

## **Exploring the drivers of Sustainable Innovation in wine cooperatives: a case-studies analysis**

Anna Uliano<sup>1\*</sup>, Giuseppe Marotta<sup>1</sup>, Marcello Stanco<sup>1</sup>, Concetta Nazzaro<sup>1</sup>

<sup>1</sup>Department of Law, Economics, Management and Quantitative Methods, University of Sannio, Italy

**Discussion Paper prepared for presentation at the 97<sup>th</sup> Annual Conference of the Agricultural Economics Society, University of Warwick, United Kingdom**

**27 – 29 March 2023**

*Copyright 2023 by Anna Uliano, Giuseppe Marotta, Marcello Stanco, Concetta Nazzaro. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

\*auliano@unisannio.it

### **Abstract**

With the current social, economical, and environmental scenarios, the intensive farming is no longer viable. In this context, innovation may play a crucial role. In particular, responsible innovation represent a value creation driver, allowing farms to realize internal economies and external social economies. The development of innovative processes is particularly suited to cooperatives, as they generate a competitive advantage and allow to overcome two constraints to sustainable innovation adoption: high costs and complexity. These aspects, which highlight the significant role of cooperation and innovation in the shared value creation process, have not been broadly addressed in previous contributions, especially regarding the wine sector. Therefore, this study aims to investigate the drivers of innovation processes for shared value creation in wine cooperatives. A 2-step analysis was implemented, including the definition of an interpretative model on the drivers of sustainable innovation processes for shared value creation in cooperatives, and a comparative analysis among two wine cooperatives, in order to validate such model. Results have validated the hypothesized scheme: in both cases, the drivers included in the model are essential for the adoption of innovations in viticulture. In particular, governance mechanisms and the very effectiveness of innovations change according to the territorial context.

**Keywords** Smart Innovation, Viticulture, Shared Value Creation, Sustainability, Smart Farming, Comparative Analysis.

**JEL code** Q00: Agricultural and Natural Resource Economics; Environmental and Ecological Economics: General

## 1. Introduction

The modern economic, social and environmental debate, that sees Europe as the first climate-neutral continent by 2050, also focuses on food systems sustainability. In fact, the European Union (EU) proposes a forward-looking and realistic vision of agriculture: sustainable and pursued through innovation and technology (European Commission, 2017). In particular, through the Farm to Fork Strategy, at the heart of the new European Green Deal, the challenge of sustainable food systems is addressed, also highlighting the link between healthy people, healthy societies and healthy planet (Nazzaro *et al.*, 2022). Likewise, the new Biodiversity Strategy aims to protect nature and reverse the ecosystems' degradation. Therefore, the European Commission pushes towards a necessary transition to new green business models, focusing on a renewed social pact in the agrifood (European Commission, 2020). The Common Agricultural Policy (CAP) also addresses these issues, aiming at an ecological and digital transition of agriculture through three key objectives: promoting a smart and resilient agricultural sector; supporting care for the environment and climate action; stimulating growth and employment in rural areas (Nazzaro *et al.*, 2022).

The most significant socio-economic changes also concerned citizens-consumers' instances, who showed more interest toward environmental, health, social and territorial issues, generating new consumption's demands which include intangible needs. In particular, a conscious and responsible purchasing and consumption model has been established which, in addition to the classic attributes (e.g. price, quality, etc.) also gives importance to the social cost linked to the production and consumption of foods (Marotta and Nazzaro, 2012). In fact, modern citizens-consumers are more informed and responsible, favoring the consumption of foods characterized by low environmental impacts, positive social repercussions and, in general, ethical attributes (Uliano *et al.*, 2021; Stanco and Lerro, 2020; Rizzo *et al.*, 2020; Tobi *et al.*, 2019).

In this context, environmental protection may represent a competitive lever that, through the introduction of sustainable innovations, which allows to meet citizen-consumers' new needs and, at the same time, produces positive environmental and social externalities, supports the transition from low-impact production models to green economy models, in line with the objectives pursued by European policies (Iakovou *et al.*, 2014; Marotta and Nazzaro, 2012, 2020).

This scenario led to the development of enterprise's new socially responsible behavior, increasingly oriented to the integration of social and environmental issues in the economic activities (Topp-Becker and Ellis, 2017; Marotta and Nazzaro, 2012; Borsellino *et al.*, 2012). As a consequence, the wine sector, which represents a leading sector in the Italian and European agrifood, both for sales volumes and revenue as well as for the excellence related to the product quality (Nazzaro *et al.*, 2022; Pomarici and Sardone, 2020), in recent years, it experimented innovative paths of change, which particularly affected production processes, increasingly smart and green (Fiore *et al.*, 2017; Nazzaro *et al.*, 2016). Therefore, there has been the birth, and the development, of a complex innovation process based, on the one hand, on the evolution of the scientific knowledge applied to the technological development in the fields of genetics, oenology and in relation to the environmental impact and, on the other hand, on the development of more competitive business and managerial strategies aimed at the product marketing and the creation of shared value (Smith, 2007; Marotta and Nazzaro, 2020). In particular, wine cooperatives have changed their investment priorities, focusing on research and development, and are increasingly oriented towards a more advanced type of innovation, that is precision and smart agriculture (Giuliani *et al.*, 2011), in order to achieve a degree of innovation which integrates their resources and productive capacities, improving the sustainability of production processes and the possibility of creating a competitive advantage (Doloreux and Lord-Tarte, 2013; Figueiredo and Franco, 2018; Lerro *et al.*, 2019). The introduction of smart innovation, when accompanied by appropriate models of corporate governance, is able to support the farmer in business decisions and allow cooperatives to create and share value (Alves *et al.*, 2011). Furthermore, the cooperative model

generates significant positive effects on the territory, producing public goods and social wealth, encouraging the conservation of the environment and local development and countering the depopulation of rural areas (Vitale, 2019).

These aspects, which highlight the significant role of cooperation and innovation in the creation of shared value, have not been broadly addressed in previous contributions, especially regarding the wine sector. For this reason, this study aims to investigate the drivers and the impacts of the implementation of smart and precision innovation processes on the creation and sharing of value in wine cooperatives, developing a comparative analysis between wine cooperatives belonging to different territories.

The paper is organized as follows. In section two, the theoretical background and the theoretical framework are highlighted. Section three concerns the methodology, while section four describes the case studies analyzed. In section five the results of the comparative analysis are discussed. Conclusions, limitations and future research trajectories are shown in section six.

## **2. Theoretical background**

### **2.1 Innovation as a value creation driver in wine cooperatives**

Innovation can be considered as a value creation driver (Drucker, 1985; Teece, 1986; Jacobides *et al.*, 2006; Nazzaro *et al.*, 2016). Such concept of value is very wide, including also the ability to create positive externalities. According to the Knowledge-Based View and the Experience Economy, in fact, the concept of value may also include immaterial contents (knowledge and meanings), and in virtue of Corporate Social Responsibility (CSR), it also concerns issues related to the environment, landscape, and society.

