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Innovation in Multiple Networks and Networks of Networks: The Case of the Fruit Sector in Emilia-Romagna

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ABSTRACT

In the paper we examine the issue of food systems in which farms participate in multiple networks that, for their part, tend also to be members of networks of networks. The issue is addressed through a descriptive analysis of the fruit sector in Emilia-Romagna (Italy). The farms in the area tend to join a different network for each product/product type. Innovation networks are embedded in commercialization or input provider networks, but separate (parallel) networks also exist, particularly for basic research activities. Networks of networks are largely a product of the cooperative system. The paper concludes by emphasising the need for further research in multiple networking strategies and the connection between commercialisation networks and innovation.

Keywords: Agro-Food Sector Networks, Agricultural cooperatives, Innovation

1 Introduction and objectives

Networks, and more specifically cooperatives and other similar associations, are key support structures for farms operating in the agro-food sector. Not only are they the main conduit for the commercialization of crops, and the provision of technical assistance and crop protection for many farms, they also provide significant support with regard to the concentration of demand, price support, loans, reduced costs, access to new markets and innovation. Farm households, in an attempt to maximize their access to available assistance, tend to turn to more than one network. Such networks are, for their part, also often members of networks of networks.

In this paper, we examine the phenomenon of multiple network participation and network of network aggregation, for a case study based on a descriptive analysis of the fruit sector in Emilia-Romagna (Italy). Tree production represents about one fifth of the Italian agricultural production (INEA, 2011), within which Emilia Romagna is one of the leading regions. Major strategic crops are peach, pear and kiwi. The local fruit system is historically characterised by the establishment of cooperatives, typically aimed at commercialisation, but which have expanded their role over time.

The connection between co-operation and fruit production is not a regional feature, but rather an important characteristic of the sector throughout Europe (Guzman et al., 2009). On the other hand, the role of cooperatives in innovation (process or product) has been discussed in the literature, generally identifying a positive role and a general contribution to increased welfare (Drivas and Giannakas, 2008; 2010). This role seems to be emphasised in times in which globalization, technological developments, and consumer concerns put pressure on farmers and food producers to enhance product innovation (Hendrikse and Bijman, 2002).

The paper is organised in two main parts in addition to this introduction. In section 2 we first briefly explain the methodology adopted. In section 3 we illustrate the networking structure of the fruit sector and concluding remarks are provided in section 4.

2 Methodology

This paper is based on a descriptive analysis of the sector actors and their network activity, supported by qualitative interviews on key components of the system. The interviews of the Emilia-Romagna fruit sector actors were carried out in the context of the NetGrow project. The primary purpose of the survey was to analyse and understand the success factors and barriers of network learning in formal and informal networking and to compare network learning between food companies of different company sizes and between the EU and the global stage. In particular, the activity involved mapping formal networks and identifying their role in innovation in EU food SMEs. In so doing, however, the survey also provided a range of basic information about the actors' overall strategies, particularly in terms of networking.

More in detail, the sector was mapped including data on its activities, size, geographical representation and industrial structure. The success factors and barriers with regard to network learning focused on innovation were then studied. Data was collected by way of in-depth face-to face interviews, carried out mainly in December 2010. The interviewees represented different types of network actors, typically representing the project's triple helix (business, research or policy makers).

For the specific case of the fruit sector in Emilia-Romagna (Italy), 10 subjects operating in fresh and processed fruit were interviewed, specifically: 4 farm households, 3 research institutes (one of which was a cooperative), 2 network coordinators (both of which are cooperatives) and 1 representative of the regional public administration.

The questionnaire was generally organized around the following contents: General profile of the network, Network inception, Network evolution, Network membership, Network configuration and Network ties, Network activity, Network governance and management, and Performance. It should be noted that such contents were adapted to the profile of the individual interviewees, in particular by distinguishing between the role of network coordinator, public body and individual network member (a category that included both farm households and cooperatives). This distinction was not, however, an easy one to make in the case of the fruit sector as several of the interviewees were in fact cooperatives that operate as networks on their own right and are members of other networks." Accordingly they could be seen as network coordinators in some cases and individual network members in others..

The results of the questionnaire phase were processed by simple text editing, and by eliciting the main messages concerning the connections between networking motivations, networking strategies and innovation.

