The Effects of Network Agreements on Firms’ Performance

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Abstract
In the current economic environment characterized by globalization, technological innovation, financial crisis, firms are facing a sharp drop in sales, production and number of employees. These changes require firms to formulate viable business responses to prevent market exit. One of the ways to strengthen the production system is represented by network agreement, according to which firms work together to achieve a common goal to be more competitive and to achieve what they themselves could not do because of the limitations inherent in the lack flexibility, expertise and lack of financial resources. The purpose of this paper is to evaluate the effectiveness of the network agreements implemented by firms operating in the industrial sector. The analysis is conducted on the Italian firms that, from 2009, have started collaborative relationships through the network contract introduced by the Italian law n. 33 of 9th April 2009. The paper is structured as follows. The first part examines the main contributions in the literature concerning the topics related to networks and the firms’ competitiveness and also the reasons influencing the formation and development of alliances between firms. The second part, instead, is focused on the evaluation of the effectiveness of the network contracts by observing the performance of firms before and after their join the network. In terms of competitiveness has been observed sales while, with regard to profitability was observed the return on investment (ROI). The findings show significant results in relation to both the turnover and profitability.

1. INTRODUCTION
The importance of small and medium-sized enterprises (SMEs) for the Italian economy is widely documented by statistical analysis and is proven by numerous economic and business management studies that have focused on the elements of excellence, on vulnerabilities, constraints and conditions for success of the business model of the firms (Cortesi et al., 2004; Visconti, 2000 and 2006). In Italy 99.7% of active industrial firms has a staff of fewer than 250 employees and 81.7% are even micro-enterprises. The current economic climate in which firms are operating appears complex and uncertain and reflects a structural instability. The challenges of the context in which SMEs face due to globalization, technological innovation, the increasing complexity of markets and radical change in the competitive environment, certainly do not help the economic recovery. On the other hand, the economic and financial crisis continues to impact negatively on SMEs Italian causing a sharp drop in sales, production, employment and exports in the same. Within this framework, firms are urged to formulate viable business responses to prevent market exit. Recent statistics show that the number of bankrupt companies continues to rise and remain above the average of previous years. It is clear, therefore, the need for SMEs to carry out a deep transformation of its
organizational structure by adopting instruments and cooperation policies in order to create winning synergies that can boost the local economy. One of the ways to strengthen the production system is represented by the network contract, according to which firms work together to achieve a common goal that is to be more competitive and to achieve what they themselves could not do because of the limitations as regards in the lack flexibility, expertise and lack of financial resources. 

The birth and the development of collaborative relationships can be a valuable tool for firms capable to ensure their growth even in times not so favorable. The change occurred in the profile of SMEs competitiveness requires a greater propensity to develop reticular relations to strengthen and consolidate its wealth of knowledge and skills and, more generally, in order to achieve the benefits of economies of scale and scope that characterize big business. The collaboration agreements and relationships between firms received in Italy explicit recognition by the legislature in 2009. It is only with the enactment of Law no. 33 of 2009, that the network contract has been regulated for the first time. This article aims to analyze the state of the network contracts in Italy in order to assessing their impact on the level of growth of manufacturing firms. The paper is structured as follows. The following section makes a brief review of the main contributions in the literature with regard to issues related to networks and the growth of SMEs. The third paragraph sets out the structure of the network contracts started in Italy. The fourth paragraph, however, is devoted to the analysis of the network contracts, which is made by observing the levels of growth and profitability of the firms involved. The final section of the paper presents conclusions.

2. THEORETICAL BACKGROUND AND HYPOTHESES

Networks agreements in a business management perspective and, more generally, in management studies represent a current topic but not new. The theme of the development of policies and aggregation of business cooperation has been the focus in the last 30 years of numerous scientific contributions related to:

1. Organizational Theory (Pfeffer, 1972; Williamson, 1975 and 1985; Mintzberg, 1979; Rugiadini, 1979; Lomi, 1991; Nohria and Eccles, 1992; Perrow, 1992; Grandori and Soda, 1995; Butera, 1999; Soda, 1998);
2. Strategic Management (Penrose, 1959; Wernerfelt, 1984; Barney, 1991; Lorenzoni, 1992; Porter, 1998; Ireland et al., 2002; Ricciardi, 2004),
3. Industrial districts (Asheim, 1986; Rullani, 1995; Albertini and Pilotti, 1996; Becattini, 2000; Guerrieri et al., 2001);
4. Innovation theory (Lipparini and Soderber, 1994; Powell, 1996 and 1998; Robertson et al., 1996; Erickson and Jacoby, 2003; Pittaway et al., 2004; Riccaboni, 2005).

