

Implications of Network Structure on Small Firms' Performance: Evidence from Italy

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Abstract

The aim of this paper is to examine whether and how some structural characteristics of the Italian Network contract (NC) influence small firms' performance. Since the '70s Italy has had a long history of network alliances characterized by the establishment of the industrial districts. However, this type of informal agreements have proved to be inadequate to counter the effects of globalization and of the changes that have occurred in the international economic scenario. Consequently, the legislator has enacted the law n. 33/2009 by introducing a new type of formal agreement, named NC, in order to increase firms' competitiveness. Research findings on the Italian NC have shown the existence of positive effects on firms' performance. However, in most cases the analyses have been based on a limited number of firms and have not verified the influence of some network structural characteristics. This research wishes to fill this gap by increasing the existing literature on the subject. The empirical analysis, based on a firm level panel data, highlights that in networks composed of small firms the results are not always consistent with prior studies. Network characteristics differently influence the firms' performance measures. The analysis shows that network diversity and network's geographical openness are negatively related to firms' performance. Instead, network size has a limited impact on firms' performance expressed only by the ROA.

Keywords: Network agreements, network diversity, network's geographical openness, network size, small firms' performance, formal network, Italian SMEs

1. Introduction

As emphasized by the growing body of literature, network relationship has a potential influence on SMEs' growth and development providing them with numerous benefits. Networks and inter-firm cooperation allow firms work together to achieve a common goal, to be more competitive and to reach a success that wouldn't be otherwise gained by operating alone, due to the limitations concerning a lack of flexibility, expertise and of financial resources (Gulati, 1998, 1999; Zaheer & Bell, 2005). Considering that, the rapid development of globalization and the increasing complexity of markets have caused a radical change in the competitive scenario (Graves & Thomas, 2004; Zain & Ng, 2006; Zeng, Xie, Tam & Wan, 2009), the creation of partnerships and relationships between firms can be a valuable tool for growth also during unfavourable times (Aureli, Ciambotti & Del Baldo, 2011). In fact, the changes occurred in the profile of competitiveness require SMEs to adopt a greater propensity for the development of network relations to strengthen and consolidate their wealth of knowledge and skills and, more generally, to achieve the benefits of economies of scale and scope that characterize large firms (Inkpen & Tsang, 2005; Lavie, 2006).

The law no. 33/2009 has recently governed the Italian network agreements by introducing the so-called network contract (NC) that represents a formal agreement, which provides the legally binding obligation between two or more firms to register the relationship. Starting from 2010 the number of NC has grown in an exponential way, showing that the Italian SMEs have acknowledged the value of alliances and cooperation. Italy has a long history of network relationships and firm partnerships. Industrial districts, especially in the '70s and '80s, have represented one of the major strengths of the Italian production system. The reason that has led firms to join and form districts was to increase their competitiveness so that they could compete with larger firms and approaching international markets that would have been out of reach for a small or micro enterprise. All this also encouraged the increase in the competitiveness of the local production fabric (Beccattini, 1991). However,

Italian districts - known as geographically limited production systems characterized by many SMEs, each specialized in a stage of the production process - have appeared inadequate to counter the effects of globalization, to face the crisis and of the changes in the international economic scenario (Corò & Grandinetti, 1999; Solinas, Giardino, Di Maria & Micelli, 2011; Cutrini, Micucci & Montanaro, 2013). Consequently, in recent years, Italy has been characterized by an evolution of the forms of aggregation through the transition from the industrial district to the NC based on the awareness that informal networks are no longer sufficient to address global challenges also because they are not designed to achieve a strategic goal (Brunetta, Censi & Rullani, 2015). The NC is an aggregate form different from the district. The latter was born and developed following a spontaneous approach in which, there are a set of unwritten rules, which are locally valid among firms. Instead, in the district there is, often a strong specialization in a specific sector with firms engaged in different phases of production processes. The NC is characterized by the different propulsive drive of the aggregation, the different types of firm involvement and the set goals. From an organizational perspective the contract can be implemented for a wide variety of collaborations, both in terms of vertical and horizontal alliance, and also among competitors sharing some special projects of innovation and strategic development to reach wider markets or implement an internationalization project (Coviello & Munro, 1997; Chetty & Holm, 2000; Rubino, Vitolla & Garzoni, 2017). The NC allows to bypass the localism of the district territory by favouring the aggregation of firms operating in different sectors and often located in geographically distant areas.

