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Keywords: cluster initiative, innovation network, social capital, performance evaluation

Social Capital and its Effect on Networked Firm Innovation and Competitiveness

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International and local policymakers have repeatedly encouraged the development of clusters—a dense geographic concentration of interconnected businesses—to boost competitiveness at both the firm and regional levels, as well as foster innovation and new product development. Following this trend, many initiatives have started to provide services and infrastructure that can facilitate the establishment of formal and informal ties between firms, local institutions or research centres, as well as upgrade the stock of human and intellectual capital. In this scenario, the present study empirically documents the effects of an innovation network, established by a regional government institution, on the participating firms. In particular, firm-level primary data, derived from the participants of "Polo di Innovazione ICT - Abruzzo" in Italy, empirically support how the cognitive, structural and relational dimensions of the social capital developed within a cluster initiative affect the performance of participating firms, unveiling a negative moderation effect arising from firms' involvement in the cluster program.

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1. Introduction

Policymakers worldwide have turned to the concept of clusters in order to strengthen the competitive environment and innovative propensity of firms in their local areas (Lindqvist, Ketels, & Sölvell, 2013; Lundequist & Power, 2002; Nishimura & Okamuro, 2011; Okamuro & Nishimura, 2018; Porter, 1998; Uyarra & Ramlogan, 2016; Wilson, 2019). Many of these cluster initiatives, which constitute "managed clusters aimed at taking up the baton from spontaneous clusters" (Lefebvre, 2013), have started to prompt innovation by joining the efforts of local firms and public institutions. Within a cluster, firms may benefit from accessing different resources (e.g., specialized labour, local providers or technological knowledge) and building informal relationships with participants, which may ultimately influence the context in which transactions take place and business prospers (Spencer, Vinodrai, Gertler, & Wolfe, 2010).

The extant literature shows that cluster initiatives can be implemented in several ways depending on participants' motivations, the degree of involvement from local actors, the network governance, etc. (Fromhold-Eisebith & Eisebith, 2005; Teigland & Lindqvist, 2007). Sustaining the interfirm network is one such method (Huggins, 2000). Despite the relevance of these initiatives, empirical research about their efficacy is scant (Lundberg & Anderesen, 2012; Pucci, Brumana, Minola, & Zanni, 2017; Rampersad, Quester, & Troshani, 2010). Scholars have suggested that participing firms' relationships with each other are one of the most significant factors in said firms' success. As such, researchers have encouraged policymakers and network managers to identify actions that can strength ties between network members and create social capital

(Inkpen & Tsang, 2005; Molina-Morales, 2005; Molina-Morales & Martinez- Fernandez, 2010). By helping firms to build a relational stock through interactions and exchanges, a cluster initiative contributes to the formation of social capital, which is itself a combination of cognitive, structural, and relational dimensions (e.g., Koka & Prescott, 2002; Nahaphiet & Goshal, 1998). Other scholars stress the importance of adopting a social capital perspective to understand how to facilitate collaboration more effectively (Molina-Morales, 2005) and how a participative process could lead to a greater appreciation of the different realities and people (Aragón, Aranguren, Iturrioz & Wilson, 2014). Recently, marketing scholars have focused on the dynamics of innovation that can arise from interfirm relationships (Aarikka-Stenroos, Sandberg, & Lehtimaki, 2014; Ganesan, Malter, & Rindfleisch, 2005; Tracey, 2014) or project-based organizations (Brunetta et al., 2018), alongside those present within the boundaries of the firm.

There is a limited empirical literature on the effects of the different dimensions of the social capital on firms' ability to improve their competitiveness and innovativeness, when the network of relations develops within a policy-implanted cluster initiative (Inkpen & Tsang, 2005; Lefebre, 2013; Nakamura & Oshimuro, 2011; Oshimuro & Nakamura, 2018; Pucci et al., 2017). Against this background, we acknowledge that the literature on cluster policies and interfirms networks needs more theoretical attention and empirical support, especially from a social capital perspective. Thus, we offer a threefold contribution: First, based on the conceptualization of social capital as resulting from the development of cognitive, structural, and relational dimensions within an interfirm network (e.g., a cluster initiative), we provide an intriguing picture about the effects of R&D policies on participating firms' innovative and competitive performance (Nahapiet & Goshal, 1998; Nishimura & Okamuro, 2011, 2018). In particular, we find that the cognitive and structural dimensions of social capital exert positive effects on innovative and competitive performance, while the relational dimension displays more varied effects. In fact, while the relational dimension positively influenced the formation of innovation, it did not seem to significantly impact the perception that the firms in the cluster increased their innovativeness and competitiveness. Second, we theoretically postulate that being majorly involved in a cluster network can have possible drawbacks for firms, and empirically support this idea through a moderation analysis. Finally, our study adds empirical evidence from the social capital perspective to the literature on R&D cooperation arising from cluster policies. In fact, we had the occasion to access first-hand data collected from the companies participating in Polo di Innovazione ICT - Abruzzo (hereafter PICT), a cluster initiative established in Italy. This allowed us to delineate the effects of networked firms' R&D cooperation from the perspective of social capital developed within a cluster initiative.

The rest of the paper is structured as follows: Section 2 frames the theoretical background and presents the hypotheses development; section 3 illustrates the characteristics of the empirical setting; section 4 presents the data and measures, while section 5 provides details on our analytical strategy and the empirical results. The final section discusses the conclusions and limitations of this study, as well as directions for future research.

2. Background and Hypotheses

The rise of cluster initiatives: Scholars have noted that clustered companies may have access to specific inputs, competencies, institutions, public goods, information, and knowledge spillover (e.g., Bahlman & Huysman, 2008; Malmberg & Maskell, 2002; Munari, Sobrero, & Malipiero, 2012; Porter, 1998; Wilson, 2019). Because of these expected advantages, the concept of a cluster has been incorporated into policy actions worldwide (Lundequist & Power, 2002; Sölvell et al., 2003). Several academic contributions point to the relevance of cluster policies (Borras & Tsagdis, 2008; Okamuro & Nishimura, 2015, 2018; Sternberg, Kiese, & Stockinger, 2010; Wolfe & Nelles, 2008). Sölvell and colleagues (2013) provided a taxonomy of cluster policies (i.e., networking, business environment, business development, human resource upgrading, innovation and technology, and cluster expansion) that exist irrespective of the overall goal of creating or leveraging a cluster. As R&D cooperation is rooted in clusters, R&D policies are of particular relevance in the context of cluster policies, and academic literature supports that innovation—usually measured as the number of patent applications or R&D productivity—is positively affected by participation in R&D consortia and public support of R&D (Czarnitzki et al., 2007; George, Zahra, & Wood, 2002; Klette et al., 2000; Lechevalier et al., 2010; Motohashi, 2005; Zucker & Darby, 2001). Accordingly, a "cluster initiative" is a combination of efforts from local firms and public institutions (government and/or research) aimed at increasing competitiveness and new product development (Sölvell et al., 2003).

