"Network for innovation as a way to enhance competitiveness: an overview of Italian food SMEs entering networks"

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Summary

Nowadays innovation represents a strategy to face the economic crisis affecting many sectors globally. It is believed that innovation is one of the most significant factors for the enhancement of competitiveness. Innovation is identified with the creation of value by companies, and networking is believed to be a key way to contribute to the better value creation. In particular networking is object of increasing interest not only by academics but also by political institutions, firstly European Union, due to the beliefs that it can foster innovation among SMEs and hence enhances competitiveness. The development of innovation may requires R&D support from outside and the collaboration with other organizations. It is hence recognized the essential role of networking for the innovation and the participation of SMEs in networks as pivotal strategy. European economy is characterized by SMEs and particularly the agri-food sector. This study carries out an investigation, based on a web survey of Italian food SMEs, presenting an overview of Italian food SMEs engaged in collaborations for innovation purposes. Especially, the examination focuses on the identification of types of organizations mainly involved in collaborations for the resources acquisition and structural factors characterizing such SMEs.
Data collection of Italian food SMEs is accomplished by standardized questionnaires designed to be compiled on line in anonymous way. Findings show higher frequency of SMEs involved in collaboration with suppliers for innovation purposes. However, in term of realized innovation, SMEs collaborating with universities demonstrate higher frequency of enhanced innovation. This work presents an additional value in term of comprehension not only for their impact on the nature of the network but also for the conceptualization of proper network able to encourage firm's participation. Additionally, it must be point out that results from such studies cannot be generalized and extended to outside SMEs nation, hence factors involved in other SMEs cultures need to be carefully investigated at each country's level.
Keywords: network, innovation, SMEs

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1. INTRODUCTION AND OBJECTIVE

Food industry has a pivotal role for the Italian economy. However, in innovation literature and based on classification according to the Organization for Economic Cooperation and Development (Christensen *et al.*, 1996; Garcıa-Martinez *et al.*, 2000; Grunert *et al.*, 1997), the food industry is considered as a sector with a low rate of research intensity. Although, the agri-food sector is improving its technology aimed to maintain process controls, food safety, quality and economic competitiveness (Traill and Meulenberg, 2002).

The agri-food sector in Europe is mostly characterized by SMEs. Some of the main constrains in achieving the competitiveness are represented by the lack of resources that SMEs have to face in order to innovate. As stated in several scientific works, SMEs have also some advantages compare to larger firms in promptly responding to new market opportunities (Olander -Argilés *et al* 2009; Narula, 1994) but mostly they suffer for a insufficient amount of resources to be addressed for innovation process (Narula, 1994). Such lack of resources can be overcome through membership of networks. Literature demonstrated that small businesses associated in network produce more innovation compared to those standing alone (Ahuja, 2000; Baptista, 2000) Cabral and Traill (2001) state that the relation between firm size and innovation depends on several factors such as context, industry, or sector; for example scientific studies on food firms state that large firms are more likely to innovate (Cabral and Traill, 2001; Dhamvithee *et al.*, 2005; Galizzi and Venturini, 1996; Huiban and Boushina, 1998).

Several studies show that innovation introduced in the food sector derives more from a learning exchange that happen among enterprises in the food chain rather than collaboration with universities and public research centers. Also, with regard to SMEs working in the traditional food sector, the organization type and the intensity of collaboration depends on the position in the chain network (Gellynck *et al.*, 2008).

This work proposes an overview on types of organizations mostly engaged in collaborations by surveyed Italian agri-food SMEs for innovation purposes. Especially the examination focus on type of organization on which SMEs choose to collaborate for the acquisition of technical, financial and scientific resources. Investigation on structural factors characterizing SMEs involved in these collaborations for the most frequent types of organizations and resources is also carried out. The contribution of this work is to provide additional actual information on SMEs in term of their collaboration preferences for networking aimed at innovation. These can lead to the development by institutions of policies aimed at supporting the networking process. The importance of SME factors comprehension is not only for their impact on the nature of the network but also for the conceptualization of proper network able to encourage firm's participation.

