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Wine and tourism : new perspectives for vineyard areas in Emilia-Romagna

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Vin et tourisme : nouvelles perspectives pour les vignobles d'Emilie-Romagne

Résumé – L'Emilie-Romagne représente l'une des régions les plus importantes d'Italie pour la production viticole, avec 12% de la production totale, 15% des exploitations viticoles italiennes et 30% de la superficie, sachant que le vignoble détient la valeur record de 63% des vignes concentrées dans la plaine.
Il existe une réelle nécessité de réorganiser ce vignoble, en identifiant et en créant de nouvelles opportunités d'emplois tout en améliorant les circuits commerciaux. Contrairement aux solutions apportées dans les années 60 qui ont conduit à l'exode rural, une forte volonté se manifeste afin d'améliorer la qualification, la promotion et la valorisation du terroir à partir d'un nombre très diversifié d'activités.
Le vin représente aujourd'hui un outil de communication et d'attraction touristique pour les zones rurales. La réalisation d'un projet intégré sur la production viticole et le tourisme (tel que les routes du vin) pourrait fournir une solution d'avenir pour développer la promotion du territoire et créer de réelles opportunités de développement. A l'aide d'une méthode de classification hiérarchique, inspirée de l'approche de Ward, nous cherchons à identifier les différentes sous-régions de Romagne de vins DOC et DOCG qui montrent les éléments essentiels favorables à la mise en place de véritables politiques de tourisme du vin.

Mots-clés :
vin, tourisme, analyse multivariée

Wine and tourism : new perspectives for vineyard areas in Emilia-Romagna

Summary *– The wine grape growing sector of the Emilia-Romagna region is one of the most relevant at national level, as it produces 12 % of the total Italian production. In relative terms, 15 % of the Italian wine growing farms and 30 % of the land alloted to grape growing are located in the Emilia-Romagna, which is characterised by a high record of 63 % of grape growing in the plain.*
There is a need to reorganise the entire sector of grape growing for wine production in such areas, by identifying and creating new job opportunities in the farm and finding alternative marketing channels. Contrary to solutions found in the sixties that led to the agricultural exodus, it appears that there is a strong will to start new initiatives for the qualification, promotion and "valorisation" of the land, resulting in diversified regional activities. Wine represents today a privileged communication and attraction tool for tourism in rural areas. The realisation of an integrated project on the wine grape growing and tourism sectors (such as the wine routes) in vineyard areas like those in Emilia-Romagna could bring about an interesting solution aimed at improving the promotion of the wine territories and creating development opportunities. Through a cluster analysis based on the Ward method, the authors tried to identify the different sub-areas in Romagna under DOC and DOCG vines which show homogeneous features that could be involved in the initiatives of wine tourism.

Key-words:
wine, tourism, multivariate statistical analysis

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This paper presents part of the results of the research project entitled "New instruments for promotion of wine production and the rural areas : a feasibility study of wine routes in Emilia-Romagna region" and financed by the Emilia-Romagna Agricultural Department and the Associazione Nazionale Città del Vino (the national association for the wine cities).

THE relationship between wine and tourism is not a new element in the rural European world. For several decades, the "wine routes"[(1)] have been one of the features of wine territories in Northern Europe, especially in Germany and France (Mallon *et al.*, 1996). In Italy and Southern Europe in general, the "valorisation" of rural areas through a tourism activity strictly linked to wine culture and especially its promotion by opening cellars and vineyards to visitors, is more recent. As a matter of fact, the first experiences of actual wine tourism – apart from the traditional direct sale – have been organised for no more than a decade. Furthermore, only after the mid-nineties, has wine tourism been organised, thanks to the creation of associations of wine tourism operators, wine routes and related specific regulations (Antonioli Corigliano, 1996; Gatti *et al.*, 2001). Projects for promoting wine tourism were successfully included among the European Union (EU) policy tools for supporting the integrated development of the less favoured rural areas of Southern Europe with a vocation for wine production (Commission européenne, 1996; Ersa Abruzzo, 1995).

The objective of this paper is to propose a method allowing to identify areas with homogeneous characteristics within the wine-growing regions in order to evaluate the impact of projects related to wine tourism. The method is based on the use of a set of territorial indicators. The tool employed is a cluster analysis, preceded by a principal component analysis, which allows to detect the similarities between original units and then classify them into groups, on the basis of their own characteristics. Multivariate statistical analysis techniques are the most frequently employed methods for analysing the characteristics and dynamics of rural areas (Anania and Tarsitano, 1995; Fanfani and Mazzocchi, 1999). They are characterised by the ability to answer to the common issues of rural policy, concerning a variety of topics, some of which essentially focus on agricultural aspects (Mazzocchi and Montresor, 2000) while others aim at evaluating the quality of life in the rural environment through an interdisciplinary approach (Bazzani *et al.*, 2001).