This paper focuses the attention on the Italian NC by observing how network characteristics and industry influence small firms' performance. Recent studies, conducted on the NC, have already shown that network membership produces positive effects on firms' performance level (Cisi, Devicienti, Manello & Vannoni, 2016; Rubino & Vitolla, 2016; Tiscini, Martiniello & Mazzitelli, 2017; Costa, Luchetti & Romano, 2017). However, it is interesting to analyze the role played by network characteristics (expressed in terms of size, diversity and different location of firms' partner) in order to make a comparison with the district model. Considering that more than 7 years have passed since the NC adoption, this research makes a more precise assessment of the Italian NC, as is it based on a larger sample of firms. At the same time, despite the theme of the networks has been sufficiently explored, it should be noted that prior studies often refer to terms such as strategic alliances, firms' agreements, inter-firm cooperation, joint-ventures. All these themes concern the same general aspect (network) but, in substance, they refer to informal and formal network and to firms having different size. Therefore, our research aims to increase the existing literature by analyzing a type of formal network related to an entrepreneurial context composed mainly of SMEs. This research provides both a broad exploratory analysis on the NC and, based on an econometric study, tests a series of hypotheses showing that in networks composed of small firms the findings are not always consistent with prior studies.

The paper is structured as follows. The next section illustrates the main findings of the leading studies concerning network performance and, subsequently, focuses on research hypotheses. The third section describes the data sources and methodology adopted. The fourth section illustrates the results of statistical analyses and the discussion of the findings. Finally, the main conclusions are outlined.

2. Theoretical Background and Research Hypotheses

2.1 Network Agreements and Firms' Performance

Starting from different perspectives, prior studies have suggested that network membership allows firms to obtain numerous benefits, which can be observed both from an organizational, strategic and from the point of view innovation (Gulati, 1998; Goezen & Beamish, 2005; Baum, Calabrese & Silverman, 2014; Mazzola, Perrone & Kamuriwo, 2016). Network relationships facilitate the circulation of knowledge within firms and represent sources of information and learning that help firms' growth (Kogut & Zander, 1992; Goerzen & Beamish, 2005). Alliances and cooperation allow firms to have performance improvements in terms of cost reduction and increase in productivity (Darr & Kurtzberg, 2000; Koka & Prescott, 2002; Zaheer & Bell, 2005; Li, de Zubielqui & O' Connor, 2015; Lin & Lin, 2016). At the same time networking enables firms to: (1) expand their market share and to start internationalization processes (Coviello & Munro, 1995; Zhou, Wu & Luo, 2007; Musteen, Francis & Datta, 2010, Rubino et al. 2017); (2) increase the availability of resources (Powell, Kenneth & Smith-Doerr, 1996; Zimmerman, Barsky & Brouthers, 2009; Kenny & Fahy, 2011); (3) improve decision-making and competitiveness (Carpenter & Westphal, 2001; Kijkuit & Den Ende, 2007). From a resource-based perspective, network membership allows individual firms access to strategic resources and capabilities held by other SMEs (Barney, 1991). Inter-firm cooperation can be considered as a process by which a set of resources and competences are combined in various ways to enhance firms' individual performance. Performance improvement could be also explained through the two dimensions of social interaction: relational embeddedness and the structural embeddedness of a firm in its network (Granovetter, 1985; Gulati, 1998;

Goerzen & Beamish, 2005).