Okamuro and Nishimura (2018) acknowledged that public initiatives to foster private research and innovation are gaining traction among academics and practitioners. Consequently, as documented in the authors' (2011) previous work, such initiatives are now receiving a significant amount of money. Even though some scholars distinguish between cluster building and cluster leveraging or adopt a lifecycle perspective (e.g., Ebbekink & Legendijk, 2013; Sölvell et al., 2013; Fornhal, Hassink & Menzel, 2015; Wilson, 2019), Parrilli, Aranguren, and Larrea (2010) suggested that public institutions can fill an "innovation gap" by bridging private companies and academia. Wolfe and Gertler (2004) also noted that public intervention is positively related to the development of specialized technology transfer institutions and research centres, even in the absence of a direct goal to create and/or sustain a cluster.

Social Capital: In the context of interconnected groups of firms, the actions and opportunities of actors are "embedded in concrete, ongoing systems of social relations" (Granovetter, 1985, p. 487; see also: Moran, 2005; Nahaphiet, 2008; see Nahaphiet & Ghoshal, 1998 for a review). In particular, the actors in the relationship network may benefit from fine-grained information exchange and joint problem-solving, which may foster innovation (Lundberg & Andresen, 2012) in a way that is inaccessible with arms-length market relations (Borgatti & Foster, 2003; Uzzi, 1997). It is noteworthy that the companies within a cluster may coordinate contributions to collective goals, with business-to-business relationships playing a prominent role in building ties (Möller & Svahn, 2003; Schepis, Ellis, & Purchase, 2018).

Following Nahapiet and Ghoshal's framework (1998), we assume that social capital includes cognitive, structural and relational dimensions. The cognitive dimension refers to shared codes, narratives and languages (Nahaphiet & Ghoshal, 1998) that may increase members' mutual understanding (Bolino, Turnley, & Bloodgood, 2002). Indeed, a shared vision among peers plays a key role in shaping people's common

perception on how they should interact (Molina-Morales & Martinez-Fernansez, 2010; Inkpen & Tsang, 2005; Tsai, 2000; Tsai & Ghoshal, 1998). The structural dimension encompasses the connections between actors that shape their interpersonal linkages (Moran, 2005; Nahaphiet & Ghoshal, 1998). In particular, actors' centrality within the relationship network accounts for the number of direct contacts they establish (Freeman, 1979), which determines resource sharing and knowledge spillover (Ahuja, 2000), which may then facilitate the creation of new ties (Tsai, 2000). The relational dimension refers to the sense of proximity among actors created by the depth and closeness of a relationship (Westerlund & Svahn, 2008). Trust and trustworthiness play a critical role in facilitating knowledge exchange, which then reduces the time spent in acquiring information and allows for greater informality (Lee, 2009; Lin, 2000; Molina-Morales & Martinez-Fernandez, 2010; Tsai & Gohshal, 1998). Larsson, Bengtsson, and Sparks (1998) also noted that trust minimizes uncertainty and opportunism. It is worth highlighting that the cognitive, structural, and relational dimensions are conceptually distinct, but nonetheless correlated (Hansen, Mors, & Lovas, 2005; Lewicki & Bunker, 1996; Zheng, 2010). Research has mainly focused on the structural and relational dimensions (e.g., Hansen, 2002; Zaheer, McEvily, & Perrone, 1998), but given less attention to the cognitive dimension.

Cluster Initiatives and Social Capital: Since transactions occur in the context of firms' relationships, a company's overall performance may depend on both its own characteristics and its network of relations with other companies (Lundberg & Andresen, 2012). Networks can enable access to resources and constitute a resource in themselves (Burt, 1992; Granovetter, 1985; Lundberg & Andresen, 2012). Some authors have noted that formal rules such as authority and contracting may be inherently limiting as incentives for innovation (Hermalin, 2013; Nishimura & Okamuro, 2018). The challenge is to motivate single actors to contribute to specific, collective goals that may not be directly or immediately relevant for said actors (Cantù, Corsato, Tunisini, & Lind, 2015; Schepis et al., 2018). In order to orient companies' diverse motivations towards a common purpose, a third party may need to step in and increase the collaboration within the network boundaries (Zucker et al., 1996). In this perspective, social capital can be considered an investment intended to reap future benefits (Bourdieu, 1986; Brass, 2012; Burt, 1992).

2.1. Hypotheses Development

In the following, we present a set of hypotheses aimed at assessing the effect of social capital, arising from a cluster initiative, on the performance of participating firms. In particular, we follow extant research in representing social capital in terms of its cognitive dimension (represented by shared vision), structural dimension (represented by degree centrality in the network of relations), and relational dimension (represented by a firm's trustworthiness) (e.g., Nahapiet & Ghoshal, 1998). Furthermore, we measure firms' performance in terms of their innovative and competitive performance, applying both a subjective and objective measure of performance in line with the literature (e.g., Nishimura & Okamuro, 2011). We also advance an unexpected effect: that firms' major involvement in governing cluster relationships may be detrimentally impacted by their centrality in the network. Figure 1 below illustrates our hypotheses and the theoretical framework in which they are embedded.

--- Insert Figure 1 about here ---

The effect of shared vision: Shared vision within a cluster network depends on a shared code or paradigm that helps actors gain a mutual understanding of their goals and aspirations (Molina-Morales & Martínez-Fernández, 2010; Nahapiet & Goshal, 1998). Inkpen and Tsang (2005) suggested that members in a network may interact more if they share a vision. Specifically, companies sharing a vision might use a common language and hold common beliefs about the success of their businesses, which may increase their mutual understanding, facilitate a greater exchange and integration of ideas, resources and knowledge, and foster similar perceptions on how they should interact. In their analysis of the manufacturing agglomeration in the Valencia region, Molina-Morales and Martínez-Fernández (2010) documented that firms sharing a vision reported higher innovative performance in terms of both products and processes. We therefore hypothesize that:

H1: The more a firm shares its vision with the other actors in the cluster initiative, the higher the likelihood that its (H1a) perceptual innovative performance, (H1b) objective innovative performance, (H1c) perceptual competitive performance, and (H1d) objective competitive performance will increase.

