola-Navarro et al. (2020b):
   a Conditions: CRM Practices, Innovation,
   b Outcome: Firm Performance.
3 **Calibrate** the conditions and the outcome. Calibrating means identifying whether a condition is present or absent by assigning a value between 0 and 1. The results of the responses to the questionnaire were transformed into a fuzzy set data, in this case (according to FsQCA methodology) into continuous values ranging from 0 (fully out) to 1 (fully in). The direct calibration method was chosen (Ragin, 2009), in which:
   a the value 0 is assigned to denote the absence of the condition,
   b 1 is assigned to denote presence
   c and 0.5 is assigned to denote the point of maximum ambiguity.
4 Generate the **Truth Table**, containing all the logically possible combinations of available conditions. The number of rows for the table is $2^k$ where k is the number of conditions, including the "logical reminders" (logically possible combinations that do not appear in our list of cases).
5 The **truth table is reduced** using the R Package from Medzihorsky et al. (2016). Depending on how we decide to deal with the logical remainders there are three different solutions: parsimonious, complex and intermediate, all compatible with each other.
6 Among the parameters, two main indicators were evaluated. A minimum level of both measures is required to accept a solution as valid (Ragin, 2009):
   a The **coverage** of a configuration refers to the percentage of cases that can be explained by that configuration.
   b **Consistency** reflects the degree of membership of a condition to a configuration.

Having introduced the fsQCA methodology, in the next sections the elements used in the present study are explained.

#### 4.3.1. *Conditions*

Guerola-Navarro et al. (2020b) identify two large variables (CRM Practices and Innovation), and an output (Firm Performance) with their elements. As shown in Fig. 1, this approach fits the theoretical framework that covers the present study, so the following step was to convert these variables into conditions for fsQCA analysis (Ragin, 2014). Conditions are those elements that are used to study the presence/absence and the impact as necessary/sufficient for the outcome to occur.

The final objective of the present study is to analyze which conditions are necessary and/or sufficient for the output (Firm Performance) to occur.

The Conditions used for this study were:

- Culture of Customer Relationship Management
- Use of CRM Technology
- Innovation on Processes
- Innovation on Product

In the next sections, the composition of each of these conditions is explained.

*3.3.1.1. Culture of customer relationship management.* The Culture of Customer Relationship Management refers to any concept, strategy, or activity directly related to good customer relationship management. This condition is composed of the elements (the code between brackets comes from the questionnaire from Guerola-Navarro et al., 2020b):

- Information sharing (3_1): actively share relevant information with customers
- Customer involvement (3_2): encourage the active participation of customers in all the processes that concern them
- Long-term partnership (3_3): cementing the durability of commercial and collaborative relationships with good clients
- Joint problem-solving (3_4): establish collaboration channels with customers for team resolution of problems and incidents in relationships with them

In our study it was assumed that for a good culture of Customer

Relationship Management to exist, these four conditions must be met at the same time, so the relationship between them would be concurrency and therefore the values of the condition to be studied would be the same, resulting from multiplying its four components.

*3.3.1.2. Use of crm technology.* Technology-based CRM refers to the effective and intensive use of any technological CRM business management solution from among those on the market, with the aim of managing customer relationships in the most efficient way. This condition is composed of the element (the code between brackets comes from the questionnaire from Guerola-Navarro et al., 2020b):

- Technology-based CRM (3_5): use of the selected software solution implemented in the company

This condition adds the use of this technology that automates and manages all relevant customer information to the Customer Relationship Management culture.

*3.3.1.3. Innovation on processes.* Innovation on Processes refers to all activities and strategies that the company puts into practice for the continuous improvement of internal processes, in the search for effectiveness and efficiency. This condition seems essential in a changing economic environment such as the current one, in which Innovation and Development policies are the key element in any attempt to stay in the market with the best practices. Its elements are (the code between brackets comes from the questionnaire from Guerola-Navarro et al., 2020b):

- Our company frequently tries out new ideas (4_1): refers to the company's ability to put process improvement ideas into practice
- Our company seeks out new ways to do things (4_2): it is often necessary to invent and develop new ways of doing things, not only when the previous ones have stopped working efficiently, but even when they are still bearing fruit.
- Our company is creative in its methods of operation (4_3): creativity is closely related to the development of new ways of doing things, and therefore to achieving process improvements

Again, it is assumed that the three conditions must be considered as concurrent if a broad and effective concept of Innovation on Processes is sought, so that the multiplication of its results will give an accurate measurement (Palacios-Marques et al., 2017).