The positive effect produced by the network was also highlighted in recent studies involving formal networks composed of SMEs (Schoonjans, Van Cauwenberge & Bauwhede, 2013). Research findings on the Italian NC, have shown the existence of positive effects on firms' performance. Nevertheless, in most cases the analyses have been based on a limited number of firms and have not verified whether and how network some structural characteristics influence firms' performance. This research intends to fill this gap.

2.2 The Role of the Network Structure and Its Characteristics: Research Hypotheses

Size is one of the elements that characterizes the network structure. The literature suggests that network size, expressed as the number of member firms in each network, expresses the size of the relationships existing between firms. This characteristic is a potential indicator of the knowledge flow that firms share with each other (Koka & Prescott, 2008; Demirkan, Deeds & Demirkan, 2013). Larger networks facilitate factors for collective knowledge generation and learning and, consequently, are positively related to firms' performance (Powell et al., 1996; Demirkan et al., 2013). Patel and Conklin (2009) argued that a larger network enables firms to achieve greater synergies and relationships. This, allows them to access to a larger number of resources and knowledge (Hislop, 2005). Zhao, Frese & Giardini (2010) argued that larger networks, in terms of number of partners, can provide a wider degree of differing information and a wider net of usable information to detect business opportunities and profit from them. Hoang and Antoncic (2003) found that network size helps to improve both the performance of the individual firms and the performance of the network as a whole. Therefore, it is logical to assume that a SME that adheres to a network is more likely to achieve better performance. At the same time, Demirkan et al. (2013) argued that large networks require effective structures and mechanisms to coordinate the different inputs and interests in the network. Consequently, network size could be negatively associated with firms' performance. In the Italian context, the first descriptive surveys indicated that the networks initially consisted of a limited number of firms, which, in any case, grew over time. The analysis that is carried out will help to understand better whether the growth of the network size has effects on firms' performance. Accordingly, we hypothesize:

H1. Network size is positively related to firms' performance

Another key network characteristic is network diversity that refers to the range or variety of different sources, industries, geographical locations, and functions represented among the network ties (Goerzen & Beamish, 2005; Bhushan & Pandey, 2015). Network diversity, expressed by the number of the different sectors of activity in which firms involved in the network agreement operate (Gupta & Sapienza, 1992), represents an important element that should also be observed. Indeed, while in the industrial districts firms mainly belong to the same sector, in the new aggregation form firms should adhere to a heterogeneous network. Therefore, it is important to examine whether sector diversity, among network members, influences the firms' performance and to what extent it does it. Network diversity, reflects the variety of backgrounds and knowledge bases of the members in the network (Ruef, Aldrich & Carter, 2003). A network with a more diversity among firms will enhance the richness and the quality of information exchanged (McPherson, Smith-Lovin & Cook, 2001). Although diversity may provide wider resources and knowledge it may also create hinder and difficulties between partners (Hambrick, Cho & Chen, 1996; Miller, Burke & Glick, 1998). Goerzen and Beamish (2005) found that in prior studies a convergent line about the effects of networks diversity on various performance measure does not exist. Some study highlighted the existence of negative effects (Chatman, Polzer, Barsade & Neale, 1998; Darr & Kurtzberg, 2000) instead, others stated the opposite (Powell et al., 1996; Zaheer & Zaheer, 1997; Rodan & Galunic, 2004). Parida, Patel, Wincent & Kohtamäki (2016) argued that in networks composed mainly of small firms, the network diversity is negatively related with the firms' performance. They state that, in such structures, there is a higher probability for internal conflicts because network partners often have divergent goals. Furthermore, small firms possess lower levels of influence, leading to a reduced ability to exploit diverse knowledge. Recent studies conducted on the Italian NC highlight divergent results. Rubino and Vitolla (2016), by examining a very small sample of agri-food firms, found a positive relationship between network heterogeneity and firms' performance. Instead, Cisi et al. (2016) on a larger sample found a negative effect. In any case, the existing divergences may depend on the variable used to measure the network diversity, but also on the size of the sample observed and not least by the size of the firms joining the network. Consequently, according to Parida et al. (2016), we hypothesize that,