In this paper, the authors analyse the situation in the Emilia-Romagna region, the fourth wine-producing region in Italy. In recent years, the region has undertaken constant efforts at valuing its own production and the dynamism of small and medium enterprises producing quality wines. The sub-areas to which the analysis is applied include the seventy

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[(1)] According to the definition given by the *Centre national des ressources du tourisme en espace rural* (1996), a "wine route" is a sign-posted itinerary, through a limited area (region, province, designed area) whose aim is to discover regional wine(s) product(s) and associated activities. This is carried out directly on the farms (enabling the traveller to meet the producer) and/or in exhibition spaces specifically developed around wine production (wine tasting centres or wine museums).

municipalities of Romagna[2]. This choice was made on the basis of (a) the qualitative characteristics of the wine-growing sector, showing excellent quality of meeting the standards of a registered and guaranteed designation of origin (*Denominazione di Origine Controllata e Garantita;* DOCG), while other potentialities of quality production in the region are still to be exploited and (b) the close link between tourism sector in the area and tourist flows tendency towards the Romagna Adriatic coast.

INCENTIVE MEASURES FAVOURING GRAPE-GROWING, WINE PRODUCTION AND RURAL AREAS

The recent European Union policies and regulations for rural development and agricultural markets, especially concerning the wine market, highlight the relevance of an integrated development of rural areas, underscoring the need for principles governing rural development to be applied to the economic structure in peripheral areas, as well as the management of agricultural production there (European Commission, 1996 and 1997). Even in the wealthier areas, the need for balancing the market requires: (a) a reduction of general production and an improvement of its quality, (b) the identification of alternative marketing channels and (c) the possibility for farm workers to find new job opportunities when the need arises. Converse to the solutions found in the sixties which led to neglect, if not utter disregard for agriculture, it seems possible today to find alternative means of utilizing the land and labour force[3].

As concerns the wine growing sector at the national level, there is a strong interest in starting new initiatives for the qualification, promotion and "valorisation" of the areas and creating more diversified regional activities. The Tuscany region was the first to focus on the implementation of integrated programmes on wine tourism, through the 1996 regional Law nº 69, which regulates the wine routes and provides subsidies for agricultural implements and modernisation of farms and related projects (ANCV, 1997). In Piedmont, new initiatives on the wine districts, together with the new 1995 Law nº 95 – implementing the EU directives on environmental issues and the promotion of quality agricultural products – focus on the objective of district "valorisation". With a fast developing tourist

[2] Romagna is an historical-geographic region of about 6,000 square kilometres under the administration of the Emilia-Romagna region. It includes the administrative provinces of Ravenna, Forlì and Rimini, but, historically, some territories of the Bologna area are also included. These latter municipalities are in the Imola area. Geographically, the Romagna area is delimited by the Sillaro and Reno river valleys to the North-West and North, by the Adriatic Sea to the East, by the Conca valley to the South and by the Apennins to the West and South-West.

[3] Inside the OECD itself the debate on the territorial development is going in the same direction (OECD, 1996a, 1996b, 1999).

industry and cultural awareness, there is a subsequent protection of the artistic and landscape heritage and directed efforts at traditional activities leading to gross agricultural and industrial development (IRES Piemonte, 1992; Aimone, 1996). On 27th July 1999 National Law nº 268 established the regulatory base for updating integrated projects on wine routes. This law was the core of regional regulations, including the law on the oenogastronomic routes in the Emilia-Romagna region (Law nº 223/2000) that have been integrated with the current legislation on registered designations of origin (the 1992 Law nº 164) that indirectly promotes and safeguards wine territories [4].

THE EMILIA-ROMAGNA WINE PRODUCTION SECTOR

The Emilia-Romagna region produces 12 % of the national DOC and DOCG quality wines [5]. With a production of about 6 million it is the fourth producing region after Puglia, Sicily and Veneto. It also represents almost 8 % of the national vineyard area and more than 10 % of the DOC and DOCG vineyard areas. Almost 50 % of the farms in Emilia-Romagna have vineyards compared to about 40% at the national level.

There was a particularly high 63 percent of grapes grown in plain areas in the nineties. The opposite is true at the national level, where 58.4 % of grapevines are cultivated in hilly regions of which 70.4 % is of DOC and DOCG qualities. In the plains, the wine growing areas total 33.9 % of which 22.7 % is composed of DOC and DOCG designated areas. The total growing area is 7.7 % in the mountainous regions, of which 6.9 % is DOC and DOCG areas. In the seventies, wine growing at hilly and mountainous areas reached a remarkable 80 % at national level according to the 1990 Istat Agricultural Census.

The size of grape-growing farms for table wine production in Emilia-Romagna is smaller than those producing DOC and DOCG wines. Almost 80 % of table wine farms are not larger than ten hectares and in the less-than-ten-hectare range farms, there are 68.6 % DOC and DOCG farms.

Farms are prevalently directly managed by the owner-farmer (95.2 % of cases), even if the importance of direct farm management using exclusive family labour decreases, as farm size increases; 90.7 % of the farms are smaller than 0.2 hectares under vines and just 11.8 % of the farms

[4] The 1992 Law nº 164, substituting the 1963 Law nº 930, is more directed to the valorisation of the qualitative issue. The new law offers some legal instruments useful for a more efficient territorial analysis of the areas under vines, allowing the identification of sub zones and particular vineyards inside a DOC or DOCG area.

[5] The Emilia-Romagna region has 20 DOC areas and one DOCG area, in which are produced 77 quality wines.

are with more than 10 hectares under vines. In the latter case, it becomes necessary to employ labour outside of family members (54.2 %) and also management with wage earning employees (ISTAT, 1990).

