Abstract. *SMEs are slightly overlooked in the open innovation literature, which provides a scarcity of studies on the risks residing in open innovation projects involving SMEs and even fewer attempts to assess the mitigation potential of these dangers. The limited literature written on SMEs and open innovation highlights the motives, the benefits and the barriers these engines of economy confront when embarking in open innovation projects. However, no particular attempt to further the research into managing and mitigating the effective risks triggered by open innovation in SMEs was found. Based on a survey conducted on 211 Romanian SMEs in the Romanian financial services and consultancy sector, this paper both explores the risks affecting the innovation performance of SMEs in collaborative relationships, and seeks to provide a conceptual model for overcoming these threats. Within the survey, our work highlights that open innovation in Romanian SMEs is impeded by risks related to insufficient financial resources, inexperienced, unmotivated and unwilling to cooperate people, poor adaptation to technological advances in the industry, knowledge sharing risks, weak social capital and noteworthy regulation risks. The research results indicate six factors as main risk mitigators: transparent communication among innovators, trust building, people empowerment, organizational learning and investment in knowledge, leadership, vision and convictions, proactiveness towards unethical behaviour. By undertaking this study we aim to contribute to the scarce literature on open innovation practices in Romanian SMEs and to shed light on the factors that a firm needs to approach in order to foster a culture for innovation and, in the same time, reduce the open innovation risks.*

Keywords: open innovation, SME, risks, innovation performance, collaboration.

A RISK MITIGATION MODEL IN SME'S OPEN INNOVATION PROJECTS

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1. Introduction

According to Chesbrough (2003), open innovation highlights the innovative potential of external factors, since valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well. Although the phenomenon of open innovation has increasingly captured the attention of many researchers, we found few studies addressing open innovation from the SMEs perspective and even fewer which deal with this innovation strategy from the risk management point of view.

SMEs concentrate the majority of employees and revenues both at European level as at country level, respectively in Romania. SMEs in Europe comprise of about 23M€ investment market that account for 99% of all businesses and represent 2nd/3rd of the total employment (Renaud, 2008). In Romania, the SME sector consists of 5 million employees (67% of total people employed in enterprises), 100 billion EUR revenues and almost 500.000 companies (Ziarul Financiar, 2013). The figures suggest a strong innovation potential for SMEs, which hasn't been yet studied in accordance to their power to mitigate risks encountered in the innovation process itself.

In addition, even if SMEs are generally thought of as high innovators, an overall look over the greatest economic sector (respectively SMEs) in Romania proves that the country lags far behind in innovation area. In the Global Competitiveness Index (2012) provided by the World Economic Forum, Romania ranks 77 out of 144 countries. In the innovation index Romania ranks 106 out of 144 signalling a low involvement of the business actors in the innovation process. This illustrates the existence of major risks that affect the innovation process, as ranked by respondents to the survey of the WEF, who were asked to select the five most problematic factors for doing business in Romania: corruption (17%), tax rates (14%), inefficient government bureaucracy (13%), access to financing (12%) and tax regulations (8%). Relevant for Romania and the working force is the poor social capital, since inadequately educated workforce (4%) and poor work ethic in national labour force (3%) are high on the list of obstacles in Romanian business environment (World Economic Forum - Global Competitiveness Report 2012 – 2013). All these threats are felt much more intense by SMEs, who not only do not boost the innovation landscape, but they also show high reluctance to collaborate in the purpose of innovation and face diverse dangers which hamper their performance. The European Commission stresses that Romanian SMEs are less likely to introduce innovations, to collaborate with each other or to innovate in-house (SBA Fact Sheet 2012).

Totally opposite to the European trend, which recorded a growth by 5.5% of innovative SMEs collaborating with others, in Romania, they have registered an annual decrease by 5.3%, which strongly indicates high barriers for small firms to enter collaboration partnerships and as well high risks emerging from the process. According to the Innovation Union Scoreboard 2011, Romania is one of the modest innovators with a below average performance and one of its majors weaknesses are SMEs introducing product or process innovations and SMEs collaborating with each other, scoring half on

EU27 average. While in Belgium, Cyprus, Denmark, Estonia and the UK more than 1 out 5 SMEs collaborate, in Romania this is less than 1 out of 20.

This low innovation performance of Romanian SMEs is also correlated with the scarce literature written on the subject of impact of external cooperation on the innovation of Romanian SMEs and especially on their potential of efficiently managing the risks this cooperation involves. In general, to our knowledge, studies focusing on external sources of knowledge as "innovation gateways" for SMEs are relatively scant. Moreover, there is a limited amount of empirical research on the innovation practices of SMEs located in Eastern and Western European countries (Lasagni, 2012). This paper aims to address these research gaps.

Given the overall sparse attention paid to the dark side of SMEs open innovation form the risk management perspective, we consider worth addressing this deficiency through the challenge of defining first a framework of risks encountered by SMEs in external partnerships and then by defining a theoretical risk mitigation model, moulded on the risks framework we have built.

2. Main purpose of the research

Gassmann et al. (2010) emphasizes that SMEs are the largest number of companies in an economy, but they are under-researched in the open innovation literature. This article focuses on open innovation risks in SMEs, first seeking to place the concepts of open innovation and risk management in the context of SME, secondly to define a comprehensive structure of internal and external risks residing in open innovation and which are more weighty for SMEs than for larger companies, and thirdly to raise awareness on the factors that help mitigate the risks met by SMEs in their innovation process. Finally, it builds up a theoretical risk mitigation model on the feedback of 211 SMEs which answered to our cross-sectional survey. The research results support the importance of risk management in open innovation in SMEs, by proposing transparent communication among innovators, trust building, people empowerment, organizational learning and investment in knowledge, leadership, vision and convictions, proactiveness towards unethical behaviour as main factors that need to be addressed in external partnerships involving SMEs in order to avoid the imminent risks.

Using a structured questionnaire survey, this paper examines the innovation activities of 211 Romanian SMEs and their awareness of the importance of risk management in the innovation process. This paper is designed to show the motives SMEs pursue open innovation agreements, the benefits they reap, the barriers encountered for opening their boundaries to external collaborations and the risks these cooperation partnerships involve. We sought to explore which risks raise the greatest concerns, which need most to be addressed to, what potential mitigation factors can be applied and which risks they are more likely to tackle.

We intend our study to make the path for future researches in the risk management area of open innovation in SMEs, analyzed on the background of developing countries.

3. Theoretical background

3.1. Open innovation in SMEs

The literature on open innovation indicates that in the last decade a tremendous shift in business has occurred: a growth in the use of external partnerships and increased interactions among different actors. A firm can collaborate with suppliers, clients, competitors, professional organizations, universities, research laboratories. The variety of open innovation forms of collaboration includes joint ventures, grants and scholarships, innovation networks, collaborative innovation. For SMEs, collaboration projects don't always take a specific and documented form for open innovation (such as R&D agreements, incubators, in-licensing programs), given their general reluctance to collaboration and sometimes an ad-hoc decision to open their strategy for external knowledge.

In spite of the increasing interest in open innovation research, most previous studies have been intended for managers in large technology-based companies, where the notion of open innovation first started. Discussions about the concept of open innovation in small and medium-sized enterprises (SMEs) have been excluded from the mainstream (West et al., 2006).

Innovation collaboration allows organizations to gain needed skills, technologies, assets, and other resources from partners' side. The sharing of resources enhances firm's capability and flexibility of conducting its innovative projects. In the mean time, it implies that project costs and risks will be reduced by shared partnership. As SMEs command fewer resources, have less R&D, and generally face more uncertainties and barriers to innovation, collaborations represent a complementary response to insecurity arising from development and use of new technologies, while reducing uncertainties in innovation (Diez, 2002).