3 Results

3.1 Fruit Sector Network structure and ties

The multiple ties between the various network actors in the fresh and processed fruit sector in Emilia-Romagna are depicted in Figure 1. Farm households are frequently members of more than one cooperative (either by virtue of the crops grown, or the need for extension services/technical assistance) on the regional or national level. The various cooperatives providing services related to the marketing of fruit or the provision of technical assistance are in turn members of larger cooperatives, often with national memberships and national and international commercialization, and may have as their members research institutes, university departments etc. Both levels of cooperatives are also generally part of networks created by, or serving the regional government, and may also participate in additional networks at the EU (or indeed international) level (particularly the larger ones) that focus on diverse issues, ranging from marketing, labelling, innovation etc.

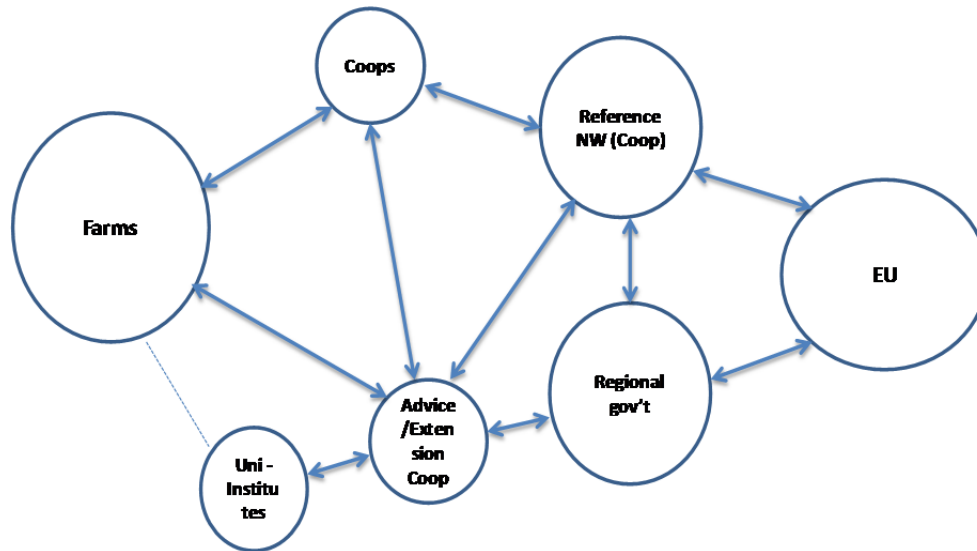


Figure 1. Fruit Sector Network ties (Emilia-Romagna, Italy)

Cooperatives specialise in specific crops/products. Although the large cooperatives in the region cover most fruits and vegetables, wine grapes tend to be the purview of specialised cooperatives that operate solely in the wine sector. Although the large cooperatives offer technical assistance and plant protection to their members, producers who are members of a smaller cooperatives may also be members of a cooperative that is specialised in extension services of this kind.

A noteworthy particularity of the fruit sector that was identified in the interviews is the varying layers of network participation. All of the subjects (not just the farm households) interviewed participated in more than one network, and several were members of networks on more than one geographical level (regional, national and international). Furthermore, the farm households, for their part, tend to be members of multiple networks that are directly related to the crops they produce. For example, a farm household may participate in a large agricultural cooperative for kiwis and pears, whilst participating in another for wine grapes. Farm households may also be members of separate networks for other important aspects of their operations, such as technical assistance and crop protection products. The network leaders interviewed represent networks that are either members of other networks and/or have members which are networks themselves.

3.2 Farm Households' perspective

The farm households interviewed represent small fruit farms in Emilia-Romagna, Italy. They range from approximately 9 to 16 hectares in size and the fruit grown includes pears, peaches, kiwis and wine grapes. Two of the farms also grow other crops, notably arable crops such as wheat. All of the farms are family-run businesses for which the farmer interviewed is the principal operator.

The relevant networks in which the farms are members are large agricultural cooperatives operating in the fruit and vegetable sector in Italy. The main networks of two of the farms are two of the largest agricultural cooperatives in Italy, with headquarters in Emilia-Romagna, and serving both the Italian and international markets. One of them belongs to a separate cooperative for wine grape production. The third farm belongs to a large competitor cooperative, also based in Emilia-Romagna and operating in the Italian and international markets. The interviewees indicated that they joined these specific networks largely due to the reputation and ability of the network to provide support to their businesses. One farmer made specific reference to the "avant-garde" nature of the cooperatives and their ability to contribute to his work by way of innovation.

As a result of his membership, and active participation, in a major cooperative one of the farmers has also created a separate network, together with the cooperative, the specialisation of which is technical assistance and crop protection products (pesticides).