The effect of network centrality: Past research widely substantiates the effects of being central in a network (Ahuja, 2000; Tsai, 2000). Consistently, formal and informal ties are considered pipes through which resources flow (Gulati, 1998; Owen-Smith & Powell, 2004). In particular, social capital studies have mostly stressed the resource exchange depends on informal interactions (Koka & Prescott, 2002; Tsai, 2000). Burt (1992), for instance, suggested that ties incur two types of advantages: information and control. Information benefits imply access to information; control benefits refer to the possibility that actors take advantage of others and avoid distort information in the network. Empirical studies have shown that a firm's centrality in the network can affect creativity and innovation (Colucci & Visentin, 2019; Hansen, 2002). Tsai (2000) demonstrated that units within a firm will exchange resources with other units in the same firm when they have more direct communication links with those other units. Based on these speculations, we can hypothesize that:

H2: The more central a firm is within the cluster initiative network, the higher the likelihood that its (H2a) perceptual innovative performance, (H2b) objective innovative performance, (H2c) perceptual competitive performance, and (H2d) objective competitive performance will increase.

The effect of trustworthiness: Trust among peers in a network may benefit participants by reducing transaction and monitoring costs, decreasing uncertainty and opportunism, and pooling strategic and complementary resources (Lee, 2009; Lin, 2000; Molina-Morales & Martinez-Fernandez, 2010; Tsai & Gohshal, 1998). Firms that are trustworthy also gain greater support from others actors in the network (Gulati, 1995; Gulati &

Nickerson, 2008; Tsai & Ghoshal, 1998; Zaheer et al., 1998). Relatedly, Levin and Cross (2004) found that competence- and confidence-based trust have a direct, positive impact on knowledge transfer. In addition, business-to-business scholars have advocated that trust mitigates opportunistic behaviours among others actors and may affect performance (Colucci & Visentin, 2017; Jain, Khalil, Johnston, & Cheng, 2014; Yang, Zhou, & Jiang, 2011). Similarly, Kale, Sing, and Perlmutter (2000) documented that the existence of relational capital (a mix of trust, friendship, reciprocity and frequent interaction) has a positive effect on learning. Tsai and Ghoshal (1998) supported a positive association between trustworthiness, resource exchange, and innovative performance. Yli-Renko et al. (2001) showed that trust in client-supplier relationships has an impact on knowledge transfer and, in turn, on the introduction of new products and the reduction of transaction costs. Accordingly, we posit that companies perceived as trustworthy by other participants in a cluster program are those that are better able to access information and knowledge and, hence, experience higher performance. Thus:

H3: The more a firm is associated with trustworthiness by the other actors in the cluster initiative, the higher the likelihood that its (H3a) perceptual innovative performance, (H3b) objective innovative performance, (H3c) perceptual competitive performance, and (H3d) objective competitive performance will increase.

The moderating role of involvement: When a cluster is established, some actors may assume a prominent position due to their major involvement in cluster initiatives, decision-making processes, and organizational or fundraising activities (Lefebvre, 2013; Laur, Klofsten, & Bienkowska, 2012). They are also crucial in proposing new initiatives and activities to the other actors (Ingstrup, 2014). Consistently, a firm's level of involvement in the cluster initiative is an important part of its social capital. On the one hand, greater involvement in the cluster's activities is a chance for firms to gain access to knowledge, opportunities and services (Molina-Morales & Martínez-Fernández, 2010). On the other hand, involvement could consume a great deal of time and effort, thereby creating an imbalance in terms of coordination costs, social control and gains that inhibits the exploitation of information and knowledge. In fact, assuming a central position in the network may produce a kind of tension: The need to be proactive in order to exploit its resources may run counter to the need to compete with other actors and control the resources that flow through network ties (Burt, 1992, 2005; Maskell, 2001). Thus, an inefficient allocation of resources and social control may be detrimental for those firms that are both central in the network and have above-average involvement in the cluster initiative. Consistently, we advance that:

H4: A firm's level of involvement in the cluster initiative negatively affects the benefits of centrality in the cluster initiative in terms of its (H4a) perceptual innovative performance, (H4b) objective innovative performance, (H4c) perceptual competitive performance, and (H4d) objective competitive performance.

3. Empirical context

An Italian cluster initiative known as "Polo di Innovazione ICT – Abruzzo" (hereafter, PICT) served as the empirical context for the present study. A multinational company based in Abruzzo (a medium-sized region in central Italy – about 1.3 million inhabitants in May, 2019) that produces semiconductors was interested in developing the local entrepreneurial ecosystem, and thus commissioned a manager to draft a response to a tender by the regional government to foster innovation. The project manager identified three main goals: stimulating the sharing of knowledge, detecting common development paths, and sustaining investments in products and innovative services. He invited 49 ICT firms to formally join the innovation network. The majority were small software businesses, but there were also a number of manufacturers and general contractors. Initially, a research centre, a science park, and a national agency endorsed the initiative. The network boundaries are defined in terms of formal membership in the PICT and involvement in its activities. That is, members are firstly defined as all organizations formally participating in the network. As some firms never paid any affiliation fee, had contact with the network manager, nor participated in any of the activities or events organized during the program, they were not included in the research. Our intent was to depict "reality" by focusing on the enduring social structure underlying the cluster initiative (Laumann et al., 1989). Ultimately, 47 firms matched the node and activity criteria.

The firms in the PICT were mostly founded less than 20 years ago (83%); they include micro (55%), small (38%) and big (7%) companies, but no medium-sized companies. The majority of the companies in the population are not part of a group (68%) and mostly operate in one (47%) or two (26%) businesses.

4. Data and measures

Due to a higher prevalence of small and micro companies in the population, objective information on firm-level variables and on performances was largely not available on common financial and business databases or other institutional data sources. Therefore, we used a questionnaire to collect network and non-network data. The text of the questionnaire underwent two stages of development. In the first stage, we developed a preliminary draft based on previous studies and preliminary interviews with key informants. In the second stage, we validated the questionnaire based on comments and insights from academic colleagues in the field of interfirm collaborations, the network manager of PICT, and staff members in the participating companies (Borgatti et al., 2013). In detail, the questionnaire included the measure for the independent variables (*Shared Vision, Degree Centrality* and *Trustworthiness*, respectively measuring the cognitive, structural and relational dimensions of social capital), the moderator (i.e., *Involvement*), the dependent variables (Perceptual and Objective *Innovative Performance* and *Competitive Performance*), and the firms' characteristics. Overall, we obtained 47 questionnaires corresponding to the 47 companies in the population.

4.1. Independent Variables and Moderator Variable

Shared Vision: In accordance with Tsai and Ghoshal (1998), we asked respondents to indicate their degree of agreement with two statements ("My organization shares the same ambitions and vision with the other members of ICT Innovation Cluster"; and "My organization is enthusiastic about pursuing the collective goals

of the ICT Innovation Cluster") on 7-point Likert scales (1= "Totally disagree", 7= "Totally agree"). The construct reliability was high (Cronbach's α=.88). Finally, we defined *Shared Vision* as the average of the two items.