Within Emilia-Romagna there are around 1,200 private wine-makers with a production higher than 100 hectolitres and around ninety co-operatives. The co-operatives are mainly located in the provinces of Reggio Emilia, Modena, Ravenna and Forlì [(6)]. In 1991 they produced 6 million hectolitres, 10 % of which were DOC and DOCG wines. Around 8 % of these 6 million hectolitres were exported. The private wine-makers are mainly located in the provinces of Piacenza, Bologna and Ravenna, but only 450 of them produce DOC and DOCG wines. In 1995, they produced a total of 2 million hectolitres of wine, 23 % of which were DOC and DOCG quality (Ravagli, 1998).

THE ANALYSIS OF TERRITORIAL FEATURES OF VINEYARD AREAS IN THE ROMAGNA REGION

The realization of integrated projects between wine grape growing and tourism sectors (such as the wine routes) in vineyard areas like Emilia-Romagna can offer an interesting solution for those wine makers who intend to launch the promotion of their own products and create development opportunities as, for instance, new job opportunities for young people. In the tourism sector, it might be possible to integrate traditional activities – such as beach, thermal and mountain tourism – with the yet non-existent thematic tourism in the Emilia-Romagna region.

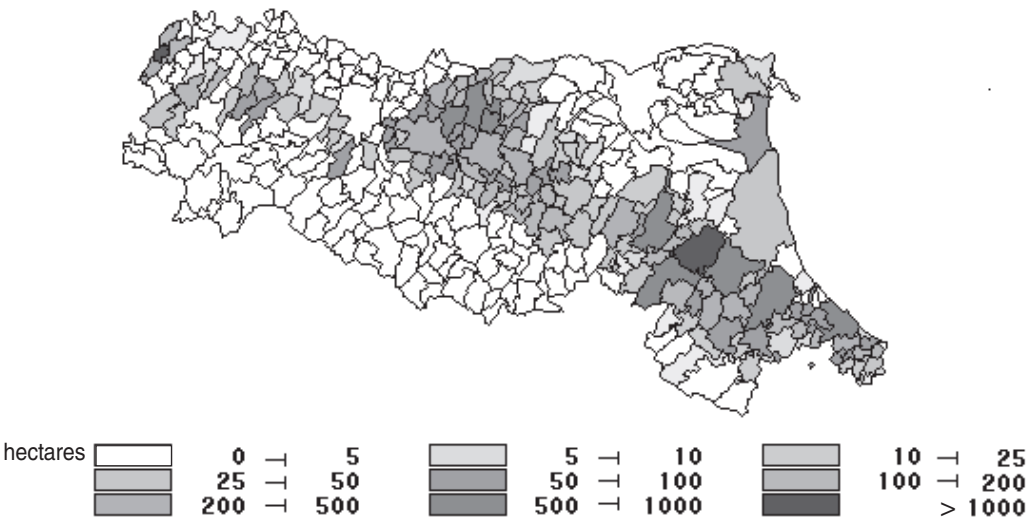
As concerns the wine growing sector, the region under study can be subdivided into two main sub-areas: *i)* Emilia, which goes from the northern part of the region to the city of Bologna and a few kilometres south, and *ii)* Romagna which is in the southern part of the region. In some respects, the two areas have different characteristics. The wine grape growing quality sector in Emilia, located in two main poles around the cities of Modena and Reggio Emilia and the municipalities in the north of Piacenza, is strongly characterised by the production in plain areas (Modena and Reggio Emilia) and is inclusive of an intensive agricultural sector with high value productions (Parmigiano Reggiano, Parma Ham, Modena Traditional Balsamic Vinegar, among others). The quality wine growing sector in Romagna is more important in terms of utilised area and more homogeneous in geographic terms (Gatti, 2001) (see also figure 1). Furthermore, DOC wine is the most important quality product in this area and the high tourism vocation in the Romagna area, which is mainly due to the heavy tourism flow in the Adriatic coast

[(6)] In these provinces are located mostly larger co-operatives of the Italian wine growing system (CAVIRO, CEVICO, Cantine Riunite, COLTIVA).

(there are 20 million tourist stays every year), made the writers focus on this specific area.

Since this work applies to a wide and diversified area, it is likely to show non homogeneous structural characteristics which can obstruct a successful implementation of policy actions aimed at developing "wine routes". Hence, it is believed that a preliminary analysis for a deeper understanding of the territorial differences can be very useful.

Figure 1. **Area under DOC/DOGC vines in Emilia-Romagna (Municipal data - ISTAT, 1990)**



Methods and indicators used

Through a cluster analysis with the Ward method (Krzanowski, 1988), the different sub-areas under DOC and DOCG vines are identified to show homogeneous features that can potentially be of interest in the wine tourism initiative projects. The objective is to recommend policy actions for each sub-area.

Based on the multivariate profile of the observed data, the most commonly employed technique is the cluster analysis (CA) which is a combination of techniques and whose main function is to detect, according to their own features, the similarities among them. If the application of CA is successful, the end-result is a division of units into homogeneous groups that are well distinct from other groups.