In the wine sector, the success of innovations is closely linked to the farms' ability to understand and to adapt wine production, distribution, and marketing to the society's new instances. In fact, the innovation in a single phase will hardly meet citizens-consumers' needs and, therefore, its impact on the farms' performance will be limited (Wood and Kaplan, 2005). The development of the innovative process, precisely due to the necessary integration in all stages of the supply chain, is particularly suited to the cooperatives' characteristics. The latter, in fact, have progressively undertaken innovation paths, which included a wide range of new activities along the wine processing and marketing chain, such as tourism and local development, in addition to the introduction of new wines (product and process innovation) (Chiffolleau *et al.*, 2008).

The attention paid by society to sustainability has led cooperatives to adopt responsible innovation strategies.

Several authors approached the topic of innovation in the cooperative context, focusing on the collective nature of innovation, emphasizing that the innovation process takes place in the context of vertical and horizontal networks. In the case of wine cooperatives, such networks are more common at the upstream of the supply chain, involving grape growers and wine producers (Caffagi and Iamicieli, 2010). Within the networks, members may share knowledge and other resources needed for the implementation of the innovation process. According to Nazzaro *et al.* (2016), innovation can be considered a driver for value creation in the context of wine cooperatives, highlighting the internal and external effects of the innovation, in terms of value creation, not only for the cooperative itself but also for the territory as a whole.

In this context, environmental innovations may play a crucial role. The latter are defined as any innovation, process, product, or organization aimed at reducing environmental pollution (OECD, 1997). According to B elis-Bergouignan and Saint-Ges (2009), independent winegrowers are more easily affected by environmental initiatives when they are involved in collective actions, allowing them to combine regulatory, technological, and organizational learning. Saint-Ges and B elis-Bergouignan (2010) analyze the ability of the wine cooperative to become a key player in the

development of environmental friendly innovative practices, showing that the cooperative organization generates a competitive advantage for its members but also allows to overcome two major constraints: the high cost of environmental innovations, and the complexity of the technological and organizational knowledge needed.

According to De Conto *et al.* (2016), wine cooperatives achieve competitive advantages after introducing environmental innovation, such as an increased attractiveness on the market, due to the improvement of cooperatives' image, and an higher income. Therefore, through the implementation of an innovation strategy capable of creating value for the market, while creating value for the territory and for the cooperative itself, the latter is able to achieve a competitive advantage (Bharadwaj *et al.*, 1993; De Conto *et al.*, 2016).

According to Alonso (2011) cooperatives represent a particular form of innovation-oriented enterprise, due to their ability to network, allowing to collaborate and share ideas and experiences but also to create a social environment in favor of cooperation and trust between the different wineries and organizations. Such organizations, by facilitating decision-making related to the adoption of innovative strategies (Gilinsky *et al.*, 2008), ease the implementation of innovations. Through different innovations, cooperatives create, therefore, value for members and for the different actors in the area, with positive effects on the community. Such effects could, however, be limited by hostile attitudes of some cooperatives' members, making it necessary the adoption of appropriate mechanisms, aimed to involve all the members in the innovation process.

### **2.3 Theoretical Framework**

Smart and precision innovations can be included in the wider category of sustainable innovation in virtue of the positive effects they generate on the environment, representing one of the key tools for achieving sustainability (Sarri *et al.*, 2020; Rose *et al.*, 2021).

Despite literature includes several studies investigating drivers related to the implementation of eco and sustainable innovations in agriculture, only few contributions contemplate the context of cooperatives and, in particular, the adoption of collective sustainable innovations as a value creation driver.

According to previous contributions (Segarra-Oña *et al.*, 2013; Triguero *et al.*, 2014), internal resources and capabilities enable to develop the necessary knowledge base to promote eco-innovations. In fact, both structural and internal factors, such as size, location and human resources, are considered important drivers of environmental innovation, representing also inputs for the development of technology push (Triguero *et al.*, 2018; Stanco *et al.*, 2020). According to Marotta and Nazzaro (2011), internal resources play an important role in the process of value creation, and can be classified as: human capital and management, financial assets and relational networks. Several contributions highlight that internal resources complements the external stock of knowledge by facilitating knowledge flows (Arora and Gambardella, 1994; Cassiman and Veugelers, 2006; Forman *et al.*, 2008). In fact, internal resources interact with external ones in order to create the conditions sustainable innovations inclusion in the farm (Marotta and Nazzaro, 2011, 2020). Therefore, in addition to internal ones, external resources, including the social capital and the territorial context, represent an important driver for the introduction of sustainable innovations.

In virtue of the important role played by technological alliances (with partners, universities, and research centres) in generating the technology push (De Marchi, 2012; Sáez-Martínez *et al.*, 2016), cooperatives' openness and knowledge networks represent other elements promoting eco-innovation adoption (Cuerva *et al.*, 2014). In particular, the role of social capital is highlighted. According to Nilsson and colleagues (2012), social capital is enhanced by the cooperative model itself, with its principles, values, ownership, and corporate purpose (Ruostesaari and Troberg, 2016).

As Hagedoorn and Schakenraad (1994) pointed out, partnerships represent the fastest and sometimes the cheapest ways to innovate, as they allow to shift from the closed innovation model, with a main focus on internal resources, to an open innovation approach, which includes a process of transfer of knowledge and technologies (Chesbrough *et al.*, 2006; Triguero *et al.*, 2018). According to Stanco *et al.* (2020), cooperation is considered particularly advantageous in the agri-food sector for the development of sustainable innovations, as it enables both to share similar and additional knowledge through collaborations with individuals belonging to the same or other sectors (Gellynck and Kühne, 2010; Minarelli *et al.*, 2015; Caiazza and Stanton, 2016).

As for the territorial context, some authors report how may engage into innovative strategies to strengthen rural economies together with other local actors (Tregear and Cooper, 2016; Fonte and Cucco, 2017; Manda *et al.*, 2020), also in order to fight problems related to land abandonment, which is currently a challenge in Europe (Lasanta *et al.*, 2017; Veronica *et al.*, 2021).