De Vrande et al. (2009) state that few studies have demonstrated that open innovation also exists in smaller organizations and, based on a database of 605 innovative SMEs in the Netherlands, they investigate to which extent SMEs apply open innovation practices and whether there is a trend towards increased adoption of the open innovation model over time. Their research was the first to investigate the incidence of open innovation in a broad sample of SMEs.

Based on the investigation of the innovation activities and networking of 53 SMEs in Ottawa of Canada, Doloreux (2004) revealed that innovation of SMEs relied heavily on the external networks of customers and suppliers. Most of the studies indicate that SMEs are rarely cooperating with universities, research laboratories or training institutions in the purpose of innovating. Although collaborating with different partners should substantially enhance innovation due to the amount and

variety of knowledge to be shared, it certainly brings with it greater risks of opportunistic behaviour (Zeng et al., 2010). It is these risks that our research is focused on.

3.2. Motives for SMEs to pursue open innovation

Bullinger et al. (2004) indicates that it is necessary for SMEs to link different companies, research facilities, suppliers and customers in a dense innovation network that enables them to share knowledge and profit from complementary competencies.

External relationships may well be helpful for innovation in SMEs because SMEs often suffer from a lack of resources to invest in R&D. Moreover, SMEs are reluctant to accept the risks associated with innovative projects. Therefore, it can be argued that the ability to access external knowledge resources efficiently can become a competitive factor for SMEs (Lasagni, 2012).

It is agreed that, while SMEs' flexibility and specificity can be advantages in accelerating innovation, few of them have sufficient capacity to manage the whole innovation process by themselves, and this encourages them to collaborate with other firms (Edwards et al., 2005). In consequence, the literature provides a variety of reasons for SMEs to embark in open innovation projects. Most studies highlight the need to access external knowledge as primary motive for collaboration. By developing joint collaborations, firms can access a greater knowledge pool than would be available in-house (Mata and Woerter, 2012). It is argued that no single organization has sufficient human talent inside its boundaries and can cover all the scientific and engineering disciplines that contribute to its product offerings (Markman et al., 2005). Collins (2006) proposes that, today, the key to successful innovation lies as much in the ability to collaborate as in the ability to perform applied science and engineering. This is even more specific to SMEs given their size, internal knowledge and resources limitations. The key to developing thriving innovations is to open the mindset and strategies to collaboration as a driver for competitive advantage.

The deficit of internal resources is a major driver for SMEs to open their boundaries to external collaborations. Their financial constraints, reflected in a profound cost pressure, are another driver for open projects, which may be able to alleviate the funding strain. While SMEs strive to share the costs and risks in their innovation projects, they may find that partnering may as well do that, apart from gaining key external knowledge, needed to increase their competitiveness.

Larger companies feel the current noteworthy change in the products' life cycle: the rapid pace of innovations is leading to a commoditization wave, the products' lives on the market decreasing rapidly. It is a shift which requires adaptation and joining forces for speeding up the innovation process in order to stay competitive. It is a vicious spiral driven by innovation itself. SMEs are one step ahead in this race due to their distinctive capabilities of time to market, flexibility and entrepreneurial orientation. SMEs invest in acquiring external knowledge in order to faster cope with the commoditization wave. Leiponen (2005) describes how greater uncertainty about

technological developments makes it more likely that firms invest in external R&D in order to stay tuned to newer developments instead of investing solely in internal knowledge building. This means that the higher the depreciation rate of knowledge is the more attractive external R&D activities become (Mata and Woerter, 2012).

De Vrande et al. (2009) have built an extensive classification of open innovation motives particular to SMEs. They assert that SMEs should open their innovation processes for the following reasons: to increase control over their activities, to get a clear focus of firm activities, to improve product development and integrate new technologies, to gain external knowledge, to efficiently manage costs, to counterbalance the lack of capacity, to keep up with current market developments, to optimally use skills and ideas of employees, to enhance management's conviction that the involvement of employees is desirable and increases their motivation and commitment. They found during their research based on 605 SMEs in Netherlands that for almost all open innovation practices pursued by SMEs, the most important motives are market-related ones. For the majority of respondents, using new innovation methods is regarded as a way to keep up with market developments and to meet customer demand, which eventually should result in increased growth, better financial results, or increased market share.

In conclusion, for small and medium sized firms (SMEs), business collaborations are particularly important for enhancing innovative capability. This is because SMEs are typically not endowed with significant internal resources for innovation (or its market exploitation) and so, in such cases, external guidance and assistance is often crucial to aid their competitive edge (Rogers, 2004). They therefore must collaborate with external partners to innovate successfully, to develop new sources of income, and to reach more profitable positions in the competitive landscape. Open innovation is thus a logical step for many SMEs to take (Vanhaverbeke, 2012)

Based on the studied literature, Figure 1 depicts the main motives which should drive SMEs towards open innovation, albeit their natural reluctance to open up to collaborations:

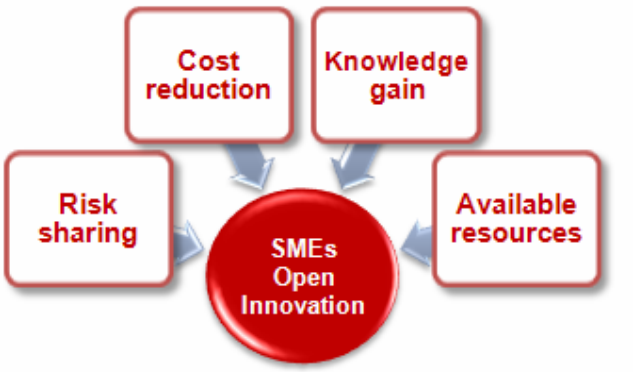

Figure 1. **Motives that drive SMEs to open innovation**

The main motives that make a small firm to get involved in partnerships are related to the risk sharing benefit, alleviation of their cost structure, increasing their knowledge base and resources pooling. By getting involved in external partnerships, SMEs find a means to share the risks of their projects. The intense focus on cost reduction is currently given by the rising costs of technology development and the shortening of the products' lives on the market. This cost pressure determines SMEs to open their organizational boundaries in order to alleviate the burden. Knowledge acquisition and intellectual capital development allures SMEs to partner in scope of becoming more competitive. By developing joint collaborations or by buying R&D in the market, SMEs can access greater knowledge than would be available internally, that would increase their chances to market new products with commercial success. Also, access to external knowledge may accelerate organizational and technological learning of a firm, by staying tuned with the latest developments. The knowledge gain may also help SMEs to overcome their general conservatory approach and increase their "outside the box" thinking. Open innovation allows SMEs to free their internal resources for other purposes and access a totally different range of resources not available internally, especially financial resources easing the funding process.

3.3. Barriers for SMEs to enter external partnerships

SMEs are reluctant to embark in partnerships and are hesitant in accepting the risks associated with joint innovative projects due to a number of reasons. Joint commitments are particularly vulnerable to opportunism and may be particularly problematic where synergies are not easily transparent or where firms are sceptical and inert to changing circumstances (Huggins, 2001). Furthermore, SMEs are particularly sceptical about networking and are less likely to participate in innovation networks than larger firms (Asheim et al., 2003). In exploring barriers to co-operation in innovation among Chinese SMEs, Xie et al.'s (2010) survey highlighted problems such as a 'lack of technical experts', 'lack of financial capital (in relation to R&D)', 'lack of technical information regarding new technologies' and a 'lack of suitable partners' as being significant. Yet, clearly such barriers are related to SME's inherent internal resource constraints that hinder their ability to build and maintain sustainable networks beyond the Chinese context (Huizingh, 2011).