One of the limits of this kind of analysis is the low availability of indicators that are representative at territorial level. In most situations, the analysis is carried out with data at municipality level, even if there is limited data obtained from a few surweys. The choice of the indicators

is very limited, as there is no data at further disaggregation levels. The other relevant problem in employing this kind of data is the irregularity in their collection and lack of accessibility to them. The main sources for municipality data are the Censuses which however, just allow for the evaluation of the changes in the economic, demographic and social structures inside the regions after long delays in their publication.

Other data sources are the provincial reports on private cellars wine production, published by the Department of Agriculture of the Emilia-Romagna region (Gatti et Tassinari, 1992; Tassinari, 1996). These data also have some problems with the Italian law on privacy that guards against publishing data from private cellars, even if these data are included in the overall data obtained at provincial level. Hence, starting from such total amounts, it is possible to derive the quantity of wine produced in those municipalities with one single cellar. Considering that such an amount is relatively small with respect to total production, an average value was assigned to each of those municipalities with one single cellar, and in order to avoid a source of bias in the analysis, this was considered as marginal, given the low number of this kind of municipalities. Despite such considerations on data limitations, it is expected that the quantitative analysis would provide valuable and reliable information.

Variables have been selected on the basis of their characteristics and also of the final objective of the study. It is therefore necessary to put into consideration the fact that variables with a low selection power will make it difficult to identify the groups, whilst highly selective variables with low relevance will lead to more effective results, though hardly useful with respect to the aims of the study.

Forty-seven variables for each of the seventy municipalities in Romagna with at least one designation of origin were taken into consideration and then classified into five categories (see table 1):

• Indicators of the economic and productive structure, defining a general framework for economic and productive development.

• Structural indicators of agriculture, and issues strictly linked to the territory from an agricultural perspective, with special attention to the wine grape-growing sector.

• Indicators of the demographic structure, allowing to monitor the resident population from a social and cultural point of view.

• Indicators of the economic and productive dynamics, allowing an analysis of the structural component flows in the agricultural sector and of the employment indicators of the economic and productive framework.

• Indicators of the tourism sector, allowing to identify where this kind of activity is more developed.

Preceding the cluster analysis is the principal component analysis (PCA), which, starting from a set of indicators, allows to synthesise such a set into a reduced number of uncorrelated (principal) components. The

components are then employed in the cluster analysis in order to identify the different groups. The role played by PCA is relevant as it serves as a preliminary instrument for the identification of homogeneous groups through a cluster analysis as it leads to the understanding of the territorial differences and assess the relevance of the original indicators. Eleven principal components were retained, explaining for about 80 % of the total variability in the original data.

Criterion used for evaluating the similarities between the units

Given the set of variables, the step taken consists in choosing a criterion for determining the similarities or differences between municipalities. For the structure of the selected variables, the Minkowski family distance measures are the most frequently employed. Hence, given p variables (k = 1,2,...,p), the distance between two units i and j through a generic measure derived from the Minkowski family is expressed as:

$$d_{ij} = \left[\sum_{k=1}^{p} \left| x_{ik} - x_{jk} \right|^{r} \right]^{\frac{1}{r}} \qquad (1)$$

where r represents any integer not smaller than unity. With $r = 2$ we obtain the common Euclidean distance, *i.e.* the square root of the sum of squared values observed for the units i and j across the p variables. Our analysis employs the Euclidean distance, as implemented by the most common statistical computer packages.

The choice of the clustering algorithm

The cluster analysis is carried out using a hierarchical (aggregative) algorithm, which assumes initially that each original unit represents a group. Then proceeds by aggregating the two closest groups at every step. The process is repeated n-1 times (given n observations), so that the outcome of the final step is a single cluster with all n units. The end result is a completed series of chained partitions. It follows that the classification into a specific number of groups is conditional to that of a higher number of clusters, so that two units, once they are joined in a given stage of the process, cannot be separated in the following step to be included in different groups. This is both the strength and the weakness of the hierarchical algorithms. The fact that each aggregation decision is permanent strongly reduces the number of possibilities to be considered, but it does not allow to improve the classifications obtained in each step.

Table 1.
List of indicators for each category

Category A: Indicators of the economic and productive structure

- A1: *Per capita* GDP (1991)
- A2: Ratio of employment in agriculture (1991)
- A3: Ratio of employment in industry (1991)
- A4: Ratio of employment in services (1991)
- A5: Average dimension (employees) of local units (1991)

Category B: Structural indicators of agriculture

- B1: Environment production ability (EPA)[7] (1990)
- B2: Gross saleable production per UAA hectare (1990)
- B3: Average farm area (1990)
- B4: Average standard gross margin per farm (1990)
- B5: Average standard gross margin excluding farms smaller than 1 hectare of UAA (1990)
- B6: Standard gross margin per agricultural working unit (1990)
- B7: Area under vines as a percentage of UAA (1990)
- B8: Farms with vineyards (1990)
- B9: Farms with vineyards for DOC and DOCG production (1990)
- B10: Area under vines (1990)
- B11: Area under vines for DOC-DOCG wine production (1990)
- B12: Private cellars producing wine in the 1994-95 campaign
- B13: Total wine production in private cellars in the 1994-95 campaign
- B14: Table wine production by private cellars in the 1994-95 campaign
- B15: DOC-DOCG wine production by private cellars in the 1994-95 campaign
- B16: IGT wine production by private cellars in the 1994-95 campaign
- B17: Number of "enotecas"/wine tasting shops (1995)

