

Development of Strategic Options for Italian Wine Cooperatives through a New Membership Integration Pattern

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Abstract. *Italian agro-food cooperatives are involved in mergers, acquisition and alliances processes, that require a renovating model of membership management. Wine cooperatives are particularly dynamic in this context. The aim of the research is to identify new integration patterns between the cooperative and its members, starting from the analysis of the members' structural and strategic choices. The research has been conducted in a wine cooperative of Veneto Region. Five elements of differentiation have been discussed and moving from five clusters of members, a linear regression model has been applied. The actual mechanism of patronage return does not comprehend the complexity of membership, but it confirms the hypothesis that the cooperative should follow differentiated integration strategies for the diverse typologies of members. The large structural, strategic, social-demographic and cultural heterogeneity of the members (especially in the big cooperatives) suggests to foresee different patterns in term of development projects, in order to propose diverse solutions for new investment initiatives and the quality improvement of deliveries, ensuring a more widespread satisfaction of stakeholders' expectations.*

Keywords: Wine Cooperative, Cooperative Nexus, Patronage Return, Membership Integration.

1. Introduction

The development of agricultural cooperative literature from the 1990's has been summarized by Cook *et al.*^[1]. Before, Staatz^[2] identified three theoretical approaches for the agricultural cooperative in the research conducted from the 1950's until the late 1980's (cooperative as a form of vertical integration, as an independent firm and as a coalition of firms). Cook *et al.*^[1] highlight that from the 1990's the agricultural cooperative studies are influenced by the new developments in economic theories and decision models. Three approaches of analysis have been identified. The first concerns the revision of the approach of the cooperative as a firm with reference to the agricultural marketing cooperatives^[3-5]. The second approach, the cooperative as a coalition, emphasizes the dynamics of coordination among the members and the bargaining power of their various coalitions about the distribution of benefits. This involves other theoretical issues, such as the design of bylaw, the planning horizon of decision-makers, the pricing scheme and the investment decision^[6-12]. The third approach, the cooperative as a nexus of contracts, underlines the contractual relationship among the stakeholders, by utilizing the theories of agency, transaction costs and property rights. The main theoretical advances regard cooperative control, organisational design, governance choices and investment decisions^[13-16].

According to the intensification of the strategic competition, nowadays the scientific debate topics concern aggregation and alliance strategies and push to elaborate a new cooperative model, in order to enhance the relationship with the stakeholders, and particularly the members.

Some recent researches explain the most important factors that motivate mergers, acquisitions, joint ventures and strategic alliances, such as the decreasing number of farms, increased costs and the industrialisation of agriculture^[17,18]. The key factors that contribute to the success of these operations might be related to interpersonal actions: the level of trust and commitment of the members, the degree of cooperative communication and team work skills of the management. In particular, Ruffio *et al.*^[18] observe that the French agricultural cooperatives are creating a complex partnership network that causes the need for organizational and institutional coherence and where the management plays an important role in the activation. This process requires the redefinition of the boundaries of the cooperative and its link with the environment. Traditionally based on a political cohesion, the cooperative must elaborate a new economic and strategic project. The definition of this is not so clear. The causes can be identified in the weakness of the leaders authority, the potential disengagement of the members, the increasing distance

between the board of directors, the management and the members, the concentration of the power in the hands of a few people and the non-transparent circulation of information ^[19].

Regarding these topics, a recent study of Östenberg and Nilsson ^[20] investigates the importance of the socio-economical and psychological attributes of the members in the agricultural cooperatives. These authors identify some critical aspects of the members' behaviour and their degree of participation in the cooperative. In particular, they point out four members' characteristics: the evaluation of the profitability in farm operations, the age, the experience as members of the cooperative board and the perception in the control of the cooperative. These characteristics make the members' control increasingly problematic, especially in large cooperatives with diversified business activities and with large and heterogeneous membership.

These results involve a new socio-psychological perspective. According to Lambert ^[21], the social identity is a basic element of the cooperative system and, in particular, of the relationship that the board of directors maintains with the members. By pursuing goals and strategies as well as other types of enterprises, the cooperative reveals its own objectives and that can create a distance from the members (for example, because of the need of many French and Italian cooperatives to differentiate the product portfolio). Lambert ^[23] takes the example of some French wineries. In different usual aspects of the cooperative life (entrance, power distribution, participation in the governance, relationship of the members with the board of directors and the management) the cooperative management elaborates coercive measures, but at the same time the flexibility of application to ensure freedom and members' conviction is a necessary strength.

Biarnès and Touzard ^[22] focus on the differentiated remuneration for the grapes in the French cooperatives of the Languedoc region. This empirical study explains that the change in the grape remuneration mechanism is a real process of organisational innovation, difficult to implement and based on a formal device. It can be imperfect, and therefore it requires interpersonal adjustments to complete it and to contribute to its evolution. These authors identify some operational key elements: i) innovation in marketing strategies; ii) stability, simplicity and flexibility of the standards; iii) application of greater transparency; iv) activation of mechanisms of higher members' accountability. A multidisciplinary approach that joins economical, organisational, technical and sociological aspects is inevitable.

Regarding the Italian wine industry, cooperative integration has allowed not only the supply concentration, against the production fragmentation of the viticultural phase, and the protection of the bargaining power, but also the link with the market and the entrepreneurial growth of the members. In Italy the wine cooperation system processes about 60% of the grape production. Also in Veneto Region¹ (where the cooperative winery the object of the present research is located) the cooperatives maintain an important position, in particular in the first phase of wine processing. There are forty cooperatives involving more than 27,000 grape growers with a total vineyard area of 36,000 hectares.

