



Munich Personal RePEc Archive

**Social Networks and Supply chain  
Management in Rural Areas: A Case  
Study Focusing on Organic Olive Oil**

Medicamento, Umberto and Degennaro, Bernardo

University of Bari

2006

Online at <https://mpra.ub.uni-muenchen.de/14558/>  
MPRA Paper No. 14558, posted 12 Apr 2009 04:43 UTC

# Social Networks and Supplychain Management in Rural Areas: A Case Study Focusing on Organic Olive Oil

U. MEDICAMENTO  
B. De GENNARO

**Poster paper prepared for presentation at the  
International Association of Agricultural Economists Conference,  
Gold Coast, Australia, August 12-18, 2006**

*Copyright 2006 by U. MEDICAMENTO and B. De GENNARO.. All rights reserved.  
Readers may make verbatim copies of this document for non-commercial purposes by any  
means, provided that this copyright notice appears on all such copies.*

## **SOCIAL NETWORKS AND SUPPLYCHAIN MANAGEMENT IN RURAL AREAS: A CASE STUDY FOCUSING ON ORGANIC OLIVE OIL**

*Key Words: organic olive oil supply chain, network, relationships.*

### **Abstract**

In recent years, due to the growing supply of organic production, the economic performances and the competitive advantages of the farms, have become more dependent on network organisations in the supply chains. This evolution requires methodological approaches able to capture all the variables involved in the generating value processes. Our aim is to show that different structure of social networks – which grows on different positions in terms of achieving common goals and sustaining and developing norms and networks for collective action - is helpful for successful uptake of socio-economic processes and then in taking market choices and in framework shaping of supply-chain in rural areas. “The importance of understanding formal and informal organizations and their contribution to the construction of social capital is necessary to perceive how people mobilize and acquire a wide range of assets and gain access to decision making processes, technologies, resources and markets, and benefit from them” (D.Parthasarathy and V.K.Chopde, 2000). So the network dimension of the supply-chain becomes a key element, and enables us to understand better the competitive performances of firms. The relationships of firms, among intangible assets, are recently considered one of the main sources of profit. So the relational capital forms the essence of the value of the firm and it is advantages on the whole coming out by occupying a specific position (role) in the network of social relationships, the social network (Costabile, 2001). The goods present in a context are not enough to explain the wealth of a firm or a supply chain or a sector, so it is necessary to understand the nature of exchanges and how do they work trough the network. For these reasons our study compares supply chains of organic olive oil in Italy and Spain using the Social Network Analysis. The data was collected by survey in two areas: the Sierra de Segura (Andalucia, Spain) and the province of Bari (Puglia, Italy). By the results of our study we can assert that the Sierra de Segura shows a simple network which allows, trough a

cooperative organisation, to generate value for the farms. On the other hand, in the province of Bari the network organisation is quite disperse, denoting a lack of organisation which brings to a low level in competitiveness of the whole supply chain. At the same time, firms with a good economic results have also a central position in the network.

### **Introduction/Problem**

The organically cultivated olive tree area in Italy amounts to 94,425 hectares (Biobank, 2004). Whereas in Spain, it's 91,000 ha (MAPYA, 2003), which is not a long way off. The potential production of Italian organic olive oil is more than 56,000 tons, while the Spanish one is about 40,000 tons (De Gennaro, 2004). Having chosen Spain as a comparison above all has to do with the rapid development experienced in this sector in recent years. The trend of Italian organic olive oil sector is decreasing (from 106,754 ha in 2001 to 94,000 ha now), while in Spain this sector is rising (about 1,800 ha in 1993 and 91,208 in 2003). From the above-mentioned analyses, it emerges that the two supply chains examined are very different in their organization. The Sierra de Segura (SdS) is characterized by a deep cooperation spirit, with a simple, not very articulate structure, which makes it possible for the product to reach the consumer after a few steps. The area covers 1.400 ha with a production of 700 tons of organic olive oil (our investigation, 2004). Farmers are associated in few processing co-operatives, which in turn depend on a single co-operative which is concerned with the commercialization of products. Only a small percentage of this production is sold on the Spanish market (due to the scanty internal demand); most of it is sold on foreign markets. On these markets it is sold either bottled with its own brand or in bulk, above all for cosmetic industry. The premium price for organic olive oil in S.d.S. ranges from 30-35% for loose oil to 100% for bottled oil; exports are growing and last year, 63% of organic olive oil from Andalusia exported in Japan came from this region.

