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External managerial networks, strategic flexibility and organizational learning: A comparative study between Non-QM, ISO and TQM firms

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Abstract

This paper studies the effect of external managerial social networks on strategic flexibility and organizational learning, considering three groups of analysis (Non-QM, ISO and TQM firms). At the present, there is a wide variety of alternatives for managing quality in organizations, such as ISO Standards or the EFQM model. Thus, different alternatives will influence the external social networks differently, affecting strategic flexibility and organizational learning, as literature on external social networks suggests that they can affect strategic flexibility and organizational learning positively. Through a comparative ANOVA analysis and step-wise regressions, we observe that external social networks affect strategic flexibility and organizational learning positively, primarily through greater size of the networks. On the other hand, we find that, depending on the QM initiative implemented in the organization, other effects vary. For example, in organizations without QM, the range of external social networks influences strategic flexibility negatively, whereas in organizations with ISO standards, this negative effect disappears. In organizations with TQM, we find the positive effect of both size and strength. For organizational learning, a negative relationship between this capability and network range was found for Non-QM firms group. These relationships turned positive for TQM firms group.

Keywords

ISO standards, TQM, external social networks, strategic flexibility, organizational learning

1. Introduction

The importance of quality management (QM) in current competitive environments has already been shown (Kaynak, 2003; Nair, 2006; Prajogo and Sohal, 2006). As a result of its positive effects on organizational performance, QM implementation has been extended all around the world. Thus, the great evolution that QM has undergone in the last few years has led to the current existence of different options proposed for implementing the practices that this philosophy proposes (García-Bernal et al., 2004). In the quality movement, there are numerous methods and tools. They vary from an orientation to the customer or process to those oriented to the human dimension or to the system dimension, and finally those that

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involve a change of culture and of learning (Gutiérrez et al., 2010; Handfield et al., 1998). Familiar examples of these are Quality Control, the American Malcom Baldrige Model, the European Foundation for Quality Management (EFQM) Excellence Model, ISO Standards and the most recent Six Sigma methodology. As a consequence, managers face a wide range of possibilities for implementing QM in their organizations. The goal of this article is to offer organizations a criterion of differentiation between three different alternatives (non-QM, ISO Standards and TQM²), based on the behaviour of social networks, strategic flexibility and organizational learning.

In spite of the importance of QM, McAdam et al. (2008) and Mellat-Parast and Digman (2007) argue that there is a need to look at quality management from the strategic view of the firm, and we argue the need for the network perspective. There is a serious lack of studies that analyze the relation between QM practices and external social networks. Thus, “there is no evidence on how the principles of quality management can be implemented within a network of firms” (Mellat-Parast and Digman, 2007, p. 804). This study will contribute to QM literature testing the relationship between the implementation of QM initiatives and external social networks effects.

Another particularly prominent gap relates to the role of CEOs’ social networks in fostering strategic flexibility and organizational learning. This gap is especially notable because the strategic choice (Child, 1972) and upper echelon (Hambrick and Mason, 1984) perspectives have highlighted the importance of top managers, especially CEOs, in driving strategic changes in firms (Rajagopalan and Spreitzer, 1997). In this context, CEOs’ social networks function as conduits for the transmission of information, resources and opportunities that could be leveraged to firm’s capabilities (Liebeskind et al., 1996), like strategic flexibility and organizational learning. So, in increasingly unpredictable environments, organizations need the capacity to carry out the strategic changes necessary to find timely solutions to solve the problems they face (Shimizu and Hitt, 2004). This is, firms need embrace strategic flexibility and CEOs’ social networks could contribute it through information, knowledge and other resources. Besides through organizational learning, which takes knowledge as an input and generates new knowledge as an output (Levitt and March, 1998), CEOs are brought together to achieve permanent changes in organizational behavior (Senge et al., 1994). Powell (1990) showed that social networks serve as sources of reliable information, which is essential to efficient organizational learning. Therefore, sourcing information from external experts not only increases learning, but also increases the flexibility of a firm's boundaries because each external expert represents a "strategic sourcing option" that the firm can exercise only when necessary (Volberda, 1996).

Thus, our research tests, in the three alternatives observed (non-QM, ISO Standards and TQM), the nexus between the informational benefits of networks and their utility in generating organizational learning and strategic flexibility. To explore this relationship in greater depth, we will study how the different dimensions of networks (Collins and Clack, 2003) can have different effects on these variables, as they contribute heterogeneous resources. Network dimensions observed include size, range and strength. Network size represents the total group of links that a person has with another ones, total of information channels. Network range represents the diversity of contacts in a social networks, it is, the

² At the present ISO standards are the most extended initiative for QM (Magd and Curry, 2003) and TQM, also constitutes a QM representative initiative as it is associated with other alternatives such as the EFQM model (Van Marrewijk et al., 2004), Six Sigma (Green, 2006) or the Malcom Baldrige model (Samuelsson and Nilsson, 2000).

variety of groups (clients, suppliers, etc.). The strength of the ties³ is a multifaceted construct consisting of interaction frequency, and the emotional intensity or closeness of a bond (Granovetter, 1973).

In summary, the goal of this paper is to study how the dimensions of external social networks (size, range and strength) affect strategic flexibility and organizational learning in the firm and whether there are significant differences in these effects depending on whether the organizations have implemented one QM initiative or another (non-QM, ISO Standards and TQM). The paper is structured as follows. After this introduction, we present a literature review that covers the relationship between external social networks and strategic flexibility and organizational learning; and the role of different QM initiatives in the previous relationship. After we review the literature, we describe the methodology and the analysis performed. Subsequently, we discuss the results obtained and present the main conclusions, limitations and recommended directions for future research.

2. Theoretical background

2.1. External social networks, strategic flexibility and organizational learning

External social networks

The external social networks of CEOs, defined as the systems of relationships that CEOs have with other actors outside their organization (Collins and Clark, 2003), are widely recognized as a crucial determinant of their access to information and knowledge (Gulati *et al.*, 2000). Social capital theory postulates that networking relationships provide value to actors (e.g., individuals, organizations or communities) by allowing them to tap into the resources embedded in such relationships for their benefit (Bourdieu, 1986; Lin, 2001). Early usage of the concept of social capital focused on how the resources acquired by an individual through the development of close social relationships and networks influence his/her behaviour (a micro-micro link). This argument has been extended to organizations (a micro-macro link) (e.g., Baker, 1990; Gulati, 1995).