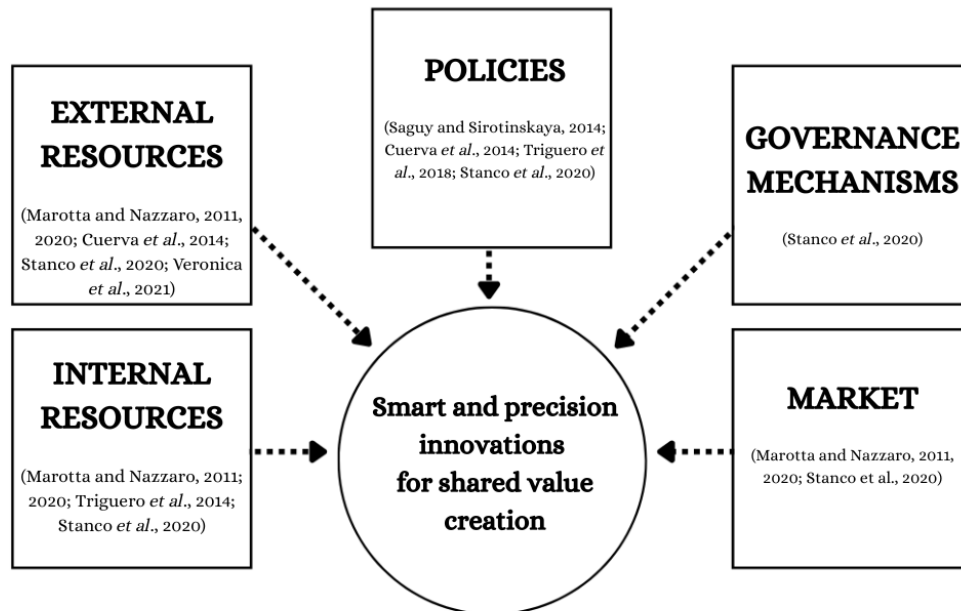
The market also represents a driver for the adoption of sustainable innovation in the agri-food sector. In particular, the most significant socio-economic changes, in recent years, also concerned citizen-consumers' instances, who showed more interest toward environmental, health, social and territorial issues, generating new consumption demands which include intangible needs. In this context, environmental protection represents a competitive lever that, through the introduction of sustainable innovations, allows to meet citizen-consumers' new needs and, at the same time, produces positive environmental and social externalities, allowing the transition from low-impact production models to green economy models (Iakovou *et al.*, 2014; Marotta and Nazzaro, 2011, 2020).

Policies, in terms of regulation and fiscal incentives, are also considered a relevant factor affecting farms' environmental responsibility and, as a consequence, their adoption of environmental technologies such as smart and precision innovations (Cuerva *et al.*, 2014; Saguy and Sirotinskaya, 2014). The question of environmental responsibility has, over last decades, attracted the attention of both practitioners and academics, and policy makers are making efforts to set it as a priority in their agenda (Triguero *et al.*, 2018). The adoption of green innovations can help farms to lead competitive advantages (Díaz-García *et al.*, 2015) as their products or services will be more attractive for the modern citizen-consumer (Yang *et al.*, 2020; Stanco and Lerro, 2020). In this sense, the role of policy-makers is crucial, as they can develop strategies and programs aimed at improving the adoption of environmental responsible innovations (Saguy and Sirotinskaya, 2014) and thereby value creation. Stanco *et al.* (2020) also highlighted the importance of policy-makers in encouraging the adoption of sustainable innovation in the agri-food value chain by proposing a best practice of sustainable collective innovation -the "Aureo" wheat supply chain- where all the investments made by the farms were co-financed by policies (i.e., Rural Development Programs - RDP). Furthermore, several policies (e.g., Horizon 2020, RDP, etc.) aim to encourage cooperation between farms, research bodies, and other local stakeholders, to convey knowledge and innovation in the supply chains, in order to improve environmental sustainability.

A further factor is represented by governance mechanisms across the cooperative and members. Nooteboom (1999) highlights that governance in cooperative relationships deals with controlling relational risk due to opportunism and dependency of firms. According to Stanco *et al.* (2020) governance mechanisms play a key role in encouraging cooperatives' members to adopt collective innovations. In fact, despite members are essentially interested in obtaining advantageous conditions from the cooperative, innovate involves costs, which may not be reflected in short-term gains. For this reason, members could desist and cause conflicts. The cooperative will, therefore, have to change the governance mechanism, in order to encourage members to participate in the innovative processes through the introduction of incentives (Heide, 1994; Hammervoll, 2011; Stanco *et al.*, 2020).

By considering all the factors analyzed, in this study it is proposed an interpretative framework (Figure 1) in which the adoption of smart and precision innovation for shared value creation in

cooperatives is driven by five main factors: i) internal resources, such as structural characteristics, human capital and financial assets; ii) external resources, including social capital and territorial context; iii) policies, in term of regulation and financial incentives; iv) governance mechanisms, referring to incentives for members to participate in innovation projects; v) market, concerning citizen-consumers' new needs.



**Figure 1.** Smart and precision innovation drivers for shared value creation in the context of cooperatives. Source: own elaboration.

### 3. Methodology

In order to validate the interpretative framework, a comparative case-study analysis (Eisenhardt, 1989) of two cooperatives characterized by a high degree of innovation is applied. The choice of such methodology, during this exploratory phase, is due to its adaptability to validate a new interpretative model (Bartlett and Vavrus, 2016) and its capability to identify the distinguish features between case studies (Savaya *et al.*, 2008). Two cooperatives were selected according to different criteria (i.e., area of reference, degree of innovation, number of members). The choice fell on the cooperative *La Guardiense*, in the province of Benevento, and the cooperative *Cantina di Conegliano e Vittorio Veneto*, in the province of Treviso. Such cooperatives showed over years a growing degree of innovation and a strong connection with the territory, representing important realities counting more than a thousand members.

The study relies on both primary and secondary data. The latter were acquired from the websites of the cooperatives. The primary data were collected through semi-structured in-depth interviews to the management of such cooperatives. Items taken into account were, as follows: i) smart and precision innovation projects; ii) drivers of smart and precision innovation according to the proposed interpretative framework; iii) value creation variables (economic, environmental and social); iv) structural characteristics of the cooperative.

The interviews were taped and transcribed. The qualitative data were coded and labeled according to qualitative analysis methods (Strauss and Corbin, 1997). Based on the codification and categorization

of individual cases, cross-case analysis (Eisenhardt, 1989) was performed to find patterns and differences between the two cooperatives. In the following section the two case studies are discussed separately.

## **4. Case Studies Analysis**

### **4.1. Cooperative *La Guardiense***

*La Guardiense* was founded on March 8, 1960 in Guardia Sanframondi (Benevento) by 33 young members who decided to join forces to escape the speculation of the grapes mediators to the detriment of the farmers. The project also involved local professionals and, therefore, the entire community, thus shaping itself as a real redemption project for the viticulture of the territory.

Currently, after more than 50 years of cooperation, *La Guardiense* has more than a thousand members and represents the largest wine cooperative in the South of Italy, producing about 200,000 quintals of grapes per year and 150,000 hectoliters of wine. It holds, in fact, 45% of the regional area of vines, equal to 1,500 hectares of vineyards on the 10,000 total hectares of the province of Benevento, with an average of 2 hectares per farm. Such characteristics allow to define *La Guardiense* as a “territorial-farm”: the winery has a strong connection with the territory, in environmental and social terms. In fact, *La Guardiense*, while not neglecting the international perspective, is concerned about the local context, contributing to avoid mass emigration, making work in the fields more profitable, creating a sense of mutual help and cooperation for the common good. The strength of *La Guardiense* is represented by the human capital. The top management, in fact, has different skills, ranging from financial and commercial to agronomic. The Board of Directors consists of 11 members. Remarkable is also the presence of an enologist, which played a key role in the constant process of wine improvement.