The supply chain network of the S.d.S. is compact and rich in relationships. Institutional stakeholders, with some exceptions, effectively spread know-how and competence and interface with the sector. There is good participation, the choices are discussed and the "organic feeling" is shared and felt by almost all the stakeholders. The collective spirit comes out probably from shared experiences of working out of a project of development with help by a common history and by

local institutions, even if without obstacles and objections. So that it has taken shape in few co-operatives and, in particular, the only one dealing with commercialization, do in fact represent a strong hierarchical element. However, no lobbies can be found that exert a resource centralization coercitive power, although such a compact network can represent an obstacle to the constitution of different organizational dynamics in the supply. The conformation of the network of the Sierra makes it possible to have a contractual power. Years ago, this was probably unexpected. It reduces the added value of external commercialization firms and guarantees high efficiency of co-operatives, which manage to sell the whole production at a remunerative price. Sierra de Segura is compensating, in a few years, for a past as an underdeveloped region, through commercial development running parallel to social one. The Province of Bari (P.o.B.) has a fragmented productive sector, as in the agricultural, industrial and commercial phase. The area covers 8.802 has with a production of 4.174 tons (Int. Observatory on Organic Olive Oil, 2004) Brands are numerous, the product is subdivided in many small quantities and few large quantities. The most important stakeholders are above all traders, commercial macro-organizations and some co-operative oil mills, which concentrate the supply and large industrial groups and large-scale organized distribution, both of which are extra-regional. Apart from these, there are also firms that have their own brand, which have managed to place themselves on the market in a competitive way. The incidence of bulk on bottled is high, the experience of co-operatives is not as preponderant as the individual one and, also in the case of associations, this does not exclude the simultaneous management of private interests. The associations are more than one and of various kinds, the relationships are not always linear, the hierarchies present are not apparent to all the stakeholders in the supply chain. Among other things, they do not always share experiences and information with each other, or are functional to the growth of the sector, since they sometimes do not favour communication and sharing of interests. The farmers are more subject to the market. Not all of them have a high contractual power. Some of them deal with organic and conventional production at the same time and they do not have a unique business strategy: some count on the brand, on market niches and on

high quality (choice which leads to good results in many cases), while others rely on quantity, others on both. Competition is very high. There are cliques and lobbies, sometimes extensions of lobbies of the conventional sector. The firms reach the market in different ways, and the same thing happens with single producers. The general profit margin is lowered by the greater quantities of organic olive oil sold in bulk, and collected then by few, often extra-regional, stakeholders, dealing with packaging, sale and/or distribution, or of further selling of olive oil bulk. Organically cultivated hectares and the number of operators in this field have decreased in the last three years and many of them, when interviewed, report decreasing profits and lack of trust in the sector, with the exception of some more competitive farmers. The relationship with institutions (although there are some exceptions), associations of farmers and certification institutions is not as intense as in the Sierra de Segura. Vertical – especially downward – distribution of information is difficult whereas the participation in the decisions and choices is scarce – when existent – and, in some cases, completely absent. In this scenario, the farms' efficiency in managing their own relational capital is not the same for everyone, and this leads, in the case of scarce effectiveness, to a marginal position in the network and not always satisfactory economic results.

## **Methodology**

The approach chosen for this study is the Social Network Analysis (SNA). This method allows a deeper analysis of the supply chain, since it gives the opportunity to understand stakeholders and sizes that are not normally analyzed in this kind of investigation. Actually, in this case it would be more correct to speak about network analysis than of supply chain analysis. What has been specially emphasized is, thus, the ties between the stakeholders: personal as well as commercial ties – in a word, relational. Indeed what becomes more and more relevant in defining value is the role of intangible assets and of a category of resources which underlies them: enterprise relationships, to the extent that relational resources have been recently regarded as one of the major sources of wealth – especially relationships with supply. The relational capital constitutes, thus, the essence of

