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A History of Wine in Europe, 19th to 20th Centuries, Volume II

Markets, Trade and Regulation of Quality

Edited by

Silvia A. Conca Messina · Stéphane Le Bras
Paolo Tedeschi · Manuel Vaquero Piñeiro



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Editors

Silvia A. Conca Messina
Department of Historical Studies
University of Milan 'La Statale'
Milan, Italy

Paolo Tedeschi
Department of Economics, Management
and Statistics
University of Milano-Bicocca
Milan, Italy

Stéphane Le Bras
University of Clermont Auvergne
Clermont-Ferrand, France

Manuel Vaquero Piñeiro
University of Perugia
Perugia, Italy

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The Role of Quality in Wine Production and Market: European Rules, CAP and New Technology

Stefanella Stranieri and Paolo Tedeschi

Introduction: New Rules and Technologies for a Constantly Evolving Wine Market

The aim of this contribution is to show how, from the 60s to the new Millennium, the quality in the European wineproduction and market was influenced by new technologies and European rules.¹ The Treaties of Rome in 1957 and the related creation of the Common market modified the rules concerning the distribution of all European products, the wine

¹Please note that the word “European” is used here with the meaning of “belonged to European Economic Community (since 1992, to European Union)”, that is “regulated by the CAP”. A wide bibliography exists about this last. See, in particular, references quoted in: Cunha and Swinbank (2011), Tedeschi (2011), Kay and Ackrill (2010), and Spoerer (2010).

S. Stranieri (✉)
University of Milan “Statale”, Milan, Italy

P. Tedeschi
University of Milano-Bicocca, Milan, Italy
e-mail: paolo.tedeschi@unimib.it

included. Moreover, in 1962 the Common Agricultural Policy (CAP) was born: since 1964, it has regulated the methods of winemaking and the characteristics of the European wines. So, European institutions progressively decided the evolution of the European wine sector and in particular the role of the quality in the production and market. They in fact established all rules concerning: the elimination of tariffs protecting national products and the actual level of competition in the European wine market, the chemical products which it was possible to use during the winegrowing against fungal diseases and insects, the minimum alcohol content and the percentage of preservatives as sulphites, the contents of labels which wine producers had to put on their bottles, etc.

These European rules also concerned the recourse of new technologies which, from the 60s, allowed a relevant improvement of the yields in grapes and, moreover, of the quality of the wine (e.g. thanks to new fermentation process and modern types of casks favouring a better conservation of the wine).² Besides, the evolution of the rules about the origins of the products and the related labelling strongly influenced the wine producers' decisions concerning the characteristics of the wine they wanted to make and sell. Face to the new world globalization of the wine market, a real European wine quality policy was shaped with the aim to improve the average quality and to promote a quality differentiation, that is to create more types of wine and encounter all target consumers. The CAP progressively enlarged to all European countries the best rules existing in France and Italy, that is the best world wine producers and, moreover, the countries where the wine sector has a great relevance for both the national agri-food system and the preservation of the territory. So, new labels as CDO (Controlled Designation of the Origin, sometimes Guaranteed too), PDO (Protected Designation of Origin), PGI (Protected Geographical Indication) and, more recently, "organic", were written on the bottles of European wines to indicate to consumers how and where the wines they drunk were made. The respect of new labels, which progressively became more severe,

²A wide bibliography exists about technological innovations concerning the winegrowing and winemaking in European countries: see, in particular, the Volume 1 and references it quoted.

obliged European winemakers to improve the quality of their products to maintain their niches of market: the final result was (and it continues to be) positive and the flavours of new quality wines were able to encounter the consumers' tastes and enlarge the wine market.

New European rules also concerned organizational innovations, in particular the wine supply chain. Relevant changes in fact regarded the implementation of sustainability aspects within the supply chain and the role of wine producers and retailers: the aim was to improve the quality of the European wines and the respect of the environment. While in the past the CAP and national public authorities justified their subsidies to the viticulturists with the need to avoid that young people left the European countryside, since the 90s and in particular in the new Millennium the aid to the winegrowers has depended on the positive effects, for the environment and also for the tourism, of the planting and cultivation of vines in the European countryside.

