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Information Sharing among Innovative SME: an exploratory study within the Portuguese SME Innovation Network

Abstract

This paper aims to enhance understanding on inter-organizational information sharing through a study in a Portuguese SME Innovation Network, which is composed of innovative firms from different economical sectors. The type of information shared was identified as well as the channels used, the gains obtained and the factors that influence its occurrence. A qualitative approach was used based on the perception of members and coordination. The motivating role played by the coordination of the network is a point to emphasize regarding the collective sharing of information. Factors related to network structure, national culture, characteristics of the companies and channels used were identified as inhibitors to a greater identification between the companies. Moreover, the factors that influence the information sharing process between the companies and its most important information sharing partners within the network were also identified.

1 Introduction

Despite the growing number of studies on inter-organizational information/knowledge sharing in the last 20 years (Easterby-Smith et al. 2008), there are still many aspects that require a deeper understanding, such as the treatment of information sharing as an independent variable from other factors that define collaboration or cooperation (Madlberger 2009) and the identification of its antecedents, especially from a multi-disciplinary perspective (Wijk et al. 2008; Martinkenaite 2011;).

This paper aims to enhance the understanding on inter-organizational information sharing through a study in a Portuguese SME Innovation Network, which is composed of innovative firms from different economical sectors. The type of information shared within the network will be presented as well as the channels used, the aspects influencing the process and its contribution to the organizations. These aspects were identified both in the collective scope and between the most important relationships. A qualitative approach was used based on the perception of members and coordination.

Understanding the kind of information shared, how and why information flows among partners will bring gains to the network coordinators, who are expected to encourage the improvement of policies, incentives and channels concerning the information sharing process. Moreover, the results may offer guidance to the companies when it comes to the aspects that must be developed internally or stimulated in the partner when the information sharing is aimed.

2 Information sharing in inter-organizational networks

Inter-organizational networks can be understood as "institutional arrangements that allow efficient organization of economic activities through the coordination of systematic links established among interdependent firms" (Britto 2001). One of the links that characterize any kinds of networks is the sharing of information.

There seems to be no consensus regarding the most appropriate term to refer to the inter-organizational information sharing, since various terms are used in the literature such as *information/knowledge sharing* (Fiala 2004; Mei and Nie 2007), *information dissemination* (Zhang, Vonderembse and Lim 2006), *information/knowledge transfer* (Tushman and Scanlan 1981; Simonin 2004), *information exchange*, (Moberg et.al. 2002; Madlberger 2009), *knowledge flow* (Dahl and Pedersen 2004), *knowledge diffusion* (Ernst and Kim 2002), *knowledge acquisition* (Hau and Evangelista 2007).

In this paper information sharing is defined as the information's communication process amid the members of the network. This process is understood to take place in a social context, which means that the informational needs of individuals are not merely cognitive, but directly related to labour and social groups to which they belong (Capurro 2003). Information is defined as meaningful data.

Researches conducted in different types of inter-organizational relationships, such as supply chain networks (Moberg 2002; Madlberger 2009), strategic alliances (Simonin 2004), clusters (Mei and Nie 2007) and innovation networks and inter-organizational teams (Fritsch and Kauffeld-Monz 2008; Bond III et al. Tang 2008) have showed that the information sharing process is dynamic and its occurrence requires taking into consideration several factors, such as the type of partnership, the type of information, the characteristics of the firms and the characteristics of the network.

Specifically apropos its antecedents, several factors are identified in the literature, such as aspects related to the firm's characteristics (organization size, absorptive capacity, ability to transfer, motivation to teach and to learn, a centralized position in the network, the presence of ICT), to the nature of the knowledge (tacitness, complexity, specificity, ambiguity) and to the inter-organizational dynamics (power, trust, social ties, the existence of vision and common systems and exchange routines) (Wijk et al. 2008; Easterby-Smith et. al. 2008; Madlberger 2009; Martinkenaite 2011).

Finally, literature highlights the benefits of inter-organizational information sharing, such as prerequisites for the consolidation of inter-organizational relations, antecedents for the improvement of product development (Lawson et al. 2009); antecedents for the innovation capacity and performance of organizations (Mei and Nie 2007; Wijk, Jansen and Lyles 2008); antecedents for the development of new strategies and customer satisfaction (Zhang et al. 2006).

3 Methodology

Taking into account the assumptions underlying the qualitative study according to Creswell (1994), this study can be classified as a qualitative research. The focus is on the *process* of information sharing, mainly considering the influencing factors and channels used; the main interest is the *meaning* given by the coordination representative and the companies' managers about the process; the result is a *descriptive* understanding of the process and an *inductive* analysis of the data.