enterprise value. Economic performances of individuals and of business are indeed remarkably influenced by their social performances and by the context in which their economic activity is “immersed”. “Social capital, defined as the ability to develop and use various kinds of social networks – and the resources that become available thereof– are central in understanding how farm households, and the farming community in general, adopt and benefit from improved agricultural technologies. Earlier studies have shown the importance of collective action for the successful uptake of technologies” and that “...these innovations could be in the areas of technology, institutions, or socio-economic processes (D.Parthasarathy and V.K.Chopde, 2000). As Portes (1998) observes, ‘Whereas economic capital is in people’s bank accounts and human capital is inside their heads, social capital inheres in the structure of their relationships’. The uniqueness of social capital is that it is relational. It exists only when it is shared. Further the concept of social capital has been defined as the whole of advantages deriving from holding a specific position in a network of social relationships and, from the business point of view, it represents the current and potential status of the relationships with external stakeholders, expressing its value in aiming at competition (Costabile, 2001). Material goods present in a context are not enough, thus, to explain the richness of a business (or of a sector, or a supply chain), but it is necessary to also understand the nature and functioning of exchanges that take place in the network of relationships. Before passing on to the results of the study, it will be appropriate to describe the tool used for investigation. SNA consists in an analysis of the relationships existing between elements of a whole, called nodes or stakeholders. The choice of the nature of the relationship is fundamental, since it is the critical element that, *a priori*, determines the exclusion or inclusion of certain stakeholders. Furthermore, this method is interesting for the capacity of being known by intuition: the structure of ties indeed helps explaining and foreseeing the behavior of the stakeholders (Piselli, 2001). Moreover, network analysis embodies two relevant features of social action: every stakeholder is part of a ‘system’, which influences its actions and decisions, and within the ‘system’ there are different roles and positions as regards power, influence, information transmission, etc.

Substantially, the method is based on the representation of the network in two different modes: matrix and graphic. In the former, relations are outlined by using binary values – that is, with a 1 if the relationship exists, with a 0 if not. This mode is functional for quantitative and qualitative determinations in the shape of sociometric and descriptive indexes and sizes (Guidicini, 1998). These data, obtained through matrix calculations, provide information about the density of the relationship, their distribution, the presence of under-networks, of groups (*cliques*), and isolated individuals. It is also possible to study how the stakeholders are connected with the resources, thus, understanding in what ways and to what extent they control them; in what ways and to what extent they take advantage of them, and how effective the network is in allocating resources and exploiting them. The graphic elaboration of the network, which is developed as a consequence of that of the matrix, results in the so-called sociograms, in which the stakeholders are represented as dots and the relationships are lines – or arrows if the relationship is oriented. For the construction of the network it is necessary to make a list, as complete as possible, of the nodes, and detect the presence of relationships between them. In this phase of the project a twofold approach to the choice of stakeholders has been chosen: reputational as well as positional (Scott, 1991). Thus, ‘informed people’ have been interviewed – that is, a group of individuals who know the network very well. The list obtained has been used for preparing a questionnaire, presented then to the stakeholders. In the questionnaire, for each single node the presence or absence of a relationship with other stakeholders has been reported. For both options, it was also possible to qualify the relationship as commercial, communicative, mediation and patrimonial. The data obtained in this way have been reported in two spreadsheets, one for each supply chain, and ordered, for each one, in a square matrix, called adjacency matrix, having the stakeholders as indexes. As for the mathematical elaboration of data, Ucinet V.6 has been used, while NetDraw has been used for the graphic representation.

