agronomy

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Are Environmental Regulations to Promote Eco-Innovation in the Wine Sector Effective? A Study of Spanish Wineries

Félix Calle [1], Inmaculada Carrasco [2,*], Ángela González-Moreno [2] and Carmen Córcoles [2]

[1] International Doctorate School, University of Castilla-La Mancha, 02071 Albacete, Spain; lycaman@hotmail.com
[2] Faculty of Economics and Business, University of Castilla-La Mancha, 02071 Albacete, Spain; Angela.Gonzalez@uclm.es (Á.G.-M.); Carmen.Corcoles@uclm.es (C.C.)
* Correspondence: inmaculada.carrasco@uclm.es

Abstract: In a changing socio-economic and ecological context, the agri-food industry, where the use of natural resources is very important, must pay more and more attention to green and eco-innovation. Public decision-makers have started to implement measures to encourage the adoption of sustainable practices by companies, which are also pressured by supply and demand factors. This article aims to determine the factors that drive eco-innovation in the wine sector in Spain, a mature and traditional sector characterized by its high fragmentation. In particular, we sought to determine the role environmental regulations play in promoting eco-innovation in the sector. To this end, an empirical study was developed using a structural equation model established using a partial least squares technique for a sample of 251 wineries from all over the country. The study shows that the current regulatory framework inhibits eco-innovation in Spanish wineries, who are more encouraged by positioning and external motivation factors.

Keywords: eco-innovation; wine sector; Spain; regulatory factors; PLS

Citation: Calle, F.; Carrasco, I.; González-Moreno, Á.; Córcoles, C. Are Environmental Regulations to Promote Eco-Innovation in the Wine Sector Effective? A Study of Spanish Wineries. *Agronomy* **2022**, *12*, 21. https://doi.org/10.3390/agronomy12010021

Academic Editors: Paulina Rytkönen, Theodosia Anthopoulou, Karin Dahlström and Håkan Tunón

Received: 30 November 2021
Accepted: 21 December 2021
Published: 23 December 2021

1. Introduction

The successive enlargements of the European Union and the complex internal process of the modernization of the different productive sectors have given rise to a melting pot of highly diverse territories and many dualities. Agriculture continues to be a very important activity in many of these regions, especially in the south (Greece, Italy, Spain, Portugal) and the east (Lithuania, Slovakia, Hungary, Bulgaria, Romania). The globalization of agricultural markets has made them more vulnerable [1], with the consequent risk of a loss of agricultural activity, which could lead to important social and environmental problems such as depopulation or biodiversity loss. For this reason, the maintenance of profitable, competitive and environmentally sustainable agricultural activity [2,3] is vital for the development of spaces often characterized by low rates of regional and sectoral innovation [4–6]. In this sense, innovation is a key determinant of productivity growth in agricultural activity and, by extension, in the agri-food industry and rural areas [7,8].

This dynamic occurs in a changing global socio-economic and ecological context, in which consumers are increasingly aware and sensitive. In the food sector, this is accompanied specifically by a change in the vision of food production that is gradually taking into account issues related to health, environmental conservation, social justice and sustainable development [6,9,10]. The agri-food industry is becoming increasingly aware of the close relationship between the activity of the sector and environmental harm [11] and very high quality. At the same time, environmentally-friendly food products are being developed since innovation in agricultural activity is associated more and more with sustainability problems in the sector [10,12–15].

From the company management standpoint, and in a context marked by the necessary search for sustainability, green innovation or "eco-innovation" has a major role [16–21].

Therefore, more in-depth research is necessary to improve the understanding of the factors that promote and hinder the development of eco-innovations in order to increase our knowledge on the subject and facilitate their implementation at all levels, as well as to encourage the development of policies to promote eco-innovation.

Therefore, eco-innovation and the adoption of sustainable practices have received attention from public decision-makers [22,23], and is also becoming a growing field of academic research [24,25]. Much of the literature on the topic studies the determinants of eco-innovation, in particular, comparing these environmental innovations with other types of innovation [26–28]. Noteworthy determinants identified in the literature include supply (technology-push), demand (demand-pull) and regulation (regulatory-push) factors. Internal company factors are also considered, including, among others, its resources and capacities or its organizational culture. Most papers analyze the adoption of environmental innovations in the entire industrial sector.

However, literature on eco-innovation in traditional sectors is very limited [29–31]. Studies on eco-innovations in the wine sector are even more scarce [32–34]. Despite this, sustainability and eco-innovation in the wine sector are a field of growing interest. However, there is still no global consensus on the meaning of the term "sustainability" [35]. Nevertheless, the issue of sustainability opens a broad debate, and it considerably impacts companies in all their actions. Santini et al. [36] conducted a useful discussion of the term applied to the wine sector. Among the published works, Doloreux and Kraft [37] highlighted the heterogeneity of eco-innovative strategies in the wine sector with respect to the capacities, know-how and specific characteristics of Canadian companies; Muscio et al. [38,39] described that the nature of the company (type of ownership) and its legal form are key elements for explaining the adoption of eco-innovations and that the commitment to external stakeholders has a significant influence depending on the eco-innovation in question. For their part, other authors found that the adoption of green innovation strategies in the wine sector has direct and positive effects on company results and provides a competitive advantage [40–42]; De Steur et al. [43] studied 64 Italian SMEs in the sector and highlighted the value of sustainability from the marketing standpoint. Barba-Sánchez and Atienza-Sahuquillo [44] concluded that environmental proactivity is positively correlated with economic results in the wine sector.

In general, the wine industry is a mature, traditional and global industry, characterized by its fragmentation (wine is defined by its origin) and by being mainly made up of SMEs [45]. The European Landscape Convention [46] recognizes the importance of vineyards to add value to the landscape, collaborate in its conservation and provide rural tourism with a quality label. Spain boasts the largest vineyard in the world in terms of cultivated area (OeIV, online data), and grapes are a key crop in the rural development of many of its autonomous communities. In addition, Spain continues to play a very important role in the international wine trade (led, nevertheless, by France), in which it has specialized in niches with little added value. The sector is made up of 4373 wineries [47], the vast majority of which are family-owned, although there are also a large number of cooperatives and, to a lesser extent, large companies. At the beginning of the new century, the sector embarked on an important process of renewal and restructuring that has been reflected in its position in the world wine markets, where it still has some way to go to access more added value markets. Many studies have focused on the sustainability of the wine sector, mostly from individual regions. Carroquino et al. [48], in one of the few studies performed for the whole country, conclude that Spanish wineries are conscious of climate change and the effects that it can have on them, but the implementation of measures is reduced and varies from one company to another.