From a business perspective, the networks are considered to be "valuable assets" that facilitate the acquisition of resources and knowledge that are essential for the survival and growth of businesses, and particularly for SMEs (Julien, 1995). These often have not sufficient resources and knowledge to address the rapidly changing environment in which they operate and, therefore, through the development of inter-firm relationships they can acquire the tools necessary to defend or increase national and/or international competitiveness (Håkansson, 1987; Ricciardi, 2001; Rubino, 2006).

The effectiveness of the combinations on the network is documented by numerous empirical studies conducted over time (Ostgaard and Birley 1996; Lechner and Dowling 2003; Rogers 2004 Watson 2007; Park et al., 2010; Schoonjans et al., 2013), which they have fostered awareness on the part of institutions and entrepreneurs of the benefits obtained through their implementation. In recent years, in fact, there was in Italy a growing attention to this issue, as
a result of the new awareness of the key role of the network contract for the purposes of a possible economic recovery of the country. The network, linking firms from different environments, meets the need for overcoming the localism and the district itself as the natural evolution of the collaboration model of the modern production system. Aggregations network are a valid response to address the rapid changing of relations between the territory and global economy. Crisis and globalization are two current issues, whose overcoming requires firms to develop growth paths also based on internationalization. Aim exports may represent a necessary choice for SMEs. However, it should be noted that the number of micro firms operating in Italian territory often have not sufficient resources and expertise to enter or remain successful in international markets. Therefore, to collaborate with other firms can be a solution to overcome this problem.

Several studies show that networks agreements contribute to the growth of firms’ performance at international level. According to these studies, the networks can help to accelerate the expansion and overcome the liabilities of foreignness (Hymer, 1976) and outsidership (Johanson and Vahlne, 2009; Pinho and Prange, 2015). For SMEs to join the network is a crucial function in which it creates value through the creation and access to a variety of resources, such as new knowledge, which is a fundamental driver of value creation in the firm (Barney, 1991; Porter, 1986, 1990). The literature suggests that knowledge from networks leads to strong competitive advantages and enhance firm performance (Fang et al., 2013; Nguyen, 2011).

The networks effects on firms’ performance, in the networks perspective, have been also explored in the past (Axelsson and Johanson, 1992; Depperu, 1993 Coviello and Munro, 1997; Johanson and Mattson, 1988; Ellis, 2000), and some researchers have shown that their startup is promoted by the development of inter-organizational relationships (Ellis and Pecotich, 2001; Fernandez and Nieto 2005). These reports can provide a more in-depth knowledge of the market, thereby reducing the uncertainty and timing of decision-making, supporting, at the same time, the internationalization (Depperu, 1993). A firm that undertakes a journey of internationalization, without developing inter-organizational relations, is forced to face higher levels of risk and uncertainty due to the lower availability of information on foreign markets to be approached (Lorenzoni, 1997; Mazzola and Sciascia, 2008). In general, therefore, it is possible to argue that business networks facilitate the acquisition of knowledge, skills and resources essential to the growth and the survival of SMEs, elements that would be difficult to achieve especially in the current competitive scenario. At the same time, the network allows firms to: (1) acquire new information and technical knowledge; (2) develop innovative products; (3) optimize the production and marketing processes. The acquisition of all these elements, should allow firms to participate in the networks in order to obtain better performance than firms isolated (Goerzen, 2007; Foresti, 2012).

A firm’s economic performance is measured on the basis of its rate of Return on Investement (ROI), which managers widely use to evaluate their annual operations. Another indicator used to measure economic performance is also represented by sales, which measures the level of growth of the firm and its competitiveness. In relation to the analysis of the effects of the networks agreements on firms, we hypothesize:

Hypothesis 1a: ROI growth is positively influenced by the presence of the firm in a network contract.