*3.3.1.4. Innovation on products.* Innovation on Products includes the actions implemented to introduce significant improvements in the products, either in their functions, quality, properties, etc. This is a basic area so that the goods and services offered to the market continue to maintain the competitive advantage that means they are acquired rather than those of the competition. Its elements are (the code between brackets comes from the questionnaire from Guerola-Navarro et al., 2020b):

- Our company is often the first to market with new products and services (4_4): refers to the strategic option of the company to be the first to offer the market new products that meet the new needs raised by customers
- Innovation in our company is perceived as too risky and is resisted (4_5): directly related to the previous one, it shows the company's ability to take risks and overcome resistance to change when it comes to offering new things to the market before competitors
- Our new product introduction has increased over the last 5 years (4_6): together with the previous two, it represents the innovative impact, measured through the introduction of new products

As in the previous conditions, it was assumed that the three conditions should be considered as concurrent if a broad and effective concept of Innovation on Products is considered, therefore resorting to the multiplication of its elements in its quantitative measurement within our analysis (Palacios-Marques et al., 2017).

*3.3.1.5. Firm performance.* Firm Performance is the outcome that is intended to be evaluated, together with the previous conditions, to determine which paths and ingredients can lead to its obtainment. Its components are (the code between brackets comes from the questionnaire from Guerola-Navarro et al., 2020b):

- The quality of the product or service. (5_1): fruit of a good innovation and development strategy, and a necessary condition to maintain a competitive advantage in the market
- The success of new products or services. (5_2): needed for maintaining the level of interest from the customers
- The customer retention rate. (5_3): essential as a customer-loyalty indicator, and essential for maintaining a good level of sales with efficiency
- The level of sales. (5_4): the main objective when performing customer relationship management
- The return on capital. (5_5): the ratio that indicates that the global strategy on effectively managing the customer relationship is successful
- Gross profit margin. (5_6): complementary performance indicator to the return on capital and the return on investment
- The return on investment (5_7): complementary to the two previous ones, and directly related to concrete investment projects

The concurrence of all these elements, and therefore the multiplication of the values obtained in the empirical study (Palacios-Marques et al., 2017), were multiplied as in the previous conditions.

### 4.3. Preparation and passing of questionnaires

To obtain information on the impact of using CRM, the questionnaire from (Guerola-Navarro et al., 2020b) was used. As part of a collaboration with the organizing committee of the WINETECH Forum 2020 business event (Winetech Forum, 2020), a personalized web communication was launched for the targeted companies under study, in which they were offered the possibility of collaborating in this study. They were asked to, anonymously, disinterestedly, and voluntarily, respond to the research model questionnaire, with the aim of obtaining objective results without a connection to any agent involved in the distribution or promotion of any type of CRM.

This web action was complemented with reinforcement calls, as well as reminders via email, in order to have as many answers as possible and thereby the best results for the investigation. In gratitude for this disinterested collaboration, the participating wineries were offered publicity in the results obtained, as a way to value the use of key business management tools in the wine production sector.

The way to answer the questionnaire was completely online, through a web-form provided by Microsoft Dynamics 365.

The questionnaire consists of a series of questions to be answered choosing responses evaluable between 1 and 5 points following a Likert scale (Albaum, 1997). This questionnaire has 5 areas, each one focused on one aspect, the sections being relevant for our study:

- Section 3 - degree of use of CRM or "CRM Practices"
- Section 4 - Innovation
- Section 5 - Firm Performance.

The results obtained after sending the questionnaire to the sample firms, were analyzed and the results are shown in the following section.

**Table 3**
Description and data sources.

| Outcome/Conditions | Description | Source and Year |
|---|---|---|
| PERF (Outcome) | FIRM PERFORMANCE | Declarative statement from the head of the company (answers to questionnaire in August 2020) |
| CRM_CULT | CULTURE of CRM | |
| CRM_TEC | USE of CRM technology | |
| IN_PROC | Innovation on PROCCESSES | |
| IN_PROD | Innovation on PRODUCT | |

### 4.4. Data and calibration

The 74 companies that made up the sample and which were therefore the object of analysis, were asked to collaborate in responding to the questionnaire, finally obtaining 26 responses, which represents a 35% response rate. The questionnaire and the study were presented as anonymous, but with the possibility for the respondent to identify himself if he so desired in order to have a means of contact in case of wanting to analyze a case in depth or as a case study.