In this context, the aim of this study was to determine the factors that drive eco-innovation in the wine sector in Spain and to analyze their impact on business results. In particular, we sought to determine the role environmental regulations play in promoting eco-innovation in the sector.

To this end, a theoretical framework based on different approaches was developed—evolutionary theory, environmental economics theory, the innovation systems perspective and the theory of resources and capacities—in order to gradually identify the explanatory variables of the phenomenon analyzed [49]. The theoretical model was tested using a structural equation model developed using a partial least squares technique for a database obtained from a survey of 251 (239 valid data) wineries throughout the country.

The study is valuable and original for several reasons: firstly, because it researches a topic as relevant in the current context as eco-innovation, on which research into small and medium-sized companies is still scarce; secondly, due to the importance of the use of natural resources in the sector; thirdly, by focusing on a traditional sector in which Spain is a key global player in terms of production, consumption and exports; and fourthly, due to the social and economic importance of the sector in the national economy.

The document is structured as follows: after this introduction, the second section synthesizes the most important literature on the subject and presents our theoretical framework; the third section presents the database and the methodology used; and the fourth, the results of the empirical model and their discussion. The fifth and final section of the article presents the conclusions.

2. The Wine Sector in Spain

Spain is the country with the largest area under vineyard cultivation in the world (975,000 hectares), followed closely by China (847,000 hectares). Three-quarters of the wineries of the national set are located in the autonomous communities of Catalonia (14%), Castilla and León (14%), Basque Country (10.6%), Castilla-La Mancha (10.26%); Galicia (10.14%); La Rioja (9.5%) and Andalusia (7.09%). Of these, the vast majority are micro (57%) and small businesses (37%) [47] (DIRCE and OeMv data online).

The business structure of the sector is very atomized and faithful to the European model of wine production. It is characterized by the existence of a large number of wineries and brands. Small wineries and cooperatives (that bare bottle) are large sellers of bulk; they often have management and marketing problems and, in order to diversify their offer, coexist with large companies. These large companies have production centers in different areas, handle large volumes in international markets and work wines of all categories. Some of them are listed on the stock exchange, have good distribution networks and even belong to financial capital entities.

In terms of foreign trade, Spain, France and Italy lead the world wine market. Together they account for more than half of total world exports in volume. In the last decades, this market has been enriched by increasing competition from new producing countries such as Chile and Australia, experiencing an unknown expansion. China, so far, has not been very active in terms of wine exports.

In Figure 1, we can see the hegemony that the "Old World" countries still maintain in world trade, despite the incorporation of countries from the southern hemisphere. It is also European countries (Germany and the United Kingdom) that maintain a leading role as major buyers of wines worldwide. In the case of Germany, as in the United States, there is a dual characteristic, as an importer and exporter, being much more relevant the role as an importer. This duality is also appreciated in France where, however, its great presence as a leading country in world wine exports stands out. Imports, usually from neighbouring countries (Italy, France or Portugal) are characterized by being much more significant in volume than in price because their fundamental purpose is the realization of coupages with French wines. Secondly, it highlights Spain's role in the world wine market. Although the country has the largest vineyard in the world, world production and trade remain to be led by France and Italy. However, Spain's international presence has recently improved, surpassing France and Italy in volume and gaining shares in all markets. Nevertheless, Spain continues to specialize in exports of low value-added wine, and France, despite having lost some relevance, remains the leading country in this regard. The export effort of Spanish wineries has made it possible to consolidate the country's position in many international markets, but there is still a long way to go, accessing segments with greater added value.

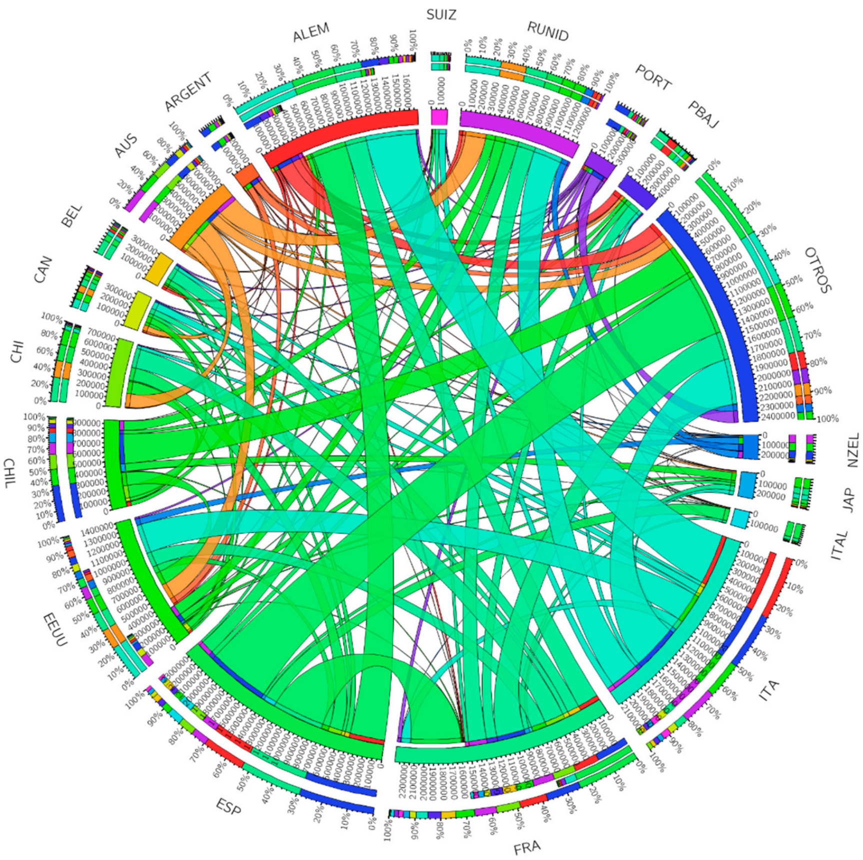

Figure 1. World wine trade. Volume. 2017 (Tm). Source FAO.