The business climate has been built on solidarity behavior both by the winery and members, who show trust in the choices made by the management, due to their involvement in business decisions. Particular attention is also paid to the training of members, carried out through the use of the technical assistance measures of the RDP.

With a turnover of EUR 16 million, *La Guardiense* is one of the most important realities of viticulture in Campania, always paying attention to the new trends of a market in continuous evolution, adapting changes in demand also through the adoption of innovations.

### ***Innovation Projects***

*La Guardiense* developed, over the years, several innovation projects aimed at the implementation of precision viticulture techniques. First of all, sensors and monitoring huts are used in order to optimize the vineyard management, reducing the waste of resources while achieving costs reduction.

*La Guardiense* also uses its own web and mobile application, developed through an interregional ministerial project, the “MAPPIAMO project”, in which several Italian companies are involved. Such application allows to obtain a mapping of the strength index of the vineyards on the territory and to evaluate the vegetation health conditions in different areas. Moreover, through such tool it is possible to obtain a real-time monitoring of the cooperative members activity. Unfortunately, not all members participate in the project, but the group involved is functional to achieve high quality standards. The main aim is the creation of a block chain, which could link members activities to the different bottles of wine produced.

A further innovation project carried out by the cooperative is the “zoning project”, which focuses on the identification of different types of soil within the same territory, through the use of sensors and innovative techniques. This has led to the production of several wines as an expression of the different areas of the territory, contributing to the enhancement of its diversities.

Other innovation projects that achieved important results have been “I mille per l’aglianico” and “I mille per la falanghina” that, through the application of innovative protocols, have led to a greater optimization of the resources involved in the different production processes. Such projects have been carried out in collaboration with research institutes and universities, who played an important role in the research and development phase, but also to encourage members to participate in the innovation process and help them understand its benefits. In fact, the projects involved almost all the members of the cooperative, achieving important economic, social and environmental results.

The motivations that have driven the cooperative to undertake innovative paths are multiple. First, there are economic reasons, such as reducing production costs and optimizing activities. Furthermore, there’s the issue of sustainability. Today, sustainability is at the heart of both European and national policies, but also represents an important issue for citizen-consumers, which are increasingly aware and responsible. Therefore, *La Guardiense* in order to respond to such needs, implemented process and product innovations fighting against resources waste and respecting the environment but also the territory and human capital. Another aspect that should not be overlooked is the farm’s desire to communicate externally its participation in a virtuous production process. Therefore, such innovative activities have always been accompanied by communicative activities, in order to share the engagement that *La Guardiense* employs in terms of CSR.

There have been also obstacles to the development of innovation projects. In particular, the greatest one is a cultural obstacle. When adopting an innovation, it is never easy to extend it, from a quantitative point of view, to a large number of individuals. The winegrowers of the territory, in fact, are not very open to innovation, as they are not aware of the benefits related to the adoption of an innovation.

### ***Innovation drivers***

*Internal resources.* More than 50% of the members are involved in the innovation projects developed by the cooperative. The aim of the cooperative is to involve all the members in order to ensure products traceability. *La Guardiense* has an organization chart consisting of more than a thousand members who, every 3 years, elect 11 directors, who will have the task of leading and managing the cooperative. Among the directors the chairman shall be appointed. The latter, by statute, has full powers in business management. Within the organizational structure of the farm there are also different area managers, which allow, in a pyramidal structure, to manage the different sectors and the business activities. There is also a director responsible of all the research and development activities. When an innovative project is implemented, training activities are provided for members, in order to ensure that the project itself sees the light. The more this activity is carried out, the more concrete results are achieved, so this aspect must always be strengthened.

*Governance mechanisms.* In order to encourage members participation in innovation projects, the cooperative adopted several governance mechanisms. In particular, ad hoc contracts have been concluded for those who decided to follow certain innovative protocols. Through such contracts, the cooperative gives protection to those who decide to take a different path. For example, as part of project “I mille per l’aglianico”, monetary incentives were provided. Then, there are forms of non-economic incentives, such as giving small advantages to the members involved (e.g. possibility for producers to give grapes at better times). Finally, there is the trust-based mechanism. The members are very numerous, so it is impossible to deep control their activities. Therefore, most activities are based on mutual trust. Members are part of an improvement process that serves the cooperative but also the member itself: it is a virtuous path that leads to growth.

*External resources.* In addition to the cooperative members, the innovation projects also involved external resources. In fact, partnerships have been established with various structures, both public and



private, in order to carry out research and development activities. In addition, the cooperative is a member of the Samnium Consorzio Tutela Vini. The cooperative also adheres to networks: Wine Research Team, a group of about thirty companies with the aim of implementing research activities on all fields of wine production,; Wine Net, a group of eight companies aimed at sharing research projects also looking for ad hoc funds. An important role has also been played by the territory of reference that has been the engine of the innovations, even if the actors on the territory have not been often ready to welcome and facilitate such processes.

*Market.* A push for change, however, was given by the new demands promoted by modern citizens-consumers. The latter, in fact, over the years have changed their purchasing priorities, also with regard to wines. Today, wine is less considered as a food and it is more and more a consumer good moving towards fashion, design, social, lifestyle. The cooperative has made changes to its products to meet the citizen-consumers needs, focusing on an improvement of production techniques to improve the quality of wines and their sustainability.

*Policies.* A key role in the development of the cooperative's innovation projects has been played by policies. In fact, the cooperative has benefited from different public funds for the design and the development of innovative projects (e.g. RDP, ministerial funds). Not all projects, however, provide for the use of public funds: the company, in fact, makes sure that all the members invest in enhancing the work of the members involved in innovation projects, while helping to enhance the cooperative itself in the long term.

### ***Value creation***

Many results have been achieved thanks to the innovation projects developed by *La Guardiense*. In particular, the waste of natural resources in production processes has certainly decreased. At the same time, it has been possible to optimize interventions on production, reducing the use of fertilizers and other products, helping to reduce pollution. Product quality has also improved. such improvement has been constant over the years, thus also allowing an increase in the perceived quality of wines, with a consequent increase in citizens-consumers' willingness to pay.

As for the turnover of the cooperative, it stems from the marketing of bulk wines and bottled wines. The turnover of bottled wines depends on the choices and the activities of the cooperative, while the turnover of bulk wines depends on market dynamics. Bottled wine benefits most from all the research and innovation activities: the trend of such turnover follows an increasing trend. Surely, a great part of such trend is due to innovations. For example, Anima Lavica wine, deriving from a process of innovation (zoning), was released from August 2020 at the highest price among the falanghinas produced by the cooperative, as it represents a product of technical and communicative approach, with an expressive label of its path. Despite the price, this wine has been very successful on the market.

As for the social value, in the last fifteen years the cooperative created value on the territory from the point of view of average remuneration of the grapes, increased employment, increased reputation of the territory, an area that 15 years ago did not have the same reputation it has nowadays.