When it comes to the objective it is an exploratory research and when it comes to the method it is classified as a field research. The unit of analysis was the information sharing process within the "SME Innovation COTEC Network", which belongs to the COTEC Portugal Network. Primary data was collected through semi-structured interviews with a representative of the network's coordination and the managers of five companies that belong to the network, as following:

- Interviewee A – Executive President – Pharmaceutical sector
- Interviewee B – Managing Partner – ICT sector
- Interviewee C – General Manager – Environmental Consulting sector
- Interviewee D – Chairman of the Board - ICT and engineering sector
- Interviewee E – Managing Director – Aerospace sector

Considering the exploratory feature of the study, a more diverse sample was aimed in order to obtain a broader view of the information sharing process. Therefore the five companies surveyed belong to different sectors. The time of foundation is situated between 10 and 22 years and the number of employees between 13 and 180. The companies are sited in different locations. Secondary data from the network website was also used. An interaction between the theoretical literature and the primary and secondary data was carried out, following Yin's (2009) orientation.

4 COTEC Portugal Network and SME Innovation COTEC Network

4.1 Characterization of the Network

COTEC Portugal Network - Business Association for Innovation - is a private, nonprofit organization, founded in 2003 by the President of the Republic, who has exerted, since the beginning, the role of President of the General Assembly. It aims to contribute to the National System of Innovation by promoting the competitiveness of Portuguese companies through the development of a culture and practices focused on innovation. The network was initially formed by large companies, called "Associated Companies".

In 2005, COTEC Portugal Network, taking into consideration the importance of the SME for the Portuguese economy, created the SME Innovation COTEC

Network with the objective of promoting public recognition of innovative SME, establishing a cooperation between the Associated Companies and the SMEs and supporting SMEs growth phases especially concerning the attraction of investment and internationalization. SMEs are considered companies with less than 250 employees and annual turnover not exceeding 50 million or balance value not exceeding 43 million Euros.

The SME Innovation COTEC Network is composed of firms with a turnover of at least 200,000 Euros, at least 10 employees, at least 3 years in the market and a minimal degree of innovation. This degree is measured by a tool developed for this purpose - the innovation scoring - whose results are analyzed by a specific committee. Membership requires the payment of an annual fee of 1,000 Euros. Moreover, in order to remain in the network, companies must maintain the efforts towards innovation, since they will be evaluated annually with respect to this criterion. Nowadays the network has 119 members. According to the coordination's representative, around 40% of them belong to ICT sector and the remaining belongs to different sectors such as food, footwear, mold, engineering and furniture. The companies are also geographically dispersed over the country.

4.2 Information Sharing Process via Collective Channels

Two types of information are primordially shared within the network through the collective channels: information related to the companies - Associates or SMEs - and information about innovation.

The main channels used by the SME Innovation Network to share information are the following ones:

- COTEC Network Website, which provides information such as activities promoted by the network to support the innovation process, training, information on innovation in Portugal, statistics on R&D and management practices.
- Technology Platform "Collaborate", a virtual communication channel that links the Associates and the SME, through which it is possible to share insights and launch projects.
- "Day of the Associate", on which representatives of the companies belonging to the SME Innovation Network are received by a large company that will share information on its competences, structure, expectations, experiences and buying trends, among others.
- The SME Innovation COTEC annual meeting, in which the members of the network have the opportunity to share successful experiences of other companies, especially regarding the conquest of new markets. The coordination has the purpose of maximizing the sharing with respect not only to successful experiences, but also to failures or mistakes, giving opportunities for companies to learn from the mistakes of each other.

The representative of the coordination highlights the important role played by coordination to encourage members to participate in network activities and to meet one another:

We are the engine, we pull things. We try to make them go...and then we get out of the way as soon as possible.

He also highlights the importance of a sense of reciprocity among the members, a perception that things are ambivalent, as a condition that facilitates the information sharing.

Three gains are identified regarding the collective sharing of information. The first one, which comes especially from the information sent by the coordination of the Network, is the encouragement and training of members in respect of internal organization and management of innovation, as showed by the following statement:

...helping companies to systematize the ideas, to organize and manage them, an aspect that is fundamental and which was managed by us empirically and based on feeling...
(Interviewee A)

Interviewee A highlighted that the questionnaire itself, made by COTEC to select companies that want to belong to the network, help them in the systematization of ideas on innovation. Hiring people to fill positions such as manager of innovation and director of innovation, research and development and obtaining certification such as the standard 4457 on Research, Development and Innovation Management Systems are some of the strategies adopted by companies to improve the internal organization.

The second gain is the development of closer relationships between partners due to joint participation in the same events, which allows richer information sharing between them and identification of new business opportunities.