Degree Centrality: In line with the common network analysis approach (e.g., Freeman, 1979), the questionnaire included a section on ongoing professional and non-professional informal ties, defined as those ties that cover the exchange of ideas, advice and information for professional and non-professional topics, respectively. Thus, we noted a tie between two actors if and only if they independently reported it; this helped to produce a reliable representation of the networks (Zaheer et al., 1998). This procedure provided a symmetric 47x47 matrix for the professional informal network and a symmetric 47x47 matrix for the non-professional informal network (Borgatti, Everett, & Freeman, 2002). Then, we summed the two matrices to define a final informal interaction network. Finally, we calculated *Degree Centrality* by applying UCINET VI to the matrix obtained as the sum of professional and non-professional informal ties (Borgatti et al., 2002, 2013; Freeman, 1979).

Trustworthiness: To measure the relational dimension of *Trustworthiness*, the questionnaire asked participants to indicate those peers in the cluster that they considered trustworthy (i.e., if the respondent was likely to exchange confidential information with them without the risk of opportunistic behaviours). This data produced a 47x47 asymmetric matrix (Borgatti, 2002, 2013) that is consistent with the asymmetric nature of trust. Given that a trustworthy firm is a network actor that displays incoming ties, we calculated *Trustworthiness* as the in-degree by using UCINET VI (Borgatti et al., 2002, 2013; Tsai & Ghoshal, 1998).

The moderator Involvement: Consistently with De Noni et al. (2013), we asked respondents to indicate their degree of agreement with three statements ("My organization is actively involved in the network governance"; "My organization has participated in events, workshops, meetings, social activities and presentations organized by the ICT Innovation Cluster"; and "It is valuable to be a member actively involved in ICT Innovation Cluster") on 7-point Likert scales (1= "Totally disagree", 7= "Totally agree"). The construct reliability was high (Cronbach's α=.76). Finally, we defined *Involvement* as the average of the three items.

4.2. Dependent Variables

Innovative Performance: To measure the *Perceptual Innovative Performance*, we asked respondents to indicate their degree of agreement with two statements ("My organization believes that participation in the PICT increased my innovative performance in terms of introducing new products and services and/or improving existing products and services"; and "My organization believes that the participation in the PICT increased my innovative performance in terms of introducing new processes and/or improving existing processes") on 7-point Likert scales (1= "Totally disagree", 7= "Totally agree"). The construct reliability was high (Cronbach's α=.84). Finally, we defined *Perceptual Innovative Performance* as the average of the two items.

To measure the objective innovative performance, we defined a dummy variable *Objective Innovative Performance*, which took 1 if the firm participated in a financed R&D program based on the corresponding record provided by the PICT and 0 otherwise.

Competitive Performance: To measure the *Perceptual Competitive Performance*, we asked respondents to indicate their degree of agreement with two statements ("My organization believes that the participation in the PICT increased my economic performance"; and "My organization believes that the participation in the PICT increased my competitive performance") on 7-point Likert scales (1= "Totally disagree", 7= "Totally agree"). The construct reliability was high (Cronbach's α=.74). Finally, we defined *Perceptual Competitive Performance* as the average of the two items.

To measure the objective competitive performance, the questionnaire asked respondents to indicate the other members with whom their organization had ongoing formal ties (whether supply, production or commercial) during the year prior to the study, as well as the ties that were established after the organization's affiliation with the PICT. We then defined the *Objective Competitive Performance* as the overall number of ties.

The final response rate was consistently over 98%.

Since the questionnaire measured both the dependent and independent variables, we conducted tests to rule out common method biases (Harmon's one factor test, McEvily & Marcus, 2005; Podsakoff & Organ, 1986). To test the moderation effect, we multiplied degree centrality and involvement (*Degree Centrality X Involvement*). The *Objective Competitive Performance* results were over-dispersed. We also checked for the existence of multicollinearity among the independent variables, finding that the value of the Variance Inflation Factor (VIF) was below the cut-off of 2.5.

We included several controls in the study – namely, company size, belonging to a group, and involvement. *Size* was measured by a company's number of employees during the year prior to the study. *Group* was a dummy variable, taking 1 if a firm was a member of a group and 0 otherwise. *Involvement* was computed as described above.

Table 1 shows the summary statistics and correlations.

--- Insert Table 1 about here ---

5. Results

In order to test hypotheses H1-4, we adopted an analytical strategy that included a baseline model (BM) using the controls; a direct effects model (DEM) using the controls and the dependent variables; and a full model (FM) using the controls, the direct effects, and the interaction effects. We calculated OLS regression models for the perceived measures (*Perceptual Innovative Performance* and *Perceptual Competitive Performance*); a logit regression model for the binomial variable *Objective Innovative Performance*; and a Negative Binomial regression model for the count variable *Objective Competitive Performance*.

Innovative Performance: The results for *Perceptual Innovative Performance* (see Table 2) revealed a significant difference between models. In particular, *Shared Vision* was significant and positive, supporting

H1a. *Degree Centrality* was positive and significant in the DEM and only barely significant in the FM. In the FM, the moderator *Involvement* also displayed a barely significant and negative effect, supporting H2a and H4a. *Trustworthiness* was not significant, thus giving no support to H3a.

The results for *Objective Innovative Performance* (see Table 2) also revealed a significant difference between models. Moreover, the controls never displayed a significant effect. These results do not support H1b and H2b, since *Shared Vision* and *Degree Centrality* displayed non-significant estimates. *Trustworthiness* displayed a positive and significant effect in both the DEM and the FM, supporting H3b. Lastly, the negative and significant estimate of the interaction effect provides partial support for H4b.

--- Insert Table 2 about here ---

Competitive Performance: The results for *Perceptual Competitive Performance* (see Table 3) showed a significant difference between models. Moreover, *Shared Vision* was significant and positive, supporting H1c. *Degree Centrality* was positive and significant in the DEM and only barely significant in the FM; the latter also displayed a non-significant estimate of the moderation effect, supporting H2c, but not H4c. *Trustworthiness* was not significant, in contradiction to H3c.

The results for *Objective Competitive Performance* (see Table 3) showed a significant difference between models. *Size* displayed a significant effect in the DEM and a barely significant effect in the FM. *Shared Vision* was significant and positive, supporting H1d. H2d and H4d received no support, since the results on *Degree Centrality* only displayed a barely significant estimate in the DEM and the interaction effect with *Involvement* was not significant in the FM. *Trustworthiness* displayed a positive and barely significant effect in the FM, supporting H3d.

