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2014

Online at <https://mpra.ub.uni-muenchen.de/67060/>
MPRA Paper No. 67060, posted 06 Oct 2015 04:18 UTC

Network Business Environment for Open Innovation in SMEs

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Keywords: open innovation, small and medium-sized enterprises (SMEs), network business environment, technological infrastructure, legal framework, model of innovation for SMEs.

Abstract. The SMEs represent an important factor of growth in both developed and developing countries, into which, however, they face different obstacles in the process of innovation. This paper analyses how open communication and collaboration can help SMEs in their struggle for sustainable innovation and profitable market competition. Based on a literature review, a number of obstacles that SMEs have to overcome in their current activity and possible support to be competitive are revealed. The main benefits and particularities of implementing open innovation in SMEs are presented. The necessity of a supportive business environment for SMEs is demonstrated. An outline of an improved model for SMEs is presented.

Introduction

The omnipresent communication and the intelligent technology blur the boundaries between physical and digital world. Open communication bring unparalleled opportunities for knowledge and for innovation, empowering the open-minded managers to take information-based decisions that are best for companies' future. Nowadays companies and small and medium-sized enterprises, SMEs, especially should be open to collaboration, to use internal and external ideas on their path to market and technology. The firms should be able to exchange all the best they have, because they can't afford to rely entirely on their own research, but instead they should buy or license processes or inventions from other companies.

The research methodology in this paper is founded on authors' experience in working with SMEs and on literature review regarding open innovation. It had been studied journal articles from scientific databases. Our research is concluded with an outline of an improved innovation model supportive for SMEs.

Open Innovation in SMEs

Large firms used, in the past, to control all the innovation process in order to dominate the market, investing in technology, people, research and development. This process is very expensive and long, and may not bring all the time the expected results so as to be a success. Sometimes, these firms depend on other firms that have to supply components for their products, and the components should be fitted for the innovated products. These firms have to adopt an open pattern of collaboration, innovation, and production [1]. In addition, internal inventions not being used in a firm's business should be taken outside the company, e.g., through licensing, joint ventures or spin-offs [2].

Open communication on blogs and social networks is a very important channel to spread and gather information to and from the customers, rival firms, employees, academic institutions, research centers. But all these ideas have to be understood, integrated, tested and then transformed into innovation, in order to become a new product, service, management concept, technology, etc. "Many corporations have installed internal ideas banks to gather the input from their employees and improve their ideation process" [3].

Open innovation has a different model of implementation in large companies than in SMEs. The SMEs have to face the lack of resources, of information, and of knowledge regarding new technology, a low commitment into organizational and managerial change and low investments in research and development (R&D). The SMEs need business and technological consultancy and a testing platform for their innovative ideas. The SMEs need to form network business environments in order to have a good collaboration with other SMEs, with universities and governmental structures. Otherwise, it is difficult for them to achieve and sustain competitive advantage.

Only a minority of SMEs is innovative and, furthermore, has the capacity and opportunity to actively pursue growth, expansion and diversification. Moreover, most of SMEs lack the internal resources to master the new determinants of production, innovation and competitiveness, such as diversification of product range, investment in R&D, introduction of modern management techniques, and continuous search for opportunities for open innovation and internationalization [4, 5, 6].

Open innovation in Asian firms was studied through a survey among 223 service firms. Open innovation is positively related to four dimensions of innovation performance, i.e., new product/service innovativeness, new product/service success, customer performance, financial performance. The impact of open innovation positively affects a broad range of innovation performance indicators. The impact on new service innovativeness and financial performance is relatively stronger [7].

Innovative SMEs have demonstrated the importance of a well-structured formal management team with both scientific and non-scientific complementary expertise [8].

The international competitiveness of SMEs depends on two major components, i.e., R&D capacity and managerial structure and competencies, and two external factors, i.e., open innovation practices and the ability of the firm to attract government grants for R&D and technological development. It is found that these factors are not fully explored through qualitative approaches because of other existing factors that can influence, too, the model of achieving competitiveness through open innovation. In addition to internal R&D capacity, a more formal management team with a diverse range of managerial skills and expertise is needed to identify, implement and utilize open innovation practices [9].

In developed countries, open innovation is a trend, being a way of facing the increased concurrence determined by globalization and the rapid changes in technology and communication. For SMEs, it is a real challenge to compete in this environment. Thus, they choose to be innovative, to use external resources and get clustered in cloud, in a network business environment. For example, in Netherlands, open innovation practices are increasingly being adopted by SMEs as shown by a study on 605 innovative SMEs. These SMEs are using a combination of several key variables, such as venturing, outward licensing of intellectual property (IP), the involvement of non-R&D workers in innovation initiatives, and external technology exploration and exploitation [5]. This trend is supported by *Fraunhofer* network for applied research, which facilitates the collaboration between academic institutions, research institutions and industry.