Category C: Demographic structure indicators

- C1: Ageing index (1991)
- C2: Social dependence index (1991)
- C3: Turnover ratio (1991)
- C4: Failure index for mandatory school (1991)
- C5: Success index for the secondary school final exams (1991)
- C6: Activity ratio (1991)
- C7: Unemployment ratio (1991).
- C8: Youth unemployment ratio (1991)
- C9: Demographic trend 1981-1991
- C10: Population equivalent (1991)
- C11: Ratio of female participation to work force (1991)
- C12: Density of resident population (1991)
- C13: Accessibility of resident population in 30 minutes (1991)[8]

[7] EPA is defined through the classification of territories into nine classes with respect to the different abilities of the essential biotic elements to sustain production processes. This variable is derived by merging geological, climatic and morphologic data. An indicator at the municipality level is then determined by weighting the areas of the nine detected classes.

[8] Population able to access any point of the region within a given time span – 30 minutes here. The index was obtained through a mathematical model for simulating the mobility conditions.

Category D: Economic and productive dynamics indicators
• D1: UAA change (1982-1990)
• D2: Number of farm change (1982-1990)
• D3: Average farm size change (1982-1990)
• D4: Employees in agriculture change (1982-1990)
• D5: Employees in industry change (1982-1990)
• D6: Employees in services change (1982-1990)
Category E: Indicators for the tourism sector
• E1: Bed ratio – hotels (1991)
• E2: Bed ratio – other accommodations (1991)
• E3: Bed ratio – farm accommodation (1995)
• E4: Stays - hotels (1991)
• E5: Stays – other accommodations (1991)
• E6: Number of farm accommodations (1995)

The differences among hierarchical algorithms just lie on the methods for defining the distance between clusters which drives the aggregation. The most known methods are those of the single linkage, the centroid method and the Ward method. The Ward method is particularly interesting, as it works in order to gather, in each step of the process, the two groups returning the minimum increase to the variance within. The Ward method is used in this analysis. The dendrogramme of the aggregation process for the seventy Romagna municipalities is reported in appendix 1.

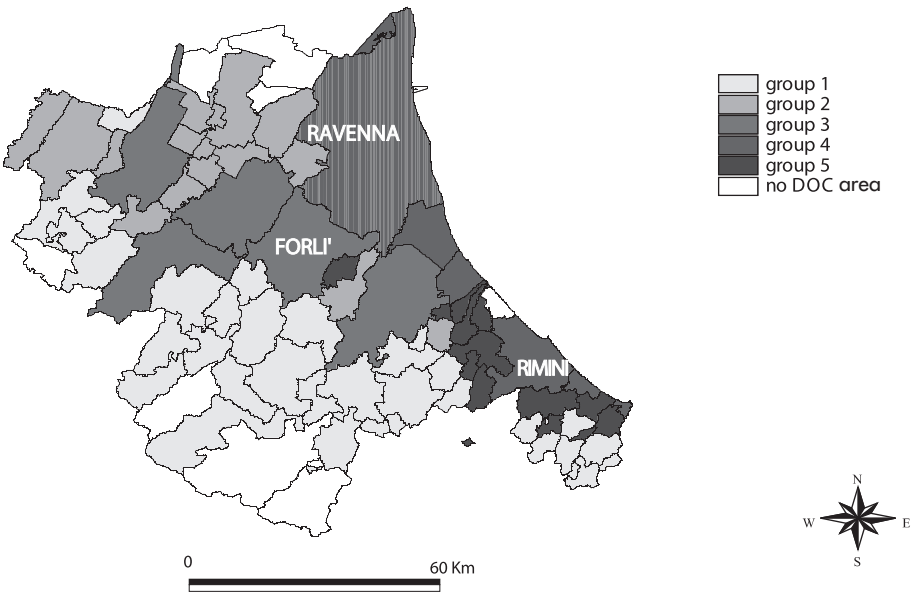
After detecting *n* potential classifications, the optimal one needs defining. In order to identify the optimal number of clusters, there are no standard procedures ensuring optimal results. The distance between groups joined in subsequent steps is a useful indicator. It allows to set the number of groups by observing the step when the aggregation distance is higher than a given limit. Otherwise, one may choose the number of clusters corresponding to an evident break in the series of the distance values (Fabbris, 1997). It is, however, advisable to test different situations and choose the number of groups while also considering the phenomenon and the objectives of the analysis. As the data presented in appendix 2 shows, the relative increase in the distance values is higher in the steps going from six to five clusters and from four to three clusters and the possible "optimal" solutions are those with three or five clusters.

The Results

The five clusters derived from the application of CA to the territorial indicators highlight a good degree of contiguity, allowing to identify five main homogeneous areas (see figure 2). This is the first interesting

result in the study, as it allows to derive some specific indications on each area and to make some hypotheses from which to plan an integrated project on wine tourism.