Additionally, it must be pointed out that results from such studies cannot be generalized and extended to outside SME countries, hence factors involved in other SMEs cultures need to be carefully investigated at each country's level.

2. LITERATURE REVIEW

The review of existent literature reveals that diffusion of innovation in network, over the past twenty years, received significant research attention within scientific literature (Gulati, 1998; Kogut, 2000; Konsti-Laakso, 2012). Many authors widely investigated on firm's size influencing innovation performance and networking (Konsti-Laakso *et al*, 2012; Lee *et al*, 2010; Narula, 2004; Santarelli and Sterlacchini, 1990; Thorgren *et al*, 2009). More specifically several studies highlights important advantages and disadvantages of SMEs in the innovation enhancement. Findings shows that small size can affect positively several aspects such as communication, flexibility and employers capability (Cooper, 1964) resulting in a more efficient and effective innovation enhancement (Vossen, 1998). On the other side many obstacles to innovation exist for SMEs such as the lack of financial resources, low capability in management and marketing and difficulty in coping with government regulations (Buijs, 1987; Freel, 2000). Among diverse determinants of innovation the type and nature of collaboration among firms for innovation purposes is not a wide explored topic especially for food SMEs. The concept of learning opportunities which emerges from actors collaboration was already highlighted by Roberts and Berry in 1985, while in 1996 Inkpen focused the attention on the network contribution for innovation. Later, this theory was developed by several authors (Beeby and Booth, 2000; Larsson *et al*, 1998) describing the fundamental role of the interaction among actors for the knowledge creation and diffusion. Especially, Cowan and Jonard (2004) focused on the process of knowledge diffusion through collaboration.

There are few specific papers addressed on collaboration for innovation dealing with food SMEs (Gallerick *et al.*, 2007; Vermeire and Viaene, 2006). Regarding Italian SMEs some findings were presented by Scozzi *et al*., 2005, that analyzing Italian SMEs working in food and manufacturing sector, through interviews, provided information on types of collaborations engaged by SMEs for innovation purposes. According to findings from this latter author SMEs collaborate more with suppliers and customers, fairs and exhibitions and in many cases ideas for innovation are suggested by clients. Considering the modest output provided by scientific literature in matter of innovation in food SMEs and the individual need for each country to be carefully investigated, because of different conditions existent at each country's level, this paper provides additional insights on Italian food SMEs in regards of their behavior in collaboration with organizations for innovation purposes.

3. METHODOLOGY AND DATA COLLECTION

This paper presents descriptive statistics on the dataset generated by a survey carried out in the context of the European project NetGrow. The questionnaire is proposed in a form of web survey and in Italy 1755 SMEs were contacted by e-mail and around 70 SMEs by phone, providing them web-link to get connected to the web-survey site. Necessary e-mail contact information were partially collected from AIDA database (Analisi Informatizzata delle Aziende) where available. For missing email contacts, some of them were found by searching on the internet. The survey was conducted within a time period of 7 months gathering 48 fully-completed questionnaires. The questionnaire is mainly composed of two sections one investigating on determinants and strategic behaviour of SMEs in networking and the other analyzing preferences expressed

by SMEs for some network types. In the first section, which represents the main object of this analysis, respondents were asked to provide information in relation to the following factors: firm primary's geographical market, firm size, firm's innovation strategy, innovation (in terms of new products, processes, markets and business models realized in the last two years) and their collaborations aimed at innovating with several types of organization for resource acquisitions.

Frequencies tables were generated illustrating firms collaborating with organizations for type of resources. Organizations considered for descriptive analysis of networking are: suppliers, clients, competitors, chamber of commerce, industrial associations, universities and public research institution, private research institutes, cluster, scientific parks, business, clubs, exhibitions and conference and training institutes. Resources object of the collaboration are: technical information, market information and facilitation, know how, scientific knowledge and financial resources.