Another important aspect is represented by the landscape: in the territory there are many hectares of cared vineyards, as well as the access areas to these vineyards, access roads, villages, borders, hedges. Everything that revolves around such hectares must necessarily be managed and cared for. The attention given by *La Guardiense* to such hectares actually goes to land management, which benefits significantly from it.

### ***4.2. Cooperative Cantina di Conegliano e Vittorio Veneto***

In 1959 a group of 37 founded the "Cantina Sociale Cooperativa del Mandamento di Vittorio Veneto", in order to enhance the grapes of their territory. Between 1980 and 2000, the winery evolved

in technology through the adoption of new pressing plants, winemaking lines and weighbridges. In 2013, the winery merged with the “Cantina di Conegliano”, another historical reality of the territory, creating the *Cantina di Conegliano e Vittorio Veneto*. Nowadays, the cooperative represents an important social and economic reference for its territory and counts more than thousand members, operating in 15 municipalities in the province of Treviso. The vineyards of the *Cantina di Conegliano e Vittorio Veneto* are located in the foothills of the province of Treviso and Pordenone. The territory benefits both from the Alps, which acts as a barrier against the icy winds of the north, both from the mild temperatures of the Adriatic Sea - which is about 45 km. The climate of the area is particularly favorable to viticulture so that the first evidence of the cultivation of vines dates back to Roman times. In this context, great importance has assumed the Prosecco, becoming the wine that mainly represents the territory, a true heritage to be defended and protected both economically and from the historical and cultural point of view.

In the western part, members cultivate the vineyards located on the hills of Conegliano Valdobbiadene, which became a UNESCO World Heritage Site in 2019. The soils of this area originated from the lifting of the seabed and were subsequently modified by the action of glaciers and rivers. This type of soil gives the grapes very intense and fine aromatic notes, as well as a minerality and a sapidity typical of Conegliano Valdobbiadene Prosecco.

Today, the *Cantina di Conegliano e Vittorio Veneto* represents one of the biggest viticulture realities in Italy, with a turnover of EUR 88 million and an area of 3260 hectares.

### ***Innovation projects***

Since 2002 the *Cantina di Conegliano e Vittorio Veneto* has been actively looking for solutions to improve the quality of the grapes and reduce the use of plant protection products in virtue of a new sustainable and innovative viticulture. The reduction in the use of plant protection products also involves communication between the winery and members. For this reason, phytosanitary bulletins written by the Cooperative technicians are sent periodically, the drafting of which is based on careful monitoring of the territory.

In order to reduce the use of plant protection products, the *Cantina* carries out experimental tests on members' vineyards. Other experimental tests are also underway, for example, in 2021 began a project aiming to verify whether it is possible to reduce the concentration of agropharmaceutical residues found on the surface of the bunches using specific products on the market: it represents another step to improve the health of the grapes during the harvest phase.

With reference to precision viticulture techniques, the Cooperative members have the opportunity to fill in an electronic campaign register using the Enogis platform. Such portal allows members to set up the defense protocol they intend to comply with and to be helped during the compilation of the register.

Since 2020, an experimental test has been underway in collaboration with a company specialized in the use of drones in agriculture. Such test aims to optimize the harvest of grapes by correlating multispectral data with agronomic data. These techniques are also used during the vegetative development phase, to monitor the health status of the plant and during the phenological phase.

As for the smart agriculture techniques, the Cooperative uses a sophisticated geolocation and zoning tool, in order to ensure the traceability of products.

There are several reasons that have led the Cooperative to adopt such techniques, including the desire to improve the quality of products, to meet the new citizens-consumers' demands, but also the need to reduce management costs and in general long-term costs, as well as the desire to use the most advanced technologies. No relevant obstacles have been encountered during the research and implementation phases.

## ***Innovation drivers***

*Internal resources.* Almost all the members of the Cooperative (a percentage ranging from 50% to 70%) participate in innovation projects. The Cooperative uses a business organization chart: there is a board of directors, a chairman, a general manager, and the different areas managers, including the one relating to research and development activities. For the development of innovation projects, the Cooperative also relies on two university professors and an agronomist for the wine development office. In order to better involve the members in innovation projects, the Cooperative has carried out a targeted training activity, using specialized staff. The management of the cooperative has a medium-high level of education, a thirty-year experience in the wine sector, and an age between 50 and 60 years.

*Governance mechanisms.* It was not necessary to conclude ad hoc contracts with the members of the Cooperative for the adoption and development of sustainable innovations, as the projects and objectives of the cooperative are fully shared with the social base, through a continuous members involvement in business decisions and through a relationship based on mutual trust. Cooperative members, in fact, realized the benefits related to the adoption of sustainable innovation and, as a consequence, they welcomed them in a positive way.

*External resources.* The Cooperative believes in the power of social capital. In fact, several contracts have been signed with universities to carry out experimentation activities in the countryside, and a contract with a private institute for the purchase and development of intelligent innovations. In addition, the Cooperative is a member of the Confederation of Italian Cooperatives, rural networks and Consortia of Prosecco DOCG and Prosecco DOC.

The territorial context has been of great importance for the development of innovation projects, in fact the economy of the territory helped such activity. This is the territory of Prosecco, the largest sparkling wine district in the world that sees, in 2021, 730 million bottles sold worldwide. The large sales volumes obviously bring benefits to the Cooperative and the territory. Prosecco, in fact, has a universally recognized quality, which has allowed it to become a real lifestyle. Such growing trend, in particular during the last 15 years, has brought economic benefits to the territory and has led to investment in sustainable innovations, which have at the same time allowed to lower production costs.

*Market.* In addition, the Cooperative has adopted sustainable innovations also to respond to the new demands promoted by modern citizens-consumers, who in recent years have changed their purchasing priorities, preferring wines with territorial, organic and sustainable characteristics. The Cooperative has, therefore, obtained several sustainable certifications and adopted sustainable innovations to reduce resources waste and promote a rational use of pesticides. Over the years, the hills of Prosecco have also suffered media attacks due to the use of agropharmaceuticals, excessive anthropization poorly managed, the lack of attention to sustainability. Therefore, the innovations also helped the Cooperative to overcome such attack, through a great communicative impact. To date, there are several projects aimed to meet the needs of citizen-consumers in this regard, such as the realization of a green Prosecco, in line with the sustainability objectives.

*Policies.* As for the funds used for the development of sustainable innovation projects, the Cooperative has benefited from public funds, mainly deriving from the RDPs, so the role of policies has been essential.

## ***Value creation***

The adoption of sustainable innovations has brought several benefits, in terms of value creation. In particular, as for the economic value, the adoption of sustainable innovations has led to a reduction in production costs, mainly due to a reduction in working hours. Moreover, the use of sustainable innovations allowed greater control from an agronomic point of view, with targeted interventions. The

reduction of resources waste allowed to a recovery of 50% of the water of the bottling plants and a rational management of pesticides has been achieved.