The strategic approach of Veneto wine cooperatives tends to enlarge the boundaries of the traditional model, predominately orientated in the technological and production capabilities. New targets of coordination with other firms, development of projects, supply of original services to the members, and renovation of the link with the territory are implemented ^[23]. The pursuit of these new goals requires the adaptation of the cooperative relationship, called "cooperative nexus" ^[24], between the members, the board of directors and the management. In particular, the growth of management responsibility and specialization is an important factor to activate original initiatives, spread of information, and cultural sharing among the members.

Recently, some of the largest wine cooperatives in Veneto have implemented new patterns of corporate governance through operations of mergers and acquisitions and total or partial control of Invested Owned Firms. However, a reactive approach was adopted regarding the necessity to increase the critical mass, to reach economies of scale and scope, or to solve critical economic and financial situations. Furthermore,

¹ Veneto is a north-east Italian region and is an high vocated wine area. There are more than 74,000 grape growers and 70,000 hectares of vineyard. About 8 millions of hectolitres of wine are produced. The wine processing involves also large companies with international reputation. Veneto is the first exporter region in Italy (28% of Italian export value).

the cooperatives are building better relationships with the members through the spread of quality projects², the management of financial services, or the development of extension activities.

In a lot of cooperatives in Veneto, a review of the goals are elaborated, in order to enlarge the traditional strategies (basic market targets and price leadership) through policies of product portfolio differentiation, market segmentation, attention to value for money, and management of new channels. For these purposes, four essential factors can be identified: the ability of the management to encourage innovation, the cultural cohesion between the members and the cooperative, the improvement of the quality of members' deliveries and the marketing strength^[25].

2. Objectives and methodology

The aim of this research is to identify new integration patterns between the cooperative and its members, starting from the analysis of the members' structural and strategic choices. This purpose originates from the necessity of the cooperative to find new integration elements with the members. In fact, the cultural and strategic gap between the members and the cooperative is increasing: the former are still small in size, while the latter is becoming bigger and bigger through the implementation of aggregation strategies.

With this aim in mind, the specific goals are: a) to highlight the main differentiation factors of the members and to identify homogenous members typologies; b) to determine the conditions that could set up an innovative relationship between the cooperative and its members, which allow the cooperative to use new opportunities of development and the members to increase management and control skills; c) to explain the adopted grape supply evaluation mechanism and to hypothesize new solutions according to the conditions in point b).

The research has been conducted taking a large dynamic wine cooperative from Veneto as a case-study. It placed its database of about 1,800 members' characteristics, vineyards and income at our disposal. The choice has fallen on this cooperative because in recent years it has been particularly active in mergers, marketing and relationship with members³.

The analysis of information was realized in three phases.

The first one was carried out to explain the characteristics of the members by univariate analysis of the database.

The second phase was designed to identify the homogeneous typologies of members, via the multivariate statistical procedures of factor analysis and the k-means cluster analysis. The factor analysis was conducted using the method of principal components and selecting a set of 15 variables that can explain the characteristics of the vineyards and the grape supplies. The varimax method was used for factor rotation. The cluster analysis was carried out to individuate the different typologies of members of the cooperative winery from the scores associated to the extracted factors. The number of clusters was determined on the basis of a comparative analysis among the matrix of Euclidean distances of alternative clustering processes. The solution of five clusters has been choose.

The third part of the research proposed to develop a patronage return model which includes new elements for the evaluation of the deliveries able to take account the members' commitment in the improvement of the grape quality. By considering the results achieved in the second phase of the research, a linear multiple regression analysis has been conducted utilising the variables presented in Table 1.

² Quality projects are voluntary initiatives of the wine cooperatives to encourage members to improve the quality of the grapes. They come from a marketing plan to satisfy specific market targets with high range products. The member's participation is voluntary, even if the cooperatives favour the members with a higher quality propensity. The participant are submitted to the technical rules of the "Quality Project", they have to reduce the grape yield by the monitoring of winery technicians, but in return they receive higher grapes payments than the other members.

³ Started at the beginning of the 1950's, the winery processes about 700,000 tonnes of grapes in four manufacturing plants, provided by 1,800 grape growers from three provinces of Veneto with 3,500 hectares of vineyards. Currently, the turnover is almost 30 million euro. In the past, the strategic orientation focused on pricing strategy and the prevalence of exclusive relationship with a few large processing and bottling companies. In the last decade, it was enriched by the enhancement of production through policies of differentiation of product/channel/market. This development took place via the achievement of numerous merger operations with cooperatives and the control of Invested Owned Firms, specialized in successive stages of processing, packaging and marketing and able to increase bargaining power and the penetration in retail trade.

Table 1. Variables utilised in the regression analysis

Variable	Mean
<i>Dependent:</i>	
Grape value supply per hectare (€)	4,868.41
<i>Explanatory:</i>	
Yield in grape (tonnes per hectare)	194.41
Share of vineyard on the hillside (%)	24.26
Share of vineyard enrolled in DOC registers (%)	33.54
Share of vineyard less than 10 years old (%)	28.24
Planting density (no. vines per hectare)	1,133.60
Share of mechanizable vineyard (%)	24.30
Share of white autochthonous grape supply (%)	29.34
Share of red international grape supply (%)	30.48
Share of “other grapes” supply (%)	27.23
Participation in quality initiatives (1/0)	93 (frequency)

The choice of using the supply value per hectare as a dependent variable comes from the diffusion to evaluate the business profitability by referring to the cultivated area. Moreover, this variable has been chosen also because the members involved in the Quality Project are remunerated according to the cultivated area.