## **Results and brief discussion**



The mean (effective ties divided by potential ties) of the two networks is respectively 0.735 for the Sierra and 0.03 for the Province of Bari and the standard deviation is 0.44 in the first case, 0.16 in the second. The mean highlights a high difference in relational effectiveness, in favour of the Sierra, while the standard deviation indicates the variability of distribution of ties, and, thus, an higher uniformity for the Sierra and a higher variability for the province of Bari. The difference that can be noticed between the values of these indexes is largely attributable to the different numerosness and extension of the two networks, and this is why, for the following comparisons, reference is made to absolute (or 'normalized' values) such as Network Centralization Index (N.C.I.) (more details in table 1). The investigation of centrality (Freeman's degree centrality measure) provides, first of all, the N.C.I., which measures in % the similarity with the most centralized star-shaped network. For the province of Bari this value is 61.64%, while it amounts to 3.71% in the Sierra. The same index, expressed as in and out degree, (referring to ties coming toward and out each actor) measures 28.9% and 19.08% in one case and 37.1% and 35% in the other, confirming the data, though highlighting a more marked tendency of the Sierra network towards a 'sink' behaviour of its stakeholders rather than 'source' in the management of the information flows. Compared to the values of the Freeman's betweenness centrality, in the Sierra de Segura almost half the stakeholders exceeds the average value (which, normalized for the network, amounts to 2.652). In the Province of Bari, slightly more than 10% of the stakeholders exceeds the mean value of this index (which, normalized, amounts to 0.636). It is important, at this point, to highlight how in this small group, besides large-scale traders, industrial groups, commercial macro-organizations, also the stakeholders who have a more important 'political' value – the firms which have managed to place go on the market on their own and have obtained very good commercial results. Besides the number of farms involved and their diversification degree (from a legal point of view), the two networks differ for the quantity and quality of actors involved, pertaining to spheres other than the entrepreneurial one. Also in this case, the network of the Sierra is much simpler. Substantially, few institutional actors can be identified and, among them, some with a very active role in local development; three certification institutions,

one of which is at the margins of the network and another is a central actor of the Sierra; some associations of various kinds, and two category associations, one of which (AS.A.J.A. – Associaciòn Agraria Jòvenes Agricultores) is against the organic sector, but it is very active and has an ambiguous position.

### **Main results of the Network Analysis**

	<b>Sierra de Seg.</b>	<b>Prov. of Bari</b>
<b>nr. of actors</b>	<b>57</b>	<b>197</b>
<b>mean</b>	<b>0,735</b>	<b>0,029</b>
<b>std.dev.</b>	<b>0,441</b>	<b>0,167</b>
<b>average distance</b>	<b>1,265</b>	<b>2,4</b>
<b>distance-based cohesion</b>	<b>0,867</b>	<b>0,373</b>
<b>Freeman's betweenness</b>	<b>2,652</b>	<b>1,01</b>
<b>network centralization index (N.C.I.)</b>	<b>3,71%</b>	<b>61,64%</b>
<b>Freeman out N.C.I.</b>	<b>19%</b>	<b>35,90%</b>
<b>Freeman in N.C.I.</b>	<b>28,92%</b>	<b>37,14%</b>
<b>norm-out closeness</b>	<b>86,74</b>	<b>3,56</b>
<b>norm-in closeness</b>	<b>86,74</b>	<b>3,76</b>
<b>in closeness N.C.I.</b>	<b>30,37%</b>	<b>37,13%</b>
<b>out closeness N.C.I.</b>	<b>19,96%</b>	<b>35,90%</b>
<b>flow betweenness N.C.I.</b>	<b>0,71%</b>	<b>29,46%</b>
<b>presence of cutpoints</b>	<b>yes</b>	<b>yes</b>
<b>level of n-cliques</b>	<b>high</b>	<b>low</b>
<b>factions located</b>	<b>0</b>	<b>4</b>

table 1

The network can, thus, be divided into two political factions: one depending on the ego network of the most important certification institute and the other to the AS.A.J.A. Some stakeholders have, then, an intermediate role, in a different way. A clear idea comes from sociogram analysis in fig.1. Here we have a selection of the most representative actors inside the network in Sierra de Segura; firms (cooperatives) are very few, not-economic actors are quite involved, ties are dense and commercial relationships with external actors are concentrated in the upper grade cooperative. It's also possible to see that the commercial partners are GDOs, specialized retailers and exporters, while the percentage of direct sell to the end-consumer is very low. This makes clear how firms in

Sierra the Segura, with this structure of relation, have built a framework of the supply chain able to deal with GDOs and offer a product rich in services.