4. RESULTS

Descriptive statistics highlight frequencies of SME collaboration with considered organizations. Table 1 reports the resource for which firms collaborate the most. They are expressed in percentage of firms that collaborate and non-collaborate with the organization. As it can be noticed by observing table 1 the 58% of SMEs state their collaboration with suppliers for the acquisition of technical information, while the 24% state their lack of collaboration with suppliers. The collaboration with suppliers represents the highest frequency of collaboration observed among SMEs. Subsequently it is highlighted the collaboration with exhibition and conference for the acquisition of market information followed by the collaboration with clients for the acquisition of market information and facilitation. The frequency of collaborations with universities and private research institutes instead, results to be are very modest. As it can be notice from table1 the 41% and the 47% of SMEs state that they never engage in collaborations for any resource respectively with universities and private research institute.

Table 1. SME main collaborations for resource types

Organization type	Resource type	% SMEs collaborating	% SMEs never collaborating for any resource type
Suppliers	Technical info and resources	58%	24%
Clients	Market info & facilitation	48%	35%
Competitors	Market info & facilitation	21%	57%
Universities	Scientific knowledge	38%	41%
Private research institutes	Scientific knowledge	21%	47%
Chamber of commerce	Technical info & resources; Market info & facilitation	39%	35%
Industrial associations	Technical info and resources	44%	27%
Training institutions, consultants	Technical info and resources; Scientific knowledge	19%	55%
Exhibitions, conferences	Market info & facilitation	52%	22%

In table 2 are illustrated structural characteristics of firms collaborating with suppliers for technical information. The majority of these SMEs are small size firms, in business from long time, working on national and global market area. Regarding innovation characteristics, they mostly focus on their niche market and produce innovation mainly in term of new products and new markets. Few innovations instead are reported in term of new processes and almost none for new business models.

Table 2. Structural and innovation characteristics of SMEs collaborating with suppliers for technical information.

Structural characteristics	Modality	% SMEs
Years in business	0-20	22
	21-30	11
	31-45	18,5
	46-70	18,5
	71-170	30
SME	Micro	33,5
	Small	48
	Medium	18,5
Area of geographical Market	Local	15
	National	30
	European	11
	Global	30
	Others	14
Innovation market strategy	First to market	26
	Seldom first to market	11
	Focus on niche market	63
Innovation in new products	None	31
	1 or more	69
Innovation in new processes	None	52
	1 or more	48
Innovation in new markets	None	23
	1 or more	77
Innovation in new business models or management tools	None	72
	1 or more	24
	don't know	4

Table 3. Structural characteristics of SMEs collaborating with university for scientific knowledge and technical information.

Structural characteristics	Modality	% SMEs for scientific knowledge	% SMEs for technical information
Years in business	0-20	22,2	25
	21-30	11,1	8,3
	31-45	11,1	8,3
	46-70	22,2	16,7
	71-170	33,3	33,3
Firm size	Micro	27,8	33,3
	Small	50	50
	Medium	22,2	16,7
Area of geographical market	Local	11,11	16,7
	National	22,2	8,3
	European	11,1	16,7
	Global	38,9	33,3
	Other	16,7	25
Innovation market strategy	first to market	44,4	41,7
	seldom first to market	22,2	25
	focus on niche market	33,3	33,3
Innovation in new products	None	11,8	9,1
	1 or more	82,3	81,8
	Don't know	5,9	9
Innovation in new processes	None	33,3	30
	1 or more	66,7	70
Innovation in new markets	None	12,5	0
	1 or more	87,5	100
Innovation in new business models or management tools	None	53,3	70
	1 or more	33,3	20
	Don't know	13,3	10

As it can be notice in table 3, in term of structural characteristic, there are not relevant differences between SMEs collaborating with suppliers and those with universities. Instead some diversity are outlined in term of new innovation. SMEs that collaborate with universities for scientific knowledge and for technical information also, enhance more innovation compare to those collaborating with suppliers. This better enhancement of innovation is observed for new products, new processes, and new markets. Moreover SMEs collaborating with universities focus more on being first to market instead that following their own niche market, as strategy of innovation.