De Vrande et al. (2009) built a classification of open innovation barriers for SMEs, which highlights a variety of structural obstacles: bureaucracy and administrative burdens, obtaining financial resources, lack of technological knowledge and competent personnel, insufficient market intelligence, efficiently balancing innovation and daily tasks, cost pressure, ownership of developed innovation, poor quality of partners, customer adoption problems, customer demand too specific, lack of employee commitment, no management support. Their work concludes that innovation in SMEs is hampered by lack of financial resources, scant opportunities to

recruit specialized workers, and small innovation portfolios so that risks associated with innovation cannot be spread. Organizational and corporate culture-related issues that typically emerge when two or more companies are working together are clearly the most important barriers/ that firms face when they engage in open innovation (ibidem).

Chesbrough (2010) also stresses the most important structural deficiencies of SMEs posed by open innovation. First, lower absorptive capacity: SMEs typically do not have the ability to support dedicated resources and personnel to build structures to identify useful external knowledge. Second, SMEs frequently lack the ability to absorb external ideas and technologies, even when they are initially identified and transferred. Third, smaller firms often are unattractive as partners to others: SMEs may not be deemed attractive partners to receive useful ideas and technologies, even when SMEs are able to initially identify them. Further, SMEs seldom have the available resources to provide research funding to support promising academic research that might form the basis for a cooperative innovation project. SMEs also often lack an institutionalized, well-structured innovation process. Fourth, deficiencies in value capture: SMEs typically do not have the market power to capture the value of their externally sourced knowledge and innovation, if not protected by intellectual property rights (IPRs). If they cannot expect to benefit from external ideas and technologies, they cannot justify the investment in pursuing those sources (Chesbrough, 2010).

The Institute for Management Development (2011) points out that open innovation is hindered basically by lack of trust and awkward regulations. Lack of trust is the consequence of weak social capital within. Awkward regulations mean such business regulations which discourage business cooperation and partnership in defence of "free competition". Also, because of widespread unethical business practices, SMEs refrain from cooperation (Institute for Management Development, 2011).

Lee at al. (2010) analyzed the innovation barriers for 817 Korean SMEs and found that the top 10 obstacles are: difficulties in finding suitable manpower in a labour market, short of suitable manpower within the firm, market uncertainty in innovative products, imitation possibilities of technology innovation, short of ability in R&D planning and management, lack of technological information, funding difficulties due to high risk from technological uncertainty, funding difficulties due to high innovation and commercialisation costs, lack of market information, frequent turnover of human resources. Thus, Lee et al. (2010) concluded that SMEs suffer from 'labour shortages', 'lack of information', 'lack of infrastructure' and 'lack of financial resources'. The difficulties in labour shortage, lack of information, and financial resources can be relieved by collaboration, and those with lack of information and lack of infrastructure could be alleviated to some extent by the action of an intermediary to help them complete innovation activities more effectively (Lee et. al, 2010). Subsequently, SMEs feel a profound cost pressure, resources constraints and people

adversity to change, which impedes them to involve in big collaboration projects. Their size acts as a limitation and, the bigger the cost pressure the higher their dependability on internal sources of knowledge and innovation.

3.4. Open innovation risks for SMEs

Advocates of open innovation tend to stress benefits, implying that we currently have a limited understanding of the costs of openness (Dahlander and Gann, 2010). As extensive the field of open innovation research is, as diverse are the threats that reside in this open innovation context. Inter-firm collaboration can thus lead to new risks and threats as well as transaction cost (Lee at al., 2010). While innovation inherently requires knowledge exchange, such an activity also holds notable risks not only in terms of failure of collaboration, but also in terms of possibly losing competitive advantage if core knowledge flows out to competing organizations (Hurmelinna-Laukkanen, 2011).

The scarce literature written about involvement of SMEs in open innovation projects is more focused on highlighting the barriers for a firm to approach open innovation rather than on depicting the risks which accompany such collaborative arrangements. Assuming a successful management of the obstacles hindering a small firm to efficiently collaborate results in increased performance, competitiveness and knowledge acquisition, it is our approach to focus on the risks met during the development of the collaboration agreement.

Becausegenerally scholars have focused their research of risks in open innovation on large companies rather than SMEs, there is little knowledge on how the magnitude and impact of open innovation threats are distinct for smaller firms than for larger companies. In our review of literature, we show what impedes a company to perform while involved in external collaborations, regardless of its size. Afterwards, in our practical research, we have specifically addressed these open innovation risks from the SMEs point of view, through our cross-sectional survey, creating a risk framework designed with the input of SMEs managers.

Strategic alliances are threatened precisely by collaboration risks. According to Das and Teng (2001) strategic alliances are marked by relational risk and performance risk. Performance risk is basically related to the probability that alliance objectives may not be met despite good relations between partners. The relational risk arises because partners may have their own individual interests that may conflict with those of other partners. This may result in opportunistic behaviour, such as cheating, distorting information and appropriating shared resources (Das and Teng, 2001).

Collaboration can also increase costs if there is "too much" diversity amongst partners. Exceptionally valuable outcomes often come from cross-collaboration from different fields of science. However, the chances of achieving a positive outcome and, indeed, the average gain from collaborations increase if both partners' knowledge is within the scope of the same specific domain (Fleming, 2001).

Researchers argue that the following non-pecuniary disadvantages can make open innovation less attractive for innovators: secrecy concerns (Thomas and Trevino, 1993); problems in division of contributions and outcomes of cooperation (Keupp and Gassmann, 2009); outsourcing critical dimensions of business (Dahlander and Gann, 2010); developing dependency on partners, losing technological competence, slowing down self-development of innovation (Rotering, 1990 cited by Brockhoff and Brockhoff, 1992); dealing with many sources and ideas at any given moment of time (Laursen and Salter, 2006); difficulty in choosing and combining between numerous alternatives (ibidem); risk of poor governance of joint learning processes (Larsson et al., 1998); difficult to maintain large number of partnerships with different actors (Ahuja, 2000); risk of selecting wrong partners (de Vrande et al., 2009); difficulty in balancing innovation with daily tasks, communication, aligning of partners, organisation of innovation (ibidem); bureaucracy and conflicting rules (de Vrande et al., 2009); not invented here (NIH) syndrome (Katz and Allen, 1985); problem in maintaining internal commitment over period of time (Chesbrough and Crowther, 2006); and organisational resistance and fear of losing control over proprietary technologies (Keupp and Gassmann, 2009).

Opportunistic behaviour from the collaboration partners (Jarillo, 1993), insufficient expertise of one partner (Flowers, 2007), or precaution measures for the possibility of information leaks regarding valuable technologies, especially in collaborations with competitors (Oxley and Sampson, 2004) may increase costs and make external R&D less attractive. Not only does actively learning about the other's assets entail costs, protecting internal knowledge from spilling over to the partner does too (Mata and Woerter, 2012).

Knowledge sharing risks may arise from the diversity of employees that take part in the knowledge transfer and their conflicting interests that may alter the message, which defines a relational risk. Lichtenthaler (2011) argues that external knowledge sharing has the potential to expose organization's core competencies to its rival organizations. Therefore, knowledge sharing is a potential risk because the organization may lose its competitive edge over its competitors. Additionally, this knowledge exposure could provide the rival organizations with added advantages if the competitor adapts this knowledge and gain significant market share (Lichtenthaler, 2011). This vulnerability issue makes knowledge sharing a critical risk concern of open innovation (Islam, 2012).

Workforce is another major anxiety for innovation outsourcing practice. The primary goal of open innovation projects is to seek skilled and talented people. Also, in big organizations employees might be less willing to share knowledge due to the "safety mentality" and competition between organizational units or individuals (Brunold and Durst, 2012). Also, in big firms, the lack of trust among employees endangers collaboration, a key strategic resource. As a result, the organization needs to permanently develop processes in order to prevent knowledge sharing risks, resulting in increased competitiveness.