Regarding the independent variables, it is well-known that high yields per hectare are synonymous with low quality, leading to the expectation of a negative sign associated with this variable. The quality of delivered grapes should be directly proportional to localization on the hillside, enrolment in the DOC registers, renewed vineyard, and involvement in quality initiatives, i.e. the participation in the Quality Project, the production of organic grape and the delivery in plateaux. Therefore, if the cooperative would encourage the production quality, the regression should lead to positive coefficients for these variables.

A different consideration should be done on the share of mechanized vineyard. On one side, the mechanization is able to reduce the costs and production efforts, by making the viticultural practices more efficient. On the other side, it is hardly practicable on the vocated hillside area and inefficient for small farms. Given that the majority part of this cooperative land is on the plain and it aims at developing the mechanization, the coefficient of this variable should be positive.

The varieties white autochthonous and red international and the “other grapes” have been introduced in the regression because they are the most cultivated. If the quality was prized, the coefficient of the “other grapes” should be less than the other two varieties or have a negative sign.

The application of this model allows to estimate the sensitivity of the grape supply value for the whole population to the variation of the explanatory variables. Nevertheless, it does not take into account the heterogeneity highlighted by the cluster analysis. By hypothesizing that the cooperative could foresee different forms of incentives or penalties on the basis of the characteristics of the members and their deliveries, the regression model has been applied for every cluster, aiming at evaluating its adherence and proposing the most opportune interventions.

3. Results

3.1. Segmentation of the cooperative membership

Table 2 highlights the critical aspects of the “grape growers - cooperative system”, reflecting the problems of viticulture in Veneto: high fragmentation of the production system, high share of mature/old age class, preponderance of vineyards located on the plain, low rate of vineyard renewal and mechanization, scarce participation in quality projects. At the same time, there are interesting strengths: the role of “family enterprise”, the innovation of the vineyard, where the land is passed on from father to son, the differentiation capacity of the local grape varieties and the classification of origin (DOC, Controlled Denomination of Origin, and IGT, Typical Geographical Indication).

Table 2. Main features of grape growers members, vineyards and grape supply

Grape growers members	Vineyards	Grape supply
<i>Members' characteristics</i>	<i>Tenure status</i>	<i>Main grape varieties</i>
- male 81.0%	- property 75.0%	- Garganega 42.1%
- less than 40 years old 2.9%	<i>Location</i>	- Merlot 13.6%
- more than 60 years old 48.0%	- hillside 24.3%	- Cabernet Sauvignon 7.3%
<i>Size of grape growers' business</i>	<i>Trellis-training system</i>	<i>Main typologies of wine from</i>
- less than 1 ha 45.6%	- pergola 66.2%	- white autochthonous varieties 29.3%
- from 1 to 10 ha 52.8%	- espalier 20.5%	- red international varieties 23.6%
- more than 10 ha 1.6%	- mechanizable 24.3%	- white international varieties 13.4%
<i>Legal form</i>	<i>Grape variety</i>	- red autochthonous varieties 1.9%
- natural person 89.7%	- white autochthonous 44.3%	- “other grapes”* 31.0%
	- red international 32.5%	<i>Wines from</i>
	<i>Age of vineyards</i>	- quality initiatives 4.9%
	- less than 10 years 28.2%	
	- more than 20 years 49.6%	
	<i>Enrolment in</i>	
	- DOC registers 33.5%	
	- IGT lists 34.3%	

* Wine from “other grapes” means the production of undifferentiated table wine sold in bulk.

In the second phase, the factor analysis highlights the main factors that discriminate the behaviour of the grape growers members. Five factors with eigenvalue greater than 1 have been extracted. They explain 73.7% of total variance. The analysis of factor scores shows the contribution of the selected variables in the explanation of the members' differentiation (Table 3).

The first factor is called *Technological Choices*. It points out that the first element of differentiation is the interest in innovation through the espalier training system and the mechanization of viticultural operations. This is a strategic option for the cooperative, especially in the organisation and rationalisation of the harvest and the first grape processing. Moreover, the difficulties in finding skilled labour, the working time in the vineyard and the related costs are reduced.

The second factor represents the *Size*. It highlights the propulsive strength of the largest members in generating the grape supply value. The investment power in the vineyard is crucial for these members. It is realized by higher planting density and the observance of cooperative guidelines, allowing a better patronage return per hectare.

The third factor concerns the *Renewal of the vineyard* and discriminates the members who have modernized their vineyard in the last ten years from those who have not. This element is associated with the choice of the variety. The innovative members have chosen the red and white international grape varieties in relation to the winery business and the market demand. These members receive a better grape

supply value per hectare. The owners of old vineyards maintain the white autochthonous varieties. The cooperative should improve the differentiation policy for these members by introducing product innovations in order to enhance the typical white wines of high perceived quality.

The fourth dimension is called *Viticultural vocation* and associates the vineyard located in hilly areas with suitable choices for the typical denomination of origin wines and the participation in quality initiatives.

The fifth factor, *Product Portfolio*, highlights the two competitive orientations of the cooperative. The first concerns the pre-eminent strategy of table wine production without classification of DOC and IGT. While it was sold in bulk to large bottling companies in the past, now it is mostly packaged by the controlled companies for the retail trade. The second approach implements the new differentiation policy through the enlargement of the range of typical local white wines, the introduction of red and white varietal wines, new packaging formats and the synergy between territorial and corporate brands.