Figure 2. **Cluster Analysis Results on the DOC Municipalities in the Romagna Region**



Group 1

The first group may be termed as the "**less fortunate hilly region of Romagna**", as the thirty municipalities grouped here are situated almost exclusively on the hills and their per capita gross domestic product (GDP) of Italian Lire 21 million is way below the regional average[(9)]. The population of this area is 85,036 – equivalent to 85 % of the total area under study – and is known as having the highest index of social dependence of 52 % among the five identified clusters, 7 % above the regional average. Another interesting fact is its extremely low density of population, about 51 inhabitants per square kilometre. A large proportion of the labour force, almost 17 %, is employed in the agricultural sector, whereas the service sector, as it can easily be noted, is less developed than in other areas. In fact, this sector's employment level represents about 42 % of the total labour force in this region, against an average of 57.7 % for the whole of Romagna.

In the agricultural sector – and especially in the wine sector – the gross final product per utilised agricultural area (UAA per hectare) is the lowest of the five identified clusters with just It. Lir. 4.4 million which

[(9)] A more in-depth presentation and discussion of the CA results is Ravagli (1998).

added to It. Lir. 15.2 million the total final income per farm is around half of the regional average, thus confirming that this area is rather poor. Municipalities as Casola Valsenio, Roncofreddo, Mercato Saraceno, just to quote some, were indeed eligible under the objective 5b.The grape growing sector, in absolute terms and given the extension of this area, reaches rather relevant levels with 4,338.83 hectares, even if in relative terms this represents just 5.9 % of the UAA. It is interesting to note how almost 45 % of this area (1943.5 hectares) is destined to grape growing for DOC and DOCG wines. The wine production is however rather low, with about 17,000 hectolitres, representing 1.3 % of the Romagna production.

In such a hilly area, where the quality wine grape growing is important and where some kind of tourism related to the countryside already exists – as evidenced by the presence of almost 30 "agro-tourisms" (*i.e.* farm accommodations for tourists) – there certainly are ideal conditions for building an ambitious project such as a wine route. A route that, in this case, can play an essential role in boosting the local economy, promoting employment and especially allowing the farmers to diversify and increase their income sources.

Group 2

This cluster includes 16 municipalities with a total of 145,388 inhabitants and a *per capita* gross product of It. Lir. 27.5 million. It can be described as the "**group of big private wine makers**" as this area produces almost 80 % of the total wine production from private cellars in Romagna and more than 50 % of the regional production. It is easy to understand why the agricultural sector in this area is quite well developed, as confirmed by the 14 % share of farm labour in the total labour force of the area and especially by the figure on the average gross standard income per farm, which is It. Lir. 34.1 million against the regional average of It. Lir. 29.2 million. Another indicator which confirms the wealth of this sector is the average gross final product per UAA hectare, It. Lir. 8.3 million, a record well above the regional average of It. Lir. 6.2 million. A further positive performance of this area is its unemployment rate of 6.3 %, – the lowest in Romagna. Another relevant aspect is the ageing index which at 173.4 % is the highest of the five clusters, but quite close to 170,9 % of the regional average.

The wine grape growing sector of this group tends to favour wine production, as its 217 private wine makers produce 1,067,687 hectolitres of wine *i.e.* more than 50 % of the regional production. Besides this important wine processing structure, there is also a big number of co-operatives which boosts even more so the already substantial wine production of this area. This huge production is broken down as follows: 93.7 % (1,000,000 hectolitres) is table wine, 4.6 % (48,840 hectolitres) is table wine with IGT (Typical Geographic Indication) and 1.8 % (18,846 hectolitres) is DOC and DOCG.

Group 3

This cluster includes just five municipalities and can be defined as "**the rich Romagna**". Its *per capita* average GDP of It. Lir. 30.3 million is the highest among the five identified clusters and is also It. Lir. 2 million above the average regional level. In this area, where 322,537 people live, *i.e.* more than 8 % of the total regional population, there is a developed agricultural sector, next to an equally strong industry and service sectors. Employment is mainly in agriculture (10.4 %) and services (56.9 %). The unemployment rate is slightly below 8 %. The UAA is 74,964.4 hectares which represents more than 6 % of the total UAA in Emilia-Romagna. Its gross final production per UAA hectare is It. Lir. 10.6 million, the highest in Romagna and almost the double of the regional average which thus confirms the prosperity of this area.

Another interesting fact is the existence of 7,698 farms with vineyards; 1,641 of which – more than 15 % of the farm population in the region – also grow quality grapes for the production of DOC and DOCG wines. This production requires an area of 9,456 hectares and accounts for more than 20 % of the total vineyard for quality wines in Emilia-Romagna.

The private production of 233,019 hectolitres wine, is broken down as follows: 68.6 % or 159,835 hectolitres is common table wine, 6.1 % or 14,233 hectolitres is DOC-DOCG wines and the remaining 25.3 % or 58,951 hectolitres is IGT table wine. Wine production in these five municipalities accounts for more than 27 % of wine with Typical Geographic Indication, mainly due to over 52,000 hectolitres from Imola. Moreover, there is just 3 % of the total private production of DOC and DOCG wines in Emilia-Romagna, despite the extensive presence of farms and vineyards for quality wine production.