The farm households noted that without the advantages provided by networks (mostly agricultural cooperatives) they do not believe that they would be in business today. The farm households noted that network support is particularly valuable with respect to the concentration of demand, price support, loans, cost reduction for inputs, access to new markets and innovation.

3.3 Cooperatives' perspective

The main cooperatives (in this case the actor closer to the role of Network Coordinator) interviewed in the case study noted that one of their principal challenges is sustaining their membership bases in face of an ageing membership without younger generation replacements, or younger members who question the value of the support provided by networks (and in particular cooperatives). The current economic challenges facing the fruit sector were cited (decreasing public support and changing configurations of networks due to the necessity to integrate more private sector members), as was the necessity to concentrate participation in the best possible networks in order to advance an organisation's mandate and values.

The two network leaders interviewed in the case study were agricultural cooperatives with headquarters in Emilia-Romagna (Italy) (hereinafter, Coop 1 and Coop 2). Coop 1 is a large cooperative, with approximately 8700 producer members and 45 cooperative members (for a total of 35,000 hectares of land under cultivation). It brings more than 850,000 tonnes of fruit and vegetables to market every year and has 90 processing centres and 150 technical experts involved in experimentation, technical assistance and quality control. It is noteworthy that member producers may belong to various separate cooperatives, depending on the crops they grow. An example provided during the interview was that of a member who produces both fruit and cereals, and who has ties with different networks for separate crops (i.e. member of Coop 1 for fruit, and another network for cereal crops). Coop 1 was created at the national level in Italy in 1994 through the amalgamation of several cooperatives, hence creating a large operating structure.

Coop 2 operates in one province of Emilia-Romagna and its mandate is essentially the provision of technical assistance, such as the delivery of plant protection products, fertilizer, seeds and irrigation and anti-hail support to member farms. It is also a member of a number of other cooperatives and has approximately 30 employees. It was created in the year 2000 by farms already active in the agricultural cooperative movement, given a perceived need for a more associative approach to the acquisition and promotion of technical support.

In terms of Network configuration and links with other networks, Coop 1 maintains ties with numerous other regional, national and international networks and collaborates with its two principal competitors on the development of mutually beneficial fruit sector innovations through the creation of a partnership. The innovation focus of the partnership is the identification of new fruit cultivars and their subsequent development, management and patenting. Indeed the results of this partnership, created by entities that are otherwise competitors in the market, constitute a large portion of the new varieties studied and developed by its founding members. In this case there are contractual relations between the networks, as well as with individual experts, such as breeders who provide advice regarding which new varieties are most suitable for specific environments. Coop 1 is a member of the cooperative referred to in the Research Institute section, a network involving large retail chains, and other networks focusing on technical support and promotion of Italian fruit in Italy and abroad. It is also a member of the Centro Servizi Ortofrutticoli (CSO) the mandate of which is "to create synergy between operators, with the aim of increasing competition in the Italian fruit and vegetable sector", and UNAPROA which represents cooperatives with respect to the role of European Union mandated Producer Organisations (PO). Coop 2 participates in other networks and has links with other cooperatives with similar and dissimilar and broader mandates, including a PO responsible for the marketing of fruit at the national and international level. These links are either informal or formal (contractual), depending on the circumstances.

3.4 Research Institutions' perspective

Representatives of three research institutes active in the fruit sector in Emilia-Romagna (Italy) were interviewed for the project.

The first is a unique network (cooperative) the mandate of which is to promote research, experimentation/innovation and divulgation in the agriculture sector. The cooperative prepares funding projects with, and for, the key actors in the sector, including the Emilia-Romagna regional government, universities and private sector actors focusing on innovation, food safety, technical assistance etc. In particular, the cooperative's activities focus on three main areas of the supply chain, namely: fruit, vegetables

and arable crops; wine and oil; extensive crops and biofuels. Although it has historically been funded through public sector support from the regional government of Emilia-Romagna, in recent years the cooperative has increasingly sought private support, and hence has developed partnerships with a growing number of private entities.

The second is an institute the mandate of which is the inspection and certification of ethical and environmental products. The primary focus is organic certification in a vast array of both food and non-food sectors, including fruit. The institute has over 300 experts inspecting more than 13,000 firms in Italy and abroad (from its 20 branches in Italy and 10 overseas).

The third institute interviewed for the project is a department of the University of Bologna specialising in fruit and woody plant sciences. The work of the department focuses on traditional pomology, including the biological processes and phenotypic traits of trees.