European rules influenced the wine producers, retailers and consumers' decisions: however, also the evolution of the wine market obliged European institutions to adapt rules to changes provoked by those decisions. World wine consumption has been greatly reduced from mid-90s. Since then, the degree of concentration of wine demand worldwide has increased. In the first decade of the new Millennium the highest levels of individual consumption remained concentrated in European countries with a strong wine tradition, such as France, Italy and Spain (which produced 80% of European wine and 50% of the world one). Other European countries, for example Germany and Greece, continued to consume limited quantities of wine. However, northern European countries without tradition on wine production revealed quite positive trends. Outside Europe, the consumption also grew up and some countries registered a considerable increase in the demand of wine: this in particular happened in USA, Russia, Australia, South Africa, Argentina, Canada, Brazil, Chile and Japan.³

³A wide bibliography exists about changes in the wine market: besides chapters in this volume (and references they quoted), see Anderson and Pinilla (2018), Anderson et al. (2017), and Dougherty (2012). See also Eurostat reports and, in particular, as well as the reform of the EU wine market in the EU Commission portal (https://ec.europa.eu/agriculture/wine/reforms_en).

So, the negative trend in the wine demand depended on the main wine markets and was mainly related to the changes in consumers' lifestyles and related diets. In the past, the consumption of wine in the main European winemaking countries was part of the everyday diet because it was an important part of the caloric intake necessary to perform work activities. From the 80s, the wine has become a matter of occasional consumption. The growing attention to health-related aspects, the increasing number of sedentary lifestyles and the growth of alternative (alcoholic or not) drinks in fact led to a decrease in the demand of wine (Hertzberg and Malorgio 2008). Moreover, the negative trend concerned the low-quality wines: consumers progressively reduced their consumption, but they drink better wine. This provoked an increasing competition in the wine market and stimulated winemakers to further improve the quality of their products and to better analyse the consumers' preferences towards quality attributes of wine. Face to these changes, the relevance of labelling increased and European institutions had to modify some rules: for example, sanctions against wine producers' false statements had to increase.

The Main European Policies for the Wine Sector

The European wine sector is deeply regulated: almost half of the world's vineyards are in fact located in the European countryside: vines strongly shape it because their surface in 2015 is 3,362,000 hectares (more than the dimension of Belgium). Moreover, the European wine producers are also the main importer and exporter in worldwide wine markets: in 2015 they produced the equivalent of 23 billions of bottles, that is 63% of the world wine production (Eurostat 2015). Due to the great importance of wine sector for the European agricultural economy, since the 60s the public regulation has provided a wide range of rules to protect and differentiate the production of wine: this happened in European countries and also in all countries where the wine market progressively assumed a social and economic relevance (Gaeta and Corsinovi 2014; Harvey and Waye 2014). Besides, the main changes characterizing the wine sector were mainly related to the product quality differentiation: the changes

concerning this last included both processes, logistic along the supply chain and the market recognition of quality attributes of wines through labelling (Banterle and Stranieri 2013).

To protect wine sector, the European wine sector has been strictly regulated by the Common Market rules and in particular by legal framework related to the CAP. The European market for the wine sector was created in order to enable a gradual convergence of prices and the elimination of customs barriers, with the goal of establishing a single market for products with one common tariff for the rest of the world. Another important intervention for the regulation of European wine market was the Reform of 1999 which had the aim to align European supply and demand through the restructuration of large areas of vineyards, to eliminate the use of intervention as exits for surplus production, to arrange regional diversity, to recognize the role of producers and give them the possibility to guarantee a production that is in line with a market that demands higher quality products. To achieve these objectives, new rules in particular concerned: production potential, market mechanisms, oenological practices and processes, designations, presentation and protection of products and trade with third countries. In addition to these provisions, the regulation included the establishment of classification of authorized wine grape varieties, of a wine inventory and vineyard register. However, this reform was insufficient in reducing wine surpluses and EU still had to pay more money for wine sector. For this reason a new reform of the wine market was needed. In 2008 the European institutions reorganized the European wine market starting from the 2003 CAP reform introduced by Regulation (EC) 1782/2003. The reform adopted in 2008 followed the Regulations (EC) 509 and 510 of 2006 which established new severe procedures to obtain new European labels. It had different aims. Among these, the normative framework recognized the importance of the following: the abolition of the ineffective public intervention in European wine market; the convergence between European wine production and demand; the increase of European wine producers competitiveness; the reinforcement of European wines reputation; the improvement of market share both in the internal market and worldwide; the importance to protect the traditions of European wine cultivation and encourage the social and environmental role of winegrowing in rural areas.