To adapt to the changes derived from the oenological and wine revolution of the final decades of the last century, characterized by the globalization of the wine markets, Spain responded with the strong restructuring of its vineyards, marked by the adjustment of the dimensions, the introduction of noble varieties, the diffusion of technological innovations and the improvement of quality [50]. All this allowed the increase of exports and positioning in the world wine markets with a renewed image, although, as mentioned above, there is still a long way to go in the segments with the highest added value. The ecological crisis and new trends in world markets require the integration of a new wave of innovations that integrate environmental aspects. Eco-innovation is the new key to sustainability in the market with adaptation to new consumer preferences. Is the Spanish wine sector ready?

3. Theoretical Framework

Eco-innovation refers to the way in which companies introduce changes in their behavior to be more sustainable. The concept provided by the OECD [51] highlights that the definition does not only refer to the development or incorporation of technologies but is much broader, encompassing new organizational methods, products, services and knowledge oriented to innovation that can teach managers to adopt these practices [52]. Literature uses different meanings to describe innovations that reduce the negative impact on the environment: green innovations, eco-innovations, environmental innovations and sustainable innovations [25].

The motivations that prompt companies to implement eco-innovation strategies are linked to improving the sustainability of the organization. Bossle et al. [53] propose a model in which eco-innovation is represented as an innovation that yields environmental benefits while maintaining a market orientation. These two perspectives are compatible, as proposed by Porter and van der Linden in 1995 [54].

When companies consider the decision to eco-innovate, they are influenced by a wide range of internal and external factors [55], and these do not have the same impact in the case of eco-innovations as in innovations in general [49]; they may not have the same effect on eco-innovations of any nature either. According to Del Río [55], the factors promoting a pro-environmental attitude are: internal factors, external factors and characteristics of environmental technologies. Internal factors include the existence of an environmental strategy and the possession of resources and capacities for its implementation, such as financial resources, size, ownership structure, export orientation and technological skills. External factors include the characteristics of the sector, market pressures and interactions with other stakeholders in the value system. Finally, the characteristics of environmental technologies encompass the complexity, maturity, level of commitment to investment and compatibility with existing technologies.

In the analysis of the factors promoting eco-innovation, the evolutionary economic perspective was introduced by Oltra [56], who identified three types of factors: normative and regulatory factors; supply-side factors; and demand-side factors. This classification shows how all the stakeholders in the economic system can impact the eco-innovation decisions of business organizations. The category of normative and regulatory factors includes considerations of the existence or absence of regulations, the possibility of anticipating them and the characteristics of the design of the regulations—rigour, flexibility and time horizon. On the supply side, Oltra identified variables related to purely economic-business motivations, including cost savings, productivity improvement, the introduction of organizational innovations, research and development activities, relationships with suppliers and with other stakeholders in the value chain and in the system in which it competes and the existence of pressure from those stakeholders. Finally, on the demand side, the influencing factors include consumer preferences for products that respect the environment and the existence of new market segments that could allow the company to gain market shares [56].

Pereira and Vence [57] classified the variables that influence eco-innovation into two large groups: conventional factors (structural characteristics of the company, business logic and technological competencies); and the environmental strategy of each company (management and commercialization of the innovation).

3.1. Regulatory Factors

The regulatory framework is usually identified as the main instrument that prompts corporate actors to change their behavior. The relationship between eco-innovation and regulations is reflected in the fact that the implementation of policies to promote such actions fuels interest in the introduction of changes aimed at improving sustainability on the part of researchers. Academic literature identifies regulations and tax incentives as drivers of the development of environmental responsibility activities [58], although environmental regulations may be seen as a double-edged sword [59]. The implementation of the processes necessary to comply with environmental regulations obliges companies to increase their production costs, which, in turn, undermines their innovation capacity [60]. Restrictive environmental policies force companies to relocate their resources from their usual processes towards processes aimed at reducing the harmful effects of their activities on the environment [61]. If a "win-win" situation is to be achieved, companies must update their technologies, leading them to enhance their technological and innovative capabilities [51]. Environmental policies can also increase entry barriers to the sector. The so-called "Porter Hypothesis" [54] suggests that environmental regulations lead to a double "win-win" situation since companies adapt to the aforementioned regulations and protect the environment while at the same time improving their competitive advantage as a consequence of this type of action. Some previous studies have found empirical evidence, reporting an increase in the efficiency of companies that implement environmentally-responsible practices [62–64], although these studies analyze the improvements in efficiency at the industry level. Studies at the company level are scarcer and have reported contradictory results, arguing that the benefits depend on the type of innovation [65].

The so-called "double externality problem" differentiates eco-innovation from innovation in general and explains the greater importance of the administration and public policies for its promotion: companies that invest in eco-innovations report difficulties in appropriating the results of such eco-innovations and see how other companies in the sector reproduce them with great ease without having to incur the costs of creating them. Companies that internalize the costs of responsible behavior are generating a benefit for society in general, which will not have to bear the costs deriving from the potential environmental damage of the activities carried out by economic institutions. Viewed this way, dual externality discourages the development of eco-innovations as no incentive for their implementation is perceived in these strategies.

Faced with this situation, environmental regulations are necessary to oblige companies to contribute to the fulfilment of public policy objectives [57,66,67]. Eco-innovations are more policy-driven and possibly less market-driven compared to general innovations [28,68].

The governments of the most industrialized countries have shown special interest in adapting their policies to the agreements reached at different international summits [69], which has had an impact on the behavior of the industry since environmental legislation directly regulates the nature of corporate production activities, prohibiting the use of certain substances or the implementation of obsolete technologies [70]. Civil, administrative and criminal liability systems have also been established, broadening the range of penalties for companies that fail to comply with environmental regulations, fees, taxes and subsidies that encourage the implementation of proactive environmental management systems [71]. Moreover, regulations will also encourage companies to adopt more reactive strategies in search of greater legitimacy [72]. Environmental legislation will promote more proactive positions in organizations, encouraging them to strive to develop pioneering behaviors, invest in environmental innovations and collaborate with the administration in the design of future regulations [69].

3.2. Internal Factors of Business Strategy

Neoclassical economics has frequently described the environmental requirements in policy as detrimental to the competitiveness of companies. However, some authors have defended the notion that if environmental policy is designed correctly, it could lead the most dynamic companies to achieve competitive advantages [54,73,74]. This contribution from the business strategy perspective meant that the internal variables of business strategy were treated as potential drivers of eco-innovation.