Three important dimensions of the structure of social networks are the size and range of the network and the strength of the ties (Collins and Clark, 2003; Cross and Cummings, 2004; Gabbay and Leenders, 1999). Network size is important because each connection that a person has represents an information channel. Network range represents the diversity of contacts in social networks. Large and diverse networks enable firms to develop a comprehensive awareness of new opportunities and hence to develop new resources and to change their competitive posture quickly by promoting better inference of continuously shifting competitor moves. When a person takes into account the opinions of different audiences, he or she is better prepared to anticipate different contingencies (Burt, 2004; McDonald *et al.*, 2008; Reagans and Zuckerman, 2001). This can favour the emergence, combination or recombination of good new ideas and actions (Obstfeld, 2005). Thus, CEOs who use more information sources have greater access to competitive ideas and opportunities and better results (Dussauge *et al.*, 2000; McEvily and Zaheer, 1999; Zaheer and Bell, 2005; Zaheer and Zaheer, 1997).

Another key aspect of networks that affects information flows is the strength of the ties. Strong networks facilitate the exchange of detailed information (Krackhardt, 1992; Uzzi, 1996), due to the fact that these networks are characterized by frequent interaction, a common

³ In this paper strength of the ties, links or bonds are considered as synonyms.

history and mutual trust (Anand and Khanna, 2000; Granovetter, 1982, 2005). However, such networks require more maintenance, which implies that the volume of information will be smaller and probably redundant.

External social networks and strategic flexibility

Aaker and Mascarenhas (1984) define *strategic flexibility* as the ability to adapt to substantial, uncertain, rapidly occurring environmental changes that impact firm performance significantly. Thus, strategic flexibility reflects a firm's ability to respond continuously to unanticipated changes and to adjust to unexpected consequences of predictable changes (Lei et al., 1996).

Most studies of strategic flexibility have focused on technology (Evans, 1991; Sanchez, 1995; Worren *et al.*, 2002) and resources (Harrigan, 1985; Young-Ybarra and Wiersema, 1999) as antecedents. These studies have ignored the influence of CEOs on strategic flexibility (Nadkarni and Narayanan, 2007, are an exception). In this study, we propose that CEOs' networks influence strategic flexibility. The development of networking relationships with top managers of other firms, clients or suppliers, enable CEOs to acquire resources, valuable information and knowledge that they can use to mitigate uncertainties and help in making the best strategic decisions to adapt the firm to the environment.

We propose that different characteristics of social networks, such as size of networks and strength of ties, may have different implications for strategic flexibility from the perspective of the social capital they provide. The network literature suggests that networks greater in size and range will foster strategic flexibility through broad scanning, speedy diagnosis and simultaneous consideration of strategic alternatives. Large and diverse social networks generate a greater variety of perspectives and stimulate criticism, since they have more access to new and diverse information and knowledge (Rodan and Galunic, 2004) and advice for problem solving (Gibbons, 2004; Sparrowe and Liden, 2005). These networks allow CEOs to notice and respond to more stimuli (Campbell-Kelly *et al.*, 2008) through heterogeneous information and knowledge (Rodan and Galunic, 2004), reducing the gap between real and provided adaptation to the environment. Larger and diverse networks promote more extensive discussion of strategic choices (Lant *et al.*, 1992), reducing the likelihood of cognitive inertia (Hodgkinson, 1997; Reger and Palmer, 1996) and status quo behaviour (Miller and Chen, 1996) that inhibit strategic flexibility.

The quality, trust and exclusivity concerning the information and knowledge derived from strong ties makes them valuable and positive in helping the organization to respond to certain contexts (Dyer and Nobeoka, 2000; Geletknycz and Hambrick, 1997; Kraatz, 1998). For example, networking relationships between CEOs and their key customers and suppliers facilitate the creation, acquisition, and exploitation of knowledge (Dyer and Nobeoka, 2000; Yli-Renko *et al.* 2001). Ties with competitors may lead to collaboration and implicitly to working together to confront competitive uncertainties in their environment (Park and Luo, 2001). This leads us to articulate the following hypothesis:

Hypothesis 1a: External social networks size of CEOs will be positively related to strategic flexibility.

Hypothesis 2a: External social networks range of CEOs will be positively related to strategic flexibility.

Hypothesis 3a: External social networks strength of CEOs will be positively related to strategic flexibility.

External social networks and organizational learning

Organizational literature conceptualizes learning as a process of knowledge acquisition, knowledge assimilation, and knowledge exploitation (Cohen and Levinthal, 1990; Huber, 1991). Recent studies have proposed that interorganizational relationships create opportunities for knowledge acquisition and exploitation (Dyer and Singh, 1998; Lane and Lubatkin, 1998). Through interactions with others, firms get access to external knowledge and can combine it with existing knowledge. Interorganizational relationships include those contacts that a firm may have with external organizations including customers, suppliers, investors, government institutions (Dyer and Singh, 1998; Larson, 1992). The learning process requires collaborative action among individual members to accomplish a given task during a given period (Powell et al., 1996), and members need to overlap roles, engage in coordination, and establish mutual interests. Dyer and Nobeoka (2000) find that learning teams in Toyota supplier networks contribute to members' joint new practice adoption by increasing their confidence and capabilities to move forward together in the new direction.

Nevertheless, several gaps remain in scholars' understanding of how firms embrace organizational learning. One prominent gap relates to the role of CEOs in fostering organizational learning. In this study, we focus on the social capital developed by the CEO through personal social networking relationships with external entities (CEOs' egonetworks) and the repercussions that these networks may have for organizational learning.