First, and to begin the study, the description of the sources and the conditions and results are reflected in Table 3.

The responses to the questionnaire used the 5-point Likert scale. In our study, all items were given a positive value, that is, 1 (strongly disagree) indicates the lowest value and 5 the highest value (strongly agree). These items were grouped into 4 conditions, using the multiplication of the elements to calculate the specific value of each factor (Palacios-Marques et al., 2017).

These conditions were then constructed on the basis of the answer to each question on the questionnaire as follows:

Where the definition of each element provided from the questionnaire is included in the annex:

Secondly, the calibration was carried out as in Table 6, which shows the primary statistics and the cut-off points for the calibration of the conditions and the result, following the principles of direct calibration (Ragin, 2009). For the calibration and the remaining analyzes, the R package developed by Medzihorsky et al. (2016).

Based on the declarative responses of the heads of the companies to which the questionnaire was passed:

- the condition **CRM_TEC** were calibrated as ***1 (presence)*** and ***0 (absence)*** of intensive use of CRM technology in the enterprise.
- the conditions **CRM_CULT, IN_PROC, IN_PROD** and the Outcome **PERF** were calibrated as:
  - ***Fully-in***: registries with values above the 90th percentile are "Fully-In"
  - ***Crossover point***: median or 50th percentile, point of maximum ambiguity
  - ***Fully-out***: registries with values below the 10th percentile are "Fully-Out"

After having calibrated the conditions and the outcome, the fsQCA analysis was performed with the results that are shown in the following section.

## 5. Results and discussion

The present study, following the FsQCA methodology, tried to determine the necessary conditions and sufficient conditions, for companies that use CRM business management systems to obtain good firm performance. Also, taking into account the literature on QCA methodologies (Ragin, 2009), we tried to evaluate whether there is only one or more ways (equifinality) to reach the desired result (the "firm performance" outcome).

According to the conceptual framework and the reviewed literature, the following conditions were identified as relevant:

- CRM_TEC: internal intensive use of CRM technological solutions for the management of customer relationships
- CRM_CULT: existence in the company of a culture of customer relationship management, assumed and internalized by all members of the company
- IN_PROC: existence of a consistent innovation strategy in terms of the processes and activities that are developed in the company in search of the best practices to adapt to a changing and dynamic environment that requires constant dedication to modern activities.
- IN_PROD: ability of the company to generate and launch new goods and services on the market at the right time and in the right way to maintain a competitive advantage, and to maintain and improve its position in the Market

The intended outcome of the study is to discern what in the world of business reality defines which strategies are acceptable and which are not, in this case firm performance.

Both the conditions and the outcome were measured through the parameter elements that the literature proposes (Guerola-Navarro et al., 2020b), through presenting a questionnaire to the companies that are in the sample. These are therefore declarative values by the participants of this independent study, which must be taken into account as both an advantage and a limitation of the study.

### 5.1. Individual necessary conditions

The first analysis carried out tried to find out if there are any of the conditions that, individually, are necessary for the company to have good Firm Performance. For a condition to be considered necessary, its consistency must be greater than 0.9 (Ragin, 2009). The result of the analysis can be seen in Table 7.

From the analysis of necessity, no condition emerges as necessary for good firm performance. In the same reciprocal way, there is no necessary condition for not having good firm performance.

In the search for logical combinations of conditions that can give a conclusive result about their need in obtaining the outcome (firm performance) or the negation of the outcome, the combinations in Table 8 were checked.

Looking at these results and leaving aside those that are not logically interesting (N / A), we obtain a combination of conditions whose consistency is greater than 0.9, specifically "fs_TEC + fs_CULT", with a coverage of 0.636. This means that **the "OR" combination of both conditions is necessary for the outcome** to occur: "with a level of probability greater than 90%, for a company to have good firm performance, it is necessary to have an intensive use of technology (fs_TEC) or a culture of customer relationship management (fs_CULT), covering 63.6% of the cases in the sample with this statement ".

The second combination of conditions that appears as necessary in Table 8 is that of "fs_PROC + fs_PROD", which has a lower consistency than the previous one (0.808 of this one compared to 0.916 of the previous one) and a coverage also less than the previous one (covers 59.6% of cases instead of 63.6% covered by the previous one). This second combination indicates that another way to achieve firm performance requires product innovation or process innovation. The fact that the consistency and coverage values are lower than the previous ones, gives greater relevance to CRM conditions than to innovation conditions.