3.2.1. Objectives of Strategies

The classic objective attributed to business organizations is profit maximization. Although it is known that this is not the only objective, decisions are taken with a view to achieving cost savings and higher revenues and, ultimately, improving productivity and efficiency.

Eco-innovation strategies can reduce costs by helping the company to comply with environmental standards and regulations and thus avoid the costs of negative externalities that the activity of economic organizations may generate [57]. Additionally, the implementation of eco-innovations can lead to a reduction in energy and resource consumption, resulting in a clear reduction in costs. Besides, some business instruments, such as the adoption of voluntary environmentally friendly certifications, serve to communicate their responsibility to the environment [75].

However, to eco-innovate, companies need to carry out actions and have instruments that increase their costs; the magnitude of the costs incurred will be dictated by the company's need to train employees, invest in research and development and purchase technologies, and these costs may even outweigh the gains from avoiding environmental problems. The dilemma faced by decision-makers must be resolved through cost-effectiveness analysis and, above all, by broadening the concept of "benefit" not only from the economic perspective but also in economic and social terms.

Eco-innovations and corporate social responsibility (CSR) are related. Even though CSR is a multidimensional concept that businesses have to weigh [76], it is evident that CSR actions and consumer demands are important factors for the initiation of investments in environmental research and development. However, to step up such actions, companies need to have the necessary capabilities accompanied by environmental regulations [77–79]. When focusing on eco-innovations in products, Kammerer [80] affirmed that the "green" characteristic of the products a company offers the market can be a source of differentiation provided the organization is able to transfer that characteristic to the market and get consumers to pay a premium for it. The premium customers are willing to pay will be determined by their level of satisfaction with products and is therefore crucial in eco-innovative products [81–84].

3.2.2. Resources and Capabilities for the Implementation of Strategies

The possession of technological capabilities is decisive for the adoption of eco-innovation strategies. These capabilities are developed from the know-how possessed and developed by the company by either engaging in their own research and development activities or outsourcing equipment, specialists or other professionals. Know-how is not always explicit but can be tacit; in the latter case, it refers to any organizational routines generated by the company.

Although investment in research and development is not the only option for creating know-how, many authors have found a strong relationship between investment and the development of eco-innovations [28,62], while others have reported weaker relationships [80,81]. Other authors claim that company size plays a moderating role in this relationship [85]. Kammerer [80] justifies this difference in results based on the different measures used to represent an investment in research and development and suggests, as a possible explanation for these findings, that the sector may be acting as a moderator in the research and development–eco-innovation relationship.

3.3. External Factors

Addressing the pressures exerted by general or specific stakeholders may prompt companies to implement eco-innovations. Stakeholder theory [86,87] is based on four key academic areas, namely strategic planning, systems theory, corporate social responsibility and organization theory [88,89], and is based on four essential premises:

1. Companies have relationships with different stakeholders, which affect company decisions [90–92].
2. These relationships are established in the company's processes and affect the results of the organization and its stakeholders.
3. Each stakeholder group aims to cover its requirements through the decisions of the company, and these cannot be covered without undermining those groups [88,93,94].
4. The focus is on decision making in the company [88].

Stakeholder theory has been adopted in some studies focusing on the analysis of the environmental strategies and environmental social responsibility actions of organizations [72,95–97]. The results of these studies have been inconsistent due mainly to the effect of the structural characteristics of the companies. However, it has been shown that companies need to satisfy the demands of stakeholders or groups that may affect the desired results. Thus, the factors influencing the environmental orientation of companies must necessarily include the pressure exerted by stakeholders to ensure that strategies are eco-innovative.

In the specific case of the wine sector in Italy, De Steur et al. [43] suggests that both internal and external factors are important in the decision to implement eco-innovative practices, but internal factors prevail, specifically concerning ethical issues.

3.4. Eco-Innovation and Results

The relationship between environmental sustainability and economic profitability is relevant [98]. The literature explains that companies (particularly small and medium-sized firms) that are able to define a proactive strategy can better identify opportunities, develop new products, penetrate new markets, and develop new processes, all of which allow them to achieve more competitive advantages, stronger growth and better results [99,100].

In studies focusing on the wine industry, Newton et al. [101] showed that companies in the sector with a differentiation strategy obtained better results than those with a cost leadership strategy. Ferrer et al. [102] studied companies in the Spanish wine industry and obtained uneven results, depending on the type of company analyzed: in the case of individual companies (family-owned), strategy (first marketing and then efficiency) was a key element for explaining results; a differentiation strategy worked best in commercial companies to obtain better business results; and finally, in the case of cooperatives, the aforementioned authors did not observe a direct relationship between strategic positioning and results.

In the last decade, many authors have studied the relationship between the development of eco-innovation strategies and business results. There have been many attempts to understand this relationship, but not all authors have obtained the same result [103–112].

The major motivation for companies to make decisions in one direction or another would be the existence of empirical evidence corroborating that a specific position has a positive impact on business performance. However, researchers have encountered difficulties when studying the relationship between the environmental performance of a company and its economic performance. Nevertheless, the literature contains hardly any studies that have attempted to explain and systematize the reasons why existing studies have sometimes reported contradictory results [113]. Although empirical attempts have been made to find relationships between eco-innovation and performance, the theory behind any results needs to be developed [114].

The theoretical approaches used most as a basis for empirical studies are, on the one hand, stakeholder theory, which maintains that the costs voluntarily assumed by the organization for environmental improvement, beyond the requirements established in standards or regulations, will result in a reduction in value for shareholders; on the other hand, resources and capabilities theory adds that eco-innovation allows companies to develop new capabilities and attract rare and valuable resources that will not be available to all competitors and that will therefore generate competitive advantages [54,111,115–117].

Most empirical studies have reported a positive relationship the differences in results obtained may be due to the time horizon considered for measuring the impact on results (too short in some studies for the results of the investments made to be verified), the type of economic variable chosen and the measurement of environmental performance. The methodological differences indicated have resulted in disparate results [113].

3.5. Proposed Eco-Innovation Factors and Results Model

Based on the previous theoretical discussion, we propose the following model regarding the motivations that prompt companies to develop process and product eco-innovations and the impact of the latter on economic-financial results (Figure 2).