Regarding the social value, the introduction of sustainable innovations has led to advantages for the territory, as a more ethical business management has determined a more rational management of the territory and the environment in general. In addition, the introduction of innovations improved the working conditions of the employees of the Cooperative, who followed the development of technologies with training and interest, contributing to increasing their degree of involvement in business activities. In addition, as a result of the development of new innovation projects, the employment of the territory has also improved, as it has been possible to recruit new staff (agronomists, technicians, etc).

As for the environmental value, the introduction of sustainable innovations by the Cooperative has led to positive impacts on the environment, in terms of rational management of resources and reduced use of chemicals and pesticides, helping to respect biodiversity.

## 5. Results and Discussion

Table 3.1 shows the results, in terms of sustainable innovations drivers, found by the comparative analysis between the cooperative *La Guardiense* and the *Cantina di Conegliano e Vittorio Veneto*.

**Table 3.1.** Comparative analysis: Innovation drivers. Own elaboration.

Innovation Drivers	La Guardiense	Cantina di Conegliano e Vittorio Veneto
<i>Internal resources</i>	<ul style="list-style-type: none"> <li>- Medium-high level of members involvement in innovation projects</li> <li>- Management high degree of education</li> <li>- Specialized personnel</li> <li>- Training activities</li> <li>- Members investment</li> </ul>	<ul style="list-style-type: none"> <li>- High level of members involvement in innovation projects</li> <li>- Management high degree of education</li> <li>- Specialized personnel</li> <li>- Training activities</li> <li>- Members investment</li> </ul>
<i>External resources</i>	<ul style="list-style-type: none"> <li>- Partnerships with public and private institutions</li> <li>- Participation in consortia and business networks</li> </ul>	<ul style="list-style-type: none"> <li>- Partnerships with public and private institutions</li> <li>- Participation in consortia and business networks</li> <li>- Local economy (territory)</li> </ul>
<i>Policies</i>	<ul style="list-style-type: none"> <li>- RDP and other public funds</li> </ul>	<ul style="list-style-type: none"> <li>- RDP and other public funds</li> </ul>
<i>Governance Mechanisms</i>	<ul style="list-style-type: none"> <li>- Contracts</li> <li>- Incentives</li> <li>- Trust-based</li> </ul>	<ul style="list-style-type: none"> <li>- Trust-based</li> </ul>
<i>Market</i>	<ul style="list-style-type: none"> <li>- High level of influence of market demands</li> </ul>	<ul style="list-style-type: none"> <li>- High level of influence of market demands</li> </ul>

The study shows that, for both the cooperatives, internal resources represent an important driver for the development of smart and precision innovation projects for the creation of shared value. In particular, in both cooperatives a consistent share of members is involved in innovation projects, even if such share is higher in the *Cantina di Conegliano e Vittorio Veneto*, despite the higher number of members and the larger area in hectares. The cooperatives employ specialized staff for the development and adoption of sustainable innovation projects, have a solid corporate structure, and a management with high education level. Both cooperatives attach considerable importance to members training, in order to actively involve them in the innovation processes and, as regards *La Guardiense*, also to overcome the cultural issues that arise during the research and development phases.

As for external resources, both cooperatives understand the importance of social capital: in both cases, in fact, partnerships have been established with public and private institutions for the development of

sustainable innovation projects and, both cooperatives, join business networks and consortia in order to exchange information and skills useful for the development of such innovations. The territory, in the case of the *Cantina di Conegliano e Vittorio Veneto* has facilitated the adoption of sustainable innovations, while in the case of *La Guardiense* several problems have been found in involving the different actors in these processes, as they are still too tied to past habits that do not contemplate innovation.

Policies represent an essential tool in both cases: most innovation projects are implemented through public funds, such as those from RDPs and funding from ministries or other public bodies.

Governance mechanisms play a key role for both cooperatives. In particular, for *La Guardiense*, in addition to relationships based on mutual trust, ad hoc contracts and incentive mechanisms are necessary in order to involve members in the processes of sustainable innovation. As for *Cantina di Conegliano e Vittorio Veneto*, on the other hand, objectives sharing is at the heart of the relationship between the Cooperative and members, therefore an essential role is assumed by trust, while it is not necessary to conclude real contracts. This is probably due to members' awareness concerning benefits related to the introduction of smart and sustainable innovations: innovation is an already rooted concept in the area. In the case of *La Guardiense*, the training and information activities in its area must be increased.

With regard to the market, both cooperatives noticed a change in citizens-consumers demands. Therefore, both cooperatives have adopted innovations to make production processes sustainable.

For both cooperatives, sustainable innovation processes drove by the listed factors have generated several benefits in terms of economic (cost reduction and resource optimization), social (enhancement of the territory and increased employment), and environmental value creation (reduction of the use of fertilizers, reduction of waste of natural resources, and respect for the environment and biodiversity in general). In the case of *La Guardiense*, moreover, the landscape is also enhanced, which until a few years ago was poorly maintained and abandoned.

## **6. Conclusions**

In recent years, the wine sector undertook important innovation paths in order to meet the new citizens-consumers needs and the demand for sustainability at European level (Marotta and Nazzaro, 2012; European Commission, 2020). As a result, wine cooperatives have changed their investment priorities by developing sustainable innovation models including the application of precision and smart viticulture. Through this process, the cooperatives, characterized by their strong link with the territory, are able to create and share value, in economic, social and environmental terms (Alves et al, 2007; Vitale, 2019).

In exploring the drivers of the adoption of smart and precision innovations in viticulture, and evaluating the effects of such adoption in terms of shared value creation, this study proposes an interpretative framework which includes five drivers of sustainable innovation for the creation and sharing of value.

Results have validated the hypothesized scheme through the development of a comparative analysis between two case studies, represented by two important Italian wine cooperatives based in different territories: the social cooperative *La Guardiense* and the *Cantina di Conegliano e Vittorio Veneto*. Both cooperatives have, over the years, adopted sustainable innovations through the application of precision and smart viticulture, in order to make their production processes in line with the demand for sustainability shown by citizens-consumers and European policies. In both cases, the drivers included in the model are essential for the adoption of this type of innovation.

In particular, the territorial context has a significant impact on the ability of cooperatives to create value through innovations: governance mechanisms and the very effectiveness of innovations change

according to the territorial context. In a strong territorial context, as in the case of *Cantina di Conegliano e Vittorio Veneto*, where there is a high landscape value, a strong territorial brand and territorial networking works well, there is no need for ad hoc contracts or incentives to involve members in sustainable innovation projects. Such mechanisms, in fact, are based on trust and the members are fully involved in the innovation processes as they share the business objectives and are fully aware of the benefits related to such processes. In the case of *La Guardiense*, however, characterized by a weak territorial context and cultural issues, and sometimes also institutions are not ready to support innovation processes, contractual and incentive mechanisms become significant in order to facilitate the dissemination of innovation and thus the creation and sharing of value.

