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► **To cite this version:**

Sara Hajikazemi, Anandasivakumar Ekambaram, Carl Christian Røstad, Bjørnar Henriksen. Overcoming Barriers Against Interaction on Innovation Capabilities Within and Between SMEs. IFIP International Conference on Advances in Production Management Systems (APMS), Aug 2018, Seoul, South Korea. pp.230-237, 10.1007/978-3-319-99704-9\_28 . hal-02164881

**HAL Id: hal-02164881**

**<https://inria.hal.science/hal-02164881v1>**

Submitted on 25 Jun 2019

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# Overcoming Barriers against Interaction on Innovation Capabilities within and between SMEs

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**Abstract.** Handling metadata and module-based capabilities are enablers for radical new ways of interaction within and between small and medium-sized enterprises (SMEs) in terms of innovation. A challenge in this often complex actor and interaction picture is that there can be organizational, process-related, financial and practical barriers which tend to reduce innovativeness. There is thus a need for methods which can provide dynamic and company-based innovation networks. This study investigates the main barriers for effective interaction and sharing of innovation capabilities within SMEs. The factors identified are individual, technological and organizational factors. The success of SMEs lies in overcoming all these barriers in order to ensure effective interaction and sharing of innovation capabilities through their networks. This study suggests the main conditions and elements which can contribute to overcoming the barriers against effective interaction on innovative capabilities among SMEs.

**Keywords:** Innovation capability, SMEs, Barriers.

## 1 Introduction

Norwegian industry, and specifically its land-based industry, is in an ever more demanding situation where competition is becoming fiercer and more complex. This is of course not just the case for Norway, but is typical for all land-based industries in the global market-place. In order for the companies to succeed, they are dependent on their innovativeness combined with a quality-focus and the ability to cooperate smarter. Therefore, the companies need to develop capabilities (resource and knowledge) and find effective approaches in order to adopt these capabilities for developing and producing the right products and services. Interaction on innovation capabilities among SMEs result in increased access to resources and knowledge, more effective innovation processes and thus better products. Interaction among capabilities (shared capabilities) will also provide better return on investment in for example test facilities, equipment, competence and motivation of further initiatives. This study is based on two ongoing four-year long Norwegian R&D projects, Live Innovation Performance and Innovative Kraft (Power). These projects are financed by the Norwegian Research Council and the participating companies focusing among other things on collaboration and the shared use of companies' test facilities and the belonging competences of companies in order to find concrete solutions and mechanisms for integra-

tion of innovation processes. Outsourcing, supply chain integration, production network are some examples of how industrial businesses adjust and have adjusted to new conditions. A challenge in this often complex actor and interaction picture is that there can be organizational, process related, financial and practical barriers which tend to reduce the innovation power. There is thus a need for methods which can provide dynamic and firm-based innovation networks. This study will address the main barriers for effective interaction and sharing of innovation capabilities among SMEs and develop a model for overcoming these barriers in practice.

## **2 Background**

This section includes a literature review on a number of relevant concepts which can contribute to better understanding the required capabilities within SMEs in order to compete within an ever more demanding situation in the market where competition is becoming more difficult and more complex. The main focus will be on 1) the interaction of firms with their innovation capabilities in order to gain increased access to resources and knowledge and 2) the barriers for effective interaction and sharing of innovation capabilities. These theoretical frameworks will be used as a platform for answering the main research question mentioned above.

### **2.1 Critical success factors in SMEs; the innovation power**

Resource-constraint SMEs need to focus on critical success factors to stay competitive amidst the challenges from globalization and liberalization [1]. Business literature presents a wide range of success factors through a number of conceptual frameworks that seek to capture aspects of SMEs success. However, their importance appears to be relative and varies with the business environment, that is the industry and country SMEs operate in. I.e. one success factor may be of great importance in one industry or country, it may not necessarily be of equal importance in another [2].