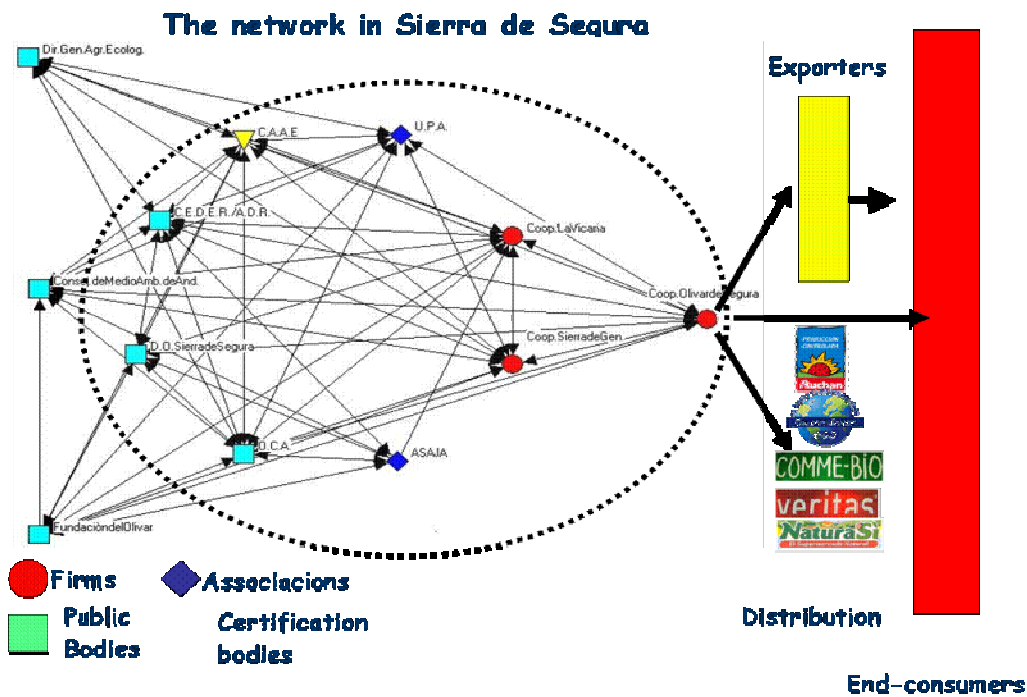


Image 1

The network of the Province of Bari is much more complex. Some big stakeholders can be identified, which mainly deal with conventional production and are in close contact with great industrial and distribution groups and category associations, which then interface, directly or indirectly, with the world of organic or with the Denomination of Origin. These stakeholders thus play a role which goes beyond the centralization of supply, and which seems to have much influence on the local market. The important certification institutions are substantially three, two on the territory and only one of these two with an egonet including the most part of the productive context and large-scale distribution actors. The institutional stakeholders are definitely less relevant than the equivalent ones in the Sierra. Lastly, there are traders, which are much less numerous than firms, and whose behaviour has been already described. Thanks to the cluster analysis, the network can be divided into four factions, including four different under-networks, depending above all from the relations between the commercial macro-organizations and the traders. One in particular

involves most co-operative oil mills, in which a large quantity of product is concentrated. The four factions are not completely independent from each other, but they partly overlap. In this context, the farms which have their own brand work in a different way and, relying on quality and on the differentiation of the product and on the quality of their relational capital, keep on increasing the income deriving from organic olive oil sales and invest more and more in the sector. These farms indeed have a very high degree of centrality and their egonets include stakeholders of the production sphere as well as of the commercial sphere, included in more than two factions at the same time. Sociograms helps us also in for the P.o.B.