H2. Network diversity is negatively related to firms' performance

A third distinctive element of a NC is the territorial aspect that refers to the firm's geographical area. The aim of the Italian legislator was to introduce a new instrument such, as the NC, to encourage the aggregation of firms

outside their traditional areas. Therefore, it seems interesting to evaluate this aspect to understand if SMEs have implemented a process of geographical expansion in their partners' choice. Although, the geographical proximity facilitates knowledge sharing, it does not allow firms to take advantage of possible sources of information available to firms located outside the network (Boschma & Wal, 2007). The recent changes, as globalization and the ever-increasing competition, have increase the awareness that geographical openness is a precondition for district firms to survive. The literature suggests that too much reliance on local knowledge sources may be harmful for interactive learning when network firms are unable to respond to new changes (Camagni, 1991; Asheim & Isaksen, 2002). Bathelt, Malmberg & Maskell (2004) argued that local relations might even be more beneficial when they are improved by non-local relations that bring about new ideas into the network. Therefore, a wider geographical location of the firms in the network allows them to broaden their knowledge and to exploit more opportunities. This suggests:

H3. Network's geographical openness is positively related to firms' performance

3. Methodology

3.1 Sample and Data

We tested our hypotheses using data from two sources. First, we used the Infocamere database on Italian NC, updated to September 4th, 2017, in order to identify the firms that joined a network by collecting information about the network structure and its composition. As a second step, we collected firms' accounting data bu using the AIDA Bureau Van Dijk database. Starting from 18,136 firms, we considered the firms that joined a network in the period 2011-2015 and we excluded those that was not required to submit a balance sheet. In addition, we also excluded all other firms for which we have found the presence of unreliable or missing accounting data. As a result, we based our research on a sample of 3,324 small firms organized in a panel format. As far as the considered period (2011-2015), in order to better perform the impact of network entry and in particular the treatment effect, we considered the periods $t - 1$ (where $t = 2011$) and $ts + 1$ (where $ts = 2015$).

Statistical analysis of the sample distribution underlined important characteristics of heterogeneity both in terms of the type of firms adhering to the same contract, and the territorial and organizational characteristics of this new type of formal agreement. By using an econometric model, we performed an analysis aimed at isolating the effect of network entry on firms' performance, as well as to identify the determinants of the effectiveness of this impact.

3.2 Variables and Measures

As dependent variables, we use two different measures of a firm's performance. First, we included one of the most commonly used measures of profitability as ROA (Goerzen & Beamish, 2005) defined by EBIT margin over Total Assets. Secondly, we used a variable that refers to firms' productivity as the value-added to sales ratio (Note 1), which represents one of the most commonly used measures of vertical integration (Adelman, 1955; Harrigan, 1985; Balakrishnan & Wernerfelt, 1986). This variable allows us to evaluate how the network characteristics influence the degree of firms' vertical integration.

As regards the independent variables, we operated as follows. Network size is measured by the total number of network partners (Burt, 1992; Tan, Zhang & Wang, 2015). Instead, network diversity is measured by the number of the different sectors of activity in which network partners operate (Goerzen & Beamish, 2005). Finally, network's geographical openness is determined as follows. We adopted a scale with values from 1 to 4 with the attribution of increasing values with growing network geographical location: (1) Network firms which are located in the same province; (2) Firms which are located in the same region; (3) Firms which are located in the same geographic area; (4) Firms which are located in two or most geographic areas (Note 2).