Sharing extant knowledge between different partners in a social network can also jointly create other specific knowledge by decomposing and recombining their complementary knowledge bases of each other. Large and diverse networks increase the level of knowledge bases to the CEOs, and it is expected to have a positive effect on new knowledge creation. This is consistent with the idea of more new information is generated through this brokerage. Lou (2001) notes that local Chinese managers' networking ties with foreign managers from different culture and with diverse experience background and management skills increase manager's willingness to develop new knowledge. Strength ties facilitate share of existing knowledge and the creation of new knowledge. Strong networks facilitate the exchange of detailed information (Krackhardt, 1992; Uzzi, 1996), due to the fact that these networks are characterized by frequent interaction, a common history and mutual trust (Anand and Khanna, 2000; Granovetter, 1982, 2005). Regular patterns of interaction among individuals permit the transfer, recombination and creation of specialized knowledge (Grant, 1996) and promote the exploitation of existing knowledge (Rowley et al., 2000). In this respect, the strength of social ties might be expected to influence firm's range of organizational learning. Strong ties encourage reciprocity, a long-term perspective and joint problem-solving arrangements (e.g., Larson, 1992; Uzzi, 1997), stimulating knowledge transfer, learning and protection in interorganizational settings (Dyer and Nobeoka, 2000; Kale et al., 2000) and learning about other firms' competencies and reliability (Kale et al., 2000). Thus, we propose the following hypotheses:

Hypothesis 1b: External social networks size of CEOs will be positively related to organizational learning.

Hypothesis 2b: External social networks range of CEOs will be positively related to organizational learning.

Hypothesis 3b: External social networks strength of CEOs will be positively related to organizational learning.

2.2. Quality Management initiatives and external social networks

Few studies in the literature analyze the relationship between quality management and external social networks. However, we find some studies that observe the effect of quality management practices on particular network cases. The contacts more analyzed are the supply chain (Flynn and Flynn, 2005; Lin et al., 2005) and strategic alliances (Mellat-Parast and Digman, 2007; 2008). These are two examples of positive relations of quality management practices on external contacts with providers and other firms. In this context, the same result would occur with other contacts, such as those with customers, competitors or financial institutions. Thus, practices such as orientation to the customer, which constitute one of the principles of quality management (Dean and Bowen, 1994; Prajogo and Sohal, 2003; Sitkin et al., 1994), cultural change (Black and Porter, 1996; Douglas and Judge, 2001) or benchmarking activities (Ahire et al., 1996; Powell, 1995) will collaborate in the development of these networks, and specifically for accessing to information. As a consequence, the positive effect of quality management practices on external social networks seems to be clear.

On the other side, as we affirmed above, at the present managers face a wide range of alternatives for QM implementation (Quality Control, Malcolm Baldrige Model, EFQM model, ISO Standards...). All these initiatives are composed by different QM structural elements. Quality Management elements are practices that should be carried out to achieve the success of its implementation. Dean and Bowen (1994) define these as the path for implementing the principles of QM. Clearly, this is an issue of greatest importance for the firms, since a direct relation has been established between the elements implemented, the form and intensity with which they have been implemented, and the organization's performance (Ahire et al., 1996; Anderson et al., 1995; Flynn et al., 1994; Kaynak, 2003; Nair, 2006; Powell, 1995; Waldman, 1994). However, the degree to which these practices develop is not the same in all QM initiatives (Gutiérrez et al., 2010). Currently, for example, the most widely QM initiative used is the implementation of ISO Standards. The literature on QM shows that ISO Standards lead to higher levels of QM practices implementation than basic QM (Gotzamani, 2005; Vouzas and Gotzamani, 2005). But also, these standards represent a significant initial step for manufacturing organizations on the way to TQM, since they involve a lower initial degree of commitment to their principles. Some studies rank TQM above ISO Standards (Bendell, 2000), although others argue that the new version of ISO Standards has some quite close to TQM (Boulter and Bendell, 2002; Gotzamani, 2005; Vouzas and Gotzamani, 2005).

These differences between ISO Standards and TQM, and obviously between both and Non-QM implementation option, lead us to establish that there are different alternatives for QM, whose elements development degrees differ among them. Thus, the development of the QM elements depends on the QM initiative in use (ISO Standards, Quality Control, Malcolm Baldrige, Six Sigma, EFQM, etc.). Elements such as leadership, product/service design, supplier management, process management, etc., as we observed, have a positive influence on external social networks. However, if the elements development degrees differ among QM initiatives, their influences on external social networks, probably will be different. This study will therefore attempt to observe whether the effects included in Hypotheses 1a) b), 2a) b) and 3a) b), differ depending on whether the organizations observed have implemented one QM initiative or another. We thus propose the fourth hypotheses:

H4a: The effect of the dimensions of external social networks of managers (size, range and strength) on organizational strategic flexibility differs between non-QM organizations, organizations with ISO Standards, and TQM organizations.

H4b: The effect of the dimensions of external social networks of managers (size, range and strength) on organizational learning differs between non-QM organizations, organizations with ISO Standards, and TQM organizations.

3. Research method

3.1. Data sample

The context chosen to test these hypotheses is the geographical region of Spain. We selected this area to minimize the impact of variables that we cannot control in the empirical research. Literature recommends selecting a sample of firms located in a relatively homogeneous geographical, cultural, legal and political space (Alder, 1983; Hofstede, 1980).

We conducted systematic random sampling of 900 companies from a mailing list Amadeus database and Dun and Bradstreet Spain. The search criterion was medium-sized and large manufacturing and services firms, as defined by the guidelines of the Fourth European Directive⁴ (2009). Because our research focuses on strategic actions—that is, on decisions that depend on the CEOs of the companies—we chose CEOs as the key informants. The procedure for data collection consisted of sending a letter by mail (754 questionnaires) or email (146 questionnaires), to different Spanish firms' CEOs. The letter explained the reasons for and objectives of the research. Finally, questionnaires answered could be sent back by mail or email.

The questionnaire was developed after an extensive review of the literature related to main constructs observed. Once designed, the questionnaire was pretested by three Spanish managers, which enabled the clarification of possible ambiguities, correction of errors and solution of formatting problems. We received 226 questionnaires, of which 203 were valid. The response rate was 22.6%. This response rate by economic sector was 24.3% manufacturing firms -94 received- and 21.2% services firms -109 received-.