In 2013 the European institutions adopted a further reform built with the aim of harmonizing and simplifying the outlines of the CAP. This reform was part of the wider reform of the CAP for the period from 2014 to 2020. The main topics discussed under the 2013 reform related to the national support programmes and the scheme of authorizations for vines plantings. European institutions had to consider the relevance for the environment as well as for the economy: in 2015 the European wine sector granted 3 million direct full-time jobs and the market value of European wine overcame 100 billion of euros (Eurostat 2015).

The first approach was linked to the one adopted in the framework of the 2008 reform. Thus, it regulated measures already existing in that reform. Such actions were: the restructuring and conversion of vineyards; the green harvesting; the mutual funds; the harvest insurance; investments; by-product distillation; promotion in third countries. The purpose of this normative framework was to foster new products and processes development, especially related to the introduction of advanced systems of sustainable wine production. In addition, it promoted the spread of information communicating with consumers about the responsible consumption of wine and about the system of the designations of origin and geographical indications.

With regard to authorizations, the planting rights approach was abolished by December 2015. New personal authorizations were granted without charge and were not transferable to the market. For this reason in 2016 a new system for the management of vine plantings was set up as the “Scheme of authorisations for vine plantings” in which EU Member States made available each year authorizations for new plantings corresponding to “1 per cent of the total area actually planted with vines in their territory, as measured on 31 July of the previous year”. This plan was based on the outcome of the High Level Group on Vine Planting Rights organized in 2012 and its fully realization is foreseen for 2030.

Besides these rules which were promulgated to protect and regulate the European wine sector, different regulatory interventions succeeded in order to strengthen also the quality of wine. Such rules referred mostly to three main issues: the market recognition of wine quality through the introduction of new labels; the introduction of rules for planting restrictions; the regulation of intrinsic quality wine attributes and their production methods.

The most relevant rule of the past was the Regulation (EC) No. 817/70 which introduced a specific regulation for the provisions relating to quality wines produced in specified regions (QWPSR). A quality wine produced in specified regions (PSR) could be sold under the name of the region granted it by the producer Member State. Examples of recognized quality schemes were the following expressions: “Naturwein”, “Originalabfüllung”, “Spatlese”, “Auslese”, “Beerenauslese”, and “Troockenbeerenauslese” for German wine; “Champagne” for French wine. Moreover, these names could be followed by recognized expressions of quality, like “Qualitätswein” in Germany, “Appellation d’Origine Contrôlée” (AOC) and “Vin délimité de qualité supérieure” in France, “Denominazione di origine controllata” and “Denominazione di origine controllata e garantita” in Italy.

The AOC was the first quality label to be recognized at European level: it was in fact introduced in France for the wine industry since 1935. So European institutions used and improved the existing rules: such quality scheme regulated the geographical name of a country, province or terroir and it designed a product whose origins and characteristics were due exclusively or mainly to the geographical place of origin. Among the distinctive features of these products were also included the characteristics of human capital and natural resources and this became for consumers a guarantee of the quality of the wine. In addition to quality recognition policy, Regulations introduced also boundaries on the replanting of vines for European countries.

The Regulation 1161/76 introduced new rules on the definition of intrinsic quality parameters for wine. In specific, such normative framework aimed at introducing and changing rules on different aspects. Firstly, each European countries had to fix a minimum natural alcoholic strength for each of the quality wines produced within its territory. Secondly, winemaking and processing methods adopted for quality wines had to be defined. Third, the regulation also suggested that permission for the sweetening of a quality wine had to be asked to a Member State. The same authorization was referred also for the enrichment, acidification and de-acidification methods. With regard to planting restrictions, in these years a complete ban on all new plantings for table wines was introduced in Europe. Such intervention aimed at limiting the production of wine and incentivizing the production of quality differentiated products.