Hypothesis 1b: Sales growth is positively influenced by the presence of the firm in a network contract.
3. METHODOLOGY

3.1 Data sources
In order to assess the impact of the network contract on the firms' performance, we have performed an analysis on the population of manufacturing firms that have joined the network in 2011 and 2012. The analysis focused on manufacturing firms, which perform activities that fall in the codes "ATECO" C25 and C28. Italian firms are categorized by a code called ATECO, which describes the type of business. The information on firms that have joined the network contract have been found by consulting the database available at the Chambers of Commerce. Instead, performance data were acquired by AIDA database Bureau Van Dijk. The choice to analyze the manufacturing sector has depended on two grounds. The first one is related to the high level of representativeness of the manufacturing sector for the Italian economy. In fact, considering the recent crisis, we have analyzed this sector in order to observe the effects produced by the network contract on firms' performance. Secondly, it should be stated that the majority of network contracts are referred to the manufacturing sector. This allowed to conduct research on a larger number of firms. The analysis focused only on 247 firms (n. 122 operating in the sub-sector C25 and n. 125 of the sub-sector C28) because we have excluded firms for which no performance data were available and also we have selected only those that have joined the network in 2011 and 2012. In order to gauge the percentage change in the firms’ performance we calculated the growth (or decline) of two indicators: (1) sales, to evaluate competitiveness; (2) Return on Investment (ROI) for the firms’ profitability. The change in the above-mentioned indicators was calculated between the years 2013-2011, for firms that have joined the network in 2011, and between 2014-2012 for firms that have joined the network in 2012. To allow a significant analysis, in order to evaluate the change in the performance indicators we have extended the analysis on other 247 firms of the same sectors that have no joined the network. We aimed at obtaining a well matched sample of 494 firms equally divided between network’s firms and not. The choice of the latter was carried out to ensure the presence of firms of the same size (in terms of total assets or number of employees) and with the same geographical distribution (north, center, south) as well as belonging to the same sub-sector of activity. In this way, through a multiple linear regression model we have test our hypotheses in order to evaluate if the network has a positive impact on firms’ performance.

3.2 Measurements
Our dependent variable is firm performance. Prior studies have used various measures to gauge the performance outcomes of the network firms. To assess the profitability we decided to rely on a change in the Return on Investment (ROI) to assess the profitability; instead, regarding the competitiveness we considered the change in Sales Revenues.

The independent variable are: (1) Network, which is considered as a key predictor variable. This is represented as a dummy variable with value of 1, if the firm participating in a network contract, and 0 otherwise; (2) Sub-sector activity: is a dummy variable with value 1, if the firm pertains on the sub-sector activity C28 and 0 if the firm belongs to the sub-sector C25; (3) the geographic area in which the firm operate: we have considered 3 dummy variable (north, center, south). Finally as control variables, we have considered the firm size by using the Log of the Total Assets.

4. EMPIRICAL RESULTS

The results of the analysis show that the research hypotheses are in part confirmed. In particular, as shown in Table I and II, the first hypothesis is confirmed, the second one not. The results confirm that network firms performed better than non-network firms, in the period
immediately following the start-up of the network agreements. Belonging to a network is an important variable for the purpose of improving the level of profitability expressed by the ROI. According to previous studies the social context in which a firm operates can have a significant impact on its behaviour and performance (Schoonjans et al., 2013).

Table 1: Dependent variable: Δ ROI - OLS using observations 1-494

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>3.32748</td>
<td>2.5958</td>
<td>1.2819</td>
</tr>
<tr>
<td>Network</td>
<td>1.87666</td>
<td>0.90858</td>
<td>2.0655</td>
</tr>
<tr>
<td>Sub-sector</td>
<td>0.708335</td>
<td>0.652846</td>
<td>1.0850</td>
</tr>
<tr>
<td>North</td>
<td>0.0177085</td>
<td>0.725852</td>
<td>0.0244</td>
</tr>
<tr>
<td>Center</td>
<td>−1.41699</td>
<td>0.901593</td>
<td>−1.5717</td>
</tr>
<tr>
<td>Total Assets (Log)</td>
<td>−0.597057</td>
<td>0.499228</td>
<td>−1.1960</td>
</tr>
</tbody>
</table>

Mean dependent var 1.634490  S.D. dependent var 6.953721
Sum squared resid 22653.94  S.E. of regression 6.813370
R-squared 0.049697  Adjusted R-squared 0.039960
F(5, 488) 4.607549  P-value(F) 0.000406
Log-likelihood −1645.867  Akaike criterion 3303.735
Schwarz criterion 3328.950  Hannan-Quinn 3313.634