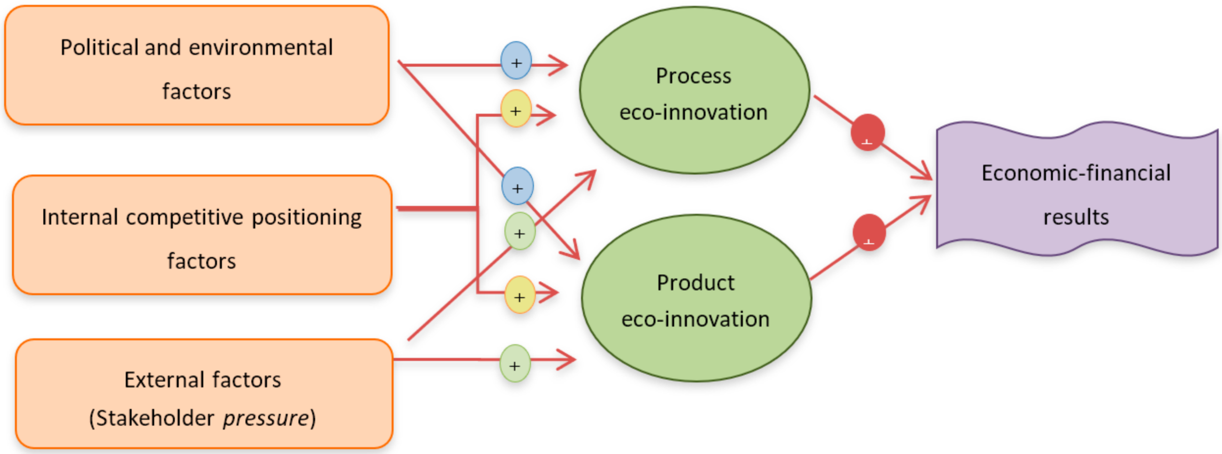

Figure 2. Proposed model.

4. Materials and Methods

4.1. Database

The proposed hypotheses were tested using a database containing data from Spanish companies in the wine sector, for which we identified the population and determined the sample size (see Table 1). The unit of analysis is the company, and the questionnaire was sent to winery owners and/or managers. Only one questionnaire was collected per company.

Table 1. Technical file of the survey carried out.

Population size	4093 wineries
Sampling method	Online questionnaire for the total population
Sample size	251 companies (239 valid data)
Response rate	13%
Sample error	6%
Information collection period	2017–2018

A questionnaire previously validated by Aragón-Correa [118] and used in other studies [119,120] was employed. Smart PLS 3 software was used for the calculation [121].

The sample is characterized by the following traits: The majority are consolidated businesses, and they are distributed by Castilla and León (72), Castilla-La Mancha (54), Catalonia (47), La Rioja (40), Andalusia (36) and Navarra (2). Those regions contain nearly 70% of the Spanish wineries. Of them, 149 are Limited Liability companies, 47 are Stock Companies and 55 are Cooperatives. Only 4.8% belong to a holding, and more than 30% belong to a family. Concerning the size of the business, the great majority are micro (58%) and small (33.90%) businesses. Only 1.60% can be classified as big-size businesses. The sample represents the characteristics of the sector's business (see Section 2), and there are no biases. The descriptive characteristics of the factors are presented in Table A1 of Appendix A.

4.2. Methodology

To test the hypotheses of the proposed theoretical model, a structural equation model (SEM) was defined following a partial least squares (PLS) technique. This method is suitable for causal-predictive analyzes when there is insufficient theoretical information, enabling the estimation of latent (unobservable) variables while establishing linear dependency relationships (regressions) between them, determining the paths between endogenous constructs and exogenous constructs [122–124]. It can also be used to estimate mediating and moderating effects [125].

PLS is a technique oriented towards prediction based on variances between dependent variables. It is very flexible insofar as it can be used with any type of scale—continuous or categorical—[126] and does not need to fulfill special requirements for the distribution of the database. It works well with reflective and formative constructs and allows models to be organized with very small samples, their minimum size depending on the number of variables contained in the most complex structural relationship. The stability of the estimated parameters is calculated by the resampling method (bootstrapping). These also work well with complex models and do not pose problems of over-fitting or lack of degrees of freedom, since the goodness of fit will depend solely on the ability of the model to explain the dependent variables, i.e., to maximize the explained variance [127,128]. The laxity of the requirements to the sample (size and distribution) is due to the fact that PLS segments the model into as many parts as there are blocks of variables, analyzing each of them separately [127,129]. However, the minimum sample size must be at least 10 times greater than the number of observed variables that the longest equation of the measurement model contains, or in other words, the number of antecedents that point to the dependent structural variable in the most complex equation [128–130].

The proposed model was configured in 6 constructs, fed by 29 factors, as shown in Figure 3. The indicators were measured according to a 5-point Likert scale, and the variables were coded according to Table A2 in Appendix A.