Of the total of 203 firms, 5.9% reported annual sales of 7 million euros or less, and 27.6% of the firms had annual sales between 7 and 40 million of euros. The firms that had annual sales of more than 40 million of euros comprised about 66.5%. As to the number of employees in each of the firms surveyed, 9.8% of the firms had less than 50 employees, 29.6% from 51 to 250, and 60.6% over 250 workers. According to the previous guidelines of the Fourth European Directive (2009), companies were categorized in the group in which achieve at least two of the three criteria of the Directive. The result showed that 43.3% were medium-sized companies and the 56.7% were large companies.

Using the same database, we checked for non-response bias. This source also provided the archival data concerning the annual sales incomes and number of employees of the responding firms and a sample of non-responding firms. The differences of means between the responding and non-responding companies concerning these variables were tested using two independent samples t-test. The results demonstrated that all t-statistics were non-significant at the level of 0.05. (The p-values for these comparisons ranged from .25 to .55). Since the questionnaire was answered by a single informant, we also checked for common

⁴ "Small" companies are companies which do not exceed the limits of two of the following three criteria (in millions EUR): a) balance sheet total<5; b) annual sales<7 and c) number of employees<50. "Medium-sized" companies are companies which achieve at least two of the following three criteria: a) balance sheet total:5-27; b) annual sales:7-40 and c) number of employees:51:250.. "Large" companies are companies which achieve at least two of the following three criteria: a) balance sheet total>27; b) annual sales>40 and c) number of employees>250.

method bias using Harman's one-factor test. A principal factor analysis of all measurement items yielded 7 factors with eigenvalues larger than one. These factors accounted for 52% percent of the variance. Since the first factor accounts for 21% of variance (less than half of the variance explained by the set of factors with eigenvalues greater than one), common method variance is unlikely to be a serious problem in the data (Podsakoff and Organ, 1986).

3.2. Measurement and tests for reliability and validity (see Appendix A)

External social networks of CEOs. External social networks of CEOs were measured observing the size, range and strength of the links that they maintain with their contacts (Collins and Clark, 2003) in seven categories: board directors same industry, board directors other industries, suppliers, clients, financial institutions, competitors and other companies' partners. The *size* of the network refers to the total number of the director's contacts that give him/her relevant information. We requested that the CEOs give the rough rate for each category (see Appendix A). To measure this rate, we asked directors to identify the number of their relevant contacts for each of the seven external categories (Collins and Clark, 2003; Hansen, 1995), using a Likert-type scale of 7 points where 1 indicates "none", 2 "few (1-3)" and 7 "many (>25)" to respond to the following question: "On average, how many people are important sources of information regarding important business or industry trends and issues?" (Cronbach's Alpha= 0.841). The *range* of the network represented the diversity of the respondent's contacts. Network range observes if CEOs interact with different contacts (suppliers, customers, etc.), or only with one or two contacts, for example, other managers. This was measured as the number of different categories with which the manager has contact (Powell and Brantley, 1992; Scott, 1991). Tie strength was operationalized as an index measuring frequency of communication or interaction and emotional intensity or closeness of the relationship (Fischer, 1982; Hansen, 1999; Marsden and Campbell, 1984; Reagans and McEvily, 2003). The frequency of the relationship was provided through the responses to the question: "On average, how often do you communicate with the people in each category?" Emotional intensity was measured through the response to the question: "On average, how would you characterize your relationship to each category?" For these cases, we provided a 7-point Likert scale to which the CEO's could respond. In the case of frequency, 1 indicated "very often" and 7 "very infrequently." In the second case, 1 indicated "distant or very far" and 7 "very close" (reverse-score). Strength was measured jointly as a linear combination of the standardized point values of the two components (Collins and Clark, 2003, Granovetter, 1973) (Cronbach's Alpha= 0.71).

Strategic Flexibility. An adaptation of a scale develop by Verdú-Jover et al. (2004) has been used, which is a synthesis of the contributions of Volberda (1996, 1998), since the perspectives of the studies were similar. Our research is based on a large number of firms and performs cross-sectional analysis. Finally, managers had to indicate their level of agreement or disagreement with the statements (see Appendix A), using a seven-point Likert-type scale (Cronbach's Alpha = 0.865).

Organizational learning. Various studies have measured organizational learning in organizations (e.g. Edmondson, 1999; Lähteenmäki et al., 2001). We selected the first two items from the scale of Kale et al., (2000) and added two items based on Edmondson (1999). We developed a confirmatory factor analysis to validate our scale and showed that the four-item scale was unidimensional and had high reliability ($\alpha=0.919$). (See Appendix A)

Classification variable: Implementation of quality management initiatives

To identify the implementation of quality management initiatives, the questionnaire included a list of the different alternatives (non-QM, ISO Standards and TQM). The firms would choose the initiatives that they had underway.

Control variables: Incomes

Large companies have a greater number of advantages due to their resources (Barney, 1991). Therefore, we include annual sales incomes as control variable. Different income levels affect to the information required from external networks, to carry on flexible behaviours and to QM implementation.

4. Data analysis

4.1. Sample distribution

We began the investigation by dividing the total sample obtained (n=203) into three groups. For the first group, we selected firms that did not choose any of the quality management initiatives included in the questionnaire. This group (Group 0, non-QM firms) was composed of 73 organizations. The second group included organizations that had implemented only the ISO standards. This second group (Group 1, ISO firms) was formed of 67 organizations. Finally, in the third group we included those firms that had chose the TQM initiative or the EFQM model, having or not the ISO standards implemented. This group (Group 2, TQM firms) was composed of 63 organizations. Table I includes group distribution, means, standard deviations, medians, maximum and minimum for each observed variable. For all four variables observed, highest means values are associated with TQM firms group, followed by Non-QM firms group and finally by ISO-firms group. For all four variables observed, highest means values are associated with TQM firms group, followed by Non-QM firms group and finally by ISO-firms group. This aspect will be considered in the discussion section.

4.2. ANOVA analysis

Once the sample was distributed into the three groups described, using the statistical program SPSS 15.0, we performed an ANOVA analysis of the means of the three groups relative to all observed variables “size”, “range” and “strength” of external social networks, strategic flexibility, and organizational learning. This test enabled us to observe if the observed variables generate significant differences among the three groups. Normality of dependent variables and homoscedasticity assumptions were confirmed. The results of the comparisons of means are shown in Table II. All variables, size (F=7.822; p=.001), rage (F=6.793; p=.001), strength (F=6.931; p=.001), strategic flexibility (F=15.025; p=.000) and organizational learning (F=7.526; p=.001) generate significant differences between groups.