Table 3. Matrix of rotated factor loadings

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Share of vineyard trained to espalier system (%)	0.890	-0.104	0.018	0.191	0.060
Share of vineyard trained to pergola system (%)	-0.930	-0.071	-0.218	-0.114	-0.032
Share of mechanizable vineyard (%)	0.889	0.043	0.114	-0.038	0.010
Total grape supply value (€)	-0.017	0.911	0.119	0.160	-0.021
Vineyard surface (ha)	0.018	0.907	0.034	0.164	0.047
Density of planting (no. vines per hectare)	0.018	0.732	0.121	-0.107	-0.005
Grape supply value per hectare (€)	-0.264	0.435	0.444	0.104	-0.193
Share of vineyard less than 10 years (%)	0.173	0.214	0.828	0.150	0.060
Share of vineyard more than 20 years (%)	-0.091	-0.237	-0.811	-0.223	-0.078
Share of international red grape supply (%)	0.413	-0.267	0.549	-0.140	0.252
Share of autochthonous white grape supply (%)	-0.344	0.077	-0.565	0.038	0.610
Share of vineyard on the hillside (%)	0.030	-0.081	-0.024	0.839	0.074
Participation in quality initiatives (yes/no)	0.065	0.235	0.087	0.672	-0.085
Share of grape supply for DOC wines (%)	0.101	0.063	0.261	0.630	0.209
Share of “other grape” supply (%)	-0.204	0.036	-0.219	-0.153	-0.899
<i>Proportion of variance explained (%)</i>	<i>19.3</i>	<i>17.6</i>	<i>15.8</i>	<i>12.0</i>	<i>9.0</i>
<i>Cumulated variance explained (%)</i>	<i>19.3</i>	<i>36.9</i>	<i>52.7</i>	<i>64.7</i>	<i>73.7</i>

As explained in section 2, from the factor scores associated to each subject the k-means cluster analysis has allowed to identify five clusters of grape growers members.

The centroids of the clusters are indicated in Table 4, that permits their first characterisation. Cluster 1 highlights the negative role of Factor 3, but the positive contribution of product portfolio in relation to the past technological choices. These last two aspects are negative for Cluster 2. Cluster 3 shows the interest in the renewal of the vineyard. The characteristics of viticultural vocation mark both Cluster 4, which is lacking in technological choices, and Cluster 5, which represents the largest businesses.

The presentation of univariate statistics for each of the five clusters in Table 5 allows the description of the main characteristics of the members, the vineyards and the grape deliveries.

Cluster 1 has the largest number of members, mostly elderly people with the smallest businesses and reluctance to participate in quality initiatives. The vineyards are located on the plain and in the last ten years these grape growers have initiated few renewal operations. Almost 90% of the vineyard surface is more than 20 years old, characterised by the lowest planting density. However, there is a discrete share of vineyard using the espalier training system (perhaps as result of past investments), which can allow the mechanization of farming operations. This last aspect can be noted in the differentiation of the grape supply characterized by the highest weight of white autochthonous varieties and a significant share of IGT red international varieties. The participation in DOC production systems is the lowest. All these structural and business characteristics have led this cluster to obtain the lowest patronage return per hectare.

Table 4. Centres of clusters

Factor	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
1. Technological choices	0.498	-0.395	0.151	-0.531	0.403
2. Size	-0.306	-0.116	0.594	-0.499	1.222
3. Renewal of the vineyard	-0.730	-0.447	1.105	0.271	0.275
4. Viticultural vocation	-0.350	-0.333	-0.579	0.875	2.657
5. Product portfolio	0.692	-1.207	0.160	0.500	-0.271

Also Cluster 2 aggregates a large number of members, elderly, with small business size, and reluctant to participate in quality initiatives. As for Cluster 1, the vineyards are located on the plain and are not renewed. The traditional pergola training system and the local white grape Garganega variety are widespread. This cluster gives little importance to the qualitative enhancement of the grape productions, as to the participation in DOC production systems. Despite the wideness of the IGT designation of the vineyards, the crop yields are the highest and more than two thirds of the deliveries produce undifferentiated medium-low quality wines without territorial indication. Thus this cluster receives a low total patronage return, but a better remuneration per hectare than Cluster 1.

Cluster 1 and Cluster 2 have some common elements. Cluster 1 could be called *Warn out seniors*. The inactivity of these members does not allow to ensure consistent adjustments of the production choices through the remuneration policies of the cooperative. For Cluster 2, called *Opportunistic seniors*, the current mechanism of patronage return is not able to promote the improvement of the grape quality and to penalize the opportunistic behaviours yet. For both clusters the socio-cultural characteristics and the speculative attitude represent a significant deterrent to their evolution according to the strategy of the cooperative, and to establish integration processes. Probably only for Cluster 1 there may be possibilities of integration in the medium-long term, if the intergenerational transfer is ensured.

Cluster 3 is made up of the youngest members; their business size is higher than the previous clusters. The vineyards are located in flat areas and they do not participate in quality initiatives. But these members invest in the vineyard: two thirds of the surface has been renewed in the last ten years with a high percentage of mechanized training systems and the highest average of planting density. This has allowed to privilege the choice of international red and white grape varieties more than any other clusters and to the detriment of local white varieties. The business choices have been focused on the vineyard valorisation through the enrolment in IGT lists rather than in the DOC registers. Business size, high yields and production choices allow to achieve higher patronage return per hectare than Cluster 1 and 2. This cluster could be called *Quantity focused*. They are members that could potentially follow the quality initiatives, but the cooperative has not defined a promotion policy for them yet. This has given way to free rider conduct. In order to reduce this risk and favour the integration with the cooperative, the propensity to innovation represents the most interesting business element to incentive.