The third gain is the formation of new partnerships between network members. Interviewee B highlights a new partnership that was identified in a networking lunch. However, this gain is seemingly partially achieved. Only in the case of interviewee B the most important information sharing relationships started after the participation in COTEC. Nevertheless, the respondent points out that this was not a decisive factor, just one more element among other factors that reinforce the positive recognition of the company in the market.

Five inhibitors regarding the development of closer relationships among the companies and further information sharing were identified. The first one is related to the organization of events. Interviewees B and E feel the need for a more fruitful and closer exchange of information among the companies, a communication process that allows for a greater number of actors to speak in a closer or more informal way:

I think communication is not the deepest, most effective or prolific, I think it is still largely confined to the events that are organized... (Interviewee B).

A second aspect refers to the absence of concrete proposals that would allow the grouping of companies with related interests and skills. According to respondent D, this is a time consuming task, since it requires the identification of potential customers / donors, funding sources, idea generation, consortia building and proposals generation. The absence of these proposals may indicate the companies' preference for working in consortia with companies outside the network, for work-

ing alone or a lack of resources such as time, money and expertise to develop such proposals.

It is interesting to notice that, considering these two first aspects, both the more informal communication and structured mechanisms in the form of consortia are considered important to the members as channels to improve the identification of common interests.

The third aspect identified is the heterogeneous composition of the network. Respondent B acknowledged not seeking information on an intentional or systematic way because his company's sector is not well represented in the network, meaning that it is difficult to find some complementarities. According to Fritsch and Kauffeld-Monz (2008), who found no relationship between the heterogeneity of skills and information sharing in innovation networks in Germany, this fact could indicate a greater interest by the companies for exploitation than for exploration of new ideas.

The fourth aspect is related to national culture. According to interviewee D, the absence of a culture of collaboration in Portugal has been a hindrance to formation of partnerships. It is also, according to the respondent, an aspect that the network has been unable to overcome:

It is not exactly a great culture for gathering or collaborating ... apart from some examples, each one is in his/her house doing what they think they are good at. And this extends to the business environment.

However, interviewee B, without referring specifically to the Portuguese culture, emphasized the importance of maintaining partnerships:

... We also understand that it is better trying to cultivate partnerships than being here alone in our corner; we always have a more limited view of reality.

In this matter, Moreira (2007, p.28) considers that the Portuguese culture is characterized by the absence of a collective system of trust and the predominance of strong informal neighboring relationships. The consequence of that is a cultural understanding of trust as the sum of individual parts and not as something that benefits the whole. This understanding inhibits inter-organizational, formal and organized cooperation and stimulates spontaneous, informal and clandestine ones.

Finally but not least, the commitment of top management to the network was identified as a relevant factor. Some respondents reported lack of time and resources to take part in the network's activities and focus on other priorities such as the relationship with international clients. This aspect becomes more relevant if one takes into account the cultural feature highlighted above and the important role played by the managers in small and medium companies.

4.3 Information Sharing Process via the Most Important Relationships

Beyond the comprehension of information sharing under the collective dimension, its process between the interviewed companies and their most important infor-

mation sharing partners was also analyzed.

Regarding the number of most important information sharing partners and the type of relationship, interviewee C mentioned 3 clients; interviewee D mentioned 3 partners in common projects; interviewee B mentioned both, 6 clients and 1 partner in common project; and interviewee E mentioned 4 companies from the same sector with whom he keeps, nowadays, no business relations. Only interviewee A mentioned not having any relationships with other companies within the network.

When it comes to size, there are relationships with large companies and SME. Most of the clients are large companies. All partners in joint projects are SME. Respondent D related that although his company has projects in common with two larger companies than yours and one smaller, this aspect is not significant in terms of their importance. Despite the size, each one stands out for a specific competence. Respondent E highlights the aspect of competition between companies from the same size as a hindrance to share information, which makes the sharing with larger ones easier. The most important information sharing partners are located in several areas, mainly in Lisbon and in the north of the country.

The communication channels are both virtual and face-to-face, with a predominance of the first one. The most virtual channels used are e-mail, Skype and telephone. No inter-organizational information system was mentioned. One respondent reported a technology platform specifically designed to assist customers. Among the face-to-face channels, formal and informal meetings were mentioned. Respondents stressed the importance of face-to-face meetings during periods of contract negotiations and informal meetings as a way to get a closer relationship with the companies. Respondent D also stressed the fact that the most important information sharing partners of its company are fruit of previous personal relationship that developed into a business relationship.

Three kinds of information are shared among the companies and the most important information sharing partners:

- General market information in the case of relationship with companies from the same sector.
- Suggestions for improvements of products and services and specific features of the companies in the cases of relationships with clients.
- Information on the partner's technology in the case of joint projects.