This study contributes to the advancement of knowledge in providing new evidence regarding the role of innovation in the cooperative context, in particular with regard to the determinants concerning the adoption of sustainable innovation in such context and the related effects in terms of shared value creation.

Despite the interesting results, which underline the essential role of the territorial context and governance mechanisms in the adoption of sustainable innovation in the context of cooperatives, the study has limitations linked essentially to the methodology adopted. In fact, the comparative analysis is based on the study of only two cooperatives, so the results obtained cannot be generalized. Further and future researches should include a wider number of case studies, in order to evaluate more realities belonging to different territorial contexts. In addition, future studies could focus on the effects, in terms of members' degree of involvement in cooperative's innovation processes, which could generate different governance mechanisms, as incentive or disincentive mechanisms or ad hoc contracts. Furthermore, further researches could extend the application of the proposed model to different sectors than wine, in order to assess its applicability outside the same.

1. Alonso, A. D. (2011). Standing alone you can't win anything: The importance of collaborative relationships for wineries producing muscadine wines. *Journal of Wine Research*, 22(1),43-55.
2. Alves, A. C., Zen, A. C., Padula, A. D. (2011), Routines, Capabilities and Innovation in the Brazilian Wine Industry, *Journal of Technology Management & Innovation*, 6(2),128-144.
3. Arora, A., Gambardella, A. (1994). Evaluating technological information and utilizing it: Scientific knowledge, technological capability, and external linkages in biotechnology. *Journal of Economic Behavior & Organization*, 24(1),91-114.
4. Bartlett, L., Vavrus, F. (2016). *Rethinking case study research: A comparative approach*. Routledge.
5. Bélis-Bergouignan, M. C., Saint-Ges, V. (2009). Quelle trajectoire environnementale pour la viticulture? L'exemple du vignoble girondin. *Revue d'Economie Regionale Urbaine*, 3,491-516.
6. Bharadwaj, S. G., Varadarajan, P. R., Fahy, J. (1993). Sustainable competitive advantage in service industries: a conceptual model and research propositions. *Journal of marketing*, 57(4),83-99.
7. Borsellino, V., Galati, A., Schimmenti, E. (2012), Survey on the innovation in the Sicilian grapevine nurseries, *Journal of Wine Research*,23(1),1-13.
8. Bosch-Sijtsema, P. M., Postma, T. J. (2009). Cooperative innovation projects: Capabilities and governance mechanisms. *Journal of Product Innovation Management*,26(1),58-70.
9. Caiazza, R., Stanton, J. (2016). The effect of strategic partnership on innovation: An empirical analysis. *Trends in Food Science & Technology*,54,208-212.
10. Cassiman, B., Veugelers, R. (2006). In search of complementarity in innovation strategy: Internal R&D and external knowledge acquisition. *Management science*,52(1),68-82.

11. Chesbrough, H., Vanhaverbeke, W., West, J. (Eds.). (2006). Open innovation: Researching a new paradigm. Oxford University Press on Demand.
12. Chiffolleau, Y, Dreyfus, F., Touzard, J. M. (2008), Ethics in French Wine Cooperatives: Part of a Social Movement in Farnworth, C. R., Jiggins, J., Thomas, E. V. (edited by), *Creating Food Futures. Trade, Ethics and the Environment*, Gower Publishing,131-145.
13. Cuerva, M. C., Triguero-Cano, Á., Córcoles, D. (2014). Drivers of green and non-green innovation: empirical evidence in Low-Tech SMEs. *Journal of Cleaner Production*,68,104-113.
14. De Conto, S. M., Antunes, J. A. V., Vaccaro, G. L. R. (2016). Innovation as a competitive advantage issue: A cooperative study on an organic juice and wine producer. *Gestão & Produção*, 23, 397-407.
15. De Marchi, V. (2012). Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms. *Research policy*,41(3),614-623.
16. Díaz-García, C., González-Moreno, Á., Sáez-Martínez, F. J. (2015). Eco-innovation: insights from a literature review. *Innovation*,17(1),6-23.
17. Doloreux, D., Lord-Tarte, E. (2013). The organisation of innovation in the wine industry: open innovation, external sources of knowledge and proximity. *European Journal of Innovation Management*.
18. Doloreux, D., Frigon, A. (2019). Understanding innovation in Canadian wine regions: an exploratory study. *British Food Journal*.
19. Drucker, P. F. (1985). *Innovation and Entrepreneurship: Practice and Principles*, New York: Harper & Row. *Innovation*.
20. Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*,14(4),532-550.
21. European Commission (2017), “Comunicazione della Commissione al Parlamento Europeo, al Consiglio, al Comitato Economico e Sociale europeo e al Comitato delle regioni”, Bruxelles, 29.11.2017 COM(2017) 713
22. European Commission (2020), A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system, Communication from the EU Commission, COM 381.
23. Figueiredo, V., Franco, M. (2018). Wine cooperatives as a form of social entrepreneurship: Empirical evidence about their impact on society. *Land Use Policy*,79,812-821.
24. Fiore, M., Silvestri, R., Contò, F., Pellegrini, G. (2017). Understanding the relationship between green approach and marketing innovations tools in the wine sector. *Journal of cleaner production*,142,4085-4091.
25. Fonte, M., Cucco, I. (2017). Cooperatives and alternative food networks in Italy. The long road towards a social economy in agriculture. *Journal of Rural Studies*,53,291-302.
26. Forman, C., Goldfarb, A., Greenstein, S. (2008). Understanding the inputs into innovation: Do cities substitute for internal firm resources?. *Journal of Economics & Management Strategy*,17(2),295-316.
27. Gellynck, X., Kühne, B. (2010). Horizontal and vertical networks for innovation in the traditional food sector. *International Journal on Food System Dynamics*,1(2),123-132.
28. Gilinsky, A., Santini, C., Lazzeretti, L., Eyler, R. (2008), Desperately seeking serendipity. Exploring the impact of country location on innovation in the wine industry, *International Journal of Wine Business Research*,20,302–320.
29. Giuliani, E., Morrison, A., Rabellotti, R. (2011), Innovation and catching up: The changing geography of wine production, Edward Elgar: Cheltenham
30. Hagedoorn, J., Schakenraad, J. (1994) The effect of strategic technology alliances on company performance. *Strateg. Manag. J.*,15(4),291-309