The Regulation (CEE) 823/1987 introduced the first system of European wine quality recognition. Such normative framework aimed at homogenizing the wine quality policy of each Member State and it regulated conditions of production and characteristics for quality wines PSR. With this Regulation new quality schemes were introduced: Quality wines produced in specified regions; Liqueur wine quality produced in specified region; Sparkling wines produced in specified regions; Semi-sparkling wine quality produced in specified regions. On the basis of such integration winemakers adopted a disciplinary of production, where the following information was provided: the determination of the production area; types of grape; cultivation methods; winemaking methods; title minimum blood alcohol; yield per hectare; analysis and assessment of organoleptic characteristics.

Italy in particular implemented such rules with the national law 164/92. Different quality labels were introduced within the Italian territory to diversify the quality characteristics of wines. They were: DOCG (Denominazione di Origine Controllata e Garantita), DOC (Denominazione di Origine Controllata) and IGT (Indicazione Geografica Tipica). They became the main quality labels introduced for wine quality differentiation. More recently the label “biologico” (‘organic wine’) was introduced and it was referred to wines made from grapes grown in accordance with principles of organic farming which typically excludes the use of artificial chemical fertilizers, pesticides, fungicides and herbicides. As this last recognition was not cited in the law 164/92, a specific legislation about the “organic wine” did not exist and so producers had to follow the Regulation 2092/91, which fixed rules in a general way for all organic products.

The label DOC was attributed to wines produced in limited geographical areas (usually small/medium sized) and made following strict rules, which included: the use of some defined types of grapes and some established winemaking techniques; the existence of predetermined wine characteristics; the consumption only after accurate chemical and sensory analysis. For these wines was also permitted: the designation “Classico” coming from the ancient wine home areas; the designation “reserve”, if the wine was exposed to a period of ageing (two years or more). At the same time, some restrictive product specification obliged

the producers to the following requirements: the DOC designation on the label; the boundaries of the production area territory; the maximum yield of grapes per hectare; a minimum alcohol volume; the specification of chemical, physical and organoleptic characteristics of the wine; the production conditions (climate, soil, altitude, soil exposure); the authorized vine types; the density of the installations, pruning systems, etc.; chemical and organoleptic examination mode; any minimum period of ageing in wood and bottle ageing; any indication of the areas authorized bottling.

The DOCG was a particularly prestigious certification reserved for certain DOC wines of high quality or with a high international recognition. Producers had to follow rules more severe than those concerning DOC wines. These wines had to be marketed in containers of less than five litres and carry a label detailing the State, the guarantee of origin, quality and also the number of bottles produced. The market benefits granted by this designation increased producers' costs and so only the best wines received it (Belletti and Marescotti 2007).

Finally, IGT was quality awarded to table wines, which had generally a quite large production area and usually a quality inferior to DOC and DOCG wines. IGT wines corresponded to the French "Vin de Pays" and the German "Landwein". For these kinds of wines the production was regulated by simple and flexible rules. The following information was required: the indication on the label of the origin and the names of grape varieties; the boundaries of the production area territory; the list of grape varieties used in the production; the colour and wine type; the maximum yield of grapes per hectare; the alcoholic volume; the grape-wine yield; the authorized corrective practices.

With Regulation (EC) No. 479/2008 the oenological practices and the policy for wine quality were changed in order to harmonize the EU quality policy for food products with that of wine products. More precisely, such Regulation linked the PSR labelling normative with PDO and PGI rules. The new normative framework distinguished between wines of quality produced in a specific area and wines without a geographical indication. Within the first group there were PDO and PGI wines. PDO referred to wine which was entirely produced and transformed in a given geographical area. PGI referred to wine products

where at least one production step within the supply chain was based in a specific geographical area. In specific, for PDO, the requirement was that “the production must take place in the geographical area [and] cover all the operations involved, from the harvesting of the grapes to the completion of the wine- making processes, with the exception of any post-production processes”. For PGI wines, “the maximum 15 per cent share of grapes could arrive from outside the demarcated area” but it had to originate from the Member State or third country in which the demarcated area was situated”. The consequence of this new regulation was that many IGT wines (or equivalent in other EU countries) became PGI ones. The result was a quality upgrade for many wine products.