Like in the municipalities of cluster 2, there are cooperatives and private cellars in this part of Emilia-Romagna. Faenza and Forlì own cooperative cellars with a storage capacity of more than 500,000 hectolitres and in such places, including Brisighella where over 30 % of DOC and DOCG wines are produced, a project for wine route would well contribute to wine production and promotion of wines with designation of origin, such as Albana di Romagna DOCG produced by the local wine makers.

Group 4

This area can no doubt be defined as "**the tourist area of Romagna**", composed of municipalities on the Adriatic coast. With its 357,512 inhabitants in only six municipalities, it is the most populated among the five identified clusters and also has the highest population density of 381.2 inhabitants per square kilometre, well above the regional average of 228.4 inhabitants per square kilometre.

As tourism is its main economic activity, it is not surprising to note that 70 % of the labour force is in the service sector. This developed tourism area offers accommodation up to almost 167,000 beds, which represents 46 % of the total Emilia-Romagna. About 17 million tourists are hosted in this area on average each year. Its unemployment rate of 12.4 % is about the double of the regional average. This value should, however, be explained by the fact that employment in the service sectors is mainly seasonal. It is interesting to note that in this area there is the lowest dependence index of 41 %.

It can be noted that the UAA is around 56,500 hectares, with an average of It. Lir. 5.4 million per hectare gross final production, a value slightly below the regional average, but well below the It. Lir. 7.3 million Romagna average. As far as the grape growing sector is concerned, this cluster includes an area under vines of 4,159 hectares, about 6 % of the region, with just 567.4 hectares devoted to grape growing for quality wines. The wine production by the 17 private wine makers, including a good 15 only in the municipality of Rimini, is rather low and with about 7,600 hectolitres representing just 0.6 % of the private production in Romagna.

Group 5

This group can be defined as the "**DOC hill of Romagna**" as these municipalities are strongly dedicated to growing quality wine grapes. It includes 13 municipalities, where 104,835 people live, with a population density of 376.5 inhabitants per square kilometre, a figure well above the regional average. The *per capita* GDP is It. Lir. 25.5 million. Employment rate structure is exactly the same as the regional one, but, with respect to Romagna, there is a larger number of workers in the manufacturing sector. There is a high unemployment rate of 10.9 %, more than 3 points above the average of Emilia-Romagna. In the agricultural sector, there is a UAA of 18,089 hectares, representing slightly more than 1 % of the regional one.The gross final production per UAA hectare is It. Lir. 7.5 million which is quite similar to the average in Romagna. The situation is very different for the standard gross income per farm which is It. Lir. 12.5 million, representing around half of the regional average.

Most are grape quality growers in this group. A good 14.7 % of farms grow quality grapes for the production of DOC and DOCG wines. Moreover, these vines cover 47.6 % of the total area under vines in this zone, a relevant figure comparable to the regional one of 29.7 %. The private production of wine is rather small, as it constitutes just 1.4 % of production in Romagna. This relatively low value however means it is no less than 15.8 % of the quality wine production of Romagna and 1.8 % of the whole region.

This part of the Romagna region is the one that could better benefit from a wine route. Besides already being quality wine producers, there

is, too, some kind of countryside tourism as evidenced by the presence of a large number of agro-tourism farms. A wine route in this area could be profitable for two reasons. First, the project could allow for the development of the local economy, by creating job opportunities to lower somehow the 10.9 % unemployment in the area. The second reason is that a wine route would serve to promote the DOC local wines, such as Sangiovese and Trebbiano. Moreover, the proximity of this area to the Adriatic coast should enable tourists to have access to the wine route. In other words, wine tourism should complement sea tourism, rather than be competing each other as might be the case with group four.

Some relevant considerations

This paper primarily aimed at projecting incentives for an integrated social and economic programme for rural development in the Emilia-Romagna region. The focus is specially in the vineyard areas of seventy municipalities divided into five groups, according to their homogeneous characteristics using the CA method. The one important feature common to all five groups is their being Sangiovese-DOC-producing areas and therefore meeting the condition of a wine route.

Data gathered in this study enabled the authors to identify, within the areas, the feasibility of integrating projects that would promote and enhance quality wine production, favour employment, offer diversified tourist activities and, in general terms, promote overall development in the areas.

The identification of micro-differences in these five groups should help to decide what policies and measures might apply best to certain groups.