Cluster 4 is a little smaller than the previous ones. The members are classified by mature/old age classes, little business sizes, but marked interest in typicality.

Table 5. Main characteristics of the five clusters

	Cluster 1 (n=496)	Cluster 2 (n=449)	Cluster 3 (n=404)	Cluster 4 (n=324)	Cluster 5 (n=103)
Grape growers members					
Members age (years)	62	62	54	58	51
Vineyard surface (ha)	1.1	1.4	3.1	1.5	5.4
Participants in quality initiatives (no.)	0	1	3	6	83
Vineyards					
Share of the vineyards surface:					
- in property (%)	82.0	85.2	75.6	82.6	75.7
- on the hillside (%)	12.5	7.7	3.3	72.1	89.6
- less than 10 years old (%)	5.9	8.4	66.6	31.0	59.5
- more than 20 years old (%)	89.4	84.7	21.5	50.6	22.6
- espalier-trained (%)	40.5	5.8	21.1	12.6	53.1
- pergola-trained (%)	58.5	91.7	53.3	85.3	38.2
- mechanizable (%)	38.7	7.0	38.1	7.2	30.0
Planting density (no. vines per hectare)	756	1,069	1,807	788	1,716
Share of the vineyards surface:					
- registered in IGT lists (%)	81.5	68.7	63.4	34.7	21.8
- enrolled in DOC registers (%)	17.3	18.8	35.4	65.1	78.2
- cultivated by organic methods (%)	0.2	0.2	1.0	1.2	4.3
- of white autochthonous variety (%)	56.8	72.5	21.4	41.6	20.4
- of white international variety (%)	3.1	3.8	25.1	13.3	24.0
- of red international variety (%)	33.0	16.5	52.4	35.0	44.9
Grape supply					
Grape supply value per member (€)	4,260.2	7,614.6	19,491.9	7,312.1	36,152.5
Grape supply value per hectare (€)	3,531.0	4,847.9	6,066.5	4,862.9	6,727.1
Yield in grape (tonnes per hectare)	16.5	26.0	24.4	17.0	12.3
Share of grape supply for:					
- white autochthonous DOC wines (%)	4.4	1.4	2.0	18.0	10.1
- white autochthonous IGT wines (%)	44.0	23.3	13.2	17.6	6.5
- white international DOC wines (%)	0.8	0.4	6.2	7.8	14.2
- white international IGT wines (%)	2.2	3.3	18.0	5.2	8.5
- red international DOC wines (%)	6.0	1.9	12.1	20.5	33.0
- red international IGT wines (%)	24.6	10.0	34.5	12.8	9.0
- other IGT wines (%)	3.3	27.7	2.5	2.4	1.4
- other wines (%)	10.3	31.0	9.9	7.0	3.8

They are characterized by a favourable location on the hillsides, high prevalence of the pergola training system, good presence of the traditional white grape varieties and wide participation in the DOC production systems. Less than one third of the vineyard surface was renewed in the last ten years, allowing the introduction of new international grape varieties predominantly red. For this group, *Small and typical*, the cooperative has not yet elaborated a development policy, although it could achieve more specific differentiation strategies of the product portfolio. Currently, despite its peculiarities, it receives a patronage return similar to Cluster 2. The production fragmentation and the socio-demographic and cultural characteristics of this cluster may slow down the integration processes. However, the improvement of the typical wines quality must start looking not only for economic incentives, but also for cultural development, at least in the younger age classes.

Cluster 5 consists of a little more than a hundred members having the characteristics that make them able to participate in quality initiatives. For this reason, they are the best rewarded by the current mechanism of patronage return. They are young members with the biggest farms. The vineyards are well located on hillsides and frequently renewed. The majority of the surface has been renewed in the last ten years, and for more than half is trained by espalier systems. The planting density is similar to Cluster 3, and about one third of the vineyard is mechanized. The most important characteristics of this cluster are: i) enrolment in the DOC registers; ii) utilisation of organic cultivation methods; iii) focus on international varieties; iv) the lowest yields. By virtue of the above-mentioned features, these members, called *Coop awareness, big and differentiated*, have been easily included in planning activities by the cooperative and contribute to deliver the grapes selected by the cooperative for the production of the higher range wines. Probably, the experience acquired thanks to the specific relationship with these members could constitute a framework for Clusters 3 and 4.

3.2. Analysis of patronage return mechanism and intervention hypothesis

A clear analysis of the diversification of the members' strategic patterns has emerged by the segmentation of the cooperative membership. Because of the evolution of the organisational and marketing strategies, it is necessary to deeply analyse the patronage return mechanism and to implement some hypothesis about how it is possible to depict the virtuous behaviour of the members.

For this reason, the third part of the research proposes to develop a patronage return model which includes new elements for the evaluation of the quality of members' deliveries.

The actual determination of patronage return is done by following the most widespread method used in Italian cooperative wineries, based on the evaluation of a few parameters. In this case, the parameters are five: delivered quantity, grape variety, sugar level, grape condition and designation for the production of DOC or IGT wines. The parameters are objective and easily measured, but they can create opportunistic behaviour by the members.