However, the homogenization of the quality requirement for wine products with other foodstuffs led to a risk of consumer confusion towards new labels. Besides, the protection of wine products within international market was at the core of political debate in main European wine producers’ countries and in particular in Italy (Chiodo 2008). PDO and PGI wines in fact represented (and they continue to represent now) a strategic element of Italian agri-food system: a great part of the Italian countryside (arriving at almost 50%) was in 2013 dedicated to the viticulture and from 50 to 80% of the wine production had the label PDO: this demonstrated the specialization of Italian wine production towards quality.⁴

Even if it is possible to realize an excellent wine without following the rules for the PDO wines (the excellent flavour of some wines depends on the mixing of grapes and must arriving from different terroirs) the relevance of European labels for consumers led all European wine

⁴In 2013 Italian wine export represented 15% of national agri-food export. Among the first twenty food products exported, PDO and PGI wines played a very important role. Moreover, the 48% of cultivated land was used for PDO and PGI wines. In the northern Italy there existed the higher concentration of PDO wines: in most of terroirs more than 70% of wine production was used for PDO wines and this percentage increased up to 80% in Lombardy. In Italy some exceptions were represented by Toscana and Sardinia only. In a context highlighting a negative trend concerning the cultivated land, the wine production had a positive trend together with the price of PDO and PGI wines. See Inea (2014), Ismea (2007, 2014), and Sardone (2013).

producers to improve the vines dedicated to the production of PDO wines. So, the improvement of the quality concerned most of European wines and this increased the competition in the wine market and, consequently, obliged European institutions to intensify the controls concerning the respect of rules.

In 2013 a new reform was adopted with the aim of harmonizing and simplifying the outlines of the CAP. The regulatory frame of the 2008 reform was preserved but, for the wine sector, some changes were introduced and in particular concerned designations of origin and geographical indications. As labelling progressively assumed great relevance in the wine market, the labels became more severe and, at the same time, were more related to the respect of the guidelines established by consortia producing PDO and IGP wines.

European institutions increased controls on wine producers' statements influencing wine consumers' choices. Studies in fact revealed different determinants affecting consumers' attitudes towards wine consumption: in particular, consumer involvement and product knowledge affected consumer's preferences (Barber et al. 2009). So, not correct information about some wine attributes was able to modify the market in favour of not honest wine producers.

Wine producers and European institutions also concentrated their attention on the effects of different product quality attributes on wine consumer's preferences. There are extrinsic attributes which can be modified without changing the product itself (for example, the price, packaging, labelling and brand name) and intrinsic attributes which are directly connected to the product, to the processing method and to the perception of it (for example, the alcohol content and product sensory characteristics). It is evident that the first ones concern marketing only, while the second ones are also strictly related to the protection of consumers' health.

Besides, European institutions had to consider that wine preferences are affected by objective traits, sensorial variables and reputational attributes of wine producers. Objective traits are the price, origin, denomination of origin, grape variety, name of producer: the price of wine influences consumers' choice in particular when the other characteristics of the product are not known by consumers, or when it is

difficult for these latter to evaluate the quality of the product; the others become relevant when consumers have a major knowledge of the characteristics of the terroirs and related wines. The sensorial variables includes product characteristics which are not known by consumers before the purchase: it is in fact possible to discover them only after the product tasting (for example, wine's aroma, body, finish and harmony of components). Reputational attributes are represented by all expectations about wine quality, built up through past experiences with the producer, the brand and the designation of origin: as their relevance progressively increased, European rules had to avoid that false statements deceive consumers and also create problem to honest producers of the same terroir (Landon and Smith 1997; Benfratello et al. 2009; Frick and Simmons 2013; Harvey et al. 2014).

Finally, the recent European rules also consider the problem of the sustainable development: consumers in fact show more interest about sustainable products and, in the wine sector, sustainability has become one of the primary concerns. Sustainability attributes attract consumer's attention as the other attributes: so, wine producers modify their strategies concerning the quality differentiation of their wine trying to underline the respect for the environment during the winegrowing and winemaking. This evidently implies that European rules have to regulate and control wine producers' statements and, moreover, verify that information is clear and does not confuse consumers in their purchasing decisions: studies in fact show that the risk of information overload exists and that labelling only the most important information helps wine producers to effectively differentiate their products from competitors.⁵

⁵A wide bibliography exists about the problem to have a correct labelling which, respecting rules, really attracts consumers and, at the same time, allows producers to realize a quality differentiation. See, among other, Golan et al. (2001), Drichoutis et al. (2006), Kapsak et al. (2008), and Grunert et al. (2010). About wine producers' decisions, see also: Carpenter and Humphreys (2019).