--- Insert Table 3 about here ---

6. Discussion and Conclusions

This paper aims to assess how the social capital developed as part of a cluster initiative affects the performance of network members. Overall, our results suggest that social capital influences the innovative and competitive performance of member firms, but the three social capital dimensions have different impacts. The cognitive and structural dimensions—respectively accounted for by *Shared Vision* and *Degree Centrality*—yielded a positive effect on both firms' (perceptual and objective) innovative and competitive performance. However, the effect of the relational dimension—captured by *Trustworthiness*—is complex. In fact, *Trustworthiness* was positively associated with the formation of innovation, but had no significant correlation with the *perception* that firms had increased their innovativeness and competitiveness. Finally, we offer an unexpected moderation effect by showing that a firm's major involvement in the activities and governance of the cluster program may negatively moderate the impact of the structural dimension on said company's performance.

Cognitive dimension: The positive impact of *Shared Vision* on a firm's innovative and competitive performance is consistent with the idea that actors who share a vision have a common language that mitigates misunderstandings and enables an easier exchange of resources (Tsai & Ghoshal, 1998; Molina-Morales & Martínez-Fernández, 2010; Munari et al., 2012). Our results are consistent with the view that a shared vision can help cluster members feel that other participants are following the same aims and goals. This perception might, in turn, strengthen members' confidence in the effectiveness of collective action (i.e., that the cluster program is delivering some sort of benefit to its participants). Moreover, sharing goals with other actors might facilitate a sense of group identification, which may then encourage a positive evaluation of the cluster's benefits.

Structural dimension: We found a positive association between *Degree Centrality* in the informal interaction network and new business and innovation ties, which is consistent with the idea that resources flow through these linkages (Ahuja, 2000; Gulati, 1998; Owen-Smith & Powell, 2004). Companies holding a central position have access to a greater volume of information (De Noni et al., 2013), such as new business and innovation opportunities and potential new partners. Consistently, our results support that firms that are central in the network exhibit superior innovativeness and competitiveness. In other words, because these firms have the ability to access large amounts of information from other members, they may perceive that their participation produces greater rewards.

Relational dimension: Our results on the effects of *Trustworthiness* are consistent with the idea that trust incentivizes the pooling of strategic resources and the transmission of information and knowledge (Gulati, 1995; Gulati & Nickerson, 2008; Zaheer et al., 1998), which then enhances performance. Thus, trustworthy firms are those that receive greater benefits compared to other participants in the cluster initiative and, thus, experience improved performance. They are more aware of business and innovation possibilities due in part to others' perception that the trustworthy firms are privileged partners with whom to establish new ties.

Moderation Effect: Overall, our data support a negative moderation effect of *Involvement* in the *Degree Centrality* on both innovative and competitive performance. As we hypothesized, a major involvement in the cluster initiative may bring both benefits and drawbacks. Since highly central companies already have access to information and knowledge via their social contacts, involvement above the average does not bring additional benefits to these companies. It only brings additional cognitive costs in terms of managing and organizing the redundant information and knowledge acquired during active participation. On the contrary, a company with a poor exchange of information and advice with other initiative members may gain access to new opportunities by participating in the cluster's activities and governance. Involvement would thus reinforce the low level of benefits acquired via social ties.

6.1. *Conclusions*

This research offers an empirical account of how the social capital developed within a cluster initiative impacts the performance of participating firms. To this end, we make a threefold contribution to the literature about the role played by interfirm relationships and networks on innovative performance. First, this study sheds light

on specific elements of social capital that should be targeted (i.e., shared vision, informal social interactions and trust among members) and those that should be carefully managed (i.e., involvement). In so doing, we add to the debate on this topic (e.g., Minola et al., 2017; Okamuro & Nishimura, 2018) by shedding light on the processes that lead firms to innovation based on the social capital generated within a cluster initiative network. In particular, we find that the cognitive and structural dimensions of social capital exert positive effects on innovative and competitive performance, while the effects of the relational dimension are more varied. In fact, the relational dimension was positively associated with the formation of innovation, but displayed no significant correlation with the perception that firms had increased their innovativeness and competitiveness. Second, we theoretically speculate about effects of involvement—the social activities and interfirms relationships that comprise the social dimension of networked firms' collective action. Our empirical study uncovered that involvement in the cluster initiative has a moderation effect, eroding the benefits that firms may achieve by being a central actor in the network. Third, by using first-hand data from a population of firms participating in an Italian cluster initiative, we contribute to the literature on R&D cooperation rooted in cluster policies, and specifically from a social capital perspective that has not been explored much empirically (Nakamura & Oshimuro, 2011; Oshimuro & Nakamura, 2018; Pucci et al., 2017). Overall, these findings add not only to the literature on cluster policies, but also shed light on interfirm collaborative relationships: They reaffirm the importance of activities that stimulate the creation of social capital among members of a cluster initiative. This could be of relevance for industrial marketers: Outside of the traditional approach to vertical buyer-seller relationships, our results suggest that firms should carefully manage their membership and participation (i.e., social exchanges and trustworthiness between peer companies) in the clustered innovation network.

That said, our results should be seen in light of some limitations that may be addressed by future research. First, the hypotheses received empirical support, but only in the context of a single cluster program. Relatedly, a small population size potentially limits the statistical robustness of the analysis. Future research should strive to validate the results in other cluster programs. Second, the cross-sectional nature of our research means that we could not assess the impact of social capital over the life cycle of the cluster initiative. Thus, a future study might try to repeat the analysis in a longitudinal format. Finally, given most of the companies in the population are small or micro, performance and firm-level information were not systematically available on business databases (e.g.: Amadeus, Aida) nor on the local Chamber of Commerce. Future research should try to address this limitation by triangulating available data with financial reports analysis.

References

Aarikka-Stenroos L., Sandberg B., Lehtimaki T., (2014) Network for the commercialization of innovation: A review of how divergent network actors contribute, *Industrial Marketing Management*, 67, 23-36.

Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *Administrative Science Quarterly*, 45(3), 425–455.

Aragón, C., Aranguren, M. J., Iturrioz, C., & Wilson, J. R. (2014). A social capital approach for network policy learning: the case of an established cluster initiative. *European Urban and Regional Studies*, *21*(2), 128-145.

Aranguren, M. J., Larrea, M., & Wilson, J. (2010). Learning from the local: Governance of networks for innovation in the Basque Country. *European Planning Studies*, *18*(1), 47-65.

Bolino, M. C., Turnley, W. H., Bloodgood, J. M. (2002). Citizenship Behavior and The Creation of Social Capital In Organizations. *Academy of Management Journal* (27/4): 505-522.

Bourdieu, P. (1986). *The forms of capital* in J. Richardson (Ed.) *Handbook of Theory and Research for the Sociology of Education* (New York, Greenwood), 241-258.

Borgatti, S. P., Everett, M. G., and Freeman, L. C. (2002). *Ucinet for Windows: Software for social network analysis*. Harvard Analytic Technologies.