The rest of the combinations are not conclusive about their need, although looking at the option "~ fs_PROC + ~ fs_PROD" it can be concluded that with almost a 90% (88.8%) probability, for there to be no good commercial results (~ fs_PERF), it is necessary that there is no innovation in the processes (~ fs_PROC) or there is no innovation in the products (~ fs_PROD), 66.7% of the sample cases being covered by this statement.

In the same way and as an alternative path with slightly less consistency (0.877 of this one versus 0.888 of the previous one), for there to be no good commercial results (~ fs_PERF), it is necessary that there is no use of any CRM technologial solution (~ fs_TEC) or there is no culture of customer relationship management (~ fs_CULT), 60.9% of the sample cases being covered by this statement

### 5.2. Analysis of sufficiency

The next step in our study was to find out which recipes, strategies, or paths lead to a good Firm Performance according to the proposed model and the results obtained in the field study of the wine production and distribution companies.

For this purpose, first the "Truth Table" was built, observing the case distribution, identifying contradictory configurations and identifying logical remainders (logical combinations of conditions that do not appear with empirical cases).

Secondly the sufficiency analysis was carried out, deleting the inexistent configurations, indicating which configurations generate the result, and proceeding with the analysis. Among the three possible approaches to sufficiency analysis, the maximum parsimony is chosen (Medzihorsky et al., 2016), which minimizes combinations assuming that all cases without empirical cases produce the result (includes logical remainders).

In our case, Table 9 was built with the results.

Although some authors consider coherence values greater than 0.75 as acceptable, other authors propose more demanding parameters and raise it to 0.8 to be acceptable (Crilly 2011; Fiss 2011). This consistency scale of 0.8 was exceeded by the model (Overall solution consistency of 0.862) and by the two paths obtained to reach the desired outcome (path 1 with consistency of 0.870, and path 2 with consistency 0.881).

On the other hand, coverage indicates empirical relevance, so greater coverage implies a greater empirical relevance of the solution (Crilly 2011; Ragin, 2009), which means that a greater number of empirical cases are covered.

Different Consistency cutoff alternatives were tested, as well as global approaches (complex, intermediate and maximum parsimony solution), but none of these alternative approaches provided more significant solutions than the one described.

Table 9 finally shows the successful pathways to reach a good level of firm performance. Analyzing the table, the sufficient configuration "**(CRM_CULT) * (IN_PROC) * (IN_PROD)**" appears in Path 2 as the "**magic recipe**" for a good firm performance. Its interpretation is that as a sufficient condition to obtain good firm performance, it is necessary at the same time to have a good Customer Relationship Management culture, a good Process Innovation strategy, and a good Product Innovation strategy. This path shows a consistency of 0.881 (which is much higher than the cutoff of 0.8) and a coverage of 0.487 (which indicates that 48.7% of the cases are covered with this path). Process Innovation does not appear in this path, but in no case does this mean that it is not good to have a good Process Innovation policy, but that it is not shown as enforceable if this combination of conditions occurs to reach the outcome (firm performance).

The other combination of conditions proposed, path1 with "(CRM_TEC) * (CRM_CULT) * (~ IN_PROD)" represents another sufficient pathway that requires the company to use CRM intensively along with a good Customer Relationship Management culture, but does not require that there is Innovation in Products. This path has a slightly lower consistency (0.870) than the magic recipe, and a coverage of 0.221 which indicates that it covers only about half of the cases covered by the magic recipe. The fact that, in this proposal, Product Innovation is not a required condition, does not imply that it is not good in general to have a good Product innovation policy, it simply indicates that in this model it is not a significantly necessary condition. From another point of view, this result highlights the relevance of the other conditions (using CRM technology or having a good culture of customer relationship management), which make us assume, according to this, that with good use of CRM as a technology or as a culture it would not be necessary to innovate.

## 6. Conclusions

The present study tried to find the necessary and / or sufficient causal relationship of certain conditions, generally accepted in the literature as relevant for the study of the CRM business management solution, with the intended outcome of Firm Performance pursued by every company that implements and uses this management system.

The first conclusion drawn is that no condition emerges as necessary for there to be good firm performance. In the same way, no condition appears to be necessary for such firm performance to not occur. This leaves a wide range of possibilities to find paths that are at least sufficient.