Supportive Business Environment for SMEs

The structural economic and political crisis can be overcome with the help of governmental structures that should invest in a technological infrastructure and in a legal framework for innovative SMEs. Nowadays SMEs are very important as hiring almost 65% of labor force and producing almost 67% of GDP (Gross Domestic Product). It has been found that around 57.5% of open innovation firms collaborated with academic institutions/ universities, 57.5% collaborated with customers, some 39.4% were involved in collaborative projects with their suppliers, and some 30.3% collaborated with private or public R&D laboratories. The more frequent relation proved to be either with customers or suppliers, or with universities or R&D laboratories [9].

In Netherlands, SMEs are being stimulated to develop their exploration skills, for exploring technology opportunities through the Dutch innovation voucher program. This program facilitates the university-industry interaction for SMEs [10]. The joint of university and global-connections-open SMEs' creative knowledge horizon and innovation capabilities in the recognition phase of the innovation process and also in the stage of the innovation process for the successful

commercialization of a product or service is essential [11]. An Innovation Platform for cooperation between business sectors and knowledge institutes is in place [12].

In UK economy, SMEs are important for employment force and for economy development, but, at the same time, they face many obstacles in accessing innovative technologies and knowledge exchange. The weaknesses of SMEs also have a negative influence on the progress of larger firms because they are partners in the supply chain. Thus, the role of government and political institutions to ensure a supportive environment for SMEs is very important. The public program support meets a real need for innovation and knowledge transfer into SMEs. In this process, universities represent important sources of innovation. The focus on universities as the only program innovation supplier hides the importance of other available sources of open innovation that may be used by SMEs [13].

Without a legal framework, without infrastructure, without R&D investments and know-how from universities, the SMEs can not innovate. SMEs should finance their activities from government and European grants for R&D and technological development. SMEs should have access to market researches in order to understand client needs and have to involve the client and the supplier in the process of innovation. SMEs need to commercialize and export their products through a well organized, trusted supply chain. Otherwise, SMEs would not trust in other counterparties to get in business with, and they neither can share their innovative ideas. The innovative SMEs should be promoted and supported by intermediaries and policy makers.

Due to the obstacles that SMEs face, they cannot innovate like large companies do. Large companies can provide the infrastructure, knowledge and funds for every specialist, customer, supplier, etc. that wants to be implied in the process of innovation. While SMEs don't have the resources and experience of large companies, they have to innovate in cloud, in a network of business. As a consequence, the model of innovation for large companies should be different by the one of small companies.

The one that comes with the idea and convert it into a product/ service appropriate for the market will be the winner. Thus, we argue the importance that SMEs are part of a network business environment, formed of SMEs, universities and R&D laboratories, and market research companies, under a governmental and policy making institutions framework supervision.

In contrast with SMEs from developed countries, the SMEs from developing countries face different barriers when trying to benefit by open innovation facilities. In the developing countries, open innovation mostly focuses on early stages of innovation, being addressed to external sourcing of technology and intellectual property and, thus, networking SMEs with technology providers [14, 15].

In Romania, a survey on 720 SMEs reveals the need to support SMEs with publicly financed advisory services, in order to improve their competencies and skills. Since SMEs encounter financial difficulties, that limit their access to paid services, one option would be to support the SME sector [16].

SMEs don't have financial resources to conduct market research studies for obtaining data on client requests and on business opportunities within particular market segments. Because SMEs don't have mass production, they use low-cost production methods, which may be supported easily by governmental structures, European funds and network. SMEs have the greatest positive impact on their innovativeness when collaborating with different types of partners [17, 18, 19, 20].

The SMEs in developing countries do not benefit of the enforcement for contract law and respect for legal contracts. Moreover, there is not an effective set of laws to support network collaboration. This is the reason why SMEs in developing countries are not very trustful in counterparties.

Model of Innovation for SMEs

A model of innovation for SMEs [21], Joint Invention Market Model, in developing countries, emphasizes the role of government in monitoring the communication and collaboration process between SMEs and other counterparties (Fig. 1). It is sustained that business partners should trust one another. The model follows the entire life cycle of a product/ service and supply chain. If a SME has a new idea of product/ service, for the beginning it asks the help of marketing research partner in the network to test the market. If the result is positive, the SME revises the idea based on the feed-back

from market, and asks a consultant agency to perform a feasible study. If the result of feasible study is positive, the inventors in the network may come out with possible solutions for implementation. The SME will may choose the best solution, or go back to the very first step. The SME and the inventor will collaborate to implement the idea, and then ask the marketing agency to commercialize it. A supervisor, e.g., a governmental partner, takes care that the profit is shared and patent is protected. For communication, counterparties may use joint pools via virtual networks.