The Main Technological and Organizational Innovations in the Wine Sector

The influence of European rules on the wine sector was relevant, but the novelties which, from the 60s to the new Millennium, mainly improved the quality of wine were related to technological, and organizational innovations.

With regard to technological innovations, from the 60s new packaging techniques were among the main drivers of novelties within the wine sector. During the 60s, the reduction of the dimension of the barrels (the *barrisques* in wood oak) giving more oxygen during the fermentation or the recourse to new giant tanks (in stainless steel or fiberglass) to better conserve the product allowed producers to create new different types of wine having a better average quality and also a more competitive price. Moreover, the introduction of new technology for bulk wine transport also affected the quality of wine sold at international level. In specific, the introduction of new packaging technique “Flexitank” (big bag-in-box with a capacity of 16,000 to 24,000 litres) progressively substituted steel containers. From 2007, it has contributed to change bottled wine with bulk wine exports for the main wine exporting countries as Australia, USA and South Africa.

Thanks to this innovation, the quality attributes of wine were no more deteriorated because of reduced oxidation: a better preservation of organoleptic characteristics was guaranteed. By Flexitank it was possible to transfer wine from the areas of production to all areas of consumption. This provided a minimization of freight costs and the possibility to sell wine with a brand of origin at reasonable prices. The implication of such innovations related to an increased competition on the world wine markets because more quality wines were available within the same market.

The introduction of this new technology had both positive and negative effects. With regard to positive effects, a cost reduction, a minimization of environmental costs due to lower wine transports certainly played an important role. With regard to negative effects, the augmentation of unemployment and the economic consequences on the glass industry were acknowledged.

In addition to packaging advances, different innovations related to the wine traceability also characterized the evolution of the quality characteristics of wine products. Among these, the Quick Response (QR) code, was recently adopted within the food industry as a two-dimensional barcode (Tarjan et al. 2015). The QR collected a higher quantity of information than the one-dimensional code, and it could be incorporated into users' smartphone applications: these latter allowed consumers to scan and decipher product information (Kim and Woo 2016). The introduction of QR technology led to an increase of product knowledge and to a reduction of market failure associated to the information asymmetry between producers and consumers: this is important for experiential products, like wine (Wilson and Quinton 2012).

With regard to organizational innovations of the wine sector, different elements of novelty were introduced. They were mainly related to changes in the organization of wine supply chain. Among these, the major variations depended on: the implementation of sustainability aspects within the supply chain; the adoption of voluntary safety and quality standards; the role of producers and retailers in the management of vertical relationships.

As sustainability of wine production progressively increased its relevance in the wine market and played a strategic role at international level (Klohr et al. 2013), different initiatives were developed to promote the sustainability of wine supply chain. The first was launched in California in 1992 (Integrated Pest Management Programme). Later, many countries started to support sustainability, especially countries belonging to the "New world of wine", such as "California Sustainable Winegrowing Program" (California, USA), "Entwine" (Australia) and "Sustainable Winegrowing" (New Zealand). These initiatives brought to the implementation of voluntary standards for environmental, social and economic sustainability of the wine production. Some initiatives related to sustainable-related wine supply chains also concerned the European terroirs. For example the "Vignerons en Développement Durable" programme, a French collective brand for the sustainable viticulture based on the subscription of regulations composed by responsibilities with the aim of reaching goals connected to the sustainability. Another example was "VIVA Sustainable Wine" which was developed

by the Italian Ministry of the Environment with the collaboration of several Italian Universities and research centres. The aim of this programme is the evaluation of the company's performance from the environmental, social and economic perspective and of the communication tools used to reach the final consumer using the QR code which allows identifying the company results with respect to four indicators: Air, Water, Vineyard and Territory.