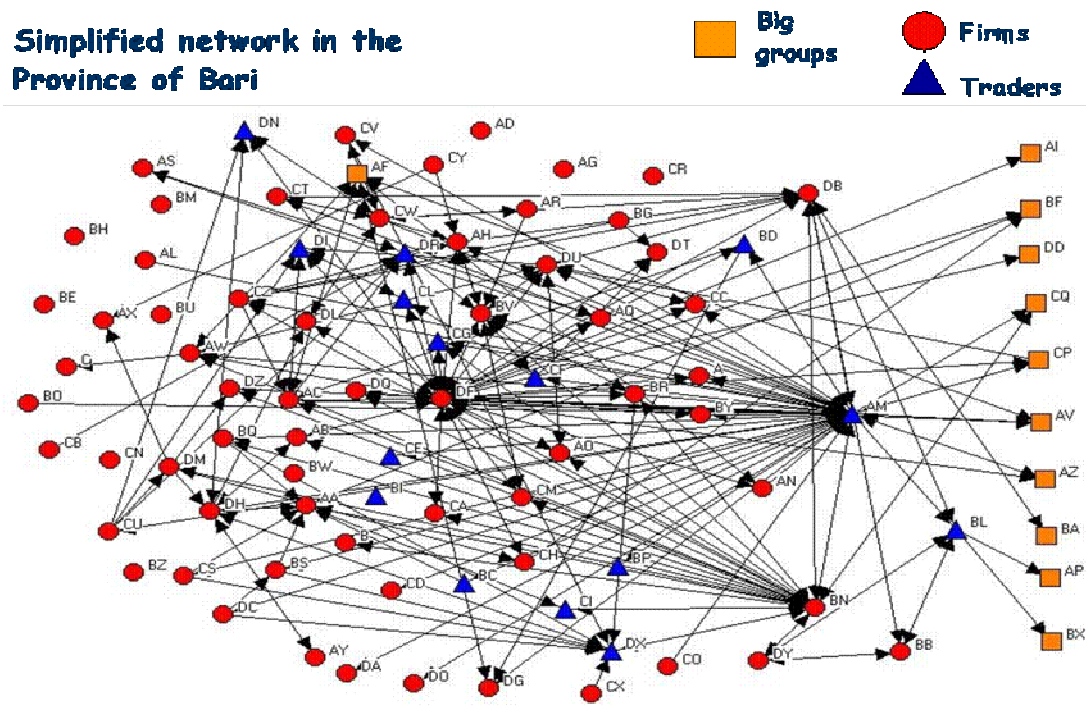


Image 2

Figure 2 shows the network of big groups (industrial companies and GDOs), traders and firms in the Province of Bari. It appears clearly disperse among firms, while traders have almost all contact with big group, especially one. There are not few firms “alone” and it is possible to recognize cliques and factions. This kind of network make it difficult for firms to have a supply management able to increase their contractual power with big groups, allowing other kind of actors to fill up this

empty space, often lacking of real economic profitable behaviour in terms of premium price. If we look at image 3 it makes clear the behaviour of local firms in the Province of Bari, showing the really few ties between them, which suggest a low shared information. All the firms at the borders have declared a debacle of their business within the last years, denoting a scarce efficiency, while central ones have a quite good position on the market of organic olive oil.