All the marketing activities, accounting activities, implementation ideas and law protection issues could not be carried out alone by one SME, but only in collaboration with counterparties in the joint network. This process is able to produce the growth of local economy with the contribution and self development of many counterparties. That is what we call a network business environment.

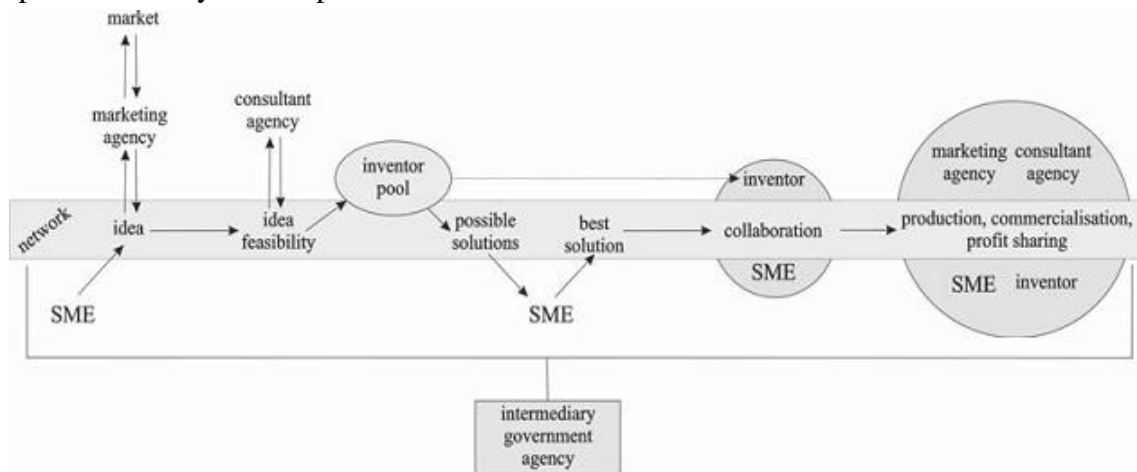


Fig. 1. Joint Invention Market Model for SMEs engaged in open innovation, in developing countries [21]



Fig. 2. Network Business Environment for SME Open Innovation

An outline of an improved model for SMEs is presented in Fig. 2. An agency is provided to supervise how ecological the products and technologies are, and which is their long-term effect on environment. This can stop an invasive process or should suggest other solutions. Furthermore, the academic researchers are part of the environment, because they must have access to newest technologies or innovating ideas. The potential of young researchers involved in doctoral programs is also exploited. The network contains a bank of ideas with open access for members. This bank of ideas is also a method of protection for intellectual property (Fig. 2).

SMEs can be the beneficiary of an organized network that will facilitate their innovation capabilities, co-developing new products and services, sharing experience and stocking the knowledge for further innovation [22].

These networks of collaboration and communication are shown to be relevant for policy development and evaluation in innovation [23].

A lot of SMEs in developing countries believe that investment in information technology (IT) is the solution for all problems [24], despite that they do not have their IT strategies defined, do not understand how to use IT tools, and when and how much to invest in IT. This problem may be solved if the SMEs ask for consultancy.

Summary

Most of the efficiency of SMEs is given by the process of open innovation in a network business environment. This has been demonstrated by Fraunhofer networks or Dutch innovation voucher program through its Innovation Platform.

The open innovation makes its presence felt in all stages of the product/ service life cycle and implies open communication between SMEs, policy institution, universities, ecological agencies, consultancy agencies, inventors and marketing agencies.

An improved innovation model for SMEs, i.e., Network Business Environment for SME Open Innovation, is outlined in the paper. In this model, SMEs collaborate within an infrastructure and a legal framework, using the know-how from universities. They make investments in R&D and technological development. They finance their activities from government and European grants. All their activities are well organized, in accordance with the market requests and the principles of sustainable development. An institutional structure is created to supervise the influence of the products and technologies on environment.

This model will be further developed, in order to be implemented in practice.

Acknowledgement

The work has been funded by the Sectoral Operational Programme Human Resources Development 2007-2013 of the Ministry of European Funds through the Financial Agreement POSDRU/159/1.5/S/134398.

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