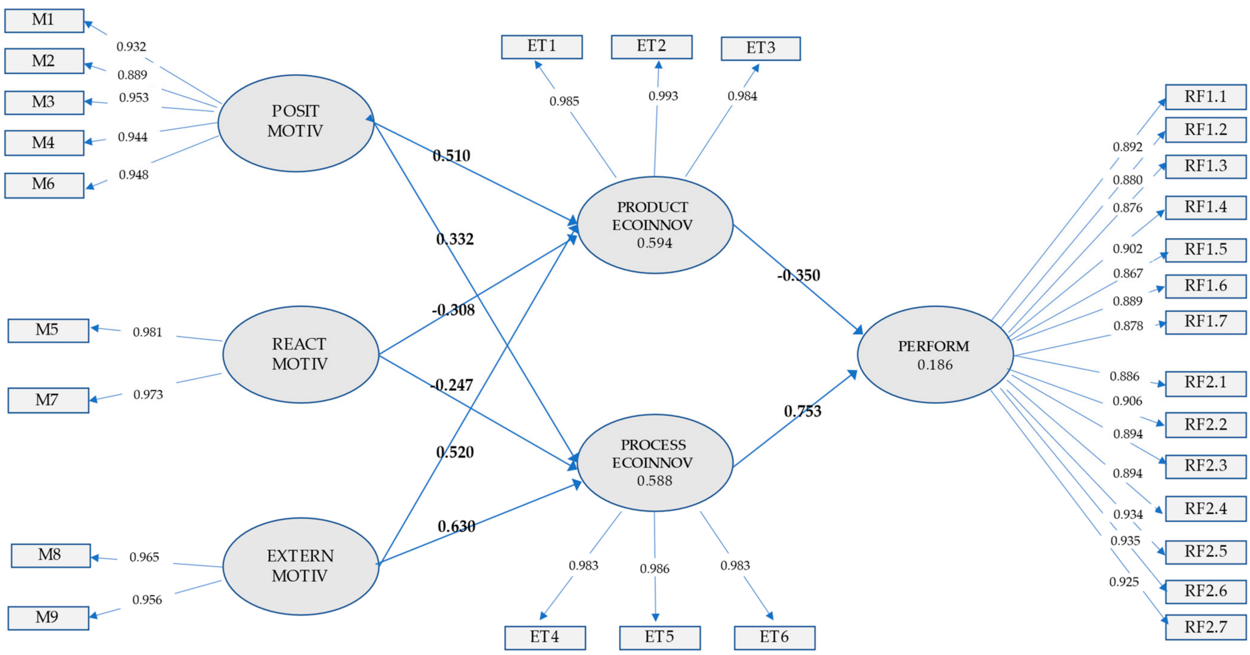

Figure 3. Estimated model.

5. Results and Discussion

The proposed model was configured into six constructs: three exogenous and three endogenous. Given the nature of the information available, no training index was incorporated, and all the constructs were formed following a reflective model. Therefore, it was necessary to validate the training scales, evaluating their unidimensionality, consistency and validity (convergent and discriminant).

5.1. Analysis of the Measurement Model

The literature has determined the standard criteria established for the different validity and reliability indicators [129,131–134]. The reliability of the measurement model is determined by the sign, magnitude, and significance of the loads of the factors informing each construct and requires the loads to be greater than or equal to 0.7, which indicates that the indicator shares more than 50% of the variance of the construct. The loads of the indicators are presented in Tables A3 and A4 in Appendix A. All the factors met the criteria, were significant, and their sign was the expected one.

The validity of the model was measured by means of convergent validity and discriminant validity. Convergent validity (see Table 2) measures the internal consistency of the constructs. It is analyzed using the mean variance extracted from the constructs (AVE), which must be greater than 0.5 [123] and means that each construct explains at least 50% of the variance of the indicators. The internal consistency of each item and its respective construct was measured using Cronbach's Alpha (it must be greater than 0.7) and composite reliability, which indicates that each indicator is significantly different from the rest, is usually measured using the composite reliability index, which must be greater than 0.85.

Table 2. Convergent validity.

	Cronbach's Alpha	Rho_A	Composite Reliability	AVE
PROCESS ECOINNOV	0.984	0.986	0.989	0.968
PRODUCT ECOINNOV	0.987	0.988	0.992	0.975
EXTERN MOTIV	0.916	0.926	0.960	0.922
POSIT MOTIV	0.963	0.966	0.971	0.871
REACT MOTIV	0.953	0.977	0.977	0.955
PERFORM	0.982	0.995	9.983	0.805

Meanwhile, discriminant validity establishes whether the indicators are adequately related to the construct in which they are incorporated. It is analyzed using the Forner–Larcker Criterion to determine whether discriminant validity exists between two latent variables if the variance shared between pairs of constructs is less than the variance extracted for each individual construct. The estimated model also met this criterion (Table 3).

Table 3. Forner–Larcker criterion.

	PROCESS ECOINNOV	PRODUCT ECOINNOV	EXTERN MOTIV	POSIT MOTIV	REACT MOTIV	PERFORMAN
PROCESS ECOINNOV	0.984					
PRODUCT ECOINNVO	0.955	0.987				
EXTERN MOTIV	0.753	0.743	0.960			
POSIT MOTIV	0.636	0.669	0.806	0.933		
REACT MOTIV	0.397	0.414	0.587	0.826	0.977	
PERFORM	0.418	0.368	0.572	0.687	0.744	0.897

5.2. Structural Model Analysis

After confirming the validity and confidence of the measurement model, we proceeded to analyze the structural model that allowed us to confirm the dependency relationships established between the variables, in line with the theoretical approaches described above. As previously indicated, PLS does not provide a measure of global goodness of fit [130] since the purpose of a predictive model with these characteristics is to maximize the variance explained by endogenous constructs, or, as in this study, to test whether the relationships established between variables in the analyzed sector complied with the general theories established for other sectors. In this sense, Falk and Miller [126] proposed evaluating the extent to which the dependent variable (or construct) is explained by the latent exogenous variables: the model will be better the greater the total explained variance, which is determined by the coefficient R^2 of each endogenous variable. This should be interpreted in a similar way to the corresponding coefficient in a linear regression [129], and values greater than 0.1 are acceptable, which would be equivalent to values of 0.5 for the R^2 in a least squares model [121]. In this study, almost 60% of the product and process eco-innovations developed in the Spanish wine sector are promoted by the factors considered, and almost 20% of the business result would be due to eco-innovations.

The algebraic sign of the path coefficients indicates whether the relationship between the exogenous and endogenous constructs is increasing or decreasing and its value (always between minus 1 and 1) reveals the intensity of the relationship, which is more intense the closer the coefficients are to 1.

The bootstrapping technique can be used to calculate the statistical significance of these coefficients [130]. In this case, the programme performed 500 subsamples. It can be seen in Table 4 that except for two, all the structural relationships were significant.

Table 4. Analysis of the significance of the structural relationships.

	Original Sample	Sample Mean	Standard Deviation	T Statistics	*p* Values
PROCESS ECOINNOV -> PERFORMAN	0.753	0.609	0.539	1.396 *	0.163
PRODUCT ECOINNOV -> PERFORM	−0.350	−0.212	0.591	0.593	0.553
EXTERN MOTIV -> PROCESS ECOINN	0.630	0.628	0.092	6.879 ***	0.000
EXTERN MOTIV -> PROD ECOINNOV	0.512	0.511	0.085	5.991 ***	0.000
POSIT MOTIV -> PROCESS ECOINNOV	0.332	0.334	0.134	2.484 ***	0.013
POSIT MOTIV -> PRODUCT ECOINN	0.510	0.506	0.129	3.942 ***	0.000
REACT MOTIV -> PROCESS ECOINN	−0.247	−0.245	0.101	2.453 ***	0.015
REACT MOTIV -> PROD ECOINNOV	−0.308	−0.301	0.100	3.068 ***	0.002

*** 99%; * 90%.

5.3. Discussion

In view of these results, we are unable to refute the existence of positive relationships between product and process eco-innovations and business results, as proposed in the theoretical model, since the first relationship was not significant and the second was a practically negligible 90%. This inconclusive result may have been due to the high fragmentation of the sector, which is reflected in the sample, when collecting data on family businesses, cooperative societies, and limited liability companies, in line with Ferrer et al. [102]. Therefore, a larger and stratified study is required to obtain conclusive results on this aspect.