Insert Table II about here

4.3. Regression analysis

In order to contrast the hypotheses 1, 2 and 3, we proceed to study the relationships between amongst themselves. For this purpose, we perform a regression analysis by steps for each of the groups. Before performing this analysis, we assessed the assumptions of multiple regression analysis. Thus, linearity, homoscedasticity, normality and multicollinearity assumptions were observed. Results showed that all these assumptions could be confirmed.

Tables III and IV show the results of the regression analysis for the independent variables size, strength and range and the dependent variables strategic flexibility and organizational learning, for each of the groups analyzed. Independent variable “Incomes” is used as control variable. There is not any significant difference between groups. Therefore, income level is

not determining factor for flexibility or learning level, independently of QM initiative implemented. As we can see in table III, the variable “size of network” was included as a significant variable in the three regressions ($\beta=0.825$, $\beta=0.366$, $\beta=0.437$, $p<0.01$, to non-QM group, ISO group and TQM group respectively). Thus, Hypothesis 1a founds strong support. However, there are differences in the other variables. Thus, in addition to size, for Non-QM group, the range exercises a negative and significant influence on strategic flexibility ($\beta=-2.171$; $p<0.01$). If we study ISO group and TQM group, this significant influence does not occur. Hypothesis 2a is rejected. Finally, TQM group adds a positive and significant effect of strength on strategic flexibility ($\beta=0.395$; $p<0.05$). Hypothesis 3a is confirmed only to TQM group. We find that external social networks influence strategic flexibility positively through their dimensions, except in the first case, where the range has a negative influence. . On the other hand, there are differences in the effects of the variables “size”, “strength” and “range” on strategic flexibility, depending on the quality initiative implemented in the organization. Based on this result, we can accept Hypothesis 4a.

Insert Table III about here

Insert Figure I about here

Referring to table IV, the variable “size of network” shows a significant relationship with the dependent variable “organizational learning”, for Non-QM firms group and ISO firms group. Network size for TQM firms group is not related significantly with organizational learning. Thus, hypothesis H1b is partially supported. Secondly, network range shows a positive relationship with organizational learning only for TQM firms group. For ISO firms there is not any significant relationship, and for Non-QM firms, there is a negative relationship between network range and organizational learning. As a consequence, hypothesis H2b is confirmed only to TQM firms group. Thirdly, network strength does not show any significant relationship with organizational learning, in any of the groups. Thus, hypothesis H3b is rejected. Finally, there are significant differences in the effects of the variables “size” and “range” on organizational learning, depending on the observed group. These differences are not observed for “strength” variable. Thus, hypothesis H4b is partially supported.

Insert Table IV about here

Insert Figure II about here

5. Conclusions and future research

5.1. Conclusions

Our study seeks to analyze the influence of size and range of CEO’s network and strength of ties on two capacities highly dependent on knowledge management: strategic flexibility and organizational learning, including the factor of quality management as main contribution. It is included to test how the relationships between external networks and strategic flexibility, and organizational learning, can be influenced by the kind of quality management initiative that organizations are implementing.

In general, our information reinforces the importance of CEOs’ social networks to develop strategic capabilities in the organization (Kang, 2008). In particular, the dimension of size affects strategic flexibility positively in the three groups observed (Non-QM, ISO and TQM firms), and organizational learning in Non-QM firms group and ISO firms group. As we established, a greater number of contacts generates a higher number of points of view, which contributes to knowing more ideas and creating new ones (Burt, 1992; Obstfeld, 2005). The

absence of significant relationship between size and organizational learning in TQM firms group will be discussed below.

For both capabilities, strategic flexibility and organizational learning, strength is developed significantly to a greater extent in TQM firms than in ISO firms or non-QM firms, constituting an example of QM's contribution to external networks. For example, we have mentioned the importance of trust, a key element in TQM in forging strong relations (Dyer and Nobeoka, 2000; Larson, 1992; Lorenzoni and Lipparini, 1999; Zaheer et al., 1998). On the other hand, strong networks require detailed information exchange (Krackhardt, 1992; Uzzi, 1996) characterized by frequent interaction (Granovetter, 1982). This study has shown that TQM firms generate greater strength in external social networks through their structural practices, including supply management, cooperation, benchmarking, knowledge sharing or learning, develop stronger external social networks, which contribute significantly to strategic flexibility and organizational learning.

It is important to pause over the negative effect detected in the case of the dimension "range" for non-QM firms for both capabilities. This result implies that, as the different categories of agents with which we associate increase, strategic flexibility and organizational learning decreases. A greater range implies a greater number, complexity and even juxtaposition of ideas and information received. This can lead to immobility or delayed reactions (Simon, 1959; Szulanski, 1996). Although variety increases the range of the organization's potential behaviours, it can also create confusion and generate costs (Borgatti and Cross, 2003). Thus, this result can be due to that non-QM firms are not used to manage a high number of different agents, unlike ISO and TQM firms, which have it inherent to QM principles, especially TQM philosophy. However, in observing the range in the other two groups, we confirm that—in spite of the fact that it is lower for the group of ISO-firms and higher for the group of TQM-firms—its influence is not significantly negative for any of the cases.

Observing all variables, if we divide the sample into non-QM firms, ISO-firms and TQM-firms, we can draw two important conclusions. Firstly, TQM-firms develop all of the dimensions of external social networks, strategic flexibility and organizational learning to a greater extent. Secondly, we see that the importance of the influence of the dimensions of external social networks on strategic flexibility and organizational learning decreases significantly when we move from non-QM firms to ISO-firms and TQM-firms. An explanation for this fact could be that TQM philosophy emphasises other structural elements inherent in it, such as strategic leadership, teamwork or stimulating decision-making processes, possibly achieving more relevance, that network dimensions, specially if we compare them with non-QM and ISO firms. Ruiz et al. (2005) studied 127 service firms from European Union and observed the positive relationship between TQM practices and organizational learning. However, the authors established that some of the relationships were indirect, instead of direct relationships. This is the case of leadership, policy and strategy, resources and partnerships, and people. The indirect relationships between partnerships and organizational learning could be an explanation for the absence of relationship between network size and organizational learning. Probably, for organizational learning, it is more important the diversity than the amount of information or knowledge. However, as a significant relationship has been found between network range and organizational learning, further studies could be directed to this line of research.