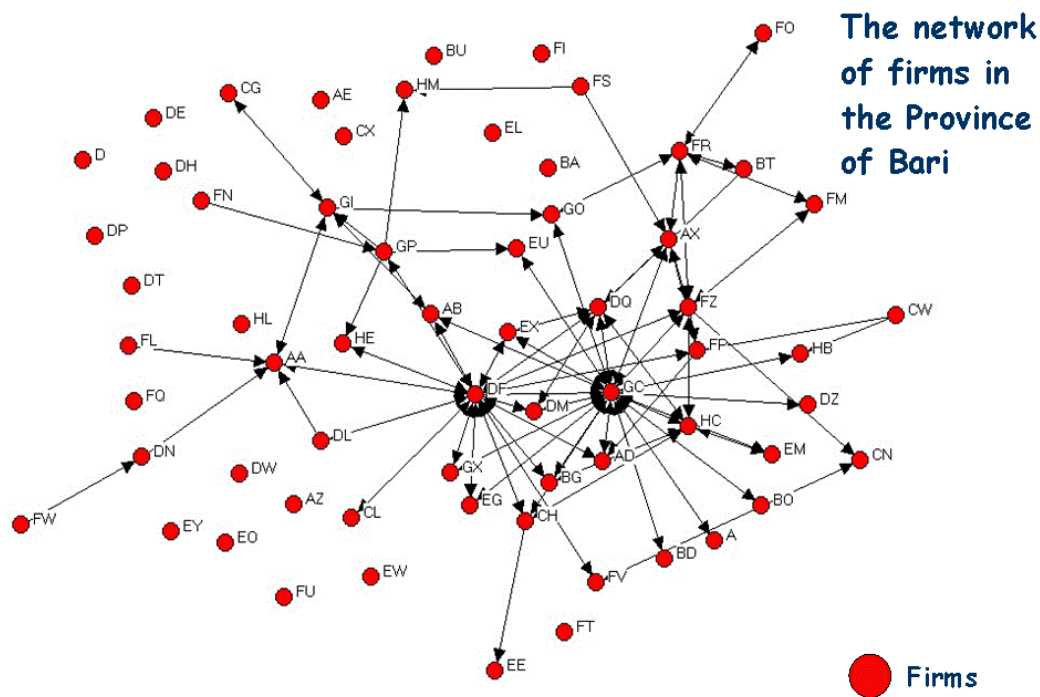


Image 3

## Conclusions

The results, in terms of network analysis, suggest two levels of conclusion. The first is a systemic conclusion, which highlights how a more equal distribution of informative flows between actors like in Sierra de Segura's network (Andalucia, Spain), favours the establishment of social mechanisms that, through the creation of a territorial identity and helping individuals to a collective action, assisted by local authorities, lead to the aggregation of stakeholders of the phase of production. They can thus elaborate common commercial strategies which increase their contractual power and the profitability of their work, and make them the promoters of sector policies, also in

agreement with central institutions and the sector's lobbies. In contrast, more dispersed networks with a higher rate of 'inequality' in the distribution of ties, like Province of Bari's network (Puglia, Italy) do not help such aggregation processes, but they favour the establishment of lobbies and speculations, that is the structure of information networks is inclined to follow a power law distribution, shaped by a preferential attachment rule, which - like in this case - can decrease the level of economic efficiency of the system and of the single firms. The second kind of considerations is more particularistic, and highlights how in a network such as the one of the Province of Bari the management of relationships takes on a much more decisive role in terms of competition than it happens in the Sierra, where, in contrast, the structure itself of the network hinders the interruption of informative flows and thwarts the competitive efforts aimed at establishing power groups, non-transparent commercial agreements and lobbies. This phenomenon is so apparent that firms with growing economic results are those who have a higher degree of centrality. The SNA, thus, allows the description and schematic representation of the relationships between the actors of supply chains, systems and networks. The different conformations that the relationship structure can give to these production organizations influences the efficiency of the system but also that of the firm, in a reciprocal relationship. The firm's relationship management capacity is thus decisive for obtaining short-term but, above all, long-term satisfying economic results. We can also assert (like emerged also in other works - see E.M. Estrada, 2005) the analysis of social structures - and by extension of the social capital inside - helps to take into account not only the processes of development within the rural communities, but also their ability and power to establish social and economic relations with external individuals, groups and stakeholders, so as the synergies between local institutions and their efficiency.

## **References**

Andrea Salvini *L'analisi delle reti sociali, una breve introduzione*, AIF, 2003.

B. De Gennaro, Proceedings of the International Forum Biol Prize, 2004, [www.premiobiol.it](http://www.premiobiol.it).

Biobank, *L'agricoltura italiana conta* – Ed. Biobank, 2004.

Cavazzani A. and Sivini G. (ed) *L'olivicoltura spagnola e italiana in Europa*, Rubbettino Editore, Italia, 2001.

Fortunata Piselli (ed.) *Reti, l'analisi di network nelle scienze sociali*; Donzelli Editore, 2001.

John Scott, *L'analisi delle reti sociali*, ed. it. Nuova Italia Scientifica, Roma, 1997 (S.N.A.. A Handbook, Sage Publ., London, 1991).

MAPYA Reports on organic farming in Spain, several years, Ministerio de Agricultura Pesca y Alimentación

D.Parthasarathy and V.K.Chopde, *Building Social Capital: Collective Action, Adoption of Agricultural Innovations, and Poverty Reduction in the Indian Semi-Arid Tropics*, Paper for the Research Theme “Escaping Poverty”.

M.Costabile, *Il capitale relazionale*, McGraw-Hill, 2001.

Eduardo Moyano Estrada, *Capital social y desarrollo en zonas rurales*, Instituto de Estudios Sociales de Andalucía (IESA, CSIC), IESA working papers series, 2005.

Paolo Guidicini (ed) *Nuovo manuale della ricerca sociologica*; Franco Angeli Editore, 1998.