A factor that significantly influences the knowledge sharing in a knowledge intensive company is trust. Lack of trust limits the channels of knowledge distribution and highly endangers the efficiency of the organizational knowledge flow, biased by people misconceptions of appropriateness of transparently managing knowledge. Trust empowers the knowledge sharing and acts as an integrator of knowledge processes, while lack of trust favours the development of deadlocks in the course of transferring knowledge with the purpose of gaining competitive advantage. Being regarded as key component in the collective risk taking structure, trust is even more a knowledge sharing incentive and lack of trust a knowledge risk. This risk refers to ambiguity or uncertainty that the other people could exploit some people's knowledge (Park, 2006).

There are a few studies specifically addressing open innovation risks for small firms. Kutvonen (2011) states that recent empirical evidence on SMEs is provided by Enkel et al. (2009) in a study with 107 companies, equally European SMEs and large enterprises. The study, undertaken in 2008, showed that risks such as loss of knowledge (48%), higher coordination costs (48%), as well as loss of control and higher complexity (both 41%) are mentioned as frequent risks connected to open innovation activities. In addition, there are significant internal barriers, such as the difficulty in finding the right partner (43%), imbalance between open innovation activities and daily business (36%), and insufficient time and financial resources for open innovation activities (Kutvonen, 2011).

Some authors point out that firms engaged in inbound open innovation may neglect to develop strong technological competences internally, which may result in a high dependence on external parties (Vanhaverbeke et al. 2012). Companies heavily involved in outbound open innovation may run the risk of facing increased competition in their end markets as externalising competitively relevant know-how may add to the strength of competitors (Fosfuri, 2006). These risks may potentially be more challenging for SMEs than for large enterprises (Spithoven, Vanhaverbeke and Roijakkers, 2011).

4. Research methodology

In order to build the structural risk framework of open innovation risks as well as the theoretical mitigation model, we used a survey which targeted 500 SMEs from the region of Bucharest. In Romania, according to the latest law on promotion of small and medium-sized enterprises and the standard definition of the European Commission, SMEs are firms that hire less than 250 employees and have an annual turnover under 50 million EUR or hold total assets valuing under 43 million EUR.

The data were collected via a cross-sectional survey approach and analyses were done based on 211 questionnaire responses received. The list of firms was obtained from the website listafirme.ro, which lists a comprehensive database of Romanian small companies. The survey was implemented by means of online questionnaire. To reliably identify collaboration and innovation activities, only

representing enterprises that systematically innovate were selected. The survey therefore started with screening questions regarding innovation; respondents first indicated if their company had developed at least one innovation in the past 3 years (product, process or organizational related innovation). Secondly, the survey asked if respondents' enter- prises had been involved in a collaboration agreement, in the purpose of innovation. The sample was disproportionally stratified across manufacturing and service industries, over 70% of SMEs being service providers.

In this investigation, first respondents were asked to indicate to what extent their firms collaborate with different partners (customers, suppliers, competitors, government agencies, intermediary institutions, and research organizations) in order to boost their innovation potential. The respondents were enquired about their reasons for involving in open innovation projects and barriers to enter such agreements. Furthermore, they were asked to record the main risks encountered during the external partnership and best ways to handle those risks, from their experience. Given the scarce research on the subject approached, we employed open-ended questions in our questionnaire.

In the second round of our survey, we used the cross-impact analysis to determine the magnitude and the likelihood of impact of six mitigation variables we asked the respondents about, in correspondence to the main risks identified. The six mitigation factors were assessed with a 5-point Likert scale, from "1" being "very low" magnitude/possibility of impact upon the structured seven risks to "5" being "very high". We have chosen the Cross-Impact Analysis since it is a powerful tool for taking a set of events and examining the potential causal impacts that the expectation or occurrence of each event may have on the others.

In our research we used an alternative approach to the cross-impact matrix, proposed by Chao (2008), in which he used both the trend value, respectively the magnitude of impact, and the conditional quantitative probability. The trend value cross-impact matrix approach quantifies impacts of the events on each other so that further analysis of the matrix is possible and changes in initial probability assumptions can be made on the basis of the net effect of the interactions. The second type of cross-impact matrices analyses are based on assumed quantitative conditional probabilities which appear in the cells of the matrix and the solution of these matrices leads to a re-estimate of the assumed initial probabilities for all of the events depicted in the matrix.

5. Research results

5.1. Open innovation risks framework for SMEs

The open innovation literature shows that the paramount benefit for firms entering collaboration projects with innovative purposes is risk sharing. At the same time, collaboration inherently brings along risks and costs.

Our research distinctly points out a paradox: even if the major motive for SMEs to embark in open innovation projects is risk sharing, in these collaborations may also reside threats that distort the initial objective of pursuing innovations and competitive advantage. An open innovation strategy aims at decreasing the risk inherent to the innovation process but at the same time it may increase the risk inherent to collaboration with different partners.

The results of our survey show that that open innovation in Romanian SMEs is impeded mainly by risks related to insufficient financial resources, people who are inexperienced, unmotivated and unwilling to cooperate, poor adaptation to technological advances in the industry, knowledge sharing risks, weak social capital and noteworthy regulation risks. In order to build a structured risk framework, we mapped down all the risks identified throughout our research into seven broad categories of risk drivers, with both internal and external origin: workforce, collaboration among partners, technology advances, regulations and market barriers, clients, access to finance, organizational culture/social capital.

Figure 2 depicts the major internal risk drivers for a small company in the process of collaboration, which are mainly related to the workforce, the organizational culture of the firm and its social capital, and the collaboration with external parties itself.

Risk driver	Category	Description
Workforce	Mentality	Employees resistance to innovation and change, poor understanding of their role, safety mentality
	Knowledge	Insufficient technical expertise or training of employees, insufficient knowledge about partners
	Low retention	High staff turnover, difficulty in finding quality employees
Organizational culture / social capital	Poor social capital	Poor work ethic, uneducated workforce generating lack of trust
	Low absorptive capacity	Low ability to absorb external ideas and technologies
	Organizational culture	Organisational fear of losing control over own technologies, cultural differences among partners
	Management support	Low support of top management for innovation, low awareness of risks, insufficient managerial skills
Collaboration	Complexity	Higher complexity of managing open innovation, difficulty in balancing innovation with daily tasks
	Control	Low control of external resources compared to internal ones

Figure 2. **Internal open innovation risk drivers for SMEs**

People related risks are regarded as highest threats by our respondents, since they are the major actors in collaboration projects. Romanian SMEs that innovate are characterized by a shortage of skilled and talented employees who do not possess critical knowledge in order to manage an open partnership and the new knowledge acquired. They are often reluctant to change and adverse to entering external partnerships, creating a barrier for the inflow of knowledge and limiting its management in innovation performance purposes. Their safety mentality acts as a major risk and its impact is even greater when it is a translation of the top management's attitude, which shows little support for innovation and low risk awareness. Under-trained or under-educated workforce is a threat for a small firm since it builds up a knowledge barrier between it and the firms it collaborates with, a

knowledge risk that highlights also the importance of gathering sufficient business knowledge about partners. The occurrence of low retention risk among SMEs surveyed implies insufficient reasonable workforce management in order to cut down the fluctuation rate among the employees.

Lack of trust and adversity to change is often accompanied by internal poor work ethic, which creates an environment which is poorly prepared to absorb and integrate external ideas and technologies, translated into what is very common for SMEs, low absorptive capacity. Our survey revealed that many SMEs have a poor organizational culture, insufficiently oriented towards collaboration and innovation, marked by fear of losing control over its own technologies or knowledge, a sign of poor social capital.