Borgatti, S. P. , Foster, P. C. (2003). The Network Paradigm in Organizational Research: A Review and Typology. *Journal of Management* (29/6): 991 -1013.

Borgatti, S. P., Everett, M. G., and Johnson, J. C. (2013). *Analyzing social networks*. London: Sage.

Borrás, S., & Tsagdis, D. (2008). *Cluster policies in Europe*. Edward Elgar Publishing.

Boschma, R. (2005). Proximity and innovation: a critical assessment. *Regional studies*, 39(1), 61–74.

Brass, D. J. (2012). *A social network perspective on organizational psychology* in S. W. J. Kozlowski (Ed.), *The Oxford handbook of organizational psychology*, 667-695. New York: Oxford University Press.

Brunetta, F., Boccardelli, P., & Lipparini, A. (2018). The Role of Networks for Innovation in Temporary and Project-Based Organizations. In *Learning and Innovation in Hybrid Organizations* (pp. 101-113). Palgrave Macmillan, Cham.

Burt, R. S. (1992). *Structural holes: The structure of social capital competition*. Cambridge, MA: Harvard University Press.

Burt, R. S. (2005). *Brokerage and Closure: An Introduction to Social Capital*. Oxford University Press.

Cantù, C., Corsaro, D., Tunisini, A., and Lind, F. (2015). Goal diversity and resource development in an inter-organisational project. *Journal of Business & Industrial Marketing*.

Colucci, M., & Visentin, M. (2017). Style and substance: a case study of the expansion of mature business-to-business relationships in the Italian clothing industry. *Journal of Business & Industrial Marketing*, *32*(1), 153-166.

Colucci, M., & Visentin, M. (2019). Continuity and Variety: The Allocation of Symbolic Rewards in Elite Italian Winemaking. *International Journal of Arts Management*, *22*(1), 41-53.

Czarnitzki, D., Ebersberger, B., & Fier, A. (2007). The relationship between R&D collaboration, subsidies and R&D performance: empirical evidence from Finland and Germany. *Journal of applied econometrics*, *22*(7), 1347-1366.

Ebbekink, M., Lagendijk, A. (2013). What's the next in Researching Cluster Policy: Place-Bsed Governance for Effective Cluster Policy. *European Planning Studies* (21/5): 735-753.

Fornahl, D., Hassink, R., & Menzel, M. P. (2015). Broadening our knowledge on cluster evolution. *European Planning Studies,* 23(10), 1921-1931.

Freeman, L. C. (1979). Centrality in Social Networks Conceptual Clarification. *Social Networks* (1): 215-239.

Fromhold-Eisebith, M., and Eisebith, G. (2005). How to institutionalize innovative clusters? Comparing explicit top-down and implicit bottom-up approaches. *Research policy*, 34(8), 1250–1268.

Ganesan, S., Malter, A. J., and Rindfleisch, A. (2005). Does Distance Still Matter? Geographic Proximity and New Product Development. *Journal of Marketing*, *69*(4), 44–60.

George, G., Zahra, S. A., & Wood Jr, D. R. (2002). The effects of business–university alliances on innovative output and financial performance: a study of publicly traded biotechnology companies. *Journal of business Venturing*, *17*(6), 577-609.

Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91(3), 481–510.

Gulati, R. (1995). Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Journal*, 38(1), 85-112.

Gulati, R. (1998). Alliances and networks. *Strategic Management Journal*, 19(4), 293–317.

Gulati, R., and Nickerson, J. A. (2008). Interorganizational trust, governance choice, and exchange performance. *Organization Science*, 19(5), 688-708.

Hansen, M. T. (2002). Knowledge networks: Explaining effective knowledge sharing in multiunit companies. *Organization Science*, 13(3), 232–248.

Hansen, M. T., Mors, M. L., Lovas, B. (2005). Knowledge sharing in organizations: multiple networks, multiple phases. *Academy of Management Journal* (48/5): 776-793.

Hermalin, B.E., 2013. Leadership and corporate culture. In: Gibbons, R., Roberts, J. (Eds.), The Handbook of Organizational Economics. Princeton University Press, New Jersey, pp. 432–478.

Huggins, R. (2000). The success and failure of policy-implanted inter-firm network initiatives: motivations, processes, and structure. *Entrepreneurship and Regional Development*, 12(2), p.211-236.

Ingstrup, M. B. (2014). When Firms Tale the Lead in Facilitating Clusters. *European Planning Studies* (22/9): 1902-1918.

Inkpen, A. C., and Tsang, E. W. (2005). Social capital, networks, and knowledge transfer. *Academy of management review*, 30(1), 146–165.

Jain, M., Khalil, S., Johnston, W.J. and Cheng, J.M.S. (2014), "The performance implications of power-trust relationship: the moderating role of commitment in the supplier-retailer relationship", *Industrial Marketing Management*, Vol. 43 No. 2, p. 312-321

Kale, P., Singh, H., and Perlmutter, H. (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic Management Journal*, 21(3), 217–237.

Klette, T. J., Møen, J., & Griliches, Z. (2000). Do subsidies to commercial R&D reduce market failures? Microeconometric evaluation studies. *Research policy*, *29*(4-5), 471-495.

Koka, B. R., and Prescott, J. E. (2002). Strategic alliances as social capital: A multidimensional view. *Strategic Management Journal*, 23(9), 795–816.

Larsson, R., Bengtsson, L., Sparks, J. (1998). The Interorganizational Learning Dilemma: Collective Knowledge Development in Strategic Alliances. *Organization Science* (9/3): 285-305.

Laumann, E. O., Marsden, P. V., and Prensky, D. (1989). The boundary specification problem in network analysis. In: Freeman, L. C., White, D. R., Romney A. K. (Eds.), *Research methods in social network analysis* (pp. 61–87). New Brunswick, NJ: Transaction Publishers.

Laur, I., Klofsten, M., Bienkowska, D. (2012). Catching Regional Development Dreams: A Study of Cluster Initiatives as Intermediaries. *European Planning Studies* (20/11): 1909-1921.

Lechevalier, S., Ikeda, Y., & Nishimura, J. (2010). The effect of participation in government consortia on the R&D productivity of firms: a case study of robot technology in Japan. *Economics of Innovation and New Technology*, *19*(8), 669-692.

Lee, R. (2009). Social capital and business management: Setting a research agenda. *International Journal of Management Reviews* (11/3): 247-273.

Lefebvre, P. (2013). Organising deliberate innovation in knowledge clusters: from accidental brokering to purposeful brokering processes. *International Journal of Technology Management*, 63(3–4), 212–243.

Levin, D. Z., and Cross, R. (2004). The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer. *Management Science*, 50(11), 1477–1490.