With regard to the adoption of safety and quality schemes, it was important the adoption of voluntary schemes which were referred both to public and private standards. Public standards related to the recognition of wine origin through the PDO and PGI certifications and environmental-friendly wine attributes through Organic standard. Private standards were linked to holistic approaches to renewable agriculture through biodynamic procedures (Demeter) or to the adoption of standards which aimed for the reduction of unfair practices among wine operators. Such rules referred to traceability schemes entailing a higher complexity compared to the mandatory scheme introduced by Regulation 178/2002. In specific, these standards, like for example ISO 22005, referred to traceability standards, whose system had a high level of depth, breadth and precision.⁶ Traceability depth referred to the sectors of the wine supply chain which were involved by the system. The breadth of the system referred to the amount of information traced. The precision of the traceability referred to the probability to reconstruct the complete history of a certain product and to the dimension of the tracking unit used to trace products. The higher the breadth, depth and precision of traceability, the higher its complexity, and the higher the probability to efficiently manage unfair practices and exogenous shocks within the wine supply chain (Wu et al. 2012; Manning and Soon 2014; Tähkäpää et al. 2015).

In terms of variations in the organization of supply chain driven by these voluntary systems, an increase in transaction transparency and in the bilateral dependency of economic agents was revealed (Banterle and

⁶About the relevance and usefulness of the traceability in the food industry, a wide bibliography exists. See, among others: Golan et al. (2004), Trienekens and Zuurbier (2008), Aung and Chang (2014), and Charlebois et al. (2014).

Stranieri 2008). Indeed, the introduction of these voluntary standards increased the supply chain efficiency due to a strengthening of vertical relationships and the reduction of transaction information asymmetry. However, the adoption of complex traceability faced some difficulties, which were associated to the costs for its adoption, the type of product considered, and to the complexity of the supply chains (Canavari et al. 2010). Moreover, the increase of transparency offered by complex traceability caused opposing effects within the supply chain, because of the presence of different interests among food firms and their tendency to behave opportunistically during transactions (Ringsberg 2014). The decision on the voluntary traceability for wine producers in fact depended on the firms' strategy, i.e. from their strategic incentives towards the implementation of traceability (Karlsen et al. 2013).

With regard to the role of producers in the organizational innovation of the supply chain, it was possible to note an increasing role of the producers associations within the wine sector. Such forms of supply chain organization implied an increase in supply chain coordination due to the integration of the production and processing phase. Moreover, a strengthening of vertical relationships was due to the introduction of supply chain agreements implying new severe production rules to be respected by all members of the association.

Retailers also played an important role in the reorganization of wine supply chains. The strategic role of food retailers within the supply chain depended on different aspects: their strategic position at the end of the supply chain and their big dimensions compared to wine producers. With regard to the first aspect, the direct connection with consumers allowed them to quickly perceive their preferences and needs. This also allowed to reach information about market changes more quickly than the other actors of wine supply chain and to have more available information during negotiations.

Moreover, the food retailing was characterized by some big firms which concentrated a high percentage of food supply. On the opposite, most of wine producers had small dimensions. For example, in Italy the system of wine production was based on about 55,000 operators subdivided into producers-winemakers, winemakers and winegrowers' associations. The first and the last category of firms were examples of supply

chain integration, whereas the second type of firms was part of supply chains mainly organized through hybrid forms of transacting, such as contracts and similar agreements. More than 90% of Italian wine firms was represented by winemakers even if they produced only a quarter of total national wine production. This entailed a power asymmetry between retailers and most of the agent of the wine supply chain and a progressive affirmation of retailers power: these later were the leader of the wine supply chain, coordinating the activities of the other agents.

Currently, retailers centralized information and production flows of the supply chain in order to better monitor activities and to guarantee a higher degree of food safety and quality. To reach this goal they introduced private standards with the aim to standardize quality procedures within the food supply chains. BRC (British Retailers Consortium) and IFS (International Food Standard) represented two relevant retailer standards for the efficient management of the supply chain. In specific, BRC was introduced by retailers in order to standardize the rules for suppliers with regard to food safety, food quality and other parameters (Contato 2007). This standard also introduced rules related to environmental and social sustainability. The environmental aspects related to a reduced use of chemicals in production processes, and to an efficient waste and water management within the food supply chain. The social aspect of this certification was based on the respect of work conditions with regard to labour rights and work safety issues.

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