Third, looking for an alternative of necessity through the combination of conditions, it is concluded that with a high degree of consistency and coverage, for there to be good firm performance in the company, there must be an intensive use of CRM technology or a good culture of customer relationship management.

Fourth, analyzing the truth table and reviewing the sufficiency analysis, a sufficient condition for obtaining good firm performance, it is necessary at the same time to have a good Customer Relationship Management culture, a good Process Innovation strategy, and a good Product Innovation strategy. This is the magic recipe offered by the fsQCA analysis as the condition that, without further qualification, would lead to obtaining the desired outcome (good firm performance).

Fifth, there is another sufficient pathway that requires the company to use CRM intensively along with a good Customer Relationship Management culture but does not require that there is Innovation in Products, in order to reach the outcome (firm performance). This second path is also sufficient, but it has less consistency and less coverage (it explains fewer empirical cases) than the previous one.

All of the above, both from the point of view of need and sufficiency, gives CRM a significant and decisive relevance: on the one hand, the conditions of combined need ("or" options) include both the use of the CRM technology and the culture of customer relationship management, and on the other hand both pathways of sufficiency include the culture of customer relationship management and one of the pathways also adds the use of CRM technology. This definitely shows that in a dynamic and changing market where customer-centered strategies are essential to obtain business success, customer relationship management is key both from a cultural point of view and from a technological point of view.

This study has several limitations that must be taken into account when interpreting the results. The first limitation is that the declarative statement of the people who responded to the questionnaire was accepted as valid, with the bias that this may introduce into the study. Second, the criterion of the multiplication of values was accepted in the analysis of grouped conditions, which is commonly accepted in the literature but has an alternative that is the sum of them (the test was carried out and the results differ in a way that is not very relevant with respect to those of multiplication).

As a general conclusion, the study obtained confirmation that a good culture of customer relationship management is key to having a good business result or firm performance, since it is in line with modern relationship marketing theories that focus on customer-centered management. To this relevance of the customer-centered management culture, it is added that the use of CRM technologies can and should help

improve firm performance. Even more essential than the use of CRM technology, the study shows that innovation in processes is directly related to the company's ability to adapt to the environment (basically, the use of CRM technology is basic to attaining the management information that must be provided, so it is indirectly assumed that CRM technology has a great impact on firm performance).

An appropriate innovation and development strategy therefore appears to be essential, together with the culture of customer relationship management, to obtain good firm performance for companies that today want to maintain their competitive advantage in a changing and dynamic market environment.

### 6.1. Managerial implication

From the results obtained, and their discussion, some valuable conclusions were obtained for business decision makers.

On one hand, having concluded that a good culture of customer relationship management is essential to have good business results or firm performance, company managers should seriously consider the option of implementing strategies aimed at managing information about their customers in the most efficient way. Completely in line with the theories of customer-centered management, this study clearly supports the culture of customer relationship management as a key element for successful business management.

On the other hand, considering the use of CRM technology-based solutions, as well as integral innovation strategies; it is concluded in this study that they are very valuable companions of the culture of customer relationship management if we want to ensure good organizational performance and good business results. Again, at this point, business decision makers should take this circumstance into account when deciding whether or not it is necessary to implement not only a good CRM culture, but also to accompany it with a good CRM technological solution and a good strategy for innovation and development.

From these conclusions, if considered by the managers of the companies represented by the analyzed sample, an increase in the adoption rate of CRM technologies should be derived, and consequently an improvement in the general management of customers that companies in the sector make. Once again, and as a consequence of all this, the most relevant impact should be the improvement in the level of customer satisfaction, and greater market perfection.

### 6.2. Practical and social implications

The present study covers a research gap in that it empirically validates the relationship between the use of CRM and the improvement in organizational performance (and with it, predictably, also improvement in business results) in the wine production and distribution sector.

The winery sector has traditionally been reluctant to face digital transformation and the massive adoption of business management technologies. Only large groups of companies, through corporate policies, have faced this process in a generalized way. That is why, focusing this study on medium and small companies, it should be taken into account by this type of company that continue to doubt the potential for management improvement and results that the use of CRM can bring to their organizations. This should lead, once again, to a higher rate of adoption of CRM, and with it a general improvement in the management of customer relationships in this sector so representative of the Spanish economy. Greater adoption of CRM can bring better knowledge about the customer, better Customer-centered strategies, and better service to customers, with greater satisfaction and greater market efficiency.