However, the relationships between the motivational factors considered and product and process eco-innovations are significant. Firstly, it is worthwhile highlighting the negative effect of reactive motivation factors on both types of eco-innovation and the impact on product eco-innovation being greater than that of process eco-innovation. However, the said impact was moderate or low in both cases. It is important to remember that the indicators that feed the reactive motivation construct refer to adaptation to the legal framework and the effect of public incentives. The result contrasts with the one proposed in the theoretical model and reveals the ineffectiveness of environmental regulations since they fail to not promote eco-innovation in either products or processes. In this sense, as Pereira and Vence [57], Renning [66] and Horbach, Oltra and Berlin [67] indicate specific and adequate environmental legislation is required to promote actions aimed at the application of product and process eco-innovations in the wine sector.

Positioning motivation factors have a positive effect on product and process eco-innovation, being greater in the case of the former. In this case, consumer requirements and corporate social responsibility actions foster eco-innovation actions in wineries, thanks, among other things, to the existence of capabilities in companies, as indicated by Kesidou and Demirel [77]; Aguilera-Caracuel and Ortiz-de-Mandojana [78]; Soomro et al. [79] and Zhao et al. [135]. In the specific case of product eco-innovation in the wine sector, it is possible that, as indicated by Kammerer [80], the condition of environmental sustainability offers wineries a source of differentiation that can help them to improve their economic performance because consumers are willing to pay a premium for these products [81–84].

Finally, external motivation has a positive impact on both product and process eco-innovation, being greater in the case of the latter. Furthermore, the two coefficients of the relationships established by the external motivational factors were the highest in the model. The study concludes, in accordance with stakeholder theory [76,77], that the pressures exerted by environmental agents promote eco-innovative behaviors in Spanish wineries and in line with the literature [72,95–97], environmental strategies and social and environmental responsibility actions of organizations are promoted due to the need of companies to satisfy the demands of stakeholders or collectives such as lobby groups and organizations. Thus, it is necessary to include, among the factors influencing the environmental orientation of companies, the pressure exerted by stakeholders to ensure that strategies are eco-innovative. This result contrasts with that obtained by De Steur et al. [43] for Italy, reporting that internal factors prevail over external ones.

6. Conclusions

This article has examined the extent to which different factors affect eco-innovation processes (product and process eco-innovation) in Spanish wine-producing companies. Our study contributes to the literature on eco-innovation, providing information on a mature and traditional sector characterized by its high fragmentation, characteristics that can cause the different factors driving eco-innovation to have a different impact than in other sectors or specific cases.

Given the specific characteristics of the Spanish wine industry, integrated into the European framework of the Common Agricultural Policy, this study provides certain lessons that could be applied on a broader scale:

- Positioning motivation factors and the desire of companies to penetrate new markets, expand their range of products, improve competitiveness, adapt to demand and, ultimately, improve economic performance, promote both product and process eco-innovation in the Spanish wine sector.
- External motivation has a positive impact on both product and process eco-innovation, being greater in the case of the latter. Furthermore, the two coefficients of the relationships established by external motivational factors were the highest in the model.
- It is worth highlighting that the current environmental regulations do not promote eco-innovation in either products or processes in wineries. Reactive motivation factors present significant and negative relationships, contrary to the relationship proposed in the theoretical model (being the less strong motivational factor). Therefore, this study, based on regulatory and policy-related factors, is important as it evidences the ineffectiveness of the existing regulatory framework. That means that environmentally

friendly practices in Spanish wineries depend more on their own desires than on the regulatory framework. Therefore, more in-depth research is required in this field to obtain more evidence, not only regarding the most efficient design of public policy instruments to promote eco-innovation but also on other aspects such as the integration of eco-innovation in education, training programs and the dissemination of information on the advantages of eco-innovation

Lastly, the study does not allow conclusions to be drawn on the extent to which eco-innovations influence the returns of wineries since the relationships with financial performance were not significant. However, the model suggests a negative relationship with product eco-innovation and a positive relationship with process eco-innovation, although the results were not conclusive.

These results have interesting implications for policy-makers as it has been demonstrated that the adoption of sustainable practices by companies is not being encouraged by public policy.

Finally, it is important to indicate the limitations of our study. Firstly, the results are sector and county-wide specific. Apart from the limitation mentioned previously, due to the design of the selected questionnaire, the other limitation concerned potential bias due to the national scope of the sample. Other similar studies carried out in other wine-producing countries would clarify this doubt. Lastly, it should be noted that the sample used reflects the high fragmentation of the sector since it integrated data from family businesses, cooperatives and public limited companies. Therefore, a broader and more stratified study is required to obtain conclusive results on aspects such as the relationship between eco-innovation and results.

Author Contributions: Conceptualization, F.C., I.C. and Á.G.-M.; methodology, I.C. and F.C.; software, I.C.; formal analysis, I.C., Á.G.-M. and F.C.; data curation, F.C.; writing—original draft preparation, C.C.; writing—review and editing, C.C. and I.C. All authors have read and agreed to the published version of the manuscript.

Funding: The authors gratefully acknowledge the financial support from the Department of Political Economy and Public Finances, Economic Statistics and Economic Policy and the Spanish Ministry of Science, Innovation and Universities (RTI2018-101867-B-I00).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Descriptive statistics.