Regarding the latter, when asked about the decision to keep the partnership rather than mastering the technology, interviewees B and D said that despite having some knowledge about the technology of the partners, the decision to maintain a partner is taken from a strategic point of view. One of them pointed out the fact that the partner's knowledge is much broader, which makes it more interesting to keep the partnership instead of investing resources to master the knowledge. The other one noted the lack of internal activities that justify the internalization of the partner's knowledge.

Finally, characteristics related to the interviewed companies, its partners and the relationship between them that influence the sharing of information between them were identified. The factors reported were partner's knowledge, trust, and openness to receive information, capability to establish relationships, absorptive

capacity and an attitude of information protection.

The scope and domain of knowledge offered by the partner was relevant in all types of relationships. Trust emerged as an important factor in relations with customers and the partners in joint projects. In both cases trust is related to the expectation that the partner will not behave opportunistically, either passing the information on to competitors or not sharing the results equitably. For COTEC's coordination representative, trust in the partners is also important and can pass firstly through the intermediate role of the coordination, meaning that it's believed that the leadership of the network functions as a seal, a guarantee that companies belonging to the network are trustworthy. The trust in the leadership is a crucial aspect for the success of SME networks in Portugal, according to Moreira (2007).

Willingness to learn is related to what Hamel (1991 *apud* Simonin 2004) meant by the intention to learn, that is, the desire and will of an organization to learn from the partner. Simonin (2004), investigating international strategic alliances, reported that the intention of learning has a positive and significant effect on knowledge transfer, regardless of whether companies are competing with each other or not. According to Martinkenaite (2011), studies show the major importance of the receiver's motivation to acquire new knowledge than the donor to share knowledge.

Ability to establish relationships is related to what Ritter and Gemünden (2003) call skills to start inter-organizational relationships. According to the authors, the start of relationships demands efforts and investments such as the monitoring of the environment and the distribution of information about the company.

The attitude of protecting information, understood as an inability or unwillingness to share (Simonin 2004), appeared as a factor that should be taken into consideration by companies and that inhibits sharing between firms from the same sector and size:

I do not pass this knowledge willingly to a company, for example in the IT sector... It does not mean that in a partnership, it could be passed, if we assessed the risks very well... (Interviewee B)

Despite advances regarding internal organization, the absence of absorption capacity is still a problem. According to Cohen and Levinthal (1990, p. 128), absorptive capacity is the ability of an organization to "recognize the value of external information, assimilate it and apply it to commercial ends". In terms of identification of external information, only respondent B reported having a strategic interfaces management. Interfaces are understood as entities that can provide relevant knowledge to the company. In terms of assimilation, respondent B also identified that it is not always easy to understand the information shared by customers, considering the specific reality of each one, which requires from him "a significant effort of approximation". This fact stresses the importance of prior knowledge to facilitate the process of assimilation. In terms of storage, the most common practices cited were the registration of information related to business proposals, product documentation, events and conferences. Finally, incorporation seems to be, according to respondent D, the greater and more relevant internal deficiency:

It has to do with the systematization of processes, methodologies, tools, repositories, to be sure that what we do is used, is incorporated in the chain and it is known to all ... innovation is not putting a team of development engineering to make a project, make the justification, develop, demonstrate...No. This has no use at all. The important is to take it and improve my offer (D).

Despite the limitations regarding absorptive capacity and the difficulties mentioned by some members to measure the benefits of information sharing with the most important partners, it was possible to identify the improvement and creation of new products as the main gains obtained by the interviewed companies both in the relationship with customers and in the cases of joint production.

5 Conclusion

This paper aimed to have a broader understanding of how and why information sharing occurs within the network. Under the collective sharing of information, it was possible to highlight the role of the coordinating as a sender of relevant information to other members and also a promoter of information sharing among them. It was also noteworthy a passive or even disinterested attitude by companies with regard to the seeking of new relationships within the network. This passivity can be justified, firstly, for the difficulty of companies to identify mutual interests, which may indicate that either they do not know each other well enough or they are not sure about their learning goals within the network. The second reason may be the unwillingness to establish and maintain relationships with companies that belong to the network, which may indicate a lack of interest in learning or in giving information to each other. Considering that the network studied consists of companies classified as innovative, it is possible that the aim of gaining status and legitimacy for belonging to the network overlaps the search of learning. Regarding the main information sharing relationships, it was possible to notice that the partners differ in size, sector and type of relationship. It was also noteworthy that even being classified as innovative, there is still room for improvement of absorptive capacity in the companies. This is an exploratory study that, holding some limitations, requires the use of quantitative methodologies for more information.

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