SMEs also claim inadequate distributive skills when entering external partnerships, since they find it highly difficult to manage the external innovation process with the daily, routinely tasks, a deficiency which often has a great impact on how they rapidly address the needs of the customers. For some firms, managing open innovation alliances proves too complex and the collaboration itself brings along what they consider a significant risk, reflected internally – losing control over the innovation process (previously internally driven) and not having enough control over external resources and technologies.

Figure 3 illustrates what external risk drivers are considered most noteworthy for the SMEs we surveyed. The external risk drivers can be mapped down to five categories: regulations in the industry and market barriers, clients constantly changing demands, collaboration with partners, difficult access to finance and adaptation to technology advances.

Risk driver	Category	Description
Regulations and market barriers	Regulations	Volatile and ambiguous industry regulations
	Corruption	Unethical behaviour of the partners of related to state administration bodies
	Bureaucracy	Large volume of paperwork, administrative burdens
	Market uncertainty	Lack of market information, marketing problems with new developed products
Clients	Clients	Constantly changing needs of the clients, requiring customized products
Collaboration	Opportunism	Conflicting interests of partners, developing dependency on partners, relational risk
	Lack of trust	Lack of trust and communication among partners, collaboration suddenly disolved due to partner leaving
	Knowledge sharing	Lack of protecting the property rights, core knowledge flowing out to competing organizations
	Performance	Collaboration objectives may not be met due to poor quality of partners or poor management of partnership
Finance	Acces to finance	Lack of financial capital to support open innovation, high commercialization costs
Techonology advances	Technology	Technology leakage to rivals, risk from technological uncertainty, inability to adapt to techonology advances

Figure 3. **External open innovation risk drivers for SMEs**

A significant part of the questioned SMEs are from the financial sector (financial consultants, insurance companies, non-banking financial institutions), which bears a high dependency on national regulations in the field, often a burden for smaller firms unable to cope with the costs entailing volatile regulations. It is also the general

case of ambiguous regulations (with poor capacity of transposing them into practice) which affect the efficiency of open agreements, resulting in higher transaction costs.

Highly specific to emergent countries, unethical behaviour is common and acts as a major business risk, as highlighted by the firms interviewed, which are facing several corruption issues in regards to their partners' collaboration and as well related to state administration bodies. Open innovation is also impeded by a high level of bureaucracy and SMEs find it harder to cover the administrative costs entailed in the external partnerships. The respondents also said they could not properly access key market information which generates high commercialization risks.

The constant changing needs of the clients require developing strong customer-oriented capabilities and a customized offer, which imposes equal constraints on costs and possibility of fast adaptation to the market.

One of the major concerns of SMEs involved in collaboration with competitors is related to knowledge sharing: possibility of information leaks regarding valuable internal technologies, key knowledge spilling over to the partner, insufficient protection of intellectual property. This attitude is strictly correlated with the lack of trust in the partner and poor communication among collaborators about common goals and strategies, which finally impedes the innovation process and the performance of the alliance. SMEs fear that if they allow their partners to build skills in an area important to their business, they individually can take advantage of this expertise in the detriment of the partnership. Opportunism is regarded as high threat for the surveyed SMEs.

Even if SMEs partner in order to reduce costs and gain access to a larger pool of resources, they state than even the partnership lacks sufficient financial resources to fund the innovation process. Lack of financial capital is high on SMEs concerns.

Given the unprepared, inexperienced and under-trained workforce, SMEs often prove to be unable to quickly adapt to technology advances and lose the advantages offered by partnering for innovation purposes.

The answers of the respondents to the open-ended questions regarding major risks encountered in external collaboration reflected their major concerns are: workforce deficiencies (especially resistance to change and closed innovation mentality of top management, and discrepancies in quality of employees), collaboration problems (lack of trust among partners, knowledge sharing risks) and organizational culture with poor support for innovation and fear of losing control over its internal process. Therefore, market problems reflected by customer needs or changing regulations are not perceived as burdening as internal resistance.

5.2. Risk mitigation model in open innovation

The factors which determine a SME to reduce the threats residing in opening the innovation process are derived from the SMEs structural advantages over large firms, which allow them to better cope with the risks of collaboration: size, speed and

flexibility, power of adaptation, entrepreneurial orientation, business specialization, focus, transparency, and people empowerment. Small firms are more flexible which enhances rapid adaptation to market shifts, technological advances or to partner requirements. SMEs can specialize their businesses in niche markets and focus on innovative activities on those markets. This is correlated to the entrepreneurial potential of SMEs, which holds both innovation and risk taking as strategic drivers. Entrepreneurial persons act as knowledge sponges and assimilate faster the new knowledge acquired externally and act faster in the decision-making process in order to achieve competitiveness on the market.

SMEs have close relationships with their customers, permanently meeting their interests by customizing their offer. Usually, small firms are perceived as having little bureaucracy but this was not cohesive with our findings. They rapidly communicate with their business partners and have a dynamic management style, more open to innovation. Once more, the results of our survey did not validate this general perception since most of SMEs depicted closed mentality management styles, reluctant to change and open communication.

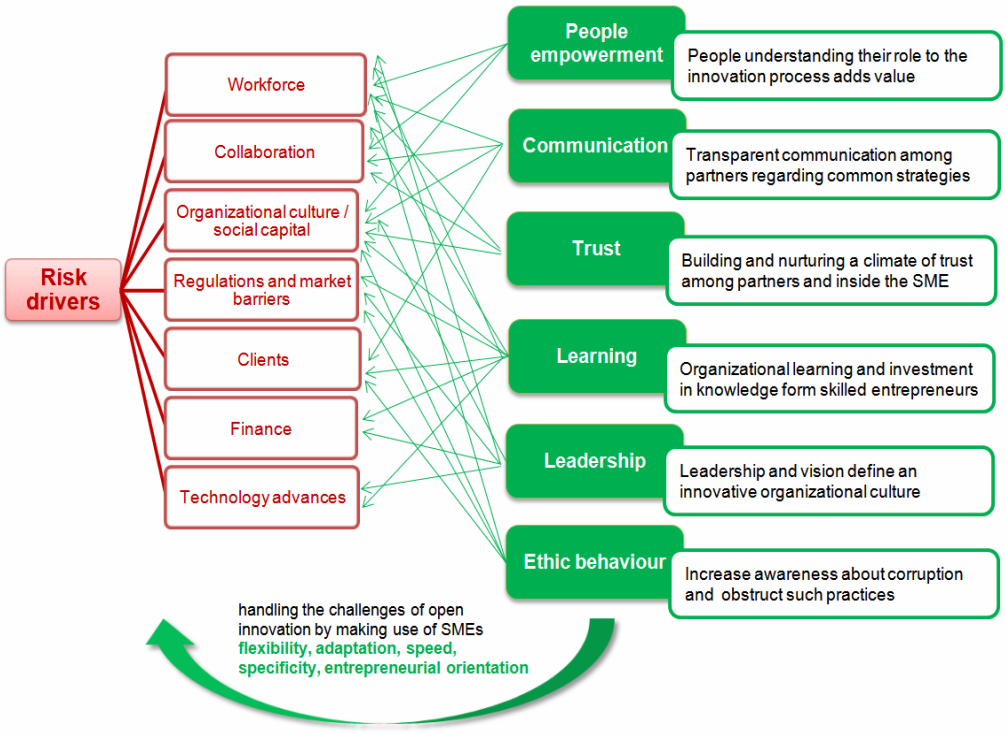

Figure 4. **Open innovation risk mitigation model**

Parting from these advantages SMEs have over larger companies, based on the practical input offered by the 211 respondent SMEs we have built a theoretical risk mitigation model for SMEs involved in open innovation partnerships, as depicted in Figure 4. This conceptual model shows the key factors important for SMEs in the innovation process, respectively how the main proposed factors address different type of risks, creating a web of risk management in order to increase open innovation performance. There are multiple interactions among the seven proposed risk mitigation factors and the main risk groups identified, further explained.