### 6.3. Limitations and future research

The present study has some limitations, as a result of the need to select sufficiently representative elements of the research model and of the study population. Despite all of this, the simplifications assumed in the study were made based on the literature analyzed, and trying not to lose representativeness in the results and conclusions obtained.

**Table 4**
Construct of each condition and outcome.

| Outcome/Conditions | Construct |
|---|---|
| PERF (Outcome) | (5_1)*(5_2)*(5_3)* (5_4)* (5_5)*(5_6)*(5_7) |
| CRM_CULT | (3_1)*(3_2)*(3_3)* (3_4) |
| CRM_TEC | (3_5) |
| IN_PROC | (4_1)*(4_2)*(4_3) |
| IN_PROD | (4_4)*(4_5)*(4_6) |

**Table 5**
Definition of the elements for the constructs.

| Group of dimensions | Definition of the elements |
|---|---|
| CRM Practices | • Information sharing (3_1)<br>• Customer involvement (3_2)<br>• Long-term partnership (3_3)<br>• Joint problem-solving (3_4)<br>• Technology-based CRM (3_5) |
| Innovation | • Our company frequently tries out new ideas (4_1)<br>• Our company seeks out new ways to do things (4_2)<br>• Our company is creative in its methods of operation (4_3)<br>• Our company is often the first to market with new products and services (4_4)<br>• Innovation in our company is perceived as too risky and is resisted (4_5)<br>• Our new product introduction has increased over the last 5 years (4_6) |
| Firm Performance | • The quality of the product or service. (5_1)<br>• The success of new products or services. (5_2)<br>• The customer retention rate. (5_3)<br>• The level of sales. (5_4)<br>• The return on capital. (5_5)<br>• Gross profit margin. (5_6)<br>• The return on investment (5_7) |

To carry out the empirical validation process of this study, a range of wineries was chosen which, following billing parameters and organizational structure, are considered representative of the sector, according to the literature reviewed. Some companies may have been left out of the sample under study, but we consider that the sample is sufficiently representative of the population to assume that even these companies can be reflected in the results and conclusions obtained in the study.

On the other hand, the use of CRM that each company can make can be very different depending on the winery under study. That is why, to avoid treating all the wineries that use CRM in the same way, "CRM practices" was taken as an independent starting variable, which contains elements that in themselves and as a whole define the degree of use of CRM. More complex elements and ranges could have been defined within the CRM Practices variable, which would have predictably generated greater variability in results, but due to the characteristics of the companies in the sector, we do not expect that the conclusions would have been different in terms of their meaning and managerial input.

As lines of future research, directly related to the study realized, carrying out the following studies is considered very interesting:

- Checking, by changing a variable in the model, how the results and conclusions of the study would change. Specifically, we consider it interesting to replace the variable "Innovation" with the variable "Management of customer knowledge".
- Create a variant of the research model, adding "Customer Knowledge Management" as an intermediate variable, which together with "Innovation" would lie (as anticipated by the expected benefits map) between the use of CRM and the improvement of the organizational performance.

**Table 6**
Calibration of conditions and outcome.

| Outcome/Conditions | Fully in | Crossover point | Fully out | Max | Min | Mean (SD) |
|---|---|---|---|---|---|---|
| CRM_TEC (fs_TEC) | Dichotomous condition. Presence (1) or absence (0) of intensive use of CRM technology | | | | | |
| CRM_CULT (fs_CULT) | 0.953 | 0.500 | 0.047 | 0.988 | 0.047 | 0.614 (0.240) |
| IN_PROC (fs_PROC) | 0.953 | 0.500 | 0.047 | 0.953 | 0.038 | 0.489 (0.186) |
| IN_PROD (fs_PROD) | 0.953 | 0.500 | 0.047 | 1.000 | 0.031 | 0.709 (0.681) |
| PERF (fs_PERF) (Outcome) | 0.953 | 0.500 | 0.047 | 0.987 | 0.040 | 0.594 (0.428) |

Note: the suffix 'fs_' denotes calibrated conditions or outcome.