Cluster analysis showed that the grape patronage return mechanism tends to prize the large groups of *Opportunistic seniors* and of *Quantity focused*, whose primary objective is to obtain the biggest profit per hectare. Only the *Coop awareness, big and differentiated* members receive the highest patronage return because of their adherence to quality initiatives. Indeed, the cooperative is trying to put into practice new patronage return mechanisms for organic grapes, grapes delivered in plateaux and grapes that follow the Quality Project, in order to prize the more aware grape growers in improving quality.

The production of organic grapes and high quality Garganega variety grapes delivered in plateaux to produce "passito" wines is encouraged by a higher grape price. Nevertheless, few members participate in these initiatives.

The Quality Project involves only the production of the Merlot, Cabernet Franc and Cabernet Sauvignon varieties, responding a precise marketing project of the cooperative and aiming at inserting prestigious red international wines in its product portfolio. For this reason, a production regulation has been foreseen, whereby the members are obliged to farm the vineyard according to the indications of the technicians of the cooperative. During the field visits, they must follow agronomical advice and they have to deliver all the produced grapes in required ways. These farmers receive a patronage return which is proportional to the growing area involved in the project⁴. Nevertheless, the participants in the Quality Project are few.

⁴ If the grape production is less than 10 tonnes per hectare or the member doesn't respect the cooperative technician's indications, the standard method is used.

Therefore, when the patronage return is determined, the cooperative does not seem to completely take into account the various characteristics of the members and the grapes. Some of these are considered only in a marginal and indirect way, even if they may require more commitment in the agricultural practices and higher fixed and variable costs. In consideration of this, the linear multiple regression model has been applied.

The estimated model partially adheres to the reality (Table 6). This shows that the actual mechanism of remuneration, which is based only on five parameters, does not comprehend the complexity of the structural and managerial characteristics of the members.

Despite the expectations, the estimations show that the yield is the most important variable with a positive coefficient for the explanation of the supply value per hectare. This factor goes against the quality, whose pursuit should be supported by a supply value decoupled with the quantity produced.

The members who have a high planting density, renew their vineyards, are involved in quality initiatives, or have vineyards enrolled in DOC registers, are less prized.

By examining the grape variety, negative coefficients for the share of white autochthonous, red international and the “other grapes” emerge, because the market prizes white international wines, which assume a marginal role in the supply of the cooperative. The supply of “other grapes” results less penalized in the remuneration in respect to white autochthonous and red international grape varieties.

Table 6. Regression equation for the supply value per hectare – *whole members population*

Variable	b	s.e.	β	Sig.	ϵ
Constant	5,149.591	234.002		0.000	
Yield in grape	3.380	0.218	0.320	0.000	0.142
Share of vineyard on the hillside	-5.086	1.185	-0.101	0.000	-0.026
Share of vineyard enrolled in DOC registers	7.371	1.155	0.140	0.000	0.052
Share of vineyard less than 10 years old	10.408	1.501	0.173	0.000	0.060
Planting density	0.244	0.042	0.125	0.000	0.057
Share of mechanizable vineyard	-7.540	1.239	-0.134	0.000	-0.038
Share of white autochthonous grape supply	-20.091	2.402	-0.300	0.000	-0.493
Share of red international grape supply	-19.103	2.224	-0.299	0.000	-0.119
Share of “other grapes” supply	-14.175	2.486	-0.201	0.000	-0.080
Participation in quality initiatives	1,388.402	207.841	0.145	0.000	0.015

F = 78.832, R = 0.556, R Square = 0.309, Adjusted R Square = 0.305

The regression shows the inverse proportionality between hillside production and supply value per hectare, not considering the major vocation and the quality supplied.

The negative coefficient of the share of mechanized vineyard further shows that the cooperative is not fully aware of the market aims in order to activate a differentiation mechanism inspired by a marketing plan. An incentive to the mechanization would make the viticultural operations more efficient by lowering costs. It will also permit the cooperative to have more control on the members and avoid very high yields. Actually, the practice of mechanization is reserved for the largest vineyards situated on the plain, that produce the lowest quality.

The analysis of the elasticity coefficients points out the positive role carried out by the yield in the increasing of the supply value per hectare, and the negative one of the white autochthonous and red international grape varieties.

The explanatory capacity of the model for each of the five groups is indicated in Table 7. For the *Opportunistic seniors* and the *Small and typical* the model fits the reality. For the *Warn out seniors* and the *Quantity focused* the errors are larger and have an opposite sign, evidencing the structural and cultural

difficulties of the former and the orientation towards the short term period of the latter. Also the *Coop awareness, big and differentiated* grape growers present an observed supply value that is larger than that estimated, since they take advantage of the participation in the Quality Project.

These reflections confirm the hypothesis that the cooperative should follow diverse strategies for the different typologies of grape growers, who are characterised by their own peculiarities, as highlighted by the cluster analysis. This could arise through the thorough analysis of the differentiation portfolio policies, the elaboration of specific development patterns for the different members' typologies and the assignation of more opportune incentives/penalties for everyone.

For this end, the application of the linear regression model to the clusters has been deemed useful. The *Coop awareness, big and differentiated* has been excluded from the analysis because a large part of these members are already involved in the closest form of integration with the cooperative. Taking into account the characteristics of each cluster and the estimated model, specific strategic levers could be individualized. The cooperative should focus on these levers in order to set up differentiated quality projects based on the members' potentiality to increase the efficiency between the supply quality and the distributed benefits, and reduce opportunistic behaviours. At same time a new concept of the governance would be activated, able to satisfy the expectations of more stakeholders.