Heteroskedasticity-robust standard errors, variant HC1
*** p < 0.01, ** p < 0.05, * p < 0.10

Table 2
Dependent variable: Δ SALES - OLS using observations 1-494

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>0.0913513</td>
<td>0.359502</td>
<td>0.2541</td>
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<tr>
<td>Network</td>
<td>0.0612699</td>
<td>0.145438</td>
<td>0.4213</td>
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<tr>
<td>Sub-sector</td>
<td>−0.0383045</td>
<td>0.078222</td>
<td>−0.4897</td>
</tr>
<tr>
<td>North</td>
<td>−0.0428449</td>
<td>0.0765879</td>
<td>−0.5594</td>
</tr>
<tr>
<td>Center</td>
<td>0.257199</td>
<td>0.164547</td>
<td>1.5631</td>
</tr>
<tr>
<td>Total Assets (Log)</td>
<td>0.0359914</td>
<td>0.0625606</td>
<td>0.5753</td>
</tr>
</tbody>
</table>

Mean dependent var 0.292274  S.D. dependent var 0.871236
Sum squared resid 366.9303  S.E. of regression 0.867125
R-squared 0.019460  Adjusted R-squared 0.009413
F(5, 488) 0.856909  P-value(F) 0.509994
Log-likelihood −627.5068  Akaike criterion 1267.014
Schwarz criterion 1292.229  Hannan-Quinn 1276.913

Heteroskedasticity-robust standard errors, variant HC1
*** p < 0.01, ** p < 0.05, * p < 0.10

In fact, through network interaction, firms are able to identify and exploit opportunities and to manage their environmental uncertainties (Burt 1997; Elfring and Hulsink 2003). Network agreements enables firms to get access to knowledge and resources in a timely and cost-effective manner (Powell et al. 1996; Gulati and Higgins 2003). In general, considering the
above, firms involved in strong network relationships with other firms are often able to achieve better performance than no network firms.

The second research hypothesis, as shown in Table II, is not confirmed. Probably the reason for the lack of significance of the sales variable may depend on the structure of the manufacturing sector. Networks may have improved the firms' performance through internal reorganization processes or by improving production/business processes whose effects have affected the profitability but not the volume of sales. In fact the Italian manufacturers have been affected by the crisis with greater intensity than in other sectors. For this reason the network firms have been trying to minimize the decline in sales and gain competitiveness by acting on cost reduction as a result of the sharing of knowledge, the strengthening of relations with suppliers and optimization of the production structure.

5. CONCLUSION

The aim of this paper was to test the effects of network agreements on firms' performance. The research hypotheses formulated, as noted in the previous paragraph, were partially confirmed. The network contract, although it has gained pace in the last three years, it is still not widespread especially when taking into account the number of firms operating in the Italian territory. The analysis focused on manufacturing firms that are more present in the world of network contracts (38%). Nevertheless, taking into account the availability of accounting data, it was possible to analyze only a small number of firms operating within this sector.

However, the introduction of the network agreements by the legislature should be welcomed especially when considering the contribution to the revival of the theme of formal collaboration between firms. Management studies, as already noted, have long recognized the importance and value of the agreements between firms, which make up for SMEs one of the main strategies to be put in place to raise their innovation capacity and competitiveness. More than ever networks must be seen as an obvious choice rather than a simple option. According to a resource-based perspective (Penrose, 1956; Wernerfelt, 1984), firms with distinctive resources and business skills must be able to use them to the fullest. The collaboration policies allow firms access to resources of strategic importance covered by other firms. Networks as a whole can be interpreted as an architecture of resources and expertise variously combined, able to improve the firm’s performance.

The evaluation of the performance produced by networks can be assessed in a broader perspective. First of all it should be noted that the assessment of the impact that the network has on the performance of a single firm (firm's performance), can not ignore the evaluation the performance and effectiveness of the whole network (network performance). A network is effective if it achieves its objectives. Therefore, future research may analyze a series of indicators of the effectiveness of a network which allow to translate the effectiveness in economic results directly attributable to the network performance. The concept of effectiveness identifies the ability to achieve a goal and can be expressed as an absolute quantification of the results obtained by the network or considering the ratio between results achieved and planned. Also it may be useful to undertake further research based on a survey. This would make possible to evaluate other variables such as the composition and the network structure, the CEOs' ties, in order to verify if and how these variables impact on the firms’ performance.
REFERENCES