**Table 7**
Analysis of necessary conditions.

| **Conditions** | **fs_PERF** | | **~ fs_PERF** | |
|---|---|---|---|---|
| | **Consistency** | **Coverage** | **Consistency** | **Coverage** |
| **CRM_TEC (fs_TEC)** | 0.650 | 0.655 | 0.348 | 0.345 |
| **~ CRM_TEC (~fs_TEC)** | 0.350 | 0.353 | 0.652 | 0.647 |
| **CRM_CULT (fs_CULT)** | 0.714 | 0.701 | 0.515 | 0.497 |
| **~ CRM_CULT (~fs_CULT)** | 0.488 | 0.506 | 0.690 | 0.704 |
| **IN_PROC (fs_PROC)** | 0.665 | 0.717 | 0.476 | 0.504 |
| **~ IN_PROC (~fs_PROC)** | 0.540 | 0.512 | 0.732 | 0.683 |
| **IN_PROD (fs_PROD)** | 0.706 | 0.641 | 0.607 | 0.541 |
| **~ IN_PROD (~fs_PROD)** | 0.495 | 0.561 | 0.598 | 0.667 |

Note: (~) denotes the absence of the condition; the suffix 'fs_' denotes calibrated conditions or outcomeb.

**Table 8**
Analysis of necessary combination of conditions.

| **Conditions** | **fs_PERF** | | **~ fs_PERF** | |
|---|---|---|---|---|
| | **Consistency** | **Coverage** | **Consistency** | **Coverage** |
| **fs_TEC+fs_CULT** | 0.916 | 0.636 | N/A | N/A |
| **fs_PROC+fs_PROD** | 0.808 | 0.596 | N/A | N/A |
| **~fs_TEC+~fs_CULT** | N/A | N/A | 0.877 | 0.609 |
| **~fs_PROC+~fs_PROD** | N/A | N/A | 0.888 | 0.667 |

Note: (~) denotes the absence of the condition; the suffix 'fs_' denotes calibrated conditions or outcome.

**Table 9**
Analysis of sufficient conditions for presence of PERF (firm performance): Parsimonious solution.

| | Firm Performance **(PERF)** | |
|---|---|---|
| | Path 1 | Path 2 |
| CRM technology-based intensive use (**CRM_TEC**) | ● | |
| Culture of Customer Relationship Management (**CRM_CULT**) | ● | ● |
| Active strategies of Innovation on Processes (**IN_PROC**) | | ● |
| Active strategies of Innovation on Products **(IN_PROD)** | ○ | ● |
| Consistency | 0.870 | 0.881 |
| Raw coverage | 0.211 | 0.487 |
| Unique coverage | 0.084 | 0.359 |
| Overall solution consistency | 0.862 | |
| Overall solution coverage | 0.571 | |

Note: As in Fiss (2011), ● means presence of the condition and ○ means absence of the condition; Algorithm: Quine-McCluskey; Consistency cutoff: 0.824027; Frequency cutoff: 1.00; Calculated as per Medzihorsky et al. (2016); Analysis of the absence of the outcome was performed but has not been included in the paper.

Far from these lines of research, highly related to the variables and paths that were seen as possible during the study, and among which the path outlined in this thesis was chosen, there are other paths that are proposed for future research:

- Include in the model the impact that the use of "Cloud Computing" platforms, in its three models (SaaS, PaaS, IaaS) can have on the adoption and use of CRM, and finally on business performance. This type of solution is found to have reduced the entry barrier, by not needing an initial investment and by being able to pay for use without the need to create fixed assets, which has definitely contributed to the degree of adoption of the technology. It will be interesting to validate whether this has improved the ratio of improvement in results.
- Analyze, together with CRM, the influence and impact of other technical business management solutions such as Enterprise Resource Planning (ERPs), Business Analytics, etc.

The high development of the Information Technologies in recent decades, due to the reduction of entry barriers, and due to the increasing complexity of management in the business world that requires a high power of information processing by management tools, gives a very encouraging future for any study carried out in this area. There is increasing accessibility to information, and therefore also to scientific

research, so the impact and value of any of the studies that conduct any of these lines of research can be decisive in the decision-making of companies of all types. (Table 4 and 5)

## CRediT authorship contribution statement

**Guerola-Navarro Vicente:** Formal analysis, Investigation, Resources, Writing – original draft, Visualization, Writing – review & editing. **Raul Oltra-Badenes:** Methodology, Data curtion, Supervision. **Hermenegildo Gil-Gomez:** Conceptualization, Project administration. **Agustín Iturricha Fernández:** Validation.

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## Supplementary materials

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