Ho and Yang [3], categorize the main success factors in four main groups including knowledge conditions, political and regulatory, Industry/product life cycles and industry structure. A number of factors under the knowledge conditions category include: diffusion of knowledge, knowledge innovation and knowledge sharing. In general organizations are becoming ever more knowledge intensive and the need for applying knowledge is increasing. Thus knowledge is becoming one of the critical driving forces of success for businesses and organizations need to be aware of the success factors of effective knowledge management [4].

Anantatmula and Kanungo [5] also state that the main driving factors in building a successful knowledge management effort, within SMEs, are top management involvement, knowledge management leadership, and the culture of the organization. This calls for a positive attitude and motivation towards knowledge sharing behavior, values that are adhered in the SME owners, as well as behavior which is acceptable to all parties. The knowledge sharing behavior will contribute to formation of innovation capability within SMEs [6].

## 2.2 Enablers for sharing innovation capabilities among SMEs

For innovation to take place, the organization must possess innovation capability and operate in an environment (internal and external) with appropriate enablers which work sufficiently under a sound innovation management system [7]. As earlier mentioned, in SMEs, the success of knowledge sharing stimulates knowledge creation and encourages individuals to think more creatively and critically. It has been proved that the responsiveness of SMEs is likely to improve if they strongly develop capabilities in external knowledge acquisition and intra-firm knowledge distribution [8]. This results in being decisive for aligning them with external environments [9].

Love and Roper [10] indicate three main channels through which firms may obtain external knowledge which may contribute to their innovation and exporting activity:

1. "Being there" in which firms benefit from un-priced, and perhaps unanticipated, flows of local knowledge or information mediated through social contacts or labor market linkages.
2. "Openness" partnering in which firms engage in purposeful relationships with other organizations in order to gather either technical knowledge or market understanding.
3. "Learning by exporting" in which firms gain market – and also potentially innovation-related – knowledge through their exporting activities.

Lage and Alturas [11] in their study investigate on possible enablers for sharing knowledge and information among SME. The existence of a "Power" asymmetry between the giver of knowledge (upper position) and the receiver is also very common; the rate of acquisition of knowledge by the recipient is a key factor to change the relationship of dependency.

Another important factor is the "Trust in the network's leadership". Cooperation among SMEs highly depends on their level of trust in their network's relationship. Therefore, trust in the network's coordination may also be an important factor for the information sharing process to happen.

The role of "Information and communication technology" is also quite important in sharing of knowledge and technology. ICT is basically the main channel for sharing information within the network. The relevance of ICT is probably higher when the members are geographically dispersed throughout the country and the network has a more vertical coordination, which demands the exchange of more operational information.

Ngah and Jusoff [12] point out the importance of strength on motivation, a good working network, unique skills and short informal communication as enablers for effective information sharing in SMEs. The success of knowledge sharing among SMEs encourages the creation of knowledge, the increase of continuous innovation capabilities and stimulating employees to think more critically and creatively [13].

Despite the fact that knowledge sharing within and among SMEs is a source of competitive advantage for these firms, not all firms and SME clusters succeed in effectively sharing their knowledge and information either internally or externally among the business cluster that they are part of. These barriers will be discussed further in the following section.

### **3 Barriers for effective interaction and sharing of innovation capabilities among SMEs**

According to Bremmersa and Sabidussib [14], working in cooperation to innovate has become an imperative in an economy where firms' links are increasing in number and in relevance. To innovate, individual efforts alone are not sufficient and the use of partnerships has developed remarkably in the last years.

One of the key ingredients for innovation in a cooperative environment is sharing knowledge. However, there are always barriers against effective knowledge sharing within SMEs and among SME networks.

In general, barrier factors influencing knowledge sharing within an organization are categorized into three main categories: individual factors, technological factors and organizational factors [15].