31. Hammervoll, T. (2011, January). Governance of value creation in supply chain relationships. In *Supply Chain Forum: An International Journal*, Taylor & Francis, 12(2),116-126.
32. Heide, J. B. (1994). Interorganizational governance in marketing channels. *Journal of marketing*,58(1),71-85.
33. Iakovou, E., Vlachos, D., Achillas, C., Anastasiadis, F. (2014). Design of sustainable supply chains for the agrifood sector: a holistic research framework. *Agricultural Engineering International: CIGR Journal*,1(1),1-10.
34. Jacobides, M. G., Knudsen, T., Augier, M. (2006). Benefiting from innovation: Value creation, value appropriation and the role of industry architectures. *Research policy*,35(8),1200-1221.
35. Lasanta, T., Arnáez, J., Pascual, N., Ruiz-Flaño, P., Errea, M. P., Lana-Renault, N. (2017). Space–time process and drivers of land abandonment in Europe. *Catena*,149,810-823.
36. Lerro, M., Vecchio, R., Nazzaro, C., Pomarici, E. (2019). The growing (good) bubbles: insights into US consumers of sparkling wine. *British Food Journal*,122(8),2371-2384.
37. Manda, J., Khonje, M. G., Alene, A. D., Tufa, A. H., Abdoulaye, T., Mutenje, M., Setimela, P., Manyong, V. (2020). Does cooperative membership increase and accelerate agricultural technology adoption? Empirical evidence from Zambia. *Technological Forecasting and Social Change*,158, 120-160.
38. Marotta, G., Nazzaro, C. (2011), Verso un nuovo paradigma per la creazione di valore nell'impresa agricola multifunzionale. Il caso della filiera zootecnica, *Economia agro-alimentare*,1/2,215-250.
39. Marotta, G., Nazzaro, C. (2012). Responsabilità sociale e creazione di valore nell'impresa agroalimentare: nuove frontiere di ricerca. *Economia agro-alimentare*.
40. Marotta, G., Nazzaro, C. (2020). Public goods production and value creation in wineries: a structural equation modelling. *British Food Journal*,122(5),1705-1724.
41. Minarelli, F., Raggi, M., Viaggi, D. (2015). Innovation in European food SMEs: determinants and links between types. *Bio-based and Applied Economics*,4(1),33-53.
42. Nazzaro, C., Marotta, G., Rivetti, F. (2016), Responsible Innovation in the Wine Sector: A Distinctive Value Strategy, *Agriculture and Agricultural Science Procedia*,8,509 – 515.
43. Nazzaro, C., Stanco, M., Uliano, A., Lerro, M., Marotta, G. (2022). Collective smart innovations and corporate governance models in Italian wine cooperatives: the opportunities of the farm-to-fork strategy. *International Food and Agribusiness Management Review*,1-14.
44. Nooteboom, B. (1999). *Inter-firm Alliances: Analysis and Design*. London: Routledge.
45. OECD (1997), Manuel d'Oslo. La Mesure des Activités Scientifiques et Technologiques Principes Directeurs Proposés pour le Recueil et l'Interprétation des Données sur l'Innovation Technologique, Commission Européenne, Eurostat.
46. Pomarici, E., Sardone, R. (2020). EU wine policy in the framework of the CAP: post-2020 challenges. *Agricultural and Food Economics*,8(1),1-40.
47. Rizzo, G., Borrello, M., Dara Guccione, G., Schifani, G., Cembalo, L. (2020). Organic food consumption: The relevance of the health attribute. *Sustainability*,12(2),595.
48. Rose, D. C., Wheeler, R., Winter, M., Lobley, M., Chivers, C. A. (2021). Agriculture 4.0: Making it work for people, production, and the planet. *Land Use Policy*,100,104933.
49. Ruostesaari, M. L., Troberg, E. (2016). Differences in social responsibility toward youth—A case study based comparison of cooperatives and corporations. *Journal of Co-operative Organization and Management*,4(1),42-51.
50. Sáez-Martínez, F. J., Díaz-García, C., Gonzalez-Moreno, A. (2016). Firm technological trajectory as a driver of eco-innovation in young small and medium-sized enterprises. *Journal of Cleaner Production*,138,28-37.



51. Saguy, I. S., Sirotinskaya, V. (2014). Challenges in exploiting open innovation's full potential in the food industry with a focus on small and medium enterprises (SMEs). *Trends in Food Science & Technology*,38(2),136-148.
52. Saint-Ges, V., Bélis-Bergouignan, M. C. (2010), Issues and forms of environmental involvement of wine cooperatives, *Communication*.
53. Sarri, D., Lombardo, S., Pagliai, A., Perna, C., Lisci, R., De Pascale, V., Vieri, M. (2020). Smart farming introduction in wine farms: A systematic review and a new proposal. *Sustainability*,12(17),7191.
54. Savaya, R., Spiro, S., Elran-Barak, R. (2008). Sustainability of social programs: a comparative case study analysis. *American Journal of Evaluation*,29(4),478-493.
55. Segarra-Oña M.D.V., Peiró-Signes A., Mondéjar-Jiménez J. (2013) Identifying variables affecting the proactive environmental orientation of firms: an empirical study. *Pol. J. Environ. Stud.*,22(3),873-880
56. Smith, K. (2007), Technological and economic dynamics of the world wine industry: an introduction, *International Journal of Technology and Globalisation*,3(2-3),127-137.
57. Stanco, M., Lerro, M. (2020). Consumers' preferences for and perception of CSR initiatives in the wine sector. *Sustainability*,12(13),5230.
58. Stanco, M., Nazzaro, C., Lerro, M., Marotta, G. (2020). Sustainable Collective Innovation in the Agri-Food Value Chain: The Case of the "Aureo" Wheat Supply Chain. *Sustainability*,12(14),5642.
59. Strauss, A., Corbin, J. M. (1997). *Grounded theory in practice*. Sage.
60. Teece, D. J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Research policy*,15(6),285-305.
61. Tobi, R. C., Harris, F., Rana, R., Brown, K. A., Quaife, M., Green, R. (2019). Sustainable diet dimensions. Comparing consumer preference for nutrition, environmental and social responsibility food labelling: a systematic review. *Sustainability*,11(23),6575.
62. Topp-Becker, J., Ellis, J. D. (2017). The role of sustainability reporting in the agri-food supply chain. *Journal of Agriculture and Environmental Sciences*,6(1),17-29.
63. Tregear, A., Cooper, S. (2016). Embeddedness, social capital and learning in rural areas: The case of producer cooperatives. *Journal of Rural Studies*,44,101-110.
64. Triguero, A., Fernández, S., Sáez-Martínez, F. J. (2018). Inbound open innovative strategies and eco-innovation in the Spanish food and beverage industry. *Sustainable Production and consumption*,15,49-64.
65. Uliano, A., Stanco, M., Lerro, M., Marotta, G., Nazzaro, C. (2021). Evaluating citizen-consumers' attitude toward high social content products: the case of social farming. *British Food Journal*.
66. Veronica, P., Victor, M. G., Elena, M. M. (2021). Drivers of joint cropland management strategies in agri-food cooperatives. *Journal of Rural Studies*,84,162-173.
67. Vitale, T. (2019). La cooperazione sociale tra tensioni e inedite sensatezze. *Animazione Sociale*,(326),68-96.
68. Wood, E., Kaplan, D. (2005), Innovation and performance improvement in the South African wine industry, *International Journal of Technology and Globalisation*,1(3/4),381-399.
69. Yang, Q., Shen, Y., Foster, T., Hort, J. (2020). Measuring consumer emotional response and acceptance to sustainable food products. *Food Research International*,131,108992.