In addition, we inserted a dummy variable that relates to the network entry. This variable has value 1 in the year in which the firm has joined the NC and 0 otherwise. The dummy variable represents the crucial point to establish the effectiveness of the NC in terms of better performance. Thanks to the availability of information on the date of activation of the NC, for each firm it is possible to process this information as a "treatment" and thus isolate its effect, net of other firm characteristics characterized by variation over time.

Finally, we included four control variables measured by following the approaches used in previous studies: (1) Network age, measured in months since the network foundation; (2) Firm size, operationalized as the number of employees; (3) Firm age, measured by the number of years since firm foundation; (4) Firm sub-area, measured with values from 1 yo 4, according to Istat classification (Note 2).

3.3 Empirical Model

In order to test our hypotheses, we performed through the random effect model, a panel regression. The random effects model treats individual effects as part of the error term, so it consider them as stochastic components certainly uncorrelated with regressors. In this way it is possible to include within the matrix X, the variables that change between subject and subject, while remaining constant inside of the T observations related to the firm. In the fixed effects model this opportunity was precluded. We generated two models with the same treatment, exogenous and control variables that are compared. In particular, the functions are:

- *Var. ROA_{i,t}* = $\beta_{0i,t} + \beta_{1t}(\text{Network size}) + \beta_{2t}(\text{Network diversity}) + \beta_{3t}(\text{Network's geographical openness}) + \delta D_{it}(\text{Network Entry}) + \beta_{5t}(\text{Firm sub-area}) + \beta_{6t}(\text{Firm age}) + \beta_{7t}(\text{Firm size}) + \mu_i + \eta_t + e_{it}$
- *Var. Value Added/Sales ratio_{i,t}* = $\beta_{0i,t} + \beta_{1t}(\text{Network size}) + \beta_{2t}(\text{Network diversity}) + \beta_{3t}(\text{Network's geographical openness}) + \delta D_{it}(\text{Network Entry}) + \beta_{5t}(\text{Firm sub-area}) + \beta_{6t}(\text{Firm age}) + \beta_{7t}(\text{Firm size}) + \mu_i + \eta_t + e_{it}$

In addition to the independent, control and traitment variables, in both functions we find:

- μ_i e η_t , that represent fixed effects respectively of enterprise and temporal ones;
- $\varepsilon_{i,t}$ that is an independent and identically distributed disorder.

4. Results and Discussion

4.1 Descriptive Statistic and Correlation Matrix

As regards the geographical distribution, firms are mainly located in the sub-areas 1 and 2, i.e. in northern Italy (54.83%) and are followed by those in the sub areas 3 (centre of Italy) and 4 (south Italy) respectively for 23.15% and 19.01%. The remaining firms are located in sub-area 5 (3.00%). The major sectors concerned are trade and services and manufacture to which belong respectively the 46% and the 29.5% of the firms. Table 1 reports the descriptive statistics for the mean, median, standard deviation, and correlation values associated with the study variables.

The observed firms are quite young with an average age of 20 years. The examination of the data shows that each network is composed on an average of n. 9 firms. Instead, in the perspective of network diversity, the data indicate that each network is composed on average by firms belonging to about 4 different sectors of activity. This data shows the existence, within the networks, of a good level of diversification of activities. However, an important element that emerged from this research is the territorial aspect of the network contract. The not high value of the network's geographical openness variable highlighted that networks primarily involve firms located in the same geographic region or area. This value shows that the suggestion to the network's geographical openness, provided by the Italian legislator, has been partially accepted by the firms, which continue to aggregate mainly in local areas. At the same time, the low average number of employees (firm size) shows that the observed firms are very similar to the micro-firms category.