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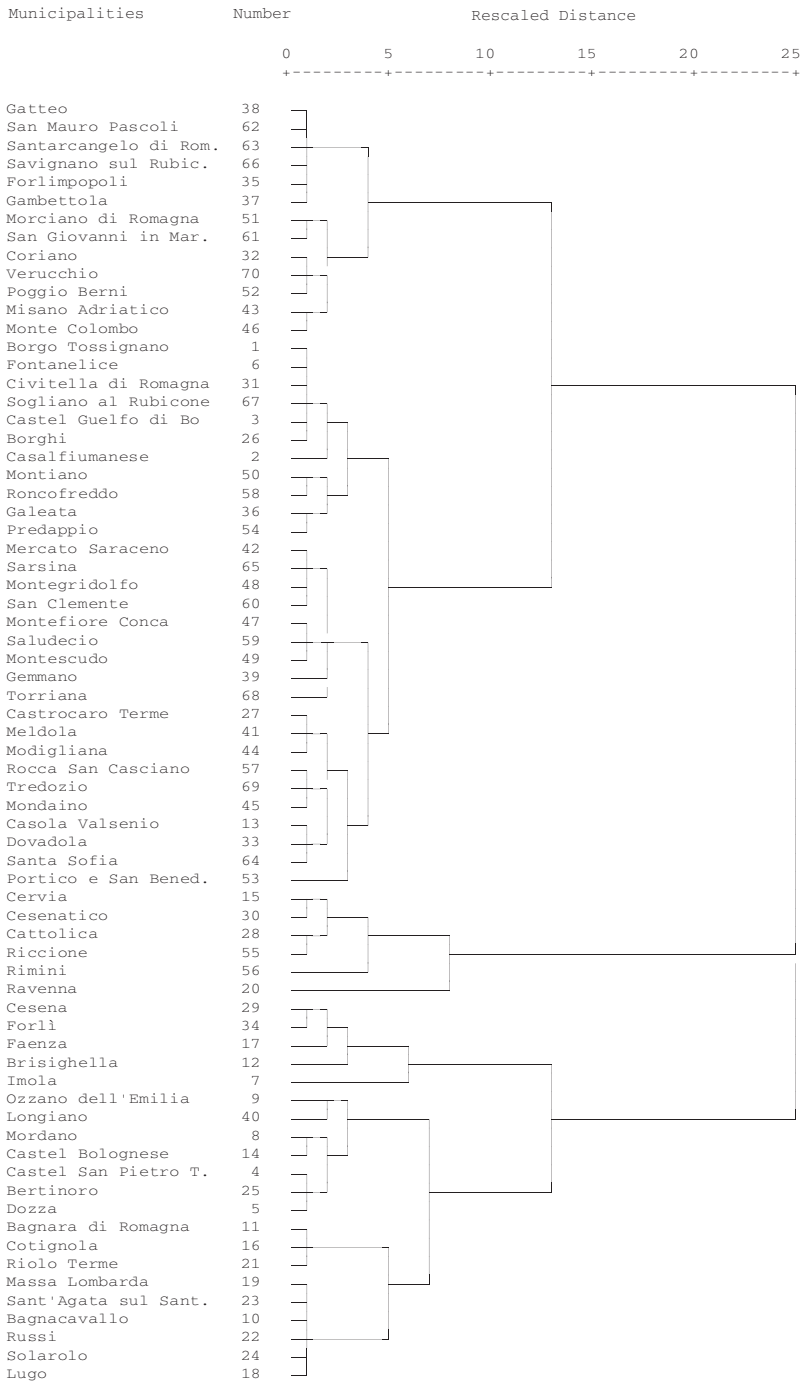
APPENDIX

1. Dendrogram of the aggregation process for 70 Romagna municipalities



GROUP 1: BORGO TOSSIGNANO, CASALFIUMANESE, CASTEL GUELFO DI BOLOGNA, FONTANELICE, CASOLA VALSENIO, BORGHI, CASTROCARO TERME E TERRA DEL SOLE, CIVITELLA DI ROMAGNA, DOVADOLA, GALEATA, GEMMANO, MELDOLA, MERCATO SARACENO, MODIGLIANA, MONDAINO, MONTEFIORE CONCA, MONTEGRIDOLFO, MONTESCUDO, MONTIANO, PORTICO E SAN BENEDETTO, PREDAPPIO, ROCCA SAN CASCIANO, RONCOFREDDO, SALUDECIO, SAN CLEMENTE, SANTA SOFIA, SARSINA, SOGLIANO AL RUBICONE, TORRIANA, TREDOZIO

GROUP 2: CASTEL SAN PIETRO TERME, DOZZA, MORDANO, OZZANO DELL'EMILIA, BAGNACAVALLO, BAGNARA DI ROMAGNA, CASTEL BOLOGNESE, COTIGNOLA, LUGO, MASSA LOMBARDA, RIOLO TERME, RUSSI, SANT'AGATA SUL SANTERNO, SOLAROLO, BERTINORO, LONGIANO

GROUP 3: IMOLA, BRISIGHELLA, FAENZA, CESENA, FORLÌ

GROUP 4: CERVIA, RAVENNA, CATTOLICA, CESENATICO, RICCIONE, RIMINI

GROUP 5: CORIANO, FORLIMPOPOLI, GAMBETTOLA, GATTEO, MISANO ADRIATICO, MONTE COLOMBO, MORCIANO DI ROMAGNA, POGGIO BERNI, SAN GIOVANNI IN MARIGNANO, SAN MAURO PASCOLI, SANTARCANGELO DI ROMAGNA, SAVIGNANO SUL RUBICONE, VERUCCHIO

2. Absolute and percentage changes in the joining group distances for the solution from 15 to 2 groups

Number of groups	Absolute change in distance with respect to previous step	Percentage change in distance with respect to previous step
15	698.20	7.04
14	747.38	6.68
13	797.29	6.99
12	853.06	7.18
11	914.27	7.18
10	979.93	7.15
9	1049.95	7.26
8	1126.15	7.70
7	1212.90	9.50
6	1328.13	8.76
5	1444.46	14.25
4	1650.29	17.74
3	1860.49	21.80
2	2266.16	18.17
1	2677.90	-

Source: own calculations