Lewicki, R.J., Bunker, B.B. (1996). Developing *and maintaining trust in work relationships* in R.M. Kramer & T.R. Tyler, (Eds.). *Trust in organizations: frontiers of theory and research*. Thousand Oaks, CA: Sage.

Lin, N. (2000). *A Theory of Structure and Action*. Cambridge: Cambridge University Press.

Lindqvist, G., Ketels, C. and Sölvell, Ö, (2013). *The cluster initiative greenbook 2.0*. Stockholm: Ivory Tower Publishers.

Lundberg, H., & Andresen, E. (2012). Cooperation among companies, universities and local government in a Swedish context. *Industrial Marketing Management*, *41*(3), 429-437.

Lundequist, P., & Power, D. (2002). Putting Porter into practice? Practices of regional cluster building: evidence from Sweden. *European planning studies*, *10*(6), 685-704.

Maskell, P. (2001). Towards a Knowledge-based Theory of the Geographical Cluster. *Industrial and Corporate Change* (10/4): 921 -943.

McEvily, B., and Marcus, A. (2005). Embedded ties and the acquisition of competitive capabilities. *Strategic Management Journal*, 26(11), 1033–1055.

Moran, P. (2005). Structural vs. relational embeddedness: Social capital and managerial performance. *Strategic Management Journal*, 26(12), 1129–1151.

Molina-Morales, F. X. (2005). The territorial agglomerations of firms: A social capital perspective from the Spanish tile industry. *Growth and Change*, 36(1), 74–99.

Molina-Morales, F. X., and Martínez-Fernández, M. T. (2010). Social networks: effects of social capital on firm innovation. *Journal of Small Business Management*, 48(2), 258–279.

Möller, K., & Svahn, S. (2003). Managing strategic nets: A capability perspective. *Marketing theory*, *3*(2), 209-234.

Motohashi, K. (2005). University–industry collaborations in Japan: The role of new technology-based firms in transforming the National Innovation System. *Research policy*, *34*(5), 583-594.

Munari, F., Sobrero, M., and Malipiero A. (2012). Focal firms as technological gatekeepers within industrial districts: knowledge creation and dissemination in the Italian packaging machinery industry. *Industrial and Corporate Change*, 21, 429–462.

Nahapiet, J. (2008). The Role of Social Capital in Inter-organizational Relationships. In: Cropper, S., Huxham, C., Ebers, M., Ring, P. S. (Eds.), *The Oxford Handbook of Inter-Organizational Relations* (pp. 580-606), Oxford: Oxford University Press.

Nahapiet, J., and Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23(2), 242–266.

Nishimura, J., and Okamuro, H. (2011). Subsidy and networking: The effects of direct and indirect support programs of the cluster policy. *Research Policy*, 40(5), 714–727.

Okamuro, H., & Nishimura, J. (2015). Local management of national cluster policies: Comparative case studies of Japanese, German, and French biotechnology clusters. *Administrative Sciences*, *5*(4), 213-239.

Okamuro, H., and Nishimura, J. (2018). Whose business is your project? A comparative study of different subsidy policy schemes for collaborative R&D. *Technological Forecasting and Social Change*, *127*, 85-96.

Owen-Smith, J., and Powell, W. W. (2004). Knowledge networks as channels and conduits: The effects of spillovers in the Boston biotechnology community. *Organization Science*, 15(1), 5–21.

Parrilli, M. D., Aranguren; M. J., Larrea, M. (2010). The Role of Interactive Learning to Close the "Innovation Gap" in SME-Based Local Economies: A furniture Cluster in the Basque Country and its Key Policy Implications. *European Planning Studies* (18/3): 351-370.

Podsakoff, P. M., and Organ, D. W. (1986). Self-reports in organizational research: problems and prospects. *Journal of Management*, 12, 531–544.

Porter, M. E. (1998). Clusters and the New Economics of Competition. *Harvard Business Review*, 76(6), 77–90

Pucci, T., Brumana, M., Minola, T., and Zanni, L. (2017). Social capital and innovation in a life science cluster: the role of proximity and family involvement. *The Journal of Technology Transfer*, 1–23. doi:10.1007/s10961-017-9591-y

Rampersad, G., Quester, P., and Troshani, I. (2010). Managing innovation networks: Exploratory evidence from ICT, biotechnology and nanotechnology networks. *Industrial Marketing Management*, *39*(5), 793-805.

Sölvell, Ö, Lindqvist, G., and Ketels, C. (2003). *The cluster initiative greenbook*. Stockholm: Ivory Tower Publishers.

Schepis, D., Ellis, N., & Purchase, S. (2018). Exploring strategies and dynamic capabilities for net formation and management. *Industrial Marketing Management*, *74*, 115-125.

Spencer G, Vinodrai T, Gertler M and Wolfe D., (2010) Do Cluster Make a Difference? Defining and Assessing their Economic Performance, *Urban Studies*, Vol. 44 July, pp. 697-715.

Sternberg, R., Kiese, M., & Stockinger, D. (2010). Cluster policies in the US and Germany: varieties of capitalism perspective on two high-tech states. *Environment and Planning C: Government and Policy*, *28*(6), 1063-1082.

Teigland, R., and Lindqvist, G. (2007). Seeing eye-to-eye: how do public and private sector views of a biotech cluster and its cluster initiative differ?. *European Planning Studies*, 15(6), 767–786.

Tracey P., (2014). Bringing "Place" Back In: regional Cluster, Project Governance and New Product Outcomes, *Journal of Marketing*, Vol. 78 (November), 1-14.

Tsai, W. (2000). Social capital, strategic relatedness and the formation of intraorganizational linkages. *Strategic Management Journal*, 21(9), 925–939.

Tsai, W., and Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, 41(4), 464–476.

Uyarra, E., & Ramlogan, R. (2016). The impact of cluster policy on innovation. *Handbook of innovation policy impact*, 196-225.

Uzzi, B. (1997). Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Administrative Science Quarterly* (42): 35-67.

Westerlund, M., Svahn, S. (2008). A relationship value perspective of social capital in networks of software SMEs. *Industrial Marketing Management* (37): 492-501.

Wilson, J. R. (2019). Cluster policy resilience: new challenges for a mature policy. *International Journal of Business Environment*, *10*(4), 371-382.

Wolfe, D. A., Gertler, M. S. (2004). Clusters from the Inside and Out: Local Dynamics and Global Linkages. *Urban Studies* (41/5-6): 1071-1093.

Wolfe, D. A., Nelles, J. (2008). *The Role of Civic Capital and Civic Associations in Cluster Policy*. Chapter 21 in *Handbook of Research on Innovation and Clusters - Cases and Policies* edited by Charlie Karlsson. Edward Elgar Pub.