An additional consideration observing table 4 is that SMEs assert that basically collaborate more with suppliers instead that with universities or other research institutes for the acquisition of scientific knowledge.

Table 4. Scientific knowledge

Organization type	% SMEs
Suppliers	39%
Clients	30%
Competitors	10%
Universities	36,7%
Private research institutes	20,4%
Chamber of Commerce	16%
Industrial Associations	30,6%
Training institutions, consultants	18%
Exhibitions, conferences	31%

In table 5 are shown the frequency of SMEs committed in network for organization typologies. As it can observed the highest frequency is remarked for Industrial Association, followed by Chamber of Commerce. Also, this highlights the limited participation to cluster, scientific & technological parks and business clubs by Italian food SMEs.

Table 5. Frequency of SME for Network type

	Chamber of Commerce	Industrial Association	Cluster	Scientific & technological parks	Business clubs
	Percent	Percent	Percent	Percent	Percent
None	35,4	16,7	64,6	68,8	70,8
1 or more	58,3	75	4,0	8,3	2,1
Don't know	2,1	91,7	6,2	2,1	4,2
Missing	4,2	8,3	25,0	20,8	22,9
Total	100	100	100	100	100

5. DISCUSSION

The undertaken work highlights how Italian food SMEs modestly relate on universities and private or public research institutions for collaboration aimed at the innovation. They mostly lean towards suppliers, clients and Industrial Associations for the establishment of collaboration, even if in fact, in term of innovation in new products, new processes and new markets the SMEs collaborating with universities show higher frequencies. This is in line with findings from literature where according with some results, not only customers and suppliers affects negatively product innovation in the whole industry (Triguero *et al*., 2005 and Scozzi *et al*., 2005), but also the higher dependence of the food firms on suppliers across time diminishes the probability to innovate (Triguero *et al.*, 2005).

Findings report that surveyed SMEs find their resources, after collaboration with suppliers, preferably from clients and exhibition. This is also stated by Scozzi *et al*., 2005, as output of the survey carried out on SMEs working not only in the food sector.

Moreover, as it can be notice from table 5, firms prefer to relate on suppliers for technical information and resources even if embedded in networks with Industrial Associations.

In term of innovation market strategies, SMEs that collaborate with universities are more likely to innovate and aim to be first to the market. This type of strategy is usually followed from larger firms Acs and Audretsch (1987). This would lead to the idea that larger SMEs are those that choose to collaborate with universities trying to be first to the market. This is another hypothesis replacing the relation of cause-effect assumed by collaboration with universities in explaining higher innovation enhanced.

However, due to the SMEs classification it is not possible to capture differences in term of size within this group.

6. CONCLUSIONS

From a synthetic analysis of the presented case study, it can be stated that Italian food SMEs demonstrated to be more motivated in collaborating with suppliers and clients for innovation purposes than with universities. Although in fact, innovation enhanced by the collaboration with suppliers is lower than that reached by the collaboration with universities.

It would be useful to provide deeper investigations on the SMEs with regard to their size, in order to be able to capture some more differences in term of structural characteristics and so resonating around behavior of firms engaging in collaborations.

Also, in order to better understand firm's needs in term of innovation, if they are related to specific requests from their clients or markets, further studies should be conducted in relation to their position within the food chain. Moreover this would help to have insights on potential improved ways for collaboration for the enhancement of different types of innovation in term of product, process, market and business model.

Studies that investigates different behaviors of SMEs within vertical and horizontal network should be also addressed since they would lead to the understanding of dynamic involved in the innovation process in term of organization chosen and related resources and innovation output.

It must be pointed out that the comprehension of SME behaviors is strictly related to information acquired directly by firms through interviews or questionnaires, which are usually of difficult achievement. Moreover conditions change over countries, hence data obtained from SMEs represents an actual additional value for the comprehension of strategic network for innovation.

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