4.2 Results

We report the results of the random-effects panel data regression analyses in Table 2. Examination of the data shows different results for the two models. The analysis of the first model indicates that only the Hypotheses 1 and 2 are confirmed. The network size positively influences firms' performance expressed by the ROA as showed in prior studies (Baum et al., 2000; Hoang & Antoncic, 2003). It is evident that, with the increase of the network size also the opportunities for the firms, to access to greater resources, grow. The cohesion effect, apart from to ensuring a greater amount of financial resources also guarantees the exchange of information needed to achieve firms' goals. However, the low level of significance of the variable also confirms that, as highlighted in other studies based on the Italian NC (Rubino & Vitolla, 2016), the network size may not be relevant to improve the firms' performance. As regards the Hypothesis 2, as expected, network diversity negatively influences the firms' performance. Although, network diversity enables firms to interact with others that belong to different sectors and to acquire new knowledge and competencies, this variable negatively affects small firms' performance as also highlighted in prior studies (Parida et al., 2016; Cisi et al., 2016). In our opinion, at a theoretical perspective, the network diversity should be positively related with the firms' performance. However, the presence of studies conducted also on the firms adhering to the Italian NC had led us to reflect on the opposite situation that is confirmed in this study. One possible explanation of the problem should be found in the existence of greater problems of coordination that affect small firms operating in different sectors. The presence of a network manager, that facilitates the planning of activities and the achievement of the network's objectives,

could help to make a positive relationship between network diversity and firms' performance (Rubino et al., 2017). Our third Hypothesis is not confirmed as the analysis indicates a negative relation between the network's geographical openness and firms' performance, contrary to what we hypothesized. This research shows that a reduction in the ROA index is associated with a greater network's geographical openness. In this case, too, the explanation of the opposite significance of the variable should be sought in the way in which firms create and manage relationships. Probably, local firms are characterized by a greater affinity in terms of behavior and ways of operating. Consequently, this affinity is not found when small firms operate with other firms belonging to different geographical contexts.

As regards the analysis of the second model, the data indicates that only the Hypothesis 2 is confirmed. As a second dependent variable, we used the value added/sales ratio, in order to evaluate the impact of network structure on firms' productivity. As already noted, the value added/sales ratio expresses the level of vertical integration of a firm. Firms, often, join a network in order to make integrations upstream or downstream of the supply chain. Therefore, we observed the influence that the network characteristics have on this indicator of productivity. The analysis shows that network diversity, as expected, negatively influences the firms' performance expressed by the value added/sales ratio. This result indicates that as the network diversity increases, the productivity indicator decreases. In other words, it can be said that network diversity negatively influences the level of vertical integration and consequently favors a downstream integration of the supply chain and not the opposite.

Table 1. Descriptive statistics and correlations matrix †

Variables	Mean	Median	S.D.	1	2	3	4	5	6	7	8	9						
1. ROA	3.401	2.445	11.242	1														
2. Val. Add./Sal. ratio	0.193	0.025	2.926	0.030	*	1												
3. Netw. Size	9.107	5	11.998	-0.015	0.038	**	1											
4. Netw. Diversity	3.890	3	3.002	-0.690	***	0.011	0.139	***	1									
5. Netw. Geog. Op.	2.651	3	0.612	-0.055	***	-0.006	0.141	***	0.124	****	1							
6. Firm Sub area	2.419	2	1.165	0.004	0.004	0.016	0.082	**	0.184	***	1							
7. Firm Age	19.993	17	13.432	0.016	**	0.016	-0.035	*	0.027	-0.029	**	-0.109	***	1				
8. Firm Size	15.178	12	12.269	0.011	*	0.011	0.007	-0.045	***	-0.016	-0.045	**	0.221	***	1			
9. Network Entry	0.600	1	0.390	0.036	**	0.036	*	0.419	*	-0.0372	***	-0.091	-0.081	**	0.103	0.025	*	1

Note. n = 3,324. S.D. = Standard Deviation. † ***p < 0.01; **p < 0.05; *p < 0.10.

In relation to the other two unconfirmed Hypotheses we can state the following. The network size and the network's geographical openness do not affect firms' productivity. Network size seems to be scarcely significant also in consideration to what we previously stated in relation to the ROA dependent variable. As regards the third hypothesis, we found a negative significant relation between the value added/sales ratio and firms' productivity. The considerations we have made on the ROA variable are also valid in this case. The greater network's geographical openness does not produce the desired effects. In our opinion, this is due to the lack of managerial tools aimed to manage and control networks. In addition, the small size of firms does not help to solve this problem.