As we have observed, at the present, managers face a wide range of possibilities for implementing QM in their organizations (TQM, ISO standards, Six Sigma, etc.). Our

conclusions may help them with this kind of decision, as the fact that TQM firms develop to a greater extent external networks dimensions, strategic flexibility and organizational learning, is an important aspect that should be considered when TQM alternative and ISO standards alternative were compared.

Our research has several implications for business practitioners. This study provides evidence that external networks serve as important informational resources for firms. Firstly, firms may be able to purposefully develop and manage the CEO's networks depending on their interests or needs. Firms and CEOs must also be conscious of the fact that social networks have both different potential benefits and significant costs (time, resources, etc.) (Alder and Kwon, 2002). However, since different network characteristics affect firm capabilities and performance differently, companies should be careful to create the network characteristics that are more interesting in their particular environmental and organizational context. So, CEOs' networks could be significant factors in the choice, training and remuneration of CEOs (Collins and Clark, 2003; Geletknycz et al., 2001; Jensen and Roy, 2008; Sumelius, 2009). The "right" CEO with the "right" kind of social network, in size, range and strength, may be able to access new and relevant information and knowledge, contributing to improvements in the firm's performance (e.g., Collins and Clark, 2003).

Finally, the organization should encourage the acquisition, implementation, transformation and use of new and relevant knowledge through CEOs' networks. Managers must devote continuous and substantial effort to developing knowledge management in the organization. These include encouraging more modern organizational structures and compensation policies and stimulating organizational flexibility and learning to encourage better knowledge transfer (Lane and Lubatkin, 1998; Nonaka and Takeuchi, 1995). The manager should be a good leader and mentor, capable of guiding the other members of the firm in their professional trajectories. This involves supporting their growth because he or she has faith in people's capacity to learn, change and innovate.

In conclusion, our results highlight the importance of the social networks of CEOs in fostering strategic flexibility and organizational learning. We hope that these results spur additional research encompassing CEO psychology, strategic behavior, and firm performance. Such research could further understanding of the mechanisms underlying the relationship between CEO and firm performance.

5.2. Limitations and future research

Among the limitations of our study, we must include the fact that QM alternative implementation is observed using a single item, instead of a compound construct. The sample of firms is not distributed uniformly according to the number of employees and annual sales incomes. Together with the cross-sectional character of the research, this factor somewhat limits generalization from these results. Thus, longitudinal research that analyses a greater number of cases and that observes effects on different kinds of organizations could enrich the literature on the external social networks and quality management initiatives.

Further, one could analyze internal managerial social networks, as well as those established between workers themselves, to determine their effects on the generation of different dynamic capabilities. We intuit that these are a significant direct and moderating variable, as they would influence the levels of capturing, creating and transforming resources. On the other hand, one could study the influence of the social networks on the different kinds of flexibility (strategic, structural and operative). This would deepen our understanding of the influences of

managerial networks on strategic and structural levels, as well as the effects of the networks with workers and the influence of networks between workers on levels of operational flexibility. Finally, establishing direct multiple comparisons between these (ISO and TQM) and other QM initiatives (EFQM model, Quality Control, Lean Manufacturing) could bring deeper understanding of their functioning, helping managers differentiate between them.

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TABLES

Table I. Means and standard deviations

Variable	n	Mean	S.D.	Median	Min	Max
Size (Non-QM firms)	73	3.93	1.13	3.57	1.59	7.00
Size (ISO firms)	67	3.80	1.01	3.57	1.59	7.00
Size (TQM firms)	63	4.71	.85	4.57	2.00	7.00
Strength (Non-QM firms)	73	3.89	.79	4.00	1.00	5.69
Strength (ISO firms)	67	3.73	.77	3.86	1.00	5.90
Strength (TQM firms)	63	4.38	.67	4.36	2.50	6.10
Range (Non-QM firms)	73	.85	.18	.86	0.14	1.00
Range (ISO firms)	67	.80	.21	.86	0.14	1.00
Range (TQM firms)	63	.92	.10	1.00	0.57	1.00
Strategic Flexibility (Non-QM firms)	73	4.21	1.10	4.13	2.13	6.25
Strategic Flexibility (ISO firms)	67	4.12	1.00	3.88	2.25	6.50
Strategic Flexibility (TQM firms)	63	5.01	0.92	5.25	2.25	6.88
Organizational Learning (Non-QM firms)	73	5.24	1.18	4.12	2.50	7.00
Organizational Learning (ISO firms)	67	5.47	0.98	3.87	3.00	7.00
Organizational Learning (TQM firms)	63	5.89	0.68	5.25	3.75	7.00

Variable	n	0-50	51-250	>250
Numer of employees (Non-QM firms)	73	5	21	47
Numer of employees (ISO firms)	67	7	18	42
Numer of employees (TQM firms)	63	8	21	34
		0-7*	7-40*	>40*
Annual sales (Non-QM firms)	73	5	26	42
Annual sales (ISO firms)	67	4	19	44
Annual sales (TQM firms)	63	3	11	49

* Millions Euro

Table II. ANOVA analysis between Non-QM firms, ISO firms and TQM firms

Variable	F	p-value
Size	7.822	.001
Strength	6.793	.001
Range	6.931	.001
Strategic Flexibility	15.025	.000
Organizational Learning	7.526	.001

Table III. The effect of external social networks on strategic flexibility in non-QM, ISO and TQM firms