Table 7. Goodness of fit of the model for the five clusters (cluster mean)

	Warn out seniors	Opportunistic seniors	Quantity focused	Small and typical	Coop awareness, big and differentiated
Observed grape supply value (€/ha)	3,530.98	4,847.90	6,066.49	4,862.90	6,727.08
Estimated grape supply value (€/ha)	3,931.27	4,892.68	5,651.47	4,786.11	6,473.67
Error term (€/ha)	-400.29	-44.77	415.07	76.79	253.41
Incidence of error term on observed grape supply value (%)	11.34	0.92	6.84	1.58	3.77

Table 8 shows the estimated elasticity coefficients for each cluster and the variables included in the regression analysis. The results of the estimations and the significance index for the four regression models are reported in detail in the Appendix.

Table 8. Elasticity coefficients estimated by the regression models for the four clusters

Variable	Warn out seniors	Opportunistic seniors	Quantity focused	Small and typical
Yield in grape	0.684	0.317	0.034	0.475
Share of vineyard on the hillside	<i>n.i.</i>	<i>n.i.</i>	<i>n.i.</i>	<i>n.i.</i>
Share of vineyard enrolled in DOC registers	0.018	<i>n.i.</i>	0.033	0.119
Share of vineyard less than 10 years old	-0.011	<i>n.i.</i>	<i>n.i.</i>	0.029
Planting density	<i>n.i.</i>	0.053	<i>n.i.</i>	<i>n.i.</i>
Share of mechanizable vineyard	<i>n.i.</i>	<i>n.i.</i>	<i>n.i.</i>	-0.020
Share of white autochthonous grape supply	-0.218	-0.477	-0.887	-0.230
Share of red international grape supply	<i>n.i.</i>	<i>n.i.</i>	-0.319	-0.092
Share of "other grapes" supply	<i>n.i.</i>	-0.552	<i>n.i.</i>	<i>n.i.</i>
Participation in quality initiatives	<i>n.i.</i>	<i>n.i.</i>	0.004	0.010

n.i. = not included (the variable has been excluded from the model because not significant).

The regression model applied to the *Warn out seniors* presents a good explanatory capacity with an adjusted R square of 69% and puts in evidence a positive correlation between the grape supply value per hectare and the yield, as well as the choice to enrol the vineyards in the DOC registers but with a lower coefficient. Instead, the choice of vineyard renewal is penalized, even if with a very low elasticity coefficient. The supply of white autochthonous grapes is not prized.

As regards the other variables not included in the model, the low planting density and the location on the plain can not represent appraisable elements for this cluster. Instead, the mechanization suitability and the role of red international grape varieties can be supported by incentives. Nevertheless, the small size of the grape growers could make mechanization an inefficient choice, because it is an explicit cost against the labour supplied by the entrepreneur and his family. Considering the role of red international grape varieties, the cooperative must operate on two fronts: forward through marketing policies, backward through a closer integration with these members both of a technical and cultural nature.

Also for the *Opportunistic seniors* the regression model, with an adjusted R square of 44%, shows that the grape supply value is above all explained by the yield per hectare and the planting density of the vineyard with the positive sign, but by the supply of the “other grapes” and white autochthonous grapes with a negative sign. The variables excluded from the regression highlight the backwardness of these members, given by the low propensity to investment, mechanization, enrolment in DOC registers and participation in the cooperative, and by localization on the plain. It is clear that the cooperative can only get low quality grapes from this cluster, even though in large quantity. At the moment, it would be inconceivable to try to involve these members in quality initiatives. At the same time, it can not discourage the high yield through an inverse correlation between it and the remuneration, because for the principle of open membership the cooperative will risk to lose a critical amount of members, not qualitatively relevant, but very productive. As it was verified for the *Warn out seniors*, the development projects for these members are necessarily projected in the long term, favouring the renewal of the investments, only if the intergenerational transfer will consent it. This will also allow the cooperative to reach positive externality both from an economic and an environmental point of view.

The regression model applied to the *Quantity focused* has an adjusted R square of 29%, showing that the patronage return for this cluster is barely explained by the selected variables. The results confirm that these members have exhausted the potentiality supplied by the yield, which are the highest among the groups. This cluster is also characterised by low awareness to the cooperative initiatives and to the DOC. Even if this cluster is the most focalized on red international grape variety production, they do not participate in the Quality Project. For this reason, the regression shows that this production is not prized, like the autochthonous varieties. The elasticity coefficients highlight the sensitivity of the supply value to the changes in these two variables. As it has been shown previously, socio-demographic characteristics and innovation propensity will favour the involvement of these members in quality projects. However, the cooperative should identify the mechanism able to decoupling the grape supply value from the quantity. It should point out the mechanization possibility and the entrepreneurship elements, ensuring remuneration stability in the mid-long term because of the probable lowering of quantity.

The regression model applied to the *Small and typical* shows an adjusted R square of 51%. Also for this cluster, there is an high positive sensitivity of the supply value to the yield, and only marginally to the enrolment in DOC registers and to the engagement in quality initiatives. Instead, the white autochthonous and red international grape varieties are penalized, as well as, marginally, mechanization. The renewal of the integration relationship between the cooperative and these members is not easy. Nevertheless, the cooperative can not back out of this, because these members could supply the most interesting contribution to typicality. The cooperative should encourage correct practices through incentives to the DOC grape quality, the vineyard on the hillside and the investment propensity.

4. Conclusions

The research showed the problems of the Italian “grape growers - cooperative system”, but interesting reacting factors are starting, such as the progressive renewal of the vineyards, also in order to apply a rational mechanization, the variety differentiation and the localization in vocated areas. However, intergenerational transfer is a critical point for the future of the business.