As for the control variables, we found out that firm size and firm age, as expected, positively influence firms' performance. Instead, for the firm sub area, considering that it is hierarchical qualitative variable, it can be stated that the sub area 4 and 5 (South Italy and Islands) have a negative impact on firms' performance.

Table 2. Panel regression models

	Var. ROA		Var. Value Added /Sales ratio		
<i>Independent Variable</i>					
	Coeff.	St. Error	Coeff.	St. Error	
Network Size	0.162458	*	0.382915	0.010834	0.012804
Network Diversity	-0.245132	***	0.927217	-0.098561	* 0.101734
Network's Geog. Openness	-0.193684	*	0.562528	- 0.032861	** 0.009158
<i>Control Variable</i>					
	Coeff.	St. Error	Coeff.	St. Error	
Firm Subarea	-0.492371	***	0.092628	-0.097831	* 0.023481
Firm Age	0.023498		0.034179	0.012834	0.030018
Firm Size	0.043906	**	0.152348	-0.001982	* 0.182584
<i>Treatment Effect</i>					
	Coeff.	St. Error	Coeff.	St. Error	
Dummy Network Entry	0.452754	***	0.123734	0.102565	** 0.342572
const	7.73628	***	1.83372	-0.983627	** 0.37815
Temporary dummy variable	Yes		Yes		
Panel model	R.E.		R.E.		
Breush Pagan Test	0.260	***	0.197	***	***
Wald Test	83.150	***	112.010	***	***
R squared	0.0953		0.0126		
R squared between	0.0102		0.0049		
R squared within	0.297		0.185		

Note. n = 3,324. ***p < 0.01; **p < 0.05; *p < 0.10.

Table 3. Italian geographic sub areas

Number	Name of te Sub-area	Corresponding regions
1	Nort West	Valle d'Aosta, Piemonte, Lombardia, Liguria
2	Nort East	Friuli-Venezia Giulia, Veneto, Trentino-Alto Adige, Emilia-Romagna
3	Centre	Toscana, Marche, Lazio, Umbria
4	South	Abruzzo, Molise, Campania, Basilicata, Puglia, Calabria
5	Islands	Sicilia, Sardegna

5. Conclusions

The findings of our study contribute to validate the effectiveness of the network agreements and to raise awareness of their adoption by firms. Network agreements allow firms to seize opportunities related to the benefits that the network offers. The integration and collaborative approach can allow firms to better address some critical issues affecting a market characterized by high instability and competitiveness, as well as the difficulty in successfully implementing a path of growth.

From a theoretical standpoint, we added to the existing literature a specific analysis that relates primarily to small firms. Furthermore, we provided an analysis of the Italian NC's structure. Contrary to our expectations and to that suggested by previous studies, we found out that for small firms network size is not relevant variable to improve firms' performance. At the same time, we found that network diversity and network's geographical openness are negatively related to firms' performance, contrary to what should happen. It is obvious that there is something wrong with networks made up of small firms. In our opinion, it is necessary to promote the existence of greater mechanisms of coordination within the network. The choice of partners cannot be random but, must be done on the basis of a shared program that represents the subject of the NC. Therefore, especially for small firms, it is necessary to foresee the existence of a managerial figure such as the network manager. This innovative figure is necessary to guarantee the shared governance of network agreements (Butera & Alberti, 2012; Tresca,

2015; Rubino et al., 2017).

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Notes

Note 1. Value added can be computed by subtracting the costs of purchased materials, services and utilities from the firm's total revenue.

Note 2. According to the Italian National Institute of Statistics (ISTAT) we classified the Italian geographic areas (regions) as follows:

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