Non-QM firms				ISO firms				TQM firms			
Variables	Strategic flexibility			Variables	Strategic flexibility			Variables	Strategic flexibility		
	Model				Model				Model		
	Coefficient	t	p-value		Coefficient	t	p-value		Coefficient	t	p-value
Constant	3.755	7.655	.000	Constant	3.131	9.488	.000	Constant	2.303	3.584	.001
Incomes	.233	1.945	.056	Incomes	.550	.393	.696	Incomes	.830	.594	.555
Size	.825	6.807	.000	Size	.366	3.218	.002	Size	.437	3.576	.001
Strength	.156	1.114	.269	Strength	-.050	-.355	.739	Strength	.395	2.566	.013
Range	-2.171	2.882	.005	Range	-.085	-.537	.593	Range	-.022	-.137	.891
R ²	.429			R ²	.137			R ²	.244		
F	26.294			F	10.356			F	9.702		
			.000				.002				.000

Table IV. The effect of external social networks on organizational learning in non-QM, ISO and TQM firms

Non-QM firms				ISO firms				TQM firms			
Variables	Organizational learning Model			Variables	Organizational learning Model			Variables	Organizational learning Model		
	Coefficient	t	p-value		Coefficient	t	p-value		Coefficient	t	p-value
Constant	5.343	10.300	.000	Constant	4.440	13.802	.000	Constant	3.662	5.117	.000
Incomes	.114	.987	.327	Incomes	.006	.046	.963	Incomes	.222	1.796	.078
Size	.942	7.376	.000	Size	.379	3.416	.001	Size	.124	.832	.409
Strength	.202	1.480	.143	Strength	-.111	-.751	.455	Strength	.215	1.711	.092
Range	-3.200	-4.017	.000	Range	-.260	-1.703	.093	Range	2.428	3.144	.003
R ²	.447			R ²	.152			R ²	.139		
F	28.296			F	11.672			F	9.883		

Figure I. The effect of external social networks on strategic flexibility according to different QM initiatives

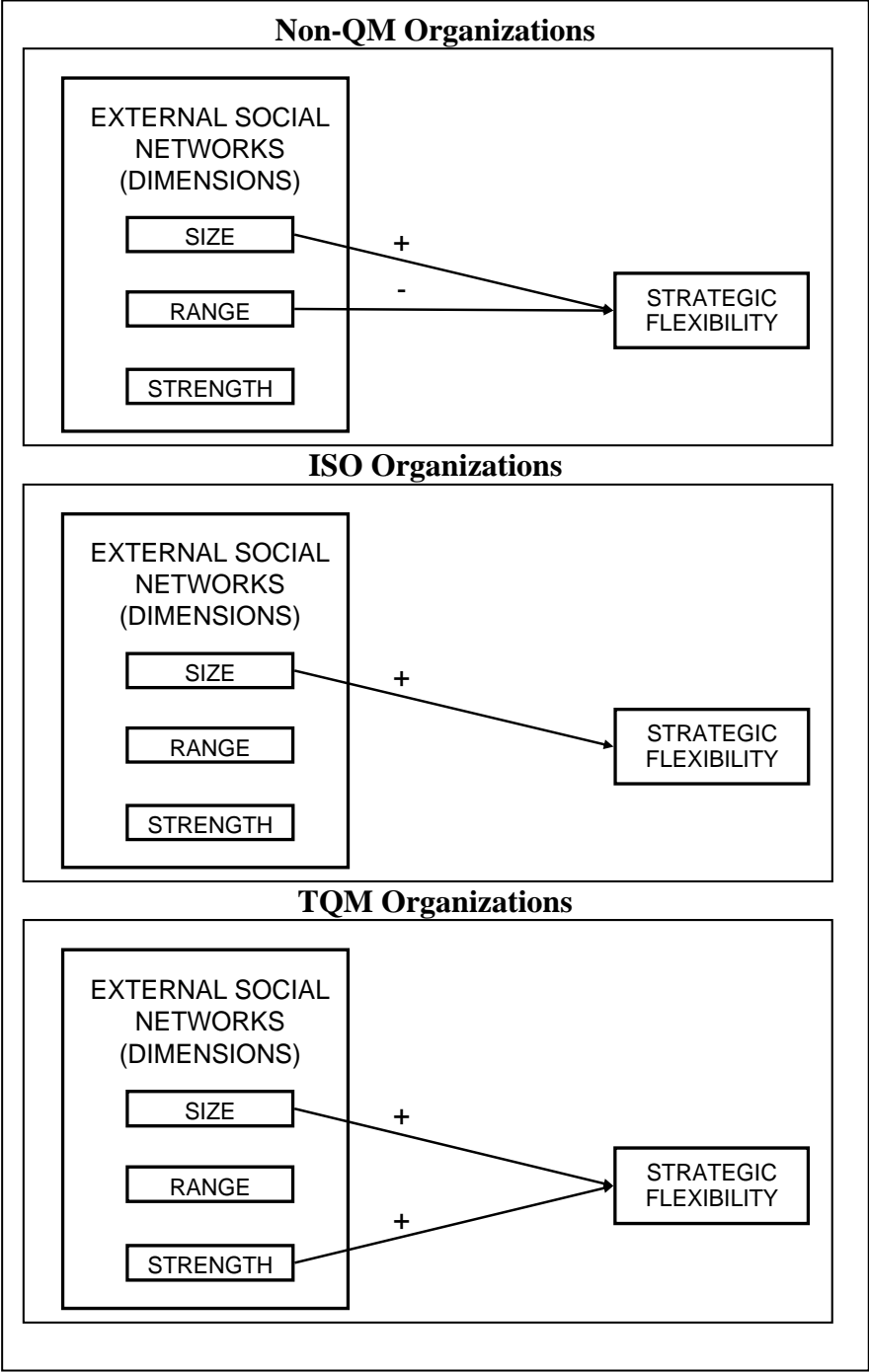
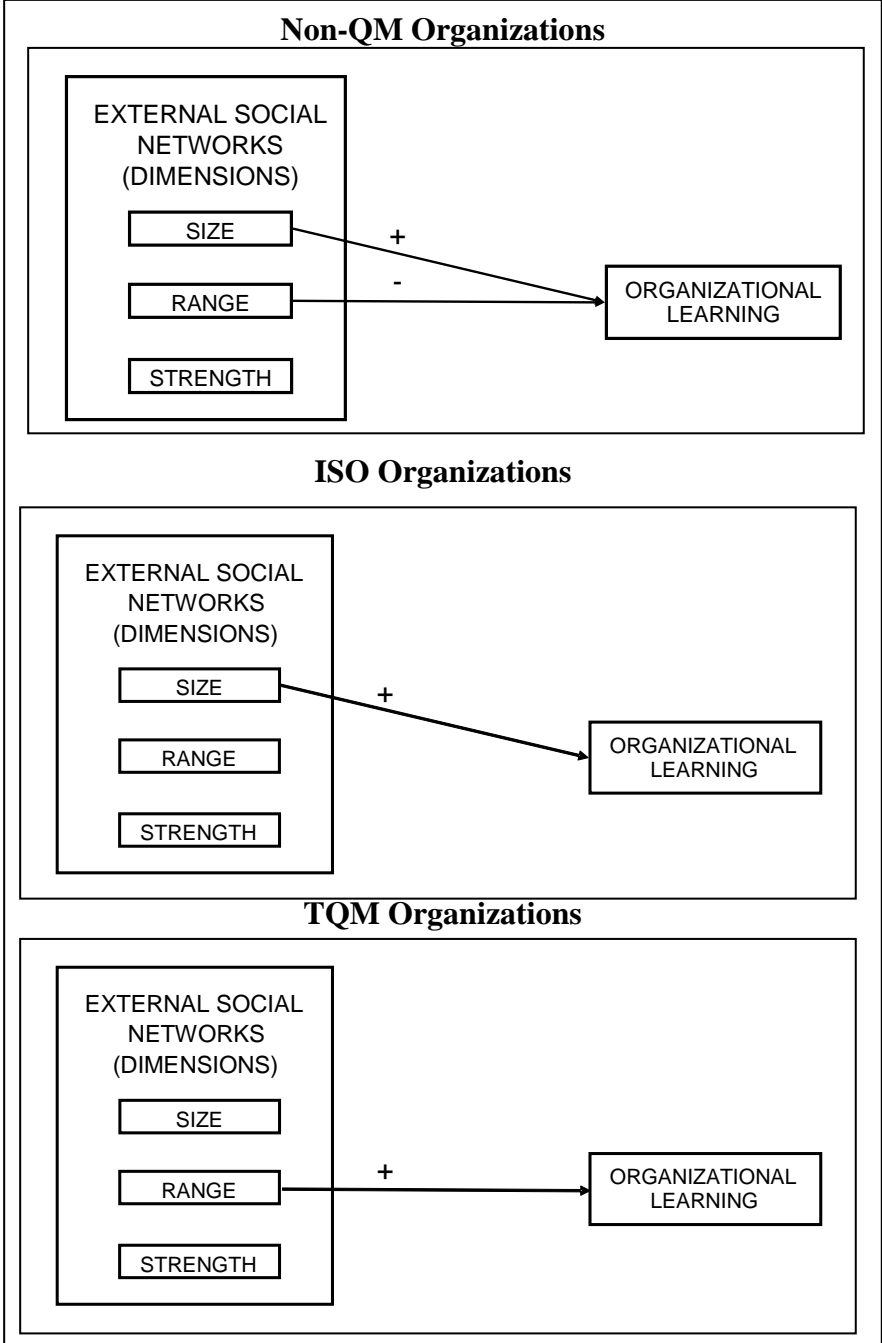