5.2.1. People empowerment

During our research we found that increased entrepreneurial orientation limits the risk of open innovation. This is correlated with the study of Sakkab (2002) who exemplified how Procter & Gamble used technology entrepreneurs in order to reap the benefits of their open innovation knowledge sharing process. In the same way, on a smaller scale, fostering an organizational culture focused on people empowerment and development of workforce skills can boost the SMEs potential for innovation while involved in external partnerships and, in the same time, limit the risks encountered. Highly skilled entrepreneurs reduce the knowledge sharing risks. If people understand the impact of their work on the innovation partnership, the innovation performance will improve and risks better managed. Critical are the management's endeavours of creating an organizational culture focused on people.

5.2.2. Communication

Open innovation equals transparent communication among partners, which enables them to reduce knowledge risks, collaboration risks and misinterpretations of information inside the firm. SMEs questioned were little aware of the importance of this variable but acknowledged the fact that communication stands as a powerful tool to transfer risk information among members of a team project. Hence, communication enhances the risk knowledge sharing among innovation partners, thus improving the risk management process with the knowledge component.

Open communication was regarded by the majority of respondents as key instrument to proactively manage tensions inside the partnerships, in order to reduce knowledge sharing risks or misuse of key information. Transparent communication with the clients also ensures a clear sharing of companies' offer of products and services, changes in processes, innovations and projects undertaken, providing a solid base of acquiring information about the changing needs of the clients.

By creating a collaborative and communicative environment, SMEs are able to open their organizational culture towards external ideas and technologies and also to go back to basics in their business: the power of human interactions.

5.2.3. Trust

Collaboration with innovation partners is based on trust principles and strong personal relationships among business partners. A key factor contributing to reducing the risks residing in open innovation is the trust built among the partners. It all boils down to how much people choose to open and share when partnering, or how they use the knowledge gained. In order to avoid risk, they may have to embrace the risk of investing trust in their partners, in order to be successful. Trust translates as a key success factor for competitiveness and building a climate of trust inside the partnership mitigates the knowledge sharing risks.

Open innovation is about sharing risks, investing time and money together in new concepts. Therefore, collaboration with innovation partners is built on trust and strong personal relationships with managers. Strong personal relationships among key persons in partnering companies always emerge as a key success factor.

5.2.4. Learning

By adopting a customer-centric approach, SMEs can significantly shift towards involving the client in the process of open innovation by tailoring the products and services on their individual needs and feedback. Connecting the customer to the innovation process ensures a pool of intellectual capital that acts as a mitigation factor for the SMEs resources limitation. This process is mainly done constantly investing in organizational learning and investment in acquiring external knowledge.

A two-way flow of information adds to the ability of the firm to boost their internal, insufficient resources: a transparent communication with the client, clearly sharing the strategic objectives pursued, and an incorporation of the clients' knowledge and desires in the new product development process. The small firm succeeds thus in enhancing its internal resources with the most strategic one: the clients' knowledge. One way to do that is to involve lead users: due to their dissatisfaction with what the market offers they have a great appetite for innovation.

Continuous learning also ensures rapid adaptation to the changes in regulations affecting the open innovation agreements and a more speedy orientation towards sources of financing. It also has a direct effect on knowledge protection: by obtaining, assimilating, transforming and utilizing external knowledge to innovate, through constant learning, SMEs are better able to protect their intellectual property and to reap the rewards from partnering for innovation purposes. An increase of training costs should also lead to lower transaction costs. Our survey revealed that organizational learning is the only variable that addresses all type of risk in our structural framework, highlighting the importance that SMEs should place on investment in knowledge.

5.2.5. Leadership

Clear leadership is needed in order to ensure the pursuit of the partnership's strategic objectives by providing clear rules, strong vision and ensuring discipline of the collaboration agreement. Strong leadership defines the roadmap of the partnership and sets attitudes examples for the workforce involved in open innovation. Even if financing the open innovation project remains a constant concern, guidance is essential for making sure the partners use all their professional advantages to increase their financial sources.

5.2.6. Ethic behaviour

Because of widespread unethical business practices, SMEs refrain from cooperation. Fostering a social capital which supports ethic behaviour among partners or among the actors in the open innovation process and the state administrative bodies ensures the development of a culture that excludes corruption. Since in Romania corruption is listed as the most important problematic factor for doing business (SBA Fact Sheet Romania, 2012), cultivating work ethic acts upon workforce quality, collaboration performance and upon building a culture based on trust among partners. Through the proposed model we assert that workforce, collaboration and organizational culture risks are more addressed to than the other open innovation threats and show a highest mitigation potential, while access to finance is much harder to be mitigated in the Romanian background. Furthermore, few tools to reduce the threats imposed by technology advances are within reach for small firms.

5.3. Validation of the open innovation risk mitigation model

In our second round of surveying, we have defined six variables that we considered as having major influence in reducing open innovation risks and we asked our 211 respondents about the magnitude and impact of mitigation of these factors on the structured seven main risks. We thus enquired how people empowerment, trust, communication, leadership, learning and ethic behaviour determine a decrease in risks brought about by workforce, organizational culture, collaboration itself, regulations and market barriers, clients, access to finance and technology advances. The six mitigation factors were assessed with a 5-point Likert scale, from "1" being "very low" magnitude/possibility of impact upon the structured seven risks to "5" being "very high".

Our goal was to assess which of the six factors might have the greatest mitigation impact upon the main threats identified in the open innovation process, and which of these risks present the highest potential to be reduced. In order to assign initial probabilities of these risks being mitigated, but also to provide the scale of

impact of the six variables and their conditional probabilities, we used the integrated results of the questionnaires.

Trend value matrix

If the column events were to occur, what is the magnitude of the impact to the row events?

If This Event Occurs	Initial Probability	People empowerment	Communication	Trust	Learning	Leadership	Ethic behaviour
Collaboration risks	0,80	4	5	5	5	3	3
Workforce deficiencies	0,85	5	5	4	5	5	4
Clients changing demands	0,50	2	4	1	4	2	3
Regulations and market barriers	0,25	1	1	2	3	3	5
Organizational culture / social capital	0,65	4	5	5	5	5	5
Techonology advances	0,25	1	1	1	4	2	1
Access to finance	0,10	1	1	1	3	2	2

*Figure 5.***Trend value matrix**

As shown in Figure 5, the first step in our cross-impact analysis was to estimate initial probabilities of mitigation for the seven types of risks, considered to be independent of one another. These initial probabilities range from 0.10 to 0.85 (as percentage of 100% probability). The six column variables consist in the factors considered to help mitigate the risks identified. Thus, we analyze what is the magnitude of impact of the proposed mitigators towards the seven risk groups.

For the trend value cross impact matrix we used a scale of 1 to 5 to indicate the level and direction of impact of the six variables.

Conditional probability matrix

If the column events were to occur, what is the conditional probability of impact of the row events?

If This Event Occurs	Initial Probability	People empowerment	Communication	Trust	Learning	Leadership	Ethic behaviour
Collaboration risks	0,80	0,50	0,70	0,85	0,75	0,80	0,55
Workforce deficiencies	0,85	0,85	0,80	0,80	0,90	0,80	0,65
Clients changing demands	0,50	0,25	0,20	0,30	0,65	0,20	0,45
Regulations and market barriers	0,25	0,10	0,10	0,10	0,45	0,45	0,70
Organizational culture / social capital	0,65	0,75	0,75	0,65	0,80	0,85	0,60
Techonology advances	0,25	0,10	0,10	0,10	0,45	0,20	0,10
Access to finance	0,10	0,05	0,05	0,20	0,30	0,35	0,45

*Figure 6.***Conditional probability matrix**

For example, initial probability of mitigating workforce deficiencies is 85%, of collaboration risks is 80% and, correspondingly, of access to finance is only 10%. Trust was ranked as having the greatest impact in mitigating collaboration risks (85%), and lowest impact in addressing regulations and market barriers and technology advances, according to the weighted probability which resulted from multiplying the initial probability with the impact ranked by respondents.