	N	Min.	Max.	Mode	Stand. Desv.
PM1	234	1	5	3	0.719
PM2	233	1	5	3	0.722
PM3	235	1	5	3	0.674
PM4	236	1	5	3	0.671
PM5	236	1	5	3	0.678
PM6	234	1	5	2	0.656
PM7	235	1	5	3	0.732

Table A1. *Cont.*

	N	Min.	Max.	Mode	Stand. Desv.
PM8	232	1	5	2	0.674
PM9	233	1	5	3	0.609
PM10	232	1	5	3	0.576
PM11	235	1	5	4	0.665
PM12	232	1	5	3	0.576
PM13	234	1	5	3	0.570
PM14	232	1	5	3	0.639
PM15	233	1	5	3	0.596
PM16	235	1	5	3	0.669
PM17	235	1	5	1	0.675
PM18	235	1	5	1	0.741
ET1	236	1	5	1	0.664
ET2	236	1	5	1	0.683
ET3	234	1	5	1	0.690
ET4	236	1	5	1	0.725
ET5	234	1	5	1	0.777
ET6	236	1	5	1	0.777
M1	236	1	5	3	0.705
M2	229	1	5	2	0.694
M3	237	1	5	2	0.665
M4	234	1	5	2	0.711
M5	237	1	5	4	0.810
M6	236	1	5	2	0.723
M7	236	1	5	3	0.894
M8	236	1	5	1	0.704
M9	237	1	5	1	0.700
RF11	236	2	5	5	0.662
RF12	236	2	5	4	0.637
RF13	236	1	5	4	0.715
RF14	237	1	5	4	0.686
RF15	236	1	5	4	0.669
RF16	236	1	5	4	0.680
RF17	236	1	5	4	0.670
RF21	234	2	5	3	0.635
RF22	236	1	5	3	0.731
RF23	236	1	5	2	0.705
RF24	233	1	5	3	0.571
RF25	235	1	5	3	0.534
RF26	235	1	5	3	0.550
RF27	235	1	5	3	0.585

Table A2. Variables and codes.

	Variable	CODE
Eco-innovation	Leadership in product eco-innovations	E.T.1
	Number of product eco-innovations	E.T.2
	Intensity of change in product eco-innovations	E.T.3
	Leadership in process eco-innovations	E.T.4
	Number of process eco-innovations	E.T.5
	Intensity of change in process eco-innovations	E.T.6
Motivations	Expand product range	M1
	Expand markets	M2
	Improve profitability	M3
	Improve competitiveness	M4
	Adapt to legal framework	M5
	Adapt to demand conditions	M6
	Leverage public incentives	M7
	Respond to pressure groups and associations	M8
	Follow industry associations' guidelines	M9
Financial and market performance	Importance of sales figures	R.F.1.1
	Importance of sales growth	R.F.1.2
	Importance of market share	R.F.1.3
	Importance of profitability	R.F.1.4
	Importance of gross profit margin	R.F.1.5
	Importance of operating profit	R.F.1.6
	Importance of achieving objectives	R.F.1.7
	Satisfaction with sales figures	R.F.2.1
	Satisfaction with sales growth	R.F.2.2
	Satisfaction with market share	R.F.2.3
	Satisfaction with profitability	R.F.2.4
	Satisfaction with gross profit margin	R.F.2.5
	Satisfaction with operating profit	R.F.2.6
	Satisfaction with achieving objectives	R.F.2.7

Table A3. Loads of the indicators.

	PRODUCT ECOIN	PROCESS ECOIN	EXTERN MOTIV	POSIT MOTIV	REACT MOTIV	PERFORM
ET1		0.985				
ET2		0.993				
ET3		0.984				
ET4	0.983					
ET5	0.986					
ETS	0.983					

Table A3. *Cont.*

	PRODUCT ECOIN	PROCESS ECOIN	EXTERN MOTIV	POSIT MOTIV	REACT MOTIV	PERFORM
M1				0.932		
M2				0.889		
M3				0.953		
M4				0.944		
M5					0.981	
M6				0.948		
M7					0.973	
M8			0.965			
M9			0.956			
RF1.1						0.892
RF1.2						0.880
RF1.3						0.876
RF1.4						0.902
RF1.5						0.867
RF1.6						0.889
RF1.7						0.878
RF2.1						0.886
RF2.2						0.906
RF2.3						0.894
RF2.4						0.894
RF2.5						0.934
RF2.6						0.935
RF2.7						0.025

Table A4. Reliability analysis: loadings significance.

	Median	Deviat.	Statistic	*p* Value
ET1 <- PROD ECOINNOV	0.986	0.005	190,840	0.000
ET2 <- PROD ECOINNOV	0.993	0.003	350,021	0.000
ET3 <- PROD ECOINNOV	0.985	0.012	82,901	0.000
ET4 <- PROCESS ECOINNOV	0.983	0.006	162,333	0.000
ET5 <- PROCESS ECOINNOV	0.986	0.006	163,453	0.000
ET6 <- PROCESS ECOINNOV	0.982	0.005	187,103	0.000
M1 <- POSIT MOTIV	0.931	0.026	35,879	0.000
M2 <- POSIT MOTIV	0.889	0.028	32,191	0.000
M3 <- POSIT MOTIV	0.953	0.009	106,166	0.000
M4 <- POSIT MOTIV	0.943	0.016	58,510	0.000
M5 <- REACT MOTIV	0.971	0.011	90,440	0.000
M6 <- POSIT MOTIV	0.948	0.010	92,327	0.000
M7 <- REACT MOTIV	0.971	0.011	90,440	0.000
M8 <- EXTERN MOTIV	0.965	0.006	157,280	0.000
M9 <- EXTERN MOTIV	0.954	0.012	81,712	0.000
RF1.1 <- PERFORM	0.894	0.047	18,832	0.000

Table A4. *Cont.*

	Median	Deviat.	Statistic	*p* Value
RF1.2 <- PERFORM	0.880	0.050	17,522	0.000
RF1.3 <- PERFORM	0.876	0.048	18,232	0.000
RF1.4 <- PERFORM	0.902	0.043	21,058	0.000
RF1.5 <- PERFORM	0.867	0.061	14,163	0.000
RF1.6 <- PERFORM	0.888	0.046	19,350	0.000
RF1.7 <- PERFORM	0.878	0.049	18,089	0.000
RF2.1 <- PERFORM	0.881	0.042	21,074	0.000
RF2.2 <- PERFORM	0.901	0.031	29,340	0.000
RF2.3 <- PERFORM	0.888	0.031	28,430	0.000
RF2.4 <- PERFORM	0.890	0.044	20,184	0.000
RF2.5 <- PERFORM	0.929	0.035	26,864	0.000
RF2.6 <- PERFORM	0.930	0.034	27,662	0.000
RF2.7 <- PERFORM	0.920	0.039	23,648	0.000

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