Through the factor analysis, five elements of differentiation have been discussed: *Technological choices*, *Size*, *Renewal of the vineyard*, *Viticultural vocation* and *Product portfolio*. These factors have allowed the

segmentation of the members. This practice could spread in other wine cooperatives also aiming at increasing the governance ability and satisfying the stakeholders' expectations.

The *Coop awareness*, *big and differentiated* members are already integrated with the strategic choices of the cooperative and they have the highest supply value per hectare. Instead, the *Warn out seniors* and the *Opportunistic seniors* can only be involved in long term intervention projects, if intergenerational transfer is possible. In the short term, the cooperative should act towards the *Quantity focused* and the *Small and typical* clusters, in order to initiate integration processes for the improvement of grape quality.

The large structural, strategic, social-demographic and cultural heterogeneity of the members (especially in the big cooperatives, like this) suggests that a unique quality project for all the members is not applicable. It is necessary to foresee different patterns in order to create diverse solutions in terms of development projects both of the grape quality and the entrepreneurship, enforcing cultural, social and territorial role of the cooperative. This process requires the commitment of the cooperative in market research and in the individualization of the most opportune market segments. Product/channel/market combinations and consequent different quality projects should be implemented.

The regression analysis highlighted some elements to privilege, which may generate management implications. In particular, the actual cooperative strategic lines could become non-competitive. In fact, it focuses on very crowded market segments poorly aware of the new trends, that lead competitors and consumers to continually strive for the improvement in quality and for price policies. Furthermore, like other Italian cooperatives, it continues to make alliances and takeovers. This can produce the estrangement of the members from the cooperative top management in terms of coherence and communication, putting into difficulties the "cooperative nexus". The implementation of differentiation for the diverse member typologies, as proposed in this research, would allow these risks to be face more consciously.

The main development elements for the quality projects can be synthesized as follows: a) investment renewal and grape variety choices can represent parameters of evaluation for the *Warn out seniors*, even if this cluster needs a combination between cultural integration policies and analysis of market targets; b) the renewal of investments will be important also for the *Opportunistic seniors*, even if it is difficult to realize; the cultural development is also necessary in order to reach social objectives by the cooperative; c) the decoupling of the remuneration from the production is inevitable for the *Quantity focused* and this could be done through the evaluation of the investments and entrepreneurship; d) instead, typical production, terroir vocation and investment propensity are the key elements to prize for the *Small and typical*. The realization of the last two mentioned point can be favoured by the young age and the cultural propensity to perceive the project initiatives.

In conclusion, in order to complete this research and make it a viable model to be applied to the cooperative system, it would be necessary to examine at least three further aspects:

- the availability of information concerning social aspects, like the degree of participation in the cooperative and the cultural level of the members;
- the quantification of the weight of new evaluation elements for the grape supply in order to formulate new methods to determine the patronage return for the different typologies of members, maintaining the actual remuneration margins in the short term;
- the analysis of the sociological and psychological characteristics of the members to favour the acceptance and the correct application of the proposed model.

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Appendix

Table A1. Regression equation for the supply value per hectare – *Warn out seniors*

Variable	b	s.e.	β	Sig.
Constant	1,375.988	84.392		0.000
Yield in grape	14.179	0.433	0.859	0.000
Share of vineyard enrolled in DOC registers	4.133	0.957	0.109	0.000
Share of vineyard less than 10 years old	-6.242	2.124	-0.075	0.003
Share of white autochthonous grape supply	-4.469	0.906	-0.131	0.000

F = 279.928, R = 0.834, R Square = 0.695, Adjusted R Square = 0.693

Table A2. Regression equation for the supply value per hectare – *Opportunistic seniors*

Variable	b	s.e.	β	Sig.
Constant	5,614.805	374.403		0.000
Yield in grape	6.201	0.430	0.524	0.000
Planting density	0.299	0.079	0.136	0.000
Share of white autochthonous grape supply	-18.511	4.630	-0.208	0.000
Share of “other grapes” supply	-34.102	4.007	-0.440	0.000

F = 87.275, R = 0.663, R Square = 0.440, Adjusted R Square = 0.435

Table A3. Regression equation for the supply value per hectare – *Quantity focused*

Variable	b	s.e.	β	Sig.
Constant	7,959.667	248.475		0.000
Yield in grape	0.861	0.263	0.138	0.001
Share of vineyard enrolled in DOC registers	4.990	2.428	0.087	0.041
Share of white autochthonous grape supply	-33.692	5.443	-0.289	0.000
Share of red international grape supply	-39.444	3.304	-0.557	0.000
Participation in quality initiatives	2,850.873	1,087.527	0.111	0.009

F = 33.516, R = 0.544, R Square = 0.296, Adjusted R Square = 0.287

Table A4. Regression equation for the supply value per hectare – *Small and typical*

Variable	b	s.e.	β	Sig.
Constant	2,825.712	308.194		0.000
Yield in grape	13.263	0.813	0.645	0.000
Share of vineyard enrolled in DOC registers	9.329	2.009	0.187	0.000
Share of vineyard less than 10 years old	5.330	2.643	0.091	0.045
Share of mechanizable vineyard	-13.101	4.286	-0.131	0.002
Share of white autochthonous grape supply	-12.271	3.145	-0.200	0.000
Share of red international grape supply	-14.478	2.952	-0.245	0.000
Participation in quality initiatives	2,615.413	569.036	0.182	0.000

F = 48.482, R = 0.720, R Square = 0.518, Adjusted R Square = 0.507