Conditional probabilities, as presented in Figure 6, range from 0.05 to 0.90. The conditional probabilities matrix must be interpreted as such: "if the column events were to occur, then what would be the probability of impact of risk mitigators on the seven types of risk?" The conditional probabilities are assessed by integrating questionnaire results.

The likely cross-impact matrix

If This Event Occurs	Initial Probability	People empowerment	Communication	Trust	Learning	Leadership	Ethic behaviour	Impact
Collaboration risks	0,80	2,0	3,5	4,3	3,8	2,4	1,7	**14,0**
Workforce deficiencies	0,85	4,3	4,0	3,2	4,5	4,0	2,6	**19,2**
Clients changing demands	0,50	0,5	0,8	0,3	2,6	0,4	1,4	**3,0**
Regulations and market barriers	0,25	0,1	0,1	0,2	1,4	1,4	3,5	**1,7**
Organizational culture / social capital	0,65	3,0	3,8	3,3	4,0	4,3	3,0	**13,8**
Techonology advances	0,25	0,1	0,1	0,1	1,8	0,4	0,1	**0,7**
Access to finance	0,10	0,1	0,1	0,2	0,9	0,7	0,9	**0,3**

Figure 7. **The likely cross-impact matrix**

The likely cross-impact matrix represents a multiplication of the trend value matrix and conditional probabilities matrix, as presented in Figure 7. Then, by multiplying this resulted matrix with the initial probability vector, we obtain the expected mitigation impact of each of the six critical variables: people empowerment, communication, trust, learning, leadership, ethic behaviour, as well as the main probabilities of occurrence of the seven risks.

The results emphasize that the risks with the highest potential to be addressed are collaboration risks, workforce deficiencies and organizational culture risks, considering the highest three impact scores in the matrix: 14.9, 19.2, 13.8. SMEs perceive people related problems to impede the most the innovation potential; additionally our findings support the idea that the human resources deficiencies are the first to be addressed in a risk management strategy. On the other hand, access to finance is a subject hard to be tackled in the Romanian business landscape, SMEs considering this risk the hardest to overcome.

We have also empirically tested which of the six risk mitigation factors proposed have the greatest power to diminish external innovation problems. We found that organizational learning and a continuous investment in knowledge diversity results in fewer people related risks, collaboration deficiencies and organizational culture risks. Learning has the greatest impact on workforce deficiencies, but it is less efficient in trying to overcome problems with insufficient financial resources. Alternatively, people empowerment was found to have the lesser power on open innovation risks, especially those related to regulations, technology advances and access to finance.

Our research on collaboration risks encountered by firms innovating together highlights the pressure on personnel quality and innovation proneness, top

management's attitude towards risks and innovation, work ethic and string leadership and vision. These findings centred on organizational culture risks are cohesive with the significant work of De Vrande et al. (2009), who asserts that organization and corporate culture-related issues that typically emerge when two or more companies are working together are clearly the most important barriers that firms face when they engage in open innovation.

6. Conclusions

The use of external relationships is increasingly interpreted as a key factor in enhancing the innovation performance of modern enterprises (Lasgani, 2012). Therefore, it can be argued that the ability to access external knowledge resources efficiently and overcoming the risks encountered in the process can become a huge competitive factor for SMEs.

On the basis of a sample of 211 SMEs, this paper has empirically explored the risks SMEs encounter in the process of open innovation, specifically pointing to some factors which help decrease the threats. Our findings provide important implications for managers concerned with the risk management of innovation cooperation. Within the survey, our work highlights that open innovation in Romanian SMEs is impeded by risks related to insufficient financial resources, inexperienced, unmotivated and unwilling to cooperate people, poor adaptation to technological advances in the industry, knowledge sharing risks, weak social capital and noteworthy regulation risks. All the risks identified were mapped down in seven categories of risk drivers, with both internal as external origin: workforce, collaboration itself, organizational culture/social capital, regulations and market barriers, clients, access to finance, technology advances. We have further designed a conceptual risk mitigation model centred on the SMEs key strategic advantages: high flexibility, adaptability, people empowerment. The research results support the potential of organizational learning and investment in knowledge, of solid leadership and ethical behaviour to help cope with the risks smaller firms encounter in external partnerships. On the other hand, access to financing is found to be difficult even in collaboration agreement. None of the six mitigation factors were proven to have significant impact on reducing the financing risk. Also, SMEs don't possess enough tools to overcome the market changes risks, the regulations burden or the technology advances which need rapid adaptation to.

The limitations of our study were given by the relatively small sample of SMEs surveyed, in a specific region of Romania. Moreover, the risk mitigation model was defined based on six factors we have provided through the questionnaire, which may have biased the respondents since other influential mitigators could have been identified. As a consequence, we cannot claim that our survey data capture the full domain of external innovation risks.

We thus recommend further research on risk management in the case of SMEs open innovation, by expanding the number of firms investigated and furthermore examining the findings in different emerging markets in order to adapt the risk framework.

References

Ahuja, G., (2000), "The Duality of Collaboration: Inducements and Opportunities in the Formation of Interfirm Linkages",*Strategic Management Journal*, Vol. 21, No. 3, pp. 317-343

Asheim, B., Coenen, L. and Svensson-Henning.M.(2003), "Nordic SMEs and regional innovation systems", Nordisk Industrifond, Oslo

Brockhoff, K. and Brockhoff, K. (1992), „R&D Cooperation between Firms-A Perceived Transaction Cost Perspective", *Management Science*, Vol. 38, No. 4, pp. 514-524

Brunold, J. and Durst, S. (2012), "Intellectual capital risks and job rotation", *Journal of Intellectual Capital,* Vol. 13, No. 2, pp. 178-195

Bullinger, H.J., Auernhammer, K. and Gomeringer, A. (2004), "Managing innovation networks inthe knowledge-driven economy", *International Journal of Production Research*, Vol. 42, No. 17, pp. 3337-3353

Chao, K. (2008), "A New Look at the Cross-Impact Matrix and its Application in Futures Studies", *Journal of Futures Studies*, Vol. 12, No. 4, pp. 45-52

Chesbrough, H. (2003), *Open Innovation,* Harvard Business School Press, Boston

Chesbrough, H. (2010),"Business Model Innovation: Opportunities and Barriers", *Long Range Planning,* Vol. 43, No. 2-3, pp. 354-363

Chesbrough, H. and Crowther, A.K. (2006), "Beyond high tech: early adopters of open innovationin other industries",*R and D Management*, Vol. 36, No. 3, pp. 229-236

Collins, L. (2006), "Opening up the innovation process", *Engineering Management Journal*, Vol. 16, No. 1, pp. 14-17

Dahlander, L. and Gann, D.M. (2010), "How Open Is Innovation?", *Research Policy*, Vol. 39, No. 6, pp. 699-709

Das, T.K. and Teng, B.S. (2001), "Trust, Control, and Risk in Strategic Alliances: An Integrated Framework", *Organization Studies,* Vol. 22, No. 2, pp. 251-283

De Vrande, V., de Jong, J.P.J., Vanhaverbeke, W. and Rochemont, M. (2009), "Open innovation in SMEs: Trends, motives and management challenges", *Technovation*, Vol. 29, No. 6-7, pp. 423-437