*Individual factors* are related to elements such as beliefs and perceptions of each individual. For example employees may not want to share due to the sense of losing control and authority over knowledge. Some might want to take ownership of it to receive accreditation from the other members. The lack of understanding of the knowledge they hold or of the benefits coming from sharing represent other reasons of resistance [16]. Employees may be reluctant also simply because they are not able or do not have the time to integrate knowledge sharing activities into their everyday duties [17]. Another aspect is the trust between the knowledge provider and the knowledge seeker [18]. The sharing of information happens when the knowledge provider is confident that the knowledge seeker has the capability (attitudes and professional capability, etc.) to make use of the shared knowledge. In fact, the level of capability of the knowledge seeker can act as a barrier for sharing of knowledge.

*Technological factors* include the unavailability of the required technological resources such as software and hardware to assist in implementation of knowledge management activities. ICT systems enable rapid search, gathering and retrieval of information, apart from providing support for communication and collaboration among employees through intranet, groupware, online databases, and virtual communities. Small-medium enterprises are increasingly adopting ICT tools, including e-commerce, but they are still limited by scarce financial investments [19].

*Organizational factors* include the influence of the organizational culture, lack of proper integration between knowledge management activities and long-term goals as well as objectives of the company, lack of proper leadership, and lack of appropriate rewards in the organization [17]. Research has shown that small firms tend to lack a strategic approach in knowledge management, being more concerned about the day-to-day viability [20]. Another organizational aspect that hinders knowledge transfer is the "not-invented-here-syndrome", which represents an attitude of not willing to make use of solutions / knowledge created by others. The not-invented-here syndrome does not allow organizational members to look for existing relevant solutions, depending on the premises behind the knowledge as well as contextual considerations.

Avdimiotis et al. [21] classified the factors contributing to lack of knowledge sharing into two categories; psychological factors, and organizational structural factors. The psychological factors included trust, willingness to communicate, and reliability

of source. The organizational structural factors included motivation, structure, and organizational leadership. These two sets of factors correspond to our categorization, namely individual factors and organizational factors respectively.

However, there are significant barriers to knowledge acquisition for clustered SMEs, both social and cognitive, and these significantly constrain smaller firm's ability to accrue knowledge-based advantage from clusters [22]. The success of SMEs lies in overcoming these barriers in order to ensure effective interaction and sharing of innovation capabilities among their network.

#### **4 A model for overcoming barriers for sharing innovative capabilities**

This section will point out the main conditions and elements which can contribute to overcoming the barriers against effective interaction on innovative capabilities among SMEs. According to Mitchell et al. [23], the role of technical specialists is essential as knowledge gate keepers and facilitators of knowledge sharing to and between SMEs in clusters. This role is significant because it illustrates an effective knowledge brokering function in clusters that overcomes the constraints set by significant cognitive distance from the technological frontier.

Another important element which contributes to overcoming the knowledge sharing barriers is the role of social capital built up by the technical specialists which will be utilized to identify and assimilate knowledge in order to transfer their knowledge to recipient organizations [23].

The culture of knowledge sharing within organizations plays a significant role in the enhancement of innovation capabilities in SMEs. Increased partnership between entrepreneur in the cluster as well as other possible clusters within the same area [6]. The above mentioned elements call for the support of the SME senior management by building up effective strategic management of firm capabilities [24]. Development of an environment of trust where people feel free to create, share, and use information and knowledge, working together toward a common purpose, within and among SMEs is also one of the drivers for overcoming the organizational barriers which were mentioned in the previous section.