All three of the institutes interviewed actively collaborate with other research centres and/or companies either nationally or internationally. The cooperative organizes a vast network of institutes, companies, private experts and other cooperatives both regionally and nationally in Italy and seeks out partners to compliment research needs with respect to innovative processes. Although it has ties with some actors and networks elsewhere in Europe, to its admission such relations are not, at present, particularly well developed.

For the three institutes one of the key motivations for participating in networks is related to the fundraising, and project development opportunities that they provide. The cooperative is itself a network and participates to some degree in other networks, including one on the European level (the interviewee referred to sporadic participation). It acts as an institutional network on the national level, and creates networks on specific issues when the need arises, and has historically acted as a sort of research and development arm of the agriculture department of the Emilia-Romagna regional government. For the university department, networks are also important for exchanging information with colleagues from other universities and research institutes, developing projects and relationships with potential partners and developing bursaries for students to join the department. Accordingly, it also participates in, and creates, networks on a needs basis.

The certification body noted that participation in networks is part of its *raison d'être* and ultimately a necessity. The institute was created by a consortium of regional associations and has grown through its participation in numerous formal, informal, as well as national and international networks in the fields of organic agriculture, sustainable development, cooperation, the fair trade movement, among others. It is also a network onto itself. In the context of the fruit sector specifically, the institute is part of a national platform involving organic certification bodies and large supermarkets, the aim of which is to ensure the smooth functioning of the sector (i.e. developing and improving criteria related to organic inspections, working together to avoid scandals, fraudulent organic products and processes etc.). The participation in this, and indeed other networks, helps promote the institute's values while at the same time developing know-how within the organisation. As the institute branches out to other sectors (i.e. mostly recently in construction and cosmetics), it invariably becomes involved in additional networks. During the interview the certification body representative noted the risk of wasting time and energy by getting involved in too many informal networks. He emphasised the importance for the institute to carefully select its partners and networks, and to concentrate its efforts only on those initiatives that can tangibly advance the work and values of the institute.

3.5 Public Body's perspective

The representative of the public administration (regional government) interviewed described the role of the public body in fruit sector networks (and food farming networks generally) as more of a administrator of stakeholder interests than an active network member. In fact, he underscored the fact that the public administration cannot actively participate in networks (as a member) or manage them directly (i.e. as a member of the Board of Directors or other similar governance structures) but rather seeks to bring together all the relevant actors on key issues facing the various agricultural sectors, and provide direction with regard to research, innovation and priorities.

The role of the regional government in the fruit network comes at several levels, from the political negotiation and lobbying level, to the lower administrative level. In addition to the commitment to networking which is a long run feature of the Emilia-Romagna regional administration, particularly through the cooperative system, its role comes also from the fact of being in charge of specific policies aimed, among other things, at increasing

networking activity. Among these, it is worth to mention the EU PO initiatives for the fruit sector, or the Rural development funding, that, in some actions, is deliberately targeted to stimulate chain coordination.

4 Discussion and concluding remarks

In this paper we provide a descriptive analysis of the network structure of the Emilia-Romagna fruit sector. By the nature of the network, network's participants are heterogeneous, with different implications in terms of network engagement and management. Network engagement on the part of the groups interviewed for this paper is largely based on need. For example, in the case of the farm-households, network engagement is directly related to what is required for a farm to function efficiently, and indeed survive, in the market: technical assistance and market access being the most noteworthy. The interviewees emphasized that without support from the cooperative to which they belong they would no longer be in business. For the other types of groups the diversity of engagement in networks (number and types) depended largely on the breadth of activities in which the groups were engaged. The network coordinators or managers, for their part tend to be large cooperatives and hence lead networks by virtue of their dominance in the market and represent a reference with regard to commercialization, technical assistance, innovation development capacity etc.. Accordingly, they also tend to be part of a greater number of networks beyond their geographic location (i.e. national as well as European and international levels).

Also, by focusing on a sector (rather than individual network description) we emphasise the role of multiple network participation and networks of networks. These structural features are largely driven by the small size and the multiproduct features of the farming system, and by the diffusion of the cooperative system. Also, this perspective emphasises the linkages between product chain (networks) and innovation-related networks. Research and innovation is largely driven by collaboration between the cooperative system and the public sector; its diffusion is increasingly performed through contractual arrangements and commercial programs. This case also draws attention to the role of public funding and policy/political commitments as a driver, yet this is not clearly highlighted by the individual network actors.

While these results are largely dependent on the specificity of the case study and the perspective taken, they emphasise the need for a better consideration in research of the joint connection between innovation networks and other networks, as well as a more in-depth examination of how different network memberships combine at the level of individual firms.

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