Diez, J.D. (2002), "Metropolitan innovation systems: a comparison between Barcelona, Stockholm, and Vienna", *International Regional Science Review*, Vol. 25, No. 1, pp. 63-85

Doloreux, D. (2004), "Regional Innovation Systems in Canada: A Comparative Study", *Regional Studies,* Vol. 38, No. 5, pp. 479-492

Enkel, E., Gassmann, O. and Chesbrough, H.W. (2009), "Open R&D and open innovation: Exploring the phenomenon", *R & D Management*, Vol. 39, No. 4, pp. 311-316

Edwards, T., Delbridge, R. and Munday, M., (2005), "Understanding innovation in small andmedium-sized enterprises: a process manifest", *Technovation,* Vol. 25, No. 10, pp. 1119-1120

European Commission (2008), "The New SME Definition: User Guide and Model Declaration". Enterprise and Industry Publications, European Union Publications Office

European Commission (2012), "SBA Fact Sheet 2012 – Romania", [online] at http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2012/romania_en.pdf (accessed February 12, 2013)

European Commission (2011), "Innovation Union Scoreboard 2011", [online] at http://ec. europa.eu/enterprise/policies/innovation/files/ius-2011_en.pdf (accessed February 12, 2013)

Fleming, L. (2001), "Recombinant uncertainty in technological search", *Management Science*,Vol. 47, No. 1, pp. 117-132

Flowers, S. (2007), "Organizational capabilities and technology acquisition: why firms know less than they buy", *Industrial and Corporate Change,* Vol. 16, No. 3,pp. 317-346

Gassmann, O., Enkel, E. and Chesbrough, H. (2010), "The Future of Open Innovation", *R&D Management*, Vol. 40, No. 3, pp. 213-221

Huggins, R. (2001), "Inter-firm network policies and firm performance: evaluating the impact of initiatives in the United Kingdom", *Research Policy*, Vol. 30, No. 3, pp. 443-458

Huizingh, E.K.R.E (2011), "Open innovation: state of the art and future perspectives", *Technovation*, Vol. 31, No. 1, pp. 2-9

Hurmelinna-Laukkanen, P. (2011), "Enabling collaborative innovation – knowledge protection for knowledge sharing", *European Journal of Innovation Management*, Vol. 14, No. 3, pp. 303-321

Innovation Union Scoreboard 2011 (2012), European Commission, [online] at http://ec.europa.eu/enterprise/policies/innovation/files/ius-2011_en.pdf (accessed February 12, 2013)

Institute for Management Development (2011), *IMD World Competitiveness Yearbook* 2011, Institute forManagement Development, Lausanne

Islam, A. (2012), "Methods of Open Innovation Knowledge Sharing Risk Reduction: A Case Study", *International Journal of e-Education, e-Business, e-Management and e-Learning*, Vol. 2, No. 4, pp. 294-297

Jarillo, J.C. (1993), *Strategic Networks: Creating the Borderless Organization*, Butterworth-Heinemann, Oxford

Katz, R. and Allen, T. (1982), "Investigating the Not Invented Here (NIH) Syndrome: a look at the performance, tenure and communication patterns of 50 R&D project groups", *R&D Management*, Vol. 12, No. 1, pp. 7-19

Keupp, M.M. and Gassmann, O. (2009), "Determinants and archetype users of open innovation", *R&D Management*, Vol. 39, No. 4, pp. 331-341

Kutvonen, A. (2011), "Strategic application of outbound open innovation", *Emerald*, Vol. 14

Larsson, R., Bengtsson, L., Henriksson, K. and Sparks, J. (1998), "The Interorganizational LearningDilemma: Collective Knowledge Development in Strategic Alliances", *Organization Science*, Vol. 9, No. 3, pp. 285-305

Lasagni, A. (2012), "How can external relationships enhance innovation in SMEs? New evidence for Europe", *Journal of Small Business Management*, Vol. 50, No. 2, pp. 310-339

Laursen, K, and Salter, A. (2006), "Open for innovation: The role of openness in explaining innovation performance among U.K. manufacturing firms", *Strategic Management Journal*, Vol. 27, No. 2, pp. 131-150

Lee, S., Park, G., Yoon, B. and Park, J. (2010), "Open innovation in SMEs - An intermediated network model", *Research Policy*, Vol. 39, No. 2, pp. 290-300

Leiponen, A. (2005), "Core complementarities of the corporation: organization of an innovating firm",*Managerial and Decision Economics*, Vol. 26, No. 6, pp. 351-365

Lichtenthaler, U. (2011), "Open innovation: Past research, current debates, and future directions", *Academy Of Management Perspectives*, Vol. 25, No. 1, pp. 75-93

Markman, G., Phillip, P., Balkan, D., and Ganoids, P. (2005), "Entrepreneurship and university-basedtechnology transfer", *Journal of Business Venturing*, Vol. 20, No. 2, pp. 241-263

Mata, J. and Woerter, M. (2012), "Risky innovation: the impact of internal and external R&D strategies uponthe distribution of returns", Paper to be presented at the DRUID 2012 at CBS, Copenhagen, Denmark

Oxley, J.E. and Sampson, R.C. (2004), "The scope and governance of international R&D alliances",*Strategic Management Journal*, Vol. 25, No. 89, pp. 723-49

Renaud, P. (2008), "Open innovation at Oseo innovation: Example of the Passerelle Programme", A presentation at the OECD Business Symposium on Open Innovation in Global Networks, Copenhagen, 25-26 February, 2008

Rogers, M. (2004), "Networks, firm size and innovation", *Small Business Economics*, Vol. 22, No. 2, pp. 141-153

Sakkab, N. (2002), "Connect& Develop Complements Research & Develop at P&G", *Research Technology Management*, Vol. 45 No. 2, pp. 38-45

Spithoven, A., Vanhaverbeke, W. and Roijakkers, N. (2011), "Open Innovation Practices in SMEs and Large Enterprises", *Small Business Economics*

Thomas, J.B. and Trevino, L.K. (1993), "Information-Processing in Strategic Alliance Building: AMultiple-Case Approach", *Journal of Management Studies*, Vol. 30, No. 5, pp. 779-814

Vanhaverbeke, W. (2012), "Open innovation in SMEs: How can small companies and start-ups benefit from open innovation strategies?", *Flanders District of Creativity and Vlerick Leuven Gent Management School,* [online] at http://www. sciencebusiness.net/eif/documents/Open-innovation-in-SMEs.pdf (accessed March 23, 2013)

West, J., Vanhaverbeke, W. and Chesbrough, H., (2006), "Open innovation: a research Agenda", in: Chesbrough, H., Vanhaverbeke, W. and West, J. (eds.), *Open Innovation: Researching a New Paradigm*, pp. 285-307, Oxford University Press, New York

World Economic Forum (2013), "The Global Competitiveness Report 2012–2013", [online] at http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf (accessed February 12, 2013)

Xie, X.M., Zeng, S.X. and Tam, C.M (2010), "Overcoming Barriers to Innovation in SMEs in China: A perspective based cooperation network", *Innovation: Management, Policy and Practice*, Vol. 12, No. 3, pp. 298-310

Zeng, S.X., Xie, X.M. and Tam, C.M. (2010), "Relationship between cooperation networks and innovation performance of SMEs", *Technovation*, Vol. 30, No. 3, pp. 181-194

ZiarulFinanciar (2013), "Radiografia IMM-urilor: România are nevoie de o nouăgenerație de miciantreprenoripentruaurcaîntopuleuropean al IMM-urilor", [online] at: http://www.zf. ro/zf-news/radiografia-imm-urilor-romania-are-nevoie-de-o-noua-generatie-de-mici-antreprenori-pentru-a-urca-in-topul-european-al-imm-urilor-10711964/poze/(accessed February 12, 2013)

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