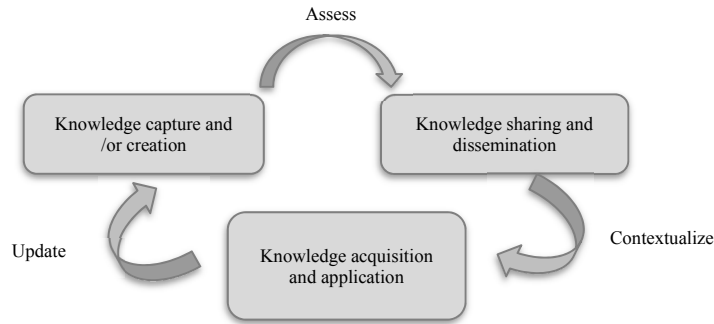
According to Vajjhala and Vucetic [25], SMEs need to focus on motivational issues and identification of non-monetary mechanisms to motivate employees to actively participate in knowledge sharing activities. The organizational leadership of SMEs should recognize the efforts of employees participating in knowledge sharing activities to foster the creation of an organizational culture which will promote the spirit of knowledge sharing in the firms.

The commitment of top management within SMEs is also an important factor which can positively contribute to effective knowledge sharing among SME networks. The top management commitment is positively related to the exchange of strategic information. Information and communication technologies are also essential for information sharing, ICT being the main channel used to share information within

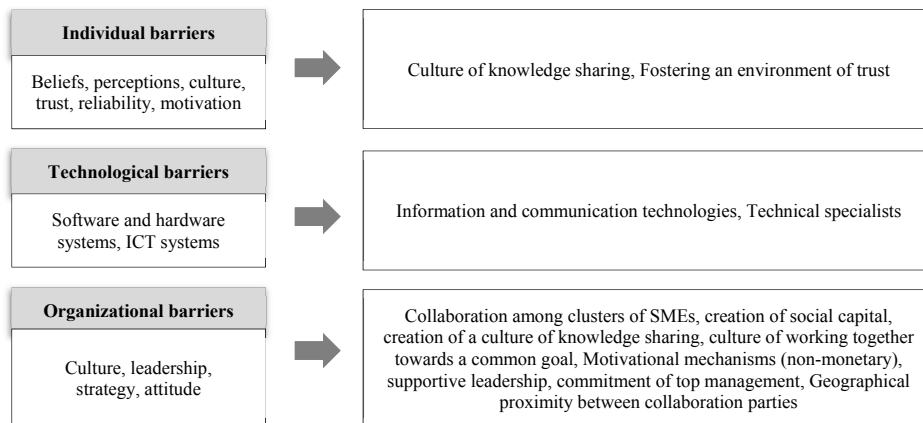
SME networks. Indeed, trust in partners and in network coordination is relevant for all networks as a basic condition for the sharing of information to happen [11].

Based on the above mentioned elements and the enablers for sharing innovation capabilities among SMEs discussed in section 2.2, a model is proposed for overcoming the possible barriers against effective interaction and sharing of innovation capabilities among SMEs.

The suggested elements for overcoming the barriers against interaction on innovation capabilities is means to cover the whole cycle of knowledge management based on Dalkir's [26] knowledge management model. Dalkir's model presents three major parts: Capturing / creating knowledge, sharing knowledge, and applying knowledge. In the transition from knowledge capture/creation to knowledge sharing and dissemination, knowledge content is assessed. Knowledge is then contextualized in order to be understood ("acquisition") and used ("application"). This stage then feeds back into the first one in order to update the knowledge content (Figure 1).



**Fig. 1.** An integrated knowledge management cycle ([26], p.43)



**Fig. 2.** Model for overcoming barriers against interaction on innovation capabilities – based on [15]

As seen in the figure, there is large focus on approaches for overcoming organizational barriers against interaction on innovations and knowledge. This might be an indication that a top-down approach within organizations can foster actions which will eventually contribute to overcoming both individual and technological barriers as well.

## 5 Conclusions

The main barriers for effective interaction and sharing of innovation capabilities among SMEs have been elucidated in this study alongside the possible approaches for overcoming these barriers. The main barriers identified through this study include: Individual barriers, technological barriers and organizational barriers. A number of approaches have been suggested for overcoming these barriers. The commitment of top management within SMEs is an important factors which can positively contribute to effective knowledge sharing among SME networks. Further research can be done on how each of these barriers and the solutions for overcoming them are different in different industries and contexts.

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