Yang, Z., Zhou, C. and Jiang, L. (2011), "When do formal control and trust matter? A context-based analysis of the effects on marketing channel relationships in China", *Industrial Marketing Management*, Vol. 40 No. 1, pp. 86-96.

Yli-Renko, H., Autio, E., and Sapienza, H. J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22(6–7), 587–613.

Zaheer, A., McEvily, B., and Perrone, V. (1998). Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science*, 9(2), 141–159.

Zheng, W. (2010). A Social Capital Perspective of Innovation from Individuals to Nations: Where is Empirical Literature Directing Us?. *International Journal of Management Reviews*: 151-183.

Zucker, L. G., & Darby, M. R. (2001). Capturing technological opportunity via Japan's star scientists: Evidence from Japanese firms' biotech patents and products. *The journal of Technology transfer*, *26*(1-2), 37-58.

Zucker, L.G., Brewer, M.B., Darby, M.R., Peng, Y., 1996. Collaboration structure and information dilemmas in biotechnology: organizational boundaries as trust production. In: Kramer, R.M., Tyler, T.R. (Eds.), Trust in Organizations: Frontiers of Theory and Research. Sage, Thousand Oaks, CA, pp. 90–113.

Figure 1: The theoretical framework

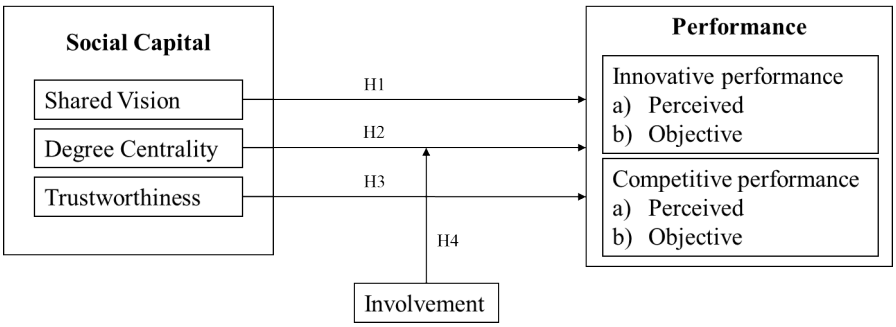

Table 1: Summary Statistics and Correlations

	Involvement	Group	Size	Shared Vision	Degree	Trustworthiness	Degree Centrality X Involvement	Perceptual Innovative Performance	Objective Innovative Performance	Perceptual Competitive Performance	Objective Competitive Performance
Involvement	1										
Group	-.189	1									
Size	.282□	-.028	1								
Shared Vision	.577***	-.258□	.261□	1							
Degree Centrality	.154	.268□	.291□	.005	1						
Trustworthiness	.256□	.315*	.454**	.118	.732***	1					
Degree Centrality X Involvement	.065	-.124	.300*	.187	-.23	-.107	1				
Perceptual Innovative Performance	.335*	.057	.204	.484**	.330*	.328*	-.289*	1			
Objective Innovative Performance	-.109	.276□	.182	-.082	.313*	.449**	-.079	.135	1		
Perceptual Competitive Performance	.299*	.022	.139	.434**	.312*	.287□	-.299*	.903***	.126	1	
Objective Competitive Performance	-.15	.114	-.081	-.003	.558***	.362*	-.720***	.412**	.136	.352*	1
N.	47	47	45	46	47	47	47	47	47	47	47
Mean (s.d.)	.00(1.52)	.32(.47)	.0(238.82)	.0(1.51)	.0(1.65)	.0(2.47)	.38(3.35)	3.43(1.71)	.53(.50)	3.12(1.56)	1.64(3.81)
Min-Max	-4.12 – 2.21	.0 – 1	-55.16 – 1481.84	-3.05 – 2.45	-1.36 – 5.64	-2.81 – 7.19	-17.63 – 5.82	.0 – 7.0	.0 – 1	.0 – 6.5	.0 – 25

Table 2: Results for *Innovative Performance*

	Perceptual Innovative Performance			*Objective Innovative Performance*		
	CM	DEM	FM	CM	DEM	FM
Controls						
Involvement	.306 (.182)	-.095 (.172)	-.069 (.168)	-.087 (.244)	-.301 (.357)	-1.204 (.599)
Group	.546 (.531)	.464 (.461)	(0.268) (0.448)	- .165 (.736)	-.668 (.838)	-.781 (.994)
Size	.001 (.001)	.000 (.001)	.000 (.001)	.004 (.007)	.002 (.006)	(.004) (.007)
Direct Effects						
Shared Vision		.648*** (.159)	0.656*** (0.154)		-.013 (.313)	.334 (.411)
Degree Centrality		.412* (.174)	.331□ (.174)		-.026 (.373)	.802 (.564)
Trustworthiness		.022 (.126)	.012 (.123)		.584* (.268)	.603* (.287)
Moderation Effect						
Degree Centrality X Involvement			-.117□ (.064)			-.838* (.378)
R^2	0.111	0.466	0.510			
R^2 Change	0.111	0.355	0.044			
F	1.701	5.525***	5.509***			
χ^2				5.719	14.286*	20.743**
Cox & Snell R^2				0.119	0.272	0.369
Nagelkerke R^2				0.159	0.363	0.493

Significance Codes: □ p<0.1; *p<0.05; **p<0.01 ; ***p<0.001

Table 3: Results for *Competitive Performance*

	Perceptual Competitive Performance			*Objective Competitive Performance*		
	CM	DEM	FM	CM	DEM	FM
Controls						
Involvement	.238 (.171)	-.106 (.169)	- 0.082 (0.166)	-.119 (.1352)	-.195 (.220)	-.141 (.245)
Group	.330 (.500)	.239 (.452)	.242 (.443)	-.318 (.486)	.611 (.614)	.666 (0.609)
Size	.000 (.001)	-.001 (.001)	.000 (.001)	-.002 (.0024)	-.007* (.003)	-.007□ (.003)
Direct Effects						
Shared Vision		.551** (.156)	.558** (.152)		.651* (.281)	.630* (.276)
Degree Centrality		.388* (.170)	.316□ (.172)		.360□ (.188)	.314 (.199)
Trustworthiness		.014 (.124)	.005 (.121)		.309□ (.166)	.289□ (0.166)
Moderation Effect						
Degree Centrality X Involvement			-.103 (.063)			- .049 (.751)
R^2	0.065	0.391	0.432			
R^2 Change	0.065	0.326	0.041			
F	0.952	4.063**	4.014**			
Pearson $\chi 2$				72.909	24.595	24.995
Log Likelihood				-77.215	-60.024	-59.817
Likelihood Ratio $\chi 2$				5.28	39.661***	40.077***

Significance Codes: □ p<0.1; *p<0.05; **p<0.01 ; ***p<0.001