Figure II. The effect of external social networks on organizational learning according to different QM initiatives



APPENDIX A. SCALES

External social networks: range, size and strength

Categories of external connections	On average, how many people are important sources of information regarding important business or industry trends and issues? None= (0) (1-3) (4-5) (6-10) (11-15) (16-25) (>25)= Many								
	1	2	3	4	5	6	7		
Board Directors same industry			1	2	3	4	5	6	7
Board Directors other industry			1	2	3	4	5	6	7
Suppliers			1	2	3	4	5	6	7
Clients			1	2	3	4	5	6	7
Financial institutions			1	2	3	4	5	6	7
Competitors			1	2	3	4	5	6	7
Other companies' partners			1	2	3	4	5	6	7

Categories of external connections	On average, how would you describe your relationship with each category? Distant =1 2 3 4 5 6 7 = Very close							On average, how often do you communicate with each category? Very often=1 2 3 4 5 6 7=Very infrequently						
	Board Directors same industry	1	2	3	4	5	6	7	1	2	3	4	5	6
Board Directors other industry	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Suppliers	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Clients	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Financial institutions	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Competitors	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Other companies' partners	1	2	3	4	5	6	7	1	2	3	4	5	6	7

Strategic flexibility

Totally disagree 1 2 3 4 5 6 7 Totally agree

-In our company <u>we reformulate very quickly the strategies</u> when is required by the market conditions or the strength of competitors	1 2 3 4 5 6 7
-When the environment conditions change, <u>we have a range of strategic measures at our disposal</u> to face the change	1 2 3 4 5 6 7
-We use machinery and/or technology of production of goods or of provision of services that allow to perform a <u>high number of operations in a fast way</u> and without incurring high expenses to change the tasks	1 2 3 4 5 6 7
-The numbers of <u>modifications over the products or services</u> introduced every year is high	1 2 3 4 5 6 7
-In our company we have the capacity to offer new products or services (to widen the range) very quick and easily (with relatively low costs) with the consequent changes in the production tasks	1 2 3 4 5 6 7
-In our company we make advertising campaigns or promotions with the objective of influencing the consumers' tastes	1 2 3 4 5 6 7
-Our position in the market <u>allow us to control</u> the competitors and to make difficult the entrant of new ones in the market	1 2 3 4 5 6 7
-In our company we can <u>influence</u> certain political actions tending to modify the commerce regulations	1 2 3 4 5 6 7

Organizational learning

-The organization has acquired and used much new and relevant knowledge that provided competitive advantage over the last three years.	1 2 3 4 5 6 7
-The organization's members have acquired some critical capacities and skills that provided competitive advantage over the last three years.	1 2 3 4 5 6 7
-Organizational improvements have been influenced fundamentally by new knowledge entering the organization over the last three years.	1 2 3 4 5 6 7
-The organization was a learning organization.	1 2 3 4 5 6 7